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Water, Water, Anywhere?: Protecting Water Quantity in State Water Quality Standards

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WATER, WATER, ANYWHERE?: PROTECTING WATER QUANTITY IN STATE WATER QUALITY STANDARDS

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Although much of the earth's surface is covered with water, less than one percent of water is available for human use. Water is becoming progressively scarcer worldwide, as demand increases and pollution, drought, and climate change jeopardize access to clean water. The United States is no exception to that trend. Effective regulation of water supplies can blunt the impacts of water scarcity. This Article suggests that states can—and should—regulate instream flows and lake levels in their federally-mandated water quality standards, with an eye toward conserving scarce water resources. Regulating water quantity as an element of water quality is not only permissible under the Federal Clean Water Act according to Supreme Court precedent, but it is also a prudent safeguard against water shortages. This Article advocates for the adoption of numeric water quality criteria mandating minimum river instream flows and lake levels pursuant to section 303 of the Clean Water Act. It argues that numeric criteria are preferable to both narrative criteria, which may be vaguer and less susceptible to enforcement, and continued reliance on the willingness of agency staff to interpret the designated uses of water bodies and state antidegradation policies as requiring adequate amounts of water.

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INTRODUCTION

"Water, water, every where,
Nor any drop to drink."
- *Samuel Taylor Coleridge*, "The Rime of the Ancient Mariner"[1]

As Coleridge's ancient mariner learned to his dismay, although water covers much of the earth's surface, only a tiny fraction of it is drinkable, fishable, or swimmable. In fact, only one percent of the earth's water is available for humans to consume.[2] Usable water is becoming progressively scarcer, as human demand increases and uncontaminated supplies become less dependably accessible, both globally and throughout the United States. The United Nations reports that the world's population quadrupled over the last hundred years, but water use grew sevenfold during the same time period.[3] The United Nations also estimates that water scarcity already "affects more than 40 percent of the global population," and that percentage "is projected to rise."[4] A recent study estimated that four billion people are living in a region with water scarcity, where net water withdrawals exceed water availability, during at least one month per year and that nearly half a billion people live in conditions of severe water scarcity all year long.[5] In sum, as the world's human population has grown, developed, and become wealthier, it also has become thirstier.[6]

Experts warn of a looming water crisis, with the effects of increased demand for water combining with the effects of climate change, droughts, floods, and water pollution to jeopardize universal access to clean, usable water.[7] The United States is

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1. SAMUEL TAYLOR COLERDIGE, THE RIME OF THE ANCIENT MARINER 31 (Educ. Publ'g Co. 1906).

2. Michael Doyle, *Politicians Quoting Coleridge on Water Get the Meaning Wrong*, MCCLATCHY D.C. BUREAU (Jan. 21, 2011, 4:06 PM), http://www.mcclatchydc.com/news/politics-government/article24608557.html [https://perma.cc/EYY4-NNA7]; U.S. Geological Surv., *How Much Water Is There On, In, and Above the Earth?* (Dec. 2, 2016, 12:51 PM), https://water.usgs.gov/edu/earthhowmuch.html [https://perma.cc/VKJ8-92Z5] (noting that 71% of the earth is covered with water and 96.5% of the earth's water exists as saltwater in the oceans); *The World's Water*, U.S. GEOLOGICAL SURV. (Dec. 2, 2016, 12:51 PM), https://water.usgs.gov/edu/earthwherewater.html [https://perma.cc/SKT6-ZM4Q] (noting that .0132% of earth's water is stored in surface freshwater lakes and rivers); *How We Use Water*, U.S. ENVTL. PROT. AGENCY, https://www.epa.gov/watersense/how-we-use-water [https://perma.cc/7BFE-APBR].

3. UNITED NATIONS DEV. PROGRAMME, HUMAN DEVELOPMENT REPORT 2006, at 137 (2006), http://hdr.undp.org/sites/default/files/reports/267/hdr06-complete.pdf [https://perma.cc/X4QA-RM8N].

4. UNITED NATIONS, CLEAN WATER AND SANITATION: WHY IT MATTERS 1, SUSTAINABLE DEV. GOALS, https://www.un.org/sustainabledevelopment/wp-content/uploads/2018/09/Goal-6.pdf [https://perma.cc/RE5V-NWGF].

5. Mesfin M. Mekonnen & Arjen Y. Hoekstra, *Four Billion People Facing Severe Water Scarcity*, SCI. ADVANCES, Feb. 2016, at 1.

6. *Id.*

7. William Wheeler, *Global Water Crisis: Too Little, Too Much, or Lack of a Plan?*, CHRISTIAN SCI. MONITOR (Dec. 2, 2012), http://www.csmonitor.com/World/Global

no exception to these trends. Just as elsewhere in the world (although to a lesser degree than many regions), supplies of clean, usable water are unevenly distributed, both physically and economically, and, at any given moment, a portion of the American population is likely enduring drought and/or water scarcity.[8]

Effective regulation of water supplies can serve as a crucial tool for blunting some of the impacts of water scarcity. This Article advocates that the fifty states, in addition to regulating the amounts of various pollutants in waterbodies as required by the Federal Clean Water Act, should also protect and regulate instream flows and lake levels in their federally-mandated water quality standards. In other words, states should regulate water *quantity* as an element of water *quality*. Doing so is not only permissible under applicable law, it is a prudent measure to ensure there is enough water to go around, both now and in the future. In particular, this Article recommends that states adopt water quality standards that explicitly mandate minimum riverine instream flow levels and lake levels, and that they do so by means of quantitative numeric criteria rather than qualitative narrative criteria.

Part I provides background on the problem of water scarcity and argues that the time for aggressively protecting our nation's water supplies has arrived. It also explains the statutory scheme by which the Clean Water Act requires the states and the United States Environmental Protection Agency (EPA) to regulate water quality. Part II examines Supreme Court jurisprudence that interprets the Clean Water Act and provides precedent for the proposition that states are authorized to regulate water quantity in their federally mandated water quality protections, beginning with the Court's seminal opinion in *PUD No. 1 of Jefferson County v. Wash. Dep't of Ecology*.[9] The question whether states will actually reliably be willing to exercise that authority, especially where enforcing minimum water levels may conflict with power production and other economic uses of rivers, remains to be seen. Accordingly, the section goes on to discuss other federal and state court opinions that have applied the *PUD No. 1* holding in a variety of contexts involving state protection of riverine instream flows. Part III next addresses both those actions taken and those not taken by the EPA to encourage state regulation of instream flow and other water quantity metrics, and it examines the regulations that some proactive states have adopted toward that end. Part IV advocates that other states should follow suit, with

-Issues/2012/1202/Global-water-crisis-too-little-too-much-or-lack-of-a-plan/%28page%29/5 [https://perma.cc/82Z4-CE3A]; *Mapping Water Use: Landstat and America's Water Resources*, U.S. GEOLOGICAL SURV. (Apr. 29, 2016), https://www.usgs.gov/news/mapping-water-use-landsat-and-americas-water-resources [https://perma.cc/F8MM-LK5Z] (noting that "changes in land use, climate, and population demographics are placing unprecedented demands on America's water supplies").

8. MELISSA S. KEARNEY, BENJAMIN H. HARRIS, BRAD HERSHBEIN, ELISA JÁCOME & GREGORY NANTZ, HAMILTON PROJECT, IN TIMES OF DROUGHT: NINE ECONOMIC FACTS ABOUT WATER IN THE UNITED STATES (2014), https://www.brookings.edu/research/in-times-of-drought-nine-economic-facts-about-water-in-the-united-states [https://perma.cc/7DJZ-HXHX]; *see also Drought - February 2019*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. (Mar. 11, 2019), https://www.ncdc.noaa.gov/sotc/drought [https://perma.cc/ZS7H-DCCA] (showing regularly updated maps of the drought situation in the United States).

9. 511 U.S. 700 (1994).

or without a mandate from the EPA, and makes recommendations for states considering adopting explicit water quantity protections.

I. BACKGROUND

A. Water Scarcity

"Water is the driving force of all nature."
- *Leonardo da Vinci*[10]

Water quality is inextricably tied to water quantity. Maintaining healthy populations and ecosystems while also supporting sustainable development requires not only clean water, but also abundant supplies of that finite resource, in amounts sufficient to satisfy all the various demands for it.[11] Yet even as the Clean Water Act[12] has provided tools to reduce discharges of pollutants into the nation's waters and thereby improve water quality generally, reliable access to ample amounts has become more uncertain. Clean water is becoming more and more scarce, both internationally and within the United States. According to the United Nations, water "[s]carcity may be a social construct (a product of affluence, expectations and customary behaviour)" or it may be "the consequence of altered supply patterns" with physical causes;[13] more likely, it is both.

Increased demand is one half of the equation. As noted above, internationally, while human population quadrupled during the last century, water demand increased sevenfold.[14] Domestically, the United States Geological Survey (USGS) (a scientific bureau within the Department of the Interior) tracks water usage; it reports that total annual water withdrawals in the United States rose steadily from 1950 to 1980, at which point annual withdrawals began stabilizing (despite growing populations) and actually decreased slightly in 2010 and even more in 2015.[15] Despite these

10. LAURENT PFISTER, HUBERT H. G. SAVENIJE & FABRIZIO FENICIA, LEONARDO DA VINCI'S WATER THEORY: ON THE ORIGIN AND FATE OF WATER, at vii (2009) (quoting Leonardo da Vinci).

11. Constance Courtney Westfall, *Protecting Our Nation's Water Supply: Key Laws and Recent Trends*, *in* NAVIGATING WATER USE AND POLLUTION LAWS: LEADING LAWYERS ON FEDERAL AND STATE REGULATION OF CONSUMPTION AND CONTAMINATION, 2014 WL 5465786, at *1 (2014).

12. 33 U.S.C. §§ 1251–1387 (2012).

13. U.N. Dep't of Econ. & Soc. Affairs, *Water Scarcity*, UNITED NATIONS, http://www.un.org/waterforlifedecade/scarcity.shtml [https://perma.cc/8J39-4KRQ].

14. *See supra* text accompanying note 3.

15. SUSAN S. HUTSON, NANCY L. BARBER, JOAN F. KENNY, KRISTIN S. LINSEY, DEBORAH S. LUMIA & MOLLY A. MAUPIN, ESTIMATED USE OF WATER IN THE UNITED STATES IN 2000, at 1 (2004), https://pubs.usgs.gov/circ/2004/circ1268/pdf/circular1268.pdf [https://perma.cc/2K5D-ZBU5]; MOLLY A. MAUPIN, JOAN F. KENNY, SUSAN S. HUTSON, JOHN K. LOVELACE, NANCY L. BARBER & KRISTIN S. LINSEY, ESTIMATED USE OF WATER IN THE UNITED STATES IN 2010, at 1 (2014), https://pubs.usgs.gov/circ/1405/pdf/circ1405.pdf [https://perma.cc/VWJ5-NKZ4]; WAYNE B. SOLLEY, ROBERT R. PIERCE & HOWARD A. PERLMAN, U.S. DEP'T OF THE INTERIOR & U.S. GEOLOGICAL SURVEY, ESTIMATED USE OF WATER IN THE UNITED STATES IN 1995, at 1 (1998), https://pubs.usgs.gov/circ/1998/1200/report.pdf [https://

fluctuations and the recent downturn in total national water withdrawals, regions of the county remain water-stressed.[16] As people withdraw more and more water from rivers and lakes for consumptive uses like irrigation, public water supply, and industrial processes, less water is left in those water bodies to assimilate pollution, satisfy downstream users, and support healthy ecosystems.

In addition to consumption, climatic events contribute to water scarcity and uncertainty as well. Incidences of both extreme drought and flooding are becoming more commonplace, as a result of the larger trends of global climate change and sea level rise.[17] Within the United States, for instance, while California and much of the rest of the United States were suffering through a historic drought that affected eighty percent of the mainland United States at its peak in July 2012, Hurricane Sandy caused massive flooding throughout the east coast states in October 2012, many of which were already experiencing adverse effects of sea level rise on their coastal communities.[18] States have been experiencing such precipitation extremes in ever closer succession in recent years; with six of the sixteen most expensive and devastating weather events on record since 1980 being hurricanes, floods, droughts, and drought-related fires happening since August 2017.[19]

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perma.cc/4N2L-7P2J].

16. Renae Reints, *The U.S. Is Going to See Water Shortages Within the 21st Century, Study Says*, FORTUNE (Mar. 4, 2019), http://fortune.com/2019/03/04/water-shortages-study [https://perma.cc/495G-EK8V] (describing Thomas C. Brown, Vinod Mahat & Jorge A. Ramirez, *Adaptation to Future Water Shortages in the United States Caused by Population Growth and Climate Change*, 7 EARTH'S FUTURE 211, 219 (2019)).

17. U.S. ENVTL. PROT. AGENCY, EPA430-R-16-004, CLIMATE CHANGE INDICATORS IN THE UNITED STATES: 2016, at 22–30 (4th ed. 2016), https://www.epa.gov/sites/production/files/2016-08/documents/climate_indicators_2016.pdf [https://perma.cc/PS9A-VVDR]; Noah S. Diffenbaugh, Daniel L. Swain & Danielle Touma, *Anthropogenic Warming Has Increased Drought Risk in California*, 112 PROC. NAT'L ACAD. SCI. U.S. 3931, 3931 (2015).

18. The Nat'l Drought Mitigation Ctr., *Map Archive*, U.S. DROUGHT MONITOR (Jan. 17, 2019, 7:00 AM), https://droughtmonitor.unl.edu/Maps/MapArchive.aspx [https://perma.cc/E5M7-8ZCP] (select July 17, 2012 as date). The 2012 drought and Hurricane Sandy are among the nation's costliest natural disasters. *Billion-Dollar Weather and Climate Disasters: Table of Events*, NAT'L OCEANIC & ATMOSPHERIC ADMIN., https://www.ncdc.noaa.gov/billions/events/US/1980-2018 [https://perma.cc/2PEC-XUW4] (listing Hurricane Sandy and drought of 2012 as the fourth and tenth most expensive natural disasters since 1980); *Frequently Asked Questions: Costliest Mainland United States Tropical Cyclones 1900-2017*, NAT'L OCEANIC & ATMOSPHERIC ADMIN., http://www.aoml.noaa.gov/hrd/tcfaq/costliesttable.html [https://perma.cc/T46W-7RN4] (listing Hurricane Sandy as the fourth most expensive hurricane); *Dealing with the Drought*, HOMELAND SECURITY TODAY (Dec. 15, 2011), https://www.hstoday.us/channels/federal-state-local/dealing-with-the-drought (describing the drought that was just beginning as on track to be the costliest natural disaster in U.S. history).

