Attachments to the Comments of Waterkeeper Alliance, et al. on Public Notice re: the Definition of "Waters of United States"

Docket ID No. EPA-HQ-OW-2021-0328

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Volume 3 of 6

Attachment 6

ATTACHMENT 6

LOWER GALVESTON BAY:

A Case Study of Coastal Wetlands at Risk from the Proposed Definition of WOTUS

Bayou Vista near Galveston Bay

The Lower Galveston Bay watershed comprises a complex network of interconnected waters, including over 2500 miles of bayous, 120,000 acres of wetlands, and countless streams and other waters. Among the wetlands covered by the definition are a class of wetlands known by several different names: Texas coastal prairie wetlands, pimple mounds, coastal prairie pothole wetlands, marsh wetlands, and palustrine wetlands (referred to here as Texas coastal prairie wetlands). These wetlands contribute flow to and therefore impact the quality of downstream waters including Lower Galveston Bay. The protection of these wetlands directly affects the long-term health of Galveston Bay and the waters feeding into it. By limiting wetlands only to those either abutting or with a direct surface connection to a covered water, the revised definition could exclude a significant proportion of wetlands with hydrological and chemical connections to covered waters.

Coastal Prairie Wetlands:

The Texas coastal prairie wetlands, which "were formed thousands of years ago by ancient rivers and bayous and once occupied almost a third of the landscape around Galveston Bay," are found "[a]long the Gulf of Mexico from western Louisiana to south Texas" and "occur as a mosaic of depressions, ridges, swales, intermound flats, and mima mounds."[1] These wetlands serve as "the headwaters for virtually all of the water bodies feeding into Galveston Bay"[2] and therefore "are a critical part of the aquatic integrity of our regional bayous and bays" that constitute navigable waters.[3]

Texas coastal prairie in Katy, Texas.

Research repeatedly has confirmed that these wetlands, regarded by the Corps' Galveston District as geographically isolated, "are not isolated" due to their hydrological connectivity.[4] Over the last ten years, additional scientific research repeatedly has confirmed the connectivity of Texas coastal prairie wetlands complexes to navigable waters in this region.[5] The benefits of these wetlands include stormwater retention, protecting coastal areas and shorelines by weakening the force of storms, decreasing flooding in other ways, cleansing water before it reaches navigable waters, replenishing groundwater supplies, reducing erosion, providing habitats for wildlife such as migratory birds, providing places for recreation, and offering an intangible sense of beauty and place in our culture.[6]

Hydrological and Chemical Connectivity

Studies demonstrate the extensive hydrological connectivity between Texas coastal prairie wetlands surrounding coastal jurisdictional waterways.[7] Much of the surface runoff entering the navigable Galveston Bay and other nearby waters likely passes through coastal prairie wetlands.[8] The Texas coastal prairie wetlands act as strong sinks for nitrogen and phosphorus, by reducing incoming inorganic nitrogen by approximately 98%, and inorganic phosphorus by 92%.[9] This provides a substantial reduction of the pollution of runoff waters that ultimately enter the Galveston Bay estuary.

Economic Importance:

Texas coastal prairie wetlands play an important role in reducing the risk and impacts of flooding.[10] The lost stormwater retention services, and therefore flood risk reduction, of wetlands that have been destroyed by development have been valued at a minimum of $600 million.[11] Studies show that of all variables, being surrounded by wetlands had the strongest influence on reducing flood damages.[12] Additionally, flood-caused property damages significantly increase as a consequence of the degree to which nearby naturally occurring wetlands are altered.[13]

Texas coastal prairie in Waller County, Texas

Ecological Importance:

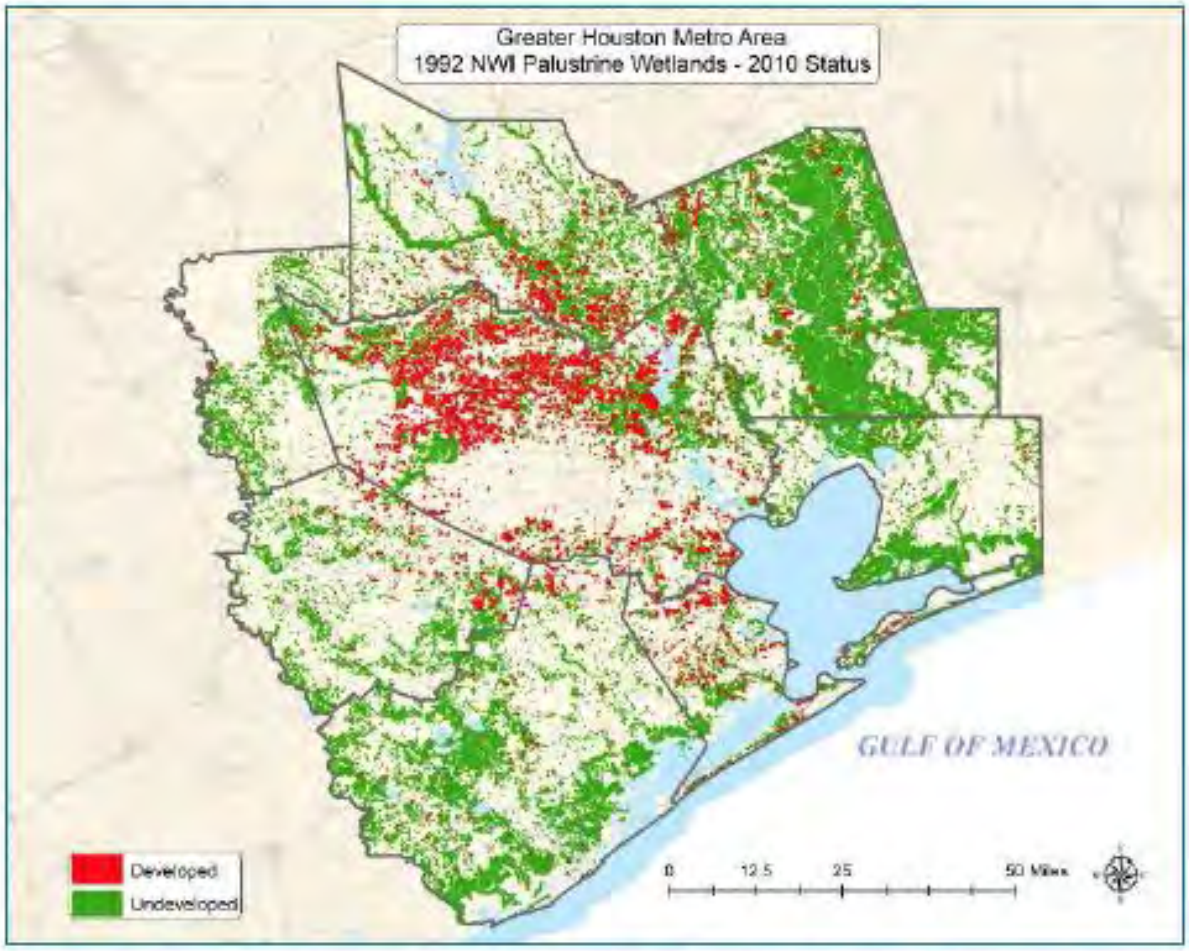
Whooping Crane

Attwater Greater Prairie Chicken

Source: CheepShot [CC BY 2.0 (https://creativecommons.org/licenses/by/2.0)]

Wetlands near the Gulf of Mexico such as the Texas coastal prairie wetlands provide essential habitat for migratory waterfowl,[14] including wintering habitat for the endangered whooping crane.[15] The critically endangered Attwater's greater prairie-chicken[16] relies on Texas coastal prairie wetlands, and the dwindling wild population of these birds is not only threatened directly by habitat destruction, but also the increased flooding caused by wetlands destruction.[17]

Threats to Coastal Prairie Wetlands:



The areas in red are where wetlands were destroyed in the Houston area from 1992 to 2010. Green areas are undeveloped wetlands.

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Despite the indisputable benefits Texas coastal prairie wetlands offer to navigable waters and neighboring communities in the region, they historically have not received adequate protection within the Corps' Galveston District. As a result, Texas coastal prairie wetlands have been permanently lost to rapid commercial and residential development. The Galveston District has effectively exempted from regulatory jurisdiction almost all regional wetlands outside of FEMA's 100-year floodplain.[19] Not coincidentally, it has been estimated that more than 80% of wetlands lost regionally to development in the past 25 years were outside the 100-year floodplain.[20] These figures underestimate the full extent of wetlands loss regionally; the actual number of acres lost may be much higher.[21] Researchers identified a full 50-75% more wetlands lost than those identified by the U.S. Fish & Wildlife's National Wetland Inventory.[22]

Texas coastal prairie wetlands "continue to be lost at a rate that is higher than any other wetland class in the Houston-Galveston region."[23] Without a broad definition of "waters of the United States," the region will lose at least 100,000 more acres of wetlands to development in the next four decades.[24] Continuing losses "will very likely have grave implications for the long-term health of the Galveston Bay System," which will lose its "principal means of cleaning the polluted runoff that enters the bay."[25]

Barriers to State Regulation:

Relegating regulation exclusively to the states would result in dirtier water across Texas. The State of Texas routinely under-enforces the Clean Water Act. In Harris County alone, the EPA's publicly available data show that 144 entities in the Houston area were out of compliance with the Clean Water Act during at least six of the last 12 quarters.[26] Of those 144, only 25 faced a formal enforcement action. And of the 10 facilities out of compliance during every quarter in the last 12 quarters, four have not been the subject of any enforcement action, formal or informal, for their continuing violations.

The state's pattern of under-enforcement allows these pervasive polluters to create large, costly disasters that wreak even greater havoc on area waters and local communities. For example, Intercontinental Terminals Company (ITC) in Deer Park, Texas recently gained media attention when a massive fire at its Deer Park chemical storage facility polluted local air and water. ITC repeatedly violated federal environmental laws, including the Clean Water Act.[27] In 2018, ITC discharged cyanide into Tucker Creek, an impaired water along the Houston Ship Channel, eight times above the levels set by its state-issued permits — once as much as 1,138 percent above permitted limits.[28] According to EPA data, at its Deer Park facility alone, the company violated the federal Clean Water Act six of the last 12 quarters.[29]

Localities like the City of Houston or Harris County would have difficulty implementing wetlands protections in the absence of regulation by the state; the state regularly preempts local efforts to impose regulations that are more stringent than state regulations.[30] The State of Texas, moreover, does not have a stand-alone citizen suit provision that would allow individuals and organizations to file lawsuits relating to violations of state water protection laws. Maintaining protection at the federal level, therefore, is crucial to maximizing compliance with water quality standards.

Endnotes

1. EPA & Corps, Technical Support Document for the Clean Water Rule: Definition of Waters of the United States, at 348 (May 27, 2015), Docket no. EPA-HQ-OW-2011-20869.
2. John S. Jacob, et al, Houston-Area Freshwater Wetland Loss, 1992–2010, at Summary (Texas A&M University System, May 2014). The full article is available at https://tcwp.tamu.edu/files/2015/06/WetlandLossPub.pdf (last visited Nov. 15, 2018).
3. John S. Jacob, et al, Upper Texas Gulf Coast Pothole Wetlands: New Research shows Significant and Profound Hydrologic Connections to Galveston Bay and other Area Waters, at 3 (Texas Coastal Watershed Program, Texas A&M Agrilife Extension, July 2011).
4. John S. Jacob, et al, Upper Texas Gulf Coast Pothole Wetlands: New Research shows Significant and Profound Hydrologic Connections to Galveston Bay and other Area Waters, at 3 (Texas Coastal Watershed Program, Texas A&M Agrilife Extension, July 2011).
5. *Id.*
6. *Id.*
7. Bradford P. Wilcox, Evidence of Surface Connectivity for Texas Gulf Coast Depressional Wetlands, Society of Wetland Scientists (2011).
8. Margaret G. Forbes, et al, Nutrient Transformation & Retention by Coastal Prairie Wetlands, Upper Gulf Coast, Texas, Society of Wetland Scientists (2012); Bradford P. Wilcox, Evidence of Surface Connectivity for Texas Gulf Coast Depressional Wetlands, Society of Wetland Scientists (2011).
9. Margaret G. Forbes, et al, Nutrient Transformation & Retention by Coastal Prairie Wetlands, Upper Gulf Coast, Texas, Society of Wetland Scientists (2012).
10. John S. Jacob, et al, Houston-Area Freshwater Wetland Loss, 1992–2010, at 1 (Texas A&M University System, May 2014).
11. John S. Jacob, et al, Houston-Area Freshwater Wetland Loss, 1992–2010, at 12-13 (Texas A&M University System, May 2014).
12. Samuel Brody, et al, Identifying the impact of the built environment on flood damage in Texas, Disasters, Vol. 32, Issue 1, 1-18 (2008)
13. Samuel Brody, et al, The Rising Costs of Floods: Examining the Impact of Planning and Development Decisions on Property Damage in Florida, Journal of the American Planning Association, Vol. 73, Issue 3, 330-45 (2007); Wesley E. Highfield & Samuel D. Brody, Price of permits: Measuring the economic impacts of wetland development on flood damages in Florida, Natural Hazards Review, (2006)
14. Laguna Madre Initiative, Gulf Coast Joint Venture (2002), available at: http://www.gcjv.org/docs/LagunaMadrepub.pdf.
15. U.S. Fish & Wildlife Service and U.S. Geological Survey, Paradise Lost? The Coastal Prairie of Louisiana and Texas (October 1999), available at: https://www.nwrc.usgs.gov/prairie/paradise_lost.pdf.
16. U.S. Fish & Wildlife Service, Environmental Conservation Online System: Attwater's greater prairie-chicken, available at: https://ecos.fws.gov/ecp0/profile/speciesProfile?sId=7259.
17. Jason Bittel, Did Hurricane Harvey Signal the Last Dance for Attwater's Prairie Chickens? (September 2007) available at: https://www.nrdc.org/onearth/did-hurricane-harvey-signal-last-dance-attwaters-prairie-chickens.
18. More Flooding, Fewer Fish: Freshwater Wetland Loss in the Houston Area, 1992–2010.
19. Texas Parks & Wildlife, Comment to Advance Notice of Rulemaking re Docket no. OW-2002-0050, at 3, 7-9 (2003) ("TPWD 2003 Comment") (resubmitted in 2014 by Natural Resources Defense Council in support of Clean Water Rule) (discussing Seattle Adjacency Guidance and approach taken by other Corps offices in Texas), Docket no. EPA-HQ-OW-2011-0880-17477.
20. John S. Jacob, et al, Houston-Area Freshwater Wetland Loss, 1992–2010, at 11 (Texas A&M University System, May 2014).
21. John S. Jacob, et al, Houston-Area Freshwater Wetland Loss, 1992–2010, at 8 (Texas A&M University System, May 2014).

22. *Id.*; *see also* Economic Analysis of the EPA-Army Clean Water Rule, at 47 (May 2015), Docket no. EPA-HQ-OW-2011-0880-20866 (noting that as of 2015 only approximately 75 percent or more of the wetlands in these states [including Texas] were not digitally mapped in the NWI").
23. Galveston Bay Wetland Mitigation Assessment & Local Government Capacity Building, at 12 (Houston Advanced Research Center, et al 2014) (prepared for the Texas General Land Office). The full report is available at https://www.harcresearch.org/sites/default/files/Project_Documents/13-079-000-7102%20Report_2014_Final.pdf (last visited Nov. 15, 2018). The greatest loss of Texas coastal wetlands has occurred in Harris County—"more than double that of the [seven neighboring] counties combined." John S. Jacob, et al, Houston-Area Freshwater Wetland Loss, 1992–2010, at Summary (Texas A&M University System, May 2014).
24. Matthew Tresaugue, Review: Developers failing to follow wetlands mandate, Houston Chronicle (Aug. 2, 2015), available at https://www.houstonchronicle.com/news/houston-texas/houston/article/Review-Developers-failing-to-follow-wetlands-6417918.php (last visited Nov. 2, 2018).
25. John S. Jacob, et al, Houston-Area Freshwater Wetland Loss, 1992–2010, at Summary (Texas A&M University System, May 2014).
26. Review of data available at echo.epa.gov by Bayou City Waterkeeper.
27. *Id.*
28. Environment Texas, Texas worst for unauthorized industrial water pollution (March 2018), available at:
29. Review of data available at echo.epa.gov by Bayou City Waterkeeper.
30. *See* Tex. Nat. Res. Code § 81.0523(b), (c) (preempting a municipality or other political subdivision to regulate an oil and gas operation in most circumstances); *City of Laredo v. Laredo Merchants Association*, 16-0748, — S.W.3d. – (Tex. June 22, 2018) (concluding state law preempted municipality's ban on plastic bags); *BCCA Appeal Group, Inc., v. City of Houston*, 496 S.W.3d 1 (Tex. 2016) (preempting a city's regulation of air pollution).

Boulder Creek:

A Case Study of Streams, Canals, Ditches and Reservoirs that Could Lose Protection under the Proposed WOTUS Definition

Boulder Creek is a mountain stream in Colorado along the front range of the Rocky Mountains. The creek forms under Arapahoe Glacier along the continental divide above 13,500 feet of elevation and flows down mountain canyons, through the city of Boulder and across the plains before joining with the St. Vrain, South Platte, Platte, Missouri and Mississippi rivers and exiting into the Gulf of Mexico.

Arapahoe Glacier ProTrails.com

Boulder Falls ProTrails.com

Boulder Canyon ProTrails.com

The creek travels 31.4 miles, drops over 8,600 feet in elevation and encompasses a watershed of over 447 square miles in Hydrologic Unit Codes 101900050401, 101900050402, 101900050403, 101900050404, 101900050405, 101900050406, 101900050501, 101900050502, 101900050503, 101900050504, 101900050601, 101900050602, 101900050603, 101900050604, 101900050605, 101900050705.

In its journey to the sea the waters of Boulder Creek touch eleven states including Colorado, Nebraska, Iowa, Kansas, Missouri, Illinois, Kentucky, Arkansas, Tennessee, Mississippi and Louisiana.

The watershed contains the cities of Boulder, Louisville, Lafayette, Erie, Superior and Nederland which in the 2020 census had an aggregate population of 163,190. For these communities Boulder Creek is the primary source of drinking water and is a vital component of the agricultural, mining industrial, power generation and recreation infrastructure in the area.

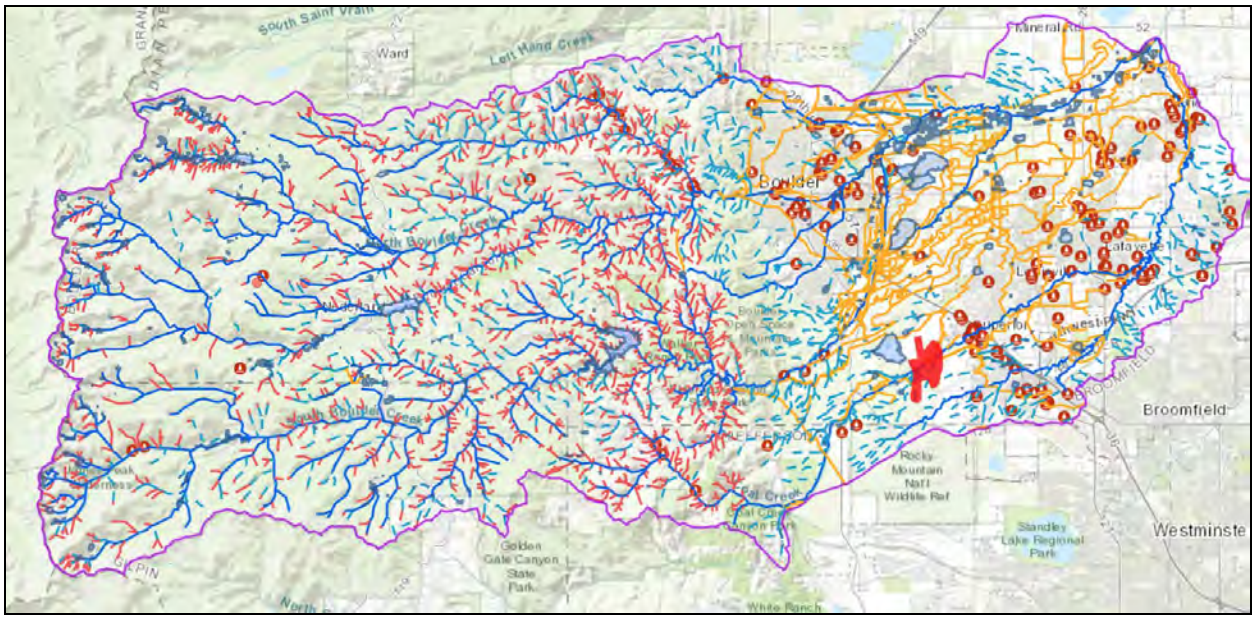
Boulder Creek Festival Bouldercoloradousa.com

Tubing in Boulder Creek Rick Pawlenty

Boulder Creek Confluence Ted Ross

The recreational opportunities available on the watershed are part of what defines the Colorado lifestyle and include swimming, wading, rafting, kayaking, hiking, fishing and rock and ice climbing. For all of Colorado the outdoor recreation industry supported over 511,000 jobs and generated over $62 billion of economic impact.[1] The area in and around the Boulder Creek watershed is a visible and important part of that emerging industry.

The proposed changes to the definition of the "waters of the United States" could significantly change the jurisdiction of the Clean Water Act in the watershed. In the watershed map below ephemeral streams are in red, ditches are yellow and artificial bodies of water in the watershed are blue. Facilities that discharges are noted with red points. Under the proposed definition, all of these features could be excluded from Clean Water Act protections against pollution discharges and destruction.

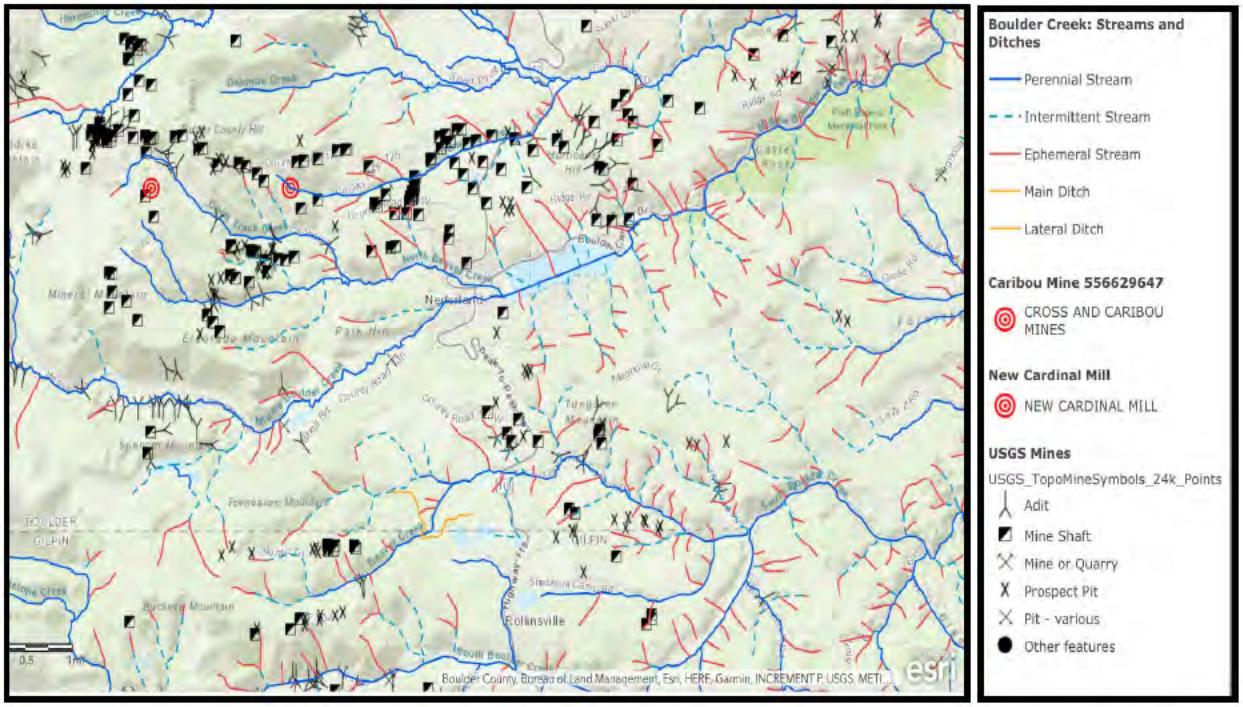


Source: Boulder County Admin Open Data;[1] U.S. EPA Office of Water - Facilities that Discharge to Water (Sept. 19, 2018).[2]

[1] http://gis-bouldercounty.opendata.arcgis.com/datasets/d52c150f5f2e48aebd8ef74b34a0dc14_0
[2] https://watersgeo.epa.gov/arcgis/rest/services/OWRAD_NP21/NPDES_NP21/MapServer

The impact of this change presents a clear and present danger to the Boulder Creek watershed, local communities and all downstream waters. There are over 100 years of mining, agriculture, industrial, and urban activity in the Boulder Creek watershed and the environmental impact of these activities is significant. For example:

Ephemeral Streams - At the highest elevations near the headwaters along the continental divide is where gold, silver and tungsten hard rock mines have been operating since the 1860s. Cross and Caribou Mines (FRS ID 110010053878) and the New Cardinal Mill (FRS ID 110027990404) are currently operating in areas where surface water flow is limited and sporadic in many unnamed ephemeral streams. Both facilities are currently active dischargers of heavy metals into the drinking source waters of the City of Boulder.[2]



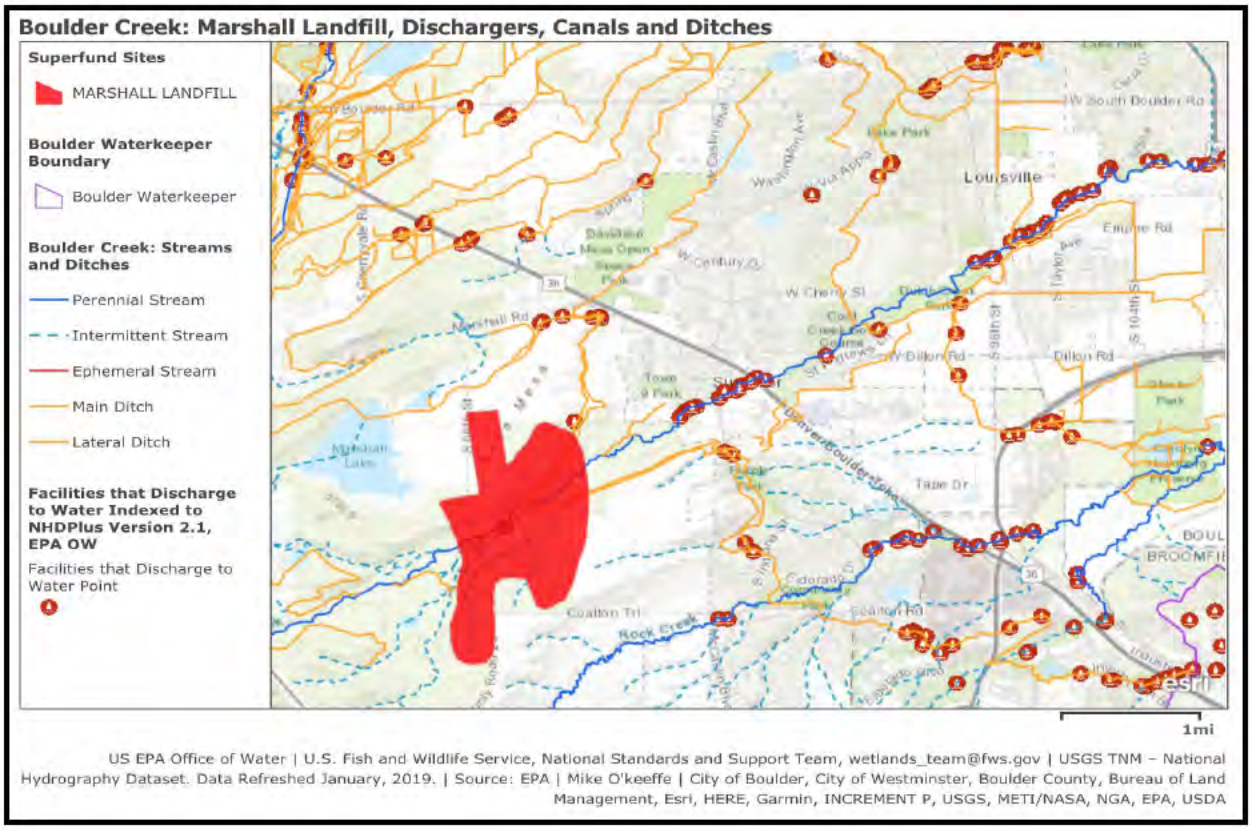
Source: Boulder County Admin Open Data;[3] Horton, U.S. EPA Enforcement and Compliance Data Online Facility Search,[4] John D., and San Juan, Carma A., 20180430, Prospect- and Mine-Related Features from U.S. Geological Survey 7.5- and 15-Minute Topographic Quadrangle Maps of the United States: U.S. Geological Survey data release DOI: 10.5066/F78W3CHG, U.S. Geological Survey, Denver, CO. [5]

[3] "The streams and ditches in this dataset were conflated from various data sources, including NHD, Colorado Department of Natural Resources Division of Water Resources (CDSS), Boulder County, City of Boulder and individual ditch companies. The data was verified with field visits and extensive staff knowledge. The data includes links to various internal databases, as well as the Colorado Division of Water Resources database. Pre and Post 2013 Colorado Flood alignments are included. Flow directions for network analysis are also incorporated into the data. This data is appropriate for both small and large scale usage." http://maps.bouldercounty.org/arcgis/rest/services/HYDRO/STREAMS_DITCHES/MapServer

[4] https://echo.epa.gov/facilities/facility-search/results

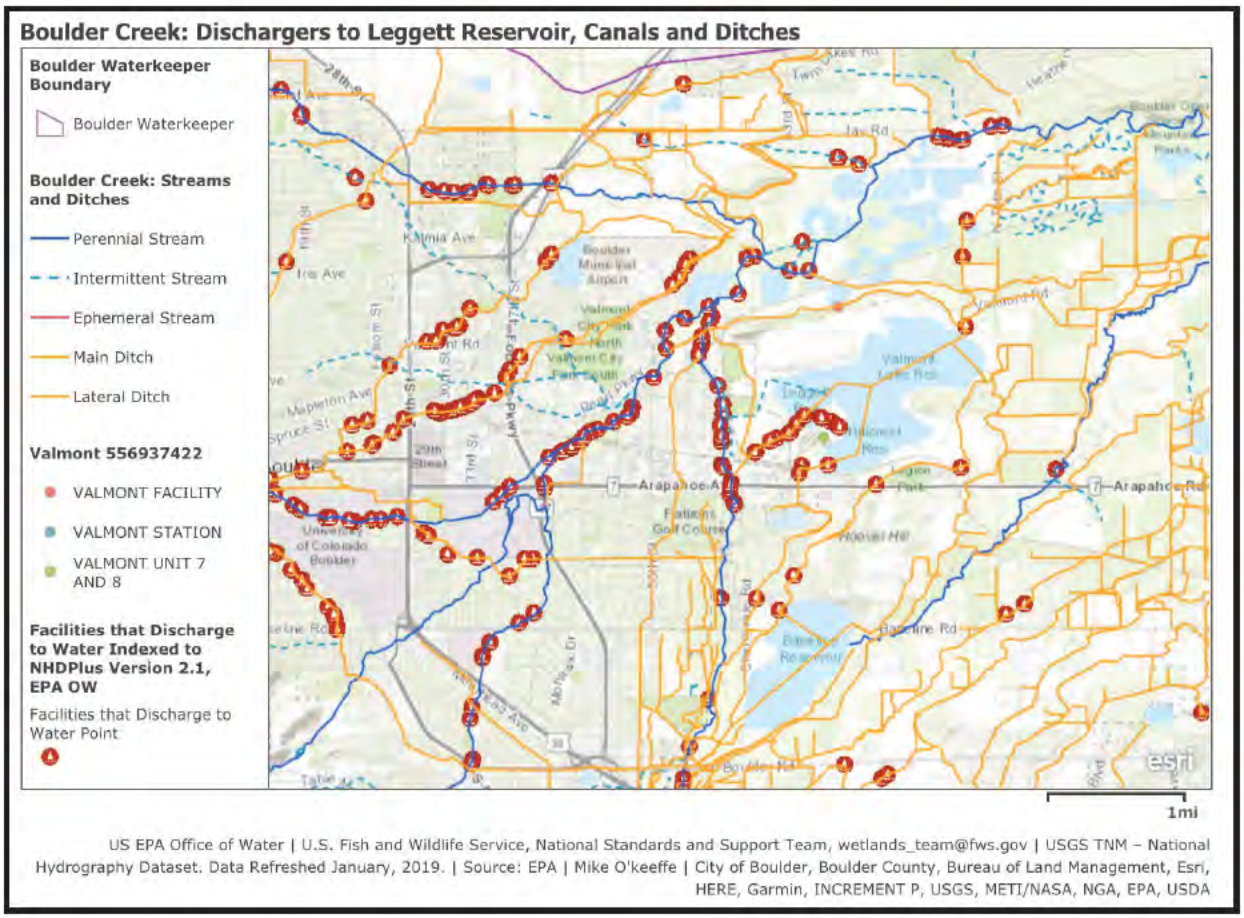
[5] https://doi.org/10.5066/F78W3CHG

Ditches and Canals - A vast system of ditches and canals transport water and pollution discharges throughout the watershed, into streams that ultimately flow into Boulder Creek. For example, Community Ditch was established in 1885 to provide irrigation water from South Boulder creek to the sugar beet, alfalfa, wheat, oats, tomatoes, cantaloupe, and fruit farmers in the area around Marshall Mesa.[3] In this same area, the City of Boulder operated the 160 acre Marshall Landfill from 1965 to 1992. In 1981 chemicals including benzene, trichloroethylene (TCE), tetrachloroethylene, barium, iron, manganese and zinc were discovered leaching into the ditch and the site was determined to be a Superfund site (EPA ID COD980499255).[4] Clean Water Act standards that currently apply to Community Ditch are essential to addressing the pollution at this site, yet the proposed definition proposes to eliminate jurisdiction over man-made ditches and canals, even when they function like tributaries, after used for water supplies and transport water and pollution into streams and rivers.



