



April 10, 2019

Mr. Andrew R. Wheeler
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Mr. R.D. James
Assistant Secretary of the Army for Civil Works
U.S. Army Corps of Engineers
441 G Street, N.W.
Washington, D.C. 20314

Via regulations.gov: Docket ID No. EPA-HQ-OW-2018-0149

Re: Scientific Societies Comments on Proposed Rule - Revised Definition of “Waters of the United States” (84 FR 4154; Docket ID No. EPA-HQ-OW-2018-0149)

CC: Michael McDavid, Oceans, Wetlands, and Communities Division, Office of Water, EPA
Jennifer A. Moyer, Regulatory Community of Practice, U.S. Army Corps of Engineers

Dear Administrator Wheeler and Assistant Secretary James:

On behalf of the undersigned science societies, we respectfully submit the following comments in response to the proposed Rule “Revised Definition of ‘Waters of the United States’” (proposed Rule) (84 FR 4154; Docket ID No. EPA-HQ-OW-2018-0149), published in the Federal Register on February 14, 2019.

The undersigned scientific societies represent more than 200,000 individuals with diverse areas of expertise in the aquatic, ecological, hydrologic, biogeochemical, biological and ecological restoration sciences. Our members have deep subject matter expertise and a commitment to independent objectivity and peer-review of science and work in the private sector, academia, and various tribal, state and federal agencies. We support wetland, aquatic, and ecological resource research, education, restoration and sustainable management. We promote the development and use of the best available science to sustainably manage and restore our freshwater, estuarine, coastal, and ocean resources for the benefit of the U.S. economy, environment, and public health and safety.

The undersigned societies strongly oppose the proposed Rule and the U.S. Environmental Protection Agency’s and the U.S. Army Corps of Engineers’ (Agencies) decision to re-write and rescind the science-based definitions contained in the 2015 Clean Water Rule (2015 CWR). By redefining waters of the United States (WOTUS), and related terms, the Agencies have cast aside the “significant nexus” standard from the 2015 CWR, based on Justice Kennedy’s opinion in *Rapanos v. United States*, 547 U.S. 715 (2006), in favor of a much narrower standard based on Justice Scalia’s opinion in *Rapanos*. The proposed Rule is not based on sound science or the best-available peer-reviewed information and will, as a result,

exclude numerous waters and wetlands that directly affect the chemical, physical, and biological integrity of primary waters making it impossible to achieve the objectives of the Clean Water Act (CWA).

We fully support the definition of WOTUS in the 2015 CWR, which was overwhelmingly supported by peer-reviewed science. The EPA's Office of Research and Development prepared a comprehensive scientific report to accompany the 2015 CWR, the "Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence" (herein the "Connectivity Report" but which was described in the 2015 CWR as the "Science Report"). The intent of the CWA is to restore and maintain the physical, chemical, and biological integrity of the nation's waters. This can only be achieved if the definition of WOTUS is grounded in sound science and recognizes all five parameters of connectivity (hydrologic, chemical, physical, biological, ecological), as documented in the Connectivity Report (EPA 2015). The Connectivity Report synthesized more than 1,200 peer-reviewed publications and provided the technical basis for the 2015 CWR. The 2015 CWR also underwent an extensive stakeholder review process. Since the completion of the Connectivity Report, substantial additional literature has emerged that reaffirms the report and the 2015 CWR (e.g., Cohen et al. 2016, Rains, et al. 2016, Fritz et al. 2018, Harvey et al. 2018, Leibowitz et al. 2018, Schofield et al. 2018, Colvin et al. 2019.)

We oppose¹ the proposed Rule because it is unsupported by peer-reviewed science. It has not been developed using the critical scientific analysis that supported the 2015 CWR rulemaking process, and it has not been subjected to a rigorous independent scientific review process. The proposed Rule only recognizes a limited subset of connectivity. Its reliance on flow permanence and physical abutment as measures of jurisdiction arbitrarily ignores other aspects of physical connectivity such as bed, banks, and high-water marks, as well as chemical, biological and ecological connectivity. In contrast, the 2015 CWR is built upon a scientific basis that incorporates these elements.