19. *Billion-Dollar Weather and Climate Disasters: Table of Events*, NAT'L OCEANIC & ATMOSPHERIC ADMIN., https://www.ncdc.noaa.gov/billions/events/US/1980-2018 [https://perma.cc/2PEC-XUW4] ("In 2018, there were 14 weather and climate disaster events with losses exceeding $1 billion each across the United States. These events included 1 drought event, 8 severe storm events, 2 tropical cyclone events, 1 wildfire event, and 2 winter storm events.").

California's drought finally ended after five years in late 2016, only to be followed by catastrophic flooding in February 2017, leading to what one author called "hydrologic chaos," in which the flood-inducing precipitation came too fast and too little to remedy the groundwater deficit caused by massive withdrawals from aquifers during the preceding five years of drought.[20] While some of the rain did begin to replenish groundwater reserves, much of it ran off quickly into rivers and lakes, taking with it eroded soil, debris, and pollutants that had been collecting on the land. The result was still-depleted groundwater reserves and polluted surface water rivers and lakes. The southeastern and midwestern United States have likewise suffered from "weather whiplash" as they swing between droughts and floods in close succession, leading to unstable water supplies and water quality that is degraded by storm runoff.[21] As of early 2018, climatologists predicted that many western states were on the precipice of yet another severe drought,[22] predictions that came to fruition, with nearly 60% of the nation in some form of drought by August and 34% remaining in drought by the end of December.[23]

Sea level rise can also degrade water quality in myriad ways. As sea levels rise, coastlines recede and wetlands disappear, resulting in the loss of their water purification services.[24] Louisiana's coast in particular is receding at alarming rates, and, as a result, a "fourth of the state's wetlands are already gone," and "[s]tate planners believe another 2,000 square miles, or even double that, could be overtaken in 50 years."[25] Ecology experts agree that salt water intrusion can change a wetland from a thriving system that "normally improve[s] water quality by retaining nutrients in soil" into a dying system that becomes a source of pollutants such as excess

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20. Jeremy Miller, *California's Drought May Be Over, but Its Water Troubles Aren't*, NEW YORKER (Mar. 21, 2017), http://www.newyorker.com/tech/elements/californias-drought-may-be-over-but-its-water-troubles-arent [https://perma.cc/9KXF-95BA].

21. Kavya Balaraman, *The Midwest's Weather Whiplash Threatens Groundwater*, SCI. AM. (Apr. 10, 2017), https://www.scientificamerican.com/article/the-midwests-weather-whiplash-threatens-groundwater [https://perma.cc/WJ6E-U35A] (describing how increasing fluctuation between drought and floods causes fertilizers and other pollutants to leach into and contaminate groundwater supplies); John Hopewell, *The Drought No One Is Talking About in the Southeastern United States*, WASH. POST (Aug. 8, 2016), https://www.washingtonpost.com/news/capital-weather-gang/wp/2016/08/08/the-drought-no-one-is-talking-about-in-the-southeast-u-s/?utm_term=.b1e7ab6a7e94 [https://perma.cc/TP73-WSSE].

22. Henry Fountain, *A Hot, Dry Winter in California. Could It Be Drought Again?*, N.Y. TIMES (Feb. 13, 2018), https://www.nytimes.com/2018/02/13/climate/california-drought.html [https://perma.cc/24SL-KHCK].

23. Nat'l Drought Mitigation Ctr., *Tabular Data Archive: Percent Area in U.S. Drought Monitor Categories*, U.S. DROUGHT MONITOR, https://droughtmonitor.unl.edu/Data/DataTables.aspx [https://perma.cc/E5M7-8ZCP].

24. Brian Blankespoor, Susmita Dasgupta & Benoit Laplante, *Sea-Level Rise and Coastal Wetlands*, 43 AMBIO 996, 996 n.2 (2014); Dennis F. Whigham, Carin Chitterling & Brian Palmer, *Impacts of Freshwater Wetlands on Water Quality: A Landscape Perspective*, 12 ENVTL. MGMT. 663, 665 (1988).

25. Kevin Sack & John Schwartz, *Left to Louisiana's Tides, A Village Fights for Time*, N.Y. TIMES (Feb. 24, 2018), https://www.nytimes.com/interactive/2018/02/24/us/jean-lafitte-floodwaters.html [https://perma.cc/8S3W-PX78].

nutrients, which encourage eutrophication and degrade water quality.[26] Moreover, as sea level rises, saltwater intrusion results in an "increase [in] the salinity of both groundwater and surface water sources of drinking water" and can eventually render those coastal water bodies unsuitable for freshwater supplies.[27]

At the same time as extreme weather and sea level rise are causing the hydrologic chaos and freshwater shortages, other sources of water pollution are further limiting the usefulness of those quantities of water that are available. Despite the passage of several decades since the enactment of the Clean Water Act, many water bodies are still a long way from meeting the Act's goal that they be free from discharges of pollutants by 1985, rendering them drinkable, fishable, and swimmable.[28] Sections 303(d) and 305(b) of the Clean Water Act require states both to assess the health of the rivers, lakes, and other water bodies within their borders and to determine the extent to which those water bodies either meet applicable water quality standards or are impaired by failing to meet one or more standards.[29] As of 1998, an estimated 45% of the assessed rivers and streams and 54% of the assessed lakes and ponds were rated as either "threatened" or "impaired" in at least one respect.[30] The most common causes of impairment were the failure to meet applicable water quality standards for the following categories of pollutants: nutrients, siltation, metals, and pathogens.[31] By 2016, the percentage of assessed water bodies that were rated as either threatened or impaired had not fallen but had, in fact, risen to 55% for rivers and streams and 71.5% for lakes and ponds, with the vast majority of those rated "impaired" for the same primary reasons and pollutants as in 1998.[32]

As the water quality and quantity issues described above are limiting available freshwater water supplies and growing populations are demanding ever more water, states inevitably compete for scarce water supplies, particularly for the water in the rivers, lakes, and aquifers that cross interstate borders. That competition sometimes can be managed with interstate agreements or "compacts." Western states often enter into compacts that simply allocate water withdrawal rights among themselves, while eastern states are more likely to enter into compacts that include ongoing cooperative management agreements; all resort to costly and time-consuming litigation from time

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26. Roger Drouin, *How Rising Seas Are Killing Southern U.S. Woodlands*, YALE ENV'T. 360 (Nov. 1, 2016), http://e360.yale.edu/features/ghost_forest_rising_sea_levels_killing_coastal_woodlands [https://perma.cc/M6XK-XG2L] (quoting scientists from North Carolina State University and Duke University).

27. Climate Change Adaptation Res. Ctr., *Climate Adaptation and Saltwater Intrusion*, U.S. ENVTL. PROT. AGENCY, https://www.epa.gov/arc-x/climate-adaptation-and-saltwater-intrusion [https://perma.cc/CUM9-YDF4].

28. 33 U.S.C. § 1251(a) (2012).

29. 33 U.S.C. §§ 1313(d), 1315(b) (2012).

30. U.S. ENVTL. PROT. AGENCY, EPA841-S-00-001, THE QUALITY OF OUR NATION'S WATERS: A SUMMARY OF THE NATIONAL WATER QUALITY INVENTORY: 1998 REPORT TO CONGRESS 6–8 (2000), https://www.epa.gov/sites/production/files/2015-09/documents/2000_07_07_305b_98report_98brochure.pdf [https://perma.cc/MRE9-C4ER].

31. *Id.* at 1.

32. *National Summary of State Information*, U.S. ENVTL. PROT. AGENCY, https://ofmpub.epa.gov/waters10/attains_nation_cy.control#total_assessed_waters [https://perma.cc/PK5D-YZ2P].

to time to resolve disputes over scarce water resources.[33] For instance, Georgia, Alabama, and Florida have been engaged in the so-called "tri-state water wars" for decades, fighting in federal court over the allocation and management of the water flow in the Apalachicola-Chattahoochee-Flint River Basin.[34] Likewise, South Carolina brought an original action in the United States Supreme Court against North Carolina in 2007, accusing North Carolina of using more than its fair share of the instream flows of the Catawba River before it flows across the border into South Carolina[35] and "seeking an equitable apportionment of" that river.[36] Numerous other states have brought similar original actions in the Supreme Court against other states over the issue of equitable apportionment of water quantity and instream flows of shared rivers.[37]

Competition for water resources occurs even within a single state or a single watershed. The problem of intrastate water scarcity often manifests as a conflict between competing users for the water contained in large bodies of water. Nationwide, electric power generation, irrigation, and public water supply rank as the three largest categories of water withdrawal and consumption for a total of approximately 90% of total freshwater and salt water withdrawals (using data from 2015).[38] Power companies use enormous amounts of water for thermoelectric power generation (the generation of electricity with steam-driven turbines), cooling towers, hydroelectric power generation, and other related processes, accounting for 41% of nationwide water usage.[39] Irrigation of agricultural crops, as well as lawns, golf courses, and nurseries, also consumes vast quantities of fresh water, accounting for 42% of freshwater withdrawals (and 37% of all water withdrawals).[40] Public water suppliers need large amounts of clean water to supply their customers, accounting for another 14% of total freshwater withdrawals (and 12% of all water withdrawals).[41] Industrial users like paper companies, beverage bottlers, and other

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33. Joseph W. Dellapenna, *Interstate Struggles Over Rivers: The Southeastern States and the Struggle Over the 'Hooch*, 12 N.Y.U. ENVTL. L.J. 828, 831–40 (2005).

34. *Id.* at 864–80; Alyssa S. Lathrop, *A Tale of Three States: Equitable Apportionment of the Apalachicola-Chattahoochee-Flint River Basin*, 36 FLA. ST. U. L. REV. 865, 868–77 (2009).

35. Motion of the State of South Carolina for Leave to File Complaint, Complaint, and Brief in Support of Its Motion for Leave to File Complaint at 8, South Carolina v. North Carolina, 558 U.S. 256 (2010) (No. 06-138), 2007 WL 2826231, at *1.

36. South Carolina v. North Carolina, 558 U.S. 256, 259 (2010); *see also* Logan Starr, *The High Court Wades into State-Law Water Allocation*, 62 DUKE L.J. 1425 (2013).

37. *See, e.g.*, Florida v. Georgia, 138 S. Ct. 2502 (2018); Texas v. New Mexico, 138 S. Ct. 954 (2018); Montana v. Wyoming, 563 U.S. 368 (2011); Nebraska v. Wyoming, 507 U.S. 584 (1993); Colorado v. New Mexico, 467 U.S. 310 (1984); Arizona v. California, 460 U.S. 605 (1983); Idaho *ex rel.* Evans v. Oregon, 462 U.S. 1017 (1983); Texas v. New Mexico, 343 U.S. 932 (1952).

38. *Total Water Use*, U.S. GEOLOGICAL SURV., https://water.usgs.gov/watuse/wuto.html [https://perma.cc/6G9X-3VDG].

39. *Thermoelectric Power Water Use*, U.S. GEOLOGICAL SURV., https://water.usgs.gov/watuse/wupt.html [https://perma.cc/XXB9-38WN].

40. *Irrigation Water Use*, U.S. GEOLOGICAL SURV., https://water.usgs.gov/watuse/wuir.html [https://perma.cc/SB9G-92MK].

41. *Public Water Supply Water Use*, U.S. GEOLOGICAL SURV., https://water.usgs.gov

businesses withdraw large amounts of water to make their products and supply their manufacturing processes.[42] Other uses such as mining and livestock care also consume significant amounts of water. All of these uses compete for the same limited water sources. Last but not least, in addition to all of those consumptive uses of water, scientists, outdoor recreationists, environmental conservationists, and others wish to preserve sufficient instream flows and lake levels to sustain fish and other aquatic life; to support boating, fishing, and other recreation; and to preserve the physical, biological, chemical, and ecological integrity of the rivers and lakes themselves.[43]

All of these stressors and demands—by competing uses and users as well as by competing states—are draining the nation's water bodies and pushing rivers in particular beyond their limits, both in terms of water quality and quantity.[44] States have a variety of tools at their disposal to address the problem; besides the intrastate water management compacts mentioned above, some states have, for instance, codified laws to limit and prioritize water for various uses and even require permits for large water withdrawals.[45] The Clean Water Act[46] also provides tools to state and federal regulators; to date, the emphasis has been on regulating and reducing the discharge of pollutants into water bodies. But the Act's provisions also contain largely untapped authority to manage water quantities as well, as discussed in more detail below. The Clean Water Act, by authorizing and requiring each state to promulgate and enforce water quality standards, offers an important tool for addressing water scarcity.

/watuse/wups.html [https://perma.cc/5Z9N-ELH3].

42. *Industrial Water Use*, U.S. GEOLOGICAL SURV., https://water.usgs.gov/watuse/wuin.html [https://perma.cc/BP58-TU2Z].

43. *See* Geoffrey E. Petts, *Water Allocation to Protect River Ecosystems*, 12 REGULATED RIVERS 353 (1996); B. D. Richter, M. M. Davis, C. Apse & C. Konrad, *A Presumptive Standard for Environmental Flow Protection*, 28 RIVER RES. & APPLICATIONS 1 (2011), http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.386.2010&rep=rep1&type=pdf [https://perma.cc/8DRG-FL5U]; *see also* City of Rockingham v. Fed. Energy Regulatory Comm'n, 702 F. App'x 106 (4th Cir. 2017) (demonstrating an example of litigation by conservation and recreation interests seeking higher instream flows to support recreation, wildlife, and ecological integrity).

44. The nonprofit American Rivers identifies a list of the nation's most endangered rivers each year and reports on the reasons for each endangerment, which usually relates to some combination of overuse, over-allocation, and pollution. *Most Endangered Rivers*, AM. RIVERS, https://www.americanrivers.org/category/most-endangered-rivers [https://perma.cc/5Y8E-HDC5].