Reservoirs and Canals: In 1923 what was to become for a time the largest coal fired power plant west of the Missouri was built near Boulder just east of South Boulder Creek. Valmont Station (FRS ID 110000467290 NPDES Permit CO0001112) has generated over 2,750,000 cubic yards of coal ash since 1993 that remain on the site[5]. At nearby Valmont Butte there have been mining and milling operations since the 1890s and Allied Chemical

Company operated large-scale fluorspar processing from the 1940s to the 1970s.[6] All of this activity has discharged directly into Leggett Reservoir which is an artificial structure that periodically discharges pollution through a canal into South Boulder Creek.



This pollution combines with pollutants discharged by numerous other sources into ditches, canals and streams that all ultimately flow into Boulder Creek. The proposed rule could eliminate Clean Water Act protections for the reservoir, as well as the canals that receive pollution discharges and transport them downstream into Boulder Creek.

The Boulder Creek watershed is an important element of landscape of the Colorado front range. In a region of scarce water resources special considerations and protections are necessary to preserve and protect the watershed. The ephemeral streams, ditches, canals and reservoirs of this watershed are a part of the physical, chemical and biological integrity of the overall watershed, and all have a direct hydrologic connection to other elements of the watershed and downstream streams and rivers.

Boulder Creek is one of the places where the "waters of the United States" originate. Eliminating Clean Water Act jurisdiction to protect "ephemeral" streams, ditches, canals and reservoirs that flow into other "waters of the United States" would create health, economic and environmental risks to local and downstream individuals and communities.

[1] Colorado's 2019 Statewide Comprehensive Outdoor Recreation Plan (SCORP), available at: https://cpw.state.co.us/aboutus/Pages/SCORP.aspx

[2] City of Boulder Source Water Protection Plan July 2017, (**Attachment A**) available at: https://www-static.bouldercolorado.gov/docs/Boulder_Source_Water_Protection_Plan-1-201707251143.pdf

[3] The Ditch Project 150 years of ditches: Boulder's Constructed Landscape, available at: :http://bcn.boulder.co.us/basin/ditchproject/?Our_Ditches:Community_Ditch

[4] U.S. Environmental Protection Agency, Superfund Program, available at: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0800187

[5] *See* Fact Sheet, Colorado Discharge Permit Number CO000112 (Sept. 5, 2012) (**Attachment B**); Xcel Energy Written Closure Plan Valmont Station - Boulder, Colorado Active CCR Landfill Public Service of Colorado (PSCo) Denver, Colorado October 17, 2016 Amended February 27, 2017, available at: www.xcelenergy.com/staticfiles/xe-responsive/Environment/Coal%20Ash%20Management/Coal-Ash-Management-Valmont-Station-CCR-Landfill-Closure-Plan-Amended.pdf

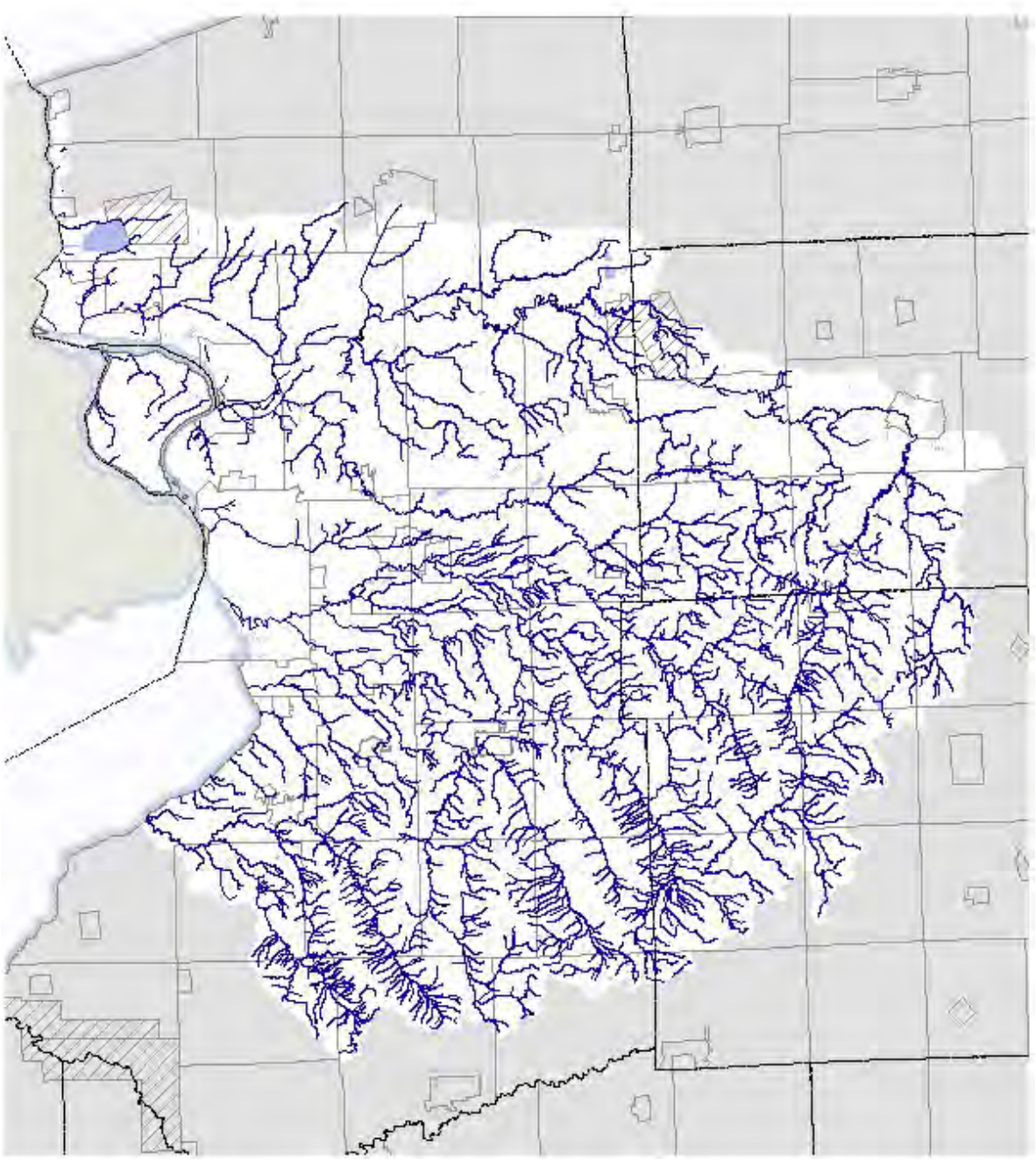
[6] Boulder Weekly The Ghosts of Valmont Butte January 26, 2012, available at: https://www.boulderweekly.com/news/the-ghosts-of-valmont-butte/

NIAGARA RIVER WATERSHED:

A Case Study of Ephemeral and Ditched Streams at Risk of Losing Protections under the Proposed WOTUS Definition

Niagara Falls[1]

The Niagara River Watershed is located along the westernmost portion of New York State and drains into the Niagara River, the channel that connects two Great Lakes - Erie and Ontario – and divides the U.S. from Canada. In total, the watershed encompasses 903,305 acres of land, 3,193 miles of watercourses, and several small lakes and ponds within the counties of Erie, Niagara, Genesee, Orleans, and Wyoming.[2]



All of the mapped waterways in the Niagara River Watershed.

The watershed spans a transect of rural to urban land use, with generally more rural regions in the upland reaches, becoming increasingly urbanized downstream towards Lake Erie and the Niagara River. Traditionally Navigable Waterways (TNWs) within the watershed are generally fed by low-order tributaries and ephemeral headwater streams in upland areas. Source waters for these waterways include groundwater seeps, freshwater springs, and ephemeral streams fed by precipitation, including snowmelt in areas with higher elevation and varied glaciated topography.[3]

Western New York has a rich history and a legacy of industrial pollution, and there are extensive efforts underway to remediate sites and restore the waterways. Currently, the Niagara and Buffalo Rivers are designated as Areas of Concern under the Great Lakes Water Quality Act, an agreement between the U.S. and Canada to protect and restore the waters of the Great Lakes.[4] Lake Erie is the shallowest and most ecologically productive of the Great Lakes, and also has the shortest water retention time of all five lakes.[5]

A kayak tour in Ellicott Creek. Photo by Buffalo Niagara Waterkeeper

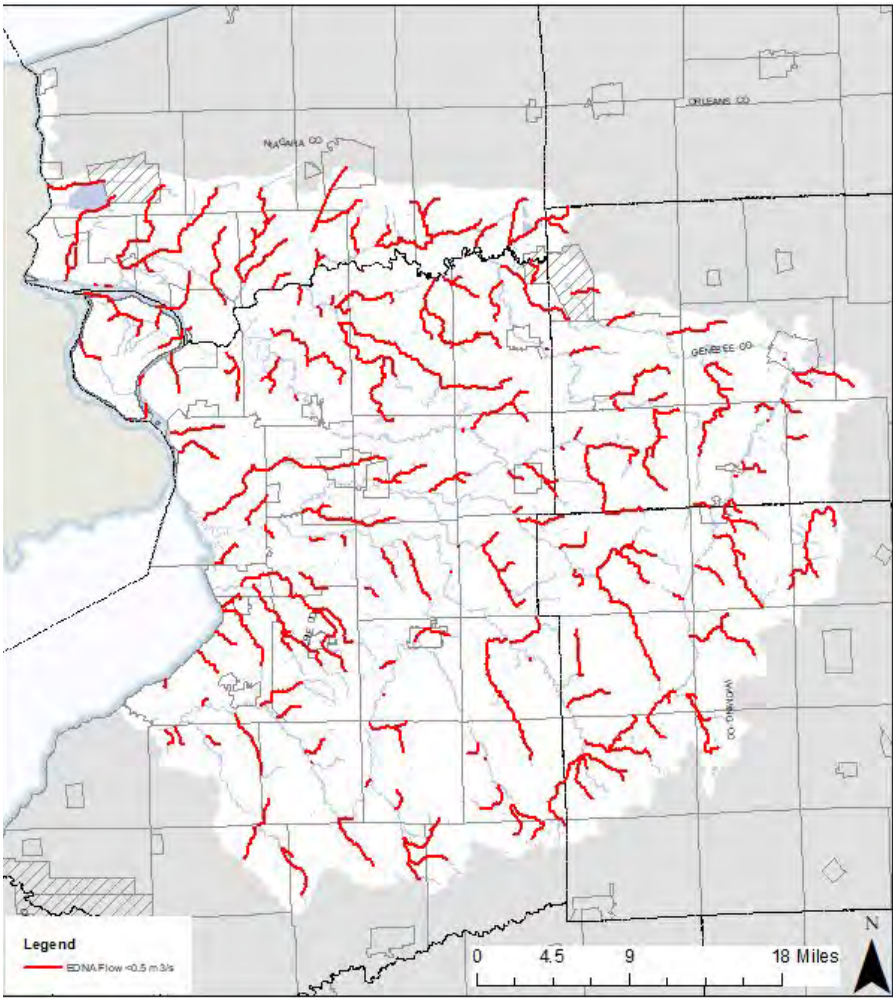
Threats to Ephemeral and Ditched Streams:

Due to both the dearth of information on ephemeral and ditched streams in the watershed and the unclear standards set forth in the proposed rule, it is very difficult to get a clear idea of the scope of the impact of the proposed rule on the Niagara River Watershed. Anywhere from 500 to over 1,000 miles of waterways in the watershed are at risk of potentially losing protections under the Clean Water Act based on the exemption of ephemeral streams.

The true extent of which waterways could be affected is unknown because neither New York State or the Federal Government maps ephemeral streams and other waterbodies that would be impacted in the watershed. In the Niagara River Watershed, many or most ephemeral streams are classified incorrectly as intermittent streams. Based on this information, there are over 1,000 miles

of waterways classified as either intermittent or ephemeral streams, and therefore at risk of being impacted by this rule change and losing protected status.

Another way to attempt to visualize and calculate the extent of the impact of the proposed rule is to look at streams with low flow, as these have the potential to be classified as ephemeral. Based on this analysis, over 500 miles of streams would potentially be impacted and could lose Clean Water Act protections.



National Hydrography Dataset and Elevation Derivatives for National Applications data showing waterways which indicate flow velocities of <0.5m3/s.

Threats to the watershed:

The Niagara River Watershed contains over 433,000 acres of undeveloped natural land, based on land use analysis.[6] The proposed rule has the potential to impair the progress made towards restoring the iconic waterways of this region by potentially easing restrictions for development on that land. The land includes forests, agricultural land, and wetlands. While these land uses account

for nearly 80 percent of all area in the watershed, only 13 percent of these lands are currently protected from future development.

A major effect that the proposed rule will have on the watershed is to make development easier in these critical headwaters areas by easing the regulatory burden of developing in protected waterways. The Niagara River Watershed, and Western New York more generally, has in the last 50 years lost population while also experiencing significant sprawl. A University at Buffalo Study found that since 1970, 39,660 new homes were built on prime farmland, forests, wetlands, and floodplains.[7]

In agricultural portions of the watershed, especially in the upper watershed, many headwater tributaries in agricultural areas have been ditched to serve as farmland drainage.[8] It is possible that many of these formally ephemeral headwater streams would no longer be regulated under this new rule, and the negative effects of non-point agricultural nitrogen and phosphorus pollution, a major source of water quality impairment in the watershed,[9] would be compounded downstream.

Eighteenmile Creek. Photo by Buffalo Niagara Waterkeeper.

There are nearly 200 sites designated as "Superfund Sites," contaminated with hazardous pollution, in the Buffalo Niagara Watershed.[10] Under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) these sites need to be cleaned up. Due to gaps in available data, it is impossible to know which Superfund sites may be located on or near waterways at risk of losing Clean Water Act protections. However, the proposed rule presents a significant risk of exempting some waters near Superfund sites from the Clean Water Act, which would impact the level of clean up the site must undergo. For sites to be properly remediated, Clean Water Act protections, such as Water Quality Standards, must be taken into consideration.[11] If waterways near Superfund sites lose Clean Water Act protections, there is a risk of remediation plans at these sites that are less protective of human health and the environment than needed.

Increases in discharges and inadequate site remediation will injure waterways already impacted by pollution. Of the watershed's total 3,193 miles of waterways, approximately 1,548.8 (48.5 percent) are considered Priority Waterbodies, meaning they have water quality impacts or issues that

restrict the water's beneficial uses. New York State also includes 255.8 water body miles and 25.4 Lake Erie shoreline miles as Priorities. Of these water bodies and segments, 64 percent have been placed on the U.S. EPA 303(d) Impaired Waters List and include much of the Niagara River, Ellicott Creek, Smokes Creek, Lower and Upper Tonawanda Creek Sub-watersheds, and all of the Lake Erie shoreline miles within the state. The proposed rule, by removing protections for upstream waters, will impede efforts to remediate these waterways.

State Enforcement:

While New York State currently protects a broad set of waters under state law, there are still numerous reasons why the state is unable to fully make up the gap created by a change in Clean Water Act jurisdiction. There currently is a legislative proposal to decrease the number of wetlands protected by the state.[12] New York does not have a standalone citizen suit provision that would allow the public to take action to protect waterways no longer protected by the Clean Water Act. Additionally, cuts to the New York Department of Environmental Conservation cast serious doubt on the ability of the state to increase activities in response to a change in federal protection jurisdiction. The number of staff in the Division of Water has decreased from 339 in 1990 to 278 in 2008 to 219 in 2018. Enforcement activity by the Division drastically declined in recent years, from 547 facilities facing enforcement actions in 2010 to 196 in 2014.[13]

Endnotes

1. Saffron Blaze [CC BY-SA 3.0 (https://creativecommons.org/licenses/by-sa/3.0)]
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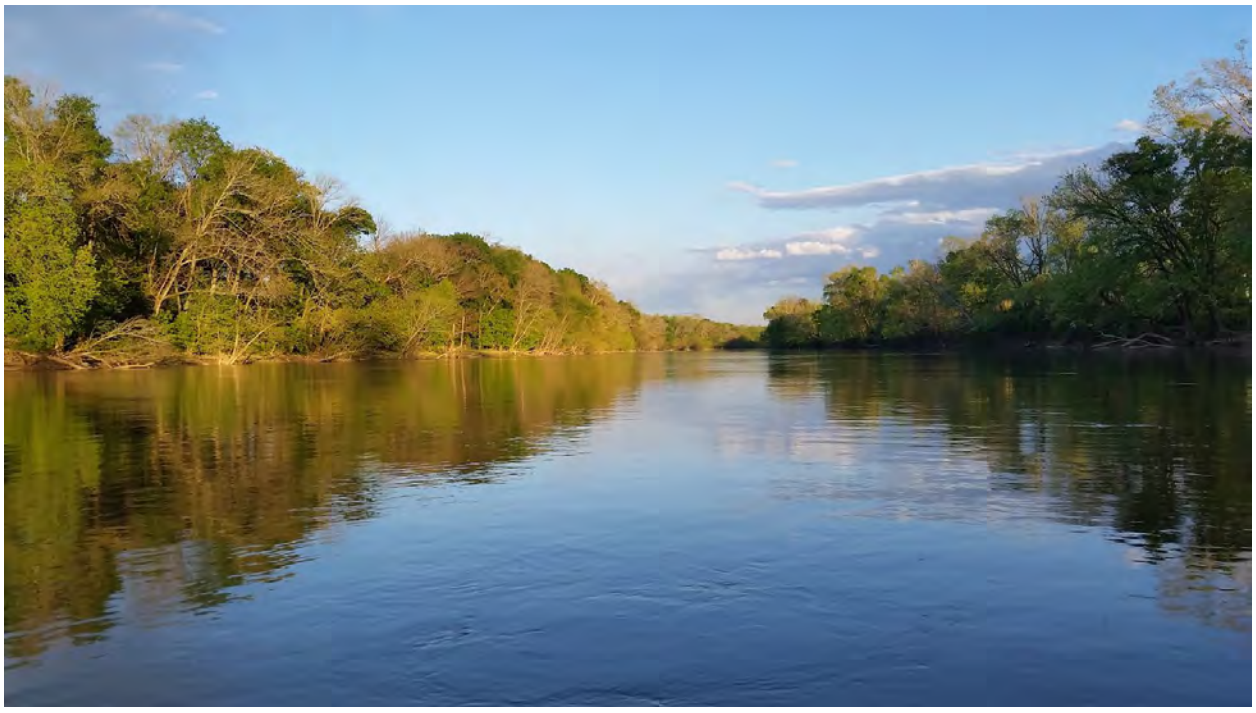
CAPE FEAR RIVER WATERSHED:

A Case Study of Carolina Bays and Ditched Streams at Risk under the Proposed WOTUS Definition



The Cape Fear River. Photo by Kemp Burdette

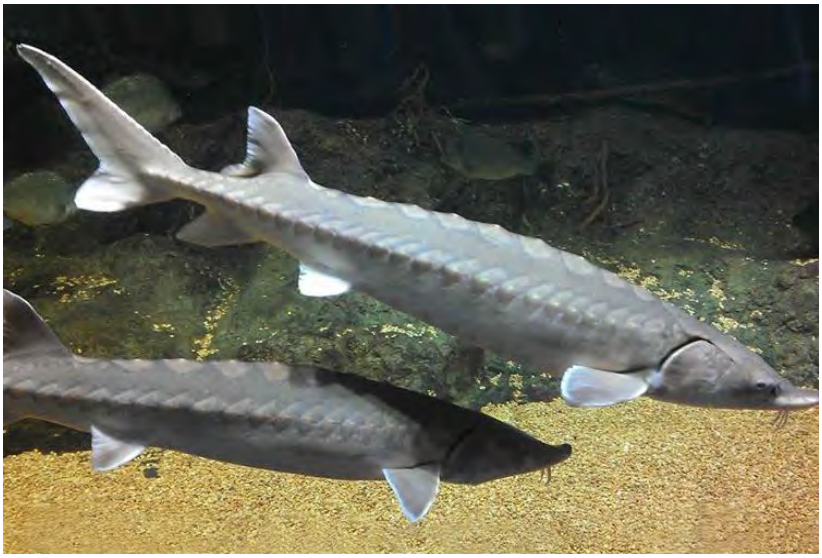
The Cape Fear River Basin is North Carolina's largest watershed, with an area of over 9,000 square miles. Major tributaries include the Deep River, the Haw River, the Northeast Cape Fear River, the Black River, and the South River. These rivers converge to form a thirty-mile-long estuary before flowing into the Atlantic Ocean at Cape Fear.[1] The Cape Fear supplies water to some of the fastest growing counties in the United States;[2] roughly one in five North Carolinians gets their drinking water from the Cape Fear, including residents of Greensboro, Fayetteville, and Wilmington.[3]

The Cape Fear Basin is a popular watershed for a variety of recreation activities. State parks along the river include Haw River State Park, Raven Rock State Park, and Carolina Beach State Park. The faster-flowing water of the upper basin is popular with paddlers, as are the slow meandering blackwater rivers and streams of the lower Cape Fear and estuary. Fishing is very popular; the Cape Fear supports a number of freshwater species, saltwater species, and even anadromous (migratory) species like the endangered sturgeon, striped bass, and shad.

The Cape Fear is North Carolina's most ecologically diverse watershed; the Lower Cape Fear is notable because it is part of a biodiversity "hotspot," recording the largest degree of biodiversity on the eastern seaboard of the United States. According to the North Carolina Department of Environmental Quality, "[t]he Cape Fear River basin is high in natural diversity with rare mussels and fish in the basin that are found nowhere else. There are four rare mollusks, eight rare insects, two rare crustaceans, and 19 rare fish in the basin." In addition, the North Carolina Natural Heritage Program has designated more than 450 Significant Natural Heritage Areas in the Cape Fear River Basin.[4] The oldest living trees east of the Rocky Mountains, ancient cypress trees, are located within the swamps of the Lower Cape Fear and are well over 2,000 years old.[5]

A Cypress tree in the Cape Fear River Basin. Photo by Kemp Burdette.

The Cape Fear River basin is home to many species that the federal government lists as endangered, including the Cape Fear shiner, Atlantic sturgeon,[6] West Indian manatee, and shortnose sturgeon. Earlier this year, the National Marine Fisheries Service proposed designating portions of the Cape Fear River as critical habitat for the endangered Carolina distinct population segment of the Atlantic sturgeon.[7] The Cape Fear River Basin is also home to threatened species such as the American alligator and loggerhead sea turtle.

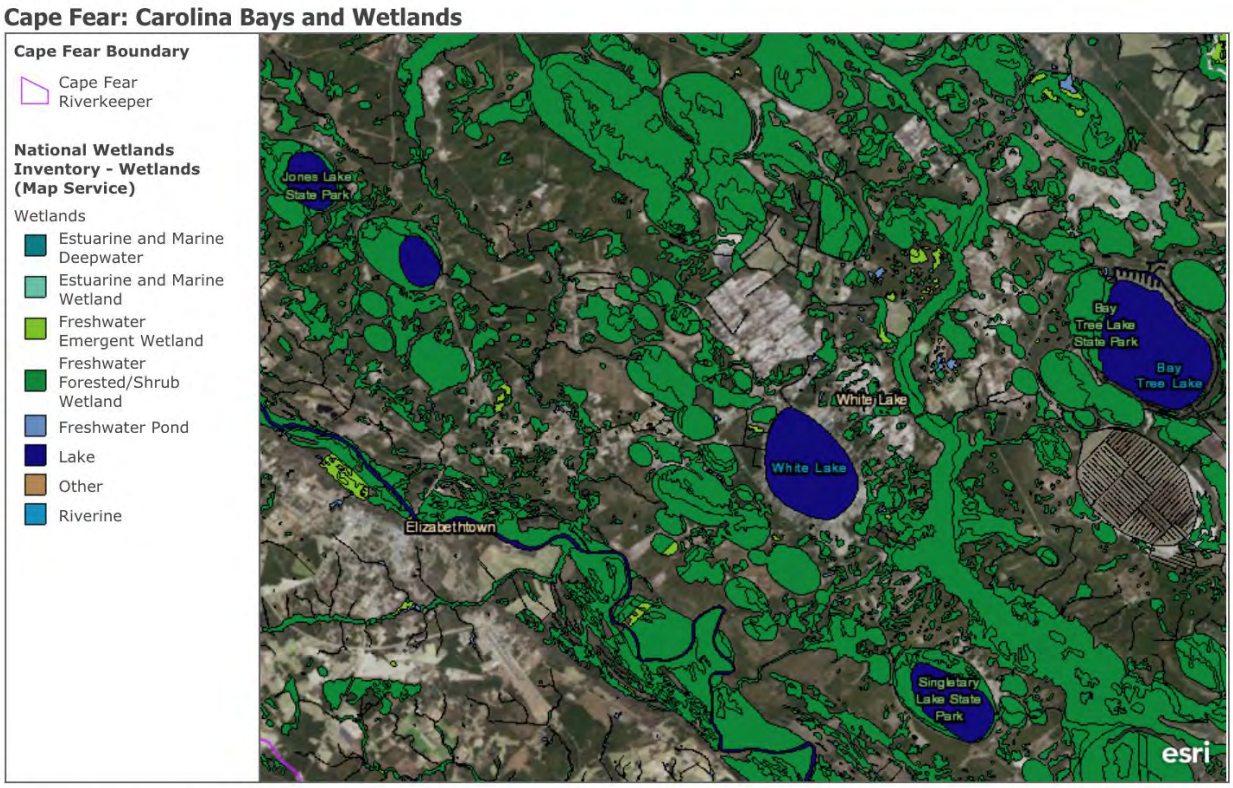


Atlantic sturgeon. Photo credit: NOAA Fisheries.

