Rough Waters Ahead

The Impact of the Trump Administration's EPA Budget Cuts on Puget Sound

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Summer 2017

Acknowledgments

Environment Washington Research & Policy Center thanks Dennis McLerran of the Puget Sound Partnership, Mindy Roberts of the Washington Environmental Council, and Chris Wilke of the Puget Soundkeeper for their review of drafts of this document, as well as their insights and suggestions. Thanks also to Tony Dutzik and Alana Miller of Frontier Group for editorial support.

Environment Washington Research & Policy Center thanks the William Penn Foundation for its grant to Environment America Research & Policy Center making this report possible. The authors bear responsibility for any factual errors. The recommendations are those of Environment Washington Research & Policy Center. The views expressed in this report are those of the authors and do not necessarily reflect the views of our funders or those who provided review.

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Layout: To The Point Publications, tothepointpublications.com

Cover photo: Fishing from kayaks at Solo Point near Joint Base Lewis-McChord, U.S. Air Force photo/ Senior Airman Jacob Jimenez

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Executive Summary

Clean water in Puget Sound is critical to the health and welfare of our families, our communities, and wildlife. Approximately 4.4 million people live in the Puget Sound watershed, and millions more come each year to fish, boat and enjoy its water and wildlife.[1]

Puget Sound's beauty hides some of the challenges it faces. Salmon and other wildlife populations struggle, past industrial pollution in some areas has made fish unsafe to eat, and untreated sewage pollutes shellfish beds. But with the dedicated work of local, state and federal governments – along with residents – the long process of restoring Puget Sound to health is underway.

The U.S. Environmental Protection Agency (EPA) has been essential to those efforts – supporting and working with state and local efforts to keep pollution out of our waterways, hold polluters accountable, restore degraded waterways to health, and study and monitor Puget Sound to ensure its future health and safety.

That progress is now in jeopardy. The Trump administration has proposed deep and devastating cuts to the EPA's budget. Even if the president's proposed cuts are scaled back by Congress, they would still have profound negative impacts on the agency's ability to deter pollution from industrial facilities, agriculture, sewage treatment plants, runoff and other sources, while undercutting efforts to restore iconic waterbodies such as Puget Sound.

America can't go back to the bad old days. We need a strong EPA with sufficient resources to support local cleanup efforts and partner with the state and local communities to protect Puget Sound.

Puget Sound is being protected with funding and effort from the EPA. The EPA has worked to:

- **Keep pollution out of our waterways:** Stormwater runoff – which carries oil, pesticides, fertilizer, pet wastes and other pollutants into waterways – is the most common pathway for toxic chemicals to enter Puget Sound.[2] Military training, chemical storage and other activities at Joint Base Lewis-McChord all pollute runoff from the facility. The EPA, which has sole authority over federal facilities in Washington, **established an innovative stormwater discharge permit in 2013 for Joint Base Lewis-McChord to limit its runoff pollution**.[3] Continued funding for the EPA is essential for it to fulfill grant promises to tribal and local efforts to address stormwater pollution across Puget Sound.[4]
- **Hold polluters accountable:** Shellfish harvested from water polluted with fecal bacteria like *E. coli* or Salmonella can make people sick.[5] Dairy farms are one source of the fecal bacteria pollution that threatens public health. In 2015, **the EPA took action against the R. Bajema Farm, a dairy in Lynden, for discharging water loaded with manure** into a tributary of Puget Sound near shellfish beds. The farm had to pay a fine and correct

the problem that allowed the pollution. The EPA continues to support the work of the Department of Ecology to monitor and address fecal bacteria pollution, such as from municipal sewer systems.

- **Restore waterways to health:** Marshland in the Skokomish River estuary, at the southern end of Hood Canal, once provided habitat for salmon and shellfish, and helped control flooding of nearby tribal lands. Construction of dikes, culverts and tide gates to create farmland destroyed more than half of the estuary's fertile marshes.[6] **The EPA contributed $85,000 to the final phase of restoration efforts, led by the Skokomish Tribe and Mason County, to remove tide gates, replace culverts, and open hundreds of acres of habitat to fish.**[7] In the 10 years since work began, the Skokomish Estuary has nearly been restored to its historic size, shellfish beds have been restored, the size of juvenile salmon has increased, eelgrass beds that provide habitat have doubled, and flooding has decreased.[8] EPA funding is critical for leveraging state and local funds for other restoration projects across Puget Sound.

- **Conduct research and educate the public:** The population of endangered orcas residing in Puget Sound and the Salish Sea has dropped to fewer than 80 whales, down from approximately 100 in the late 1990s.[9] One cause of the orcas' decline is contamination of Puget Sound with persistent organic pollutants such as toxic flame retardants, PCBs, lubricants, plasticizers and the banned insecticide DDT. The **EPA has funded research by the University of Washington's Center for Conservation Biology to better understand how these types of pollutants affect orcas and salmon, the orcas' main food source**. Continued research funding is needed for greater knowledge to develop strategies to restore the orca population to health.

Table ES-1. How Clean Water in Puget Sound Depends on the EPA

Puget Sound Is Cleaner Because the EPA:	The EPA Continues to Protect Clean Water by:
Limited stormwater runoff from Joint Base Lewis-McChord	Overseeing state permit programs
Fined R. Bajema Farm for manure pollution from dairy cows polluting shellfish beds in Whatcom County	Working with the Department of Ecology to oversee municipal utility upgrades to limit raw sewage releases and runoff
Directed Lockheed Martin to clean up pollution from a closed shipyard in Elliott Bay	Overseeing cleanup at 51 Superfund sites in Washington
Helped fund restoration of salmon and shellfish habitat in the Skokomish River estuary	Supporting restoration work on the Puget Sound Action Agenda, a list of high-priority restoration projects
Funded removal of culvert that blocked passage of spawning salmon in Chico Creek in Kitsap County	Funding culvert removal and replacement projects to restore salmon habitat
Funded research identifying stormwater as cause of coho salmon deaths and demonstrating benefits of filtering stormwater through soil	Supporting research into stormwater filtration methods
Supports research into impacts of persistent pollutants on endangered orcas in Puget Sound	Supporting research into new threats to water quality and aquatic wildlife

The Trump administration's proposed cuts to the EPA budget put these and other critical functions in danger – threatening the future health of Puget Sound.