45. Joseph W. Dellapenna, *Changing State Water Allocation Laws to Protect the Great Lakes*, 24 IND. INT'L & COMP. L. REV. 9, 22–25 (2014) (discussing various state water allocation statutes that regulate systems for issuing permits for water withdrawals).

46. 33 U.S.C. §§ 1251–1387 (2012).

B. Water Quality Standards Under the Clean Water Act

"Filthy water cannot be washed."
-*West African Proverb*[47]

The Federal Clean Water Act divides responsibility for safeguarding the nation's surface waters between the federal government and the governments of the fifty states.[48] One of the fundamental responsibilities delegated to the states is codifying "water quality standards."[49] Most states focus their water quality standards on limiting various chemical and toxic pollutants—setting limits on the highest concentration of, for instance, arsenic or ammonia that is permissible in different types of water bodies. But several forward-thinking states have also included regulations governing water *quantity* in their water *quality* standards in recognition of the increasing stressors and demands being placed on water resources, as described above. Such regulation is both wise and permissible within the bounds of states' rulemaking authority.

Section 303 of the Clean Water Act requires states to adopt water quality standards to establish minimum protections for water bodies within their borders, designed to protect public health and welfare and to enhance the quality of the nation's waters.[50] The requirement, enacted in 1972, gave states until April 16, 1973, to adopt an initial set of standards and submit them for approval to the Administrator of the EPA.[51] The Act then required the EPA Administrator to review the initial set of water quality standards adopted by each state to determine whether they were "consistent with the applicable requirements of" the Clean Water Act and approve those standards that it deemed consistent.[52] For standards that the Administrator found inconsistent with the Clean Water Act, the Act prescribed a process whereby the Administrator would notify the state of inconsistencies, identify necessary changes for the state to make, and promulgate replacement standards for a state if it failed to codify the required changes.[53]

Each state's water quality standards, pursuant to the Clean Water Act, must include three categories of standards:

1. Designated uses of the water bodies within its borders;
2. Water quality criteria; and

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47. Ghana Health & Educ. Initiative, "*Filthy Water Cannot Be Washed." -West African Proverb*, GHEI NEWS (May 18, 2012), https://gheiblog.wordpress.com/2012/05/18/filthy-water-cannot-be-washed-west-african-proverb [https://perma.cc/4MAQ-58L4].

48. 33 U.S.C. §§ 1251–1387 (2012) (originally enacted as the Federal Water Pollution Control Act in 1948, then substantially reorganized in 1972, and, together with subsequent amendments, is now referred to as the Clean Water Act).

49. *Id.* § 1313.

50. *Id.*; 40 C.F.R. § 131.2 (2018).

51. 33 U.S.C. § 1313(a)(3)(A) (2012) (setting the deadline for states to adopt and submit standards at "not later than one hundred and eighty days after October 18, 1972").

52. *Id.* § 1313(a)(3)(B).

53. *Id.* § 1313(a)(3)(C)–(b).

3. An antidegradation policy.[54]

The state must first identify the "designated uses" of all "the navigable waters" within the state's borders—that is, the "water quality goals" for each water body[55] and the expectations for how each water body can and should be used.[56] "Navigable waters" is a term that has generated much discussion, controversy, and litigation.[57] It is currently defined by statute to mean simply "the waters of the United States."[58] That definition is fleshed out by regulations, which are currently being re-assessed,[59] but it presently includes various categories, including: "[a]ll waters which are currently used . . . in interstate or foreign commerce," "[a]ll interstate waters," and "[a]ll waters adjacent to [interstate waters] . . . including wetlands, ponds, lakes, . . . and similar waters."[60] The designated uses must take into account each such water body's "use and [its] value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes, [as well as its] use and value for navigation."[61]

Using North Carolina as an example, a water body may be designated as a Class A, B, or C water body based on the primary uses for which it is deemed suitable, and it may receive a secondary classification based on special uses, such as sustaining trout or shellfish populations. A particular stream might be designated both a Class C water body, meaning that it has been deemed suitable for protection for certain uses such as habitat for fish and other wildlife, aquatic life propagation, fishing, agriculture, and secondary recreation like boating and wading, but not suitable for other uses such as use as a public water supply and primary recreation like swimming that involves full bodily contact with the water. If that stream happens to be a mountain stream, it might further be designated as a trout water, meaning that it will

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54. 40 C.F.R. § 131.6(a), (c), (d); s*ee also* U.S ENVTL. PROT. AGENCY, WATER QUALITY STANDARDS HANDBOOK: CHAPTER 1: GENERAL PROVISIONS 1–2 (2014), https://www.epa.gov/sites/production/files/2014-10/documents/handbook-chapter1.pdf [https://perma.cc/YU2Q-X7FW].

55. 33 U.S.C. § 1313(c)(2)(A) (2012); 40 C.F.R. § 131.2 (2018).

56. 33 U.S.C. § 1313(c)(2)(A) (2012); 40 C.F.R. § 131.10 (2018).

57. *E.g.*, Rapanos v. United States, 547 U.S. 715 (2006); Solid Waste Agency of N. Cook Cty. v. U.S. Army Corps of Eng'rs, 531 U.S. 159 (2001); Exec. Order No. 13,778, 82 Fed. Reg. 12,497, 12,497 (Mar. 3, 2017) (ordering the EPA to reconsider its 2015 regulation broadly defining "navigable waters" under the Clean Water Act and instead "consider interpreting the term . . . in a manner consistent with the opinion of Justice Antonin Scalia in *Rapanos*," which was a more limited definition).

58. 33 U.S.C. § 1362(7) (2012).

59. Definition of "Waters of the United States"—Recodification of Pre-Existing Rules, 82 Fed. Reg. 34,899, 34,899 (July 27, 2017) ("The [EPA] and the Department of the Army . . . are publishing this proposed rule to initiate the first step in a comprehensive, two-step process intended to review and revise the definition of 'waters of the United States' consistent with the Executive Order signed on February 28, 2017 [by President Trump] . . . to rescind the definition of 'waters of the United States' . . . promulgated by the agencies in 2015 . . . [and] to recodify the regulations that existed before the 2015 Clean Water Rule . . . .").

60. 40 C.F.R. § 110.1 (2018); *see also* Definition of "Waters of the United States"—Addition of an Applicability Date to 2015 Clean Water Rule, 83 Fed. Reg. 5200 (Feb. 6, 2018).

61. 33 U.S.C. § 1313(c)(2)(A) (2012).

also be protected as habitat for native trout species,[62] which need particularly "clear, clean and cold" water to survive, along with areas of both slow-flowing pools and rapid-flowing stream segments, and "deep pools . . . for over-winter survival."[63] Each state classifies each navigable water body within its boundaries with its own set of categories and uses.

Second, the state must adopt "water quality criteria," prescribing the pollutant limits and other conditions that are necessary to protect each water body for its designated uses.[64] The criteria must be set at levels that will "protect the public health or welfare, enhance the quality of water and serve the purposes of" the Clean Water Act.[65] The EPA provides guidance to the states through a list of National Recommended Water Quality Criteria that it periodically updates with the latest scientific data; that list includes numeric criteria that represent "the highest concentration of a pollutant or parameter in water that is not expected to pose a significant risk to people" and/or "to the majority of species in a given environment."[66] Returning to the example of the hypothetical North Carolina stream that has been designated as both a Class C water body and a trout stream, North Carolina's current EPA-approved numeric water quality criteria include such limits as a maximum of 150 µg of "arsenic, dissolved, chronic" per liter of water, a maximum of 0.012 µg of mercury per liter of water, a minimum dissolved oxygen level of at least 6.0 mg of oxygen per liter of water, a temperature that does not exceed 68°F, and turbidity that does not exceed certain measures, given the trout's need for particularly clear, clean, cool water.[67] To supplement their "numeric" criteria, states may also establish "narrative" water quality criteria. Continuing the example, North Carolina's criteria for Class C waters includes several narrative criteria, including that oils and other wastes that cause discoloration of the water may be present only in "such amounts as shall not render the waters injurious to public health, secondary recreation, or to aquatic life and wildlife, or adversely affect the palatability of fish, aesthetic quality, or impair the waters for any designated uses."[68] Each state currently applies either the water quality criteria that it promulgated itself or, for some states, EPA-imposed criteria.[69]

Third and finally, a state's water quality standards must include an "antidegradation policy," a regulation that must be designed to ensure that "[e]xisting

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62. 15A N.C. ADMIN. CODE 02B .0211, .0202(57), .0301 (2015).

63. WILDLIFE HABITAT COUNCIL, U.S. DEP'T OF AGRIC. & NAT. RES. CONSERVATION SERV., RAINBOW TROUT (ONCORHYNCHUS MYKISS) (2000), https://www.fws.gov/northeast/wssnfh/pdfs/rainbow1.pdf [https://perma.cc/VEH5-W5Q7].

64. 33 U.S.C. § 1313(c)(2)(A) (2012); 40 C.F.R. § 131.11 (2018).

65. 33 U.S.C. § 1313(c)(2)(A) (2012).

66. U.S. Envtl. Prot. Agency, *National Recommended Water Quality Criteria*, https://www.epa.gov/wqc/national-recommended-water-quality-criteria [https://perma.cc/V4DQ-F927]; *see also* 40 C.F.R. pt. 131 (2018) (providing water quality standards guidance).

67. 15A N.C. ADMIN. CODE 02B0 .0211(6), (11), (18), (21).

68. *Id.* at 12.

69. *See, e.g.*, *Water Quality Standards for Idaho*, 62 Fed. Reg. 41,162, 41,162 (July 31, 1997) (to be codified at 40 C.F.R. pt. 131) ("EPA is promulgating water quality standards applicable to the waters of the United States in the State of Idaho. These standards supersede certain aspects of Idaho's water quality standards that EPA disapproved in 1996 . . . after concluding they were inconsistent with the Clean Water Act and EPA's implementing regulations.").

instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected."[70] Federal regulations explain that "[e]xisting uses are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards."[71] Without an antidegradation policy, a state could bring its waters into compliance simply by lowering its standards or reclassifying a water body for different designated uses, rather than actually protecting currently existing uses and maintaining and/or improving water quality to support those uses. The antidegradation policy requirement prevents such a gaming of the clean-water system.

Unlike designated uses and water quality criteria, the antidegradation policy portion of water quality standards was not expressly prescribed by the 1972 legislation. Rather, the antidegradation requirement "was originally based on the spirit, intent, and goals of the Act, especially the clause" that sets a goal of "'restor[ing] and maintain[ing] the chemical, physical and biological integrity of the Nation's waters' . . . and the provision . . . that made water quality standards under prior law the 'starting point' for [Clean Water Act] water quality requirements."[72] In 1987, the Clean Water Act was amended to refer specifically to an antidegradation policy in section 303(d)(4)(B) of the Act, which mandates that an effluent limit in a permit granted to a point source allowing it to discharge pollutants into a water body "may be revised only if such revision is subject to and consistent with the antidegradation policy established under this section."[73] The EPA has clarified the antidegradation policy requirement by regulation; 40 C.F.R. section 131.12 provides that each state "shall develop and adopt a statewide antidegradation policy" which "shall, at a minimum, be consistent with . . . [e]xisting instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected."[74]

All states have adopted water quality standards, some with and some without the intervention of the EPA Administrator. Significantly, although state water quality standards must at a minimum include these three requirements (designated uses, water quality criteria, and an antidegradation policy) and they must satisfy the EPA Administrator's review, they also may be *more* stringent and contain more features —that is, be *more* protective of water quality—than federally required. This is true as a general legal principle, but also because the Clean Water Act provides as much. Specifically, section 101 of the Act identifies the following as one of its purposes: "[i]t is the policy of the Congress to recognize, preserve, and protect the primary responsibilities and rights of States to prevent, reduce, and eliminate pollution, [and] to plan the development and use (including restoration, preservation, and enhancement) of land and water resources . . . ."[75] Moreover, section 510 of the Act

70. 40 C.F.R. § 131.12(a)(1) (2012); *see also* 33 U.S.C. § 1313(d)(4)(B) (2012); 40 C.F.R. §§ 131.6(d), 131.12(a)(1) (2012).

71. 40 C.F.R. § 131.3(e); *see also* 40 C.F.R. §§ 131.6(d), 131.3(e).

72. U.S. ENVTL. PROT. AGENCY, WATER QUALITY STANDARDS HANDBOOK: CHAPTER 4: ANTIDEGRADATION 1 (2012) (citing sections 101(a) and 303(a) of the Clean Water Act), https://www.epa.gov/sites/production/files/2014-10/documents/handbook-chapter4.pdf [https://perma.cc/4CX9-YSDC].

73. 33 U.S.C. § 1313(d)(4)(B) (2012) (referring to what are known as National Pollutant Discharge Elimination System or "NPDES" permits granted pursuant to 33 U.S.C. § 1311(b)).

74. 40 C.F.R. § 131.12(a)(1) (2018).

75. 33 U.S.C. § 1251(b) (2012).

specifically grants to the states the right to enact more stringent water quality protections; that sections states, "nothing in this chapter shall (1) preclude or deny the right of any State . . . to adopt or enforce (A) any standard or limitation respecting discharges of pollutants, or (B) any requirement respecting control or abatement of pollution, except" for any such standard or limitation that is "less stringent than" any corresponding federal standard or limitation.[76] In recent years, however, several states have adopted laws that restrict their *own* authority to adopt environmental statutes and regulations that are more stringent than required by federal law.[77] Because, as described below, setting minimum instream flows for rivers and minimum levels for lakes is arguably necessary to protect public health and support designated uses of water bodies, adopting water quality criteria that do so would not run afoul of these state-imposed limitations.

After the initial round of adoption of water quality standards, the Clean Water Act requires states to hold public hearings to review and modify those standards as necessary at least as often as every three years in a process known as the "triennial review."[78] In its triennial review, a state might adopt new standards for new pollutants (for instance, a newly developed herbicide or dry cleaning solvent), or it might modify existing standards based on new scientific evidence regarding toxicity levels of previously-regulated pollutants. The Act includes a process for, following each triennial review, submission of a state's new or modified standards to the Administrator, who then reviews and approves them, or reviews, gives notice of disapproval, and promulgates substitute standards as necessary, similar to the process for review of the initial standards.[79] These new and modified standards must include,

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76. *Id.* § 1370.