The 2015 CWR reflects the best available science regarding connectivity. In essence, what happens to the waters and wetlands in the upper reaches of a watershed, including ephemeral, intermittent, or perennial streams, will affect downstream waters and wetlands. That is, they are hydrologically, chemically, physically, biologically and ecologically connected to what happens downstream. Aquatic ecosystems cannot function properly without functional biological and chemical connectivity, as well as physical connectivity, and therefore cannot provide essential ecosystem services without it.

The functioning of the circulatory system in the human body is a useful metaphor to demonstrate the importance of watershed connectivity. Introduction of toxins, such as cigarette smoke, to the smallest capillaries in the lungs ultimately delivers those toxins to the larger blood vessels and the main organs. The heart itself can ultimately be damaged beyond repair by the cumulative effect of toxins introduced at the peripheries of the circulatory system. The health of the whole organism cannot be preserved without consideration of the smaller features. Watersheds function in a similar way. Pollutants introduced into ephemeral waters and wetlands ultimately make their way to the largest waterways and water bodies with deleterious effects on the functioning of downstream ecosystems. Eliminating protections for smaller, intermittent, non-floodplain, geographically isolated and/or ephemeral waters degrades the large downstream waters in the same way that introduction of toxins to small blood vessels jeopardizes the health of the human body if the toxins are potent enough and in large enough

¹ We incorporate by reference the comments submitted by the undersigned societies on September 21, 2017, regarding the proposed rule, Definition of "Waters of the United States" – Recodification of Pre-existing Rules, EPA-HQ-OW-2017-02-03 and on November 20, 2017, regarding the proposed rule, Definition of "Waters of the United States" – pre-proposal Outreach Comments, EPA-HQ-OW-2017-0480. These comments are in Appendix A.

quantities. Restoring and maintaining the structural and functional integrity of the Nation's waters is only possible if the ephemeral and headwater aquatic systems are protected.

Many of the definitions and terms in the proposed Rule lack clarity, are not based in science or the criteria for determining jurisdiction are not based in science. Particularly problematic are the definitions for "adjacent", "intermittent", and "tributary" as discussed below.

Adjacent: The Agencies have proposed a significant re-definition of "adjacent" that strays from the dictionary definition that the Agencies rely on, but also in relation to settled science and decades of past regulatory precedent (p. 4187 of the proposed Rule). The agencies cite a 1994 dictionary definition for the word "adjacent" and note that the common understanding for the term "adjacent" means "next to", "adjoining", "to lie near" or "close to", and state that this meaning is consistent with the *Rapanos* plurality's "physical-connection requirement," 547 U.S. at 751 n. 13 (see page 4187 of proposed Rule). However, the *Rapanos* plurality physical connection requirement ignores three out of the four synonyms given for "adjacent" (i.e., "next to", "to lie near", and "close to"), and instead adds a requirement that an adjacent feature must "abut" a jurisdictional water, and that "abut" means "to touch at least at one point or side of". The three "adjacency" terms that the proposed Rule ignores are better encompassed by Justice Kennedy's "significant nexus" standard. We request that the Agencies acknowledge and incorporate both the full meaning of the word "adjacent" into any proposed rule revision, and the science that supports this more complete meaning of the word.

The Agencies request comment on, "Wetlands that do not abut or have a direct hydrologic surface connection to other waters of the United States in a typical year are not inseparably bound up with the waters of the United States and are more appropriately regulated as land and water resources of the States and Tribes pursuant to their own authorities." (page 4186 of the proposed Rule). Here, the Agencies appear again to be proposing to restrict the definition of "adjacent" to one that requires contact (i.e., converting "adjacent" to "abut" and relying on direct surficial hydrologic connection). Such a definition ignores other forms of ecological connectivity, like ephemeral hydrological connections and contributions of water, solutes and pollution through groundwater flows. In addition, defining a "typical year" ignores the periodic and substantial connectivity that occurs during increasingly frequent atypical years resulting from climate change. This substantial re-definition of the term lacks a scientific basis. The term "inseparably bound up with" is not a scientifically defined term but suggests the concept of functional connection. As documented in the Connectivity Report, wetlands that neighbor other waters of the United States, but are not necessarily abutting or having a direct hydrologic surface connection in a typical year, often exhibit functional connection with other WOTUS, as recognized by Justice Kennedy's "significant nexus" concept and should be protected.