Threats to the Cape Fear River Watershed:

Carolina Bays:

The Cape Fear watershed includes Carolina Bays, a unique type of depressional wetland. There are multiple Carolina Bays in the Cape Fear River Basin, which includes portions of Bladen County, the location of the highest concentration of Carolina Bays in the country. While most Carolina Bays have been altered or filled in, the remaining bays are important to rare and declining plants and animals; numerous Carolina Bays are also used for recreation.[8] Carolina Bays are also associated with pocosins, a unique type of wetland.[9] Pocosins can play an important role in flood control and maintaining the ecological equilibrium in the basin by storing large amounts of freshwater, slowing the release into the brackish estuaries. Additionally, pocosins are important habitat for amphibians, reptiles, and even large mammals such a black bear and bobcats.[10]



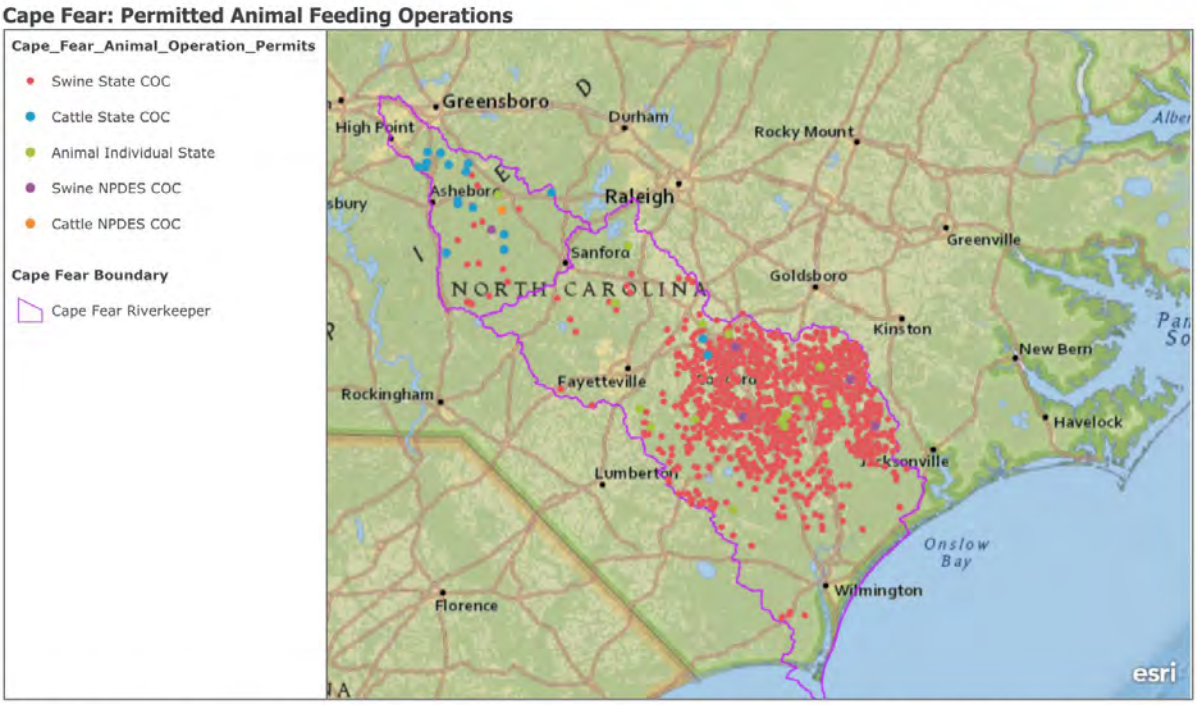
USGS TNM – National Hydrography Dataset. Data Refreshed January, 2019. | USGS TNM – National Hydrography Dataset. Data Refreshed January, 2019. | U.S. Fish and Wildlife Service, National Standards and Support Team, wetlands_team@fws.gov | US EPA Office of Water | NCWRC | State of North Carolina DOT, Esri, HERE, Garmin | NC CGIA, USDA FSA, Earthstar Geographics

Both pocosins and Carolina Bays often lack surface water connections to other waterways.[11] However, there is scientific evidence of significant hydrologic connectivity with nearby waterways via groundwater flow.[12] Pollution from agriculture and logging is linked to algal blooms and low dissolved oxygen in Carolina Bays.[13] The proposed rule creates uncertainty over the protection of these important and unique resources; many Carolina Bays are at risk of losing protections because they have no or low-flowing surface inlets and outlets.

Ditched and Ephemeral Streams:

A significant percentage of stream miles within the coastal plain of North Carolina are modified natural stream channels and ditches. According to the North Carolina Department of Environmental Quality, "it may be difficult to differentiate between an artificial feature (e.g. ditch or canal) and a natural stream that has been modified (e.g, straightened or relocated)."[14] In North Carolina, many swine Concentrated Animal Feeding Operations (CAFOs) are located in the area of the coastal plain where the groundwater table is high, requiring ditching or tile drain in order to allow for crop harvesting and waste application. Therefore, many CAFOs are located along ditched streams.

CAFOs are more heavily concentrated in the Cape Fear Basin than anywhere else on Earth, producing roughly 5.4 million hogs and 41.8 heads of poultry annually. North Carolina currently ranks second in the nation in terms of swine population and, according to a study by scientists from the University of North Carolina at Wilmington, the Cape Fear River basin houses more than half the hog population in the state.[15] While swine CAFOs are particularly concerning because the majority are located in the coastal plain, North Carolina also ranks second in the nation in turkey production and fourth nationally in the production of broiler chickens; many poultry operations are also located in the Cape Fear River Basin.[16]

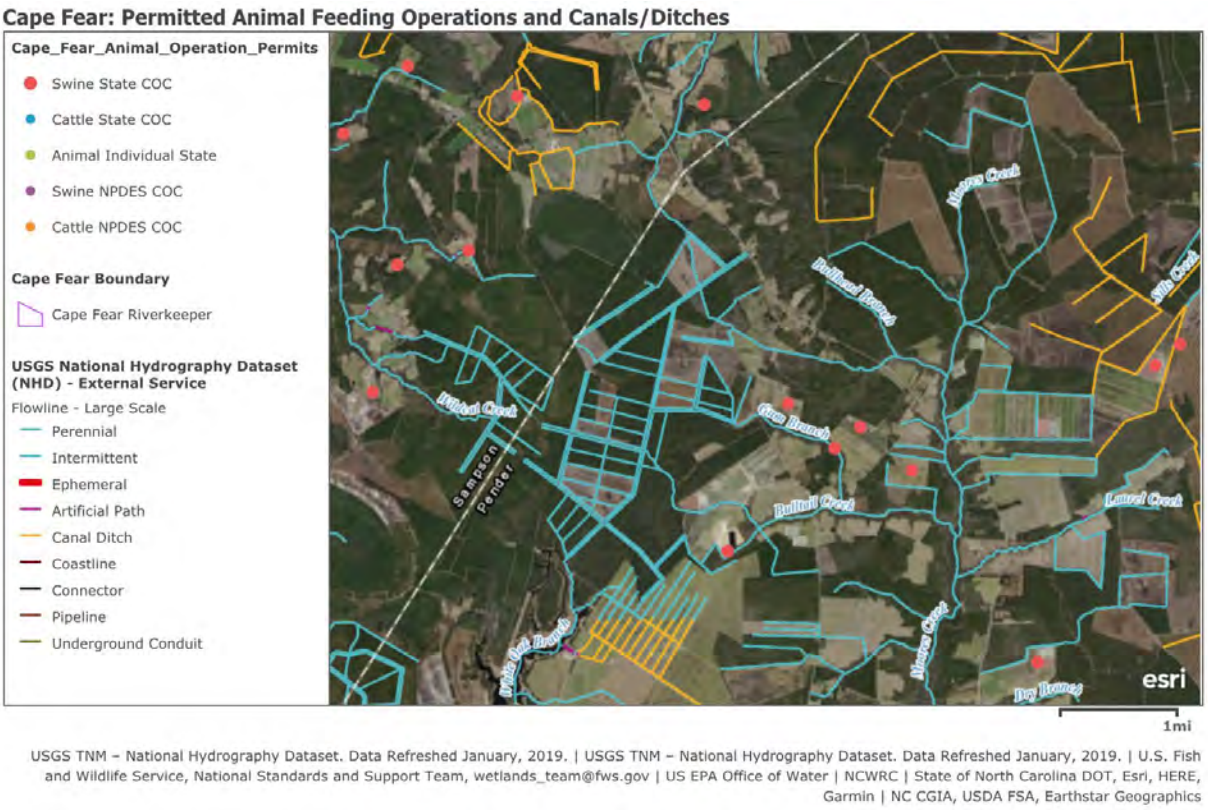


USGS TNM – National Hydrography Dataset. Data Refreshed January, 2019. | USGS TNM – National Hydrography Dataset. Data Refreshed January, 2019. | U.S. Fish and Wildlife Service, National Standards and Support Team, wetlands_team@fws.gov | US EPA Office of Water | NCWRC | Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp. 17

These swine and poultry CAFOs generate massive amounts of waste, and discharge an enormous amount of pollution into surface waters either directly or through tributaries, shallow groundwater,

and ditches into wetlands, creeks, streams, and larger tributaries that all feed into the Cape Fear Basin. CAFO discharges contain ammonia, nitrogen, phosphorus, heavy metals, and pathogens. The situation in the basin is so severe that analysts with the USDA's Natural Resources Conservation Service found the Cape Fear River basin and surrounding land area was the number one priority watershed in the United States, based on its vulnerability to livestock manure nutrient pollution.[18]

CAFOs in the Cape Fear River Basin frequently discharge pollution through ditches, ditched tributaries, groundwater, wetlands, and ephemeral or intermittent streams. Pollution discharged into these waters is transported downstream to larger waterways as part of the natural hydrologic process of the Cape Fear Basin. The most recent Basin Assessment from the North Carolina Department of Environmental Quality documented widespread and severe pollution of the Cape Fear Basin.



Hog Farms and ditches near Ivanhoe, on Moore's Creek, a tributary to the Cape Fear.

Pollution from swine and poultry CAFOs, such as ammonium, nitrogen, phosphorus, and bacteria, is degrading water quality in wetlands, streams, ditched streams, tributaries, the Black River, the Northeast Cape Fear, the Cape Fear, and the Lower Cape Fear Estuary. Over 10,000 freshwater acres were impaired by chlorophyll-a; 6,527 estuarine acres and 50 stream miles were impaired due to low dissolved oxygen, 41 stream miles, 97 estuarine acres and five miles of the Atlantic coastline were impaired due to bacteria pollution. At that time, it was also estimated that 265 stream miles could be polluted by agricultural sources.[19] The pollution from CAFOs causes and

contributes to toxic algae blooms, bacteria levels that are unsafe for recreation, and dissolved oxygen problems throughout the Cape Fear River Basin and in the estuary. Low dissolved oxygen levels can lead to aquatic species mortality, including endangered species such as the Atlantic sturgeon.[20] Additionally, even artificial ditches over time can develop their own aquatic communities and ecosystem benefits similar to natural waterways, and CAFO pollution impacts these habitats.[21]

It is very difficult to determine which ditched streams will continue to be protected under the proposed rule. This uncertainty, and the likelihood of many ditched streams being excluded from Clean Water Act protections, will make it even more difficult to address the extensive degradation being caused by CAFOs. Many CAFOs and ditches are not included in available mapping data, making it very difficult to assess the extent of the potential impacts of the proposed rule on CAFO pollution in the watershed.

An example of unmapped CAFOs and ditches.

<u>Barriers to State Regulation</u>:

North Carolina is unlikely to make up for gaps in federal regulations of water pollution, and both the state legislature and agencies have shown an unwillingness to take the needed steps to protect the waters of the Cape Fear Basin. In fact, North Carolina law bans agencies from adopting "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, if a federal law or rule pertaining to the same subject matter has been adopted."[22] Further, in 2015, the North Carolina General Assembly restricted protections for isolated wetlands.[23] Also in 2015, the North Department of Environmental Quality reclassified the lower Cape Fear River Estuary as "swamp waters," which has the effect of allowing greater discharges of pollutants into the watershed.[24]

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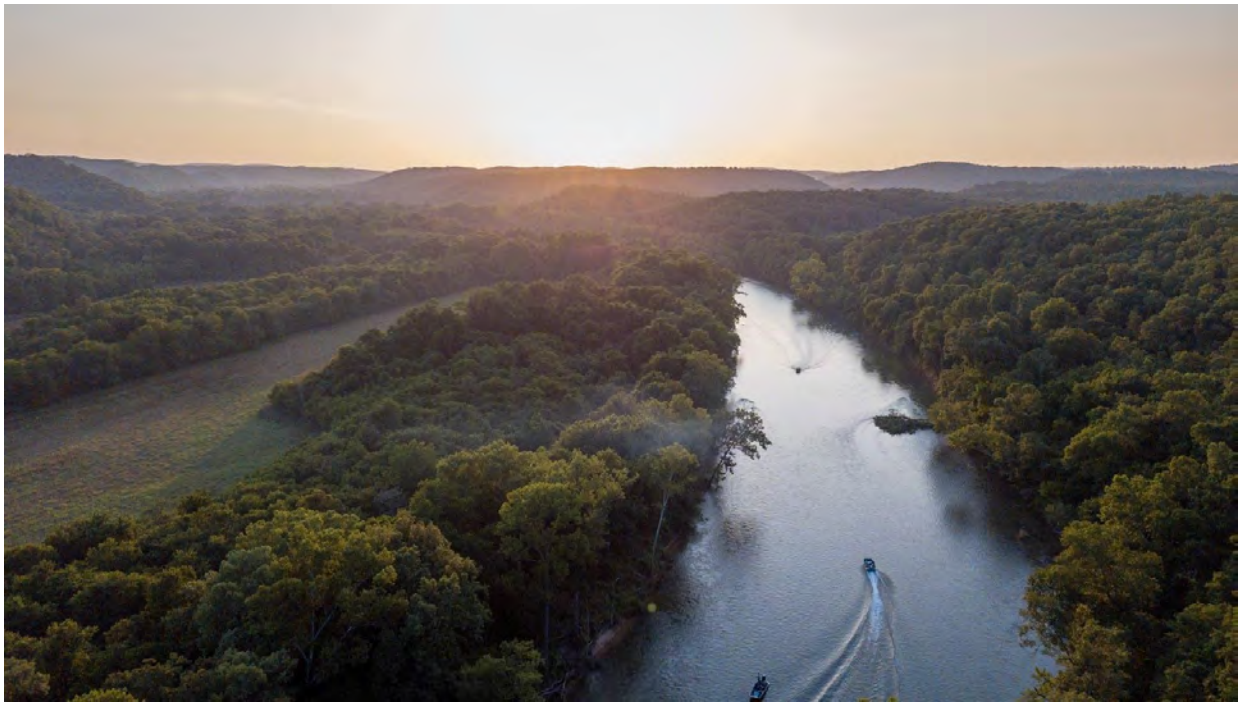
MERAMEC RIVER AND LOWER MISSOURI RIVER WATERSHEDS:

A Case Study of Streams and Ditches that Could Lose Protection under the Proposed WOTUS Definition

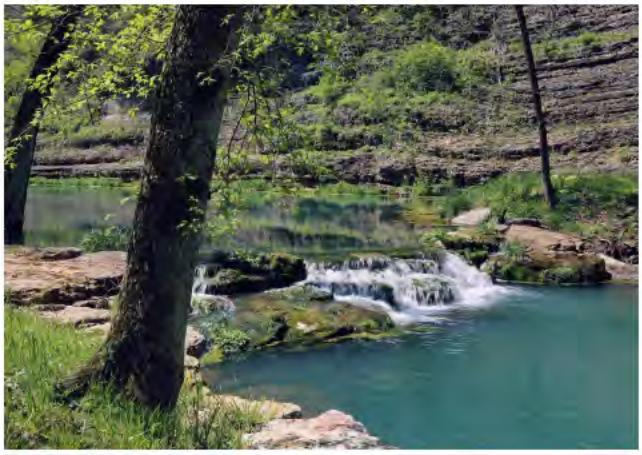


@J.R.Reed (Missouri River near St. Louis, Missouri)

Flowing from the mountains of western Montana, the **Missouri River** is fed by a vast watershed that touches ten states and two Canadian provinces before finally meeting the Mississippi River near the city of St. Louis, Missouri. In terms of total drainage area, the Missouri River is the nation's longest river.[1] Its watershed covers approximately one-sixth of the continental United States and is second in size only to the Mississippi, to which it serves as the principal tributary. Together, these two mighty rivers form the fourth-largest river system in the world and serve as one of the most important waterways in North America for transportation, industry, and recreation.

The **Meramec River** is one of the longest free-flowing waterways in Missouri, and among the most biologically diverse and significant river basins in mid-continental North America.[2] Beginning as an ephemeral stream nestled among hundreds of natural springs in the rugged Ozark highlands, it flows through forests, bluffs, and scattered glades before passing through more developed urban areas and eventually joining the Mississippi River just south of St. Louis.

The headwaters region in the Ozarks is sprinkled with springs, subsurface channels, caverns, and caves whose only surface clues are often sinkholes sealed with mud and sometimes holding water.[3] Permeable bedrock and subsoil allow seepage into aquifers and recharge groundwater supplies. Except after prolonged rainfall, there is no surface flow on the Meramec for the first few miles. The porous, karst topography of the Ozarks makes this region's water particularly vulnerable to pollution.



@jon.crenshaw (Dogwood Canyon, Missouri)

The Missouri and Meramec Rivers - together with more than 115,000 miles of flowing water from smaller rivers and streams - trace the landscape and define the state of Missouri.

<u>The Meramec River:</u>

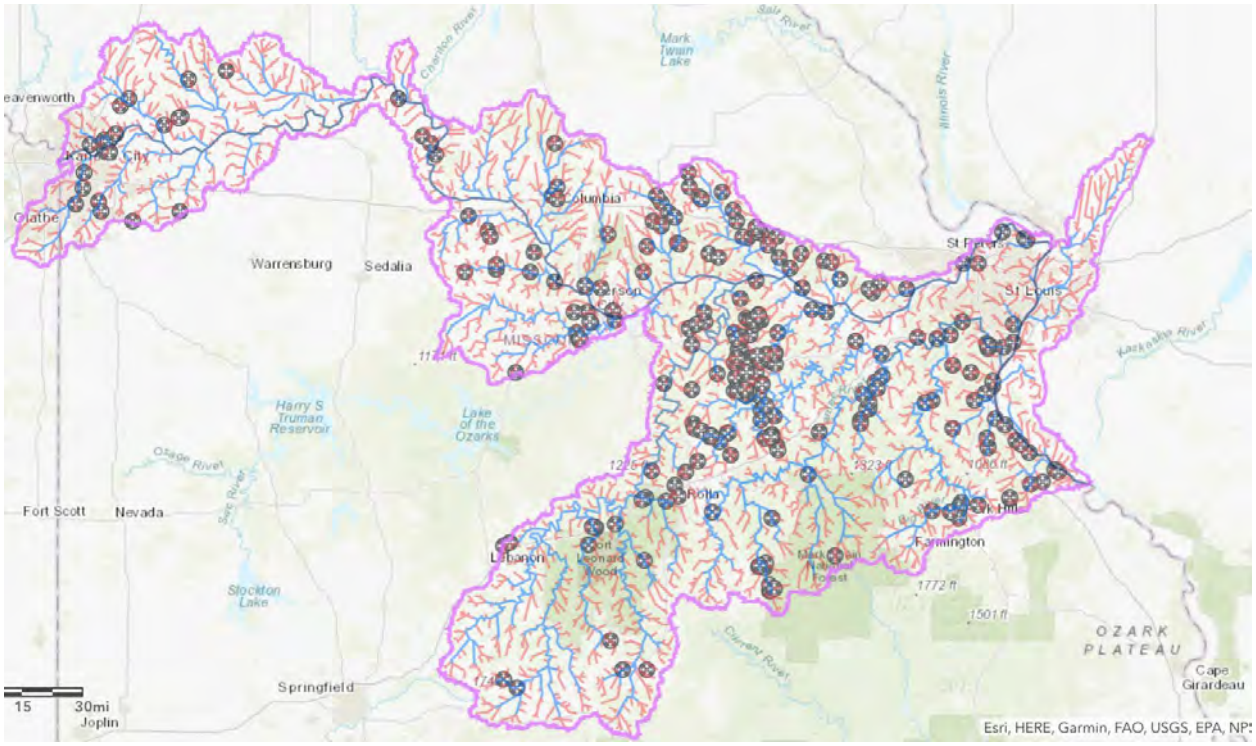
Fifty years ago, the Meramec was one of the most polluted rivers in Missouri.[4] Fortunately, decades of conservation actions and clean water enforcement have begun to breathe life back into the river. Today, the Meramec watershed provides important social and economic benefits to the region. As an ecologically significant wildlife area, a playground for aquatic recreation and fishing, and an important source of drinking water for hundreds of thousands of people, increased pollution would have devastating consequences.

The Meramec River and its tributaries contain over a hundred types of fish. Additionally, the lower Meramec is home to a federally endangered mussel, the pink mucket.[5] The Maramec Spring system and caves also provide unique habitat through stable year-round temperatures and distinctive water chemistry. There nearly 40 animal species found only in Ozark springs and subterranean waters.[6] The springs provide habitat to cave crayfish, and a species of caddisfly found nowhere else in the world.[7]

@JakeTrostPhotography (Meramec River, Castlewood State Park)

The Meramec River and its springs provide ample recreational opportunities, including sportfishing for numerous species of bass and trout. The river is also provides drinking water for over 340,000 households.[8]

The Meramec River faces tremendous pressure from floodplain development and resource extraction operations. Water-borne pollutants from industrial agriculture and animal waste, and toxic effluent from underperforming sewage treatment facilities and failing septic systems continue to flow into the river.[9] Heavy-metal mining has polluted thousands of acres of habitat, significantly impaired water quality, and continues to threaten streams, freshwater aquifers, and drinking water.[10]



Mineral mining sites in the region.

Water-borne pollutants from mines, energy production facilities, and other military and industrial resource extraction operations, as well as toxic effluents from factories, illegal dumping of chemicals, and leakage from fuel tanks are being discharged directly into the waterways or allowed to seep through the permeable carbonate bedrock to contaminate groundwater.[11] While these are major threats to both the Lower Missouri and Meramec rivers, contaminated sediments in the Meramec River basin are among the highest concentrations measured in rivers nationwide.[12]

Past and present mining and quarrying operations have significantly impacted water quality and continue to threaten Missouri's rivers, streams, freshwater aquifers, and drinking water. Heavy-metal mining has polluted thousands of acres of terrestrial habitat and hundreds of miles of streams and is a primary source of contaminated sediment.[13] Abandoned mines and their tailings continue to poison and degrade waters for decades after mining activity has ceased through stormwater, erosion, and fugitive dust. Gravel reaming, as well as in-stream mining for sand and gravel are ongoing threats.[14] Currently, there are over 100 permitted operations and numerous unpermitted sites of in-stream mining along the Meramec alone,[15] and several major mining and materials companies planning to expand or create new sites.[16]

The Missouri River:

The Missouri River and its tributaries also support a wide variety of fish, mammals, waterfowl and other bird species.[17] The river is also an important source of drinking water throughout the region; nearly half a million people Kansas City alone depend on it.[18] However, the Lower Missouri River has been extensively channeled, altering natural water flow and habitats.[19] The water quality of the Missouri River is being degraded by excess nutrients from agriculture, as well as industrial and mining pollutants such as mercury. [20]

@MOWaterkeeper (Missouri River near Jefferson City)

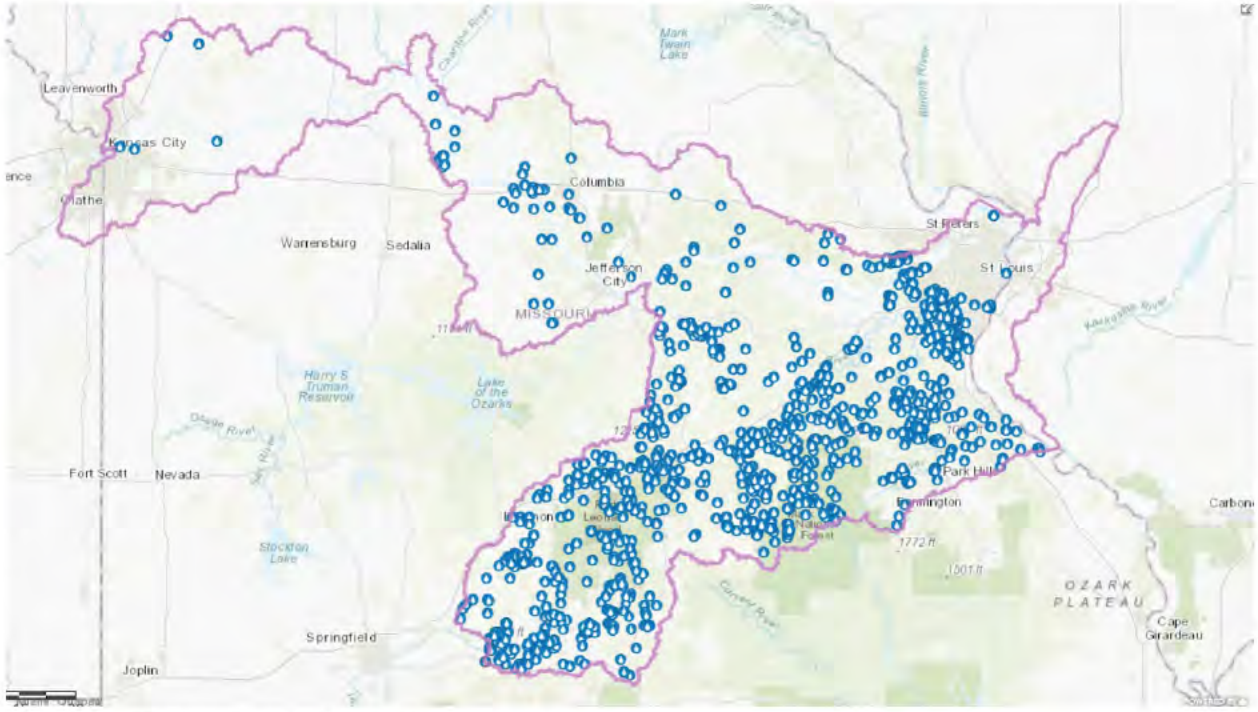
The Missouri River is also being impacted by a dangerous combination of overdevelopment in floodplains and numerous Superfund sites at risk of flooding. For example, St. Louis is located on an overdeveloped floodplain that was completely submerged during the Great Flood of 1993. As soon as the floodwaters receded, higher levees were constructed and the wetlands were filled with sediment and paved over to construct the longest strip mall in America. Approximately 85 acres of wetlands were destroyed behind the reconstructed 500-year levee to make Chesterfield Valley development possible, further damaging the habitat of the river and squandering the flood-reduction benefits that wetlands provide.

It is believed that "[i]f the levee around Chesterfield Valley had not breached in 1993 and absorbed a huge amount of that flood's force, the 1993 flood would have likely breached the Earth City levee around West Lake Landfill."[21] West Lake Landfill EPA Superfund Site is 32 miles upstream of St. Louis City's primary drinking water intake and only 8.5 miles upstream of a drinking water intake serving North St. Louis County.[22] Much of the uranium that powered the early nuclear bombs was purified in St. Louis as part of the Manhattan Project, and the resulting radioactive contaminants were buried at the landfill.[23] Making matters worse, an underground smoldering fire is continuously moving closer to the radioactive landfill,[24] and the site is located on a fault line. The complicated situation in St. Louis of historic contamination, irresponsible development and flood control, and drinking water needs demonstrates some of the challenges of remediating and protecting the Missouri River and the people that rely on it.

@susandean (Missouri River)

Threats to Losing Streams and Springs:

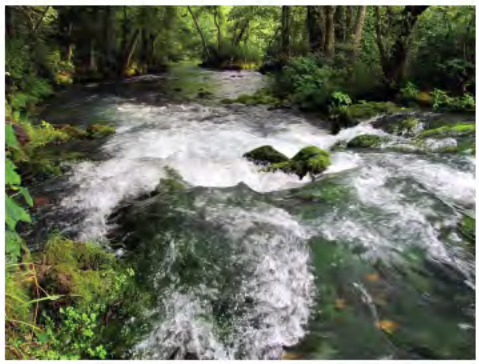
The Ozarks region of the Meramec watershed is dominated by "karst topography," which means the bedrock underlying the soil is made up of highly soluble limestone and dolomite. Over time, water makes the bedrock porous,[25] forming the region's iconic freshwater springs[26] and caves.[27] This also has created a complex interrelationship between surface water, groundwater, and springs.



There are 1,184 mapped springs in the region.