77. *See, e.g.*, MISS. CODE ANN. § 49-17-34(2) (West 2011) ("All rules, regulations and standards relating to air quality, water quality or air emissions or water discharge standards promulgated by the [state environmental] commission . . . shall not exceed the requirements of federal statutes and federal regulations, standards, criteria and guidance . . . ."); N.C. GEN. STAT. ANN. § 150B-19.3(a) (West Supp. 2017) ("An agency authorized to implement and enforce State and federal environmental laws may not adopt a rule for the protection of the environment or natural resources that imposes a more restrictive standard, limitation, or requirement than those imposed by federal law or rule . . . ."); S.D. CODIFIED LAWS § 1-40-4.1 (2012) ("No rule that has been promulgated [related to environmental protection, mining, water rights and water management] may be more stringent than any corresponding federal law, rule, or regulation governing an essentially similar subject or issue."); *see also* ENVTL. LAW INST., STATE CONSTRAINTS: STATE-IMPOSED LIMITATIONS ON THE AUTHORITY OF AGENCIES TO REGULATE WATERS BEYOND THE SCOPE OF THE FEDERAL CLEAN WATER ACT 11 (2013), https://www.eli.org/sites/default/files/eli-pubs/d23-04.pdf [https://perma.cc/MVT9-M23K] (noting that, as of 2013, "28 states [had] adopted laws or policies that limit the authority of state agencies to protect waters more stringently than would otherwise be required under the federal Clean Water Act," and thereby "making the federal regulatory floor equally a state regulatory 'ceiling,'" and describing each state's laws); NAT'L CONFERENCE OF STATE LEGISLATURES, STATE AGENCY AUTHORITY TO ADOPT MORE STRINGENT ENVIRONMENTAL STANDARDS (2014), http://www.ncsl.org/research/environment-and-natural-resources/state-agency-authority-to-adopt-more-stringent-environmental-standards.aspx [https://perma.cc/3CBC-DATA] (listing states that have adopted such limitations on their own authority).

78. 33 U.S.C. § 1313(c) (2012).

79. *Id.* § 1313(c)(2)–(4).

but are not limited to, the "specific numeric criteria" for those toxic pollutants listed by the EPA on its lists of National Recommended Water Quality Criteria for the protection of human health and aquatic life.[80]

The Clean Water Act then goes on to provide various mechanisms for states to enforce their water quality standards. For instance, state environmental agencies, in issuing pollutant discharge permits, can set limits on the amount of pollutants entities can discharge into water bodies.[81] State agencies can also identify impaired, or polluted, water bodies that are not meeting one or more applicable water quality standards and then develop and implement water-body-specific remediation plans known as "Total Maximum Daily Loads" or "TMDLs" to try to bring the impaired water body back into compliance with the standards.[82]

Relevant to this article, the Clean Water Act delegates a particularly important responsibility to the states: the responsibility for issuing "water quality certifications" for federal actions. Section 401 of the Act states that an applicant for a federal license or permit for an activity that "may result in any discharge into the navigable waters" of a state must seek a certification from that state stating that the proposed activities will not result in the violation of the state's water quality standards described above.[83] Upon receiving a request for a 401 certification, a state has three choices: (1) it may deny the application outright, upon concluding that the activities will result in the violation of the state's water quality standards; (2) it may grant the application and issue a section 401 water quality certification without conditions if it finds the activities will not result in a violation of water quality standards; or (3) it may grant the application and issue a section 401 water quality certification that imposes any conditions that "may be necessary to insure compliance with applicable water quality requirements."[84] The conditions might involve such protections as monitoring or limiting discharges of particular pollutants to certain levels (to ensure criteria for those pollutants are met), installing devices to increase dissolved oxygen in the water body (to meet state dissolved oxygen criteria), or installing erosion control measures to prevent runoff of sediment from a construction site into the waterbody (to satisfy state water quality criteria for turbidity).[85] If the state issues a section 401 water quality certification with conditions, the responsible federal agency must then include those conditions as a part of the federal license or permit.[86]

It is in the codification of water quality standards and in the issuance of section 401 water quality certifications that states may enforce limits on water *quantity* as an

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80. *Id.* § 1313(c)(2)(B); *Water Quality Criteria*, U.S. ENVTL. PROT. AGENCY (Dec. 6, 2018), https://www.epa.gov/wqc [https://perma.cc/39E7-NMJ5].

81. 33 U.S.C. § 1342 (2012) (governing issuance of National Pollutant Discharge Elimination System or "NPDES" permits); *see also National Pollutant Discharge Elimination System (NPDES)*, U.S. ENVTL. PROT. AGENCY (Dec. 12, 2018), https://www.epa.gov/npdes [https://perma.cc/5F6F-CYPZ].

82. 33 U.S.C. § 1313(d) (2012) (governing TMDLs); *see also Clean Water Act Section 303(d): Impaired Waters and Total Maximum Daily Loads (TMDLs)*, U.S. ENVTL. PROT. AGENCY (Sept. 13, 2018), https://www.epa.gov/tmdl [https://perma.cc/PQC8-DJL2].

83. 33 U.S.C. § 1341(a)(1)–(2) (2012).

84. *Id.*; CLAUDIA COPELAND, CONG. RESEARCH SERV., CLEAN WATER ACT SECTION 401: BACKGROUND AND ISSUES 4 (2015), https://fas.org/sgp/crs/misc/97-488.pdf [https://perma.cc/538W-25HN].

85. 33 U.S.C. § 1341(a)(1).

86. *Id.* § 1341(a)(2).

element of water *quality*. Some have already begun to do so, as described below. The Supreme Court paved the way with a seminal decision in 1994.

II. COURT DECISIONS PROTECTING WATER QUALITY: *PUD NO. 1* AND ITS PROGENY

"Eventually, all things merge into one, and a river runs through it."
- *Norman Maclean, A River Runs Through It: And Other Stories*[87]

A. The Supreme Court Decision in Public Utility District No. 1 of Jefferson County v. Washington Department of Ecology

In 1994, the United States Supreme Court considered a dispute over the terms of a section 401 water quality certification and issued a groundbreaking opinion recognizing that the regulation of water quantity as a factor affecting water quality in *Public Utility District No. 1 of Jefferson County v. Washington Department of Ecology* (hereinafter "*PUD No. 1*").[88]

In that case, the City of Tacoma, Washington, and the local electric utility (Public Utility District or "PUD" No. 1 of Jefferson County) sought a federal permit from the Federal Energy Regulatory Commission ("FERC") to build a hydroelectric power plant on the Dosewallips River in Washington State. Such a permit may be issued for up to fifty years and authorizes the terms under which the hydroelectric plant will operate for that entire time, including how the river's water will be released, or discharged, downstream from the dam. As explained above, section 401 of the Clean Water Act requires any entity that applies for a federal permit for an activity that "'may result in any discharge into the navigable waters' to obtain from the State a certification 'that any such discharge will comply with the applicable provisions of'" the Clean Water Act, including the water quality standards of the state in which the river at issue is located.[89] The state may impose any conditions that may be necessary to ensure that the discharge from the activity authorized by the federal permit will not result in a violation of the state's water quality standards, and those conditions become a condition of the federal license or permit.[90]

Before continuing, an explanation of hydroelectric power generation is in order. A typical hydroelectric power plant operates by, essentially, using falling water to create power. More specifically, some or all of the water in a river is impounded behind a dam in order to raise the level of the water; the water is then diverted to run through turbines at the bottom of the dam, where the kinetic energy of the falling water turns the blades of the turbine, creating mechanical energy, which in turn creates electrical power.[91] After the water passes through the turbine, it is discharged back into the river; it is this "discharge" into the river that implicates section 401 of the Clean Water Act. Hydroelectric power plants typically hold significant amounts of water behind their dams, saving it for the times when it will be needed for power

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87. NORMAN MACLEAN, A RIVER RUNS THROUGH IT: AND OTHER STORIES 104 (1976).

88. 511 U.S. 700 (1994).

89. *Id.* at 707 (quoting 33 U.S.C. § 1341(a) (2012)).

90. *Id.* at 708.

91. *Hydroelectric Power: How It Works*, U.S. GEOLOGICAL SURV. (Dec. 2, 2016, 12:51 PM), https://water.usgs.gov/edu/hyhowworks.html [https://perma.cc/236K-86QR].

generation. Thus, the river reach below (that is, downstream of) a hydroelectric power plant's dam may experience both drought conditions (with the dam releasing only the minimum instream flow that is required by its license) and flood conditions (when water is released as part of the power generation process); a single river reach downstream of a hydroelectric power plant may experience such fluctuations between drought and flood several times over the course of each day. Such fluctuations may result in degradation of habitat for aquatic species living below the dam, decreased dissolved oxygen, increased turbidity, and other potential water quality problems.

In *PUD No. 1*, the Washington State Department of Ecology granted the city and utility's application for a section 401 water quality certification for the proposed hydroelectric power plant, but, in so doing, it imposed a condition mandating that the plant release water from its dam at or above certain rates to ensure a minimum instream flow in the river downstream of the project.[92] As originally proposed, the operation of the hydroelectric plant would have reduced the flow in the relevant section of the Dosewallips River from its natural range of 149 to 738 cubic feet per second ("cfs") to an artificially low range of 65 to 155 cfs. (The instream flow of all rivers naturally varies, both seasonally and depending on inflow from rain, snow melt, etc., but natural flow ranges can be determined from historic flow records, for instance, from flow gauges maintained by the USGS.) The Washington State Department of Ecology imposed conditions in the section 401 certification requiring minimum instream flow downstream of the project of 100 to 200 cfs, with the specific amount depending on the season (still below natural levels, but higher than proposed by the utility), in order to protect salmon and steelhead trout populations in the river.[93] The city and utility challenged the imposition of the minimum instream flow requirements, arguing that the state agency had exceeded its authority, which they maintained was limited to imposing conditions in its 401 certification that addressed the discharge of chemical pollutants that violated water quality criteria. They argued that the return of water from upstream of the dam to the river reach downstream of the dam was not a "discharge" for purposes of section 401 nor did it involve any "pollutant," and that the quantity of instream flow below the dam necessary to support designated uses was not the proper subject of a 401 water quality certification.[94]

The Supreme Court granted certiorari in *PUD No. 1* in order "to resolve a conflict among the state courts of last resort" of Washington, Vermont, and New York.[95] The Washington Supreme Court had held in the *PUD No. 1* case that Washington state's water quality standards, including without limitation its antidegradation policy, mandated the imposition of minimum instream flows to protect the river's designated uses, including sustaining salmon and trout species, and that the state's authority under the Clean Water Act to impose conditions encompassed the power to impose minimum instream flows to protect designated uses. That court explained, "issues

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92. 511 U.S. at 708.

93. *Id.* at 709.

94. *Id.* at 711–20.

95. *Id.* at 710 (citing Wash. Dep't of Ecology v. Pub. Util. Dist. No. 1 of Jefferson Cty., 849 P.2d 646, 650 (Wash. 1993); Ga. Pac. Corp. v. Dep't of Envtl. Conservation, 628 A.2d 944 (Ga. 1992) (table); Power Auth. of N.Y. v. Williams, 457 N.E.2d 726 (N.Y. 1983)).

regarding water quality are not separable from issues regarding water quantity and base flows . . . ."[96]

Similarly, in *Georgia-Pacific Corp. v. Department of Environmental Conservation*, the Vermont Supreme Court had affirmed a Vermont Superior Court ruling that approved the imposition of a minimum instream flow from a hydroelectric power plant as a condition of its section 401 water quality certification for a federal license for the operation of the plant and its dam.[97] The Vermont Department of Environmental Conservation imposed the minimum instream flow to raise dissolved oxygen levels below the dam and thereby protect aquatic habitat for several species of fish, including Atlantic salmon, as well as the aesthetic and recreational values of the river below the dam pursuant to its authority under section 401 of the Clean Water Act.[98] The holdings of the Washington and Vermont courts depended in part upon a conclusion that a state agency, in considering an application for a section 401 water quality certification, could impose conditions necessary to meet state water quality standards *or to satisfy any other considerations of state law*, such as state law governing water allocation and prioritization among different water users.[99] Both state courts held that minimum instream flow conditions were arguably necessary to protect and support the designated uses of the respective rivers; without sufficient quantities of water in the stream segments, the resident fish could not live there no matter how pure the water was, and the aesthetic and recreational uses could not be enjoyed.

In contrast, in *Power Authority of New York v. Williams*, the New York Court of Appeals had held that, in considering an application for a section 401 water quality certification for a hydroelectric power plant, a state may only consider whether state water quality standards will be violated by the activity that is the subject of the application, and could not take into account other considerations of state law.[100] In that case, instream flow and water quantity downstream of the project were not at issue; rather, a lower court had ordered that the administrative agency must take into consideration the requirements of state energy law as well as state laws governing water quality, that is, by balancing energy, economic, and environmental interests in deciding whether to issue a section 401 water quality certification.[101] The New York Court of Appeals reversed, explaining that the Clean Water Act "authorizes States to determine and certify only the narrow question whether there is 'reasonable assurance' that the construction and operation of a proposed project 'will not violate applicable water quality standards' of the State."[102] It added that "Congress did not empower the States to reconsider matters, unrelated to their water quality standards, which the Power Commission has within its exclusive jurisdiction under the Federal Power Act."[103]

In deciding *PUD No. 1*, the Supreme Court resolved what it viewed as a conflict among those three state court opinions in holding that states do, in fact, have the

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96. *Wash. Dep't of Ecology*, 849 P.2d at 653, *aff'd sub nom. PUD No. 1*, 511 U.S. at 700.

97. 35 E.R.C. 2052, 2053 (Vt. 1992).

98. *Id.*

99. *PUD No. 1*, 511 U.S. at 720–21.

100. 457 N.E.2d at 730.

101. *Id.* at 728 (explaining the holding and rationale of the New York Supreme Court, Appellate Division, Third Department).

102. *Id.* at 729–30 (quoting Rham v. Diamond, 295 N.E.2d 763, 766 (N.Y. 1973)).

