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Charting a Course to Conserve 30% of Freshwaters by 2030

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CHARTING A COURSE TO CONSERVE 30% OF FRESHWATERS BY 2030

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ABSTRACT

One of President Biden's earliest executive orders established an ambitious national goal to conserve at least 30 percent of U.S. lands, waters, and oceans by 2030. The Biden administration is not alone; over 100 countries support this goal as a means of combating climate change and slowing the pace of species extinction, both of which are accelerating at a rate that is unprecedented in history.

Despite its vow to pursue a wide-sweeping, all-of-government approach, Biden's 30 by 30 initiative overlooks a critical component of the conservation goal—it pays virtually no attention to freshwater. Freshwater ecosystems are among the most endangered in the world due to diminished streamflows, pollution, wetlands destruction, nonnative species' invasions, and hydrological modifications. Yet in the United States, there are extreme institutional barriers to holistic watershed management. Complexity, controversy, and conflict arise from fragmentation and long-entrenched interests, making reforms especially difficult.

This Article explores federal freshwater conservation law, along with a handful of potential reforms that could advance the 30 by 30 objective without requiring statutory revisions. It covers provisions of existing federal laws that protect the quality, quantity, and integrity of freshwater ecosystems, specifically the Clean Water Act, the Wild & Scenic Rivers Act, federal hydropower, reclamation, and

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flood control statutes, and the Endangered Species Act. It also identifies ways these laws could be implemented more effectively to conserve 30 percent of the nation's freshwater resources by 2030, focusing primarily on the agencies' ability to utilize statutory planning requirements to promote biodiversity and climate resilience.

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INTRODUCTION

A global movement is underway to protect 30 percent of the earth's lands and waters from human exploitation by 2030. More than one hundred countries support this goal as a means of combatting climate change and slowing the pace of species extinction,[1] both of which are accelerating at an unprecedented rate.[2] The two threats are closely intertwined. The greatest drivers of species extinction are climate change and habitat loss; by the same token, the loss of intact, functioning habitat and biodiversity diminishes the capacity for climate resilience.[3]

In the United States, one of President Biden's earliest executive orders, issued his first week in office, established a national goal to conserve at least 30 percent of U.S. lands, water, and oceans by 2030 (the so-called "30 by 30" initiative).[4] According to David Shiffman, writing for *Scientific American*, 30 by 30 "represents the largest shift in United States science-based biodiversity conservation policy since the Endangered Species Act."[5]

Despite its vow to pursue a wide-sweeping, all-of-government approach,[6] Biden's 30 by 30 initiative overlooks a critical component of the conservation goal. The Administration's blueprint, known as "America the Beautiful," highlights the need to conserve terrestrial

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1. Campaign for Nature, *More Than 100 Countries Commit to Protect at Least 30% of Land and Oceans by 2030* (June 30, 2022), https://www.campaignfornature.org/more-than-100-countries-commit-to-protect-at-least-30-of-land-and-oceans-by-2030 [https://perma.cc/YR94-JK49].

2. INTERGOVERNMENTAL SCIENCE-POLICY PLATFORM ON BIODIVERSITY AND ECOSYSTEM SERVICES, SUMMARY FOR POLICYMAKERS OF THE GLOBAL ASSESSMENT REPORT ON BIODIVERSITY AND ECOSYSTEM SERVICES OF THE INTERGOVERNMENTAL SCIENCE-POLICY PLATFORM ON BIODIVERSITY AND ECOSYSTEM SERVICES 12 (S. Díaz et al. eds., 2019), https://doi.org/10.5281/zenodo.3831673 [https://perma.cc/U8PH-CV7U].

3. Ramón Pichs Madruga, Editorial, *Linking Climate and Biodiversity*, 374 SCI. 511 (Oct. 29, 2021), https://www.science.org/doi/epdf/10.1126/science.abm8739 [https://perma.cc/C23H-B42W].

4. Exec. Order No. 14,008, 86 Fed. Reg. 7,619 (Feb. 1, 2021) [hereinafter E.O. 14,008].

5. David Shiffman, Opinion, *An Ambitious Strategy to Preserve Biodiversity*, SCI. AM. (Oct. 4, 2020), https://www.scientificamerican.com/article/an-ambitious-strategy-to-preserve-biodiversity/ [https://perma.cc/QYY7-794N].

6. E.O. 14,008 at 7,622; U.S. DEP'T OF INTERIOR, U.S. DEP'T OF AGRIC., U.S. DEP'T OF COM., & COUNCIL ON ENV'T QUALITY, CONSERVING AND RESTORING AMERICA THE BEAUTIFUL 10-11 (2021) [hereinafter AMERICA THE BEAUTIFUL].

and marine ecosystems and contemplates measures that may be necessary to meet the 30 by 30 goal with respect to them.[7] However, America the Beautiful pays virtually no attention to freshwater ecosystems.[8]

Is this an inadvertent oversight? Freshwater ecosystems are among the most endangered ecosystems in the world due to diminished streamflows, pollution, wetlands destruction, nonnative species' invasions, and hydrologic modifications.[9] In the United States, the four groups of species most at risk of extinction are those that depend upon rivers, streams, and lakes: fish, amphibians, mussels, and crayfish.[10]

What might explain the omission of freshwater ecosystems from America the Beautiful and, for that matter, the 30 by 30 executive order? Perhaps even more than migratory wildlife and bird species, waterbodies do not respect artificial political boundaries.[11] Moreover, extremely high institutional fragmentation exists in the management of freshwater resources.[12] Jurisdictional barriers to holistic watershed management exist both horizontally—among federal agencies, in particular—and vertically, among federal, tribal, state, and local authorities.[13]

Complexity arises from institutional fragmentation and the (literally) fluid nature of freshwater. So does controversy. Throughout American history, proposals for almost any type of water law reform have encountered fierce opposition.[14] If the Biden administration were to highlight freshwater conservation deficiencies and potential reforms, it could jeopardize the entire 30 by 30 initiative.[15]

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7. *See* AMERICA THE BEAUTIFUL, *supra* note 6, at 10-11. The report mentions access to pure drinking water in several places, but otherwise says next to nothing about freshwater other than within the phrase "lands and waters." *Id.* at 14.

8. *See id.* at 5-6, 8, 14.

9. Rebecca Flitcroft, Michael S. Cooperman, Ian J. Harrison, Diego Juffe-Bignoli & Philip J. Boon, *Theory and Practice to Conserve Freshwater Biodiversity in the Anthropocene*, 29 AQUATIC CONSERVATION: MARINE & FRESHWATER ECOSYSTEMS 1013, 1014 (2019).

10. William L. Andreen, *Developing a More Holistic Approach to Water Management in the United States*, 36 ENV'T L. REP. NEWS & ANALYSIS 10277, 10278 (2006).

11. *See id.* at 10279.

12. *See id.*

13. *See id.* (identifying the presence of excessive jurisdictional barriers as a primary reason for "the relentless tide of aquatic decline").

14. *See id.*; *infra* Part III.

15. *See infra* Part III.

This Article is an exploration of federal freshwater conservation law, along with a handful of potential reforms that could advance the 30 by 30 objective without requiring statutory revisions by Congress. The 30 by 30 concept is covered in Part I of this Article. Part II highlights the unique attributes and values of freshwater ecosystems, focusing on lakes, rivers, streams, and wetlands, and assesses the effects of climate change on them. Part III illustrates the seemingly intractable nature of conflicts over water resources and the conflagrations typically sparked by proposals for reform. Part IV analyzes the provisions of existing federal laws that protect the quality, quantity, and integrity of freshwater ecosystems—specifically, the Clean Water Act (CWA), the Wild & Scenic Rivers Act (WSRA), federal hydropower, reclamation, and flood control statutes, and the Endangered Species Act (ESA). Part IV also identifies several ways these laws could be implemented more effectively, focusing primarily on the agencies' ability to utilize statutory planning requirements to promote biodiversity and climate resilience. The CWA is an exception; here, the focus is on the statute's jurisdictional scope and the troublesome yet foundational concept of "waters of the United States."[16] The Article concludes by summarizing the tools that should be deployed to conserve 30 percent of the nation's freshwater resources by 2030.

I. 30 BY 30 AND AMERICA THE BEAUTIFUL

In 2019, a group of internationally renowned scientists ignited interest in the 30 by 30 concept by making it the centerpiece of the Global Deal for Nature, a proposed companion pact to the Paris Climate Agreement.[17] These scientists claim that the Paris Agreement, which focuses on curbing greenhouse gas emissions, "will do little by itself to save the planet's collapsing biodiversity or preserve the massive ecosystems upon which humanity depends—and which we

16. *See infra* Part IV.A.

17. Eric Dinerstein, Carly Vynne, Enric Sala, Anup R. Joshi, Sanjiv Fernando, Thomas E. Lovejoy, Juan Mayorga, David Olson, Gregory P. Asner, James E.M. Baillie, Neil D. Burgess, Karl Burkart, Reed F. Noss, Ya-Ping Zhang, Alessandro Baccini, Tanya Birch, Nathan Hahn, Lucas N. Joppa & Eric Wikramanayake, *A Global Deal for Nature: Guiding Principles, Milestones, and Targets*, 5 SCI. ADVANCES 1, 1-2 (2019).

are fast degrading."[18] The Global Deal for Nature states plainly, "beyond 1.5°C, the biology of the planet becomes gravely threatened because ecosystems literally begin to unravel."[19]

Around the same time as the Global Deal for Nature, the International Union for the Conservation of Nature (IUCN) proposed a 30 percent by 2030 milestone as a critical step for marine conservation.[20] According to the IUCN, "[p]rotected areas are the cornerstone of biodiversity conservation, and studies document that well-managed reserves are far more effective in safeguarding biodiversity than are other forms of land use."[21]

What does it mean to be "protected"? According to currently accepted international and domestic standards, for an area to be included, it must be a clearly defined geographical space, which is identified, dedicated, and managed in an intact natural condition.[22] Protection must be durable, ideally permanent, through legally enforceable or other effective means, where development and extractive uses that would diminish the area's ecological function are limited or prohibited.[23]

The scientific community has reached widespread agreement on the importance of protecting large areas in an intact, functioning state, where vital ecological processes can occur with little human

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18. Stewart M. Patrick, *The '30x30' Campaign to Save the Biosphere*, WORLD POL. REV. (Apr. 12, 2021), https://www.worldpoliticsreview.com/articles/29565/the-30x30-campaign-to-save-the-planet-from-biodiversity-threats [https://perma.cc/RRU3-E9MD].

19. Dinerstein et al., *supra* note 17, at 1.

20. *Id.* at 4 (citing IUCN Resolution: WCC-2016-Res-050-EN).

21. *Id.* at 2.

22. *See id.* at 1; Alexander K. Fremier, Michael Kiparsky, Stephan Gmur, Jocelyn Aycrigg, Robin Kundis Craig, Leona K. Svancara, Dale D. Goble, Barbara Cosens, Frank W. Davis & J. Michael Scott, *A Riparian Conservation Network for Ecological Resilience*, 191 BIOLOGICAL CONSERVATION 29, 31 (2015) (explaining how "protected" may be defined differently in different contexts, and definitions can be highly nuanced).

23. *What Is a Protected Area?*, INT'L UNION FOR THE CONSERVATION OF NATURE, https://www.iucn.org/theme/protected-areas/about [https://perma.cc/YVR4-4SSN]. "Durable" means "having a high probability of providing dedicated, secure, and enforceable protection into the future." Jonathan Higgins, John Zablocki, Amy Newsock, Andras Krolopp, Phillip Tabas & Michael Salama, *Durable Freshwater Protection: A Framework for Establishing and Maintaining Long-Term Protection for Freshwater Ecosystems and the Values They Sustain*, 13 SUSTAINABILITY 1, 3 (2021). Examples of durable protections include actions that are binding and enforceable, such as "legislation, administrative designations, regulations, acquisition of enforceable rights in natural resources, and judicial actions." *Id.* at 6.

intervention.[24] However, even the oldest and arguably greatest systems of conservation lands in the United States—the national parks—simply do not include sufficient habitat to sustain viable populations of fish and wildlife species within the parks, much less beyond park boundaries.[25]

This means that ecological connectivity is equally important to biodiversity conservation and climate resilience. At present, around 15 percent of the global terrestrial base is protected, but only about half of that is interconnected.[26] Through sophisticated modeling and mapping techniques, scientists have identified significant ecological gaps in our existing protected land systems.[27] Although species had been able to move to more suitable habitats during past climate swings, "in the current climate crisis and with reduced connectivity of natural landscapes, species may be unable to move fast enough to track shifting climatic envelopes or at all."[28] Thus, meaningful conservation initiatives require "coordinated planning and management among federal, state, tribal, and local entities as well as private landowners."[29]

The United States came to the 30 by 30 table relatively late in the game.[30] However, within days of taking office, President Biden embraced 30 by 30 by issuing an executive order declaring a national all-of-government goal to conserve at least 30 percent of U.S. lands and freshwater and 30 percent of U.S. ocean areas by 2030.[31]

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24. *See* Jocelyn L. Aycrigg, Craig Groves, Jodi A. Hilty, J. Michael Scott, Paul Beier, D. A. Boyce, Jr., Dennis Figg, Healy Hamilton, Gary Machlis, Kit Muller, K. V. Rosenberg, Raymond M. Sauvajot, Mark Shaffer & Rand Wentworth, *Completing the System: Opportunities and Challenges for a National Habitat Conservation System*, 66 BIOSCI. 774, 776 (2016).

25. Robert B. Keiter, *Toward A National Conservation Network Act: Transforming Landscape Conservation on the Public Lands into Law*, 42 HARV. ENV'T L. REV. 61, 90 (2018).

26. Dinerstein et al., *supra* note 17, at 2.

27. Keiter, *supra* note 25, at 91; *see also* Solomon Dobrowski, *UM Studies How Climate Change Could Undermine Biodiversity Conservation Goals*, UNIV. MONT. (Sept. 30, 2021), https://www.umt.edu/news/2021/09/093021glob.php [https://perma.cc/FT62-5K5P] (describing models that show where protected areas might be connected to facilitate species movement and how we might "anticipate dynamic and shifting patterns of biodiversity and respond with strategic conservation investments").

28. Dinerstein et al., *supra* note 17, at 4.

29. Keiter, *supra* note 25, at 91.

30. *See* Dinerstein et al., *supra* note 17, at 1-2; E.O. 14,008.

31. E.O. 14,008.

Is there any there there?[32] Although it could be characterized as a glib soundbite, according to former Secretary of the Interior Bruce Babbitt and other conservation leaders, 30 by 30 has the potential to provide a "synthesizing, consolidating, organizing" theme that breaks down jurisdictional barriers and supercharges the biodiversity-climate movement.[33] Milestones and targets such as 30 by 30 may simplify policy strategies and provide evocative concepts that generate media attention and public support.[34]

Going forward, Biden's executive order directed officials of the land- and water-managing agencies of the Administration to prepare a preliminary report to describe how the United States may meet the 30 by 30 goal.[35] The agencies issued a report, called "America the Beautiful," in May 2021.[36] It describes a ten-year, locally led campaign to conserve and restore the lands and waters upon which we all depend and that bind us together as Americans.[37]

America the Beautiful emphasizes a third goal. In addition to addressing climate change and protecting biodiversity, it prioritizes something quite different: equitable access to nature.[38] In fact, one of the first outreach efforts of the Department of the Interior, whose agencies manage 18 percent of the nation's lands,[39] sought input not on conservation but rather on removing "barriers that

32. Gertrude Stein coined the phrase "there is no there there." GERTRUDE STEIN, EVERYBODY'S AUTOBIOGRAPHY 289 (1937).

33. Randy Showstack, *30 by 30: A Push to Protect U.S. Land and Water*, EOS (Feb. 7, 2020), https://eos.org/articles/30-by-30-a-push-to-protect-u-s-land-and-water [https://perma.cc/U3GB-NDJZ] (quoting former Secretary of the Interior Bruce Babbitt).

34. Dinerstein et al., *supra* note 17, at 4.

35. *See* E.O. 14,008 at 7,622, 7,627 (directing "[t]he Secretary of the Interior, in consultation with the Secretary of Agriculture, the Secretary of Commerce, the Chair of the Council on Environmental Quality, and the heads of other relevant agencies" to prepare a report with recommendations on achieving 30 by 30, and seeking "bold, progressive action that combines the full capacity of the Federal Government with efforts from every corner of our Nation, every level of government, and every sector of our economy"). The all-of-government approach is to be "coupled with substantive engagement by stakeholders, including [s]tate, local, and [t]ribal governments." *Id.* at 7,622.

36. AMERICA THE BEAUTIFUL, *supra* note 6.

37. *Id.* at 9-10. The interagency working group is led by the Department of Interior's U.S. Geological Survey (USGS), the Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS), and the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). *Id.* at 17.

38. *Id.* at 14-16.

39. CAROL HARDY VINCENT, LAURA A. HANSON & LUCAS F. BERMEJO, CONG. RSCH. SERV., R42346, FEDERAL LAND OWNERSHIP: OVERVIEW AND DATA 1, 10 (2020).

underserved communities and individuals may face in participating in recreation opportunities on [Interior]-managed public lands and waters."[40]

Half of the six focus areas flagged by America the Beautiful are aimed at expanding outdoor access and creating jobs.[41] Only one of the focus areas prioritizes the protection of large intact areas by proclaiming the intent to expand collaborative conservation of fish and wildlife habitats and corridors.[42] Other focus areas are intended to generate ecological and related benefits by embracing tribally led conservation and restoration efforts and supporting voluntary efforts of private actors.[43]

Equitable conservation strategies are imperative; however, increased human access can significantly impact wildlife and its habitat.[44] It is unlikely that adverse impacts can be avoided altogether, but perhaps they can be mitigated by careful planning based on science and by making hard choices about protecting sensitive areas by limiting or denying access altogether.[45]

Planning relies in part on reliable, up-to-date data. Importantly, America the Beautiful calls upon federal agencies to develop an

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40. *See* Advancing Racial Equity and Support for Underserved Communities Through Recreation Opportunities, 86 Fed. Reg. 57,848 (Oct. 19, 2021) (announcing a series of virtual listening sessions and inviting public comments on removing barriers to equitable access).