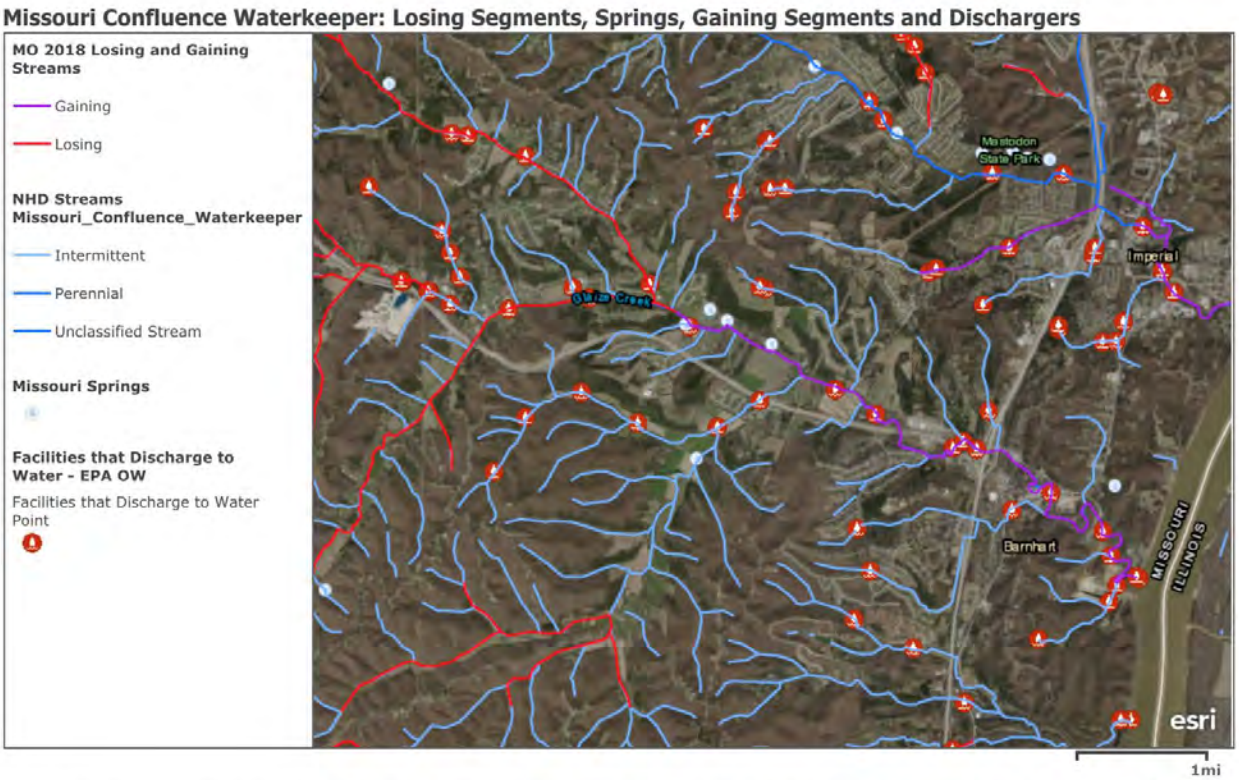
Many of the sources of the springs in the region can be traced back to upstream "losing streams." A "losing stream" is a stream that diminishes in volume downstream because the water drains into groundwater.[28] For example, studies of the hydrology of the Maramec Spring demonstrate that the spring is recharged by the flows from numerous nearby "losing streams."[29] These streams lack consistent surface water connections with waterways, and some are largely dry parts of the year, however, their important role in providing flow to the spring is undisputed.[30]

@JakeTrostPhotography (Ozark spring)



@annie937 (Ozark spring)

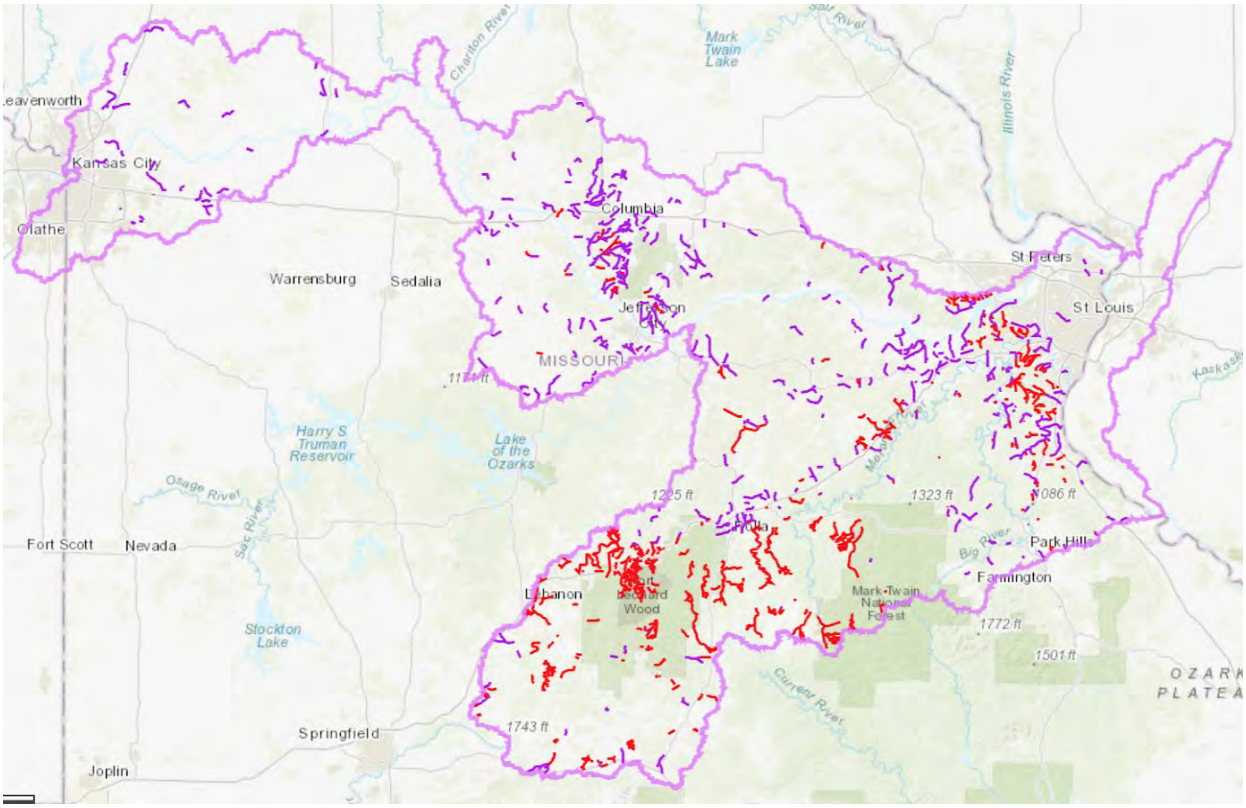
@olcore (Ozark stream)



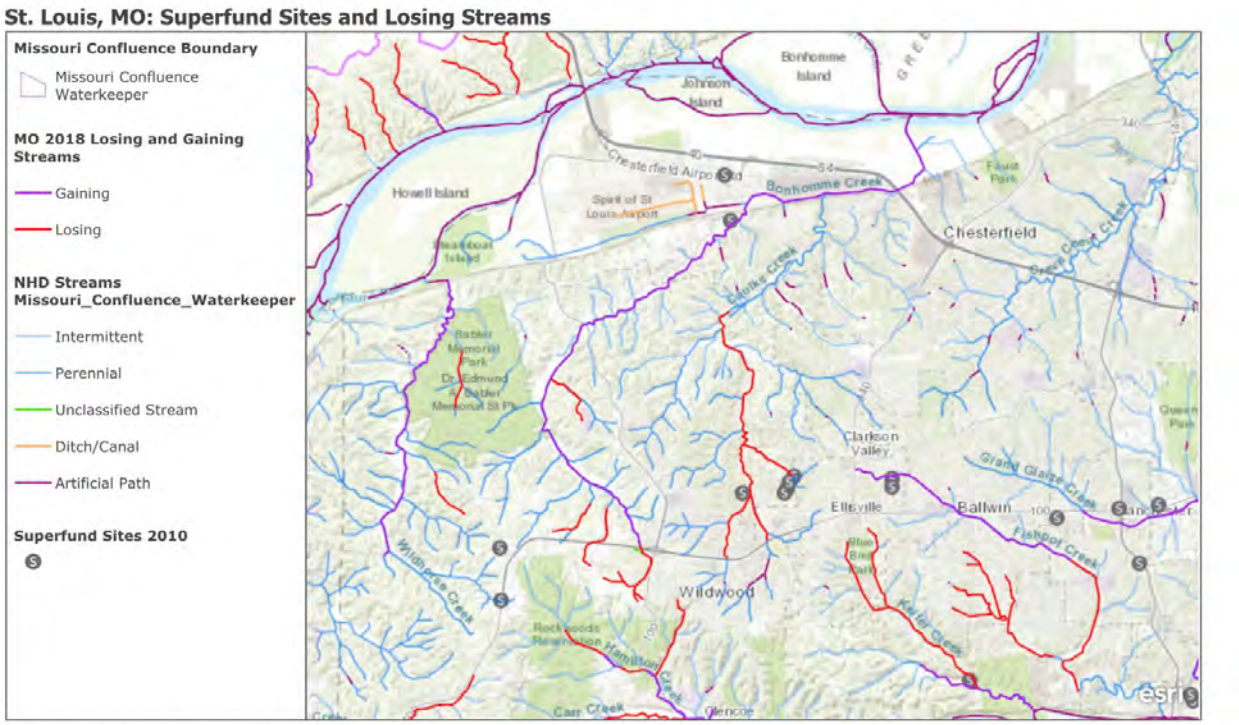
This map above demonstrated the complex relationship between losing streams, springs, and other waterways. The losing springs, shown in red, go subsurface, feeding the springs, which in turn feed the purple "gaining streams" that connected with the river. Also shown are discharge points - areas where pollutants are being released into the waterway. Due to the interconnectedness of the system, pollutants released into the losing streams have the potential to contaminate the springs and the waterways that run from them.

Despite this clear connection, the proposed rule is likely to exempt losing streams and their tributaries from Clean Water Act protection because they lack surface water connections to other waterways. In the map above, many of the losing streams shown in red and the streams that feed into them are at risk of losing Clean Water Act protections. This could result in the dischargers located on the losing streams being allowed to release greater amounts of pollutants, which has the potential to degrade the entire hydrological system.

This threat is not merely speculative. In 1981, a pipeline leaked ammonium nitrate-urea adjacent to Dry Fork, one of the losing streams that which recharges Maramec Spring. Eight days later, impacts from the spill were seen at the spring in the form of plummeting levels of dissolved oxygen. Despite efforts to intervene and minimize the impacts on the aquatic organisms, about 37,000 sculpins and large spring-basin trout died as well as thousands of cavefish downstream, as well as unknown numbers of other cave-dwelling fauna.[31] This disaster demonstrates that the only way to protect the springs is to protect the streams that recharge them through groundwater.



As shown above, in red, there are at least 1,083 miles of losing streams in the region. The proposed rule could result in all waters shown in red and the waters upstream from them losing protections. This would have widespread impacts on the water quality of the entire region and endanger the region's iconic cool, clear springs.



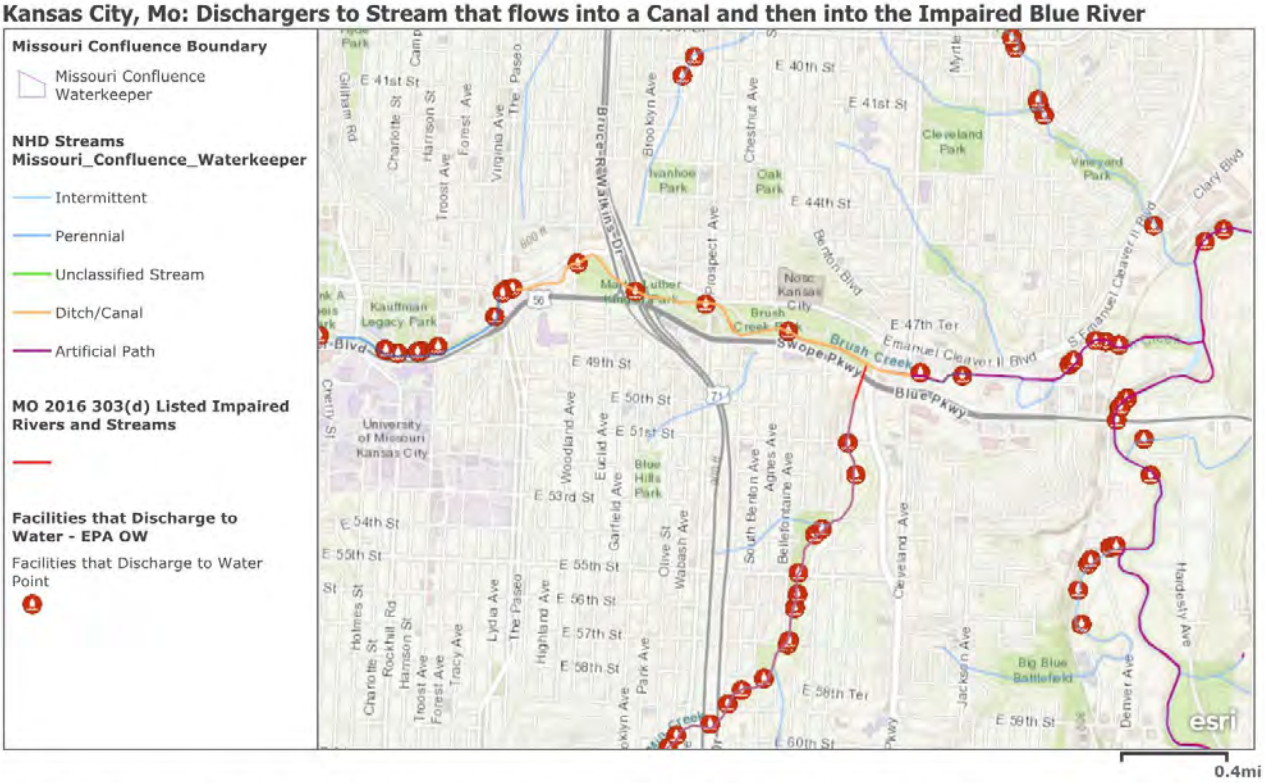
USGS TNM – National Hydrography Dataset. Data Refreshed January, 2019. | US EPA Office of Water | USGS TNM – National Hydrography Dataset. Data Refreshed January, 2019. | County of St. Louis, Missouri Dept. of Conservation, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS

Another example of the impacts of exempting losing streams from Clean Water Act protections can be seen in the map above of a segment of west St. Louis County. Here, there are Superfund sites located on losing streams shown in red. Under the Comprehensive Environmental Response, Compensation, and Liability Act these sites need to be cleaned up. For sites to be properly remediated, Clean Water Act protections, such as Water Quality Standards, must be taken into consideration.[11] If the waterways near Superfund sites lose Clean Water Act protections, there is a risk of remediation plans at these sites that are less protective of human health and the environment. Adequate and expedient clean up of these sites is particularly important in light of the threat posed to the Missouri River and public health from the Superfund sites located in an overdeveloped floodplain that is at risk of catastrophic flooding.

Threats to Ditched Streams:

The Proposed Rule would make it more difficult to protect ditches under the Clean Water Act. One example of the rippling impacts of exempting many ditches from Clean Water Act protections can be seen below.

Kansas City, Mo: Dischargers to Stream that flows into a Canal and then into the Impaired Blue River



USGS TNM – National Hydrography Dataset. Data Refreshed January, 2019. | US EPA Office of Water | USGS TNM – National Hydrography Dataset. Data Refreshed January, 2019. | Kansas City, MO, Jackson County, MO, Missouri Dept. of Conservation, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA

This map shows a section of Kansas City, which has a waterway, called Brush Creek, classified as a "ditch/canal" (shown in yellow) running through it. There are numerous dischargers releasing pollutants into Brush Creek and the tributaries of Brush Creek. Brush Creek flows to the Blue River, a tributary of the Missouri River.[32] The Blue River is listed as impaired for Chlordane, a pesticide that bioaccumulates in fish,[33] and other pollutants, including sewage, that cause low dissolved oxygen levels, killing aquatic life.[34] This small example shows the ripple effects of exempting one waterway from protections. The proposed rule could result in higher levels of pollutants discharged to the exempt waters, further impairing downstream waters.

Barriers to State Enforcement:

The state of Missouri is unlikely to take the action needed to protect the state waters that may lose federal Clean Water Act protection because of the Proposed Rule. Currently, the Missouri Department of Natural Resources, per the Governor's Executive Order,[35] is reviewing all of the agency's regulations with the aim of rescinding or amending those deemed to be unnecessarily burdensome.[36] With this "red tape reduction" currently being prioritized, it is highly unlikely that the agency will be ready to take the regulatory and enforcement actions to make up for gaps in federal jurisdiction.

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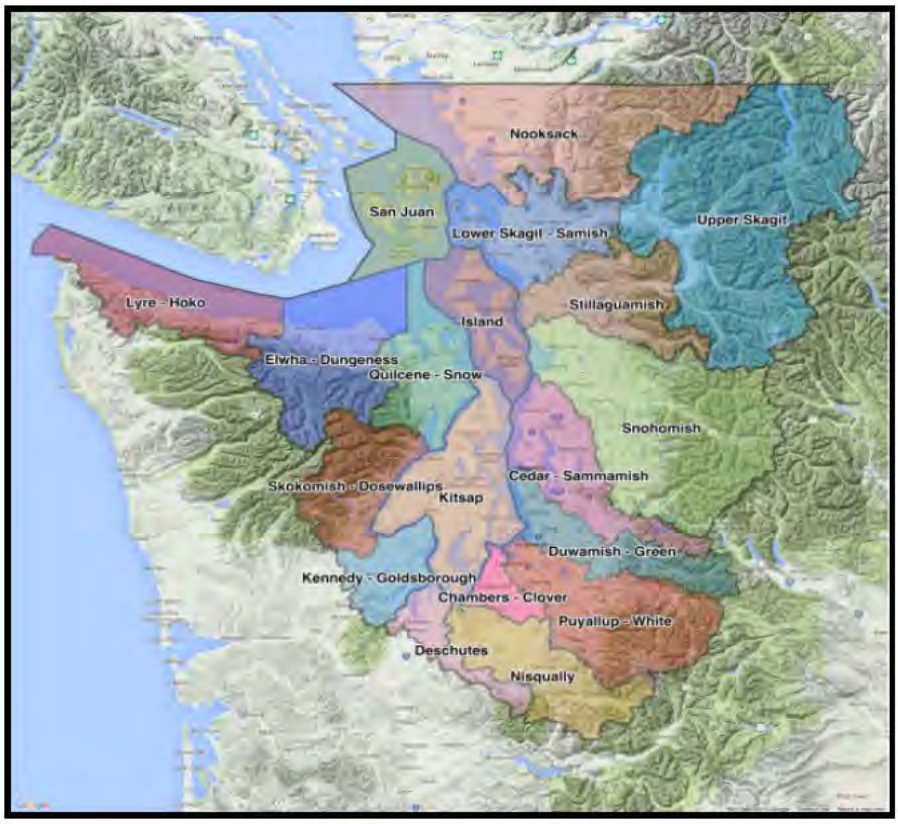
PUGET SOUNDKEEPER®

WATERKEEPER® ALLIANCE

PUGET SOUND:

A Case Study of Streams and Ditches that Could Lose Protection under the Proposed WOTUS Definition

The Puget Sound basin is a coastal area of the Pacific Northwest in the U.S. state of Washington, including Puget Sound, the Strait of Juan de Fuca, the San Juan Islands the Puget Sound lowlands, and the surrounding region roughly west of the crest of the Cascade Range and east and north of the Olympic Mountains. It is characterized by a complex array of saltwater bays, islands, and peninsulas carved out by prehistoric glaciers along with many rivers, streams, lakes and wetlands. Water managers typically use a description for the Puget Sound Basin, based on Water Resource Inventory Areas (WRIAS) 1-19.



The Puget Sound Basin and WRIAs 1-19
Source: Encyclopedia of Puget Sound;[1] Map: Kris Symer; Data Source: WA DOE

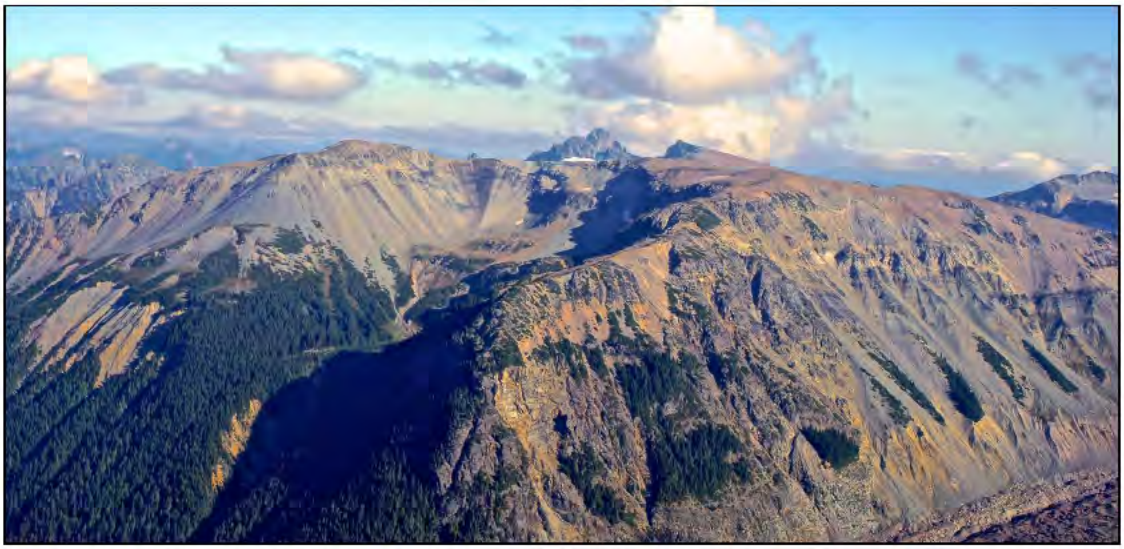
Although it is adversely affected by development and pollution,[2] Puget Sound still hosts more than 10 species of marine mammals including the orca whale,[3] 8 species of pacific salmon and trout and charr,[4] plus an important and thriving shellfish industry.[5] There are over a dozen federally-recognized treaty tribes[6] in the Puget Sound area who have

stewarded this resource for thousands of years, and who rely on its watersheds for treaty-protected fishing, hunting and food and medicine gathering to this day.

Despite its richness and history, Puget Sound is on the brink of collapse – 21 native species are currently listed as threatened or endangered,[7] including southern resident orca whales, Puget Sound Chinook salmon, Hood Canal Summer-run chum salmon and Puget Sound steelhead trout. More than 1,000 rivers, streams and lakes are listed as impaired,[8] and there are periodic low oxygen "dead zones" in Hood Canal[9] and the South Sound.[10] Many swimming beaches and shellfish beds[11] are closed because of contamination, and fish consumption advisories[12] warn of unsafe toxic loading, especially in urban and industrialized areas. There are many factors contributing to these issues but declining water quality[13] is clearly one of the major stressors and is not adequately addressed. Primary water pollution concerns include polluted stormwater runoff,[14] wastewater discharges[15] and agricultural pollution.[16] According to Washington State Department of Ecology:

> *Puget Sound is critical to our environment, culture, and economy. About two-thirds of the state's population lives in the Puget Sound region. Our nation's second largest marine estuary faces a number of challenges related to population growth and development, as well as habitat loss and multiple sources of pollution. We work in collaboration with a wide range of local and tribal governments, other state and federal agencies, non-profit organizations, and private sector partners to use the best available science and research to better understand and counter challenges facing Puget Sound. We are building lasting partnerships, working together, pooling resources, and making smart investments to restore, protect, and preserve the health of Puget Sound, now and for future generations.* [17]

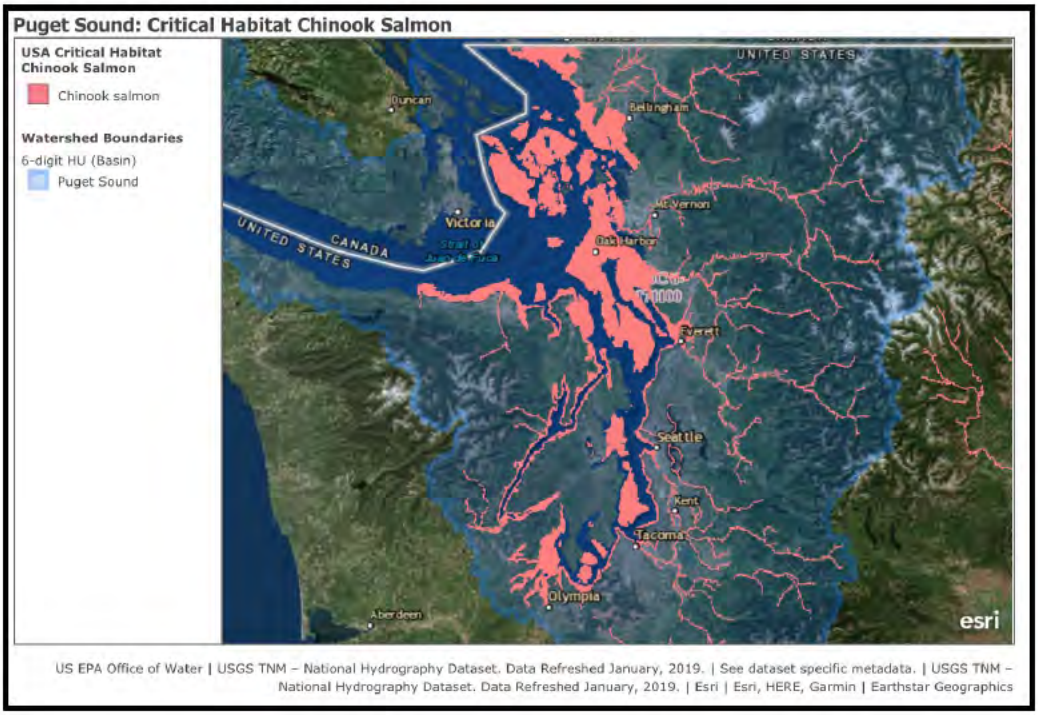
Although Puget Sound is known as a deep water estuary, with stunning views of snow-capped mountains, it needs a complete and continuous healthy watershed to ensure the wellbeing of all of its communities and wildlife. Puget Sound cannot be recovered unless all of its interconnected waterways are protected.



Cascade Mountains, 2018. Photo: Chris Wilke

The Upper Watershed: *Endangered Intermittent and Ephemeral Streams*

Snowmelt from steep slopes in the Cascade and Olympic Mountains is critical for adequate flows and to to protect water quality in the dry summer months typical of the region. Snowmelt drains from mountains to form the tributaries of some of the nation's most iconic cold water salmon streams.[18] These streams provide water for critical downstream habitat for culturally, spiritually, economically and ecologically significant species like federally-threatened Chinook salmon, coho salmon, chum salmon and steelhead trout.



Due to seasonal variations in precipitation, these smaller tributaries sometimes exhibit interrupted surface flow, as waters disappear underground and transition through wetlands and eventually merge with larger navigable waterways. During the wetter months, rainfall again fills the banks of these streams. The smaller tributaries are often especially important for steelhead trout[19] and coho salmon[20], as they offer ideal rearing habitat and spawning grounds away from the larger Chinook salmon that dominate the larger rivers. And the Chinook salmon depend on adequate flow and cold, clean water from the tributaries to protect the water quality in the larger rivers.[21,22]

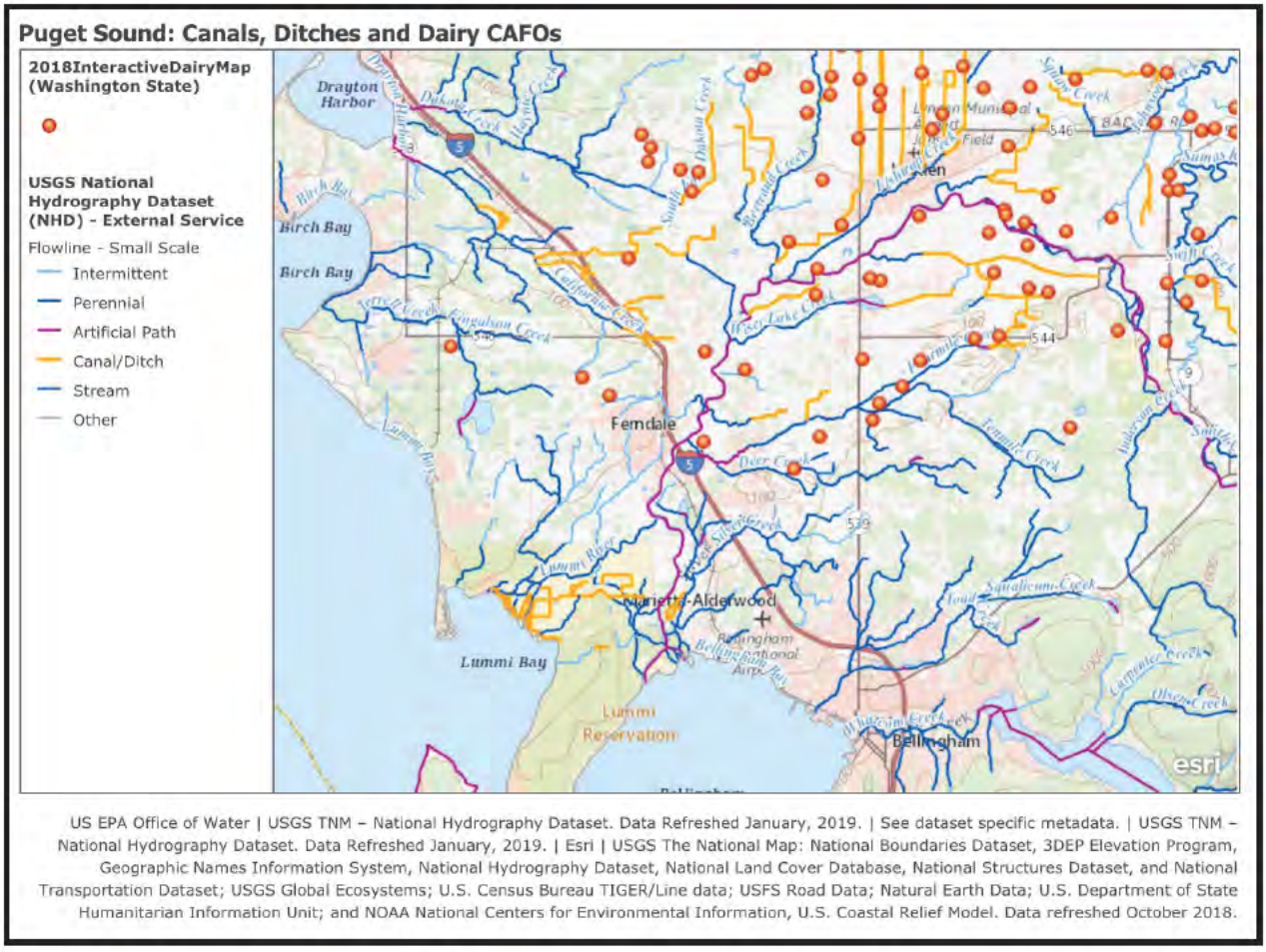
A trickle of water emerges beneath a footbridge Footbridge, tributary to Middle Fork Snoqualmie River. *Photos: 2017, Chris Wilke*

Same vantage point, looking upstream Streambed is dry, but with clear bed and bank.