Further, on page 4187, the Agencies note that their "proposed definition of "adjacent wetlands" would not require surface water exchange between wetlands and the jurisdictional waters they abut to create the jurisdictional link, consistent with case law and for ease of implementation." Here, they appear to acknowledge that surface water exchange is not required for a functional relationship to exist, but only grant regulatory status to wetlands that "abut" other WOTUS. This is not only inconsistent with other parts of the proposed Rule, but also inconsistent with settled science and regulatory precedent. The Agencies acknowledge the history of case law that supports functional connection without surface water exchange, yet they exclude adjacent wetlands lacking a direct surficial hydrologic connection in a typical year when those adjacent wetlands do not abut other WOTUS. The Agencies should revert to the 2015 WOTUS or provide a proposed Rule that is logically consistent with settled science, regulatory precedent, and past case law on this issue.

Intermittent: The Agencies request comment on whether or not the definition of “intermittent” should require continuous flow for a specific duration (page 4178). There is wide variability across the United States regarding how hydrologic systems function, their flow durations, and long-term flow trends. Intermittent streams may exhibit substantial variation in flow duration from year to year. Adding a requirement for a specific flow duration to the definition of “intermittent” would be impractical and would likely fail to achieve the CWA mandate, given the flow variabilities across the country. The Agencies should not add such a requirement to any proposed Rule.

Tributary: The Agencies request comment on whether or not the definition of “tributary” should refer only to perennial waters, whether there should be a requirement that a tributary originate from a particular source such as groundwater interface, snowpack, or lower stream orders that contribute flow (page 4177 of the proposed Rule), and request comment on whether the definition should be changed to focus on “seasonal flow” rather than on intermittent flow (page 4178).

The definition for tributary should be based on the best available science and should contribute to the mandate of the CWA and the objectives that Congress set when it passed the CWA. Thus, “tributary” should not refer only to perennial waters, the source of the tributary should not be restricted, and the focus should not shift to “seasonal flow”. The point is that the water flowing in a tributary contributes to the downstream waters, and therefore contributes to the chemical, physical, and biological integrity of those downstream waters, and that this relationship (based on chemical, physical and biological [aka ecological] connectivity) is the justification for regulating the tributary.

In addition to the above problems with terminology, the proposed Rule fundamentally fails to protect the Nation’s waters, wetlands, and the important and economically valuable ecosystem services that they provide. The proposed Rule will have the effect of removing protections afforded to headwaters, tributaries, wetlands (including non-floodplain wetlands and geographically isolated wetlands) and non-surficially connected adjacent waters. Each of these changes, in turn, will have costly and significant negative consequences for American citizens, businesses, communities, and public health. The economic value of these ecosystem services is increasing as waters face mounting risks from land use, water withdrawals, storms, drought, wildfires and rising seas.

Wetlands and headwater streams (regardless of flow duration and location in the watershed) provide essential ecosystem services to communities, such as protection of drinking water quality and quantity, provision of flood storage, storm damage mitigation, resilience against sea level rise and drought, and essential fish, shellfish, waterfowl and wildlife habitat. Loss of protections for headwater streams and wetlands would diminish ecosystem services provided by those waters and wetlands, increase the threat to imperiled species, affect commercial and recreational fisheries, and degrade fishes of cultural value to Native Americans and the recreating public. (Colvin et al. 2019). As an example of impacts of the proposed Rule, non-contiguous wetlands, lakes, and headwater streams within the Great Lakes basin are connected via subsurface flow or groundwater. The loss of protections for wetlands and headwater streams threatens to degrade the smaller systems, which will ultimately degrade the Great Lakes themselves. Wetlands and tributary streams surrounding the Great Lakes and connecting channels provide important refugia for migrating wildlife as well as spawning and nursery grounds for numerous species. These wetlands also contribute important ecosystem services. The Laurentian Great Lakes contain 20% of the world’s surface freshwater. They enhance recreational opportunities and improve water quality in nearshore areas, and are the source of drinking water for 26 million Americans residing in the Great Lakes basin.