41. AMERICA THE BEAUTIFUL, *supra* note 6, at 18-21. Those three focus areas are creating more parks in underserved communities, increasing access for outdoor recreation, and creating jobs by investing in restoration and resilience. *Id.* The first annual "America the Beautiful" report provides more details and updates. U.S. DEP'T OF INTERIOR, U.S. DEP'T OF AGRIC., U.S. DEP'T OF COM., & COUNCIL ON ENV'T QUALITY, YEAR ONE REPORT: AMERICA THE BEAUTIFUL 6 (2021) [hereinafter YEAR ONE REPORT].

42. *See* AMERICA THE BEAUTIFUL, *supra* note 6, at 19; *see also* YEAR ONE REPORT, *supra* note 41, at 13-17.

43. *See* YEAR ONE REPORT, *supra* note 41, at 9-11, 20-22.

44. *See* Robert B. Keiter, *The Emerging Law of Outdoor Recreation on the Public Lands*, 51 ENV'T L. 89, 90-91 (2021) ("As the ranks of recreationists have swelled, environmental damage has become ever more visible along with conflicts between the participants—personified by intense controversies over motorized use, wilderness designation, mountain biking, and hunting.").

45. Although the issue of increased access is not the focus of this Article, I and other scholars have examined the conservation benefits of restricted areas such as wilderness and roadless areas. *See, e.g.*, Sandra B. Zellmer, *Wilderness Management in National Parks and Wildlife Refuges*, 44 ENV'T L. 497 (2014); Robert L. Glicksman, *Wilderness Management by the Multiple Use Agencies: What Makes the Forest Service and the Bureau of Land Management Different?*, 44 ENV'T L. 447 (2014); Sandra B. Zellmer, *A Preservation Paradox: Political Prestidigitation and an Enduring Resource of Wildness*, 34 ENV'T L. 1015 (2004).

American Conservation and Stewardship Atlas.[46] The Atlas is intended to reflect the voluntary "contributions of farmers, ranchers, forest owners, and private landowners"; "[t]he contributions of [f]ishery [m]anagement [c]ouncils"; and other existing conservation "designations on lands and waters across [f]ederal, [s]tate, local, [t]ribal, and private lands and waters across the nation."[47] It will supplement existing federal databases, including USDA's Natural Resources Inventory and Forest Inventory and Analysis programs,[48] the USGS's Protected Area Database (PAD),[49] and NOAA's Marine Protected Areas Inventory.[50] Although these databases reflect federal and some state data, they do not include lands and waters protected by tribes or many private landowners.[51] Moreover, the concept of "protected" is not standardized across the various databases.[52]

More to the point, comprehensive nationwide data on freshwater resources is sorely lacking.[53] It is possible that the Atlas will help fill this void. However, when it comes to freshwater ecosystems, the 30 by 30 initiative makes only passing references and provides no details whatsoever.[54] Is this merely an oversight? Surely not, as the importance of freshwater ecosystems to biological diversity and climate resilience is indisputable, and the need for interjurisdictional management of these boundary-spanning resources is clear

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46. AMERICA THE BEAUTIFUL, *supra* note 6, at 17.

47. *Id.*; *see* Request for Information to Inform Interagency Efforts to Develop the American Conservation and Stewardship Atlas, 87 Fed. Reg. 235-36 (Jan. 4, 2022) (seeking input on how the Atlas can serve as a useful public tool and reflect a continuum of conservation actions).

48. *National Resources Inventory*, NAT. RES. CONSERVATION SERV., U.S. DEP'T OF AGRIC., https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technicat/nra/nri/ [https://perma.cc/N3LF-BX5U]; *Forest Inventory and Analysis*, FOREST SERV., U.S. DEP'T OF AGRIC., https://www.fia.fs.usda.gov [https://perma.cc/UTH3-EY83].

49. PAD includes open space lands owned in fee by all federal agencies, many state and local entities, and nonprofits, plus conservation easements. *Protected Areas*, U.S. GEOLOGICAL SURV., https://www.usgs.gov/programs/gap-analysis-project/science/protected-areas [https://perma.cc/7NQM-3WLV]. The "GAP Status Codes" of these lands indicate the degree of protection afforded by their management. *See id.*

50. *More About the Marine Protected Areas Inventory*, NOAA, U.S. DEP'T OF COM., & U.S. DEP'T OF INTERIOR (July 31, 2017), https://marineprotectedareas.noaa.gov/helpful_resources/inventory_sup.html [https://perma.cc/YQ7S-VNNE].

51. AMERICA THE BEAUTIFUL, *supra* note 6, at 17.

52. *See* Fremier et al., *supra* note 22, at 31.

53. Andreen, *supra* note 10, at 10286 n.147, 10289.

54. *See* E.O. 14,008.

as well.[55] Does the omission of freshwater reflect a misguided notion that protecting land will effectively protect wetlands, streams, rivers, and lakes? Perhaps, but this, too, seems unlikely.[56] Instead, the oversight may be political in nature.

Sustainable water management is complicated, even more so than sustainable land management. Complexity arises from extreme institutional fragmentation and the (literally) fluid nature of freshwater. So, too, does controversy. The implications of 30 by 30 for land management have already drawn fire from property rights proponents.[57] When it comes to water resources, tensions run even higher.

The hallmarks of water law include settled expectations of existing water users, states' rights, and extremely high institutional fragmentation—along with fierce territorialism.[58] Jurisdictional barriers to holistic watershed management exist both horizontally—among federal agencies, in particular—and vertically, among federal, tribal, state, and local authorities.[59] Given these dynamics, if the Biden administration were to highlight freshwater conservation deficiencies and potential legal reforms, it might be akin to touching the political third rail, which could jeopardize the entire 30 by 30 initiative.

Despite the political capital needed to move water management reforms forward, the 30 by 30 initiative can only scratch the surface of the climate-biodiversity crisis if it fails to address freshwater conservation in a meaningful way. Over-appropriation, pollution, invasive species, and physical alterations are causing the collapse of entire aquatic and riparian communities in many watersheds throughout the nation.[60]

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55. *See* Dobrowski, *supra* note 27.

56. *See infra* Part III.A.

57. *Stop the 30 x 30 Land Grab*, AM. STEWARDS OF LIBERTY, https://stop30x30.americanstewards.us [https://perma.cc/QUV5-N2ZB].

58. *See* Andreen, *supra* note 10, at 10279 (identifying the presence of excessive jurisdictional barriers as a primary reason for "the relentless tide of aquatic decline").

59. *See infra* Part III.B.

60. *See infra* Part III.B; Janet Neuman, *Are We There Yet? Weary Travelers on the Long Road to Water Policy Reform*, 50 NAT. RES. J. 139, 144 (2010).

II. FRESHWATER ECOSYSTEMS, BIODIVERSITY, AND CLIMATE

Water management is widely recognized as one of the most vital—and challenging—climate-change-related issues in the world. Sustainable water management has significant implications for climate resilience as well as biological diversity.[61]

This Part of the Article will detail the physical characteristics and functions of freshwater ecosystems and the threats they face due to exploitation, degradation, and climate change. The scale and the urgency of the situation reflect "grossly inadequate" policy responses to date, and cry out for a robust and durable legal framework for conserving freshwater resources.[62]

A. Characteristics of Freshwater Ecosystems

Although they cover less than 2 percent of Earth's surface, freshwater rivers, lakes, and wetlands support an extraordinary diversity of life, providing a home for approximately one-third of vertebrate species and 12 percent of all species.[63]

Flowing waters—rivers and streams—provide critical aquatic and riparian habitat for numerous species. They also serve as connective passageways for fish and wildlife. Riparian corridors represent exceptional ecological value, especially as warming temperatures and changes in precipitation motivate species movement.[64] Rivers and streams connect upland headwaters to lowlands in a "structured" and "complex" pattern and allow an exchange of energy and materials with the broader watershed.[65] They provide both aquatic

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61. *See, e.g.*, Itzchak Kornfeld, *The Impact of Climate Change on American and Canadian Indigenous Peoples and Their Water Resources*, 47 ENV'T L. REP. NEWS & ANALYSIS 10245, 10245-46 (2017); Jerome C. Muys, Jr. & George William Sherk, *The Dogmas of the Quiet Past: Potential Climate Change Impacts on Interstate Compact Water Allocation*, 34 VA. ENV'T L.J. 297, 300 (2016); Noah D. Hall, *Interstate Water Compacts and Climate Change Adaptation*, 5 ENV'T & ENERGY L. & POL'Y J. 237, 264 (2010).

62. Higgins et al., *supra* note 23, at 2 (citing Ian Harrison, Robin Abell, William Darwall, Michele L. Thieme, David Tickner & Ingrid Timboe, *The Freshwater Biodiversity Crisis*, 362 SCI. 1368, 1369 (Jennifer Sills ed., 2018)).

63. *Id.* at 1.

64. Fremier et al., *supra* note 22, at 29-30.

65. *Id.* at 30.

and terrestrial species with linear corridors in which to move through otherwise hostile, human-altered areas.[66]

Lakes[67] also provide habitat for fish, birds, and wildlife, and provide climate mitigation through carbon sequestration.[68] Like other waterbodies, lakes are also important in terms of ecosystem services, such as food, transportation, recreation, irrigation, and domestic water supplies.[69]

As for coastal and inland wetlands, both serve as massive storehouses of carbon, placing them "among the most important ecosystems in the response strategy to climate change."[70] Intact wetlands in the United States support more than one-third of the federally listed threatened and endangered species.[71]

Although the U.S. Geological Survey, with assistance from many state agencies, maintains streamflow gauges and records, there is no national inventory of riparian areas, and data on instream flows is spotty and nonuniform.[72] To the extent that data on *quantity* exists (river miles, flow regimes, volume, or other measurements),

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66. *See id.* (stating that, although the extent of movement is not well documented, "a variety of [terrestrial] species use riparian corridors for access to water, escape from predators, cover, food, nesting habitat, and dispersal or movement between habitat patches").

67. There is no uniformly accepted scientific definition of "lake," but lakes do share certain features, such as generally lying in topographic depressions in the landscape. *See* 33 C.F.R. § 328.3 (2020) (defining lakes as "standing bodies of open water"). For details, see WARWICK F. VINCENT, LAKES: A VERY SHORT INTRODUCTION 1-2 (2018).

68. N. John Anderson, Adam J. Heathcote & Daniel R. Engstrom, *Anthropogenic Alteration of Nutrient Supply Increases the Global Freshwater Carbon Sink*, 46 SCI. ADVANCES 1, 3-4 (2020).

69. *See* Robert W. Sterner, Bonnie Keeler, Stephen Polasky, Rajendra Poudel, Kirsten Rhude & Maggie Rogers, *Ecosystem Services of Earth's Largest Freshwater Lakes*, 41 ECOSYSTEM SERVS. 1, 1 (2020); 33 C.F.R. § 328.3 (defining lakes as "standing bodies of open water").

70. David Were, Frank Kansiime, Tadesse Fetahi, Ashley Cooper & Charles Jjuuko, *Carbon Sequestration by Wetlands: A Critical Review of Enhancement Measures for Climate Change Mitigation*, 3 EARTH SYS. & ENV'T 327, 327 (2019).

71. Drevet Hunt & Becky Hammer, *To Save Species, Protect 30% of Freshwaters by 2030*, NRDC: EXPERT BLOG (May 22, 2020), https://www.nrdc.org/experts/drevet-hunt/save-species-protect-30-freshwaters-2030#:~:text=As%20the%20world%20comes%20together,Earth%20and%20aal%20its%20inhabitants [https://perma.cc/759F-84XY].

72. *See* Fremier et al., *supra* note 22, at 31; William L. Andreen, *No Virtue Like Necessity: Dealing with Nonpoint Source Pollution and Environmental Flows in the Face of Climate Change*, 34 VA. ENV'T L.J. 255, 273-74 (2016); Reed D. Benson, *Pollution Without Solution: Flow Impairment Problems Under Clean Water Act Section 303*, 24 STAN. ENV'T L.J. 199, 237, 254 (2005); Janet Neuman, Anne Squier & Gail Achterman, *Sometimes a Great Notion: Oregon's Instream Flow Experiments*, 36 ENV'T L. 1125, 1142-43 (2006).

data on the *quality* of stream function and riparian integrity is even more limited.[73] It appears that riparian areas within the United States vary significantly in habitat quality, but all types of riparian areas are experiencing significant threats.[74]

B. Threats to Freshwater Resources and Species

Despite all of their benefits to humans and ecological communities, freshwater ecosystems are among the most threatened on Earth.[75] Rivers, streams, lakes, and wetlands—and their inhabitants—face existential threats.

Only about 37 percent of the world's large rivers are free flowing.[76] In the conterminous United States, nearly a quarter of inland stream mileage is experiencing severe degradation.[77] When it comes to adverse impacts, dams deserve special mention.[78] A

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73. Andreen, *supra* note 72, at 279, 292. However, the states and the U.S. Environmental Protection Agency (EPA) maintain lists of water-quality impaired water bodies under the Clean Water Act (CWA) which reflect impairment by pollutants covered by the CWA. *Id.* at 269.

74. *Id.* at 279; *see* Higgins et al., *supra* note 23, at 2 (describing disparities in quality of higher and lower elevation waterbodies).

75. *See* Hunt & Hammer, *supra* note 71.

76. Günther Grill, Bernhard Lehner, Michele Thieme, Bart Geenen, David Tickner, Francesca Antonelli, Suresh Babu, Pasquale Borrelli, Lin Cheng, Heather Crochetiere, Heloisa Ehalt Macedo, Raquel Filgueiras, Marc Goichot, Jonathan Higgins, Zeb Hogan, Belinda Lip, Michael E. McClain, Jian-hua Meng, Mark Mulligan, Christer Nilsson, Julian D. Olden, Jeffrey J. Opperman, Paulo Petry, Cathy Riedy Liermann, Leonardo Sáenz, Sergio Salinas-Rodríguez, Patricia Schelle, Rafael J.P. Schmitt, James Snider, Florence Tan, Klement Tockner, Paula H. Valdujo, Arnout van Soesbergen & Christiane Zarfl, *Mapping the World's Free-Flowing Rivers*, 569 NATURE 215, 215 (2019).

77. Steve Crawford, Gary Whelan, Dana M. Infante, Kristan Blackhart, Wesley M. Daniel, Pam L. Fuller, Tim Birdsong, Daniel J. Wieferich, Ricardo McClees-Funinan, Susan M. Stedman, Kyle Herreman & Peter Ruhl, *Through a Fish's Eye: The Status of Fish Habitats in the United States 2015*, NAT'L FISH HABITAT P'SHIP, http://assessment.fishhabitat.org/ [https://perma.cc/9H63-A7GK]. Human activities have had the most severe impacts on rivers in North America and western Europe, where affluent populations mean greater impoundment, development, and depletion. Guohuan Su, Maxime Logez, Jun Xu, Shengli Tao, Sébastien Villéger & Sébastian Brosse, *Human Impacts on Global Freshwater Fish Biodiversity*, 371 SCI. 835, 835 (2021).

78. Michele L. Thieme, Dmytro Khrystenko, Siyu Qin, Rachel E. Golden Kroner, Bernhard Lehner, Shalynn Pack, Klement Tockner, Christiane Zarfl, Natalie Shahbol & Michael B. Mascia, *Dams and Protected Areas: Quantifying the Spatial and Temporal Extent of Global Dam Construction Within Protected Areas*, 13 CONSERVATION LETTERS 1, 2 (2020) ("Infrastructure, especially dams, has altered the status of rivers globally by changing their

Western Water Policy Review Advisory Commission report described the impacts of dams on U.S. aquatic systems in stark terms, with implications for both climate resilience and biodiversity:

> Natural variations in flow were entirely replaced by patterns dictated by downstream water demands.... [S]treams formerly passing through braided channels began to flow rapidly through sluiceways over bare gravel and sand, distantly bounded by cutbanks and quickly cooled and heated due to exposure, lower water volumes, and reduced groundwater exchange....
>
> ....
>
> Native fishes were devastated. As rivers were beheaded by dams and natural variation in flow disappeared, so did the resilient species and biological communities adapted to these inherently transient systems.[79]

Not all streams are perennial, but ephemeral (intermittent) streams, swales, arroyos, and gullies, which flow only in direct response to precipitation, are important, too. They represent nearly 59 percent of the United States' streams and 81 percent of the streams in the arid west.[80] Urbanization increases the amount of impervious surface area, which in turn increases runoff and decreases infiltration, and leads to flooding, bank erosion, channel alteration, increased pollutants, and ecological damage.[81] Although ephemeral streams provide essential dispersal corridors and habitat for various animals, including reptiles, amphibians, birds, and

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connectivity and flow regime.").

79. Wendell L. Minckley, *Aquatic Ecosystems: Sustainability of Western Native Fish Resources*, *in* REPORT TO THE WESTERN WATER POLICY REVIEW ADVISORY COMMISSION 65, 67 (1997).

80. LAINIE R. LEVICK, DAVID C. GOODRICH, MARIANO HERNANDEZ, JULIA FONSECA, DARIUS J. SEMMENS, JULIET STROMBERG, MELANIE TLUCZEK, ROBERT A. LEIDY, MELISSA SCIANNI, D. PHILLIP GUERTIN & WILLIAM G. KEPNER, U.S. ENV'T PROT. AGENCY, THE ECOLOGICAL AND HYDROLOGICAL SIGNIFICANCE OF EPHEMERAL AND INTERMITTENT STREAMS IN THE ARID AND SEMI-ARID AMERICAN SOUTHWEST 5, 48 (2008).