- Water-related programs run directly by the EPA would be slashed by 34 percent, hobbling the EPA's ability to prevent runoff pollution, monitor water quality, establish pollution limits, protect watersheds and wetlands, and pursue polluters.
- In addition, EPA grants to state and local governments for clean water would be slashed by 23 percent – making it more difficult for state agencies to do their jobs and delaying important locally led cleanup efforts.[10] For example, the proposed budget would end grants to state governments and tribal agencies to address pollution from stormwater runoff, farms and other dispersed sources.[11]
- Research and development funding would be cut by 47 percent, limiting the EPA's ability to help scientists, citizens and local communities understand the ever-changing threats facing their waterways.[12] For instance, the Safe and Sustainable Water Resources research program would be cut by more than a third.
- EPA grants to state, tribal and local governments would also be slashed – making it more difficult for those agencies to do their jobs and delaying important locally led cleanup efforts.
- Funding for the Puget Sound Partnership, supported through the National Estuary Program, would be eliminated.[13] Because every $1 of funding through the National Estuary Program leverages, on average, $18 in additional funds from local and state sources, zeroing out this federal funding could have far-reaching effects.[14]
- Funding for EPA's Superfund cleanup program would be reduced by 30 percent, slowing progress on existing cleanup sites and preventing new cleanups from being added.[15]
- Overall, the EPA budget would be reduced by 31 percent.[16]

The job of cleaning up and protecting Puget Sound is not done. Continuing pollution from urban runoff, sewer systems and industrial facilities – along with the emergence of new pollution threats from new classes of industrial and household chemicals – calls for continued vigilance and action. Only a well-funded EPA can continue the region's legacy of progress in cleaning up Puget Sound and ensure that it is healthy and safe for us and future generations to enjoy.

Table ES-2. Estimated EPA Grant Funding Losses to Washington if the Trump Administration's Proposed Budget Is Enacted (table shows selected programs)[17]

Program (most recent year of funding for which data are available)	Funding in most recent year	Estimated lost funding due to proposed Trump admin. cuts
Water Pollution Control Grants (FY16)	$5,631,000	$1,689,300
Nonpoint Pollution Control Grants (FY15)	$5,970,458	$5,970,458
Drinking Water Protection and Enforcement Grants (FY17)	$2,731,000	$819,300
TOTAL	**$14,332,458**	**$8,479,058**

Note: Estimates are calculated assuming EPA budget cuts affect all states by the same percentage. Reductions are based on grants from most recent fiscal year.

Puget Sound Is Unique and Worth Protecting

Puget Sound is one of the largest and most productive estuaries in the United States.[18] The Sound lies within the state of Washington and the Canadian province of British Columbia, and is home to 19 U.S. tribes and many Canadian First Nations. Around 4.4 million people live in the Puget Sound watershed, and millions more come each year to fish, boat and enjoy its water and wildlife.[19]

The Sound offers diverse fish and shellfish resources, including salmon, rockfish, geoducks and abalone. Historically, shellfish aquaculture in Puget Sound has been capable of producing more than 11 million pounds of clams, geoducks, oysters, mussels and scallops in a single year.[20]

Figure 1. Puget Sound Watershed Boundary

Photo: EPA

Sailing in Bellingham Bay in northern Puget Sound with Mount Baker in the background.

Puget Sound is the home of iconic species, including salmon and orcas, that draw more than two million people a year to observe and photograph wildlife.[21]

Puget Sound is an important resource for people, but human activity – including industrial pollution, stormwater runoff and habitat destruction – has inflicted tremendous damage on the Sound.

Industrial activity has contaminated the water of Puget Sound since the early 20th century, leaving the region dotted with Superfund sites. Shellfish

Photo: WA DNR

Harvesting oysters.

growers first sounded the alarm over contamination from pulp mills in the 1920s. Pollution from shipbuilding, manufacturing and other industrial activities meant that by the 1970s shellfish were unsafe to eat, tumors were found in bottomfish, and whales were dying.[22] Scientists have detected over 40 dangerous chemicals at concentrations that are higher than is safe for people and marine life. These contaminants include dioxins, arsenic and industrial byproducts like polychlorinated biphenyls (PCBs), and are often concentrated near active and inactive major shipyards.[23]

Land use change in Puget Sound has also polluted the water and harmed fish. Urbanization and forest removal have increased the flow of stormwater runoff into the Sound. Each year, rainfall carries thousands of tons of toxic chemicals from urban development, roads, industrial and commercial areas, rural lands with homes and farms, and animal feeding operations into the Sound.[24] These chemicals include petroleum products, fertilizers and heavy metals. Once they get into the water, they may be consumed by and accumulate in wildlife, rendering fish unsafe for human consumption, and inhibiting the growth, reproduction, and health of aquatic creatures.[25]

Photo: Robert Lawton, CC BY-SA 2.5, https://commons.wikimedia.org/w/index.php?curid=1243835

Stormwater runoff from pavement and rooftops degrades water quality in Puget Sound.

Photo: Doug Wilson, National Archives and Records Administration, via EPA

Water contaminated with bleach from a pulp mill in Bellingham Bay, WA, in April 1973.