To put the importance of non-floodplain wetlands and headwater streams in perspective:

- Headwaters comprise 79% of the total length of rivers in the US, drain more than 70% of land area (Colvin et al. 2019), and supply clean water for 1/3 of the US population (EPA 2009).
- Ephemeral streams may comprise 96% of stream system lengths (Meyer et al. 2003).
- Wetlands located outside of floodplains (including vernal pools, prairie potholes, etc.) occupy 6.59 million hectares (Lane and D'Amico 2016). As a point of comparison, the state of West Virginia occupies 6.27 million hectares.
- On an annual basis, headwater streams provide \$15.7 trillion and wetlands outside of floodplains/geographically isolated wetlands provide \$673 billion in ecosystem services for the conterminous US and Hawaii (Creed 2017).
- Commercial and recreational fisheries contributed over \$208 billion in economic impact and 1.62 million jobs in 2015 (NMFS 2015). Headwaters have both direct and indirect impacts on the health of fisheries.
- Nationally, trout anglers spent \$3.5 billion on their pursuits, supported over 100,000 jobs, and had a \$10 billion economic impact, including \$1.3 billion in federal and state tax revenues in 2006 (USFWS 2014) and 30.1 million freshwater anglers spent \$29.9 billion on freshwater fishing trips in 2016 (USFWS 2018).

The proposed rule fails the fundamental test of being functional, and promises to leave the citizens, communities and businesses of the United States with diminished ecosystem services including:

- reduced water quality;
- less dependable water supplies, resulting in higher costs for drinking water
- increased vulnerability to wildfires;
- reduced flood storage capacity;
- reduced and degraded fish, shellfish and wildlife habitat, thereby undermining the commercial operations that are dependent on them;
- reduced capacity to mitigate storm damages to properties and infrastructure;
- reduced recreational opportunities and the economic benefits accrued to the recreational and tourism industries;
- greater exposure to pollutants in food and water;
- much higher associated costs to taxpayers, insurance companies and insurance rate payers, who will have to absorb the resulting damages and property and health care costs, and fund replacement of these services; and
- negative economic impacts for many businesses and industries.

Moreover, the proposed Rule fails to meet the stated goal of clarity, predictability and consistency. The agencies claim that the average landowner will have sufficient knowledge to understand how water moves through their properties to be able to determine whether it is a WOTUS. In reality, the average landowner is unlikely to be able to conduct sophisticated professional-level field evaluations or to be able to use the science-based tools necessary for assessing flow regimes, such as regional regression analysis, hydrologic modeling, USGS topographic data, various modeling tools, drainage area, precipitation data, soils maps, climate change, land use, vegetative cover, geology, and national hydrography data necessary for determining jurisdiction under the proposed Rule. Further, the proposed Rule's regulatory structure and language (definitions, concepts and criteria) lack clarity, simplicity, predictability and consistency. Given those issues, the proposed Rule appears to be an

attempt to eliminate Federal oversight of national resources rather than to increase clarity in the regulatory landscape.

The 2015 CWR only protected an additional five percent of streams under the Clean Water Act. However, the proposed Rule would go much further than simply reversing the 2015 CWR. It would eliminate protections from more than 18 percent of the nation's stream miles and more than 50 percent of our remaining wetlands, including critical habitat for fish, fur bearers, ducks, and other migratory birds. The proposed Rule would reverse decades of protections that were put in place to ensure that clean water would be available for future generations.

History and current experience demonstrate that few states have the legal authority, capacity, or funding in place to fill the gaps in jurisdiction left by the proposed Rule. Since 1977, states have had the authority to assume the CWA Section 404 program, but only two (Michigan and New Jersey) have done so (ASWM & ECOS 2011). Financial constraints play a substantial role in states declining to accept this responsibility. Furthermore, many states have provisions in their state laws that prohibit state agencies from regulating more stringently than the CWA regulates (ELI 2013). Whereas state legislatures may amend their laws to broaden state protections, in practice such efforts take time. It is more likely that states will follow the federal lead. In California, for example, it took a decade to develop a state response to restricted federal jurisdiction after *Rapanos* (Wittenberg 2019). If the proposed Rule went into effect, states would not be able to respond in a timely manner.