Middle Fork Snoqualmie River, a popular hiking, swimming, fishing destination downstream from the confluence of numerous ephemeral and intermittent streams. Photo :2017, Chris Wilke

Lowland Watershed: Endangered *Ditched Streams and Canals*

Much of the Puget Sound lowland areas contain agricultural land which is increasingly developed into light industrial, commercial and residential uses. Many once-productive streams in this area have been functionally converted to ditches, although Clean Water Act protections remain in place as long as they are recognized as streams by natural resource agencies.



Source: Washington State Department of Agriculture, WADairies2018dataset (all active dairy milking facilities and active anerobic digesters associated with dairy manure handling), https://agr.wa.gov/foodanimal/livestock-nutrient/formspublications.aspx

If they are to be redesignated as ditches and removed from protection, protective standards like erosion control and animal waste prohibitions won't be enforced, leading to devastating impacts downstream in navigable waters where designated uses like shellfish harvest, fishing, recreational contact will be at risk.

Agricultural ditches with connection to Joe Leary Slough. Skagit County, WA 2018
Photo: Chris Wilke

Without specific designation as 'waters of the United States," pollution sources in Puget Sound could increase their impact drastically. These sources include industrial stormwater discharges, municipal stormwater discharges, wastewater discharges from industrial and municipal sources, combined sewer overflows, mining discharges, non-point agricultural discharges from animal grazing and crop irrigation, and point-source agricultural discharges from confined animal feeding operations (CAFOs).

Concentrated Animal Feeding Operations (CAFOs) with manure lagoons. Skagit County, WA 2018 Photos: Chris Wilke

In addition, transitional, seasonal or ephemeral waterways could be destroyed altogether by development, mining and agricultural operations.

State Enforcement: ***Inadequate to Fill the Gap***

Washington State enforces state and federal water quality laws through the state's Department of Ecology, which is a delegated authority under the Clean Water Act. The state uses both federal and state statutes to implement its authority. However, the federal Clean Water Act provides an effective backstop against localized efforts to weaken protections. And the EPA has had to step when the state fails to act.[23]

Special interest groups representing polluting industries have a demonstrated ability to impact the state's water quality protection budget and decision-making through political pressure[24] and legislative action,[25] which has a chilling effect on the state's enforcement program. Often it is citizen groups that must step up to enforce provisions of the Clean Water Act because the state is under-resourced and/or lacks the political will to live up to its mandate. If whole classes of waterways lose protection under federal law, citizen groups could be powerless to invoke the provisions of the Clean Water Act to ensure that illegal pollution is stopped.

Science confirms the need to protect the connectivity of waterways:

To be effective at meeting its goal of protecting the biological, chemical and physical integrity of the nation's navigable waters, the Clean Water Act and the "waters of United States" definition must include all interconnected waterways that science confirms must be protected[26] to in turn protect the waters of the Puget Sound basin.

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**Critical Habitat for the Chinook salmon designated under the U.S. Endangered Species Act. Imagery Layer by Esri https://landscape10.arcgis.com/arcgis/rest/services/USA_Critical_Habitat_Chinook_Salmon/ImageServer

RIO GRANDE WATERSHED AND CENTRAL CLOSED BASIN:

A Case Study of Streams, Ditches, Canals, and Wetlands that Could Lose Protection under the Proposed WOTUS Definition

Confluence of Rio Grande and Pojoaque River in Santa Fe County, NM - Credit: Adriel Heisey

The Rio Grande is a western icon and the lifeblood of the desert Southwest. It's the third longest river in the United States and fifth largest watershed in North America covering 336,000 square miles (an area larger than the state of Texas). It arises in the snow-capped peaks of the San Juan Mountains in Colorado as the collection of several tiny creeks. The river builds force and is enveloped in a deep and vast canyon—the Rio Grande Gorge—that its flows carved centuries ago from southern Colorado through northern New Mexico. As more sediment laden tributaries contribute and turn its color brown, the river slows and widens into a seemingly endless floodplain (historically between one to three miles wide) that bisects central and southern New Mexico along the central flyway. Incredibly, the Rio Grande's journey through the desert Southwest really only begins as it becomes the border between the United States and Mexico for the remaining 1300 miles of its total 1900-mile course to the sea.

Principal Tributaries. The principal tributaries contributing flow to the Rio Grande include the Conejos River (Colorado); the Rio Chama, Rio Puerco and Rio Salado (New Mexico); the Pecos and Devils River (Texas); and the Rio Conchos, Salado and San Juan Rivers (Mexico). What makes this watershed so unique is its circulatory system of streams, creeks, arroyos, washes, and wetlands that contribute flows to these major tributaries and ultimately the Rio Grande. These diffuse sources make up over 68 percent of waterways in Colorado and 88 percent of waterways in New Mexico,[1] which largely serve as the source of water for flows in the Rio Grande.

Central Closed Basin. The Rio Grande Watershed surrounds the Central Closed Basin—a group of drainage systems in south-central New Mexico—that are isolated from the Rio Grande hydrologically.[2] These sub-basins cover 14,605 square miles (or portion of the 11 counties) with few perennial waterways.[3] While some perennial streams exist, ephemeral waterways are the predominant source of surface water along with playa lakes and other fresh water formations.[4]

Conejos River, Colorado - Credit: Adriel Heisey

Biodiversity. While the Rio Grande corridor makes up only one percent of the landscape, this riparian habitat is home to more species than any other ecological community in the region. Over 400 species of native fish, wildlife, and plants have inhabited the watershed for centuries. Tens of thousands of sandhill cranes overwinter each year in the central Rio Grande valley and are concentrated just south of Socorro, New Mexico in the Bosque del Apache National Wildlife Refuge. The largest contiguous cottonwood forest ("Bosque") in the world is found along the Rio Grande's banks. A growing list of imperiled species—Rio Grande chub, Rio Grande cutthroat trout, Rio Grande sucker, Rio Grande silvery minnow, Southwestern willow flycatcher, yellow-billed cuckoo, New Mexico meadow jumping mouse, and Pecos sunflower—depend on the Rio Grande, its tributary streams, and supporting wetlands for survival.

Sandhill cranes over the Rio Grande Bosque in Valle de Oro National Wildlife Refuge - Credit: Jen Pelz

Culture. In these unforgiving landscapes, the Rio Grande and its tributaries serve as the primary source of water for diverse communities of people and wildlife. The river historically supported over 100 pueblos in the Rio Grande valley. Today, the Rio Grande sustains at least 19 pueblos and five tribes. A network of irrigation canals (acequias) were formed—from southern Colorado to northern and central New Mexico—to serve the irrigation needs of the communities adjacent to the Rio Grande. This community irrigation system persists today.

Drinking Water. Drinking water for the communities in the watershed is a combination of groundwater and surface water. Colorado's San Luis Valley (about 46,400 people) relies almost exclusively on groundwater for its municipal needs. In New Mexico and Texas, groundwater serves the municipal needs of about half the population. Increasingly surface water is preferred where it is available. For example, the City and County of Santa Fe and the Albuquerque Bernalillo County Water Utility Authority directly divert water from the Rio Grande for municipal use.

Agricultural Economy. The Rio Grande is the heart of the economy in the watershed. The Basin is home to six million people and two million acres of land. The three largest metropolitan areas include Albuquerque, New Mexico (1.2 million people); El Paso, Texas (900,000 people); and Ciudad Juarez, Mexico (1.4 million people). Despite the growing cities and the general movement away from the traditional agricultural economy,

agriculture persists as the vast majority of surface water use (87%) and 2 million acres in the Basin.

Recreational Economy. The Rio Grande also supports a robust tourism and recreation economies. The Rio Grande watershed is home to a number of crown jewel protected landscapes including: the Rio Grande del Norte National Monument and Bosque del Apache National Wildlife Refuge in New Mexico; Great Sand Dunes National Park in Colorado; and Big Bend National Park and the Santa Ana, Laguna Acosta, and Lower Rio Grande National Wildlife Refuges in Texas. In addition, Congress designated two reaches of the Rio Grande—totaling 270 miles—as wild and scenic rivers including the Rio Grande from the Colorado-New Mexico state line to Velarde, New Mexico (1968) and the Rio Grande through Big Bend National Park (1978). As a result of these recreational opportunities, northern New Mexico experienced a 40 percent increase in visitors, 21 percent rise in tax revenue, and 8 percent jump in gross receipts revenue in the first year after the Rio Grande del Norte National Monument was designated. Further, tourism in the Big Bend area is estimated to bring in $23.5 million a year. By comparison, agriculture in the Big Bend region provides an economic benefit of $5 million a year.

Rio Grande Wild and Scenic River in Boquillas Canyon - Credit: Austin Alvarado

Rio Grande: Importance of Protecting Ephemeral and Intermittent Streams

"[E]phemeral and intermittent stream systems comprise a large portion of southwestern watersheds, and contribute to the hydrological, biogeochemical, and ecological health of a watershed. Given their importance and vast extent, consideration of the cumulative impacts from anthropogenic uses on these streams is critical in watershed-based assessments and land management decisions to maintain overall watershed health and water quality."[5]

Ephemeral and intermittent streams make up at least 88 percent of waterways in New Mexico and 68 percent in Colorado—many of these waterways are found in the Rio Grande watershed.[6] While these estimates are significant, the National Hydrography Dataset ("NHD") actually is thought to underestimate the total extent of such ephemeral or intermittent streams in the region.[7] The NHD data "does not include stream segments less than one mile in length, combines intermittent and ephemeral steam, and is based on 1:100,000 scale topographic maps."[8] USGS has, however produced a database of streams and rivers entitled Elevation Derivatives for National Applications ("EDNA") that uses the NHD, National Elevation Dataset ("NED"), and other information to hydrologically condition the data for "improved hydrologic flow representation."[9] An analysis of of EDNA and NHD data indicates that at least 64,741 miles of 71,854 total streams miles, or 90%, of the rivers and streams in the Rio Grande watershed outside the Central Closed Basin,[10] and even more within the Closed Basin, could lose protection under the proposed rule.

Endangered Rivers and Streams in the Rio Grande Basin

Credit Waterkeeper Alliance (2019).

The New Mexico Environment Department estimates 6,362 miles of perennial non-tribal rivers and streams; 88,810 miles of non-perennial (intermittent or ephemeral) non-tribal rivers and streams; 196 significant public lakes and reservoirs (equaling 89,042 total acres); and 845,213 acres of wetlands in New Mexico.[11] The Proposed Rule could strip clean water protections from intermittent or ephemeral streams leaving tens of thousands of miles of streams, creeks, arroyos, and washes in New Mexico—the majority of our waterways—without their existing protections under the Clean Water Act. Many important rivers and streams would be impacted in the Rio Grande Basin including the Rio Puerco and the Santa Fe River, among many others.

***RIO PUERCO**: Ephemeral streams contribute significant flows to Rio Grande*

Rio Puerco east from Rio Puerco Bridge, New Mexico (2017 left, 2019 right) – Credit: Jen Pelz

Some of the principal tributaries contributing flow to the Rio Grande are not perennial, but remain vital to the quantity and quality of water that ultimately reaches the Rio Grande. For example, the Rio Puerco is one of the largest tributaries to the middle Rio Grande in New Mexico.[12] The Rio Puerco flows 140 miles from its headwaters at an elevation of 10,500 feet in Sandoval County to where it meets the Rio Grande near Bernardo, New Mexico at an elevation of less than 5,000 feet.[13] The Rio Puerco watershed drains 7,000 square miles (only slightly smaller than the state of New Jersey) in seven counties.[14] The watershed is home to a handful of threatened and endangered species protected under state and federal law including the Rio Grande cutthroat trout, Jemez Mountains salamander, Mexican spotted owl, gray vireo, and Parish's alkali grass.[15]

The waterway remains dry most of each year (approximately 264 days per year from 1941-1959), but still contributes roughly 30,000 acre-feet of water to the Rio Grande annually.[16] Most of the flows in the Rio Puerco originate from monsoonal rainstorms.[17] The Rio Puerco contributes 10 percent or more of the total water flow to the Rio Grande and contributes a large percentage of sediment, up to 80 percent.[18]

Water quality in the sub-basin is a continuing challenge.[19] This historical agriculture, grazing, logging, mining in this vulnerable landscape has led to a decline in the health of the sub-watershed.[20] A federal, state, tribal, and local effort to restore the water quality and health of the Rio Puerco watershed are over four decades old and ongoing based at least in part on the funding and mandates of the Clean Water Act including development of total maximum daily load for the watershed's rivers, implementation of best management practices, restoration (riparian fencing and planting).[21] Existing clean water protections for this watershed could be removed under the proposed rule.

***SANTA FE RIVER**: Ephemeral streams contribute to quality drinking water*

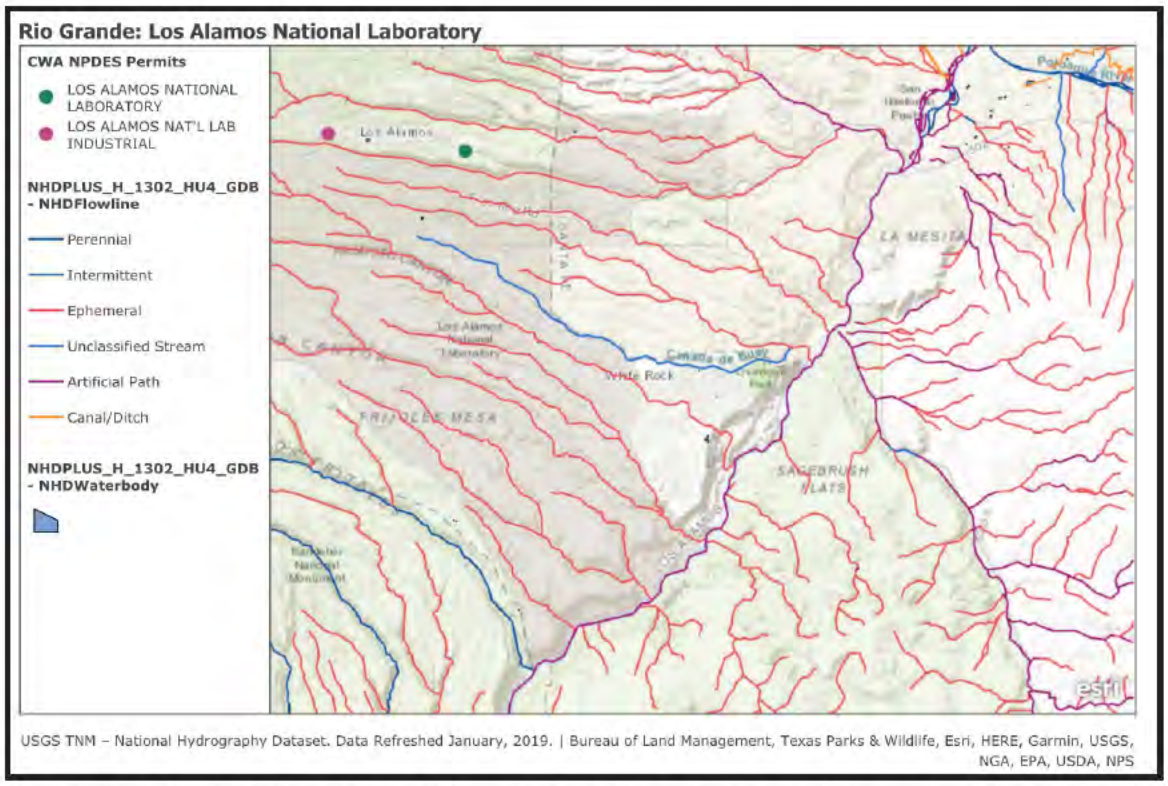
Santa Fe River near Frenchy's Field with headwaters in the background - Credit: Jen Pelz

The Santa Fe River begins in the Santa Fe National Forest (11,600 feet in elevation) and flows into the Rio Grande southwest of Cochiti Reservoir (5,230 feet in elevation).[22] The river becomes ephemeral downstream of Nichols Reservoir, primarily because of this upstream water storage.[23] As a result, the river no longer flows year-round through the city of Santa Fe and only "periodic reservoir spills and storm flows provide intermittent flow in the river through the City of Santa Fe."[24]

The proposed rule could strip existing clean water protections from this ephemeral section of the Santa Fe River.[25] In addition, this ephemeral section under the proposed rule could sever jurisdiction to the entire upstream watershed in the Santa Fe National Forest (17,400 acres) that serves as an important source of drinking water for the city of Santa Fe.[26] The

headwater-portion of the watershed is vital to ensuring the quality of the water for this community, and every community living downstream.

To add insult to injury, the legacy pollution from the Los Alamos National Laboratory is situated upstream of the city of Santa Fe's drinking water intake on the Rio Grande—the Buckman direct diversion.[27] The 2009 New Mexico House Memorial No. 120 states "potential water contamination from migration of nuclear waste through or near canyons that feed into the Buckman diversion project site."[28] The proposed rule could strip existing protections of the Clean Water Act for the intermittent and ephemeral streams that receive these pollutants, and make vulnerable a vital source of drinking water for the city and county of Santa Fe.[29]



Map showing location of Los Alamos National Labs relative to ephemeral streams and the Rio Grande
Credit: Waterkeeper Alliance (2019)

Rio Grande: Importance of Protecting Closed Basins

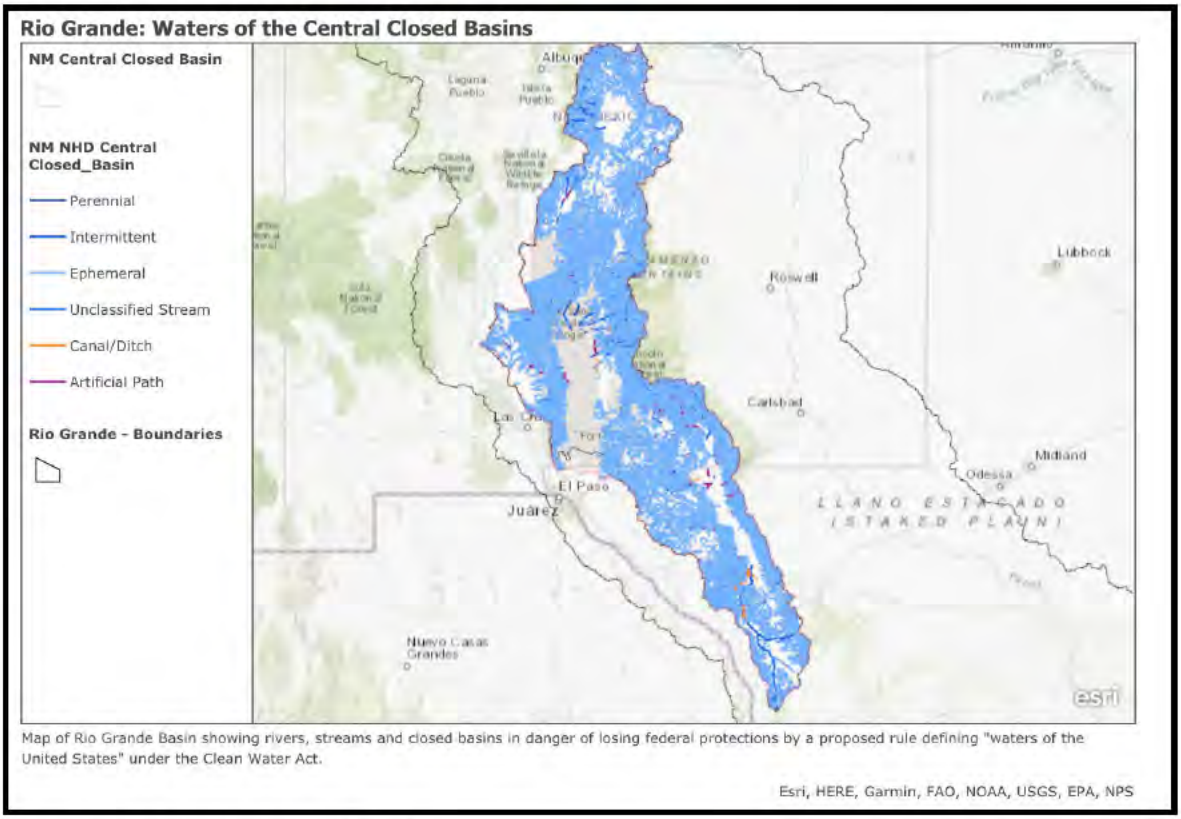
THE CENTRAL CLOSED BASIN: Non-tributary streams water vital in to the desert

In the south-central part of New Mexico and surrounded by the Rio Grande watershed are a group of four drainage basins known as the Central Closed Basin (shown as the gray region on the map, left).[30] These sub-basins cover 14,605 square miles and include portions of eleven counties from Santa Fe to Dona Ana County.[31] These self-contained basins do not flow into our major rivers that flow to the sea.[32] Although sparse geographically, the

existing water sources in these sub-basins are critically important to the communities and wildlife encompassed in this region.[33]

For example, the aquifer found near the Manzano Mountains at the northern end of the Basin "is the only source of potable water in the area."[34] Similarly, in the Estancia sub-basin is dependent on groundwater and perennial streams to provide irrigation water and support the economy of the region.[35]

The waters located in these four sub-basins (that make up the Central Closed Basin) could all lose protection under the proposed definition on the basis that they are not tributaries to a traditional navigable water.[36] At least some of these waters have historically been protected under the Clean Water Act.[37] Based on NHD data, this means more than 33, 933 miles of rivers, streams, ditches and canals could be left unprotected under the proposed definition.



Credit: Waterkeeper Alliance (2019).

Rio Grande: Importance of Protecting Wetlands

Wetland in near Monte Vista, Colorado – Credit: Jen Pelz

Extensive wetlands exist in the Rio Grande watershed in Colorado and New Mexico above Elephant Butte Reservoir.[38] Wetlands in the Rio Grande Basin in Colorado were subject to an extensive assessment in July of 2011.[39] New Mexico is home to about one million acres of wetlands, only a fraction of what existed in the early 1800s.[40]

Wetlands play an important role in filtering and trapping sediment and other pollutants (improving water quality), mitigating the impacts of extreme weather events (droughts and floods), and serve as headwater sources for perennial streams.[41] Loss of wetlands facilitates the "loss of natural flood attenuation, nutrient cycling, habitat connectivity, particulate retention, carbon sequestration, dynamic and long-term water storage, moderation of groundwater flow discharge, and maintenance of vertebrate and invertebrate communities and habitat structure."[42] Wetlands also provide significant benefits to plants, birds and wildlife.[43] The existing protections of wetlands under the Clean Water Act will be drastically reduced to include only wetlands adjacent to "waters of the United States" as defined under the proposed rule.[44] Redefining what constitutes wetlands will leave vulnerable important wetland habitats, like ciénegas, in the Rio Grande basin and throughout the southwest.

***CIÉNEGA**: Seep-fed wetland meadows provide habitat oasis in arid regions*

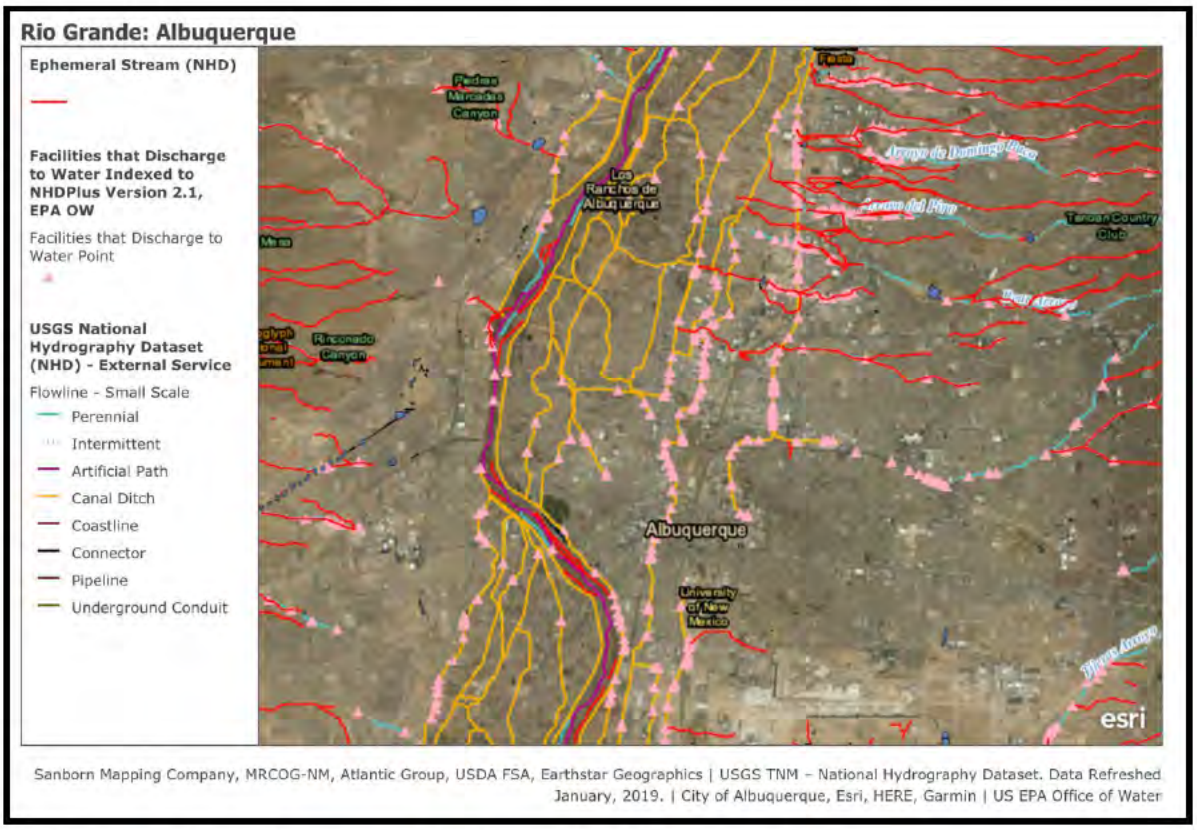
Another type of wetland prevalent in the American southwest is a Ciénega, which means swamp, bog, or marsh in Spanish.[45] A ciénega is defined "as distinct climax communities of ecological significance" found in "freshwater wetlands with permanently saturated, highly organic, reducing soils occupied by a low-growing herbaceous cover of mostly sedges and rushes."[46] "Not all springs support ciénegas, but almost all ciénegas are supported by springs.[47] Ciénegas are critical for plants and animals in the arid portions of the Rio Grande watershed and especially in the Closed Basins in New Mexico.[48] Threatened or endangered species that rely on these unique habitats including frogs, pupfish, gambusia, chub, topminnow, and spring snails.[49]

The Pecos sunflower is a casualty of disappearing wetlands from west Texas to west-central New Mexico.[50] The U.S. Fish and Wildlife Service listed the Pecos sunflower as threatened under the Endangered Species Act on October 20, 1999 (64 FR 56582-56590) due to disappearing spring seeps and desert ciénegas, aquifer depletion, agricultural activities and encroachment by other plants.[51] Unlike common sunflowers, the Pecos sunflower blooms in late fall and relies on alkaline soils characteristic of ciénegas.[52]

The State of New Mexico also lists the Pecos sunflower as endangered under the New Mexico Endangered Plant Species Act (19 NMAC 21.2) and it is also listed as threatened by the State of Texas (31 TAC 2.69(A)). To protect the habitat and recover the Pecos sunflower and other species that rely on such wetlands, the protections of the Clean Water Act are essential.[53] Ciénegas are lush "oasis in the desert" and thus by definition not typically adjacent to rivers and streams; therefore, these unique wetlands would likely not be protected under the proposed rule.[54]

Rio Grande: Importance of Protecting Ditches and Canals

The Middle Rio Grande watershed through Albuquerque, New Mexico contains a series of ditches, drains and canals connected to the Rio Grande that are part of the irrigation infrastructure of the region. Under the proposed rule, these artificial but important canals could lose clean water protections. Based on the large number of dischargers identified in the map below from U.S. EPA Office of Water data,[55] the loss of protections would mean free reign for polluters and could leave the Middle Rio Grande as a dumping ground for industry.



Map showing ephemeral streams and dischargers near Albuquerque, NM
Credit: Waterkeeper Alliance (2019).

Rio Grande: Importance of Protecting Groundwater

Groundwater is critical to life in the Rio Grande watershed. Colorado's San Luis Valley relies almost exclusively on groundwater for its municipal needs and about half of New Mexicans depend solely on ground water as their source of drinking water.[56] Further, "[n]early half of the total water annually withdrawn for all uses in New Mexico, including agriculture and industry, is groundwater, the only practicable source of water in many

areas of the State."[57] The proposed rule expressly excludes "groundwater, including groundwater drained through subsurface drainage systems."[58]

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ROGUE RIVER WATERSHED AND CRATER LAKE:

A Case Study of Streams, Ditches, Canals, Wetlands and a "Closed" Basin that Could Lose Protection under the Proposed WOTUS Definition

Lower Rogue River - Credit: Darren Campbell

The Rogue River lo ws 215 miles from its headwaters near Crater Lake to the Paciic Ocean near Gold Beach, Oregon. The river lo ws through a valley plateau where most of the urban development in the region is located before cutting a deep canyon through the remote Klamath-Siskiyou Mountains towards the Paciic Ocean. The Rogue is an iconic river, legendary for its whitewater, salmon and steelhead runs, and rugged wilderness. Located in southwestern Oregon, the Rogue is home to some of the most biologically diverse and undeveloped lands in the country.