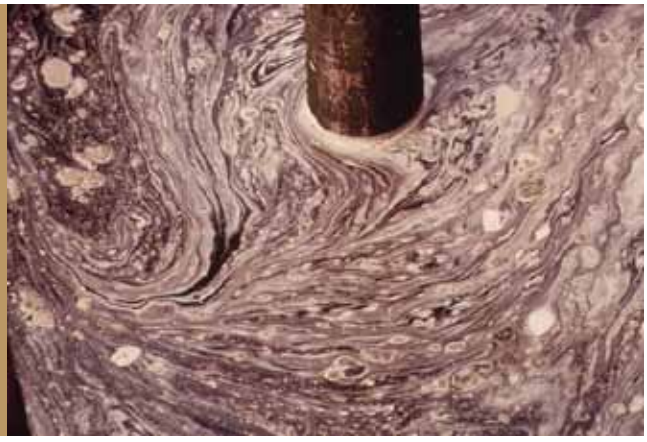

Photo: Ingrid Taylar CC 2.0

Salmon leap at the Ballard Locks in Seattle traveling upstream to spawning sites.

Over the past 100 years, sprawling development has wreaked havoc on the natural features of Puget Sound that enabled salmon to thrive. Urbanization has covered land with impervious surfaces, damaged riverbanks and altered stream flow. Obstacles like dams and culverts block salmon's access to miles of suitable spawning streams, and can also cause the build-up of silt and sediment in gravel beds, reducing available spawning grounds. River modifications, from dams across rivers to culverts on creeks, are largely responsible for the decline of emblematic species like Chinook salmon, which have declined by 60 percent since 1984.[26]

In 1970, in the face of public outcry about declining conditions of waterways like Puget Sound, the U.S. Congress created the Environmental Protection Agency to clean up the environment and passed the Clean Water Act in 1972 to address water pollution.

To accelerate restoration in Puget Sound, the state of Washington created the Puget Sound Partnership in 2007 with EPA backing to restore habitat in the Sound, support indigenous fish, shellfish and wildlife populations, and combat stormwater pollution. The EPA provides critical funds that leverage substantial tribal, state and local investments.[27] These support projects undertaken by more than 800 local organizations.

The Trump administration's budget proposal eliminates funding for the Puget Sound Partnership's work and slashes the EPA's budgets for clean water protection, enforcement and research.[28] These programs are playing an important role in Puget Sound's recovery from its history of pollution and degradation.

Photo: Ingrid Taylar CC 2.0

The biodiversity and landscapes of Puget Sound are part of America's natural heritage.

Trump Administration Budget Cuts Would Hobble the EPA's Work to Protect Our Waterways

The Trump administration's proposed fiscal year 2018 budget, released in May 2017, cuts funding for the Environmental Protection Agency by 31 percent, from $8.2 billion in fiscal year 2017 to $5.7 billion in fiscal year 2018.[29] That would return the agency's budget to 1970s levels, adjusted for inflation, despite the EPA's vastly expanded congressionally mandated responsibilities and the continued severe threats facing our waterways.[30] Congress will likely modify the administration's budget, but even if proposed cuts are scaled back they would still have disastrous impacts on the EPA's ability to protect our waterways.

The Environmental Protection Agency plays a vital role in ensuring the nation has clean water for drinking and recreation, and for sustaining fish, plants and wildlife. The EPA works directly to ensure that the requirements of the Clean Water Act, the Safe Drinking Water Act, the Superfund law and other laws protecting water quality are met, and also supports the work of states, tribes and local governments in implementing and enforcing those laws. The budget cuts proposed by the Trump administration would weaken the EPA's efforts on both fronts.

Cuts Would Affect Human Health and Hamper Scientific Research

Dramatic budget cuts mean that the EPA would be less able to protect clean water and hold polluters accountable across the country. The Trump administration's proposed budget indicates that the EPA would need to reduce its staff by nearly one quarter.[31]

Environmental programs run by the EPA and related to water are slated for a 34 percent reduction.[32] This would make it harder for the EPA to reduce runoff pollution, monitor waterways for pollution and protect watershed lands and wetlands that are critical to keeping our waterways clean and healthy. The EPA's resources for pursuing polluters and enforcing water quality protections would also be slashed, with a proposed 24 percent budget cut.[33] Funding for the EPA's Superfund cleanup program would be reduced by 30 percent, slowing progress on existing cleanup sites and preventing new cleanups from being added.[34]

Funding for research and development by the EPA is slated for a 47 percent reduction, a larger research and development cut than for any other agency.[35]

Budget cuts proposed for the Office of Science and Technology that would harm water quality include:

- A 33 percent budget cut for the Safe and Sustainable Water Resources program, which provides the science and technological research to protect water for drinking and wildlife.[36]
- A 40 percent cut in funding for the Human Health Risk Assessment program, which seeks to understand how environmental contaminants affect human health.
- A 31 percent cut for the Chemical Safety for Sustainability program, which studies the potential health and environmental impacts of manufactured chemicals throughout their lifecycle and seeks to develop faster analytical tools to identify risks more quickly.
- A 61 percent cut to the Sustainable Healthy Communities program's research in support of better cleanup technologies for Superfund sites.
- A 38 percent cut to the Homeland Security Research Program that includes understanding how to decontaminate water supplies in the event of a chemical, biological or radiological attack.[37]
- A 23 percent cut to the Forensics Support program, which documents the sources and types of pollution to help the EPA's enforcement actions against polluters.

Cuts Would Slow Efforts to Prevent Pollution and Clean up Contamination

The budget cuts would also limit the EPA's support for the work that state, tribal and local governments do to protect water quality. Many state and tribal assistance grants for clean water are slated to be reduced by 30 percent or more.[38]

The proposed budget eliminates entire programs that have helped states and tribes to protect water quality. The budget would:

- End grants to state governments and tribal agencies to address pollution from stormwater runoff, farms and other dispersed sources.[39]
- End grants that help local governments identify and clean up underground storage tanks that may be leaking oil or other hazardous products into groundwater.