In conclusion, the undersigned scientific societies strongly oppose the proposed Rule, strongly support the 2015 CWR, and reject any definition of WOTUS that is not based in sound, peer-reviewed science. The proposed Rule does not meet this standard. Effective implementation of the CWA requires science as its foundation. There have been significant advances and discoveries in aquatic science since the CWA was passed 50 years ago. These advances, meticulously documented and vetted in the Connectivity Report, conclusively demonstrate the need for the proposed rule to protect the chemical, physical, and biological integrity of our nation's waters. Through an evaluation of the best available science (including the Connectivity Report), we conclude that the proposed Rule poses a significant threat to the integrity and security of our drinking water (quality and quantity), public health, and to fisheries, shellfish habitat and wildlife habitat. It increases the threat of damage to communities and infrastructure from flooding, severe storm events, and sea-level rise, all of which have negative economic impacts on citizens, communities and businesses.

The proposed redefinition of WOTUS will make it impossible to achieve the objectives of the CWA because it excludes numerous waters and wetlands that directly affect the chemical, physical, and biological integrity of primary waters. Furthermore, many of the definitions and terms in the proposed Rule lack clarity and/or are not based in science. Likewise, many of the criteria for jurisdiction are not based in science and fail to meet the stated goal of clarity, predictability and consistency.

Under this proposed Rule, the CWA's primary goal of maintaining and restoring the chemical, physical, and biological integrity of downstream traditional navigable waters would not be possible. In conclusion, we wish to state in the strongest possible terms that the proposed Rule should be rejected.

Thank you for considering these comments. If you have further questions, please do not hesitate to contact Drue Winters at dwinters@fisheries.org or telephone at 301-897-8616 x202.

Sincerely,

American Fisheries Society
American Institute of Biological Sciences
Association for the Sciences of Limnology and Oceanography
Coastal and Estuarine Research Federation
Ecological Society of America
Freshwater Mollusk Conservation Society
International Association for Great Lakes Research
North American Lake Management Society
Phycological Society of America
Society for Ecological Restoration
Society for Freshwater Science
Society of Wetland Scientists

REFERENCES

- ASWM and ECOS (Association of State Wetland Managers, Inc. and the Environmental Council of the States). 2011. Section 404 Program Assumption. A Handbook for States and Tribes. Windham, ME. https://www.aswm.org/pdf/lib/cwa_section_404_program_assumption.pdf Accessed March 10, 2019.
- Cohen, M. J., I. F. Creed, L. Alexander, N. B. Basu, A. J. K. Calhoun, C. Craft, E. D'Amico, E. DeKeyser, L. Fowler, H. E. Golden, J. W. Jawitz, P. Kalla, L. K. Kirkman, C. R. Lane, M. Lang, S. G. Leibowitz, D. B. Lewis, J. Marton, D. L. McLaughlin, D. M. Mushet, H. Raanan-Kiperwas, M. C. Rains, L. Smith, and S. C. Walls. 2016. Do geographically isolated wetlands influence landscape functions? *Proceedings of the National Academy of Sciences of the United States of America* 113:1978-1986.
- Colvin, S. A. R., Sullivan, S. M. P., Shirey, P. D., Colvin, R. W., Winemiller, K. O., Hughes, R. M. Fausch, K. D., Infante, D. M., Olden, J. D. Bestgen K. R., Danehy, R. J., and Eby, L. 2019. Headwater streams & wetlands are critical for sustaining fish, fisheries, & ecosystem services. *Fisheries* 44(2):73-91.
- Creed, I. F., Lane, C. R., Serran, J. N., Alexander, L. C., Basu, N. B., Calhoun, A., Christensen, J. R., Cohen, M. J., Craft, C., D'Amico, E., DeKeyser, E., Fowler, L., Golden, H. E., Jawitz, J. W., Kalla, P., Kirkman, L. K., Lang, M., Leibowitz, S. G., Lewis, D. B., Marton, J., McLaughlin, D. L., Raanan-Kiperwas, H., Rains, M. C., Rains, K. C., ... Smith, L. 2017. Enhancing protection for vulnerable waters. *Nature geoscience*, 10(11), 809-815.
- ELI (Environmental Law Institute). 2013. State constraints. State-imposed limitations on the authority of agencies to regulate waters beyond the scope of the federal Clean Water Act. Washington, D.C. <https://www.eli.org/sites/default/files/eli-pubs/d23-04.pdf> Accessed March 10, 2019.
- EPA (U.S. Environmental Protection Agency). 2009. Section 404 of the Clean Water Act. Geographic information systems analysis of the surface drinking water provided by intermittent, ephemeral, and headwater streams in the U.S. U.S. Environmental Protection Agency. Washington, D.C. <https://www.epa.gov/cwa-404/streams>
- EPA (U.S. Environmental Protection Agency). 2015. Connectivity of streams & wetlands to downstream waters: A review & synthesis of the scientific evidence. EPA/600/R-14/475F | January 2015 | [epa.gov/research](https://www.tucson.ars.ag.gov/unit/publications/PDFfiles/2302.pdf). Downloaded from <https://www.tucson.ars.ag.gov/unit/publications/PDFfiles/2302.pdf> 27 January 2019.
- Fritz, K. M., K. A. Schofield, L. C. Alexander, M. G. McManus, H. E. Golden, C. R. Lane, W. G. Kepner, S. D. LeDuc, J. E. DeMeester, and A. I. Pollard. 2018. Physical and chemical connectivity of streams and riparian wetlands to downstream waters: a synthesis. *Journal of the American Water Resources Association* 54:323-345.
- Harvey, J., J. Gomez-Velez, N. Schmadel, D. Scott, E. Boyer, R. Alexander, K. Eng, A. Kettner, C. Konrad, R. Moore, J. Pizzuto, G. Schwarz, C. Soulsby, and J. Choi. 2018. How hydrologic connectivity regulates water quality in river corridors. *Journal of the American Water Resources Association*. <https://doi.org/10.1111/1752-1688.12691>.