81. *Id.* at 66.

mammals,[82] they have little legal protection, federally or otherwise.[83]

Like rivers and streams, lakes face a plethora of threats. Physical degradation includes complete dewatering, primarily due to agricultural diversions, plus impoundment and various kinds of shoreline alterations.[84] Chemical degradation includes toxic pollution and excess nutrients—algal blooms—from both point and nonpoint sources.[85]

Wetland losses are even more dire. Worldwide, approximately 75 percent of wetlands have been lost during the twentieth century.[86] In the United States, about half of the nation's wetlands have disappeared, mostly due to crop production but also dredging and channelization for navigational purposes.[87]

Physical and chemical degradation has a direct correlation with biological degradation. Freshwater biodiversity is declining at roughly twice the rate of marine or terrestrial biodiversity declines.[88] Fish and amphibians face the highest rates of extinction

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82. Andrew J. Boulton, *Conservation of Ephemeral Streams and Their Ecosystem Services: What Are We Missing?*, 24 AQUATIC CONSERVATION: MARINE & FRESHWATER ECOSYS. 733, 735 (2014).

83. *Id.* at 737; *see* The Navigable Waters Protection Rule: Definition of "Waters of the United States," 85 Fed. Reg. 22,250, 22,251 (Apr. 21, 2020) (excluding ephemeral features from CWA protection).

84. *See* Ming-Chih Chiu, Catherine Leigh, Raphael Mazor, Núria Cid & Vincent Resh, *Anthropogenic Threats to Intermittent Rivers and Ephemeral Streams*, *in* INTERMITTENT RIVERS AND EPHEMERAL STREAMS 433-48 (2017).

85. *See generally id.*

86. IUCN, INLAND WATERS-POST 2020 TARGETS (2020).

87. *See* USDA, WETLANDS VALUES AND TRENDS (1995), https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technitec/nra/rca/?cid=stelprdb1042133#losses [https://perma.cc/4STN-UUHZ]; *Wetlands Update—Has Preservation Had an Impact?*, SCI. AM. (July 9, 2008), https://www.scientificamerican.com/article/wetlands-update/ [https://perma.cc/VST6-BJTH].

88. David Tickner, Jeffrey J. Opperman, Robin Abell, Mike Acreman, Angela H. Arthington, Stuart E. Bunn, Steven J. Cooke, James Dalton, Will Darwall, Gavin Edwards, Ian Harrison, Kathy Hughes, Tim Jones, David Leclère, Abigail J. Lynch, Philip Leonard, Michael E. McClain, Dean Muruven, Julian D. Olden, Steve J. Ormerod, James Robinson, Rebecca E. Tharme, Michele Thieme, Klement Tockner, Mark Wright & Lucy Young, *Bending the Curve of Global Freshwater Biodiversity Loss: An Emergency Recovery Plan*, 70 BIOSCI. 330, 330-31 (2020).

in the world.[89] Since 1970, the populations of all monitored freshwater species have declined by 83 percent.[90]

As described in this Article's next Section, climate change exacerbates these impacts and losses by causing warmer water temperatures, greater evaporative losses, altered precipitation patterns, acidification, salinization, and other adverse effects.

C. Freshwater Resources and Climate Change

In the United States, climate models consistently project a shift from snow-dominated to rain-dominated precipitation, especially in the West.[91] Along with an overall decline in mountain snowpack over the past fifty years, spring snowmelt is occurring up to thirty days earlier, and summertime flows for many western streams and rivers have declined precipitously. More frequent and severe low-flow occurrences mean dramatic decreases in summertime streamflow.[92] These changes negatively impact both human and ecological communities in a variety of ways.

Rivers and streams are highly sensitive to climate change. Detrimental impacts affect both the hydrological aspects of streams—depth, velocity, and substrate (sediments and other material composing the streambed)—and their ecological indicators, such as temperature and water quality.[93]

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89. *See* David Dudgeon, Angela H. Arthington, Mark O. Gessner, Zen-Ichiro Kawabata, Duncan J. Knowler, Christian Lévêque, Robert J. Naiman, Anne-Hélène Prieur-Richard, Doris Soto, Melanie L.J. Stiassny & Caroline A. Sullivan, *Freshwater Biodiversity: Importance, Threats, Status and Conservation Challenges*, 81 BIOLOGICAL REVS. 163, 166-67 (2006); Andrea J. Reid, Andrew K. Carlson, Irena F. Creed, Erika J. Eliason, Peter A. Gell, Pieter T.J. Johnson, Karen A. Kidd, Tyson J. MacCormack, Julian D. Olden, Steve J. Ormerod, John P. Smol, William W. Taylor, Klement Tockner, Jesse C. Vermaire, David Dudgeon & Steven J. Cooke, *Emerging Threats and Persistent Conservation Challenges for Freshwater Biodiversity*, 94 BIOLOGICAL REVS. 849, 855 (2019). For lists of imperiled aquatic and other species, see THE IUCN RED LIST OF THREATENED SPECIES, https://www.iucnredlist.org/ [https://perma.cc/B29S-MKMV].

90. Jeffrey Parrish, *Durable Freshwater Conservation*, NATURE CONSERVATION (Sept. 3, 2021), https://www.nature.org/en-us/whatwe-do/our-insights/perspectives/durable-freshwater-protection/ [https://perma.cc/H3GV-DCUY].

91. U.S. GLOB. CHANGE RSCH. PROGRAM, CLIMATE CHANGE IMPACTS IN THE UNITED STATES 465-66, 489-90 (Jerry M. Melillo, Teresa (T.C.) Richmond & Gary W. Yohe eds., 2014).

92. *Id.*

93. *See* Dylan R. Hedden-Nicely & Lucius K. Caldwell, *Indigenous Rights and Climate Change: The Influence of Climate Change on the Quantification of Reserved Instream Water*

Freshwater lakes are by no means immune from the effects of climate change. Warming temperatures can lead to the loss of dissolved oxygen in lakes, which in turn causes the loss of water quality.[94] Increased surface temperatures and diminished winter ice cover accelerates lake evaporation, acidification, and eutrophication by preventing mixing of oxygenated, nutrient-rich waters.[95] Water supply, hydropower outputs, and recreational opportunities are diminishing, and salinity and extreme flooding are increasing.[96]

Biodiversity is in severe decline as well. Among other impacts, fish and amphibians perish during droughts and heat waves; cold-water species cannot escape to cooler, deeper waters; predator-prey relationships are disrupted; and reproduction and growth rates are altered.[97] For fisheries, the most detrimental effects of climate change are warming water temperatures, altered precipitation patterns, increased salt water incursion, and acidification.[98] These

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Rights for American Indian Tribes, 2020 UTAH L. REV. 755, 793 (2020). However, there is especially "high variability associated with how streams will react to climate change." *Id.*

94. Stephen F. Jane, Gretchen J.A. Hansen, Benjamin M. Kraemer, Peter R. Leavitt, Joshua L. Mincer, Rebecca L. North, Rachel M. Pilla, Jonathan T. Stetler, Craig E. Williamson, R. Iestyn Woolway, Lauri Arvola, Sudeep Chandra, Curtis L. DeGasperi, Laura Diemer, Julita Dunalska, Oxana Erina, Giovanna Flaim, Hans-Peter Grossart, K. David Hambright, Catherine Hein, Josef Hejzlar, Lorraine L. Janus, Jean-Philippe Jenny, John R. Jones, Lesley B. Knoll, Barbara Leoni, Eleanor Mackay, Shin-Ichiro S. Matsuzaki, Chris McBride, Dörthe C. Müller-Navarra, Andrew M. Paterson, Don Pierson, Michela Rogora, James A. Rusak, Steven Sadro, Emilie Saulnier-Talbot, Martin Schmid, Ruben Sommaruga, Wim Thiery, Piet Verburg, Kathleen C. Weathers, Gesa A. Weyhenmeyer, Kiyoko Yokota & Kevin C. Rose, *Widespread Deoxygenation of Temperate Lakes*, 594 NATURE 66, 67-68 (2021).

95. R. Iestyn Woolway, Benjamin M. Kraemer, John D. Lenters, Christopher J. Merchant, Catherine M. O'Reilly & Sapna Sharma, *Global Lake Responses to Climate Change*, 1 NATURE REVS. EARTH & ENV'T 388, 399 (2020).

96. Reed D. Benson, *Reviewing Reservoir Operations: Can Federal Water Projects Adapt to Change?*, 42 COLUM. J. ENV'T L. 353, 358 (2017).

97. Jean-Philippe Jenny, Orlane Anneville, Fabien Arnaud, Yoann Baulaz, Damien Bouffard, Isabelle Domaizon, Serghei A. Bocaniov, Nathalie Chèvre, Maria Dittrich, Jean-Marcel Dorioz, Erin S. Dunlop, Gaël Dur, Jean Guillard, Thibault Guinaldo, Stéphan Jacquet, Aurélien Jamoneau, Zobia Jawed, Erik Jeppesen, Gail Krantzberg, John Lenters, Barbara Leoni, Michel Meybeck, Veronica Nava, Tiina Nõges, Peeter Nõges, Martina Patelli, Victoria Pebbles, Marie-Elodie Perga, Serena Rasconi, Carl R. Ruetz III, Lars Rudstam, Nico Salmaso, Sharma Sapna, Dietmar Straile, Olga Tammeorg, Michael R. Twiss, Donald G. Uzarski, Anne-Mari Ventelä, Warwick F. Vincent, Steven W. Wilhelm, Sten-Åke Wängberg & Gesa A. Weyhenmeyer, *Scientists' Warning to Humanity: Rapid Degradation of the World's Large Lakes*, 46 J. GREAT LAKES RSCH. 686, 693 (2020).

98. Craig Paukert, Julian D. Olden, Abigail J. Lynch, David D. Breshears, R. Christopher Chambers, Cindy Chu, Margaret Daly, Kimberly L. Dibble, Jeff Falke, Dan Issak, Peter

factors result in altered migration patterns and timing, range shifts in fish populations or entire species, diminution of both individual growth and population abundance, and increased competition from nonnative species.[99]

III. FRESHWATER CONSERVATION AND COUNTERVAILING INTERESTS

Conservation targets sometimes combine inland waters with terrestrial goals, treating waters as part of the lands in which they are embedded. This appears to be the approach of the 30 by 30 initiative, to the extent that freshwater is addressed at all. Of course, water and land are intertwined, and holistic conservation strategies must address both in a comprehensive fashion, but must also recognize the distinctions between them, physically and politically.

A. Water and Land Are Intertwined but Distinct

From an ecological standpoint, there is no bright line between water, the shoreline, and the terrestrial corridor abutting streams or lakes, known as the riparian zone.[100] For flowing waters, in particular, the composition and processes of the riparian zone adjacent to the stream channel interact with the stream itself, affecting water chemistry, temperature, and the exchange of food sources between the land and the aquatic environment.[101] Invariably, the quality of habitat within waterbodies is influenced by the riparian communities, features, and processes surrounding the waterbody.

However, lumping land and water together ignores the distinct threats that freshwaters face.[102] Placing protective measures on land alone often permits activities that are harmful to aquatic

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Jacobson, Olaf P. Jensen & Daphne Munroe, *Climate Change Effects on North American Fish and Fisheries to Inform Adaptation Strategies*, 46 FISHERIES 449, 450 (2021).

99. Hedden-Nicely & Caldwell, *supra* note 93, at 770.

100. *Id.* at 766-67.

101. *Id.*

102. *See* Parrish, *supra* note 90 ("Freshwater is a moving, dynamic force with its own needs that require—and deserve—us to look beyond the lines drawn for protection of terrestrial species.").

ecosystems, such as recreational activities, over-grazing, and dams.[103] Degradation from dams is particularly concerning.[104] Over 1,200 of the world's large dams are located within protected areas, and 500 more are planned or under construction in protected areas.[105] If this trend continues, by 2030, natural flows will be altered for 93 percent of river volume worldwide.[106] Thus, protecting 30 percent of land will not protect 30 percent of freshwater areas.[107]

To be protected in any meaningful ecological way, a waterbody must be subject to enduring measures that preserve (or restore) natural character, processes, functions, and components.[108] In the freshwater context, that means maintaining ecological flow regimes, maintaining and restoring connectivity, preventing pollution, degradation, and destruction, and protecting aquatic and riparian fish, wildlife, invertebrate, and plant species.[109] To contribute to broader biodiversity and climate goals, protected freshwater areas should be broadly representative of habitats and ecoregions. Factors to consider include the physical condition of the freshwater resource, the number and status of species that depend on it, connectivity with nearby waters, and ecosystem services like carbon storage potential, drinking water supplies, and flood control.[110]

According to the Intergovernmental Panel on Climate Change (IPCC), strategic water management, conservation, and restoration of lakes, rivers, streams, and wetlands can enhance natural carbon sinks and provide high-quality habitats and connectivity for a

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103. Dinerstein et al., *supra* note 17, at 12; *see* Higgins et al., *supra* note 23, at 1 (stating that terrestrial-based measures "are generally inadequate for addressing freshwater ecosystem processes and attributes critical for maintaining their natural patterns and the values they provide to people and nature").

104. *See supra* notes 78-79 and accompanying text.

105. *See* Thieme et al., *supra* note 78, at 3 (finding 1,249 existing large dams, which is nearly 20 percent of geo-located large dams, located within 984 protected areas across eighty countries). Large dams are higher than five meters and impound three million cubic meters or more. *Id.* at 2.

106. *Id.*

107. Fremier et al., *supra* note 22, at 30 (in addition to protected terrestrial areas, recommending the establishment of a "Riparian Connectivity Network").

108. *See supra* notes 22-23 and accompanying text (describing "protection").

109. *See* Hunt & Hammer, *supra* note 71.

110. *Id.* This Article does not attempt to resolve the scientific issues. Natural Resources Defense Council (NRDC), National Wildlife Federation, The Nature Conservancy, and others are endeavoring to do so. *See, e.g.*, Parrish, *supra* note 90.

multitude of species.[111] This is where 30 by 30 comes in—if humans can find the political will to accomplish it.

B. The Politics and Law of Freshwater Resource Management

The jumble of laws in the United States falls short of providing a true water policy.[112] Since the advent of water law, proposals for almost any type of reform or change have been controversial, and the constituency supporting reform has been limited while the constituency opposed—typically irrigators and other water users—has been vocal and highly motivated.[113] As a result, over-appropriation and depletion have become intractable problems in many watersheds, in some cases causing the collapse of entire aquatic and riparian communities.[114] Yet governments at all levels have been loath to impose restrictions that protect ecological interests for fear of political fallout and legal challenges by water users.[115]

In fact, proposals for rethinking the existing system of water rights are viewed as the "political third rail"—to touch that high voltage rail, much less to embrace it, means electrocution.[116] To raise even a hint of *federal* oversight or control is even more deadly,

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111. IPCC, GLOBAL WARMING OF 1.5°C, at 218 (Valérie Masson-Delmotte et al. eds., 2018). *See generally* Fremier et al., *supra* note 22, at 30.

112. Sandra B. Zellmer, *A New Corps of Discovery for Missouri River Management*, 83 NEB. L. REV. 305, 334 (2004) (citing Gerald E. Calloway, *Perspectives on a National Water Policy*, 126 WATER RES. UPDATE 6, 6, 9-10 (2003)).

113. Janet C. Neuman, *Federal Water Policy: An Idea Whose Time Will (Finally) Come*, 20 VA. ENV'T L.J. 107, 115 (2001).

114. Sandra B. Zellmer & Jessica Harder, *Unbundling Property in Water*, 59 ALA. L. REV. 679, 744 (2008) (first citing Janet C. Neuman, *Beneficial Use, Waste, and Forfeiture: The Inefficient Search for Efficiency in Western Water Use*, 28 ENV'T L. 919, 976-77 (1998); and then citing Eric T. Freyfogle, *Water Rights and the Common Wealth*, 26 ENV'T L. 27, 40, 50 (1996)).

115. *See* Andreen, *supra* note 10, at 10287 (noting there is scant evidence that either federal or state entities have, in fact, developed comprehensive, forward-looking solutions that synthesize water quality and water quantity concerns); CHARLES F. WILKINSON, CROSSING THE NEXT MERIDIAN: LAND, WATER, AND THE FUTURE OF THE WEST 292 (1992) (stating that"cries of complexity" typically serve as "the last refuge of the vested interests" in water); David H. Getches, *The Metamorphosis of Western Water Policy: Have Federal Laws and Local Decisions Eclipsed the States' Role?*, 20 STAN. ENV'T L.J. 3, 22 (2001) (remarking that uncertainties raised by the complexities of an altered watershed favor the status quo).

116. Juliet Christian-Smith, *Water Rights Conversation Heats Up*, WATER FOUND. (Aug. 24, 2021), https://waterfdn.org/water-rights-conversation-heats-up/ [https://perma.cc/VU33-KWQL].

politically speaking.[117] As Professor Janet Neuman, who served on the presidential Western Water Policy Review Advisory Commission,[118] observed: "[T]he water policy arena has always been a major battlefield for power struggles among the states, tribes, and the federal government."[119]

State law generally governs water allocation and use—water quantity—and the states zealously guard this prerogative.[120] Yet the federal government has compelling reasons to adopt a comprehensive approach to water management, given that water is "an interstate resource of crucial importance to the nation's health and economy" and that "the federal government currently spends tens of billions of dollars on water-related programs with insufficient policy guidance to insure [sic] that those dollars are well spent."[121]

High-level water commissions and councils, including the Western Water Policy Review Advisory Commission, have issued recommendations in previous years to address states' failures to protect instream flows and the species and communities that rely upon them.[122] One notable recommendation was for the federal government to "review existing [s]tate water law systems and determine whether or not they promote equity, efficiency and environmental quality consistent with [f]ederal policy."[123] States that failed to

117. A. Dan Tarlock, *Water Demand and Energy Production in a Time of Climate Change*, 5 ENV'T & ENERGY L. & POL'Y J. 325, 347 (2011).