103. *Id.* at 730 (quoting *Rham*, 295 N.E.2d at 768).

authority to protect water *quantity* pursuant to their authority to impose conditions in section 401 water *quality* certifications, and that section 401 certification authority is not limited merely to consideration of discharges of chemical pollutants but may take into account other considerations of state law. The *PUD No. 1* Court then specifically addressed the challenge by the city of Tacoma, Washington, and its local power utility to the imposition of instream flow requirements. To their argument that the Clean Water Act governs only water *quality*, but not water *quantity*, the Court explained:

> This is an artificial distinction. In many cases, water quantity is closely related to water quality; a sufficient lowering of the water quantity in a body of water could destroy all of its designated uses, be it for drinking water, recreation, navigation or, as here, as a fishery . . . . This broad conception of pollution—one which expressly evinces Congress' concern with the physical and biological integrity of water—refutes petitioners' assertion that the Act draws a sharp distinction between the regulation of water "quantity" and water "quality."[104]

The Court went on to elaborate on the ways in which the Clean Water Act acknowledges that "reduced stream flow, *i.e.*, diminishment of water quantity, can constitute water pollution."[105] First, the Clean Water Act defines "pollution as 'the man-made or man induced alteration of the chemical, physical, biological, and radiological integrity of water . . . .'"[106] That definition is clearly broad enough to encompass the concept of man-made reductions to water quantity and resulting harm to the physical and biological integrity of the waterbody. A reduction of the amount of water flowing through a river is, by definition, altering the river physically, and the same reduction of instream water quantity will likely impact its ability to assimilate pollutants (thus altering its chemical integrity). Either of these changes —in the chemical or physical integrity of the river—may impact the river's ability to sustain its indigenous population of fish, mussels, and other species, thereby altering its biological integrity as well.

Second, the Court pointed out that the Clean Water Act "expressly recognizes that water 'pollution'"—that is, alteration of the integrity of the waterbody—"may result from 'changes in the movement, flow, or circulation of any navigable waters . . . , including changes caused by the construction of dams.'"[107] Third and finally, the Court pointed out that EPA regulations specifically require existing dams to be operated in such a way as to support and attain designated uses.[108] Moreover, the *PUD No. 1* Court rejected the notion propounded by the city that sections 101(g) and 510(2) of the Clean Water Act "exclude the regulation of water quantity from the coverage of the Act"; it explained that those sections "preserve the authority of each State to allocate water quantity as between users [yet] they do not limit the scope of water pollution controls that may be imposed on users who have obtained, pursuant to state law, a water allocation."[109] Ultimately, the Court upheld the decision of the

104. *PUD No. 1*, 511 U.S. at 719.
105. *Id.* at 719.
106. *Id.* (quoting 33 U.S.C. § 1362(19) (2012)).
107. *Id.* at 719–20 (quoting 33 U.S.C. § 1314(f) (2012)).
108. *Id.* at 720 (citing 40 C.F.R. § 131.10(g)(4) (2018)).
109. *Id.* at 720.

Washington state courts and affirmed the power of the state to impose minimum instream flow requirements in a section 401 water quality certification in order to support designated uses and satisfy the state's antidegradation policy.[110]

Just a few years later, the Supreme Court had occasion to affirm its holding in *PUD No. 1*. In its 2006 decision in *S.D. Warren Co. v. Maine Board of Environmental Protection*, the Court considered a challenge to a section 401 water quality certification that imposed minimum instream flow requirements as a condition of the FERC license for a series of five hydroelectric power plants operated by a paper company along the Presumpscot River in Maine.[111] The company argued that the condition was not appropriate because the dams did not add anything foreign to the river, but rather only returned the river's own water to the river, and therefore its dams did not result in a "discharge" into navigable waters for purposes of section 401 of the Clean Water Act.[112] The Court held that the term "discharge" was not limited solely to discharges of pollutants, and it affirmed the *PUD No. 1* Court's holding that the term could apply to "the discharge of water at the end of the tailrace [of a hydroelectric plant] after the water has been used to generate electricity."[113] It further affirmed the *PUD No. 1* Court's holding that allowing states to impose instream flow conditions to such discharges supported the very purpose of Congress in enacting the Clean Water Act: to control "'the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water'"[114] by allowing states to "enforce 'any . . . appropriate requirement of State law . . . .'"[115]

Thus, with clear Supreme Court precedent confirming that states have authority to use section 401 certifications to assure adequate water quantities to support designated uses and other considerations of state law, one question remained: would states actually use that power—that is, would they be willing to interpret state water quality standards and other state laws to require certain amounts of water be maintained in the water bodies within their borders? The answer appears to be a somewhat tepid "yes, sometimes." States that have adopted explicit numeric criteria, or at least narrative criteria, that protect instream flows and lake levels are much more likely to be willing to require minimum instream flows in the section 401 water quality certifications that they issue than are states that have not adopted such criteria.

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110. *Id.* at 723 ("[T]he State may include minimum stream flow requirements in a certification issued pursuant to § 401 of the Clean Water Act insofar as necessary to enforce a designated use contained in a state water quality standard.").

111. 547 U.S. 370, 373 (2006).

112. *Id.* at 378–82 (summarizing the company's argument that, *inter alia*, the doctrine of *noscitur a sociis*, which states that the meaning of a word can be derived from the words with which it is associated, requires that the term "discharge" must mean the addition of a pollutant into the river because the term "discharge" is used in close proximity to the term "discharge of pollutants" in 33 U.S.C. § 1362, and the latter is defined to mean the "addition of any pollutant to navigable waters").

113. *Id.* at 376–77 (quoting *PUD No. 1*, 511 U.S. at 711).

114. *Id.* at 385 (quoting 33 U.S.C. §1362(19) (2012)).

115. *Id.* at 386 (quoting 33 U.S.C. § 1341(d) (2012)).

B. Aftermath of PUD No. 1 *in the Courts of Appeals and State Courts*

Subsequent to *PUD No. 1*, federal and state courts alike have applied the same reasoning in a variety of circumstances, often involving section 401 certifications for FERC licenses for hydroelectric projects as in *PUD No. 1*, to protect water *quantity* as a necessary part of protecting water *quality*. Several courts have upheld water quality certifications that go beyond merely ensuring that numeric water quality criteria for various pollutants will be satisfied and that, instead, also specifically impose limits on water *quantity*, such as minimum instream flow conditions. In one such case, *In re Appeal of Clyde River Hydroelectric Project*, the Supreme Court of Vermont reviewed a section 401 water quality certification for the federal license for a hydroelectric power plant that imposed minimum instream flows.[116] The power plant included a dam in the Clyde River in Vermont. Originally licensed in 1963, the plant caused a significant portion of the river to bypass its natural channel in order to route the water from the dam to the turbines in the powerhouse, where it could be used to create electricity; the water was then "discharged back into the river at the tailrace" below the dam.[117] The portion of the river that was bypassed by the plant had historically been "largely dry" because it received only the "very small amounts of water" that leaked over the dam, approximately two cfs.[118]

When the plant's operator applied for a new federal license in approximately 2003, it sought the required section 401 water quality certification from the state.[119] The state environmental agency granted the certification but imposed a condition that required a minimum instream flow in the bypassed reach of 30 cfs in order to support aquatic habitat.[120] Significantly, Vermont's water quality standards required not mere satisfaction of numeric criteria for chemical pollutants but actually included explicit criteria protecting instream flow amounts.[121] The court quoted several subsections of one of Vermont's narrative flow criteria in its opinion, noting that they required that aquatic life be sustained by high-quality aquatic habitat, that instream flows "exhibit[] good aesthetic value," and that there be "[n]o change from the reference condition that would prevent the full support of aquatic biota . . . ."[122] While the Vermont Supreme Court denied the plaintiff environmental group's request to impose minimum flows that were even higher than those imposed by the state in the 401 certification, which the group sought in order to sustain the life cycles of certain migratory fish species, it did not question the state agency's authority to impose conditions ensuring minimum quantities of water. It held that the administrative record contained adequate support for the agency's decision that the required minimum instream flows in the bypass reach (combined with mechanisms to ensure

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116. 895 A.2d 736, 737–40 (Vt. 2006).
117. *Id.* at 738.
118. *Id.* at 739.
119. *Id.* at 737.
120. *Id.* at 739.
121. *Id.* at 738 (noting that Vermont Water Quality Standards protect "'aquatic biota and wildlife sustained by high quality aquatic habitat,' . . . *water character, flows, level*, and bed and channel characteristics" (emphasis added) (citations omitted)).
122. *Id.* (citing several subsections of 16-5-100 VT. CODE R. § 3-04).

migratory fish passage up- and downstream) provided sufficient quantity to satisfy Vermont's water quality standards.[123]

The fact that Vermont's water quality standards specifically included explicit criteria that protected instream flow and water quantity made upholding flow conditions in the section 401 certification an easier call for the *Clyde River Hydroelectric Project* court than some other cases that followed *PUD No. 1*. In other cases, courts have had to extrapolate from more generalized antidegradation policies, definitions of designated uses, and water quality certification guidelines to find support for enforcing minimum instream flows in section 401 certifications for FERC licenses for hydroelectric projects. For instance, in a case linked to the conflict between North and South Carolina over the equitable apportionment of the waters of the Catawba River mentioned above,[124] the South Carolina Board of Health and Environmental Control reversed the South Carolina state environmental agency's decision to issue a section 401 water quality certification to Duke Energy Corporation approving its operation of a hydroelectric project that included a series of dams and power plants along the river in both North and South Carolina. The Board ordered that the certification be denied on the grounds that the proposed minimum instream flow would "not provide sufficient flow to protect classified uses, the endangered shortnose sturgeon and adequate downstream flow of the Catawba River into South Carolina in order to provide reasonable assurance that . . . water quality standards in the Catawba River in South Carolina will be met."[125] In other words, even though South Carolina's water quality standards contained no specific flow criteria, the Board based its denial of the certification on the insufficiency of the proposed instream flows from the various dams to protect the designated uses of the river. Although the Board decision was not addressed by higher courts, subsequent negotiations between Duke Energy, the state agency, and the environmental groups who had challenged the original section 401 certification resulted in a settlement agreement that likewise protected minimum instream flows.[126]

Similarly, the U.S. Court of Appeals for the Ninth Circuit upheld the imposition of conditions in a FERC license for yet another hydroelectric power plant that imposed minimum instream flow requirements, but went even further than *PUD No. 1* in approving instream flows that not only matched but *exceeded* those requested by the state agency's section 401 certification.[127] In *Snoqualmie Indian Tribe v. FERC*, the owner of a hydroelectric power plant applied for a forty-year license to operate the plant.[128] The Washington State Department of Ecology issued a section

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123. *Id.* at 739–40.

124. *See supra* notes 35–36.

125. *Duke Energy Carolinas, LLC*, S.C. Bd. of Health & Envtl. Control Final Agency Decision, Bd. Docket No. 09-RFR-43 (Aug. 6, 2009) (available at FERC eLibrary document accession number 20090811-5132, pp. 51–52).

126. RACHAEL NOVAK ET AL., EPA REPORT 822-R-16-007, FINAL EPA-USGS TECHNICAL REPORT: PROTECTING AQUATIC LIFE FROM EFFECTS OF HYDROLOGIC ALTERATION 124 (2016), https://www.epa.gov/sites/production/files/2016-12/documents/final-aquatic-life-hydrologic-alteration-report.pdf [https://perma.cc/Y3WZ-TZQ5] (describing settlement agreement).

127. Snoqualmie Indian Tribe v. Fed. Energy Regulatory Comm'n, 545 F.3d 1207, 1218–19 (9th Cir. 2008).

128. *Id.* at 1210.

401 water quality certification that imposed conditions, including minimum instream flow requirements, to ensure that the operation of the power plant did not "degrade water quality and negatively affect 'characteristic' uses of the Snoqualmie River," including its existing, designated uses for public water supply, fish and wildlife habitat, recreation, and navigation.[129] In issuing the license, FERC adopted all of the state agency's conditions, plus required even higher minimum instream flows for the months of May and June and Labor Day weekend to further protect the state's designated uses.[130] The Ninth Circuit Court of Appeals explained that FERC's imposition of even higher minimum instream flows was "not contrary to, nor did it weaken" the state agency's minimum instream flow conditions, which result might have violated the state's antidegradation policy; rather, the higher FERC imposed flows *strengthened* the state-imposed conditions and supported the state's water quality standards, including by ensuring that the river's existing beneficial uses were not degraded and that its designated uses were in fact enhanced.[131]

In *City of Rockingham v. North Carolina Department of Environment and Natural Resources*, the North Carolina Court of Appeals approved minimum instream flows of 330 cfs (increased to 725 cfs during shad spawning season) that the North Carolina state environmental agency imposed as conditions of a section 401 water quality certification for a FERC license for a hydroelectric project located on the Yadkin River.[132] Although the state agency and court declined to impose even higher minimum instream flows sought by the plaintiffs (a city located downstream of the project and an environmental non-profit, both of whom were interested in higher flows to enhance recreational uses and wildlife habitat downstream of the dam), the court enforced the higher flows required by the state agency's certification. North Carolina's water quality standards did not include specific numeric criteria to protect instream flow, but its regulations did require that section 401 certifications impose conditions to ensure that "existing uses are not removed or degraded" and "minimize adverse impacts to the surface waters based on consideration of existing" conditions.[133] The court explained that the Yadkin River had been classified such that its designated uses included that it be "suitable for aquatic life propagation and maintenance of biological integrity, wildlife, [and] secondary recreation," and that the evidence supported the agency's findings that the minimum instream flows required by the agency's section 401 certification were necessary to support those designated uses.[134]

Thus, despite the lack of specific water quality criteria addressing instream flows, water quality standards like Washington's, North Carolina's, and South Carolina's, which identify designated uses such as aquatic life propagation, biological integrity, and recreational swimming, fishing, and boating, have been held to support inclusion of conditions requiring minimum instream flows in section 401 certifications. This is a thin thread to cling to, though; the result depends upon the willingness of both the state agency and the court system to interpret those designated uses and the

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129. *Id.* at 1218.
130. *Id.*
131. *Id.*
132. 736 S.E.2d 764, 768–69 (N.C. Ct. App. 2012).
133. *Id.* at 768 (quoting 15A N.C. ADMIN. CODE 2H .0506(b) (2012)).
134. *Id.* at 768 (quoting 15A N.C. ADMIN. CODE 2B .0211(2) (2012)).

antidegradation policy to mean that the water body in question must not only be clean enough and sufficiently free of toxic pollutants to support the uses, but must also contain enough water realistically to support the uses—for instance, that a river must contain enough water for a boat to float or a salmon to swim upstream. As a case in point, in *City of Rockingham*, the plaintiffs pointed to evidence that, while the instream flows required by the section 401 certification would slightly improve the ability of the river to support the designated uses of biological integrity, aquatic life, and secondary recreation as compared to the 40 cfs flows under the prior fifty-year license, they would not truly support those designated uses. The evidence showed that those uses would be far better supported at higher minimum instream flows that were closer to the flows that existed historically before the dam was installed, that certain fish species required deeper flows, for instance, and that the traditional forms of boating (flat-bottomed jon boats for fishing) required deeper water as well.[135] The court refused to consider the impacts on those designated uses of flows closer to historic levels, however. Rather than insist that the state agency base its decision whether to issue a section 401 certification with or without conditions solely on whether designated uses would be adequately supported, the court ratified the agency's use of a cost-benefit analysis, allowing the agency to consider what it would cost the power company to relinquish more water for supporting designated uses instead of for power generation.[136] Had the North Carolina water quality standards included specific numeric criteria mandating certain instream flow conditions (for instance, no less than ninety percent of historic average flows or ninety percent of 7Q10 flows[137]), the plaintiffs in the *City of Rockingham* case likely would have been more successful in convincing the state agency, FERC, and/or the court to impose higher instream flows than those proposed by the applicant power companies, as in the *Snoqualmie Indian Tribe* case.