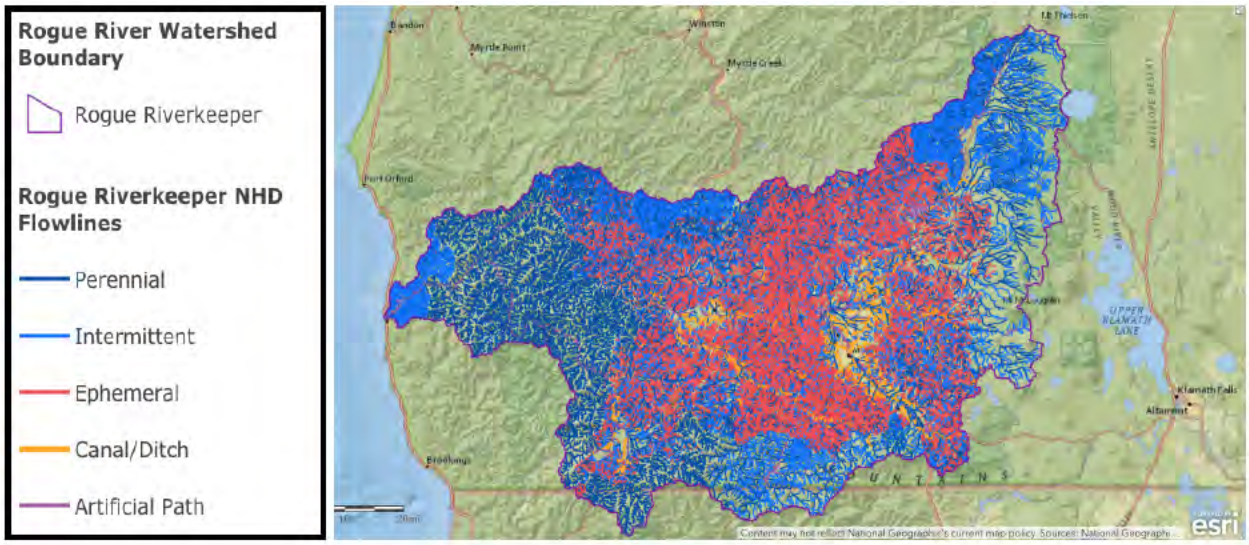
Rogue River: Importance of Protecting Intermittent and Ephemeral Streams

Ephemeral streams are a critical component of the hydrology of the Rogue watershed, as is common in many regions in the West. In fact, the EPA estimates that 59 percent of streams in the United States (excluding Alaska) are ephemeral or intermittent.[1] As stated in "The Ecological and Hydrological Significance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest" EPA report from 2008:

Ashland Creek Credit: Stacey Detwiller

> *"Ephemeral and intermittent streams are the defining characteristic of many watersheds in dry, arid and semi-arid regions, and serve a critical role in the protection and maintenance of water resources, human health, and the environment".[2] Ephemeral or intermittent streams are often headwater streams or major tributaries to perennial streams, and are important sources of water, sediment, nutrients, and organic matter for downstream systems.[3]*

In the Rogue River Basin, ephemeral streams also provide habitat for salmon and steelhead. Based on data from the U.S. Geological Survey National Hydrography Dataset (NHD"), there are more that 9,165 ephemeral stream miles in the Rogue River watershed.**



Importance of Ephemeral Streams to Salmon and Steelhead Populations

Critically, the waters of the Rogue provide habitat for Southern Oregon/Northern California Coast (SONCC) coho, listed as threatened under the Endangered Species Act. According to the 2014 Southern Oregon/Northern California Coast Coho Salmon Recovery Plan developed by NOAA Fisheries, one of the key limiting stresses for the Upper Rogue and Lower Rogue populations of SONCC is water quality.[4]

Neil Creek Photo Credit: Stacy Detwiller

The Upper Rogue population has a moderate extinction risk and key limiting threats include agricultural practices and urban/residential/industrial development.[5] The Lower Rogue population has a high extinction risk and key limiting threats include roads and urban/residential/industrial development.[6]

If ephemeral streams lose Clean Water Act protections under the proposed rule, it is likely that threatened populations of SONCC coho will be even more stressed by development that could degrade or destroy these unprotected waterways. The Oregon Conservation Strategy speciicall y notes the importance of ephemeral streams to salmon and steelhead, stating:

> Many salmon and steelhead make their homes in these rivers. Even though many streams in the Rogue sub-basin dry up naturally in summer, the streams are still used for spawning by salmon and steelhead at other times of the year.[7]

Additionally, according to the Rogue Basin Total Maximum Daily Load (TMDL):

> Many of the small streams preferred by steelhead for spawning dry up in the summer, and steelhead fry produced in these ephemeral streams migrate downstream into larger streams as lo ws decrease (Everest 1973). In addition to high water temperatures, numerous other factors limit steelhead production in the Rogue River Basin (ODFW 1992, ODFW 1994).[8]

Importance of Ephemeral and Intermittent Streams to Drinking Water

The Rogue watershed drains all of or small portions of six counties in southwestern Oregon (Jackson, Josephine, Curry, Klamath, Douglas, and Coos) as well as small areas in northwestern California (Siskiyou and Del Norte). Across these six counties, more than 289,000 people rely on intermittent, ephemeral and headwater streams as a source of their drinking water.[9]

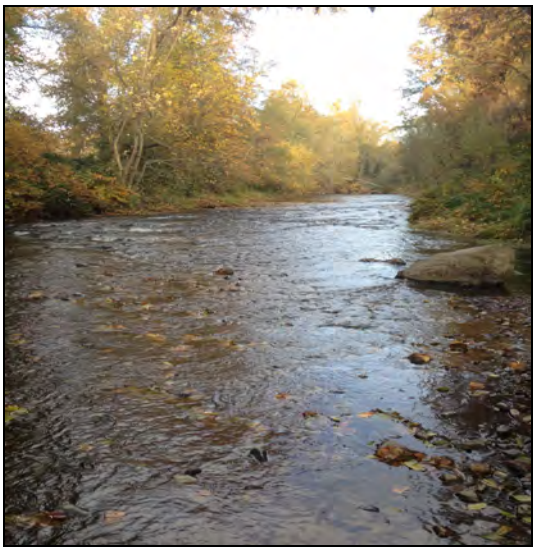
By excluding ephemeral streams entirely and narrowing protections for tributaries, the proposed rule places the drinking water supply of nearly 300,000 people in southern Oregon at risk. In a 2014 economic analysis of the Clean Water Rule, EPA noted the importance of protecting these kinds of streams "could ultimately save the costs of additional drinking water iltr ation, stream restoration, and other costs of repairing damage caused by pollution."[10] Narrowing the deinition of "waters of the United States" under the proposed rule leaves these waters at risk of pollution.

Rogue River: Importance of Protecting Ditches and Canals

The hydrology of the Rogue watershed is signiicantl y impacted by a complex network of irrigation ditches and canals. According to USGS NHD Data, there are more that 705 miles of ditches and canals in the Rogue River Basin.**

The Rogue watershed was the location of a critical case on this issue when 100,000 juvenile steelhead died in 1996 following application of an aquatic herbicide to an irrigation canal that drained into Bear Creek, a major tributary to the Rogue River. In *Headwaters, Inc. v. Talent Irrigation District*, Headwaters, Inc. iled a citizen suit against the Talent Irrigation District ("TID") alleging that TID's application of the aquatic pesticide without an NPDES permit violated the Clean Water Act. If, as is likely under the proposed rule, canals such as the one at issue in *Headwaters, Inc. v. Talent Irrigation District* are not "waters of the United

States," similar pollution could occur on an even larger scale and directly impact downstream waters, including the Rogue River itself.



Bear Creek Credit: Frances Oyung

Bear Creek, the most urbanized tributary to the Rogue River, provides a compelling example that highlights the connections between irrigation systems and the watershed. The Bear Creek watershed stretches across 395 square miles entirely within Jackson County in southwestern Oregon. Approximately 46 percent of the watershed is forested, 35 percent is zoned exclusive farm use, and 12.5 percent is zoned rural residential, commercial, industrial, or urban use.

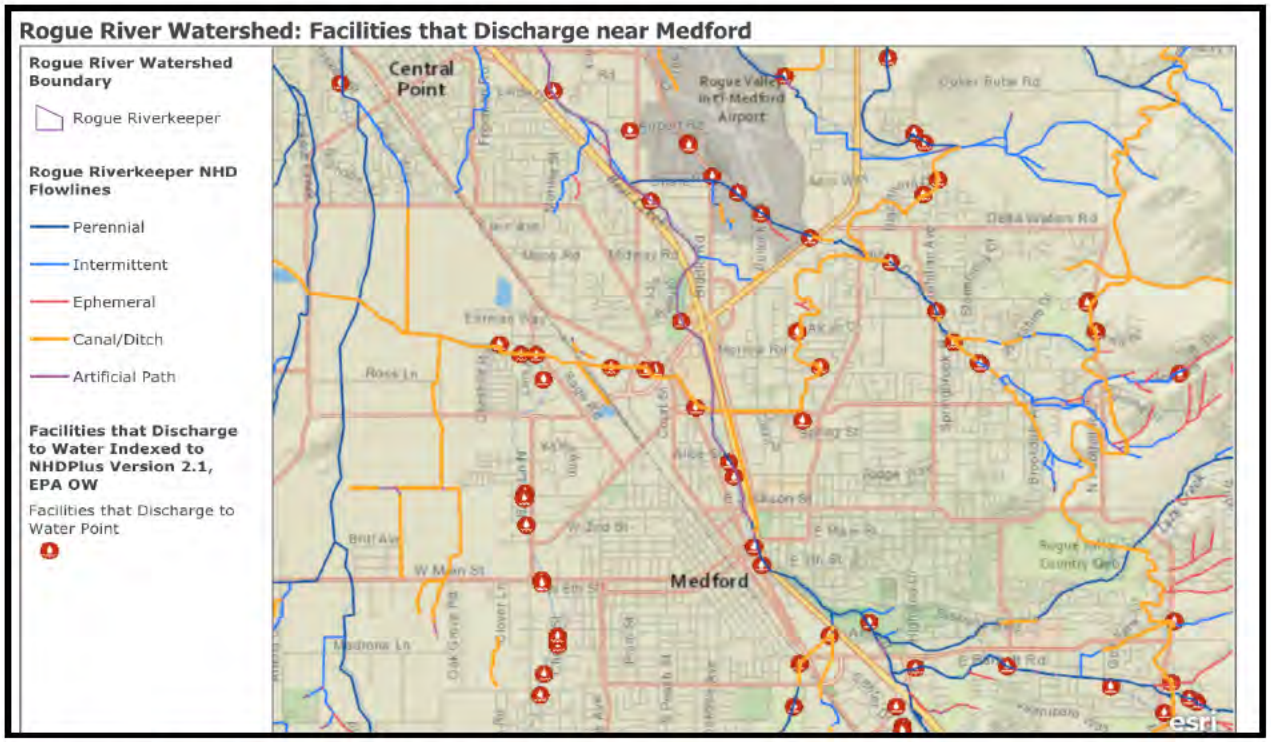
There are three large irrigation districts within the watershed, Talent Irrigation District ("TID"), Medford Irrigation District ("MID"), and Rogue River Valley Irrigation District ("RRVID") that operate more than 250 miles of irrigation canals.[11]

Source: USGS NHD - Canals in Orange.

The Oregon Department of Environmental Quality (DEQ), in the Bear Creek TMDL, explains the impact that the system of irrigation canals and ditches can have on water quality in Bear Creek, and ultimately the Rogue, stating that "the canals can play a major role in transporting bacterial contamination across the valley."[12] Further, Oregon DEQ states:

> "The flows in Bear Creek and tributaries are greatly influenced by irrigation water. The irrigation season in the Bear Creek Valley is legally defined as April 1 through October 31 (30 cfs is also allocated for frost control from February 15 through April 1). Although the irrigation districts do not have responsibility for creating bacteria they do convey it through a complex system of over 250 miles of canals. Irrigation water has the potential to pick up bacterial contamination as excess water runs over fields, animal pastures, along roadside ditches or as it detours through urban stormwater pipes and culverts before it finds its way back to a tributary or the Bear Creek mainstem. This whole process might happen several times as the water gets diverted and used again farther downstream."[13]

These canals have a significant impact on water quality in both Bear Creek and the Rogue River. The canals also receive direct pollution discharges from multiple sources.



Source: USGS NHD; EPA-OW Facilities that Discharge:
https://edg.epa.gov/metadata/catalog/search/resource/details.page?uuid=%7B091FC504-8762-8E7F-DCD7-513F648BC5B5%7D

Rogue River: Importance of Wetlands and Vernal Pools

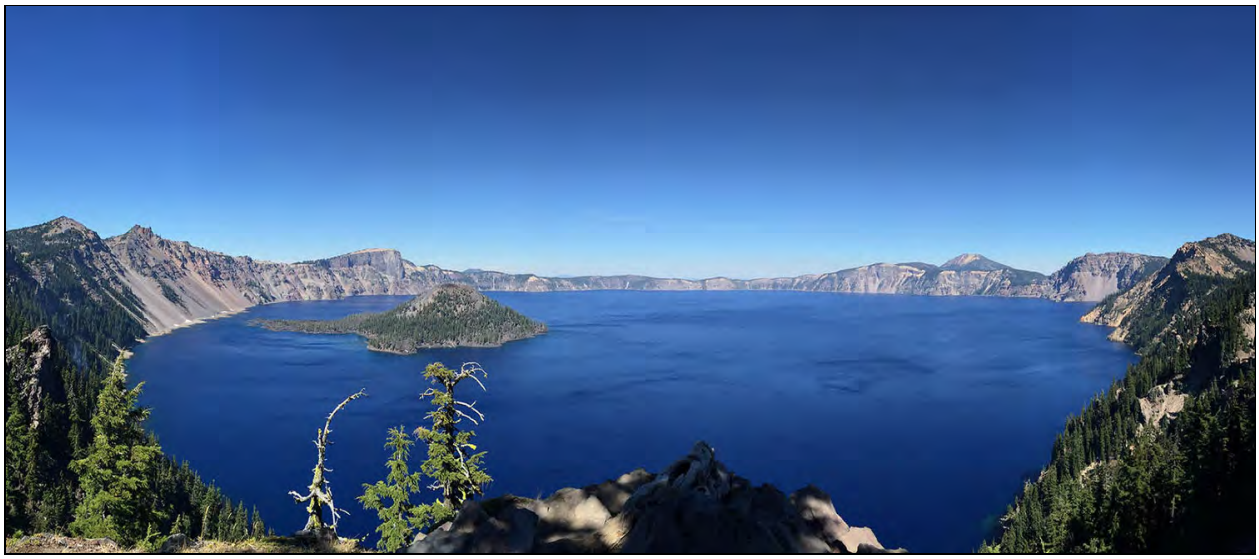
Wetlands store lood waters, ilt er out pollutants, retain sediment, capture nutrients, and provide habitat.[14] Under the proposed rule, jurisdiction over wetlands would be narrowed in multiple ways, including (1) by narrowing the classes of protected waters such that there will be fewer adjacent wetlands; (2) requiring wetlands to have a direct surface hydrologic connection with perennial or intermittent lo w, or actually abut that narrower class or waters; and (3) deining upland in a way that encompasses waters that have historically been protected "waters of the United States."

Southern Oregon is home to unique vernal pool systems that ill up with rainwater during the winter and spring, but may otherwise be dry.

Table Rock Vernal Pools Credit: Stacey Detwiler

The Agate Desert vernal pools in Jackson County are the only vernal pools in Oregon and support unique species, such as the vernal pool fairy shrimp listed as threatened under the Endangered Species Act.[15] Vernal pools help to store lood waters, ilt er out pollutants, and provide habitat for migrating birds.[16] Unfortunately, an estimated 82 percent of the Agate Desert vernal pools have been destroyed or signiicantl y degraded.[17] Development has latt ened and destroyed these wetlands and roads fragment this fragile system.[18] The proposed rule would leave the Agate Desert vernal pools unprotected and vulnerable to increased degradation.

Crater Lake: "Closed Basin" That Could Lose CWA Protections:



Crater Lake Credit: Stacey Detwiler

Under the proposed rule, so-called "closed basins" and other waters that lack connections to traditionally navigable waterways that have historically been considered "waters of the United States" could lose protections under the Clean Water Act. Outside of the Rogue watershed, but no less important, are the iconic blue waters of Crater Lake. Most of the water in Crater Lake comes directly from snow melt or rainfall and, at 1,949 feet deep, it is also the deepest lake in the United States. According to the National Park Service, scientists consider the lake the "clearest and cleanest large body of water in the world."[19]

Crater Lake National Park Source: Crater Lake Institute

According to the Crater Lake Institute, "Crater Lake is a closed-basin caldera lake set in the Cascade Mountains of south-central Oregon. The lake lies within the boundary of Crater Lake National Park and is managed by the National Park Service (NPS). Formed by the eruption of Mt. Mazama roughly 7000 years ago, this lake is the deepest in the United States (589 m) and the 7th deepest in the world . . . Most water enters the lake by direct deposition of snow and leaves by evaporation and seepage. The lake has extremely low nutrient inputs and organic production. As a consequence, it is also one of the clearest lakes in the world."[20] "The lake is surrounded by steep caldera walls and occupies about 80% of its own drainage basin."[21]

Despite its incredible value and importance to the nation, the proposed rule could remove Clean Water Act protections from "isolated" lakes like Crater Lake that don't have direct surface connections to waters that are traditionally navigable. There have been some determinations indicating Crater lake is not itself "navigable," but is still "water subject to jurisdiction of the U.S.."[22] It is essential to utilize that jurisdiction to protect the chemical, physical and biological integrity of "closed basins" like Crater Lake.

ENDNOTES:

[1] The Ecological and Hydrological Signiicance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest. U.S. Environmental Protection Agency. 2008, at p. 5, available at: https://www.epa.gov/sites/production/files/2015-03/documents/ephemeral_streams_report_inal_508-keppner.pdf.
[2] *Id*. at p. 2.
[3] *Id*. at p.. 7.
[4] National Marine Fisheries Service, Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Signiicant Unit of Coho Salmon (Oncorhynchus kisutch) (2014), available at: https://www.westcoast.isheries.noaa. gov/publications/recovery_planning/salmon_steelhead/domains/southern_oregon_northern_california/sonccinal_ch1to6_mainchapters_1_.pdf.
[5] National Marine Fisheries Service. 2014. Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Signiicant Unit of Coho Salmon (Oncorhynchus kisutch). National Marine Fisheries Service. Arcata, CA. Chapter 32. Upper Rogue Population, available at: https://www.westcoast.isheries.noaa. gov/publications/recovery_planning/salmon_steelhead/domains/southern_oregon_northern_california/SONCC%20Final%20Sept%202014/sonccinal_ch32_upperrogueriver.pdf.
[6] National Marine Fisheries Service. 2014. Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Signiicant Unit of Coho Salmon (Oncorhynchus kisutch). National Marine Fisheries Service. Arcata, CA. Chapter 10. Lower Rogue Population., available at: https://www.westcoast.isheries.noaa. gov/publications/recovery_planning/salmon_steelhead/domains/southern_oregon_northern_california/SONCC%20Final%20Sept%202014/sonccinal_ch10_lowerrogueriver.pdf >.
[7] Strategy Spotlight: Rogue River Salmon and Steelhead. Oregon Conservation Strategy, available at: http://oregonconservationstrategy.org/success-story/rogue-salmon-and-steelhead/.
[8] Rogue Basin Total Maximum Daily Load. Oregon Department of Environmental Quality. December 2008. Executive Summary, pp. 1-7, available at:
. https://www.oregon.gov/deq/FilterDocs/rogueChapter1andExecutiveSummary.pdf.
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[10] U.S. Environmental Protection Agency, Economic Analysis of Proposed Revised Deinition of Waters of the United States (2014), pp. 30-31, available at: https://www.federalregister.gov/documents/2015/06/29/2015-13435/clean-water-rule-definition-of-waters-of-the-united-states. 2014. P. 30-31.
[11] Oregon Department of Environmental Quality, Bear Creek Watershed TMDL, p. 1-9, (July 2007), available at: https://www.oregon.gov/deq/FilterDocs/rogueMRtmdlchp1sec345.pdf.
[12] *Id*. at p. 9.
[13] *Id*. at p. 12.
[14] Tiner, Ralph W., et al., U.S. Fish and Wildlife Service. Geographically Isolated Wetlands: A Preliminary Assessment of their Characteristics and Status in Selected Areas of the United States (2002).
[15] Agate Desert Vernal Pool Final Draft Functional Assessment Methodology, p. 1-9, available at: http://www.oregon.gov/dsl/WW/Documents/vernal_pool_agate_desert.pdf.
[16] *Ibid*, p. 1-7.
[17] *Ibid,* p. 1-8
[18] *Ibid*, p. 2-3
[19] National Park Service, https://www.nps.gov/crla/planyourvisit/index.htm

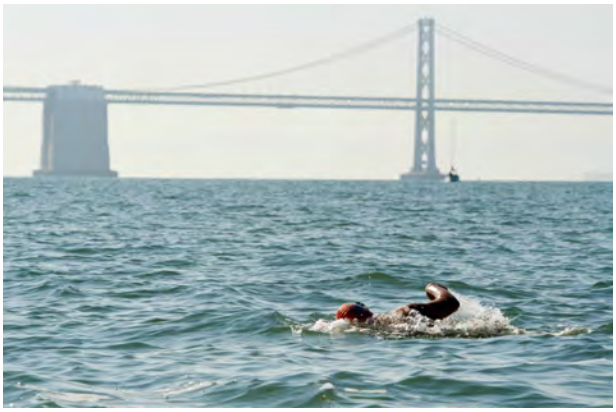
[20] http://www.craterlakeinstitute.com/online-library/mixing-dynamics/mixing-dynamics.htm
[21] *Id*.
[21] U.S. Coast Guard: NAVIGABILITY DETERMINATIONS FOR THE THIRTEENTH DISTRICT, available at: https://www.paciicar ea.uscg.mil/Portals/8/District 13/dpw/docs/Navigability Determination for the 13th Coast Guard District.pdf?ver=2017-06-20-135946-777

**USGS National Hydrography Dataset, https://viewer.nationalmap.gov/advanced-viewer/.

SAN FRANCISCO BAY:

A Case Study of Streams at Risk from Proposed Definition of WOTUS

San Francisco Bay's watershed stretches from the granite tips of the Sierra Nevada to the Golden Gate, covering almost 60,000 square miles and nearly 40 percent of California.[1] The ephemeral streams and creeks, and year-round streams and creeks, flow to rivers that merge and flow to the San Joaquin-Sacramento Delta and San Francisco Bay, which comprise the largest estuary on the Pacific Coast.[2] San Francisco Bay and the San Joaquin-Sacramento Delta comprise one of the most ecologically productive waterbodies in the world, with open water habitats, intertidal mudflats, rocky shores, salt ponds, salt and freshwater marshes, shaded stream and creek habitats, and ephemeral streams, creeks and marshes that flow with the season.



[Left] The Sausal Creek watershed begins as a series of ephemeral creeks 1,300-1,500 feet above sea level in the Oakland Hills[3] Sausal Creek is a tributary to the SF Bay Area. [Right] swimmer in the San Francisco Bay. Photo credit: San Francisco Baykeeper

The Bay Area's explosive growth, coupled with its rich biodiversity, has resulted in a high number of native species at risk. The area's nine counties are home to more than 90 animal and plant species listed as threatened or endangered under the federal Endangered Species Act, including:

- California red-legged frog,
- Alameda whipsnake,
- California tiger salamander,
- Central California Coast steelhead trout and coho salmon,
- southern green sturgeon,
- callippe silverspot butterfly,
- Bay checkerspot butterfly,
- Contra Costa goldfields,
- Suisun thistle, and
- yellow larkspur.[4]

The hundreds of native rare or endangered plants grow in the wide variety of environmental conditions unique to the San Francisco Bay-Delta estuary.[5] The Bay-Delta also hosts a diverse wildlife community of fish, seals, sea lions, and native and migrating birds.[6] San Francisco Bay is a treasure of the Bay Area, defining so much of the character and quality of life of the community.

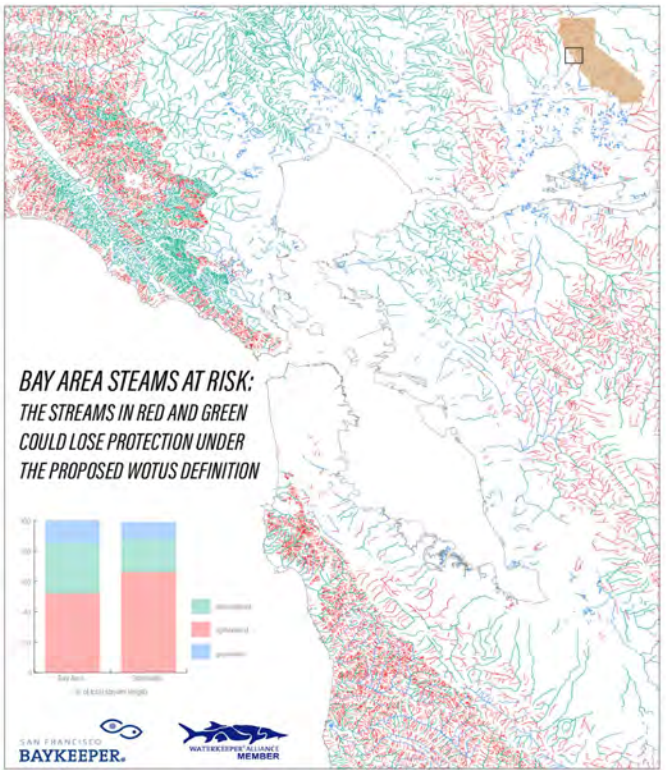
San Francisco Bay is surrounded by:

- More than 7 million people[7]
- 5 oil refineries[8] and more than 1300 other industrial facilities[9]
- More than 86 city stormwater systems[10]
- 40 sewage treatment plants[11]

Additionally, thousands of Bay Area residents surf, swim, kiteboard, boat, view wildlife, and pursue other activities on and in the water of the Bay. Thousands of residents and visitors come to the Bay's shorelines for fitness, inspiration, beauty, and renewal.

Important Ephemeral/Intermittent Waters Could Lose Protection:

In California, the vast majority of streams flow only in response to rainfall, according to U.S. Geological Survey data.[12] 66% of California's streams are ephemeral or intermittent, though this statistic does not include stream segments less than one mile in length.[13]



The proposed definition of "waters of the United States" could strip protections from the headwaters of creeks, rivers and numerous streams that feed the California Delta and San Francisco Bay. Under the proposed rule, over 40% of the Bay Area's stream miles could lose protection.

Ephemeral and intermittent streams systems comprise a large portion of southwestern watersheds, contributing to the hydrological, biogeochemical, and ecological health of a watershed. Given their importance and vast extent, it is accepted that an individual ephemeral or intermittent stream segment should not be examined in isolation.

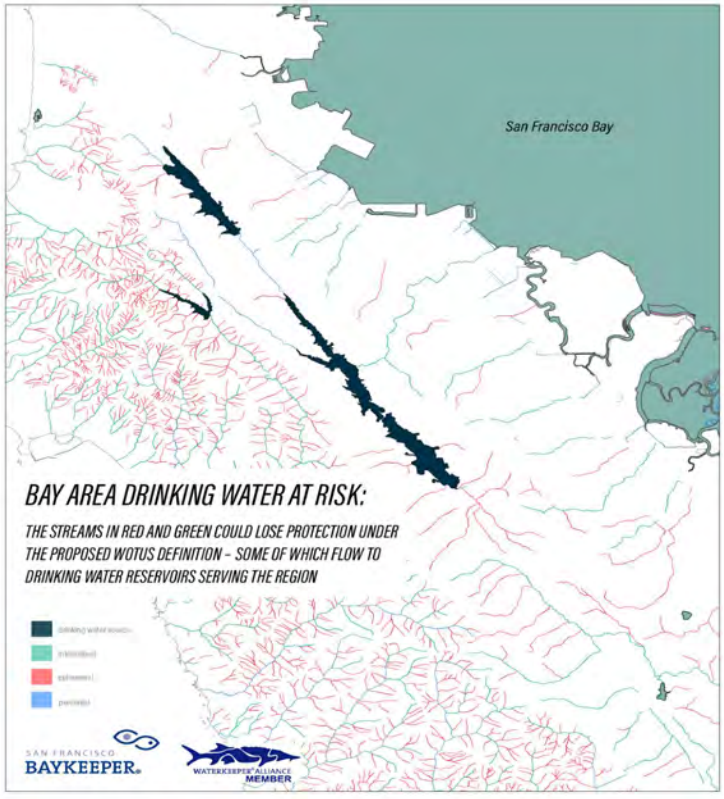
Map of Bay Area showing Endangered Ephemeral Streams. *Source: Ian Wren, San Francisco Baykeeper (2019).*[15]

Consideration of the cumulative impacts from anthropogenic uses on these streams is critical in watershed-based assessments and land management decisions to maintain overall watershed health and water quality.[14]

Some of the potentially affected creeks and streams already are threatened by pollution, development, mining, and agriculture. Eliminating environmental protections would harm these already fragile waterways, and add to the threat faced by the watershed's six endangered fish species. Endangered Chinook salmon, for example, rely on ephemeral and intermittent streams as spawning grounds. Removing protections could also lead to creek filling, accelerated erosion, and contamination threatening the survival of numerous other native species.

Ephemeral Streams and Drinking Water:

According to a 2009 EPA analysis, 58% of U.S. streams that supply public drinking water systems are intermittent or ephemeral.[16] If ephemeral waters were to lose Clean Water Act protection, it could also harm some of California's stream-fed reservoirs in the Bay Area.