118. In 1995, President Clinton appointed members to the Western Water Policy Review Advisory Commission and charged the Commission with reviewing federal activities that affected the use and allocation of water in the western states, as well as reviewing numerous aspects of water resources, management, and law. *See* Denise D. Fort, *The Western Water Policy Review Advisory Commission: Another Look at Western Water*, 37 NAT. RES. J. 909, 909-10 (1997).

119. Neuman, *supra* note 113, at 115.

120. *See* Justin Huber & Sandra Zellmer, *The Shallows Where Federal Reserved Water Rights Founder: State Court Derogation of the* Winters *Doctrine*, 16 U. DENV. WATER L. REV. 261, 272 (2013) (noting that "Congress has sometimes deferred to state water law and sometimes has not").

121. Neuman, *supra* note 113, at 108.

122. Reed D. Benson, *"Adequate Progress," or Rivers Left Behind? Developments in Colorado and Wyoming Instream Flow Laws Since 2000*, 36 ENV'T L. 1283, 1289-91 (2006). Although many states have adopted some form of instream flow protection, these provisions often fall short of providing meaningful protection to fisheries and ecosystem services. *Id.*; Michael F. Browning, *Instream Flow Water Rights in the Western States and Provinces*, 56 ROCKY MTN. MIN. L. INST. 9-1 (2010).

123. Andreen, *supra* note 72, at 279 (quoting Water Resource Policy Study, 42 Fed. Reg. 36,788, 36,794 (July 15, 1977)).

comply with federal policy could find "future water related [f]ederal programs and projects such as reclamation, flood control and insurance, water quality control and others ... delayed or conditioned upon compliance by the [s]tate."[124]

Unsurprisingly, many states took offense; consequently, the Senate passed a resolution stating its concern about interference with the states' prerogatives for water allocation.[125] As Professor William L. Andreen notes, these recommendations "were ambitious and aggressive as well [as] politically naïve in many respects."[126]

In addition to instream flow requirements, Blue Ribbon commissions have flagged other deficiencies of state water laws and have issued various recommendations, ranging from bold to lukewarm, for some form of federal coordination of water quantity and/or quality management.[127] As Professor Neuman explains, none have gained much traction:

> Water study commissions stretch back as far as the 1808 Gallatin Report, making them almost as old as our nation.... A century later, President Theodore Roosevelt appointed the Inland Waterways Commission. This Commission promoted large-scale, multiple-purpose water development projects throughout the country's major river basins. The Commission's recommendation to create a single new federal agency to prepare and implement multipurpose river basin plans was met with opposition.[128]

Almost another century later, President William Clinton made a modest step to recognize and protect American Heritage Rivers.[129] There were no mandates—designated rivers would receive federal resources to support voluntary community efforts at enhancing and protecting rivers or river segments.[130] Selection criteria were

124. *Id.*

125. *Id.* at 280 (citing S. Res. 284, 95th Cong., 1st Sess. (1977)).

126. *Id.*

127. Andreen, *supra* note 10, at 10287 (noting that "there has been a good deal of rhetoric about the need for watershed planning" but little action). Regarding federal authority for groundwater resources, see John D. Leshy, *Interstate Groundwater Resources: The Federal Role*, 14 HASTINGS W.-NW. J. ENV'T L. & POL'Y 1475, 1480-81, 1488-89 (2008).

128. Neuman, *supra* note 60, at 141-42 (footnotes omitted).

129. Exec. Order No. 13,061, 62 Fed. Reg. 48,445 (Sept. 15, 1997) [hereinafter E.O. 13,061].

130. *Id.* The Obama administration's Great American Outdoors initiative, adopted by

developed under the Council on Environmental Quality (CEQ), with wide government and expert involvement.[131] The recommended rivers were to "represent a variety of stream sizes, diverse geographical locations, and a range of settings from urban to rural and ensure that relatively pristine" rivers were considered, "as well as degraded rivers in need of restoration."[132] Designations would help coordinate the efforts of multiple governmental entities to further three objectives: natural resource and environmental protection, historic and cultural preservation, and economic revitalization.[133]

In 1998, President Clinton designated fourteen rivers out of 126 nominations.[134] Property rights proponents immediately shouted about the potential for the Heritage initiative to federalize waterways: "The American Heritage Rivers program can be viewed as a complicated ... stagework that lays the structure ... for effective federal control over land and water use in any given region."[135] Their heated rhetoric raised alarm bells about the likelihood of a federal "juggernaut of enforcement potential."[136]

Four members of Congress sued, arguing that Congress had not delegated to the President the authority to create an American Heritage River system, and that Executive Order 13,061 violated an array of constitutional provisions.[137] Rather than reaching the

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Presidential Memorandum in 2010, included somewhat similar objectives, in particular, "conserving and restoring large landscapes and working lands and waters; and enhancing rivers and other waters." THE WHITE HOUSE, AMERICA'S GREAT OUTDOORS: 2012 PROGRESS REPORT 3 (2012). The Obama initiative is not to be confused with the Great American Outdoors Act of 2020, which provides permanent funding for the Land and Water Conservation Fund (LWCF) and deferred maintenance projects of various federal agencies. *See* 54 U.S.C. § 200303.

131. *See* E.O. 13,061 at 48,446.

132. *Id.*

133. *Id.* at 48,445 ("Executive agencies ..., to the extent permitted by law ..., shall coordinate [f]ederal plans, functions, programs, and resources to preserve, protect, and restore rivers and their associated resources important to our history, culture, and natural heritage.").

134. *See The American Heritage Rivers Initiative*, HUDSON RIVER VALLEY INST., https://www.hudsonrivervalley.org/american-heritage-rivers-initiative [https://perma.cc/4ZLR-5GEE] (listing rivers).

135. Carol W. LaGrasse, *Heritage Rivers-Elites Only*, PROP. RTS. FOUND. AM., https://prfamerica.org/positions/ElitesOnly.html [https://perma.cc/VU68-7R4E].

136. *Id.*

137. *See* Chenoweth v. Clinton, 997 F. Supp. 36, 37 (D.D.C. 1998) (citing the Commerce Clause (U.S. CONST. art. I, § 8, cl. 3), the Property Clause (U.S. CONST. art. IV, § 3, cl. 2), the Spending Clause (U.S. CONST. art. I, § 9, cl. 7), and the Tenth Amendment (U.S. CONST.

merits, the district court dismissed the case for lack of jurisdiction, as the plaintiffs' alleged institutional injury was a "generalized grievance" about the conduct of government that lacked the requisite specificity for standing.[138]

In reality, it is not clear whether designation as a Heritage River had a significant impact on the conservation or restoration of the fourteen designated rivers. Upon designation, each affected community received initial assistance from a federally funded "River Navigator" who served as a liaison between the community and over a dozen federal agencies.[139] The funds went toward technical assistance on specific projects, building local capacity, and fostering partnerships among governments and private entities.[140] The initiative reached its sunset when federal funding lapsed.[141] Meanwhile, designation did not stop industrial development. For example, an intermodal railroad-truck transportation project was situated alongside the designated Detroit River,[142] and a large gas-fired power plant was approved in the Hudson River corridor.[143]

What, then, can the federal government do to conserve 30 percent of our freshwaters by 2030? How might 30 by 30 be a harbinger of change, indeed, a new, more clearly defined federal vision?

These questions are the subject of the next Part. Given the intractable nature of interests in freshwater, rather than advocating for a significant overhaul of our nation's environmental laws, this Article seeks to identify agency reforms and implementation improvements that may move the nation closer to its 30 by 30 conservation goal.

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amend X)), *aff'd*, 181 F.3d 112 (D.C. Cir. 1999). The plaintiffs also asserted violations of the Anti-Deficiency Act, 31 U.S.C. § 1301, the Federal Land Policy and Management Act, 43 U.S.C. §§ 1701-1785, and the National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321-4347. *Id.*

138. *Id.* at 39.

139. *The Hudson River Leadership Navigator*, HUDSON RIVER VALLEY INST., https://www.hudsonrivervalley.org/hudson-river-navigator [https://perma.cc/FYV7-7M43].

140. *Id.*

141. *Id.*

142. *See* City of Riverview v. Surface Transp. Bd., 398 F.3d 434, 444 (6th Cir. 2005).

143. *See* Pogliani v. U.S. Army Corps of Eng'rs, 166 F. Supp. 2d 673, 700 (N.D.N.Y. 2001), *aff'd*, 306 F.3d 1235 (2d Cir. 2002).

IV. EXISTING LEGAL TOOLS GOVERNING FRESHWATER RESOURCE MANAGEMENT

This Part focuses on the major federal laws that govern the depletion, pollution, or alteration of the nation's freshwater resources. It covers water-centric laws, specifically, the Clean Water Act (CWA), the Wild & Scenic Rivers Act (WSRA), and federal hydropower, reclamation, and flood control statutes, as well as one generally applicable environmental statute with special relevance for biodiversity, the Endangered Species Act (ESA).[144] This Part, and the Article as a whole, focuses on improvements that can be made without legislative revision, through administrative rulemaking, guidance, or individual project, permit, and license decisions. Opportunities to engage in comprehensive, coordinated planning for biodiversity and climate resilience are highlighted throughout.

The litany of existing legal tools found here reflects water law's extreme institutional fragmentation. Although point source pollution is addressed by the CWA and overseen by the U.S. Environmental Protection Agency (EPA), states generally retain authority over nonpoint (diffuse) pollution.[145] At the federal level, wetlands are the province of the U.S. Army Corps of Engineers (the Corps), with some EPA oversight.[146] Federal agricultural programs, plus state and local land use regulations, affect wetlands as well. Hydropower and flood control are overseen by three different federal agencies: the Federal Energy & Regulatory Commission (FERC), the Corps, and the Bureau of Reclamation (the Bureau).[147] The Bureau also oversees water supply from hundreds of dams throughout the western United States, but state law and agencies govern the

144. Several other relevant laws are not addressed in this Article. The Migratory Bird Treaty Act (MBTA) and the Coastal Zone Management Act (CZMA) are somewhat more attenuated to the 30 by 30 initiative as related to freshwater resources than the panoply of laws addressed here. Federal public lands management statutes will be addressed in a separate Article on 30 by 30, forthcoming in 2023. Moreover, state water law and their implications for climate change, adaptation, and mitigation could be the subject of another time.

145. Andreen, *supra* note 72, at 255.

146. *See id.* at 274-75.

147. *Id.*

allocation of water resources.[148] Finally, when it comes to the ESA, the U.S. Fish and Wildlife Service (FWS) exerts authority over listed species in inland waters and on land, whereas the National Marine Fisheries Service (NMFS) has authority for marine species.[149] As Professor Andreen notes:

> These barriers or boundaries make it difficult to deal effectively with the protection of such complex ecosystems, where whatever happens in one part of a watershed—whether on land, in the water, or at the water's edge—may have a real detrimental impact on the health of the aquatic resource.[150]

A. CWA

The Clean Water Act (CWA) is a success story in many ways.[151] In particular, the CWA's point source permit program has "significantly reduced wastewater discharges from both industrial and municipal facilities and, in the process, has enhanced water quality throughout the nation."[152] In addition, the CWA's 404 dredge and fill permit program has done much to slow the rate of wetlands loss.[153]

As Professor Andreen observes, however, CWA implementation is still "a work in progress."[154] Dean Robert W. Adler agrees that the high aspiration that Congress had for the Act remains largely unfulfilled.[155] Adler and Andreen highlight several aspects of the CWA that could be strengthened, including provisions for nonpoint source pollution and streamflows.[156]

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148. *Id.* at 263, 274-75, 283.

149. *Id.* at 281; *About Us*, NOAA FISHERIES, https://www.fisheries.noaa.gov/about-us#overview [https://perma.cc/NA3E-TYSN].

150. Andreen, *supra* note 10, at 10279.

151. Andreen, *supra* note 72, at 256.

152. *Id.*

153. *Id.* at 256-57.

154. *Id.* at 257.

155. Robert W. Adler, *The Decline and (Possible) Renewal of Aspiration in the Clean Water Act*, 88 WASH. L. REV. 759, 762 (2013).

156. *Id.*; Andreen, *supra* note 10, at 10288. Although the CWA includes a few planning provisions, *see* 33 U.S.C. §§ 1288(b), 1313(d)-(e), and 1329(d)(3), they are relatively weak compared to its permit provisions for individual sources of pollutants. For discussion, see GEORGE CAMERON COGGINS & ROBERT L. GLICKSMAN, 2 PUBLIC NATURAL RESOURCES LAW § 19:11 (2d ed. 2022); Jamie Konopacky & Laurie Ristino, *The Healthy Watershed Framework: A Blueprint for Restoring Nutrient-Impaired Waterbodies Through Integrated Clean Water Act*

This Article narrows the focus to one aspect of the CWA that would make the greatest difference for climate resilience and biodiversity—the definition of "waters of the United States" (WOTUS). More than just a definition, WOTUS is a threshold concept that establishes the geographic scope of the Act and all of its regulatory requirements. If a waterbody is excluded from the definition, it is not federally protected and is vulnerable to degradation and outright destruction.[157]

Congress's overarching objective in passing the CWA was to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[158] A comprehensive, scientifically-based definition of WOTUS is essential to meeting these goals. Expanding the definition of WOTUS to include tributaries, ephemeral streams, and ecologically important wetlands and ponds is consistent with the CWA's goal of chemical, physical, and biological integrity and would do much to advance the biodiversity and climate goals of 30 by 30.

The CWA regulates discharges to "navigable waters," with "navigable waters" defined as "the waters of the United States, including the territorial seas."[159] The statute does not define the phrase "the waters of the United States" even though it is a foundational requirement for determining the geographic scope of its provisions. Since 1986, that phrase, colloquially known as WOTUS, was defined by regulation to encompass tributaries of interstate waters and other waters used in or affecting interstate or foreign commerce, as well as wetlands adjacent to such waters, including those separated by man-made dikes or barriers.[160] The Supreme Court approved of the regulatory definition in large part in *United*

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and Farm Bill Conservation Planning and Implementation at the Subwatershed Level, 47 ENV'T L. 647, 692 (2017); *see also* Nathan Gardner-Andrews, *Water Quality and Land Use Planning: Emerging Legal and Regulatory Considerations*, 65 PLAN. & ENV'T L. 4, 4-6 (2013) (describing how a novel approach for total maximum daily loads (TMDLs) in the Chesapeake Bay watershed may have broader planning-related ramifications).

157. *See* Adam S. Ward & Riley Walsh, *New Clean Water Act Rule Leaves U.S. Waters Vulnerable*, EOS (Feb. 11, 2020), https://eos.org/opinions/new-clean-water-act-rule-leaves-u-s-waters-vulnerable [https://perma.cc/EW7Y-LJAY].

158. 33 U.S.C. § 1251(a).

159. 33 U.S.C. §§ 1311(a), 1311(f), 1362(7), 1362(12).

160. *See* 33 C.F.R. § 328.3(a), (c) (1986); 40 C.F.R. § 232.3(q) (1988).

States v. Riverside Bayview Homes, Inc.[161] However, the Court questioned the application of it to wetlands with attenuated connectivity to navigable waters in subsequent cases—including, most importantly, *Rapanos v. United States*.[162]

In *Rapanos*, a deeply divided Court determined that a connection to distant navigable waters via ditches or artificial drains did not constitute "waters of the United States."[163] The Court parted ways when it came to the applicable test for determining what did, in fact, come within that phrase. Writing for a plurality, Justice Scalia eschewed science and relied instead on a narrow grammatical interpretation to conclude that the full statutory phrase, which uses a "definite article"—"*the* waters of the United States"—must mean "relatively permanent, standing or continuously flowing" streams, rivers, and lakes, rather than water in general.[164]

By contrast, Justice Kennedy's concurrence concluded that wetlands constitute "navigable waters" if there is "a significant nexus between the wetlands" and traditionally navigable waters, such that "the wetlands, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity" of those so-called foundational waters.[165] Over time, Justice Kennedy's concurring opinion emerged as the test favored by many lower courts as most consistent with the statute's text, structure, and purpose.[166]

In 2015, the Obama administration completed a review of scientific literature on the connections between tributaries, wetlands, and downstream waters, called the "Connectivity Report," and adopted the "Clean Water Rule," which re-defined WOTUS.[167] The

161. 474 U.S. 121, 134-35 (1985).

162. 547 U.S. 715, 731-33 (2006).

163. *Id.* at 757.

164. *See id.* at 732-33 (plurality opinion) (citing WEBSTER'S NEW INT'L DICTIONARY 2882 (2d ed. 1954)) ("The use of the definite article ('the') and the plural number ('waters') show plainly that [the CWA] does not refer to water in general ... [but rather] water as found in 'streams,' 'oceans,' 'rivers,' 'lakes,' and 'bodies' of water 'forming geographical features.'").

165. *Id.* at 779-80 (Kennedy, J., concurring).

166. Pascua Yaqui Tribe v. U.S. Env't Prot. Agency, 557 F. Supp. 3d 949, 952 (D. Ariz. 2021).

167. 33 C.F.R. § 328.3 (2016); *see* Clean Water Rule: Definition of "Waters of the United States," 80 Fed. Reg. 37,054, 37,059 (June 29, 2015) (citing U.S. ENV'T PROT. AGENCY, CONNECTIVITY OF STREAMS AND WETLANDS TO DOWNSTREAM WATERS: A REVIEW AND SYNTHESIS OF THE SCIENTIFIC EVIDENCE (FINAL REPORT) (2015)).