Courts have considered—and imposed—instream flow requirements as conditions to other types of permits and federal actions as well.[138] In *Alameda Water & Sanitation District v. Reilly*, a federal court considered a discharge permit granted by the Army Corps of Engineers under section 404 of the Clean Water Act for the construction of a dam to create a large water supply reservoir for the metropolitan areas surrounding Denver, Colorado.[139] The EPA raised concerns about the environmental effects of the large quantity of water that would be held in the

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135. *Id.* at 768–71.

136. *Id.* at 769.

137. As discussed in more detail later, "7Q10" flows are defined as the lowest average or mean instream flow that would be expected to occur for seven consecutive days once every ten years in a particular stream. *See infra* note 142.

138. *See, e.g.*, San Luis & Delta-Mendota Water Auth. v. United States, 672 F.3d 676, 681–82, 704–14 (9th Cir. 2012) (imposing conditions based on state water quality standards to decision by federal Department of the Interior regarding releases of water from "the nation's largest federal water management project," the Central Valley Project in California, "providing water for about thirty million people, irrigating California's most productive agricultural region and generating electricity at nine powerplants," and whether those releases should be accounted for as part of the amount of water released for the designated use of supporting spawning salmon and other high priority fish).

139. 930 F. Supp. 486, 488–89 (D. Colo. 1996).

reservoir, both on the lands that would be flooded behind the dam and the impacts below the dam on fish populations and white water recreation caused by the changes to instream flow, and it ultimately vetoed the permit on that basis.[140] The plaintiffs, several municipal water utilities that had intended to help pay for and then use the reservoir, argued that "in enacting the [Clean Water Act] Congress was concerned only with water *quality* impacts, such as pollution, and not effects relating to water *quantity* resulting from inundation."[141] They further argued that the EPA had exceeded its authority by focusing on impacts to aquatic life and recreation caused by the change in instream flow in vetoing the permit. The United States District Court for the District of Colorado ultimately held that the EPA could properly base its veto on considerations of water *quantity*, and not solely on the satisfaction of numerical water quality criteria for various pollutants, citing the Supreme Court's *PUD No. 1* decision and its clear holding that the Clean Water Act allows regulation of water quantity because "water quantity is closely related to water quality."[142]

More recently, the United States District Court for the District of Montana ruled that a federal agency had acted arbitrarily and capriciously by approving a mining project despite the fact that the project would violate Montana's water quality standards by allowing instream flow reductions in excess of ten percent below base flows.[143] The court cited *PUD No. 1* for the proposition that a "project that does not comply with a designated use of [a water body] does not comply with the applicable water quality standards."[144] The court explained that Montana's antidegradation policy requires the maintenance and protection of "[e]xisting uses of state waters and the *level of water necessary to protect those uses*,"[145] and that the policy further provides that significant changes to the physical properties of water bodies constitute "degradation" and that alteration of instream flows by more than ten percent exceeds the level generally considered "nonsignificant."[146] Although no section 401 certification was yet required at that point in the project approval process, the court found that the federal agency had erred in approving a project that would cause more than ten percent reduction below "7Q10" base level flows, that is, "the lowest streamflow averaged over 7 consecutive days that occurs, on average, once every 10 years."[147] In sum, even though no 401 water quality certification was called for in the particular circumstances of the *Alameda Water* and *Save Our Cabinets* cases, the courts relied on *PUD No. 1* in holding that water quantity (as measured by instream riverine flow) could be protected as part of the enforcement of state water quality standards.

Because of the mandatory nature of section 401, in situations in which a state

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140. *Id.* at 491.

141. *Id.*

142. *Id.*

143. Save Our Cabinets v. U.S. Dep't of Agric., 254 F. Supp. 3d 1241, 1252–55 (D. Mont. 2017), *dismissed sub nom.* Save Our Cabinets v. U.S. Fish & Wildlife Serv., No. 17-35694, 2018 WL 1091533, at *1 (9th Cir. Feb. 23, 2018).

144. *Save Our Cabinets*, 254 F. Supp. 3d at 1249.

145. *Id.* at 1252 (emphasis added) (quoting MONT. CODE ANN. § 75-5-303(1)).

146. *Id.* (citing MONT. CODE ANN. § 75-5-103(7), (27), MONT. ADMIN. R. 17.30.715(1)(a), (2)).

147. *Id.* at 1253.

agency is willing to interpret state water quality standards to require minimum instream flows, federal agencies will be obliged to include conditions imposing those flows in federal licenses, even where the result is harsh. Appellate courts have elaborated on the extent of that obligation on several occasions. In *City of Tacoma v. FERC*, the U.S. Court of Appeals for the District of Columbia clarified that the Clean Water Act requires enforcement of conditions from section 401 certifications that are necessary to ensure that state water quality standards are met, even where those conditions "may have the effect of shutting a project down or occasioning a change of ownership[,]" for instance, if required instream flows past a dam leave too little water behind the dam to make hydroelectric power generation cost-effective, forcing the operator to cease operations.[148] In another case, the Supreme Court of Washington held that a state environmental agency "has authority to impose bypass flow conditions in a water quality certification regardless of whether the applicant has existing water rights that may be affected"; presumably, the same holding would apply to the imposition of minimum instream flows in a certification.[149]

The litigants in the above-described cases who were interested in protecting instream flow and water quantities were, by and large, lucky to find courts and agencies willing to extrapolate from narrative descriptions of designated uses and intimations in antidegradation policies that existing uses need sufficient water quantities. In light of increasing competition for scarce water resources, states would do well to follow Vermont's lead and adopt explicit water quality standards to protect water quantities, making enforcement of water quantities a clearer mandate.

III. CURRENT EFFORTS TO PROTECT WATER QUANTITY IN STATE WATER QUALITY STANDARDS

"Do not become addicted to water, it will take hold of you and you will resent its absence."
- *Mad Max: Fury Road*[150]

To date, very few states have adopted specific protections mandating the quantity of instream flow in their rivers and streams or the water levels in the lakes and reservoirs.[151] Of course, all state water quality standards implicitly protect flow to some extent because, for instance, they identify designated uses that logically cannot be supported without adequate instream flows. Yet, enforcement of that implicit protection of stream flow requires several steps of logic and a commitment to conservation that may be difficult to secure in courtrooms and agency hallways amid competing interests and values. When faced with an electric utility's request for a permit that will result in a large increase in its demand for water to support electricity production, even the most environmentally conscious permit writer may have

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148. 460 F.3d 53, 74 (D.C. Cir. 2006).

149. Public Util. Dis. No. 1 of Pend Oreille Cty. v. Wash. Dep't of Ecology, 51 P.3d 744, 747 (Wash. 2002).

150. MAD MAX: FURY ROAD (Warner Bros. Pictures 2015).

151. For instance, as discussed, *see infra* Section III.B, Vermont and Maine have adopted numeric criteria to protect instream flow and/or lake levels, while Kentucky, Louisiana, and Virginia, among others, have adopted narrative criteria.

difficulty enforcing an implicit protection to support, for instance, an unspecified need for water depth to support recreation or fish spawning. This difficulty may be especially great where the needed amount varies according to the type of recreational boat or species of fish to be supported; kayaks, canoes, fishing boats, and motor boats all have different drafts requiring different water depths to float; while trout, salmon, shad, and other fish have different habitat needs in terms of depth and velocity of water.

Returning to the earlier example of the hypothetical North Carolina stream that has been classified as both a Class C water and a trout stream: by definition, because of its classification, that stream must be managed to support habitat for trout and other indigenous fish species, as well as to support aquatic life propagation generally, recreational fishing, boating, and wading, among other uses. The stream must meet the numeric and narrative criteria for various chemical pollutants and other parameters for a Class C water and a trout stream; that is, it must not exceed the set levels of those pollutants that would, for instance, preclude a healthy trout population or safe human contact while boating and wading. Logically, it must also contain enough water to support those uses. If upstream segments of the stream, for example, are overly depleted by excessive upstream water withdrawals, a particular downstream segment of the stream may receive reduced inflow of cool water from upstream or from groundwater sources, and it may stagnate or become so shallow that it is susceptible to overheating by the sun. Any of those events may cause the stream segment to exceed the maximum temperature limit for trout streams and therefore fail to meet that water quality criterion. Low flow conditions can also cause a water body to violate the water quality criteria for numerous other parameters besides temperature, including limits for dissolved oxygen concentrations, pH, salinity, nutrient concentrations, and concentrations of toxins due to its reduced volume and capacity to assimilate or dilute pollutants.[152]

Moreover, even if it does not fail to satisfy any particular numeric water quality criterion like temperature or a toxin concentration, a water body that fails to attain the uses for which it has been designated violates the "designated uses" portion of its water-quality standards. If that same North Carolina Class C trout stream is so depleted by water withdrawals that it is not deep enough to support recreational kayaking and canoeing or the spawning and life-cycle needs of trout and other indigenous fish species, the stream's designated uses are not being protected, and the water quality standards are violated in that way. As the *PUD No. 1* Court explained, "water quality standards contain two components . . . . [T]he language of § 303 is most naturally read to require that a project be consistent with *both* components, namely, the designated use *and* the water quality criteria."[153]

In addition, all states' water quality standards implicitly protect flow to some extent by virtue of their required antidegradation policy. Given that a state's antidegradation policy must ensure that "[e]xisting instream water uses and the level of water quality necessary to protect existing uses shall be maintained and

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152. NOVAK ET AL., *supra* note 126, at 36–37.

153. PUD No. 1 of Jefferson County v. Wash. Dep't of Ecology, 511 U.S. 700, 714–15 (1994).

protected,"[154] when excessive water withdrawals render a stream too shallow to support a use—for instance, if a trout stream becomes too shallow to continue to support trout habitat or to support existing types of boating—then the antidegradation policy arguably has been violated.

Accordingly, all states implicitly already regulate instream flow through their designated uses and antidegradation policies. Whether implicit protections are actually enforced in that way, however, depends on the state agency's willingness to do so; for instance, it will depend on the agency's interpretation of what depth is really "too shallow" to sustain a use. It will depend on the agency staff's judgment and may either implicitly or even explicitly involve staff engaging in an ad hoc cost-benefit analysis, considering whether another inch of fish habitat generated by a higher instream flow is worth more than the power that would be generated by holding that water back for power production. Numeric water quality criteria that specifically mandate certain levels of instream flow, on the other hand, are more easily measured, do not depend on such judgment calls, and are therefore more definitively enforceable. In recognition of that fact, the EPA has *encouraged* the adoption of such criteria, although it has not yet *required* adoption.

A. EPA Efforts to Encourage Water Quality Criteria Protecting Instream Flow and Lake Levels

Both EPA's national headquarters and staff at several EPA regional headquarters have made overtures over the years aimed at encouraging states to adopt water quality criteria to protect water quantity through, for instance, minimum instream flow and lake levels, but they have not yet been willing to require it.

Significantly, the EPA has considered promulgating a model water quality criterion for instream flow, just as it publishes the National Recommended Water Quality Criteria for numerous toxins and other pollutants. Under the Clinton administration, the EPA published a report entitled, *Water Quality Criteria and Standards Plan – Priorities for the Future*; in that report, it described its intention to "investigate the need for optimum flow guidance, criteria, management targets or other measures to protect against impairments of waterbody designated uses due primarily to flow alterations, including excessive flows from wet weather runoff and lack of base flows due to excessive water usages."[155] The EPA headquarters have not yet developed such guidance, and given recent executive orders and other indicia of executive branch policy during the Trump administration, the EPA is not likely to do so in the near future.[156]

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154. 40 C.F.R. § 131.12(a)(1) (2012); *see also* 33 U.S.C. § 1313(d)(4)(B) (2012) (requiring that, when "the quality of . . . waters equals or exceeds levels necessary to protect the designated use for such waters or otherwise required by applicable water quality standards," limitations on effluents should be "consistent with the antidegradation policy").

155. U.S. ENVTL. PROT. AGENCY, EPA 822-R-98-003, WATER QUALITY CRITERIA AND STANDARDS PLAN – PRIORITIES FOR THE FUTURE 43 (June 1998), https://nepis.epa.gov/Exe/ZyPDF.cgi/20003NQE.PDF?Dockey=20003NQE.PDF [https://perma.cc/GJR9-9BPP].