Table 1. Estimated EPA Grant Funding Losses to Washington if the Trump Administration's Proposed Budget Is Enacted (table shows selected programs)[40]

Program (most recent year of funding for which data are available)	Funding in most recent year	Estimated lost funding due to proposed Trump admin. cuts
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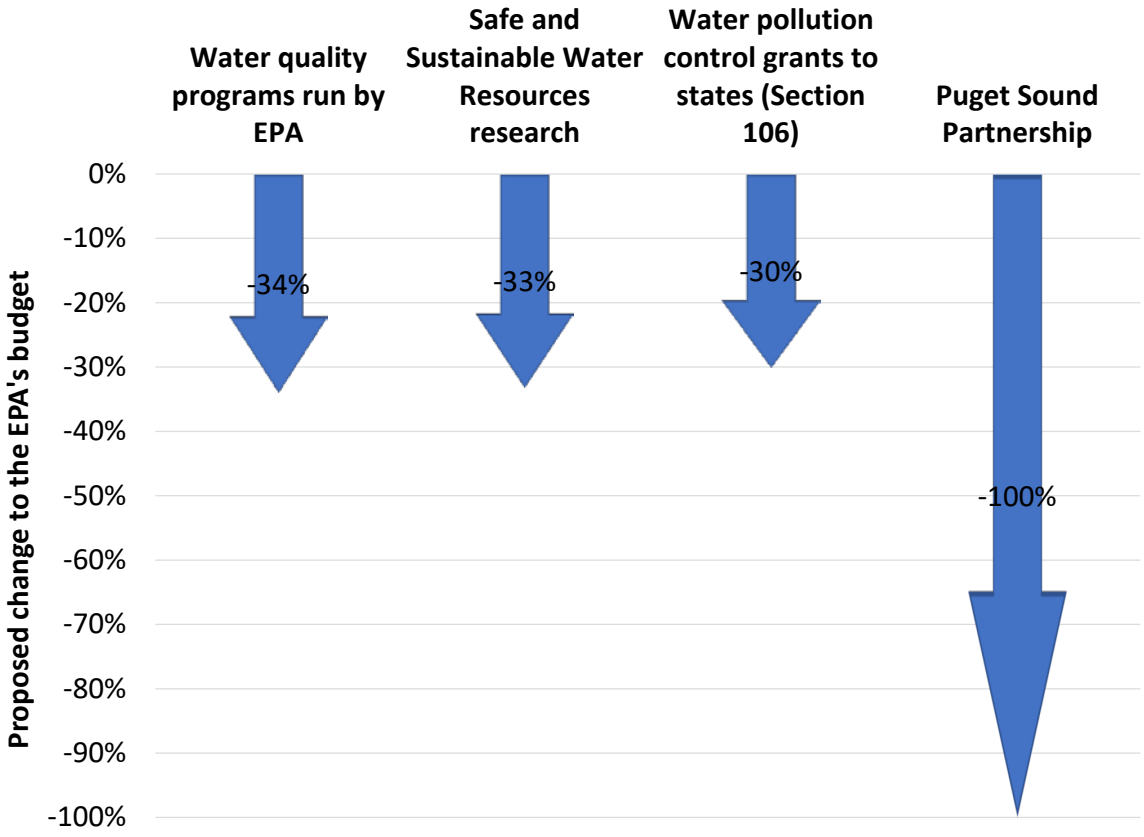
- End regional programs to address pollution problems in Puget Sound, the Great Lakes, the Gulf of Mexico, Chesapeake Bay, and other large water bodies.

Other aspects of the EPA's budget that affect water quality are also slated for cuts. For example, funding for efforts to clean up hazardous waste sites, which have the potential to pollute water, is in jeopardy. Table 1 shows state-level funding losses for selected programs.

These budget cuts to the EPA's national work and its support of state and local action would harm water quality in Puget Sound.

Figure 2. The Trump Administration's Proposed Budget Slashes Clean Water Funding (selected programs)[41]



Puget Sound Water Quality Is Threatened by the Trump Administration's EPA Budget Cuts

The EPA plays a critical role in protecting clean water in Puget Sound. Working with state, tribal and local governments, the EPA establishes and enforces limits on pollution, helps support pollution cleanup and restoration of damaged streams and rivers, and pursues research to better understand threats to clean water. The budget cuts proposed by the Trump administration will greatly weaken the EPA's ability to ensure water in Puget Sound is clean enough for drinking, swimming, fishing and shellfish harvesting.

More Pollution in Puget Sound

The most important task to protect and restore Puget Sound is preventing pollution from contaminating the waterway. Sometimes that means limiting what polluters can release to waterways. Other times, it means reducing the flow of runoff into the Sound by protecting natural and agricultural lands that absorb water and reduce pollution. The EPA plays a key role in protecting water quality in Puget Sound, administering and overseeing limits on pollution, and providing funding for the Department of Ecology and other state agencies, tribes and local governments to develop new protective measures.

The EPA Set Limits on Stormwater Pollution from Joint Base Lewis-McChord

Polluted runoff from Joint Base Lewis-McChord carries a range of pollutants into Sequalitchew Creek, American Lake and the Sound.[42] Road vehicles, aircraft traffic, industrial activities, residential development, live fire ranges, training areas, and storage of chemicals and hazardous wastes all have the potential to contaminate the base's stormwater runoff, including with petroleum products, heavy metals, phosphorus, bacteria, and synthetic organic chemicals.[43] Stormwater runoff is the most common pathway for toxic chemicals to enter Puget Sound.[44]

Joint Base Lewis-McChord spreads across 90,000 acres near Tacoma and houses 150,000 military personnel, retirees, families, and civilian employees working for the U.S. Army and Air Force.[45]

In Washington, the EPA is the authority that oversees the water quality impacts of federal facilities. In 2013, the EPA established an innovative stormwater discharge permit for Joint Base Lewis-McChord to limit its runoff pollution.[46] The EPA permit requires that the base adopt low impact development techniques like rain gardens

and permeable pavement to help rain percolate into the ground; develop rules for disposing of rainwater that falls on existing structures to avoid runoff; educate its employees and communities; and run biological health monitoring programs in the nearby Clover and Murray Creeks.[47] Now, more than 95 percent of the base's buildings have rainwater filtration systems, including rain gardens that help filter contaminants such as phosphorus through the soil instead of polluting nearby waterways.[48]