Clean Water Rule directed federal agencies to utilize science-based factors to determine if wetlands and other waters have a "significant nexus" to foundational waters.[168] However, the Rule cautioned that "science does not provide bright line boundaries with respect to where 'water ends' for purposes of the CWA" but that principles of statutory construction would also play a role to develop "the outer bounds of the scope of the CWA."[169]

Industry groups, developers, and over a dozen states immediately challenged the Clean Water Rule, calling its fate into question.[170] The Trump administration sympathized with those concerns. The agencies repealed the Clean Water Rule in 2019[171] and redefined "waters of the United States" in a so-called "Navigable Waters Protection Rule" (NWPR).[172] The NWPR narrowly defined tributaries and adjacent wetlands and categorically excluded ephemeral streams.[173]

The EPA and the Corps identified 333 projects that would have required permits under the CWA prior to the NWPR but not under the Trump rule.[174] The agencies acknowledged that the effects on ephemeral streams, wetlands, and other aquatic resources could have "cascading and cumulative downstream effects," and that "the reduction in the jurisdictional scope of the CWA is resulting in significant, actual environmental harms."[175] Like the Clean Water Rule

168. Clean Water Rule: Definition of "Waters of the United States," 80 Fed. Reg. at 37,060.

169. *Id.* ("The agencies interpret specific aspects of the significant nexus standard in light of the science, the law, and the agencies' technical expertise.").

170. Timothy Cama, *States Sue to Block Obama's Water Rule*, THE HILL (June 29, 2015, 4:40 PM), https://thehill.com/policy/energy-environment/246435-three-states-sue-to-stop-obama-water-rule/ [https://perma.cc/NQK6-F849]; Timothy Cama, *Court Blocks Obama's Water Rule Nationwide*, THE HILL (Oct. 9, 2015, 10:55 AM), https://thehill.com/policy/energy-environment/256493-court-blocks-obamas-water-rule-nationwide/ [https://perma.cc/7KDT-VZL9].

171. Definition of "Waters of the United States"—Recodification of Pre-Existing Rules, 84 Fed. Reg. 56,626 (Oct. 22, 2019).

172. 33 C.F.R. § 328.3(a) (2020); *see also* The Navigable Waters Protection Rule: Definition of "Waters of the United States," 85 Fed. Reg. 22,250, 22,251-52 (Apr. 21, 2020).

173. 33 C.F.R. § 328.3(b), (c)(1), (c)(12); *see also* Pascua Yaqui Tribe v. U.S. Env't Prot. Agency, 557 F. Supp. 3d 949, 956 (D. Ariz. 2021) ("Between June 22, 2020 and April 15, 2021, the Corps made approved jurisdictional determinations under the NWPR of 40,211 aquatic resources or water features, and found that approximately 76% were non-jurisdictional.").

174. *Pascua Yaqui Tribe*, 557 F. Supp. 3d at 956.

175. *Id.* In *Pascua Yaqui Tribe*, the district court vacated the 2020 rule as arbitrary and capricious, finding both procedural and "fundamental, substantive flaws," and noting the seriousness of environmental harm if the 2020 rule remained in place during remand. *Id.* at 955.

before it, the NWPR triggered a firestorm of litigation, but this time the complaints were lodged primarily by public interest environmental groups and Native American tribes.[176]

The saga turned yet another page when President Biden took office. In his first week in the White House, President Biden issued an executive order on "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis," which is a companion order to the 30 by 30 order.[177] Executive Order 13,990 vows:

> to listen to the science; to improve public health and protect our environment; to ensure access to clean air and water; to limit exposure to dangerous chemicals and pesticides; to hold polluters accountable, including those who disproportionately harm communities of color and low-income communities; to reduce greenhouse gas emissions; to bolster resilience to the impacts of climate change; to restore and expand our national treasures and monuments; and to prioritize both environmental justice and the creation of the well-paying union jobs necessary to deliver on these goals.[178]

To effectuate this promise, Executive Order 13,990 directs agencies "to immediately review and, as appropriate and consistent with applicable law, take action to address the promulgation of [f]ederal regulations and other actions during the last 4 years that conflict with these important national objectives."[179] The Trump administration's NWPR falls squarely within this order.

In June 2021, the EPA and the Corps signaled their intent to restore the pre-2015 regulatory definition of "waters of the United States" while working to develop a new regulatory definition.[180]

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176. *See id.* at 950-51.

177. Exec. Order No. 13,990, 86 Fed. Reg. 7,037 (Jan. 25, 2021).

178. *Id.*

179. *Id.*

180. *EPA, Army Announce Intent to Revise Definition of WOTUS*, EPA (June 9, 2021), https://www.epa.gov/newsreleases/epa-army-announce-intent-revise-definition-wotus [https://perma.cc/CP3Y-ZVG9]. The reinstatement of the pre-2015 definition has been challenged in several circuits, with the Supreme Court accepting certiorari in *Sackett v. U.S. Environmental Protection Agency*, 8 F.4th 1075 (9th Cir. 2021), *cert. granted in part sub nom.*, 142 S. Ct. 896 (2022) (mem.) (No. 21-454). The Ninth Circuit rejected the Sacketts' argument that only wetlands with a continuous surface water connection to regulated waters could be regulated

During the rulemaking process, the agencies sought input specifically on "how climate change affects the chemical, physical, and biological integrity of the nation's waters."[181]

The Biden administration issued its proposed WOTUS rule in December 2021.[182] In addition to traditional navigable waters, interstate waters, and the territorial seas, and their adjacent wetlands, the proposed rule includes ephemeral streams that meet the significant nexus standard,[183] plus the following:

> most impoundments of "waters of the United States"; tributaries to traditional navigable waters, interstate waters, the territorial seas, and impoundments, that meet either the relatively permanent standard or the significant nexus standard; wetlands adjacent to impoundments and tributaries, that meet either the relatively permanent standard or the significant nexus standard; and "other waters" that meet either the relatively permanent standard or the significant nexus standard.[184]

The EPA and the Corps state that the proposed rule advances the goals of the CWA and bolsters resilience to climate change.[185] In particular, they explain that the "significant nexus" standard allows them to consider a changing climate when assessing whether upstream waters significantly affect foundational waters and allows them to consider the functions of streams, wetlands, and other waters that support the resilience and chemical, physical, or biological integrity of foundational waters.[186] Importantly, the agencies conclude that having a "significant nexus" turns in large

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and instead applied Justice Kennedy's "significant nexus" test to find that the wetlands in question were covered. *Id.* at 1091.

181. Notice of Public Meetings Regarding "Waters of the United States," 86 Fed. Reg. 41,911, 41,913 (Aug. 4, 2021).

182. Revised Definition of "Waters of the United States," 86 Fed. Reg. 69,372 (proposed Dec. 7, 2021) (to be codified at 33 C.F.R. pt. 328 and 40 C.F.R. pt. 120).

183. *Id.* at 69,385. The proposed rule follows Justice Kennedy's opinion in *Rapanos*, and builds on the scientific record compiled in support of Obama's Clean Water Rule, by defining "significant nexus" as "waters that either alone or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of traditional navigable waters, interstate waters, or the territorial seas (the 'foundational waters')." *Id.* at 69,373.

184. *Id.* at 69,385.

185. *Id.* at 69,386.

186. *Id.* at 69,394.

part on connectivity, which is "a foundational concept in hydrology and freshwater ecology."[187]

The proposed rule is not perfect, but its emphasis on connectivity, functionality, and resilience is encouraging. The rule's flexibility is both a strength and a weakness. For tributaries, impoundments, ephemeral streams, and wetlands, the proposed rule calls for case-by-case decision-making rather than imposing detailed, hard-and-fast standards, which leaves the foundational jurisdictional issue to be thrashed out in the context of individual permits and case-by-case rulings. The lack of certainty worries agricultural interests and developers.[188] On the upside, however, the proposed rule allows for adaptation and incorporation of evolving conditions and new knowledge. As a practical matter, the proposed rule may be more durable than its predecessors because it is difficult to bring a broad-sweeping facial challenge to this type of rule, and when litigation does arise, the science and policy issues involved in reviewing a single permit are more discrete and straightforward, with less complexity, than litigation over "every possible future permit application."[189]

It is fair to ask whether a regulatory change is sufficient. If Congress were to define WOTUS to include ephemeral streams, tributaries, and ecologically important wetlands and ponds, the definition may be less likely to be tied up in court, meaning that it would be more durable and more likely to advance the CWA's goal of chemical, biological, and physical integrity.[190] Yet the agencies would still have to determine what is ecologically important, perhaps using similar criteria as they have in the Biden rule, and

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187. *Id.* at 69,396 ("Connectivity is the degree to which components of a system are joined, or connected, by various transport mechanisms and is determined by the characteristics of both the physical landscape and the biota of the specific system."); *see supra* notes 26-29 and accompanying text (discussing connectivity).

188. *See* Jeff Beach, *Ag Groups Seek Return of Exemptions in WOTUS Proposal*, AGWEEK (Jan. 24, 2022, 5:30 AM), https://www.agweek.com/news/policy/ag-groups-seek-return-of-exemptions-in-wotus-proposal [https://perma.cc/423K-8UHY].

189. Dan Farber, *The Quagmire of Clean Water Act Jurisdiction*, LEGAL PLANET (Jan. 6, 2022), https://legal-planet.org/2022/01/06/the-quagmire-of-clean-water-act-jurisdiction/ [https://perma.cc/ 2XEU-U62Z].

190. Constitutional challenges would be triggered if the definition went beyond the federal Commerce Clause power, but statutory challenges such as those asserted in *Rapanos v. United States*, 547 U.S. 715 (2006), and *United States v. Riverside Bayview Homes, Inc.*, 474 U.S. 121 (1985), would not.

that determination in and of itself would be controversial and subject to challenge. Most importantly, Congress has been, and continues to be, unable to make substantive revisions in the nation's environmental laws, and gridlock has become the norm rather than the exception in federal legislative affairs.[191] The regulatory fix—finalizing the Biden administration's WOTUS rule—would be a meaningful step toward the 30 by 30 goals, in terms of both water quality and conservation of the physical and biological attributes of the nation's freshwater resources.

B. WSRA

Designated wild and scenic rivers and river corridors are an important component of the nation's system of protected lands and, in particular, its protected riparian areas. Strengthening the protection of free-flowing rivers is essential for reaching the goals of the 30 by 30 initiative.[192]

Prior to 1968, the national policy was "to dam, divert, channelize, and develop rivers to support navigation, irrigation, and other consumptive water uses."[193] Today, there are more than 80,000 dams in the United States, impacting around 20 percent of the nation's rivers.[194] With the passage of the Wild & Scenic Rivers Act (WSRA) in 1968,[195] Congress expressed its intent to protect at least some free-flowing rivers in order to maintain their outstanding natural, cultural, or recreational values.[196] As of 2019, 226 rivers and 13,413 river miles—less than 0.5 percent of the nation's rivers—were protected in forty-one states.[197]

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191. *See* Sandra Zellmer, *Treading Water While Congress Ignores the Nation's Environment*, 88 NOTRE DAME L. REV. 2323, 2366-67 (2013).

192. *See supra* notes 76-79, 93 and accompanying text (discussing attributes of free-flowing rivers and streams).

193. Michael C. Blumm & Max M. Yoklic, *The Wild and Scenic Rivers Act at 50: Overlooked Watershed Protection*, 9 MICH. J. ENV'T & ADMIN. L. 1, 3 (2019).

194. *About the WSR Act*, NAT'L WILDLIFE RIVERS SYS., https://www.rivers.gov/wsr-act.php [https://perma.cc/CUD7-5KT3]; *see* Anna Lieb, *The Undamming of America*, PBS NOVA (Aug. 12, 2015), https://www.pbs.org/wgbh/nova/article/dam-removals/ [https://perma.cc/92BM-UF2Z].

195. Wild and Scenic Rivers Act of 1968, Pub. L. No. 90-542, 82 Stat. 906 (1968) (codified as amended at 16 U.S.C. §§ 1271-1287).

196. Blumm & Yoklic, *supra* note 193, at 3.

197. *About the WSR Act*, *supra* note 194.

Eligible river segments are free flowing and possess one or more of the "outstandingly remarkable values" (ORVs) delineated in the statute, that is, "scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values."[198] Designated rivers or river segments may be classified as wild, scenic, or recreational.[199] "Wild" rivers are intended to "represent vestiges of primitive America," and must be "free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted."[200] "Scenic" rivers must also be "free of impoundments" but may be "accessible in places by roads."[201] "Recreational" rivers are "readily accessible" and "may have some development along their shorelines" and may have been subject to past impoundment or diversion.[202]

Once designated, the river's ORVs guide its management.[203] Specifically, Congress directed the river management agencies to administer each segment within their jurisdiction so "as to protect and enhance the values which caused it to be included" in the WSRA system.[204] To do so, the agency must prepare a comprehensive management plan (CMP) for the river and adjacent lands

198. 16 U.S.C. § 1271. Congress may establish a river's ORVs in the enabling legislation for that river, but if it does not, the agency charged with administering the river corridor must identify ORVs and "prepare a comprehensive management plan ... to provide for the protection of the river values." *Id.* § 1274(d)(1). Prior to completion of the comprehensive management plan, the managing agency must give "primary emphasis" to "esthetic, scenic, historic, archeologic, and scientific features." *Id.* § 1281(a).

199. *See id.* § 1273(b).

200. *Id.* § 1273(b)(1).

201. *Id.* § 1273(b)(2).

202. *Id.* § 1273(b)(3). In any case, lands within the river corridor are withdrawn from entry, sale, or other disposition (including mining) under federal public land laws. *See id.* § 1280(a)(iii).

203. *Id.* § 1274(d)(1).

204. *Id.* § 1274(d)(1); *see id.* § 1281(a) ("Each component of the national wild and scenic rivers system shall be administered in such manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values."). Interagency guidance has interpreted this requirement as imposing "a nondegradation and enhancement policy for all designated river areas regardless of classification." National Wild and Scenic Rivers System; Final Revised Guidelines for Eligibility, Classification and Management of River Areas, 47 Fed. Reg. 39,454, 39,458 (Sept. 7, 1982). The Guidelines note that "[s]pecific management strategies will vary according to classification but will always be designed to protect and enhance the values of the river area." *Id.* at 39,459.

within the river corridor.[205] The WSRA provides: "The plan shall address resource protection, development of lands and facilities, user capacities, and other management practices necessary or desirable to achieve the purposes of this chapter. The plan shall be coordinated with and may be incorporated into resource management planning for affected adjacent Federal lands."[206] In preparing the plan, the river managing agency must consult with state and local governments and the interested public.[207] Agency guidance further specifies that management plans should include:

> [g]eneral principles for any land acquisition which may be necessary; the kinds and amounts of public use which the river area can sustain without impact to the values for which it was designated; and specific management measures which will be used to implement the management objectives for each of the various river segments and protect esthetic, scenic, historic, archeologic and scientific features.[208]

Prior to completion of the management plan, the managing agency must give "primary emphasis" to "esthetic, scenic, historic, archeologic, and scientific features" of the river and adjacent lands.[209] Adjacent lands are generally limited to "one-quarter mile from the ordinary high water mark on each side of the river."[210] According to the Eighth Circuit, "[b]oundaries must be adequate to achieve the purposes of the Act and may include lands that serve as

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205. 16 U.S.C. § 1274(d)(1). This provision applies to rivers designated on or after January 1, 1986. *Id.* § 1274(d)(2). Earlier designations are reviewed for conformity with the WSRA's provisions "through regular agency planning processes." *Id.*; *see* Wilderness Soc'y v. Tyrrel, 918 F.2d 813, 817 (9th Cir. 1990) ("[F]or rivers designated prior to 1986, the provision requires only a review of pre-existing plans rather than a requirement that such plans be prepared.").

206. 16 U.S.C. § 1274(d)(1); *see id.* § 1281(a) (stating that, in administering a designated river, "primary emphasis shall be given to protecting its esthetic, scenic, historic, archeologic, and scientific features," and that management plans "may establish varying degrees of intensity for its protection and development, based on the special attributes of the area").

207. *Id.* § 1274(d)(1).

208. National Wild and Scenic Rivers System; Final Revised Guidelines for Eligibility, Classification and Management of River Areas, 47 Fed. Reg. at 39,458.

209. 16 U.S.C. § 1281(a).

210. *Id.* § 1275(d). Congress adopted a unique boundary provision for Alaska. *See id.* § 1285b(1) (limiting WSRA river boundaries in Alaska to "an average of not more than [640] acres per mile on both sides of the river").

buffers where necessary to protect and enhance ORVs."[211] An agency's boundary decision will be upheld so long as it is rationally connected to the protection of the river's ORVs.[212]

Along with the river management plan, designated rivers are protected in two additional ways. First, the Federal Energy Regulatory Commission (FERC) is prohibited from licensing the construction of any hydroelectric facility on or directly affecting any designated river segment.[213] In addition, federal water resource development projects that would cause adverse effects on ORVs are prohibited.[214]

There are several ways in which the WSRA could be implemented in a more robust fashion to advance biodiversity and climate resilience. Much has changed in our understanding of river ecology and of river management approaches since enactment in 1968.[215] The goals of 30 by 30 could be advanced by strengthening the agencies' planning and implementation requirements to reflect this half century of learning in protecting the rivers' ORVs. There are a variety of specific reforms that would advance the WSRA's promise of comprehensive watershed protection, three of which are most noteworthy for the purposes of biodiversity and climate resilience.

The first is that more rivers should be designated. This is beyond the agencies' authority and thus ventures beyond the scope of this Article, but it deserves mention nonetheless.[216] Congress's interest in WSRA designations has waxed and waned over the years, but at

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211. Blumm & Yoklic, *supra* note 193, at 28.

212. *See* Sokol v. Kennedy, 210 F.3d 876, 879 n.8 (8th Cir. 2000).

213. 16 U.S.C. § 1278(a); *see* Idaho Rivers United v. Hudson, 173 F. Supp. 3d 1027, 1032-33 (D. Idaho 2016) (finding that the Forest Service's failure to consider the effects of logging trucks on a designated river's ORVs was unlawful even though the trucks were operated on private land within the river corridor); *infra* Part IV.C.

214. 16 U.S.C. § 1278(a); *see* Sierra Club N. Star Chapter v. Pena, 1 F. Supp. 2d 971, 979 (D. Minn. 1998) (upholding the Secretary of the Interior's interpretation of "water resources project" to include "any type of construction which would result in any change in the free-flowing characteristics of a [wild and scenic] river," including a bridge (alteration in original)).