156. *See, e.g.*, Exec. Order No. 13,771, 82 Fed. Reg. 9339, 9339 (Jan. 30, 2017) (requiring the "total incremental cost of all new regulations" to be "no greater than zero" and the "incremental costs associated with new regulations" to be "offset by the elimination of existing

Regional EPA staff are, however, encouraging states to adopt their own instream flow criteria. EPA's Region 1 has been at the forefront of the issue; it governs New England, where most states have adopted instream flow requirements, with Vermont and Maine leading the way by passing some of the earliest and most comprehensive sets of instream flow criteria. As early as 1996, Region 1 staff were calling for water quantity protections in eloquent letters to state environmental agencies. They described the problem as follows:

> [I]mprovements [in water quality] are threatened by a growing problem: the ever-increasing diversion of water for hydropower generation, industrial and commercial use, agriculture, snowmaking, and municipal water supply. Whatever the end use, the result of unchecked water withdrawals can be a dangerous reduction in flows in rivers and streams and severe reductions in lake levels.
>
> The effects of flow reductions can include disruption of fish passage, reduced protective cover, increased accessibility to predation, increased stream temperatures, and reduced spawning habitat. In addition, these effects can exacerbate the effects of chemical stressors. . . . Artificially reduced flows have interfered with recreational uses, the restoration of historic salmon runs, and the cultural heritage of Native Americans.
>
> We all have a responsibility to tackle the flow problem.[157]

Among other suggestions, Region 1 staff identified revising its water quality standards as the number one way for a state to "tackle the flow problem." Citing the *PUD No. 1* decision, the staff recommended "increasing the effectiveness of water quality standards by incorporating numeric flow criteria" as well as being willing to use the state's antidegradation policy and designated uses to vigorously protect water quantities when issuing permits and certifications.[158] It explained, "if a stream segment is designated as habitat for aquatic life, the standards might specify a flow level necessary to support such habitat."[159] It also specifically suggested adopting numeric criteria for measuring biological integrity.[160]

Water quality staff at the headquarters of EPA's Region 4 (which governs eight Southeastern U.S. states and six tribes), have also been proactive, recommending

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costs associated with at least two prior regulations"); Exec. Order No. 13,777, 82 Fed. Reg. 12,285, 12,286 (Feb. 24, 2017) (requiring each agency to "evaluate existing regulations . . . and make recommendations . . . regarding their repeal"); Exec. Order No. 13,778, 82 Fed. Reg. 12,497, 12,497 (Mar. 3, 2017); Coral Davenport, *Trump Budget Would Cut E.P.A. Science Programs and Slash Cleanups*, N.Y. TIMES (May 20, 2017), https://www.nytimes.com/2017/05/19/climate/trump-epa-budget-superfund.html [https://perma.cc/9BUY-KLJN] ("President Trump's fiscal 2018 budget proposal would cut the Environmental Protection Agency's Office of Science and Technology nearly in half, while paring by 40 percent funding for E.P.A. employees who oversee and put in place environmental regulations . . . .").

157. Letter from John P. DeVillars, Regional Administrator, U.S. Envtl. Prot. Agency, to Timothy R.E. Keeney, Director, R.I. Dep't of Envtl. Mgmt. (June 25, 1996) (on file with the *Indiana Law Journal*).

158. *Id.* at 2.

159. *Id.* at 4.

160. *Id.*

adoption of instream flow protections to the states under their purview since at least 2010. Often, that advice is delivered as part of the staff's recommendations to state water quality regulators as they prepare for upcoming triennial reviews of water quality standards. For instance, on August 20, 2010, the Region 4 Water Quality Standards Section Chief wrote to North Carolina's Chief of Water Quality Planning to advise as follows:

> EPA led a discussion at the May 2010 meeting with States and Tribes in Atlanta, Georgia relating to flow (water quantity) and water quality. Drought, floods, water disputes and the development of regional and state water plans have brought water quantity/quality issues into sharp focus – including impacts of both extreme low and high flows on habitat and aquatic life. Around the country and here in Region 4, states and tribes have begun to address flow through the water quality standards program. . . . *Region 4 is encouraging all of our states and tribes to consider explicit expression of flow as a water quality standard, either through a narrative standard*, (i.e., such as used by Tennessee ". . . flow shall support the aquatic criteria….") *or through a numeric standards* (i.e., such as used by Vermont, "no more than 5% 7Q10 change from natural flow regime…"). The Region can provide you with full examples in use by other states or additional information as needed.[161]

As recently as 2017, Region 4 staff were continuing to give the same advice, with virtually the same words, to state environmental agency staffs as their triennial reviews came due.[162] Region 4 staff have also published guidelines on water efficiency, in recognition of the fact that "[o]ur nation's growing population and challenging climatic events continue to stress our available water supplies," and that "[c]limatic extremes are affecting the availability of public water supplies in the Southeast."[163] The guidelines suggest ways of reducing water demand through increasing efficiency, both by water suppliers (eliminating systemic issues that allow distribution system leaks, excessive evaporation, and other waste) and by consumers (through such methods as public education, pricing and metering practices that

161. U.S. Envtl. Prot. Agency, EPA Comments and Recommendations: North Carolina 2008–2010 Triennial Review of Water Quality Standards 12 (emphasis added) (enclosed in Letter from Annie M. Godfrey, Chief, Water Quality Standards Section, Reg. 4, U.S. Envtl. Prot. Agency, to Alan Clark, Chief, Planning Section, Div. of Water Quality, N.C. Dep't of Env't & Nat. Res. (Aug. 20, 2010)).

162. *E.g.*, Letter from Annie Godfrey, Chief, Water Quality Standards Section, U.S. Envtl. Protection Agency Region 4, to Chris Johnson, Chief, Water Quality Branch, Alabama Dep't of Envtl. Mgmt. 3 (Nov. 1, 2017) (reiterating previous recommendation to adopt "narrative and/or numeric water quality criteria for the hydrologic conditions necessary to protect aquatic life and all designated uses"); Letter from Annie Godfrey, Chief, Water Quality Standards Section, U.S. Envtl. Protection Agency Region 4, to David Wilson, Chief, Bureau of Water, S.C. Dep't of Health and Envtl. Control 3–4 (Nov. 13, 2015) (using virtually the same language as 2010 comments to NC, *see supra* note 161).

163. U.S. ENVTL. PROT. AGENCY, ENVIRONMENTAL PROTECTION AGENCY REGION 4 GUIDELINES ON WATER EFFICIENCY MEASURES FOR WATER SUPPLY PROJECTS IN THE SOUTHEAST 2 (June 21, 2010), https://archive.epa.gov/pesticides/region4/water/wetlands/web/pdf/guidelineso_wate_efficienc_measures.pdf [https://perma.cc/9KXU-WYPC].

encourage efficiency, and the use of water-efficient fixtures, appliances, and landscaping).[164]

Region 9 staff have also encouraged their Pacific Southwestern states to adopt water quality standards to protect instream flow, but to date only California has taken significant steps in that direction. For several decades, EPA Region 9 staff have been working with California water regulators to develop flow criteria specifically for the San Francisco Bay Delta.[165]

Despite all of these efforts, the EPA and its regional staffs have stopped short of outright requiring states to adopt instream flow and lake level criteria. Nevertheless, many states have done so voluntarily, in a variety of ways.

B. Water Quality Criteria Adopted by States

Despite EPA's tentativeness, several proactive states have already adopted numeric and/or narrative water quality criteria to protect water quantity and enforce minimum instream flows, motivated by the looming water crisis and experiences with water supply shortages during droughts and other climatic fluctuations. Vermont has adopted robust numeric criteria to protect the quantity of water in its rivers and streams (measured by instream flow) and its lakes and reservoirs (measured by water level), supplemented by narrative criteria. These criteria prohibit water withdrawals and other activities that affect flow in a stream or water level in a lake in such a way as to cause more than minor diminishments from natural conditions. For instance, Vermont imposes a numeric criterion for instream flow in rivers that it categorizes as "Class A(1) waters" (those designated to be protected for aquatic life, wildlife habitat, swimming, boating, and aesthetics, but not public water supplies[166]); that criterion mandates that the natural flow regime may not be diminished "by more than 5% of 7Q10 at any time."[167] The "7Q10" flows are defined as the lowest mean instream flow that would be expected to occur for seven consecutive days once every ten years in a particular stream, and they can be calculated based on historical flow data, often from USGS gauges placed in the stream.[168] For other categories of water bodies, the criteria use narrative terms by, for instance, limiting diminishment of water levels to only "minimal" amounts. The full text of Vermont's water quantity criterion for flow, excerpted from the administrative regulation setting out all of Vermont's water quality criteria, follows:

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164. *Id.* at 4–10.

165. *See, e.g.*, U.S. ENVTL. PROT. AGENCY REGION IX, TECHNICAL SUPPORT MEMORANDUM: REVIEW OF STATE OF CALIFORNIA WATER QUALITY CONTROL PLAN FOR THE SAN FRANCISCO BAR/SACRAMENTO-SAN JOAQUIN DELTA ESTUARY UNDER SECTION 303 OF THE CLEAN WATER ACT 9 (Sept. 21, 1995) (providing comments on flow criteria); Letter from Nancy Woo, Assistant Dir., Water Div., to Jeanine Townsend, Clerk, State Water Res. Bd. (Feb. 23, 2017), https://www.epa.gov/sites/production/files/2017-10/documents/sfbay-water-quality-control-plan-comments-on-scientific-basis-report-2017-02-23.pdf [https://perma.cc/9GZ9-9JRP] (comments on flow criteria).

166. 12-030-025 VT. CODE R. § 3-02 (2018).

167. 12-030-025 VT. CODE R. § 3-01(C)(1)(a) (2018).

168. 12-030-025 VT. CODE R. § 1-01(B)(42) (2018).

> C. Hydrology Criteria: In order to effectively implement the water conservation and hydrology policies . . . and to ensure full support of uses, the following hydrology criteria shall be achieved and maintained where applicable. Where there are multiple activities that affect flow in a basin, a determination of compliance with the following criteria shall include consideration of the cumulative effects of these activities.
>
> 1. Streamflow Protection
>
> a. Class A(1) Waters - Changes from the natural flow regime *shall not cause the natural flow regime to be diminished, in aggregate, by more than 5% of 7Q10* at any time;
>
> b. Class B WMT 1 Waters[169] - Changes from the natural flow regime, in aggregate, *shall not result in natural flows being diminished by more than a minimal amount* provided that all uses are fully supported; and when flows are equal to or less than 7Q10, *by not more than 5% of 7Q10.*
>
> c. Class A(2)[170] Waters and Class B Waters other than WMT1 - Any change from the natural flow regime shall provide for maintenance of flow characteristics that *ensure the full support of uses* and comply with the applicable water quality criteria . . . .
>
> . . .
>
> 3. Water Level Fluctuations
>
> a. Class A(1)/Class B WMT 1 Waters - Manipulation of the water level of lakes, ponds, reservoirs, riverine impoundments, and any other waters *shall result in no more than a minimal deviation from the natural flow regime.*
>
> b. Class A(2) Class B WMT 2/Class B WMT 3 Waters - Lakes, ponds, reservoirs, riverine impoundments, and any other waters may exhibit artificial variations in water level when subject to water level management, but only to the extent that such variations ensure full support of uses.[171]

By using deviations from 7Q10, the lowest flows estimated to occur naturally only once every ten years, Vermont is still basing its minimum criteria on conditions that are essentially equivalent to drought conditions, and then allowing minimal deviations below that level. And yet Vermont's criterion provides a measurable, enforceable limit that preserves some level of ecological integrity in the water bodies of the state.

Maine has adopted similarly robust criteria to protect the quantity of water in its water bodies, devoting an entire chapter of its administrative code to the protection of "In-Stream Flows and Lake and Pond Water Levels."[172] Like Vermont, Maine's

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169. Class B waters are managed for the same purposes as Class A(1) plus public water supplies (with disinfection) and irrigation of crops and other agricultural uses (without treatment). 12-030-025 VT. CODE R. § 3-04(A) (2018). "WMT" means "water management type" and indicates Class B waters that have been designated for a decreased or increased level of protection based on certain circumstances. 12-030-025 VT. CODE R. § 3-06 (2018).

170. Class A(2) waters are managed for the same purposes as Class A(1) plus public water supplies (with disinfection). 12-030-025 VT. CODE R. § 3-03 (2018).

171. 12-030-025 VT. CODE R. § 3-01(C) (2018) (emphasis added).

172. 06-096-587 ME. CODE R. §§ 1–14 (LexisNexis 2017).

flow standards have both narrative and numeric features, and it has adopted separate numeric criteria for the instream flow in rivers and streams and the water levels in lakes and reservoirs, as well as separate criteria for waters based upon their designation as Class AA, A, B, or C. Waters designated as Class AA are the highest classification, deemed "waters which are outstanding natural resources," and are managed "for the designated uses of drinking water after disinfection, fishing, agriculture, recreation in and on the water, navigation, and as habitat for fish and other aquatic life."[173] Class A waters are managed "for the designated uses of drinking water after disinfection; fishing; agriculture; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, . . . navigation; and as habitat for fish and other aquatic life."[174] Class B and C waters are lower classifications, managed for other uses. Maine's water quantity criteria for Class AA waters are as follows:

> 4. Flow requirements for Class AA waters
>
> A. Narrative requirement for Class AA waters. Except as provided for in this section, flows in Class AA waters *shall be maintained as they naturally occur*. Withdrawal or other direct or indirect removal, diversion, activity, or use of these waters that causes the natural flow to be altered may occur as provided in paragraph 4-B below.
>
> B. Flow established by standard allowable alteration for Class AA waters. Flow in Class AA waters may not be less than the amounts defined in subparagraphs (1), (2) and (3) below, except when natural conditions alone cause those flows to be less, or as provided by an Alternative Water Flow or regulatory permit as established in sections 7 or 8 of this chapter.
>
> (1) When natural flow exceeds the spring aquatic base flow, *90% of the total natural flow* shall be maintained.
>
> (2) When natural flow during the early winter season exceeds the early winter aquatic base flow, *90% of the total natural flow* shall be maintained.
>
> (3) When natural flow in any other season, except as described in (1) and (2) above exceeds 1.1 times the seasonal aquatic base flow and exceeds 1.5 times seasonal aquatic base flow if aquatic base flow was calculated from methods in paragraph 3-B, *90% of the total natural flow* shall be maintained.[175]

And Maine's slightly more lenient criteria for Class A, B, and C waters are as follows:

> 5. Flow requirements for Class A, B, and C waters
>
> A. Narrative requirement for Class A, B, and C waters. Withdrawals or other direct or indirect removal, diversion, activity, or use of Class A, B, or C waters *must maintain flows sufficient to protect all water quality standards including all designated uses* and characteristics of the assigned class unless as a naturally occurring condition . . . . Withdrawal

173. ME. REV. STAT. ANN. tit. 38, § 465(1) (2001 & Supp. 2018).

174. ME. REV. STAT. ANN. tit. 38, § 465(2)(A) (2001 & Supp. 2018).

175. 06-096-587 ME. CODE R. § 4 (LexisNexis 2017) (emphasis added).