The EPA is involved in efforts beyond Joint Base Lewis-McChord to address stormwater pollution that threatens Puget Sound. Several examples are available under a plan developed by multiple federal agencies for how to protect water quality in Puget Sound:

- In the coming years the EPA has pledged to issue stormwater permits for additional Department of Defense facilities in the region.[49]
- The agency will work with and provide an estimated $250,000 per year through 2021 to tribal governments to help them implement their stormwater management plans.
- In further support of existing local efforts to address stormwater pollution, the EPA has said it will provide $300,000 annually through 2021 to the Puget Sound Local Source Control Partnership, which provides hands-on advice to small businesses that generate dangerous waste to help them prevent water pollution.[50]

Full funding for the EPA is essential if it is to fulfill these commitments and help local and tribal governments reduce stormwater pollution in Puget Sound.

Impacts of Budget Cuts

The Trump administration has proposed cutting funding for programs that have helped protect water quality in Puget Sound. The administration proposes to cut grants to states by 23 percent.[51] Grant programs to states to address pollution from dispersed sources – such as stormwater from development that replaces forested areas – would be zeroed out. The state, federal and tribal agencies convened through the Puget Sound Partnership identified more than 100 local programs and projects focused on reducing stormwater pollution that needed funding in 2016.[52] EPA grant money is a critical part of implementing these projects.

Photo: U.S. Army

Joint Base Lewis-McChord installed a rain garden outside North Fort Youth Center.

The deep proposed budget cuts for the EPA would also limit its ability to address water pollution from military bases. Though the Washington Department of Ecology has the lead role for implementing and enforcing the Clean Water Act for most of the state, the EPA retains sole authority over federal facilities in Washington and coordinates with tribes on discharges to tribal lands and waters. Slashing the EPA's budget would undermine the agency's ability to administer and oversee permits at sites like Joint Base Lewis-McChord, and to limit stormwater pollution from military facilities and tribal lands into the Sound.

Less Accountability for Polluters

The laws designed to limit pollution and encourage the restoration of Puget Sound mean nothing if they are not enforced. Enforcing clean water laws means issuing appropriate permits to limit pollution discharges, reviewing discharge data, inspecting sites to detect illegal pollution, and issuing penalties to punish violators of the law and discourage other would-be polluters from following suit. The EPA and state and local agencies work together to enforce clean water laws, prevent pollution from reaching dangerous levels, and keep communities and the environment safe from harm.

The EPA Stopped Manure Pollution that Contaminated Shellfish

Oysters, clams and other shellfish harvested from polluted water may carry pathogens like *E. coli*, hepatitis and Salmonella that make people sick.[53] When water contains too much fecal bacteria, shellfish harvesting in the area must end until water quality improves and shellfish are once again safe to eat. The Lummi Nation, south of the Canadian border, has had to repeatedly close shellfish beds since the 1990s because of fecal bacteria contamination, largely from dairy farms in the area.[54]

In 2015, the EPA took action to address some of the pollution affecting the Lummi Nation's shellfish beds. The EPA issued a compliance order and penalty to

Photo: Washington Department of Ecology CC BY-NC 2.0

Red-orange algae bloom in Puget Sound near Edmonds, WA, in May 2013. Some shellfish beds were closed in 2015 to protect people from exposure to a harmful algal bloom.

the R. Bajema Farm, a dairy farm located in Lynden, in Whatcom County, for discharging water loaded with manure into a ditch that leads to Fishtrap Creek, then the Nooksack River, and finally Bellingham Bay, without a permit. The runoff from the dairy farm emptied into the Sound near shellfish beds used by the Lummi Nation.[55] The EPA ordered the facility to address its discharge issues to better protect the quality of nearby water resources and shellfish beds.[56] In addition, the EPA has provided funding to place real-time monitors in Whatcom County to help provide data to separate the large number of compliant operations from the smaller number of operators that are causing water quality problems that impact shell fishing.[57] This allows targeted education and enforcement efforts that focus on bad actors.

In addition to cracking down on pollution from particular facilities like the R. Bajema Farm, the EPA works closely with the Washington State Department of Ecology to enforce the Clean Water Act. The EPA delegates implementation and enforcement of the

Clean Water Act to the Department of Ecology, yet maintains oversight and bottom-line responsibility to step in if the Department of Ecology fails to protect water quality.

The Department of Ecology, the EPA and local partners that rely on funding by the EPA have reduced pollution from wastewater treatment facilities, which contribute to fecal bacteria pollution in Puget Sound.[58] While urban areas have separate wastewater and stormwater pipes, some like Seattle have combined pipe systems. When rainfall overwhelms the capacity of the pipes and plants, overflows occur, discharging a mix of stormwater and wastewater that receives disinfection but not full treatment.

For example, between 2006 and 2010, the City of Seattle and King County discharged hundreds of millions of gallons of raw sewage to Puget Sound waters each year, often during large storm events.[59] These combined sewer overflows discharged into Lake Washington, the Lake Washington Ship Canal and to Puget Sound directly, resulting in periodic closures of beaches and water quality standard violations. The EPA launched an enforcement action against Seattle and King County, and in 2013, the EPA and its co-plaintiff, the Washington Department of Ecology, reached a settlement with both parties.[60] The City of Seattle agreed to pay $350,000 in civil penalties and eliminate 99 percent of the raw sewage discharges by December 31, 2025, while King County agreed to a penalty of $400,000 and to cut raw sewage overflows by 95 to 99 percent.[61] To do so, the city and county developed long-term combined sewer overflow control plans, including measures to limit the amount of rainwater that flows into the system at peak times, that will cost an estimated $1.46 billion to implement.[62]