The San Francisco Public Utilities Commission (SFPUC) owns 23,000 acres of watershed lands on the Peninsula adjacent to Highway 280. They house three drinking water reservoirs — San Andreas, Crystal Springs (upper and lower), and Pilarcitos — that collect Montara Mountain Watershed and San Mateo Creek runoff. The Peninsula watershed "consists of small ephemeral streams (including San Mateo Creek) that follow natural watercourses from the eastern slope of the Santa Cruz Mountains to Crystal Springs Reservoir."[17] These ephemeral streams, reservoirs and other waters have historically been protected as "waters of the United States" under the Clean Water Act.[18]

Map of Crystal Springs reservoir in the south Bay Area, which is a drinking water source for the Silicon Valley. *Source: Ian Wren, San Francisco Baykeeper (2019).*[1]

It is critical to maintain Clean Water Act jurisdiction over these waters because the water stored in the Peninsula Watershed directly serves more than one million people in northern San Mateo and San Francisco counties.[20] Upper and Lower Crystal Springs reservoirs operate as one system, and have a combined capacity of 22.5 billion gallons of water.[21] Additionally, the Peninsula Watershed lands have the greatest concentration of special status-species in the nine-county Bay Area.[22]

Endnotes:

1. San Francisco Estuary Partnership, Comprehensive Conservation And Management Plan tor the San Francisco Estuary (September 2016), available at: http://www.sfestuary.org/wp-content/uploads/2016/10/CCMPFinalOct2016.pdf, at p. 7.
2. *See Id.*
3. Alameda County Flood Control and Water Conservation District, see: https://acfloodcontrol.org/resources/explore-watersheds/sausal-creek-watershed/
4. See Center for Biological Diversity, San Francisco Bay Area and Delta Protection, available at: https://www.biologicaldiversity.org/campaigns/san_francisco_bay_area_and_delta_protection/index.html
5. San Francisco Estuary Partnership, Comprehensive Conservation And Management Plan for the San Francisco Estuary (September 2016), available at: http://www.sfestuary.org/wp-content/uploads/2016/10/CCMPFinalOct2016.pdf, at p. 7.
6. *See Id.* at pp. 7, 23, 24.
7. Metropolitan Transportation Commission-Association of Bay Area Governments, San Francisco Bay Area Census, available at: http://www.bayareacensus.ca.gov/bayarea.htm.
8. California Air Resources Board, California Refinery General Information, available at: https://www.arb.ca.gov/fuels/carefinery/carefinery.htm.
9. San Francisco Baykeeper, Bay-Safe Industry Campaign, available at: http://baykeeper.org/our-work/bay-safe-industry-campaign.
10. *See* California Regional Water Quality Control Board San Francisco Bay Region
11. San Francisco Bay Regional Water Quality Control Board, ORDER No. R2-2014-0014, Waste Discharge Requirements for Nutrients From Municipal Wastewater Discharges to San Francisco Bay, available at: https://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2014/R2-2014-0014.pdf.
12. The Ecological and Hydrological Significance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest (2018), available at: https://www.epa.gov/sites/production/files/2015-03/documents/ephemeral_streams_report_final_508-keppner.pdf at pp. 76.
13. See *Id.* at pp. 5.
14. See *Id.* at pp. iii.
15. See fn. 19, *infra*.
16. U.S. EPA, "Geographic Information Systems Analysis of the Surface Drinking Water Provided by Intermittent, Ephemeral, and Headwater Streams in the U.S." available at: https://www.epa.gov/cwa-404/geographic-information-systems-analysis-surface-drinking-water-provided-intermittent
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19. Data Source: U.S. Geological Survey, National Geospatial Program, 20190221, USGS National Hydrography Dataset (NHD) Best Resolution 20190221 for California State or Territory FileGDB 10.1 Model Version 2.2.1: U.S. Geological Survey.
20. San Francisco Public Utilities Commission - Peninsula Watershed, available at: https://sfwater.org/modules/showdocument.aspx?documentid=9615
21. *Id*.
22. PENINSULA WATERSHED MANAGEMENT PLAN -*Final Environmental Impact Report (2001)* Available at: https://www.sfwater.org/Modules/ShowDocument.aspx?documentID=4343 pp II-5.

SNAKE RIVER WATERSHED:

A Case Study of Closed Basins, Ephemeral Streams, and Ditched Streams at risk under the Proposed WOTUS Definition

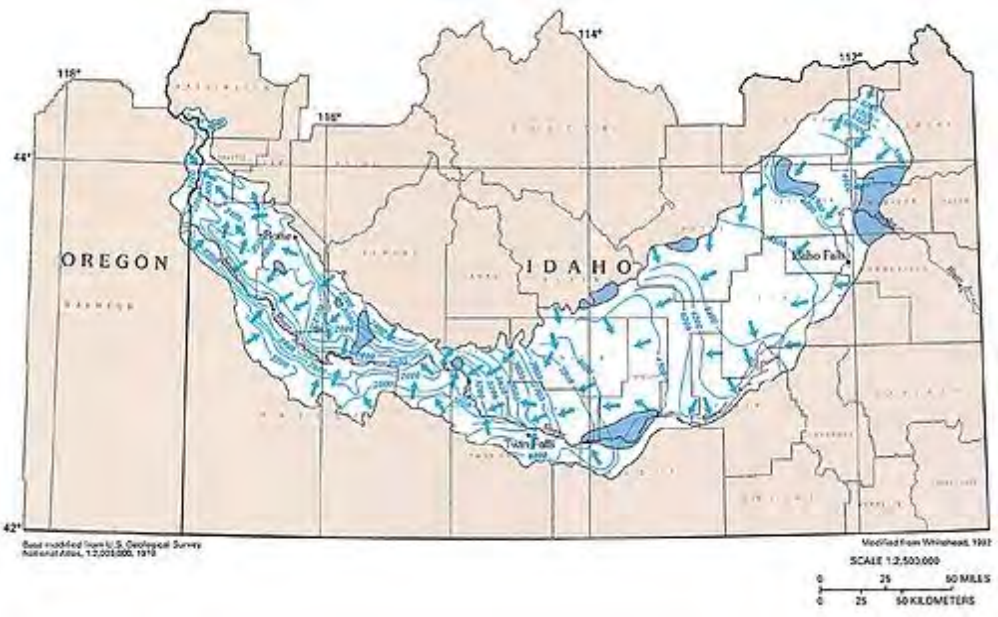
South fork Snake moonrise. Photo by Kirk Anderson

The Snake River flows from its origin headwaters in Wyoming across the full breadth of Idaho to its mouth near Washington State's Tri-cities. At 1,078 miles long, with an average discharge over 54,000 cubic feet per second, the Snake River is the largest tributary of the Columbia River and one of our nation's greatest hydrologic resources. As it passes over the Snake Plain Aquifer on its journey westward to the Columbia River, the Snake flows through pine forests, vast plains, and red rock canyons, exemplifying the region's rich diversity of landscapes. From Henry's Fork to Hells Canyon, visiting fly fishermen, rafters, kayakers, and hikers have access to incredibly diverse outdoor opportunities as the river morphs from its alpine headwater sources into freestone, whitewater, reservoir, and classic tailwater. The whole state benefits. Idaho's $3.4 billion tourism

industry employs more than 26,000 Idahoans and generates almost $500 million in local, state, and federal tax revenues, according to the U.S. Travel Association.[1]

The Snake River's water quality has been degraded by industrial and municipal pollution, toxic waste dumps, and pesticide and fertilizer runoff.[2] In 2014, the Idaho Department of Environmental Quality found that 36 percent of Idaho's assessed rivers and streams failed to meet water quality standards (while 31 percent of the rivers and streams had not yet been assessed).[3] The Snake River and its tributaries are also affected by an extensive system of dams, which prevent salmon and steelhead migration, significantly alter the river's flow, and degrade the water quality. Logging, water diversions for agriculture, and human population growth have also altered the Snake River's flow and water quality, reducing the quality of fish habitat basin-wide.

The Snake River is home extensive dairy Concentrated Animal Feeding Operations (CAFOs) that keep thousands of cows in a confinement. Nearly all of Idaho's dairy CAFOs drain to the Snake River and its aquifer; they are estimated to produce more than 12 million tons of manure each year. Inadequately regulated and poorly designed CAFOs – as well as the intensive crop production needed for animal feed – pose serious problems for human health and water quality from nitrates, ammonia, phosphate, pesticides, herbicides, antibiotics, heavy metals, pathogens like E. coli and salmonella, and other pollutants.



The Snake Plain Aquifer[4]

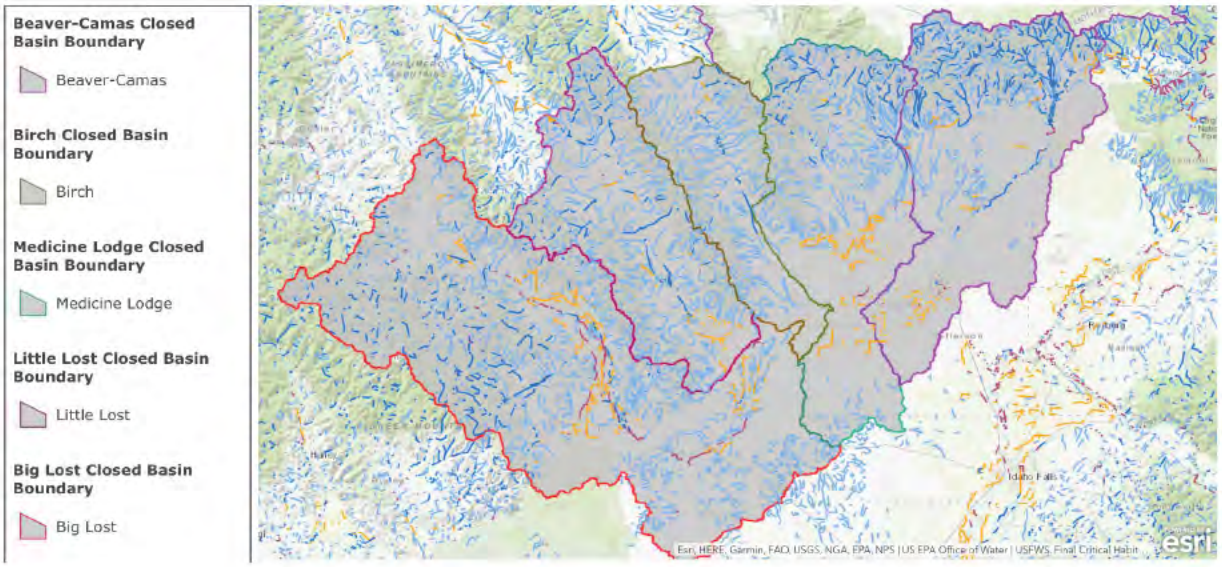
The Snake Plain Aquifer is vital to the economy of the region, especially for irrigation.[5] Additionally, more than 95 percent of Idaho's drinking water comes from groundwater.[6] Because the Snake River and the Snake River Plain Aquifer are hydrologically connected, pollution and depletion of one water resource inevitably affects the other. Major segments of the Snake River are highly polluted by bacteria and nutrients, causing excessive nuisance algae production and low dissolved oxygen levels. Nitrate pollution in the Snake River Aquifer affects most of the aquifer and is growing largely

due to fertilizer application and dairy facilities. Consumption of water polluted by nitrate is dangerous, especially for young children; studies show that within 30 years large portions of the aquifer will be undrinkable.[7]

Threats to the Closed Basins:

Within the Snake River watershed, at least five percent of the area (about 5,185 sq. miles or 3,318,400 acres) is considered a "closed basin" because the waterways are only connected to the Snake River via subsurface connections. Called the "Upper Snake Closed Basin," in east-central Idaho, it includes the drainages of five watersheds, the Big Lost, Little Lost, Birch, Medicine Lodge, and Beaver-Camas.[8]

Located within this basin is the Camas National Wildlife Refuge, established in 1937 to provide habitat for waterfowl, including migratory birds.[9] A portion of the Caribou-Targhee National Forest is also located within the basin.[10] Two of the major waterways in this basin, the Big Lost and Little Lost rivers, percolate through volcanic flows, enter the Snake River aquifer, and join the Snake River as springs.[11] The waterways found in this basin play an important economic and ecological role that is already being affected by pollution.



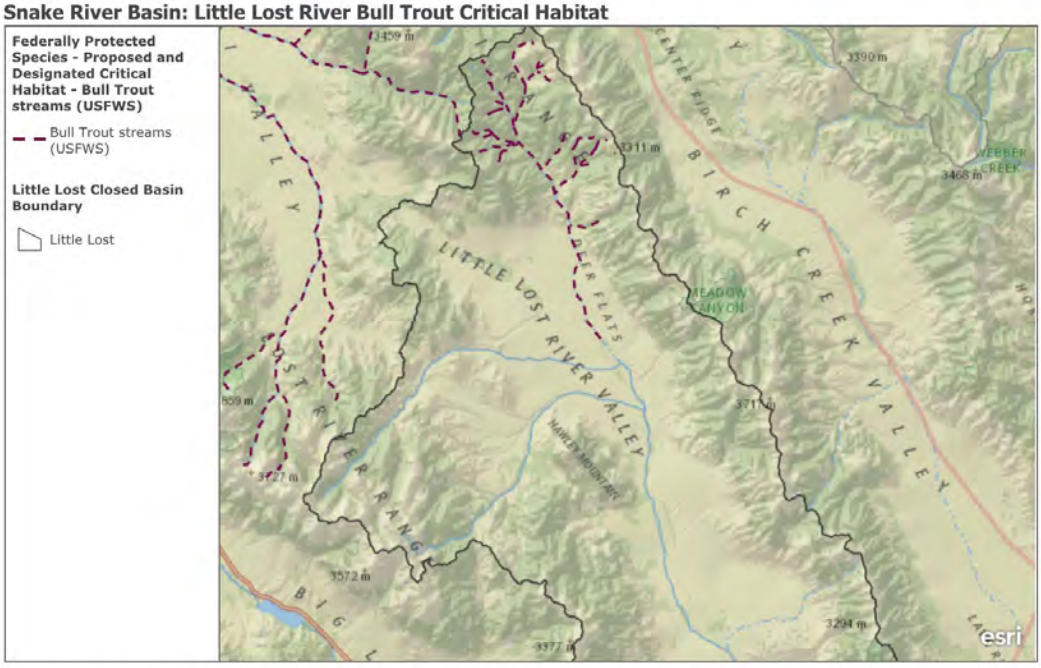
Esri, HERE, Garmin, FAO, USGS, NGA, EPA, NPS | USGS TNM – National Hydrography Dataset. Data Refreshed January 2019. | USGS TNM – National Hydrography Dataset. Data Refreshed January 2019.

- **Birch Creek Subbasin:** There is no surface water flowing on the bottom half of Birch Creek because all surface water has been diverted for a hydroelectric project and irrigation.[17]
- **Medicine Lodge Creek Subbasin:** Medicine Lodge Creek and its tributaries contain rainbow trout, brook trout, and Yellowstone cutthroat trout. Water quality is threatened by temperature alterations and the presence of *E. coli.*[18]
- **Beaver–Camas Subbasin:** This subbasin is also impaired for temperature and sediment, largely caused by grazing.[19]
- **The Big Lost River Subbasin:** The Big Lost River runs above ground for approximately 135 miles before sinking underground and feeding into the Snake River as groundwater. The river is an important resource for irrigation, as well as recreation and tourism, especially focused on trout fishing.[12] The water quality and these uses are being impacted by diversion for irrigation, alterations of vegetation and the stream bed, development, and past timber harvest and mining. This has led to the Big Lost River being listed as impaired for temperature and sediment.[13]

Redband Trout - Buck Ryan

- **Little Lost River Subbasin:** The Little Lost River runs aboveground for about 75 miles before flowing into groundwater. This subbasin includes critical habitat for bull trout, listed as threatened under the Endangered Species Act.[14] The water quality is being adversely impacted by sediment deposition and elevated stream temperatures, degrading native fish habitat.[15]

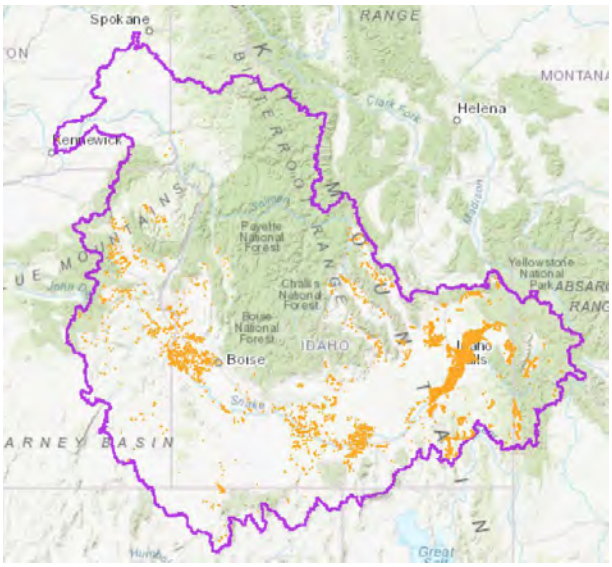
Snake River Basin: Little Lost River Bull Trout Critical Habitat



USGS TNM – National Hydrography Dataset. Data Refreshed January, 2019. | USGS TNM – National Hydrography Dataset. Data Refreshed January, 2019. [16]

All of the waterways in this closed basin are at risk of being exempted from the Clean Water Act. The underground hydrological connection between the closed basin and the Snake River is undisputed, but the Proposed Rule would likely exempt all waterways in the area from Clean Water Act protection because this connection is via groundwater rather than surface water.

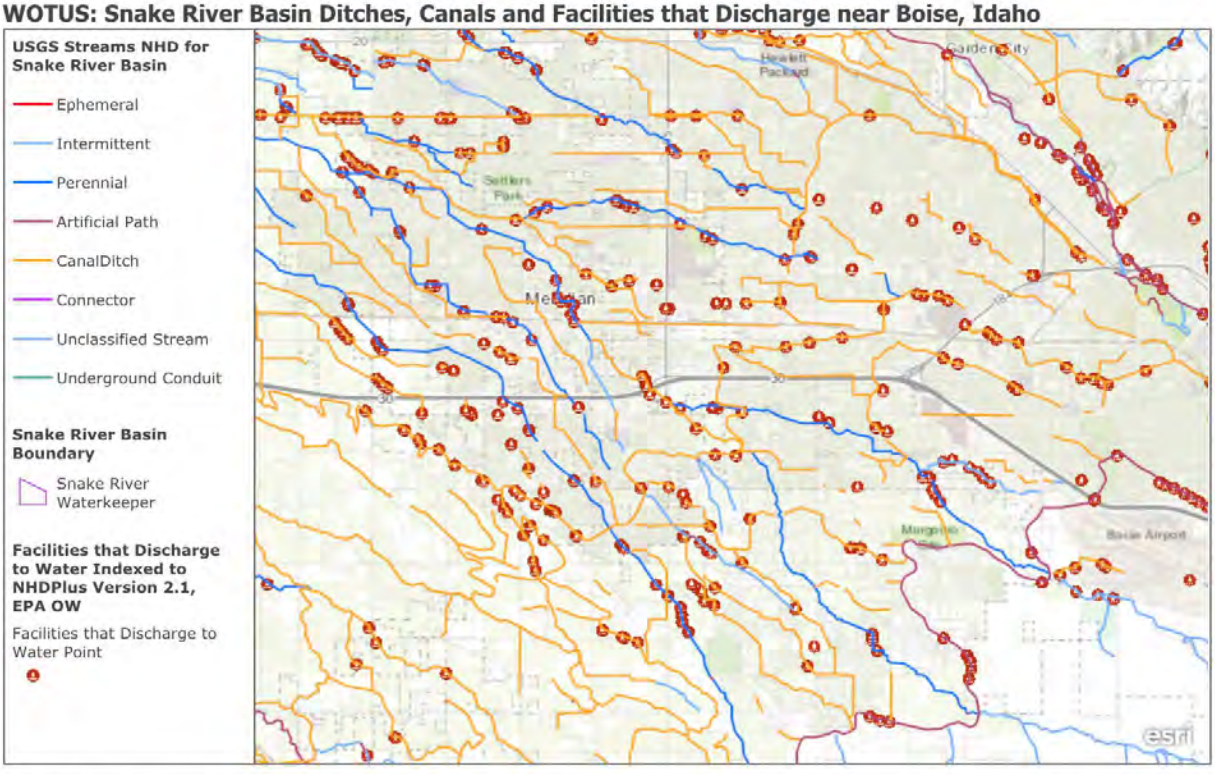
Threats to Ditched Streams:



There are over 14,866 miles of canals or ditches in the Snake River watershed. Under the Proposed Rule, most of these are at risk of losing protections. In the map to the right, all the ditched streams throughout the Snake River watershed are shown in yellow. [23]

Many of these ditches currently have dischargers releasing pollutants to the waterway. Under the proposed rule, it is possible that many of these dischargers may no longer have to comply with Clean Water Act requirements. One example of the potential scope of this problem can be seen in the map below, showing facilities that currently discharge pollutants to canals and ditches near Boise, Idaho.

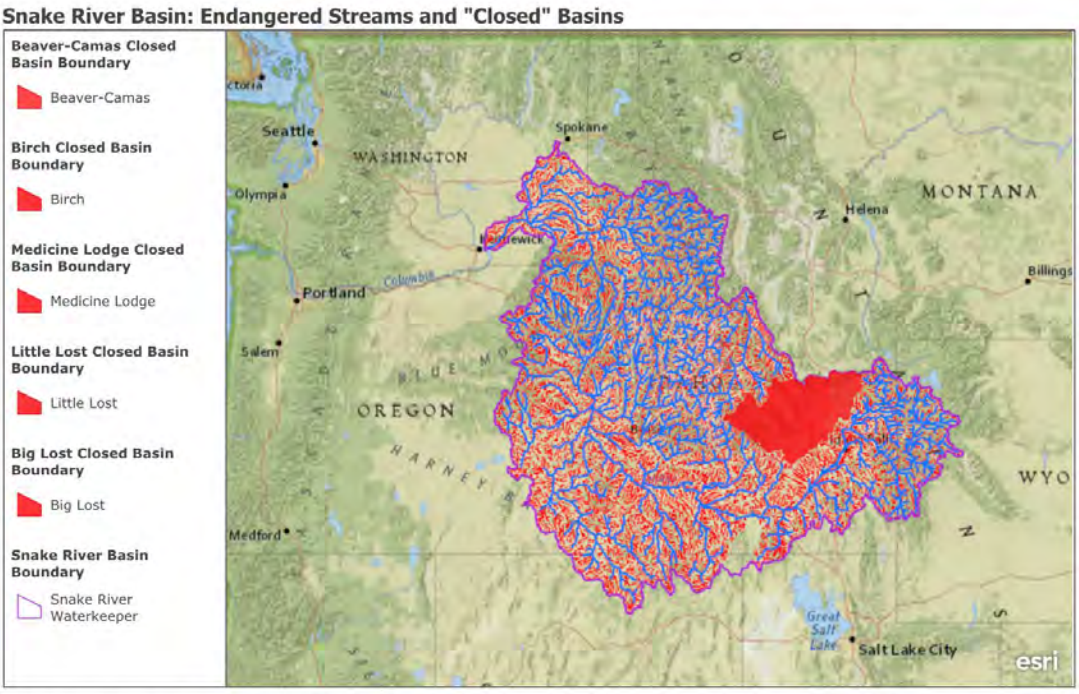
WOTUS: Snake River Basin Ditches, Canals and Facilities that Discharge near Boise, Idaho



County of Ada, Bureau of Land Management, Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS | USGS TNM – National Hydrography Dataset. Data Refreshed January, 2019. | USGS TNM – National Hydrography Dataset. Data Refreshed January, 2019. | © IDEQ-2019 | Esri | Created by Pamela Bond, IDFG, GIS Analyst. | This dataset was compiled by Chris Murphy, Idaho Department of Fish and Game, wetland ecologist, from previous spatial datasets created by Angie Schmidt, GIS analyst, Chris Murphy, and Lisa Harloe, botanist, with Idaho Department of Fish and Game. | USDA Forest Service | Data was compiled by NOAA Fisheries West Coast Region. Barb Seekins and Charleen Gavette developed the geospatial data with guidance by Dr. John Stadler, Kerry Griffin, and Eric Chavez as well as multiple NOAA Fisheries staff. | Protected Resources Division, National Marine Fisheries Service, NW Region. Critical Habitat for the Snake River Steelhead ESU. 2005. | USFWS. Final Critical Habitat for the Bull Trout (Salvelinus confluentus). 2010. | US EPA Office of Water

Threats to Ephemeral Streams:

The Snake River watershed contains many miles of streams with low levels of flow. However, the available data makes it impossible to determine which of these streams would be categorized as ephemeral. Historically, the state of Idaho has not made any distinction between intermittent and ephemeral streams.[21] As of 2009, over 250,000 people in Idaho received drinking water from public drinking water systems that rely at least in part on intermittent, ephemeral, or headwater streams.[22] These waterways also include critical habitat for endangered salmon and bull trout. All of these waterways are at risk of losing Clean Water Act protections.[20]



USGS TNM – National Hydrography Dataset. Data Refreshed January, 2019. | USGS TNM – National Hydrography Dataset. Data Refreshed January, 2019.

Barriers to State Enforcement:

Idaho was only approved by EPA to administer and enforce the Idaho Pollutant Discharge Elimination System program in 2018, with the program planned to be fully implemented by 2021.[24] The historic inaction by the state of Idaho against CAFOs and other polluters strongly suggest that the state is unlikely to step in to make up for gaps in federal protection. Furthermore, Idaho does not have standalone citizen suit provision, which means that the public would be unable to take legal action to protect waterways impacted by pollution if they are no longer protected under the Clean Water Act.

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UPPER MISSOURI WATERSHED:

A Case Study of Ephemeral and Intermittent Streams the Could Lose Protection under the Proposed WOTUS Definition

The Missouri River is "the longest river in the United States, flowing more than 2,500 miles from its source on the eastern slope of the Rockies near Three Forks, Montana, to its confluence with the Mississippi River at St. Louis, Missouri."[1]

Source: Missouri River | American Rivers."
https://www.americanrivers.org/river/missouri-river/.

From the Missouri River's utmost source - a spring in the Centennial Mountains of Montana - a tributary to the Missouri forms and begins its 298-mile journey through the mountain valleys of southwestern Montana.[2] Along the way it merges with headwater rivers: The Red Rock River, the

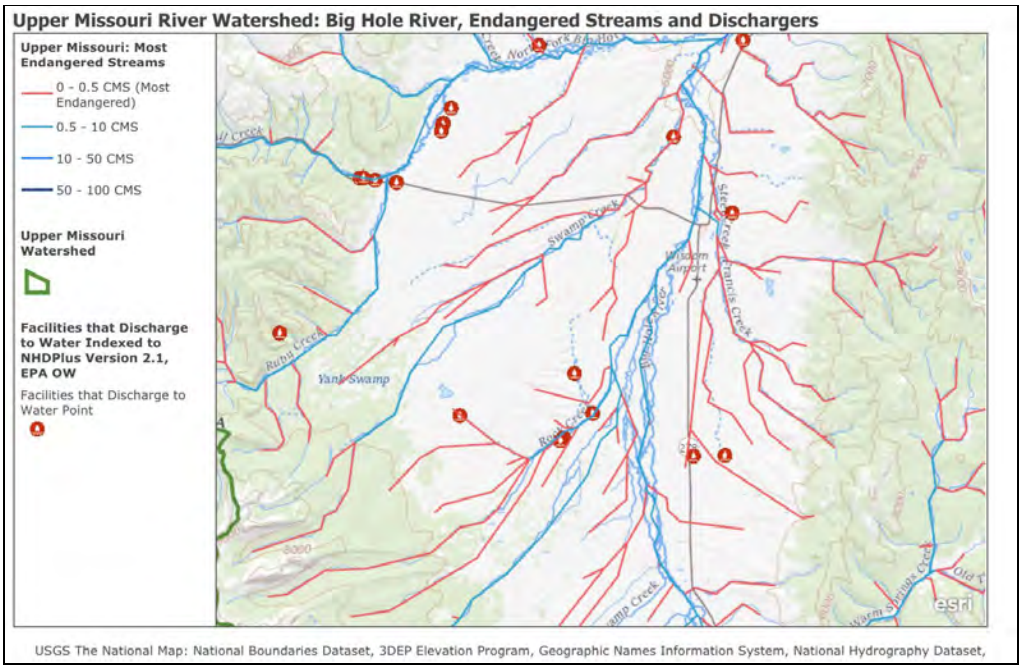
Beaverhead, the Big Hole and then the Jefferson.[3] When it arrives in Three Forks and Headwaters State Park, it merges with the Madison and the Gallatin, and the Missouri River "officially" starts.[4]

The Upper Missouri River Basin of Montana encompasses the first two subbasins of the Missouri River: the Missouri Headwaters and the Missouri-Sun-Smith subbasins. Together these subbasins drain the approximately 24,749 square miles of southwestern Montana's Northern Rocky Mountain landscapes. The Upper Missouri River Basin is distinct from other watersheds by virtue of its geography and land use traditions. Northern Rocky Mountain landscapes are made up of broad valleys with prairie habitats of grasslands, sagebrush, and wooded riparian areas rising to foothills and mountains as high as 11,500 feet in elevation. Most lowlands are privately owned, while most of the higher elevations are federally owned by the United States Forest Service or the Bureau of Land Management. Congress designated 149 miles of the Upper Missouri as a component of the National Wild and Scenic River System in 1976.[5]

Approximately forty-nine species of fish reside in the river, including goldeye, drum, sauger, walleye, northern pike, channel catfish, carp, and smallmouth buffalo.[6] The Upper Missouri River has one of the few self-sustaining populations of paddlefish, which can grow up to 150 pounds, in the United States,.[7] The pallid sturgeon, listed as federally endangered under the Endangered Species Act, and the shovelnose sturgeon, listed as federally threatened, also inhabit the river.[8] Trout fishing is a popular recreational activity on parts of the Upper Missouri.[9]

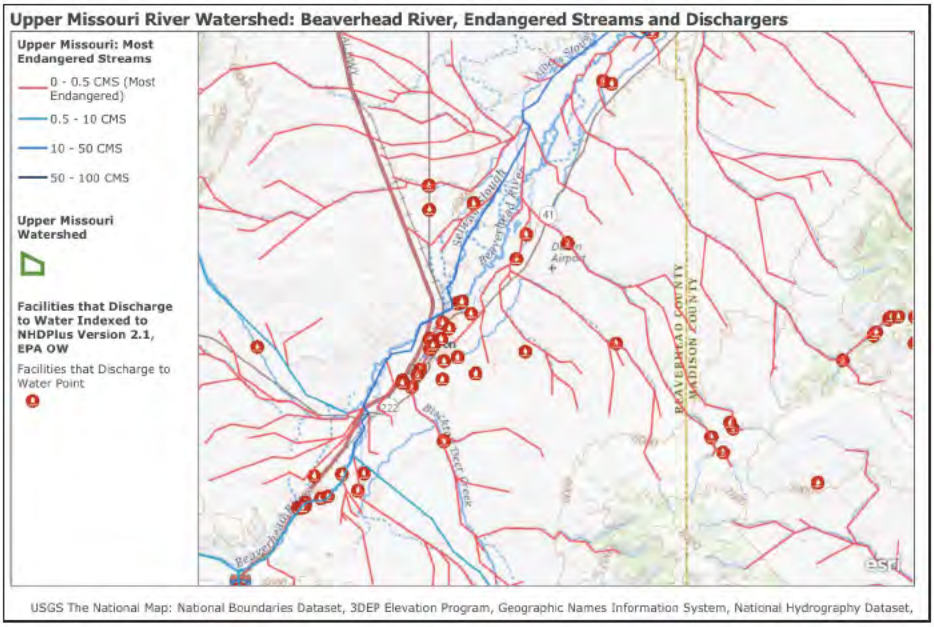
World-Renowned Trout Streams:
Wild trout fisheries are important economic drivers in Montana. The Montana Fish Wildlife and Parks estimated in 2015 that recreational angling in Montana added $907.8 million to the state's economy.[10] Four of the state's most renowned trout streams are the Big Hole, Beaverhead, Jefferson, Madison, and Gallatin Rivers.