215. *See* INTERAGENCY WILD AND SCENIC RIVERS COORDINATING COUNCIL, EVOLUTION OF THE WILD AND SCENIC RIVERS ACT: A HISTORY OF SUBSTANTIVE AMENDMENTS 1968-2013 (2014).

216. Agencies are directed to study rivers within their jurisdiction and to make recommendations for additions to the WSRA system, and they should utilize this authority broadly. *See* 16 U.S.C. § 1275(a). Notably, "[e]very such study and plan shall be coordinated with any water resources planning involving the same river which is being conducted pursuant to the Water Resources Planning Act." *Id.*

present there are thousands of worthy candidates for inclusion, including 3,200 segments in the National Rivers Inventory maintained by the National Park Service (NPS).[217] "Restoration rivers" in particular—those that would qualify for inclusion if impoundments were removed and flows restored—should be given serious consideration.[218] According to Professor Blumm, "[t]he statute's text and purpose are broad enough to include restoration rivers, and Congress clearly has the authority to designate them."[219] Blumm notes that there are probably as many potentially eligible restoration rivers as there are eligible rivers on the National Inventory.[220]

Second, agencies could advance the goals of 30 by 30 through the river management approaches delineated in their WSRA guidance and implemented in their management plans. The agencies' guidance, adopted in 1982, is woefully outdated, and is "largely inadequate to protect the rivers in the system from the ecological, developmental, and political threats they face."[221] Agency and interagency guidance should be updated to incorporate scientific advancements and to better achieve the statutory goal of protecting and enhancing the ORVs of designated rivers and the WSRA system as a whole.[222] Moreover, the guidance should expand the scope of recognized ORVs to promote biodiversity by including birds and other riparian species that rely on rivers for habitat.[223] Upon review, courts should ensure that new and revised management plans are

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217. *Rivers: Nationwide Rivers Inventory*, NAT'L PARK SERV., https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm [https://perma.cc/8T64-FXQ3].

218. *See* Blumm & Yoklic, *supra* note 193, at 57-58.

219. *Id.* at 55. Congress specifically endorsed the inclusion of "restoration rivers" in early versions of the WSRA, but that does not appear explicitly in the text of the 1968 Act. *Id.* at 56 n.324.

220. *Id.* at 57-58. Agencies should include the goal of restoring degraded but otherwise worthy rivers in their guidance. *See id.*

221. *Id.* at 4; *see also id.* at 56 n.323 (noting that the Bureau issued a revised WSRA management guide in 2012, but the other managing agencies have not published management guidance since 1982).

222. *See* Keiter, *supra* note 25, at 80 (observing that the WSRA could be strengthened by knitting it into a more intentional landscape-scale conservation network).

223. *See* 16 U.S.C. § 1271 (including fish and wildlife among recognized ORVs). In *Friends of Yosemite Valley v. Norton*, 194 F. Supp. 2d 1066, 1090 (E.D. Cal. 2002), *aff'd in part*, 348 F.3d 789 (9th Cir. 2003), the court refused to require the National Park Service (NPS) to recognize Peregrine falcons and California spotted owls as biological ORVs in its management plan for a designated river in a national park. However, nothing would prevent river managing agencies from including river-related species as ORVs if they chose to do so.

consistent with updated guidance and with the "protect and enhance" objective of the WSRA.[224]

Finally, managing agencies could do more to "protect and enhance" designated segments by claiming federal reserved water rights wherever upstream diversions threaten ORVs.[225] The WSRA explicitly reserves federal water rights when necessary to preserve ORVs. "Designation of any stream or portion thereof as a national wild, scenic or recreational river area shall not be construed as a reservation of the waters of such streams for purposes other than those specified in this chapter, or in quantities greater than necessary to accomplish these purposes."[226]

Although this provision is stated in the negative, it is clear that WSRA designations reserve federal water rights in quantities "necessary to accomplish" the purposes of the WSRA.[227] The minimum necessary amount of water for a designated river includes streamflows in sufficient quantities to support the river's free-flowing condition and to protect and enhance its ORVs, including ecological components and water quality.[228] Even state courts that are otherwise hostile to federal reserved rights have found that the WSRA plainly expresses congressional intent to reserve sufficient water to fulfill the purposes of the Act, as it would be "anomalous ... to say

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224. 16 U.S.C. §§ 1274(d)(1), 1281(a). For the most part, courts have given relatively light scrutiny to river management plans—for example, *In re Montana Wilderness Ass'n*, 807 F. Supp. 2d 990, 1000 (D. Mont. 2011), *aff'd in part*, 725 F.3d 988 (9th Cir. 2013) (holding that the agency "carried out the unenviable task of balancing solitude and recreation" in its plan)—though there are a few exceptions—for example, *Friends of Yosemite Valley v. Scarlett*, 439 F. Supp. 2d 1074, 1077 (E.D. Cal. 2006), *aff'd*, 520 F.3d 1024 (9th Cir. 2008) (holding that the Park Service's plan did not adequately address user capacities in a heavily used river corridor).

225. Blumm & Yoklic, *supra* note 193, at 57.

226. 16 U.S.C. § 1284(c).

227. *See* Blumm & Yoklic, *supra* note 193, at 51; CYNTHIA BROUGHER, CONG. RSCH. SERV., RL30809, THE WILD AND SCENIC RIVERS ACT AND FEDERAL WATER RIGHTS (2009). Neither does the WSRA's disclaimer of any "claim or denial" to an exemption from state water law displace necessary federal reserved rights. Blumm & Yoklic, *supra* note 193, at 53 n.295 (citing 16 U.S.C. § 1284(b)).

228. Blumm & Yoklic, *supra* note 193, at 52 n.287. *But see* Trout Unlimited v. U.S. Dep't of Agric., 320 F. Supp. 2d 1090, 1095, 1114-15 (D. Colo. 2004) (finding that a Forest Service right-of-way permit for a diversion in the headwaters of the Cache la Poudre River did not violate the WSRA by failing to include a "minimum bypass flow" requirement which would prevent the tributary from drying up in winter months and affecting listed fish species recognized as one of the ORVs).

that the Act which was expressly created to preserve free-flowing rivers failed to provide for the reservation of water in the rivers."[229]

In sum, to effectuate the WSRA's promise of comprehensive watershed protection and, consequently, the biodiversity and climate resilience goals of 30 by 30, more rivers should be designated, including restoration rivers. Agency guidance should also be updated and expanded to fulfill the statutory goal of protecting and enhancing the ORVs of designated rivers and the WSRA system. Finally, agencies should be more assertive in seeking federal reserved water rights to preserve streamflows and thereby protect and enhance ORVs.

C. The Federal Power Act

Conventional hydroelectric generators provide 6 percent to 7 percent of electricity generation in the United States each year.[230] Hydropower is a renewable source of energy that does not burn fossil fuels and does not emit greenhouse gases.[231] Although hydropower may be a component of a carbon-free future, it comes at a high cost to biodiversity. Dams alter fundamental physical and biological processes. In addition, turbines kill fish, and the water released from hydropower dams is low in dissolved oxygen and high in temperature, dissolved metals, and supersaturated gases.[232]

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229. Potlatch Corp. v. United States, 12 P.3d 1256, 1258 (Idaho 2000); *see also* Riverside Irrigation Dist. v. Andrews, 568 F. Supp. 583, 587 (D. Colo. 1983), *aff'd*, 758 F.2d 508 (10th Cir. 1985); Fitzgerald v. Harris, 549 F.3d 46, 55 (1st Cir. 2008).

230. *Hydroelectric Generators Are Among the United States' Oldest Power Plants*, U.S. ENERGY INFO. ADMIN. (Mar. 13, 2017), https://www.eia.gov/todayinenergy/detail.php?id=30312 [https://perma.cc/4L3V-B7Z9].

231. HYDROPOWER EXPLAINED: HYDROPOWER AND THE ENVIRONMENT, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/hydropower/hydropower-and-the-environment.php [https://perma.cc/FML4-LLP3]. Although hydropower operations do not emit carbon dioxide directly into the air like other sources of electricity, reservoirs emit methane. Bridget R. Deemer, John A. Harrison, Siyue Li, Jake J. Beaulieu, Tonya Delsontro, Nathan Barros, José F. Bezerra-Neto, Stephen M. Powers, Marco A. Dos Santos & J. Arie Vonk, *Greenhouse Gas Emissions from Reservoir Water Surfaces: A New Global Synthesis*, 66 BIOSCI. 949, 949 (2016).

232. Michael C. Blumm & Michael Benjamin Smith, *Salmon and the Clean Water Act: An Unfinished Agenda*, 51 ENV'T L. REP. 10109, 10109 (2021).

Most hydropower projects were built decades ago, long before fish and wildlife protection was a priority.[233] The construction of hydroelectric dams in the United States exploded between the 1940s and 1970s, spurred by World War II and postwar economic growth.[234]

Congress passed the Federal Power Act (FPA) in 1920 to promote systematic development of the nation's waterways for hydropower.[235] The FPA requires nonfederal hydropower projects to undergo licensing and relicensing every fifty years.[236] Absent a federal license, the FPA prohibits the maintenance of any unlicensed dam in a navigable waterway.[237]

FPA-licensed dams remain the single largest influence on streamflows in many watersheds.[238] Because most dams were built in the last century, relicensing, in particular, raises important opportunities to improve water quality, fisheries, and wildlife habitat.[239] Several provisions of the FPA warrant close attention here.

First, section 10(a) of the FPA envisions coordinated planning by directing the licensing agency, FERC, to determine whether a project is "best adapted to a comprehensive plan for improving or developing a waterway."[240] In doing so, FERC must consider an

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233. *A Brief History of Hydropower*, INT'L HYDROPOWER ASS'N, https://www.hydropower.org/iha/discover-history-of-hydropower [https://perma.cc/6HMW-2GJH].

234. *Id.*

235. Fed. Power Comm'n v. Union Elec. Co., 381 U.S. 90, 98 (1965); Federal Water Power Act (FPA) of June 10, 1920, Pub. L. No. 66-280, ch. 285, § 10, 41 Stat. 1063, 1068-70 (codified at 16 U.S.C. § 792). Congress also wanted to prevent hydropower monopolies while giving licensees security in their investments during the license term. *See* 16 U.S.C. § 803(h).

236. 16 U.S.C. §§ 791a-823d. Congress's objective in passing the FPA was "unapologetically promotional"—to encourage private investment in hydropower development by creating an efficient approach to licensing. Peter Huber, *Electricity and the Environment: In Search of Regulatory Authority*, 100 HARV. L. REV. 1002, 1029 (1987).

237. 16 U.S.C. § 817(1); *cf.* United States v. Chandler-Dunbar Water Power Co., 229 U.S. 53, 69 (1913) (denying compensation for lost revenue when government required removal of dam).

238. *See* Michael C. Blumm & Viki A. Nadol, *The Decline of the Hydropower Czar and the Rise of Agency Pluralism in Hydroelectric Licensing*, 26 COLUM. J. ENV'T L. 81, 82 (2001).

239. *See generally* Todd Griset, *FERC Relicensing and Annual Licenses*, ENERGY POL'Y UPDATE (May 5, 2016), http://energypolicyupdate.blogspot.com/2016/05/ferc-relicensing-and-annual-licenses.html [https://perma.cc/9VBZ-5HKV] (discussing the FPA relicensing process).

240. 16 U.S.C. § 803(a) (stating that any licensed project "shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, for the adequate protection,

array of public interest factors, including "preserving reaches of wild rivers and wilderness areas, the preservation of anadromous fish for commercial and recreational purposes, and the protection of wildlife."[241] FERC need not create its own comprehensive plan from scratch; rather, it may rely upon plans prepared by other agencies (state or federal).[242]

Next, the FPA includes three unique provisions that give other agencies authority to impose environmental conditions on FERC licenses, thereby enhancing section 10(a)'s coordinated planning provision.[243] The first of these, found in section 4(e), authorizes the Secretaries of the Interior and Agriculture to issue mandatory substantive conditions for the "adequate protection and utilization" of reservations within their jurisdiction.[244] This authority covers all national forest lands, federal Indian reservations, Bureau lands, National Wildlife Refuge System and NPS lands, and lands associated with reclamation projects.[245] FERC may not reject section 4(e) conditions, though it may express disagreement or simply refuse to issue the license.[246] Courts will remand license conditions

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mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes referred to in section [4](e)..."). For background on the planning provision, which was included in the 1920 FPA, see D. H. Cole, *Reviving the Federal Power Act's Comprehensive Plan Requirement: A History of Neglect and Prospects for the Future*, 16 ENV'T L. 639, 652-63 (1986).

241. Udall v. Fed. Power Comm'n, 387 U.S. 428, 450 (1967).

242. *See* 16 U.S.C. § 803(a)(2)(A); *see, e.g.*, San Bernardino Valley Audubon Soc'y v. FERC, 242 F. App'x 462, 465 (9th Cir. 2007) (upholding FERC's decision that relicensing was consistent with a Forest Plan where the Forest Service stated that license conditions were "consistent with the [Plan's] goals, objectives, standards, and guidelines"); Rainsong Company, 65 FERC ¶¶ 61,104, 61,576 (1993) (rejecting a proposal as inconsistent with a Forest Plan).

243. *See* 16 U.S.C. §§ 797(e), 803(j), 811. For details, see GEORGE CAMERON COGGINS & ROBERT L. GLICKSMAN, 4 PUBLIC NATURAL RESOURCE LAW § 37:26 (2d ed. 2022); 18 C.F.R. §§ 4.30-4.39.

244. 16 U.S.C. § 797(e). The conditioning requirement for federal reservations is found in the first sentence of § 797(e). *See id.*

245. *See id.*; Adell Louise Amos, *Hydropower Reform and the Impact of the Energy Policy Act of 2005 on the Klamath Basin: Renewed Optimism or Same Old Song?*, 22 J. ENV'T L. & LITIG. 1, 5-6 (2007). The federal land management agencies may only impose license conditions of section 4(e) of the FPA on projects that are located within their reservations, not on those that merely affect a federal reservation. *See* Escondido Mut. Water Co. v. La Jolla Band of Mission Indians, 466 U.S. 765, 772, 779 (1984).

246. *See* S. Cal. Edison Co. v. FERC, 116 F.3d 507, 516 (D.C. Cir. 1997); *see also Escondido*, 466 U.S. at 777-79 (holding that, although federal agencies do not wield blanket veto power,

if they are not reasonably related to the protection of the federal reservation.[247]

A separate, largely procedural provision within section 4(e) requires FERC to give "equal consideration" to the environmental consequences of licensing and relicensing, including fish, wildlife, and habitat.[248] However, "equal consideration" is not the same as "equal treatment"; rather, the environment must be given "full and genuine consideration" with other conflicting interests.[249] In the end, this provision allows FERC to license a facility despite environmental impacts if it finds that the benefits of hydropower production outweigh nonpower values and are, therefore, in the "public interest."[250]

The second mandatory conditioning provision involves fish passage. Section 18 requires FERC to condition licenses on prescriptions for fishways as directed by the Secretary of the Interior.[251] Fishway prescriptions will be upheld, despite their expense, if the Secretary provides substantial evidence to support the recommended prescriptions for protecting fisheries that would otherwise be adversely affected by a particular project.[252]

The third conditioning provision, section 10(j), authorizes, but does not compel, the inclusion of license conditions recommended

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FERC must include its section 4(e) conditions in its licenses); City of Tacoma v. FERC, 460 F.3d 53, 67 (D.C. Cir. 2006) (holding that the Secretary of the Interior may impose conditions to mitigate the effect of the project to the extent reasonably related to protecting the reservation).

247. *See Escondido*, 466 U.S. at 777.

248. 16 U.S.C. § 797(e). The "equal consideration" requirement, which the Electric Consumers Protection Act of 1986 added to the FPA, is found in the last sentence of § 797(e): "[I]n addition to the power and development purposes for which licenses are issued, [FERC] shall give equal consideration to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of, fish and wildlife (including related spawning grounds and habitat), the protection of recreational opportunities, and the preservation of other aspects of environmental quality." *Id.*

249. California v. FERC, 966 F.2d 1541, 1550 (9th Cir. 1992) (quoting 132 CONG. REC. S15,107 (statement of John Bennett Johnston, Jr.)).

250. Conservation L. Found. v. FERC, 216 F.3d 41, 45 (D.C. Cir. 2000).

251. 16 U.S.C. § 811.

252. *See* Am. Rivers v. FERC, 201 F.3d 1186, 1192 n.10 (9th Cir. 2000) (FERC must impose fish passage conditions in the relicensing process); Wis. Power & Light Co. v. FERC, 363 F.3d 453, 461, 464-65 (D.C. Cir. 2004) (finding that fishway requirements were supported by "substantial evidence" where Secretary cited relevant studies concerning turbine mortality rates, entrainment protection devices, and new prototype fishways, supported by the state agency's findings that the dam was a complete barrier to upstream fish movement).

by federal, state, and tribal fish and wildlife agencies for the "protection, mitigation and enhancement" of "fish and wildlife (including related spawning grounds and habitat)."[253] Under section 10(j), FERC must give "considerable deference" to fish and wildlife agencies' recommendations, but FERC may reject or modify the recommendations if it follows detailed statutory procedures and explains its reasoning.[254] In this sense, section 10(j) is much like section 4(e)'s "equal consideration" provision, though it gives weight to the expertise of other federal, state, and tribal agencies.[255]

Together, these conditioning provisions create a form of "agency pluralism" with potential for breaking down the jurisdictional barriers that make watershed protection, and sustainable water management, so difficult.[256] While the requirements of the conditioning provisions are complex and cumbersome, they are also highly useful for integrated watershed planning and, in turn, biodiversity and climate goals.[257] The Edwards Dam decision is a compelling example, where FERC, for the first time, denied relicensing due to environmental impacts.[258] FERC applied sections 4(e), 10(j), and 18 to determine that relicensing was not in the public interest where the dam blocked passage of anadromous fish species and impaired recreational fishing opportunities. The Secretaries of Commerce and of the Interior would have required construction of "state-of-the-art" fishways; FERC found that any other conditions short of dam removal, including fishways, would be ineffective, and

253. 16 U.S.C. § 803(j)(1).