Although the 2013 settlements ended one chapter of enforcement, the EPA's job is not done. Under the 2013 consent decree, the federal government and the state may seek damages for violations of the consent decree, which they did in November 2016, issuing a $33,500 penalty to the city of Seattle for 10 violations and a $63,500 penalty to King County for 23 violations that occurred in 2015.[63]

Efforts to reduce pollution from dairy farms and from stormwater overflows have helped reduce fecal pollution in Puget Sound, enabling Washington state authorities to reopen a net 3,695 acres for shellfish harvest in Puget Sound since 2007.[64] However, 16 percent of shellfish beds are still closed, and more than 5,500 acres of shellfish beds' conditions have changed for the worse or been downgraded since 2007, mostly in Samish Bay, due to ongoing pollution from agricultural runoff, septic

Photo courtesy of Vulcan Real Estate

A new swale on Yale Avenue in Seattle uses the natural properties of marshlands to help slow, store and filter rain water to prevent runoff pollution and sewer overflows. Green stormwater infrastructure is part of Seattle's strategy to better deal with heavy rain episodes and avoid future EPA enforcement action.

system contamination, and wastewater treatment plants.[65] Pollution continues to create a health risk to consuming shellfish: in March 2017, 40 people contracted norovirus after eating raw oysters harvested at Hammersley Inlet.[66]

The Department of Ecology coordinates its enforcement work with the EPA to meet shared goals, and if the EPA has fewer resources, the agency will contribute less toward those goals. The Trump Administration's proposal to cut nearly one-quarter of the EPA's enforcement budget could place the health of the Sound and its residents at greater risk of fecal contamination.[67]

EPA Enforcement Is Cleaning Up Toxic Pollution in Seattle's Elliott Bay and other Urban Bays

Elliott Bay provides critical habitat for endangered Chinook salmon and is used for boating, fishing and clamming by Seattle residents and the Muckleshoot and Suquamish tribes.[68] However, Elliott Bay is polluted with PCBs, petroleum products, heavy metals such as arsenic, and tributyltin, a highly toxic biocide used to prevent the growth of marine organisms on ship hulls.[69] People must carefully follow consumption advisories for fish and shellfish harvested from Elliott Bay to avoid health risks associated with heavy metal and PCB contamination, including skin conditions like acne and rashes, liver damage, nerve disorders, immune disorders, and lung, liver and kidney cancers.[70] The Washington Department of Health recommends that people limit their consumption of Chinook salmon caught in Elliott Bay to one serving per week and blackmouth to two meals per month.[71]

The Lockheed Martin Corporation, the world's largest defense contractor, operated a shipyard in West Seattle from 1946 until 1986, when it ceased activities and sold the property. However, the company left behind extensive pollution of sediments in Elliott Bay, and under federal Superfund law is responsible for cleaning up the site.[72]

At the state's request, the EPA added the site to its list of national priorities for Superfund cleanup in March 2007.[73] Lockheed Martin then investigated the extent of pollution at the site and designed a cleanup plan, subject to public comment and EPA review. In March 2017, the EPA approved the preliminary cleanup stages, and Lockheed Corporation will begin to remove 167,000 cubic yards of contaminated soil and sediment from the southwest corner of Elliott Bay starting in 2018.[74] The company will pay the full cleanup cost, estimated at $48 million.[75]

Cleaning up the Lockheed West Seattle site is one of the necessary steps in a long-term endeavor to restore the health of Elliott Bay and its wildlife. Cleanup is complete at two sites near the Duwamish River, which empties into Elliott Bay. Upstream, the EPA is supervising ongoing cleanup of the Lower Duwamish River, which contains extensive industrial pollution that makes some fish unsafe to consume. More than half of the pollution has already been cleaned up, but at least another decade of cleanup and monitoring remains to be done, at a cost of more than $300 million.[76] As of 2013, the EPA had notified 116 companies that they could be liable for some of the cost of cleanup, and is working to assign appropriate financial responsibility to those companies.[77]

Overall, under EPA oversight, 17 Superfund sites in Washington have been cleaned up and removed from the national priorities list since the 1980s, but there are still 51 Superfund sites remaining in the state.[78] The Trump administration's current proposal would cut over a third of the EPA's budget for Superfund enforcement, leaving the agency with far fewer resources to ensure that polluters honor their responsibility to clean up hazardous waste on their sites.[79]

Impacts of Budget Cuts

The Trump administration has proposed cutting nearly a quarter of the EPA's environmental enforcement budget, and zeroes out funding for Superfund enforcement at federal facilities and for environmen-

Photo: CC0 / Public domain

Aerial view of Lockheed Martin West Seattle Superfund site on Harbor Island (left) and on the western bank (right) of the Duwamish West Waterway.

tal justice to help defend the rights of tribes, communities of color, and low-income communities to safe drinking water and a clean environment.[80]

Though pollution from industrial facilities, wastewater treatment plants and other identified sources has fallen sharply from its peak, there are still 26 ongoing Superfund cleanup sites in the Washington counties that lie within the Puget Sound watershed, and 16 percent of the Sound's shellfish beds are closed due to unsafe pollution levels.[81] If the EPA has less funding to support monitoring of pollution levels, unscrupulous actors may decide to violate their permits, exposing communities in Puget Sound to additional health risks and setting back the Sound's restoration.

Stalled Restoration of Polluted Waterways

After more than a century of pollution and degradation, restoring Puget Sound is key to continue providing its communities with safe drinking water, fish and shellfish. Restoration work includes measures such as strengthening eroded streambanks and dredging polluted sediment, all with the aim of turning polluted waterways into healthy ecosystems.

EPA-Backed Program Helped Restore Vitality to the Skokomish River Estuary

Marshland in the Skokomish River estuary, at the southern end of Hood Canal, once provided habitat for salmon and shellfish, and helped control flooding of nearby tribal lands. Construction of dikes, culverts and tide gates to create farmland destroyed more than half of the estuary's fertile marshes.[82]

Since 2007, the EPA has helped fund a project led by the Skokomish Tribe and Mason County to restore water flow and function across 500 acres of the Skokomish River estuary. The EPA contributed $85,000 to the final phase of the project that removed four tide gates and removed or replaced 30 culverts, reconnected and re-excavated more than 1,500 yards of tide channels, and opened more than 400 acres of habitat for fish passage.[83] Through the National Estuary Program, the EPA also funds the Puget Sound Partnership, which works with local and tribal governments to help identify and prioritize areas throughout the region in need of habitat restoration.