- **Big Hole River:** The Big Hole flows for 155 miles in the southwestern corner of Montana and is a primary tributary of the Upper Missouri River. It is also well known for its world-class trout fisheries.[11] The Big Hole is fed by a multitude of smaller headwater streams.

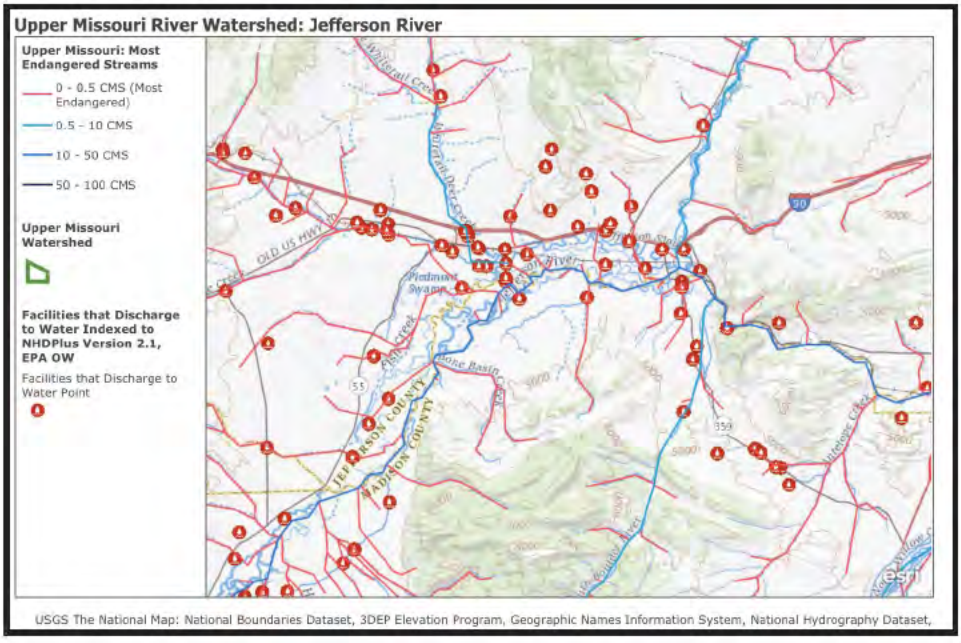


The Upper Big Hole is the last location in the lower 48 states to host a naturally producing population of native fluvial Arctic grayling in a river. Grayling historically occupied much of the Upper Missouri. However, development, dams, and mining caused the population to decline dramatically, and a drought in the 1980s caused the grayling population in Big Hole River to fall dangerously low.[12] Grayling are dependent on cold water flows and proper gravel bed habitat; their current population is largely confined to parts of the upper Big Hole River and approximately eleven tributary streams. Dewatering of the river and tributaries for irrigation and agricultural development has lead to a decline in grayling numbers.[13]

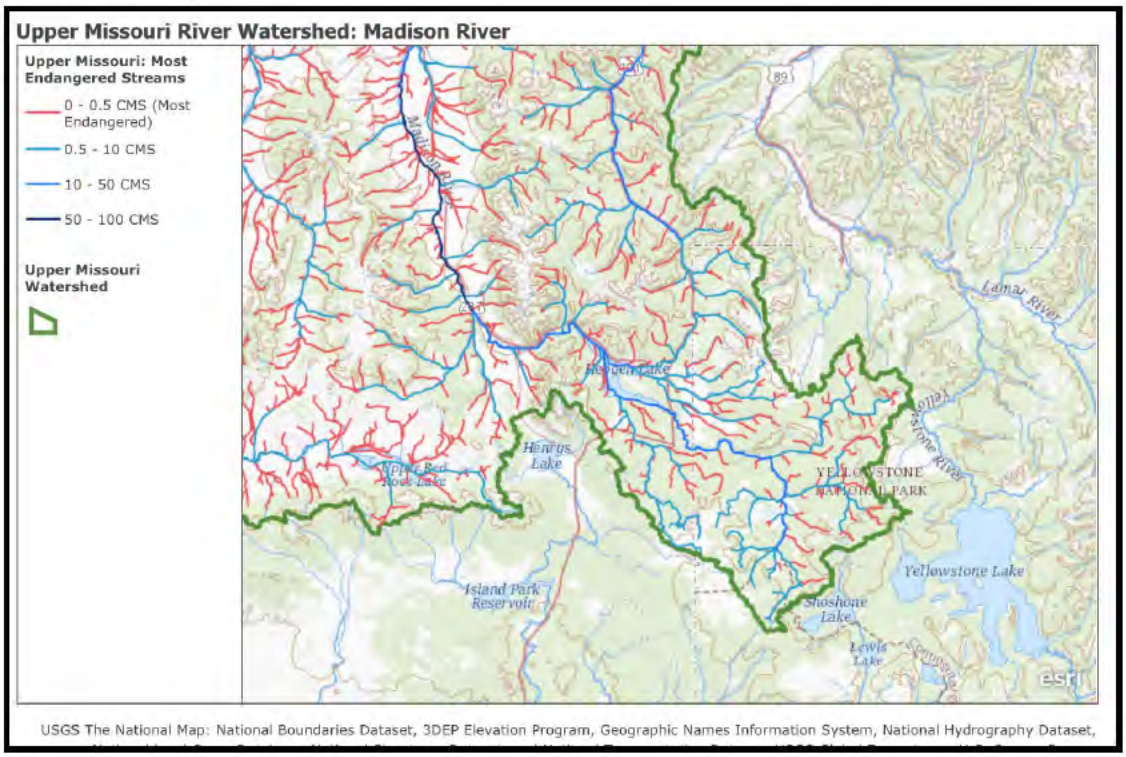
- **Beaverhead River:** The Beaverhead River begins at Clark Canyon Dam, before flowing for 80 miles to the confluence with the Jefferson River. This is one of Montana's premier brown trout fishing rivers, particularly known for producing large brown trout.[14]



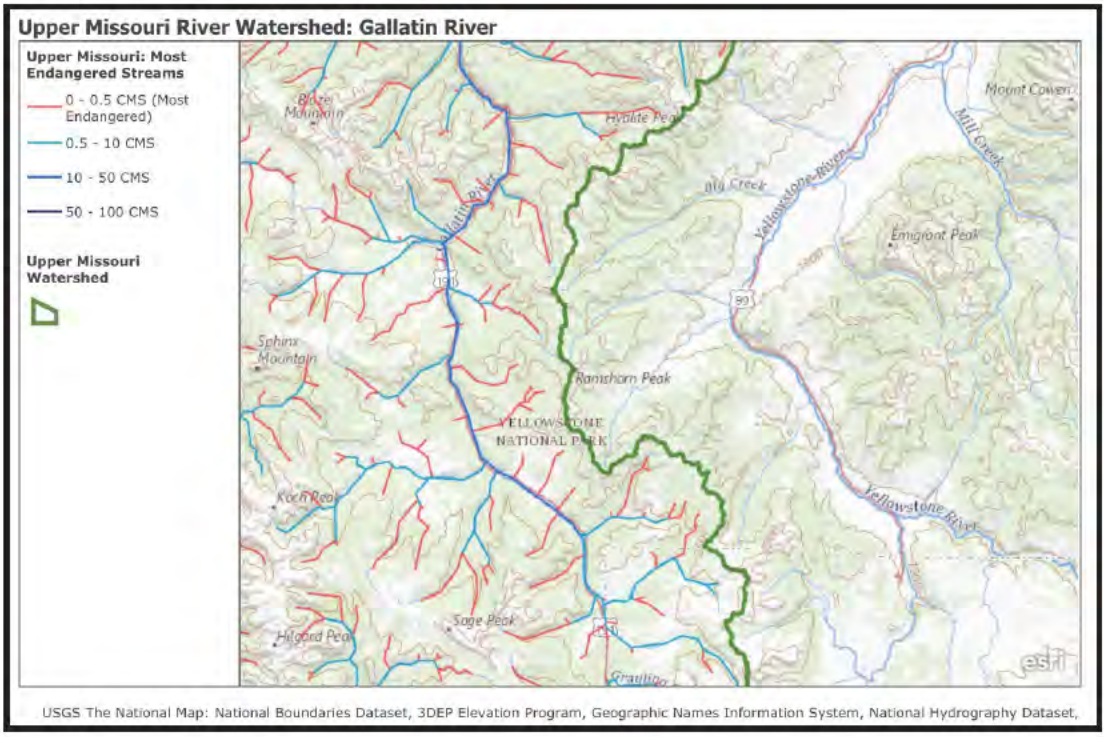
- **Jefferson River:** The Jefferson River is formed by the combination of the Beaverhead and Big Hole. The river hosts a wide variety of fish, including the Westslope cutthroat trout, a Montana Species of Concern. The Jefferson River also a source of drinking for this section of the state. This river has been classified as "chronically dewatered," leading to adverse impacts to fisheries.[15]



- **Madison River:** The Madison River begins in Yellowstone National Park at the confluence of the Firehole River and Gibbon River. Known for beautiful scenery, the river and its tributary area provide habitat for Yellowstone cutthroat trout and westslope cutthroat trout.[16] The Montana Department of Fish, Wildlife and Parks estimates the Madison River experienced over 170,000 angler days in 2017.[17] This watershed possesses broad floodplains with shallow groundwater that is highly conductive to the nearby mainstem river system, especially during winter runoff season.[18] Much of the Madison River's lowlands are privately owned and used in agriculture; intensive land use on these lands can have far-reaching impacts on hydrologically connected water due to high sub-surface connectivity.[19]



- **The Gallatin River:** The Gallatin River begins and flows for more than 25 miles in Yellowstone National Park. After it leaves the park, where floating it is prohibited, it has extensive whitewater stretches that are popular for rafting and kayaking, boosting the region's economy. In the upper reaches of the Gallatin, numerous species of trout are found.[20]

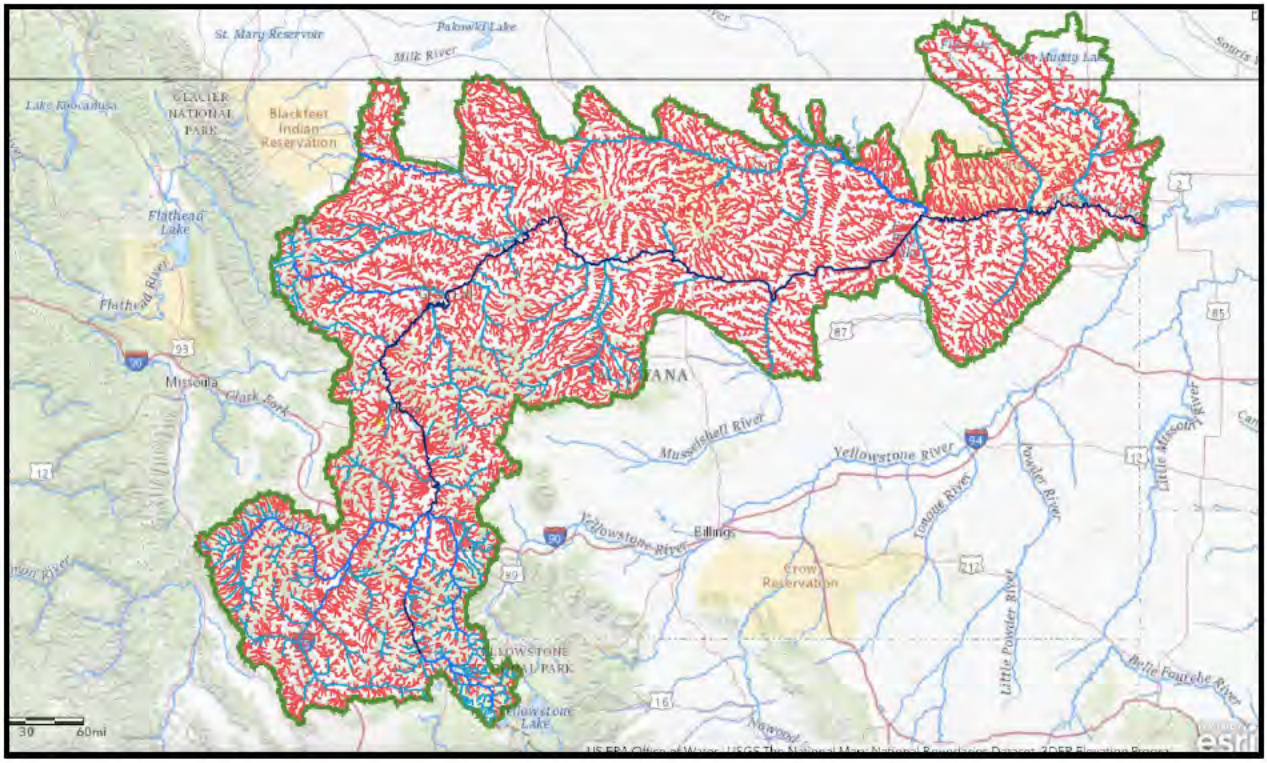


Threats to Ephemeral and Intermittent Streams:

The rivers that come together to form the Missouri River originate from the cumulative flow of hundreds of headwater streams, springs, seeps, and creeks, many of which are intermittent or ephemeral. Ephemeral and intermittent streams are abundant in the arid and semiarid landscapes of western Montana.[21] The Upper Missouri River Basin's headwaters have a high density of intermittent and ephemeral streams. The steeper slopes and ridges in these headwaters mean the main source of surface water is snowmelt, with some groundwater discharge. These streams often are small pools linked by narrow surface water channels or groundwater seepage.[22] Connectivity of ephemeral and intermittent streams to the relatively few perennial waters through snow runoff is a major driver of the hydrology of the Upper Missouri River Basin.[23]

Mountain streams of southwestern Montana in their natural state are typically cold and clear and serve as the headwaters for all major river systems in Montana.[24] High-elevation snowpack serves as a natural water storage system, and in some regions, it is the primary source of water. Western snowpacks melt slowly through spring and into early summer, releasing water gradually to the

streams and the groundwater systems they charge. Snowpack then builds back up in the late fall and winter to produce water for the subsequent year.[25]



Streams shown in red are at risk of losing protection based on some or all of the proposed definitions. [26]

Headwater streams like the ones shown on this map supply water, sediment, nutrients, and biota to downstream reaches and rivers. In addition, they provide runoff to recharge alluvial and regional groundwater aquifers that support baseflow in perennial mainstem stream reaches over extended periods when little or no precipitation occurs.[27] The type of episodic runoff common to western Montana's Upper Missouri River Basin, as well as groundwater inflow to surface water in streams, supports limited naturally occurring riparian communities including many of Montana's world-renowned wild blue-ribbon trout streams.[28]

Wild trout fisheries depend on cool, clean headwater flows, and most populations of native trout in the West have evolved around this water cycle, timing spawning or movement to rearing and foraging areas with the rise and fall of streams caused by spring melting of snowpack. Healthy snowpacks that melt gradually enable streams to maintain flows and cool temperatures well into the hot summer months, allowing coldwater fish such as trout to survive.[29] Interruptions and changes to these headwater flows hurt trout and other native fisheries in the Upper Missouri River. Similarly, the degradation or destruction of intermittent and/or ephemeral headwater streams can affect the timing and quality of those freshwater inputs, affecting river biological and chemical quality.[30]

In the Upper Missouri River watershed, the wetlands are also often temporary or seasonal, dependant on snowmelt or ephemeral or intermittent streams. However, these wetlands are critical to the health of the Upper Missouri River. Wetlands trap sediments, moderate water temperature, produce oxygen, recycle nutrients, and absorb chemicals and other pollutants. All of these functions improve and maintain water quality in nearby waterways, and the degradation of these wetlands leads to impacts to the watershed as a whole.[31]

While no available cumulative dataset definitively identifies streams as ephemeral, intermittent or perennial for the entire watershed, it is possible to identify streams that are the most in danger of losing Clean Water Act protection under the narrow proposed definition of "waters of the United States." These are the headwater streams with individually small, but cumulatively large contributions to the Upper Missouri River. Based on United States Geological Survey data that has been hydrologically conditioned for improved hydrologic flow representation, it can be estimated that nearly 85 percent of the streams, or roughly 30,297 stream miles, in the Upper Missouri watershed are in danger of losing protection based on the exclusion of "ephemeral" streams, the prohibition on protecting streams that flow only in response to precipitation and the flow requirements based on "typical years." [32]

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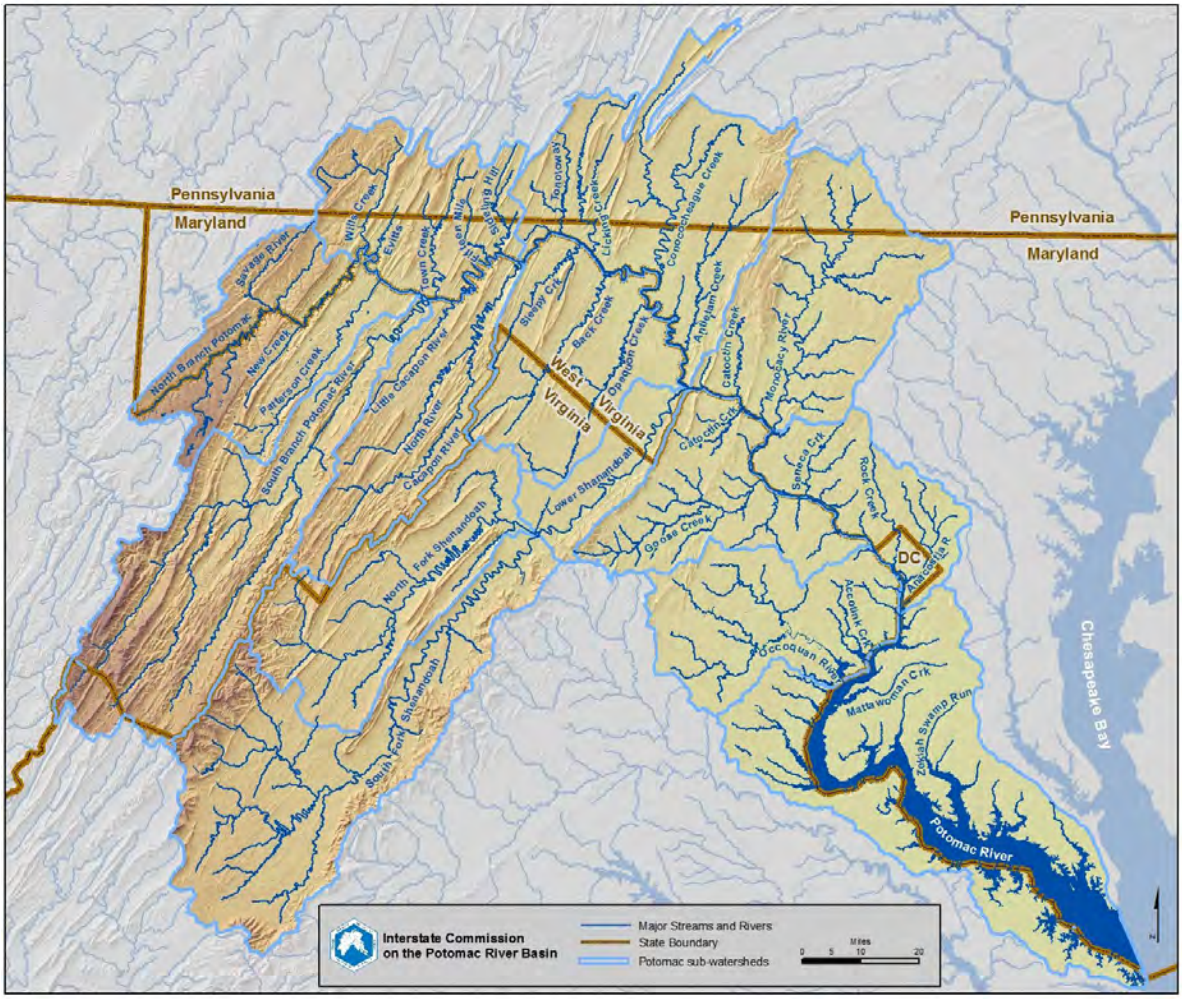
UPPER POTOMAC RIVERKEEPER®

WATERKEEPER® ALLIANCE

Upper Potomac Watershed

A Case Study of Ephemeral Streams and Interstate Waters that Could Lose Protection under the Proposed WOTUS Definition



Interstate Commission on the Potomac River Basin, Potomac River Basin Atlas - Subwatersheds - available at: http://www.potomacriver.org/Atlas-Maps/Subwatersheds/

The Potomac basin covers 14,670 square miles stretching across Maryland, Pennsylvania, Virginia, West Virginia, and the District of Columbia. The Potomac River is the second largest contributor of fresh water to the Chesapeake Bay and is a critical water supply source to communities in its watershed.

Most of the population of the basin, approximately 6 million people,[1] which includes the District of Columbia, receives its drinking water from the Potomac River. About 600 million gallons per day is used for water supply, and about 1.6 billion gallons, most of which is returned to streams, is used daily for power plant cooling and industrial use.[2] Washington, D.C., and the surrounding National Capital Region (NCR) is the largest population center along the non-tidal Potomac. The source water area for the NCR water suppliers covers 11,560 sq. mi. of the Potomac basin.[3] In this portion of the basin, there are approximately 4.5 million residents or about three-quarters of the basin's population. According to the U.S. Census Bureau, the total population of the basin is 6.2 million[4] and continues to grow steadily. By 2030, the population of the entire Chesapeake Bay watershed is expected to increase by 13 percent with much of the growth anticipated in the NCR [5].

Approximately three-quarters of the water for the NCR comes from the Potomac River. The river provides approximately 520 million gallons of water a day.[6] The costs associated with treating drinking water increase as the supply is degraded. Currently, the operating expenses are nearly half a billion dollars,[7] and a feasibility study predicts increased costs due to emerging pollutants.[8]

From the headwaters of the Upper Potomac down to the tidal Potomac River and Estuary, the waters of the Potomac sustain a wide variety aquatic life. This includes the Eastern Hellbender, an aquatic salamander that is listed as endangered in the state of Maryland,[9] a species of concern in Virginia, and Federal Species of Concern.[10] The Eastern Hellbender is particularly sensitive to degraded water quality and therefore seen as a reliable indicator of environmental health.[11] Further downstream, more than 100 species of fish live and/or spawn in the tidal Potomac River and Estuary.[12] This includes the American Shad, which was once one most abundant and economically important fish in the East Coast before being nearly wiped out by pollution and overfishing. Thanks

to restoration programs and improvements in water quality, the American Shad population is rebounding.[13]

In the states the Upper Potomac runs through, water-based recreation plays an important role in the economies. For roughly every six boats registered in Maryland, the state adds more than one full-time job; each boat contributes on average about $9,230 a year in economic activity.[14] Similarly, in 2018, the Pennsylvania Fish and Boat Commission sold 765,983 fishing licenses and 555,199 fishing permits;[15] recreational fishing generates an estimated annual economic benefit of $46.1 billion.[16] Roughly eight million wildlife watchers spent $636 million, $960 million, and $1.4 billion in Maryland, Virginia, and Pennsylvania, respectively, on trip-related expenses and equipment in 2006.[17]

A 2001 study compared the 1996 water quality of the Chesapeake Bay with what it would have been without the Clean Water Act found the benefits of water-quality improvements to annual recreational boating, fishing, and swimming ranged from $357.9 million to $1.8 billion.[18] The tributaries and the mainstream of the Potomac provide a wealth of recreational opportunities from fishing to boating, including three large outfitters in the Harpers Ferry area that place thousands of people on the Potomac River every year. Sport fishing for smallmouth bass dominates the fishing industry in the Upper Potomac, providing an estimated $23 million to the region's economy.[19]

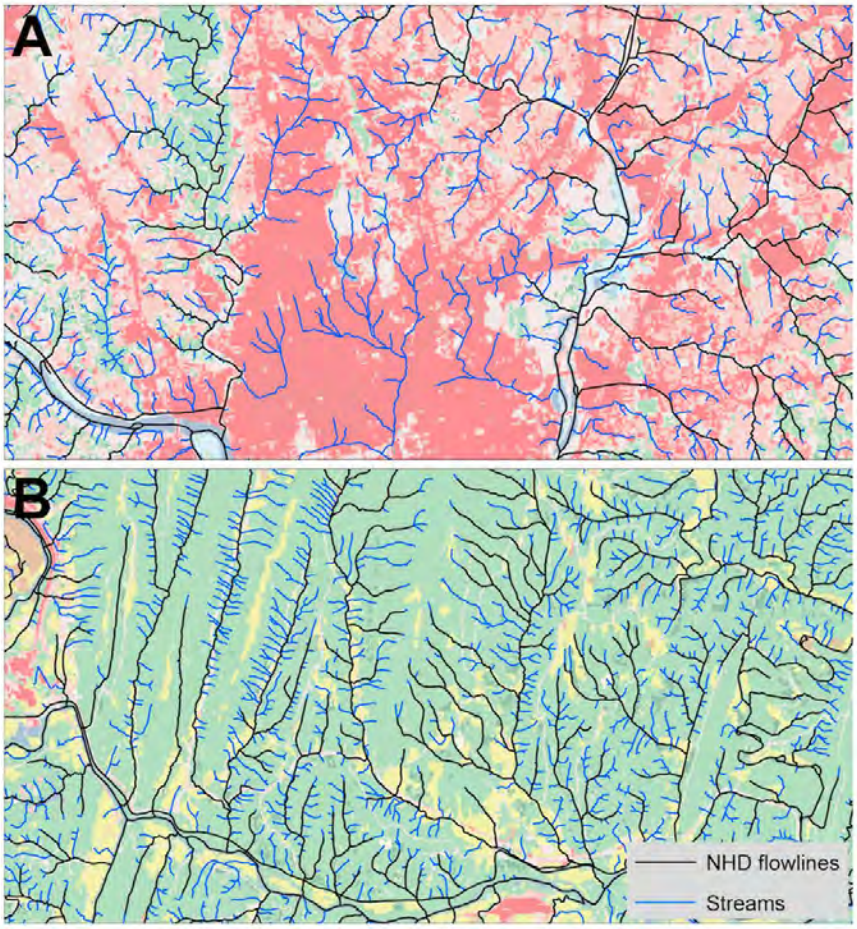
South Branch Potomac Trough - Upper Potomac Riverkeeper

The many uses of the watershed are being affected by development and pollution. In the Upper Potomac River watershed, sources of pollution include industry, agriculture, mining, and failing infrastructure.[20] The North Branch Potomac is also impacted by acid mine drainage seeps from historic mining practices. The Upper Potomac and its tributaries are impaired for pollutants including chloride, bacteria, phosphorus, and sediment.[21]

Threats to Ephemeral streams:

A recent study of nearly 60,000 square kilometers, including the Potomac River watershed and five smaller watersheds in Maryland, found that the National Hydrography Dataset (NHD) underestimates stream density by up to 250 percent.[22] This is because any headwater stream reaches are not included in hydrographical maps such as the NHD. The streams are often excluded from mapping because they either were buried during development or because they are overlooked

for being smaller than the minimum mapping size. Despite being unidentified in mapping data, these streams are an important part of the watershed and impact downstream waterways. Failure to identify and protect these streams leads to downstream water degradation, aquatic habitat fragmentation, and increased water contamination.[23]



[24]

These figures from the study show an example of the streams currently excluded from mapping (blue), as compared to the currently mapped streams (black).

This data gap makes it difficult to study and prevent the impacts of development and other forms of degradation on streams and the watershed as a whole. It also makes it impossible to understand the impacts of the proposed rule's exemption of ephemeral streams on the Upper Potomac Watershed. Without data on these smaller headwater streams, it is impossible to assess the number of potentially impacted streams, let alone assess which of the streams might qualify as ephemeral under the unclear terms of the Proposed Rule. However, it is clear that impacts to the aforementioned drinking water and recreation benefits of the region would be increased with a loss of protection of ephemeral streams in the watershed, even if the full extent of the impacts are not known at this point.

Threats to Interstate Waters:

The Upper Potomac watershed covers four states: West Virginia, Virginia, Maryland, and Pennsylvania. These varying jurisdictions and standards lead to unique challenges in protecting water quality throughout the watershed. In recognition of this, Congress authorized the Interstate Commission on the Potomac River Basin to facilitate cooperation between the states and their agencies.[25] Similarly, efforts to protect the Chesapeake Bay required extensive cooperation and negotiation between states to create region-wide pollutant-loading standards.[26]

The Proposed Rule's exemption of ephemeral streams from protections and exclusion of "interstate waters" as a basis for jurisdiction threatens to further complicate matters. Strong federal protections for waters that cross state lines are essential to preventing unequal protections throughout the watershed, with widespread consequences. The proposed rule threatens to bring chaos to the delicate balance of protections in the watershed.

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