254. *See* City of Tacoma v. FERC, 460 F.3d 53, 64-65, 72, 78 (D.C. Cir. 2006) (upholding a condition that significantly increased downstream flow requirements, even though the resulting loss of hydropower would make the project uneconomic); *Conservation L. Found.*, 216 F.3d at 48 (upholding FERC's denial of conditions where FERC found that Interior's recommendation would curtail power production and may actually do more harm than good to the region's fish habitats); *see also Am. Rivers*, 201 F.3d at 1203 n.23 (stating that FERC's reclassification, rejection, or modification of agency recommendations under section 4(e) must be based on "substantial evidence").

255. *See supra* notes 245-47 and accompanying text.

256. *See supra* notes 58-59, 116-19, 145-50 and accompanying text.

257. *See* Blumm & Nadol, *supra* note 238, at 84, 129 (concluding that greater agency pluralism in hydroelectric licensing would improve streamflows); *see also* Ruth Langridge, *Changing Legal Regimes and the Allocation of Water Between Two California Rivers*, 42 NAT. RES. J. 283, 284-85 (2002) (describing how dispersed decision-making authorities among federal, state, tribal, and local agencies promote greater equity in water allocation decisions).

258. Edwards Mfg. Co., 81 FERC ¶¶ 61,255, 62,211 (1997).

costs would exceed revenues generated by continued operation.[259] The operator initially resisted, but subsequently donated the dam and adjacent riverside property to the State of Maine, which agreed to conduct the cleanup and removal.[260] Since the dam was removed in 1999, water quality has improved and fisheries and other aquatic species have rebounded.[261] As a result, the Edwards Dam removal has generated a great deal of interest in dam removal and watershed restoration.[262]

Dam removal and river restoration, in turn, can result in watershed protection, but this has not occurred in a systemic fashion.[263] As Professor Dave Owen and others have stated, the decision on where, when, and how to remove a dam on any given river would benefit greatly from "coordinated planning and action."[264]

FERC has never embraced its duty to prepare comprehensive watershed plans under section 10(a), perhaps due to the complexity of long-range, systemic planning and the difficulties of timely coordination with other agencies, and perhaps because it prioritizes the more detailed "conditioning" requirements of sections 4(e), 10(j),

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259. *Id.* ¶¶ 62,203-04.

260. COGGINS & GLICKSMAN, *supra* note 243, § 37:30.

261. *See* Angela T. Bednarek, *Undamming Rivers: A Review of the Ecological Impacts of Dam Removal*, 27 ENV'T MGMT. 803, 805 (2001).

262. Subsequent dam removals include the Condit and Elwha dams in Washington. *See* David H. Becker, *The Challenges of Dam Removal: The History and Lessons of the Condit Dam and Potential Threats from the 2005 Federal Power Act Amendments*, 36 ENV'T L. 811, 813 (2006); Ian McCluskey, *Removing Condit Dam Spurred Hopes, but It Also Begged Questions the White Salmon River Is Slowly Answering*, OPB (Oct. 16, 2021, 8:00 AM), https://www.opb.org/article/2021/10/16/with-condit-dam-removed-10-years-ago-hopes-have-flowed-with-the-restoration-of-the-white-salmon-river/ [https://perma.cc/Z24X-YEME] (describing postremoval revegetation and fish recovery). Four PacifiCorp dams in the Klamath Basin are slated for removal in the 2020s. *See* James C. Ish, *A Road Map to Restoring Rivers: How the Klamath Basin Restoration Agreement Might Influence Future Dam Removal and River Restoration Projects*, 60 NAT. RES. J. 261, 276-78 (2020) (describing the Klamath Agreement as an example of how successful removal projects, followed by riparian restoration, can be accomplished through "continuous widespread stakeholder involvement").

263. *See* Dave Owen & Kim Sager-Fradkin, *The Law and Ecology of Dam Removal*s, 3 ROCKY MTN. MIN. L. FOUND. SPEC. INST.: WATER L. INST. 2-1 (2020).

264. *See id.* at 2-8 (arguing that coordinated planning and decision-making about relicensing or removal of multiple dams would yield significant benefits "both in increased environmental benefits and in minimizing losses of hydropower"); Blumm & Nadol, *supra* note 238, at 119-20 n.249 (noting that, of FERC's various relicensing alternatives for Edwards Dam, "only the dam removal alternative was consistent with all of the relevant comprehensive plans").

and 18.[265] Indeed, FERC has argued it need not prepare an actual plan for the development of a river basin but may approve a license so long as it finds that the individual project contributes in some way to the beneficial use of the waterway.[266] With few exceptions,[267] courts have granted FERC broad discretion, indicating that the judiciary does not take the planning provision very seriously either.[268]

Despite individual success stories, such as the Edwards Dam, the lack of planning puts FERC's current relicensing processes "at odds with emerging best practices for climate change adaptation."[269] Moreover, FERC has not done enough to account for extreme climatic events, such as flooding and drought.[270] Integrated water

265. *See* A. DAN TARLOCK, LAW OF WATER RIGHTS AND RESOURCES § 9:28 (2010); Owen & Sager-Fradkin, *supra* note 263, at 2-9 (noting that the FPA "appears to obligate FERC to make its dam-licensing decisions pursuant to basinwide plans, but the agency has systematically ignored that obligation, with the acquiescence of the courts"); Joshua H. Viers & Daniel M. Nover, *Too Big to Fail: Limiting Public Risk in Hydropower Licensing*, 24 HASTINGS ENV'T L.J. 143, 147 (2018) (stating that FERC has not yet moved toward "integrated water resources management and planning, which promotes the coordinated development and management of water resources to maximize social benefit while sustaining ecosystems").

266. Cole, *supra* note 240, at 644; *Report of the Committee on Part I Regulations*, 10 ENERGY L.J. 399, 414 (1989).

267. The exceptions appear to arise when other statutes, such as the ESA or NEPA, are violated as well. *See* Am. Rivers v. FERC, 895 F.3d 32, 55 (D.C. Cir. 2018) (remanding a licensing decision that had relied upon a flawed biological opinion and environmental assessment); LaFlamme v. FERC, 852 F.2d 389, 403 (9th Cir. 1988) (ordering FERC to consider cumulative impacts under NEPA and the need for a comprehensive plan under the FPA); *Report of the Committee on Part I Regulations*, *supra* note 266, at 413 (observing tendency "to combine the otherwise distinct requirements to consider a 'comprehensive plan' pursuant to ... the FPA and to consider 'cumulative impacts' on the environment" under NEPA); *see also* Nat'l Wildlife Fed'n v. FERC, 801 F.2d 1505, 1512-13 (9th Cir. 1986) (finding no evidence to support the refusal to develop a plan for the Columbia basin and remanding the matter as arbitrary and capricious without deciding whether the FPA requires a comprehensive plan).

268. *See* Fed. Power Comm'n v. Idaho Power Co., 344 U.S. 17, 21 (1952) ("[T]he determination ... that the project adopted 'shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan ... is an administrative, not a judicial, decision."); Brady v. FERC, 416 F.3d 1, 9-10 (D.C. Cir. 2005) (holding that FERC could issue a license though the state agency had not completed a comprehensive plan); Nat'l Wildlife Fed'n v. FERC, 912 F.2d 1471, 1473, 1475 (D.C. Cir. 1990) (upholding FERC's refusal to consider the effects of a second phase of a project in which the licensed dam would be greatly expanded).

269. Viers & Nover, *supra* note 265, at 147.

270. *See id.*; Owen & Sager-Fradkin, *supra* note 263, at 2-9. Interestingly, in 2020, representatives of the hydropower industry entered into a memorandum of understanding with environmental groups, which promises to increase coordinated planning in order to promote climate resilience and biodiversity. *See Joint Statement of Collaboration on U.S. Hydropower: Climate Solution and Conservation Challenge*, STAN. UNIV. UNCOMMON

management planning would help FERC and project operators understand, predict, and prepare for extreme events and other effects of climate change.[271]

The Edwards Dam example demonstrates how existing provisions of the FPA can be utilized to promote both biodiversity and climate resilience. In some cases, this may require dam removal. In all cases, it will require careful, comprehensive watershed planning and coordination with other water management and wildlife agencies, which may include mitigating conditions such as fishways and other strategies.[272] FERC's authority over nonfederal hydroelectric facilities gives it a significant role to play in conserving 30 percent of the nation's freshwater resources by 2030, but it must do more to utilize its existing authorities, especially as relates to coordinated planning.

D. Federal Dams and the ESA

In contrast to the FPA's provisions for nonfederal projects, hydropower projects constructed and operated by federal agencies have no overarching planning requirement or licensing program. Individual authorizations, manuals, and operating plans provide a patchwork of disparate management approaches for federal dams.[273] This leaves a significant gap in freshwater conservation, for there are hundreds of federal projects operated by the Army Corps of

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DIALOGUE (Oct. 13, 2020), https://woods.stanford.edu/sites/g/files/sbiybj5821/f/hydropower_uncommon_dialogue_joint_statement.pdf [https://perma.cc/LY43-VJYV]. The statement was followed by a joint proposal. CLIMATE CHANGE, RIVER CONSERVATION, HYDROPOWER AND PUBLIC SAFETY: AN INFRASTRUCTURE PROPOSAL FOR THE BIDEN ADMINISTRATION AND CONGRESS, https://s3.documentcloud.org/documents/20698762/hydropower-proposal.pdf [https://perma.cc/3SBY-QA3U].

271. *See* Cole, *supra* note 240, at 671 (arguing that reinvigorating the FPA's planning requirement would "promote informed and expedited resource-oriented decision-making" for the nation's rivers).

272. *See* Christine A. Klein, *On Dams and Democracy*, 78 OR. L. REV. 641, 732 (1999) (expressing optimism "that environmental protection and citizen participation will be integral parts of the equation"); *cf.* Jody Freeman, *The Uncomfortable Convergence of Energy and Environmental Law*, 41 HARV. ENV'T L. REV. 339, 420 (2017) (noting that "the story of FERC's accommodation of environmental goals is one of gradual steps rather than great leaps, of interest-based compatibility rather than love-struck merger," and that the convergence of energy and environmental goals has yet to come).

273. *See* Reed D. Benson, *Keeping Power in Charge: Federal Hydropower and the Downstream Environment*, 39 PUB. LAND & RES. L. REV. 23, 26 (2018).

Engineers and the Bureau of Reclamation, situated on waterbodies throughout the United States.[274]

For federal dams operated by federal agencies, then, it would seem that the Biden administration's 30 by 30 initiative could be particularly influential as a means of stitching together the myriad operational approaches to promote biodiversity and climate resilience objectives. However, the agencies are subject to a dizzying array of programmatic and site-specific statutes, making systemic, coordinated action exceedingly difficult.[275] Congress may have to revise the organic acts for the Corps and the Bureau to effectuate comprehensive reforms.

To keep the focus on agency action, this Part turns to the ESA as the federal statute with the most profound impact on federal dams and with tremendous potential for agency-driven biodiversity conservation and climate resilience.[276] Although the ESA is a necessary component to this Article's freshwater conservation assessment, this Part will be kept brief, given the complexity and overarching application of the ESA to *all* federal action, not just water-related action.[277]

1. Corps and Bureau Projects

The Corps controls nearly seven hundred dams, most of which are multipurpose facilities built primarily for flood control but that

274. *Id.* at 27.

275. *See id.* at 26-28.

276. *See generally* Endangered Species Act (ESA), 16 U.S.C. §§ 1531-1544. Notably, similar to the ESA, the National Environmental Policy Act (NEPA), 42 U.S.C. § 4332, has a significant impact on project operations, though its procedural requirements lack the substantive "teeth" of the ESA. *See* Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 351 (1989) ("NEPA merely prohibits uninformed—rather than unwise—agency action."). Moreover, as for the Bureau, as Professor Reed Benson observes, "courts have effectively exempted routine water project operations from NEPA since 1990, when the U.S. Court of Appeals for the Ninth Circuit held that the Bureau did not need to prepare an environmental impact statement (EIS) before cutting releases from an Idaho reservoir during a drought." Reed D. Benson, *Ongoing Actions, Ongoing Issues: Trying Again to Free Federal Dams from the ESA*, 49 ENV'T L. REP. NEWS & ANALYSIS 11019, 11024 (2019) (citing Upper Snake River Chapter of Trout Unlimited v. Hodel, 921 F.2d 232 (9th Cir. 1990)).

277. *See* 16 U.S.C. §§ 1531-1544. The ESA provisions discussed here apply to FERC-licensed nonfederal dams as well. *See* U.S. FISH & WILDLIFE SERV. & NAT'L MARINE FISHERY SERV., ENDANGERED SPECIES CONSULTATION HANDBOOK 4-30 (1998) (delineating the same approach for all "ongoing water projects").

also support navigation, water supply, recreation, and fish and wildlife.[278] About seventy-five of these dams generate hydropower.[279] The total generating capacity of Corps' projects is 22.9 gigawatts, which makes the Corps the largest single source of hydropower in the United States.[280]

The Corps' mission is to "[d]eliver vital engineering solutions, in collaboration with our partners, to secure our Nation, energize our economy, and reduce disaster risk."[281] The Corps' institutional history goes back to 1775, but more recent congressional enactments have given it the authority to make operational changes to address project-related environmental issues so long as the changes are consistent with authorized project purposes.[282] In particular, Congress has authorized the Corps

> to carry out a program for the purpose of making such modifications in the structures and operations of water resources projects constructed by the Secretary which the Secretary determines (1) are feasible and consistent with the authorized project purposes, and (2) will improve the quality of the environment in the public interest.[283]

The Bureau is primarily responsible for water supply, and it has been building projects for this purpose ever since 1902, when Congress authorized it to construct and operate irrigation works.[284] Of the Bureau's six hundred or so dams, only fifty-three of them generate power.[285] Although that is a small percentage of the Bureau's dams, these are very large projects, with a total generating

278. U.S. ARMY CORPS OF ENG'RS, DAM SAFETY PROGRAM (updated Dec. 16, 2021), https://www.usace.army.mil/Missions/Civil-Works/Dam-Safety-Program/ [https://perma.cc/EHN6-RCM7]; *see* Zellmer, *supra* note 112, at 309-10 (calling for a legislative overhaul of flood control acts).

279. CONG. RSCH. SERV., R42579, HYDROPOWER: FEDERAL AND NONFEDERAL INVESTMENT 7 (2015).

280. *Id.*

281. U.S. ARMY CORPS OF ENG'RS, MISSION AND VISION, https://www.usace.army.mil/About/Mission-and-Vision/ [https://perma.cc/698T-9GMM].

282. 33 U.S.C. § 2294.

283. *Id.* § 2309a(b).

284. *See generally* 43 U.S.C. § 371.

285. *About Us*, BUREAU OF RECLAMATION, https://www.usbr.gov/main/about [https://perma.cc/Y4X6-KH5Q].

capacity of nearly fifteen gigawatts, making the Bureau the second-largest U.S. hydropower producer.[286]

The lack of a comprehensive planning or licensing requirement applicable to federal dams leaves a gaping hole in watershed management and freshwater conservation.[287] Unlike FERC-licensed nonfederal dams, there is no mechanism to review federal operations on a regular basis. Stepping into this void is the ESA,[288] which Professor Reed Benson explains has been "far and away the most effective tool in making environmental concerns legally relevant in federal water project operations."[289]

2. The ESA's Application to Federal Dams

The ESA strives to conserve threatened and endangered species and the "ecosystems upon which endangered species and threatened species depend."[290] Conservation is defined as "the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary."[291]

Once a species is listed under the ESA,[292] two important sections of the statute kick in. First, section 9 prohibits any unauthorized "take" by any person, including federal agencies, regardless of whether the action occurs on federal, state, tribal, or private

286. *See id.*; CRS, *supra* note 279, at 8-9.

287. For assessments of various Flood Control Acts governing the Corps, see generally Zellmer, *supra* note 112; Sandra Zellmer, *A Tale of Two Imperiled Rivers: Reflections from a Post-Katrina World*, 59 FLA. L. REV. 599 (2007); Christine A. Klein & Sandra B. Zellmer, *Mississippi River Stories: Lessons from a Century of Unnatural Disasters*, 60 SMU L. REV. 1471 (2007). For an assessment of the need for a legislative overhaul for the Bureau, see Reed D. Benson, *New Adventures of the Old Bureau: Modern-Day Reclamation Statutes and Congress's Unfinished Environmental Business*, 48 HARV. J. ON LEGIS. 137, 182 (2011) ("Without ... new [programmatic] authority and increased funding, the Bureau simply lacks the tools to deal systematically with the fish and wildlife issues that affect countless reclamation projects across the West.").

288. *See generally* ESA, 16 U.S.C. §§ 1531-1544.

289. Benson, *supra* note 276, at 11024.

290. Sandra B. Zellmer, Samuel J. Panarella & Oliver Finn Wood, *Species Conservation & Recovery Through Adequate Regulatory Mechanisms*, 44 HARV. ENV'T L. REV. 367, 371 (2020) (quoting 16 U.S.C. § 1531(b) (2018)).

291. 16 U.S.C. § 1532(3).

292. *See id.* § 1533(a)(1).

lands.[293] "Take" includes impacts to the species caused by either direct action, such as shooting or trapping, or indirect harms through modifications to habitat.[294] Dewatering a stream that provides habitat for a listed species can constitute a take, as can obstructions to fish passage by dams.[295] Despite the importance of section 9, individual takes are addressed on a case-by-case basis, and the take prohibition rarely triggers comprehensive changes in management.[296]

Section 7 is the more critical of the two sections as applied to federal dams.[297] It applies to federal agency actions, including new or revised permits, licenses, projects, and operational plans.[298] However, agencies and the courts have determined that maintaining the status quo is not an "action" under section 7.[299] Likewise, nondiscretionary actions do not trigger section 7.[300]

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293. *Id.* § 1538(a).