The restoration project's impacts on wildlife were immediate, with fish appearing in newly excavated channels within 24 hours. In the 10 years since restoration work began, shellfish beds have been restored, the size of juvenile salmon has increased, eelgrass beds that provide habitat have doubled, more birds live in the estuary and flooding has decreased.[84]

Thanks to the EPA-supported Skokomish Estuary project, more than 500 acres of estuarine river delta wetlands were restored. But restoration work has recovered less than 2,800 acres in Puget Sound since 2006, far less than 2020 targets of approximately 7,400 acres.[85] Many restoration projects are underway, including in the Snohomish Estuary, the Titlow Estuary, the Little Squalicum Creek Estuary, and the

Photo: U.S. Department of Agriculture, Washington Natural Resources Conservation Service

The Skokomish Estuary project restored salmon and trout habitat and improved water quality in the Hood Canal basin.

Skagit Delta.[86] But without steady and strong funding for restoration of Puget Sound's estuaries, some of these exceptionally diverse and fertile ecosystems are unlikely to recover.

EPA-Funded Project Removed Obstacles to Salmon Runs on Chico Creek

Chico Creek, the most important salmon stream in Kitsap County, has supplied the Suquamish Tribe with salmon for generations. But the mouth of the creek was relocated in 1961 to build State Route 3 and Kittyhawk Drive, and a culvert blocked salmon's passage.[87] Vegetation and silt built up in the culvert, and when the tide was too low fish could not continue upstream to spawn.

In 2010, the EPA awarded the Suquamish Tribe $600,000 to remove the culvert and restore free flow at the mouth of Chico Creek.[88] In 2014, workers removed 400 feet of Kittyhawk Drive and replaced the culvert with a bridge, in time for the October and November salmon runs.[89] This project was a critical step to restoring Chico Creek. An EPA-funded effort led by the Suquamish Tribe is currently removing a culvert on Chico Creek under Golf Club Hill Road. The removal of an even larger culvert under State Route 3 is the Washington Department of Transportation's second highest priority in the entire Olympia Region.[90] Across Washington, removing culverts has restored salmon access to high quality rivers.[91]

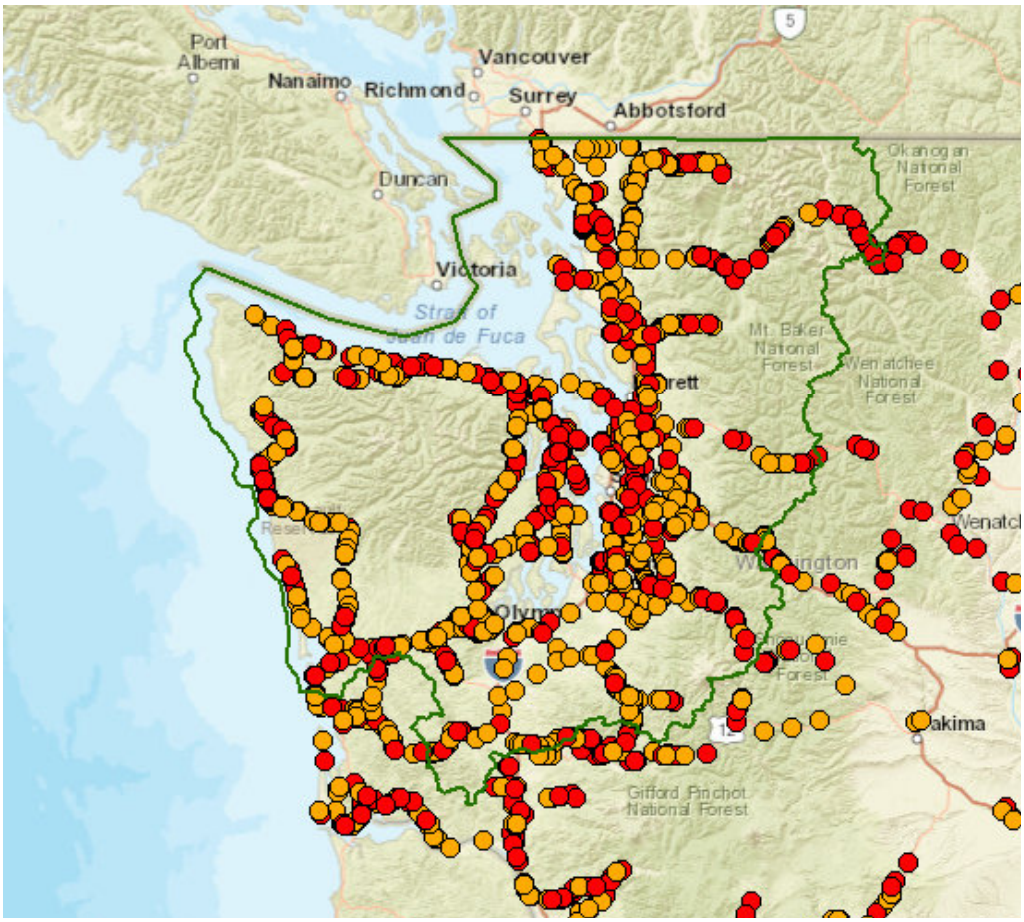
Photo: Northwest Indian Fisheries Commission

The Chico Creek culvert was removed to enable salmon migration.