- Lane C. R., D'Amico E. 2016. Identification of putative geographically isolated wetlands of the conterminous United States. *J. Am. Water Resour. Assoc.* 2016;52:705–722.
- Leibowitz, S. G., P. J. Wigington, K. A. Schofield, L. C. Alexander, M. K. Vanderhoof, and H. E. Golden. 2018. Connectivity of streams and wetlands to downstream waters: an integrated systems framework. *Journal of the American Water Resources Association* 54:298-322.
- Meyer, J. L., Kaplan, L. A. Newbold, D., Strayer, D. I., Woltemade, C. J., Zedler, J. B., Beilfuss, R., Carpenter, Q., Semlitsch, R., Watzin, M. C., Zedler, P. H. 2003. Where rivers are born: the scientific imperative for defending small streams and wetlands. *American Rivers*, Sierra Club, Washington, DC.
- NMFS (National Marine Fisheries Service). 2015. Fisheries economics of the United States, 2015. Government Printing Office, Washington, D.C.
<https://www.fisheries.noaa.gov/resource/document/fisheries-economics-united-states-report-2015>
- Rains, M. C., S. G. Leibowitz, M. J. Cohen, I. F. Creed, H. E. Golden, J. W. Jawitz, P. Kalla, C.R. Lane, M. W. Lang, and D. L. McLaughlin. 2016. Geographically isolated wetlands are part of the hydrological landscape. *Hydrological Processes* 30:153-160.
- Schofield, K. A., L. C. Alexander, C. E. Ridley, M. K. Vanderhoof, K. M. Fritz, B. C. Autrey, J.E. DeMeester, W. G. Kepner, C. R. Lane, S. G. Leibowitz, and A. I. Pollard. 2018. Biota connect aquatic habitats throughout freshwater ecosystem mosaics. *Journal of the American Water Resources Association* 54:372-399.
- USFWS (U.S. Fish and Wildlife Service). 2014. Trout fishing in 2006: a demographic description and economic analysis: addendum to the 2006 national survey of fishing, hunting, and wildlife-associated recreation. *Wildlife and Sport Fish Restoration Programs*, Arlington, Virginia.
<https://digitalmedia.fws.gov/digital/collection/document/id/52/> Accessed March 10, 2019.
- USFWS (US Fish and Wildlife Service) and US Department of Commerce, US Census Bureau. 2018. 2016 National survey of fishing, hunting, and wildlife-associated recreation. <https://www.census.gov/library/publications/2018/demo/fhw-16-nat.html> Accessed March 10, 2019
- Wittenberg, A. 2019. California clinches new regs just in time for federal rollback. *E&E News, Greenwire*. <https://www.eenews.net/stories/1060118877> Accessed March 10, 2019.