294. *See* Babbitt v. Sweet Home Chapter of Cmtys. for a Great Or., 515 U.S. 687, 697-707 (1995) (upholding the Secretary of the Interior's definition of "harm" codified at 50 C.F.R. § 17.3); 50 C.F.R. § 222.102 (prohibiting habitat modifications which may "impair[ ] essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering").

295. *See* S. Yuba River Citizens League v. Nat'l Marine Fisheries Serv., 629 F. Supp. 2d 1123, 1125, 1131-33, 1135 (E.D. Cal. 2009) (finding that the Corps violated the ESA's prohibition on taking three listed fish species in its operation and licensing of two dams); United States v. Glenn-Colusa Irrigation Dist., 788 F. Supp. 1126, 1133 (E.D. Cal. 1992) (holding that an irrigation district's diversion of water constituted a take when screens installed over the district's pump killed listed salmon). Most federal dams obtain an incidental take statement (ITS) under section 10 to continue operating despite the adverse effects on listed species. *See* 16 U.S.C. § 1539(a)(1).

296. *See* Daniel J. Rohlf, *Section 4 of the Endangered Species Act: Top Ten Issues for the* Next *Thirty Years*, 34 ENV'T L. 483, 521 (2004); Federico Cheever, *The Road to Recovery: A New Way of Thinking About the Endangered Species Act*, 23 ECOLOGY L.Q. 1, 59 (1996).

297. *See* 16 U.S.C. § 1536(a)(2).

298. *See* 50 C.F.R. § 402.02 ("*Action* means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas.").

299. *See* Grand Canyon Tr. v. U.S. Bureau of Reclamation, 691 F.3d 1008, 1020-21 (9th Cir. 2012) (finding that the Bureau's annual operating plan for Glen Canyon Dam was not an affirmative agency action under the ESA); Nat. Res. Def. Council v. Kempthorne, 621 F. Supp. 2d 954, 979 (E.D. Cal. 2009) (ruling that the Bureau's implementation of service contracts for diversions of water from the Central Valley Project did not trigger the ESA when the Bureau lacked discretion to modify diversion volumes); *cf.* Upper Snake River Chapter of Trout Unlimited v. Hodel, 921 F.2d 232, 235 (9th Cir. 1990) ("routine managerial actions" did not trigger environmental review under NEPA).

300. *See* 50 C.F.R. § 402.03; Nat'l Ass'n of Home Builders v. Defs. of Wildlife, 551 U.S. 644, 649-50 (2007) (holding that the EPA's approval of a state's request to assume responsibility

Once section 7 is triggered, it requires consultation to ensure that the federal action will not result in jeopardy to listed species or the destruction or adverse modification of critical habitat.[301] If a species or its critical habitat may be adversely affected, FWS must issue a biological opinion (BiOp) detailing the effects of the proposed action.[302] The action cannot go forward if the BiOp concludes that no reasonable and prudent alternative will avoid jeopardy to the species.[303]

Countless cases have found that federally operated dams jeopardize fish and other aquatic species.[304] In one of the most notable and long-running cases, a federal district court in Oregon held that a BiOp for the massive Federal Columbia River Power System (FCRPS) violated the ESA.[305] It found fault with the BiOp's conclusion that listed salmon species were "trending toward recovery" even though overall population levels remained critically low.[306] It also held that the BiOp did not properly analyze the effects of climate change.[307] The court acknowledged that the federal agencies had engaged in an array of mitigation and restoration

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for a CWA permitting program did not trigger section 7); Turtle Island Restoration Network v. Nat'l Marine Fisheries Serv., 340 F.3d 969, 974 (9th Cir. 2003) ("If no discretion to act is retained, then consultation would be a meaningless exercise." (citing Sierra Club v. Babbitt, 65 F.3d 1502, 1509 (9th Cir. 1995))).

301. 16 U.S.C. § 1536(a)(2); *see* 50 C.F.R. § 402.02 (defining adverse modification as "a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species").

302. 16 U.S.C. § 1536(b)(3); 50 C.F.R. § 402.14(h).

303. *See* Tenn. Valley Auth. v. Hill, 437 U.S. 153, 173-74 (1978).

304. *See, e.g.*, *id.* (finding the operation of the Tellico Dam unconstitutional); S. Yuba River Citizens League v. Nat'l Marine Fisheries Serv., 804 F. Supp. 2d 1045, 1055-56, 1058, 1060-61 (E.D. Cal. 2011) (finding that the Corps' dam operations jeopardized the survival of threatened fish by impeding upstream migration to spawning and rearing habitats); Rio Grande Silvery Minnow v. Keys, 333 F.3d 1109, 1138 (10th Cir. 2003), *vacated as moot*, 355 F.3d 1215 (10th Cir. 2004) (compelling the Bureau to maintain flows to avoid jeopardizing listed species).

305. *See* Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 184 F. Supp. 3d 861, 930 (D. Or. 2016). The FCRPS is operated by the Bureau, the Corps, and the Bonneville Power Administration. *Id.* at 880-81.

306. *See id.* at 892.

307. *Id.* at 917 (finding that NMFS's analysis "does not apply the best available science, overlooks important aspects of the problem, and fails properly to analyze the effects of climate change, including its additive harm, how it may reduce the effectiveness of the RPA actions, particularly habitat actions that are not expected to achieve full benefits for 'decades,' and how it increases the chances of a catastrophic event").

efforts to minimize the effect of dam operations, to the tune of billions of dollars, yet the species "continue to be in a perilous state."[308] In the end, on the Columbia River, "the option of breaching, bypassing, or even removing a dam may be considered more financially prudent and environmentally effective than spending hundreds of millions of dollars more on uncertain habitat restoration and other alternative actions."[309]

The ESA's impact on water management has been so extensive that in basins like the Columbia and many others, the ESA has effectively become "the Law of the River."[310] Yet the steps taken by the Bureau and the Corps to satisfy the ESA have been undertaken on a reactive, case-by-case basis rather than a proactive, programmatic strategy.[311] The agencies "are missing an opportunity to adapt their water projects to changes that have already occurred and to prepare for future challenges, especially those posed by climate change."[312]

The Corps and the Bureau have pushed back on efforts to expand the ESA's application to their dams by arguing that (1) section 7 does not apply because their operations are not discretionary, and (2) the impacts of existing dams and ongoing operations should be considered part of the "environmental baseline" and, thus, not attributed to the agencies' future dam operations.[313] As for the latter, when negative impacts caused by the presence of the dam itself or by historic operations of that dam are characterized as part of the baseline, the incremental effects of future operations are less likely to be found to cause jeopardy to listed species.[314] The agencies have evaded section 7 consultation only in part with this argument;

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308. *Id.* at 876.

309. *Id.* at 875-76; *see* Noah Mikell, Comment, *Fighting an Upstream Battle: Fish Recovery in the Federal Columbia River Power System*, 100 OR. L. REV. 111, 131 (2021) (stating that "[a]ction agencies cannot continue engineering rivers out of one problem and into another," particularly when "nothing about the current fish recovery scheme in the Columbia River Basin suggests a greater likelihood of success in a changing climate").

310. *See* Zellmer, *supra* note 112, at 315. The phrase "Law of the River" first arose in relation to the web of state and federal water laws governing the Colorado River. *See generally* Charles J. Meyers, *The Colorado River*, 19 STAN. L. REV. 1, 43-45 (1966).

311. *See* Zellmer, *supra* note 112, at 315; Benson, *supra* note 273, at 25.

312. Benson, *supra* note 96, at 359.

313. Benson, *supra* note 276, at 11019-20.

314. *See id.* at 11020.

courts generally view an existing dam's presence as part of the baseline but reject the agencies' arguments that the baseline includes ongoing operations.[315]

Similarly, judicial reception is mixed with regard to the "discretionary" nature of dam operations and whether consultation is triggered at all. If either the Corps or the Bureau lack discretion to alter their operations to avoid adverse impacts to species or their habitat, consultation would be a hollow exercise and thus not required.[316] Where a governing statute mandates a particular course of action with no room for alternatives, courts have upheld the agencies' refusal to consult.[317]

By contrast, if a governing statute provides discretion to prioritize some outputs over others or to choose alternative strategies, courts have required consultation.[318] The statutes governing the vast majority of federal dam operations provide sufficient discretion to warrant consultation and, if necessary, the adoption of alternatives that would avoid jeopardizing species.[319] The Corps and the Bureau, or the FWS, could confirm the need to consult, and emphasize the value of doing so, through guidance or rulemaking.[320]

As powerful as it is, the ESA is not a complete answer to the biodiversity-climate crisis. As Professor Benson explains:

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315. *See id.*

316. *See* 50 C.F.R. § 402.03; Nat'l Ass'n of Home Builders v. Defs. of Wildlife, 551 U.S. 644, 667-69 (2007).

317. *See, e.g.*, WildEarth Guardians v. U.S. Army Corps of Eng'rs, 947 F.3d 635, 640 (10th Cir. 2020) (holding that consultation was not required because the Corps must operate its projects on the Rio Grande in accordance with specific instructions in the Flood Control Acts of 1948 and 1960 and the Rio Grande Compact); Defs. of Wildlife v. Norton, 257 F. Supp. 2d 53, 67-69 (D.D.C. 2003) (stating that the Bureau's operations on the Lower Colorado River were nondiscretionary).

318. *See, e.g.*, *In re* Operation of the Mo. River Sys. Litig., 421 F.3d 618, 631 (8th Cir. 2005); Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 524 F.3d 917, 928-29 (9th Cir. 2008).

319. *See In re Operation of the Mo. River,* 421 F.3d at 631; *Nat'l Wildlife Fed'n*, 524 F.3d at 928-29; *see also* Benson, *supra* note 276, at 11036.

320. *See* Benson, *supra* note 276, at 11036. Although the Trump administration narrowed the range of decisions that would trigger consultation, *see* Regulations for Interagency Cooperation, 84 Fed. Reg. 44,976, 44,979-80 (Aug. 27, 2019) (codified at 50 C.F.R. § 402.14), the Biden administration plans to propose revisions to the Trump rule regarding section 7 consultation and other matters, *see Endangered Species Act Regulation Revisions*, U.S. FISH & WILDLIFE SERV., https://www.fws.gov/project/endangered-species-act-regulation-revisions [https://perma.cc/Q96L-ZQF4].

> Authorities tied to the ESA are too narrow, in that they apply only where a listed species is present and exclusively to the needs of that species, leaving too many places and too many interests out in the cold. Linking environmental authorizations solely to endangered species also effectively encourages litigation: by scratching only where there is an ESA itch, Congress inadvertently creates powerful incentives to get new species listed for purposes of obtaining leverage.[321]

An underutilized ESA tool—species' recovery plans—could address these concerns and promote broad-scale species conservation, if it were more fully deployed by the FWS.[322] "Recovery plans are 'a basic road map to recovery, *i.e.*, the process that stops or reverses the decline of a species and neutralizes threats to its existence.'"[323]

> To the "maximum extent practicable," recovery plans must include three elements: (1) a description of site-specific management actions that may be necessary to recover the species; (2) objective and measurable criteria which, when met, would result in a determination that the species be removed from the list; and (3) estimates of the time and cost required to carry out those measures needed to recover the species and to achieve intermediate steps towards that goal.... Notably, the quality of protection ... is more important than the quantity of included criteria.[324]

As co-authors and I wrote in a previous publication about the potential for biodiversity conservation through recovery planning:

> [C]oordinated efforts across jurisdictional lines through cooperative federalism and private initiatives provide a crucial means for imperiled species to make progress toward recovery.... Among the[ ] lessons [learned through the history of ESA

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321. Benson, *supra* note 287, at 179-80 (footnote omitted).

322. *See* 16 U.S.C. § 1533(f).

323. Zellmer et al., *supra* note 290, at 382 (quoting Fund for Animals v. Babbitt, 903 F. Supp. 96, 103 (D.D.C. 1995)). The default expectation in the Act is that a recovery plan will be created for each listed species, but many species do not have one due to lack of resources or a finding by FWS that a recovery plan will not "promote conservation of a species." *Id.* at 383.

324. *Id.* at 382-83; 16 U.S.C. § 1533(f)(1)(B)(i)-(iii).

> implementation] are the importance of bringing all critical players (federal, state, tribal, and private) in a species' health to the table to receive their input and obtain their commitments to implementing measures to assist in the species' recovery, the critical need for the FWS to provide consistent and informed oversight throughout the recovery process, and an insistence on the primacy of science-based solutions over political compromise.[325]

Enhanced recovery plans could provide a roadmap to lasting recovery, not only of a single species, but also of their broader ecosystems, thereby advancing the biodiversity and climate resilience objectives of 30 by 30.[326] Multispecies recovery plans, which cover communities of listed species within an ecosystem, may be especially effective.[327]

To sum up this Part of the Article, in an ideal world, Congress would step in and modernize the organic acts for the Bureau and the Corps.[328] Short of that, the Bureau and the Corps could make tremendous strides toward the goals of the 30 by 30 initiative by revisiting their stance on ESA section 7 implementation for the operating plans of federal water projects. Meanwhile, the FWS could

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325. Zellmer et al., *supra* note 290, at 415; *see also* Robert L. Fischman & Jaelith Hall-Rivera, *A Lesson for Conservation from Pollution Control Law: Cooperative Federalism for Recovery Under the Endangered Species Act*, 27 COLUM. J. ENV'T L. 45, 172 (2002) ("The conservation imperative of comprehensive planning requires the Services to enlist the help of state and local jurisdictions with the authority, experience, and desire to incorporate species recovery needs into land use controls.").

326. *See* Alejandro E. Camacho, *Assisted Migration: Redefining Nature and Natural Resource Law Under Climate Change*, 27 YALE J. ON REGUL. 171, 219-20 (2010) (discussing views on how "endangered species serve as an indicator of native ecosystem health" (citing Oliver A. Houck, *Why Do We Protect Endangered Species, and What Does That Say About Whether Restrictions on Private Property to Protect Them Constitute "Takings"?*, 80 IOWA L. REV. 297, 327-28 (1995); John Copeland Nagle, *Playing Noah*, 82 MINN. L. REV. 1171, 1212-13 (1998); and Zygmunt J.B. Plater, *Endangered Species Act Lessons Over 30 Years, and the Legacy of the Snail Darter, a Small Fish in a Pork Barrel*, 34 ENV'T L. 289, 305 (2004))).

327. *See, e.g.*, J.B. Ruhl, *Who Needs Congress? An Agenda for Administrative Reform of the Endangered Species Act*, 6 N.Y.U. ENV'T L.J. 367, 377-78, 378 n.37 (1998) (describing a trend toward multispecies recovery planning in the South Florida Ecosystem and beyond).

328. *See id.* at 409-10 (applauding FWS's attempts to incorporate ecosystem management through agency action because: "In a perfect world, Congress would make the tough decisions, agencies would know and do just what was expected of them, and courts would need to stick their necks in matters only when one of the other two institutions went haywire. Congress reneged on that covenant long ago and one should not hold one's breath for Congress to change its act.").

make a significant contribution to biodiversity conservation with a deeper commitment to ESA recovery planning.

CONCLUSION

Throughout this Article, water-centric and related statutory provisions that enable the federal agencies to enhance their efforts to meet the biodiversity and climate goals of 30 by 30 are highlighted.[329] The agencies will be most successful if they focus their efforts on durable conservation initiatives where activities that diminish an ecosystem's integrity and ecological function are limited or prohibited.[330] Special attention is given to comprehensive planning provisions, which lend themselves to durability by bringing other interested authorities and experts to the table to contemplate alternatives in an informed and coordinated fashion. Specifically, the Article brings the following reforms and recommendations to light.

Beginning with the CWA, the regulatory definition of "waters of the United States" must include ephemeral streams, tributaries, and hydrologically connected or ecologically important wetlands. Ensuring a scientifically based, broad definition is essential to advance the CWA's goal to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[331] By the same token, ensuring the chemical, physical, and biological integrity of the Nation's waters is essential to meeting the biodiversity and climate goals of 30 by 30.

With respect to the WSRA, agencies should recommend and Congress should designate more rivers, including restoration rivers. In addition, agencies should expand the scope of recognized ORVs to include fish and wildlife species, such as birds, that rely on rivers for habitat. Agencies should also make their guidance and river management plans more robust to protect ORVs and to adapt to climate change.

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329. *See supra* Part IV.

330. *See supra* note 23 and accompanying text (discussing the need for "durable" protection).

331. 33 U.S.C. § 1251(a); *see also supra* Part IV.A.

Dams and dam operations warrant extended attention and raise a number of unique challenges and opportunities. For nonfederal hydropower dams, FERC should ensure that relicensing and dam removal promote watershed protection in a more comprehensive, systemic fashion through basinwide planning and coordination with other federal, state, and tribal agencies. For these dams and federal dams operated by the Corps and the Bureau, the agencies and the FWS can make improvements in ESA section 7 implementation by expanding the definition of "discretionary" federal action to include continuing operations and by narrowing the definition of "environmental baseline" to fully account for the impacts of continuing operations.[332] For FWS, multispecies recovery planning could be especially powerful as a conservation and restoration tool for water-dependent species and their ecosystems.[333]

None of these reforms will be easy, institutionally or politically. Did the Biden administration realize what an ambitious goal—and daunting challenge—it had established? Perhaps. In campaign materials, the administration has referred to 30 by 30 as "unprecedented," "bold," and the most "ambitious" all-of-government environmental agenda ever pursued.[334] One thing is abundantly clear—neglecting freshwater ecosystems will surely cause the initiative to fail. The legal framework exists; bold action is possible.

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332. *See supra* Part IV.D.2.

333. *See supra* notes 326-27 and accompanying text.

334. *See, e.g.*, *The Biden Plan for a Clean Energy Revolution and Environmental Justice*, JOE BIDEN, https://joebiden.com/climate-plan/ [https://perma.cc/6GF2-X86L].