> or other direct or indirect removal, diversion, activity, or use of these waters that causes the natural flow to be altered shall occur as provided in paragraphs 5-B or 5-C below.
>
> B. Flow requirements for Class A waters. Flow requirements established by the standard allowable alteration in Class A waters *may not be less than the seasonal aquatic base flow* as defined, except when natural conditions alone cause those flows to be less. . . . The Commissioner may establish . . . site-specific water flows that are protective of all water quality standards, including all designated uses and characteristics of those waters.
>
> C. Flow requirements for Class B and C waters. Flow requirements established by the standard allowable alteration in Class B and C waters *may not be less than the seasonal aquatic base flow* as defined, except when natural conditions alone cause those flows to be less. The Commissioner may establish, pursuant to sections 7 or 8 of this chapter, site-specific water flows that are protective of all water quality standards, including all designated uses and characteristics of those waters.[176]

Maine's criteria differ from Vermont's in that, instead of permissible flow and water level deviations being based on 7Q10 drought levels, they are based on non-drought conditions, that is, historic seasonal aquatic flows. These seasonal aquatic base flows are based on median flow values, calculated using flow measurements taken by the USGS over a minimum of ten years, for each season.[177] Arguably, although Maine allows for a ten percent deviation from those mean flows, because the starting point is not drought conditions, Maine's criteria are even more protective of water quantity than Vermont's. Both states offer excellent models for other states that are considering adopting criteria to protect water quantities.

Several other states have adopted narrative water quality criteria for protecting instream flow and/or lake levels, though none to date are nearly as comprehensive as Maine's and Vermont's, which cover all regulated water bodies within those states' borders. For instance, Kentucky requires that, in waters that have been designated for "warm water aquatic habitat," "[f]low shall not be altered to a degree that will adversely affect the aquatic community."[178] Louisiana, Missouri, New Hampshire, New York, Rhode Island, Tennessee, and Virginia have likewise adopted some form of explicit, albeit narrative, criteria to protect flows in at least some portion of their water bodies.[179]

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176. 06-096-587 ME. CODE R. § 5 (LexisNexis 2017) (emphasis added).

177. 06-096-587 ME. CODE R. §§ 2, 3 (LexisNexis 2017).

178. 401 KY. ADMIN. REGS. 10:031(4)(1)(c) (2018).

179. LA. ADMIN. CODE 33, § 1113(10) (2018) ("The natural flow of state waters shall not be altered to such an extent that the basic character and water quality of the ecosystem are adversely affected except in situations where alterations are necessary to protect human life or property. If alterations to the natural flow are deemed necessary, all reasonable steps shall be taken to minimize the adverse impacts of such alterations."); MO. CODE REGS. ANN. 10, § 20-7.031(4)(H) (2018) ("Waters shall be free from physical, chemical, or hydrologic changes that would impair the natural biological community."); N.H. CODE ADMIN. R. Env-Wq 1703.01 (2019) ("Unless high or low flows are caused by naturally-occurring conditions, surface water quantity shall be maintained at levels that protect existing and designated uses."); N.H. CODE ADMIN. R. Env-Wq 1705.01(a) (2019) ("[T]he department shall hold not less than 10 percent

Several states do not have separate criteria to protect flow or water levels explicitly, but they do include explicit quantity-related statements in their antidegradation policies. For instance, South Carolina's water quality standards contain this statement:

> Existing uses and water quality necessary to protect these uses are presently affected or may be affected by instream modifications or water withdrawals. The stream flows necessary to protect classified and existing uses and the water quality supporting these uses shall be maintained consistent with riparian rights to reasonable use of water.[180]

Finally, several states have adopted regulations to protect instream flows and water quantity outside of their federally-mandated water quality standards. As but one such example, Georgia protects instream flows and lake levels in its regulation of water withdrawals and allocation rather than in its water quality standards. The Georgia regulation provides that a user seeking to withdraw more than 100,000 gallons of water per day on a monthly average must first obtain a permit to do so, and the permit must provide for retention of a minimum instream flow "at or immediately downstream of the point of withdrawal," either at the 7Q10 level, or some other "non-depletable flow" or "other appropriate instream flow limit."[181]

Similarly, Florida expressly protects water quantity, not with its federally mandated water quality standards, which are found in title 62, chapter 302, of its administrative code, but rather in a related section of the administrative code that governs the allocation and protection of water resources. It provides a comprehensive scheme for establishing minimum flows to protect for a broad variety of uses of the waters of the state, including aquatic life habitat, recreation, water quality, and aesthetic attributes.[182] The regulation goes on to provide that minimum stream flows and lake levels should be established "defining a minimum hydrologic regime, to the extent practical and necessary to establish the limit beyond which further withdrawals would be significantly harmful to the water resources or the ecology of the area."[183] The regulation also states that those "minimum flows and levels shall be protected during declaration of a water shortage" and that "recovery or prevention

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of the assimilative capacity of each surface water in reserve to provide for future needs."); N.Y. COMP. CODES R. & REGS. tit. 6, § 701.2(d) (2019) (for Class N waters: "There shall be no alteration to flow that will impair the waters for their best usages."); N.Y. COMP. CODES R. & REGS. tit. 6, § 701.3(e) (2019) (for Class AA-S waters: "There shall be no alteration to flow that will impair the waters for their best usages."); 250-150 R.I. CODE R. § 1.10(B)(8) (LexisNexis 2019) ("For activities that will likely cause or contribute to flow alterations, streamflow conditions must be adequate to support existing and designated uses."); TENN. COMP. R. & REGS. 0400-40-03.03(4)(m) (2015) ("Stream flows shall support recreational uses."); TENN. COMP. R. & REGS. 0400-40-03.03(3)(n) (2015) (protecting instream habitat with adequate flows); 9 VA. ADMIN. CODE 25-260-40 (2001) ("Man-made alterations in stream flow shall not contravene designated uses including protection of the propagation and growth of aquatic life.").

180. S.C. CODE ANN. REGS. 61-68(D)(1)(b) (2012).

181. GA. COMP. R. & REGS. 391-3-6.07(4)(b)(9)(iii).

182. FLA. ADMIN. CODE ANN. R. 62-40.473 (2018).

183. *Id.*

strategies" must be developed for water bodies that fall (or are predicted to fall) below their minimum flows and levels.[184] The list of protected uses, and the scheme in general, is comprehensive enough that the regulation comes very close to stating that Florida is protecting the underlying ecological integrity of its water bodies, and not simply protecting consumptive uses, but without explicitly doing so.

Arkansas's protection for "minimum instream flow" is likewise found, not in the state's water quality standards (which are codified in Title 14, Division 4, Rule 2 of the Code of Arkansas Rules), but rather with the Arkansas Natural Resources Commission rules governing the allocation of water rights in Title 138. There, a regulation provides that "[m]inimum streamflow is the quantity of water required to meet the largest of the following instream flow needs as determined on a case by case basis: 1. Aquifer recharge, 2. Fish and wildlife, 3. Interstate compacts, 4. Navigation, [and] 5. Water quality."[185] The rule goes on to provide, "[w]hen streamflows reach established shortage levels . . . the Executive Director [of the Natural Resources Commission] shall implement [] withdrawal restrictions,"[186] with "shortage" being defined as the condition when "there is not sufficient water in a stream to meet all beneficial uses."[187] Among the restrictions that the Executive Director can impose is that the minimum instream flows established for the purposes listed above "shall receive a reserved water right prior to allocations for other uses."[188] In other words, the state agency's right to retain water in the stream would trump the rights of others to withdraw water from the stream in situations in which the instream flow was insufficient to satisfy all uses.

Finally, Oregon has adopted a similar rule, whereby several state agencies (the State Department of Fish and Wildlife, the Department of Environmental Quality, and the State Parks and Recreation Department) are authorized to request water right certificates to retain amounts of instream flow that are necessary to protect and maintain water quality standards and basic public uses of the water bodies.[189] Rules such as Oregon's are a departure from the norm among western states, which typically apply the prior-appropriation doctrine for water allocation instead of a system of riparian rights, which is more typical of Eastern states, or a regulated riparian system, as in Arkansas. In a prior-appropriation system, the first person to take a quantity of water from a water source and use it for a beneficial use typically then has the right to continue to use the same quantity of water for the same use, and other water withdrawers essentially get in line behind that person in order of each of their own first withdrawals. Traditionally, a person has a legally-cognizable claim to water right only after actually *removing* it from the stream and putting it to some beneficial use like irrigation or household use.[190] Thus, a regulation like Oregon's that allows state agencies to obtain a water right that trumps earlier users' rights and that allows the agencies to *retain* the water in the stream (and thereby deny others users their prior-appropriation-based withdrawal) is a fairly remarkable development

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184. *Id.*
185. 138-00-003 ARK. CODE R. § 301.3(W) (LexisNexis 2018).
186. *Id.* § 303.4.
187. *Id.* § 301.3(II).
188. *Id.* § 307.6.
189. OR. REV. STAT. § 537.336 (2017).
190. STEVEN FERREY, ENVIRONMENTAL LAW 265–67 (2d ed. 2001).

that could have significant impacts on protecting baseline quantities of water in Western water bodies.

While Vermont and Maine's models are particularly robust, any of the foregoing regulatory schemes for protecting water quantities is a better, more certain solution for a state that is interested in protecting its water resources than relying solely on its codification of designated uses and antidegradation policies.

IV. STATES SHOULD SEIZE THE OPPORTUNITY TO PROTECT WATER QUANTITY IN THEIR WATER QUALITY STANDARDS

"When the Well's dry, we know the Worth of Water."
- *Benjamin Franklin*[191]

Although all of the above-described state regulations are commendable, narrative criteria are vaguer, leaving them somewhat more susceptible to interpretation and, possibly, being discounted or effectively ignored by courts and agencies, as illustrated above, than are the more measurable and enforceable numeric criteria that Vermont and Maine have adopted. State agencies who receive and consider applications for section 401 water quality certifications and ultimately issue the certifications will be more likely to fully protect water quantity and quality if they have explicit numeric criteria mandating measurable instream flows and lake levels to enforce than they will be if left to interpret generic statements of designated uses and antidegradation policies or even narrative flow criteria. The same is true of the federal agencies who must receive and implement the resulting section 401 certifications and the courts who are charged with interpreting and enforcing them. Conditions related to water quantity in section 401 certifications will more surely stand up to legal scrutiny if backed by specific, numeric criteria that are not susceptible to misinterpretation and weakening by a cost-benefit analysis. For instance, a mandate that no federal permitted activity shall deplete a stream's flow to less than the easily discernible 7Q10 flow is not susceptible to an argument by the operator of a hydroelectric power plant that the cost of the lost power outweighs the benefit to the downstream ecosystem.

Although the matter would be much simplified if the EPA published a model numeric water quality criterion for instream flow and lake levels, just as it publishes its National Recommended Water Quality Criteria for numerous pollutants, states should not wait for this eventuality. Nor should states wait for the next severe drought to be spurred to action. They should adopt, now, numeric criteria modeled after Vermont's example, but rather using a higher floor than Vermont's 95% of 7Q10, perhaps a metric based on mean historic flows or seasonal base flows.

The words of the Clean Water Act, as well as the Supreme Court's decision in *PUD No. 1* and its progeny, have made it abundantly clear that states can, and should, regulate and protect water quantity as a necessary component of water quality. Moreover, simply because regulating water quantity has not yet been mandated by

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191. Benjamin Franklin, POOR RICHARD: AN ALMANACK FOR THE YEAR OF CHRIST 1746 (1746), https://founders.archives.gov/documents/Franklin/01-03-02-0025 [https://perma.cc/2JUG-QG78)]

Congress or the EPA does not mean that doing so is not both permissible and advisable. To the extent that a state wishes to adopt water protections that are more protective than explicitly required by the EPA pursuant to its authority under the Clean Water Act, nothing in the Clean Water Act prohibits it. As Justice Stevens pointed out in his concurring opinion in the *PUD No. 1* case, "[n]ot a single sentence, phrase, or word in the Clean Water Act purports to place any constraint on a State's power to regulate the quality of its own waters more stringently than federal law might require. In fact, the Act explicitly recognizes States' ability to impose stricter standards."[192] Indeed, the Clean Water Act expressly states that nothing in the Act "preclude[s] or deny the right of any State or political subdivision thereof or interstate agency to adopt or enforce . . . any requirement respecting control or abatement of pollution" so long as the State standard is not less stringent that any federal standard.[193]

As noted above, several state legislatures have taken the remarkable step of constraining their own state environmental agencies by passing laws prohibiting state environmental statutes and regulations from being more stringent or protective than federal law.[194] The agencies in these states can rest assured, however, that adopting numeric criteria for water quantity, instream flows, and lake levels will not run afoul of those self-inflicted limitations. As the Supreme Court made clear in *PUD No. 1*, numeric criteria protecting water quantity are not actually "more stringent" than federal law—they are merely prudent, permissible ways to ensure that the state's federally-mandated designated uses of water bodies are supported, and that the water quality criteria for toxins and chemical pollutants are satisfied. If adequate levels of water are not maintained, the assimilative capacity of the water body is reduced and the more likely it is to become impaired for one of more pollutants.

In sum, it is abundantly clear that we are on the verge of a real crisis of water scarcity. Yet less than a third of all states have taken any steps to adopt regulations that expressly protect water quantities, whether as instream flow or lake water levels. In the words of the United Nations, "[w]ater is critical for sustainable development, including environmental integrity and the alleviation of poverty and hunger, and is indispensable for human health and well-being."[195] The time for ensuring its availability into the future is now.

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192. PUD No. 1 of Jefferson Cty. v. Wash. Dep't. of Ecology, 511 U.S. 700, 723 (1994) (Stevens, J., concurring) (citing 33 U.S.C. § 1311(b)(1)(C)).

193. 33 U.S.C. § 1370 (2012).

194. *See supra* note 77.

195. G.A. Res. 58/217, ¶ 2 (Dec. 23, 2003), http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/58/217 [https://perma.cc/FDL3-6TD5].