EPA's support for culvert removal has been a critical part of salmon restoration efforts in Puget Sound. The EPA has funded dozens of projects to remove obstacles to salmon spawning in creeks and rivers, eliminate invasive plants that displace native vegetation needed for good habitat, and curb sediment pollution that smothers spawning grounds.[92]

But more work is needed: to comply with recent court findings that the culverts interfere with tribal treaty rights, Washington state must replace or remove nearly 1,000 culverts in western Washington, which is projected to cost more than $300 million per year until 2030.[93] Several efforts are underway to identify which of the culverts owned by federal, state or local government or private landowners should be prioritized for action. Adequate funding of the EPA is essential for the federal government and the state of Washington to meet treaty obligations in which tribes were promised that there would be salmon for them to catch in rivers. To meet a court-ordered 2030 deadline of replacing culverts that block salmon passage, the state and the EPA will need to increase funding for culvert removal work, not scale it back.[94]

Figure 3. Washington State Must Replace Almost 1,000 Culverts that Block or Impede Fish Passage in Western Washington[95]



Note: Red dots indicate a barrier that completely blocks fish from accessing a stream. Orange dots indicate that a barrier partially blocks access.

Impacts of Budget Cuts

President Trump's budget proposal eliminates funding for the National Estuary Program, which funds hundreds of projects that have been thoroughly vetted and prioritized by state, tribal and local entities. The EPA is an important source of funds for implementing the Puget Sound Action Agenda, the regional list of high-priority restoration projects: it has provided $115 million to the Puget Sound Partnership, Department of Ecology, Department of Health, Northwest Indian Fisheries Commission, and other agencies leading cleanup of Puget Sound since 2010.[96] Those groups have used the EPA's funding to leverage additional money, raising an estimated $18 from local and state sources for every dollar of federal funds.[97] The Trump administration's budget cuts would curtail work funded through the National Estuary Program and slow restoration of damaged habitat and polluted water.[98] Grants that have already been awarded will not be affected, but progress on new initiatives would be severely curtailed starting in the fall of 2017 and beyond.

Less Research and Education on Threats to Water Quality

Although the EPA and the state of Washington have made substantial progress in protecting and restoring the Sound, emerging problems, like new kinds of compounds getting into the water, failing water infrastructure, and climate change, pose new challenges to protecting and restoring this vital waterway. EPA programs and funding initiatives, like the Safe and Sustainable Water Resources research program, support research that generates knowledge and tools that help toxicologists, water agency managers and officials understand the impacts of various threats to water; set drinking water and wastewater treatment standards that protect public health and aquatic communities; and establish new land use, discharge and wastewater management regulations that effectively safeguard Puget Sound.

EPA-Funded Research Seeks to Understand the Impacts of Persistent Organic Pollutants on Orcas

The population of orcas residing in Puget Sound and the Salish Sea has dropped to fewer than 80 whales, down from approximately 100 in the late 1990s.[99] The whales were added to the endangered species list in 2005, but the population has not stabilized. One reason for the orcas' decline is contamination of Puget Sound with persistent organic pollutants (POPs), which may compound the effects of inadequate food as salmon populations struggle.[100]

Persistent organic pollutants do not break down once released into the water. Instead they accumulate in the Sound, its fish, shellfish and wildlife, and cause cancer and other diseases in fish, shellfish and wildlife, and in the people who eat them. These pollutants, which include toxic flame retardants, PCBs used in electrical equipment, and the banned pesticide DDT, have been found throughout the marine environment, including at the top of the food web in orcas.[101]

The exposure of orcas to high levels of persistent organic toxins is one reason for the 20 percent decline of Puget Sound's orca population since 1995.[102] The decline in Chinook salmon, the orcas' primary prey, may also be associated with exposure to POPs like flame retardants, and contribute to the low orca population levels.[103] Furthermore, POPs may increase the stress orcas experience when they cannot find enough food. Orcas consume POPs in salmon and other fish, and store the toxins in their own body fat. When orcas are unable to find enough salmon to eat – a frequent problem because of the decline of salmon populations – they burn body fat, releasing POPs that add to the physical stress of not having enough to eat.[104]

The EPA has funded research by the University of Washington's Center for Conservation Biology to better understand POPs in Puget Sound's orca popu-

Photo: Chase Dekker (licensed and cropped under CC BY-NC-SA 2.0

A Salish Sea orca breaches the surface near the San Juan Islands in Puget Sound.

lation. Research conclusions guide how to better monitor POPs in the marine environment and boost endangered species conservation, and the project created a new method to track POP concentrations in orcas that does not harm or disturb the endangered animals.[105] The EPA has also funded two grants worth $957,357 to the National Ocean and Atmospheric Administration (NOAA), the Washington Department of Commerce and the National Marine Fisheries Service to investigate the effects of toxic flame retardants on Chinook salmon, to set more protective standards, and develop ecosystem protection and restoration goals.[106] These research projects led to a better understanding of the effects of flame retardants on Chinook salmon and helped develop ecosystem restoration goals.[107]

EPA-Backed Research Demonstrates Treating Runoff Protects Salmon

In urban watersheds of Puget Sound, more than 50 percent of coho salmon entering spawning streams in the fall die before they spawn.[108] Reducing this mortality rate is important to protecting and rebuilding populations of endangered salmon. Research funded by the EPA, along with other federal and regional agencies, has helped to explain the cause of this high mortality rate and to identify a solution.

A team of Washington-based scientists collected polluted runoff from an urban road with heavy traffic, and exposed otherwise healthy spawning coho salmon to this water.[109] Within 24 hours, all the salmon were dead, leaving the researchers to conclude that "urban run-off was 100% lethal to otherwise healthy adult coho salmon."[110]

When salmon were exposed to highway stormwater that had been treated with a simple soil filtration system, all the fish survived.[111] The filtration system involved layers of gravel, sand, compost and mulch, constructed according to green infrastructure guidelines and similar to a rain garden. Not all the pollution was removed from the stormwater, but pollution levels dropped enough that fish not only survived but also did not show the behavioral symptoms of salmon that have been exposed to untreated stormwater. While the researchers hailed the effectiveness of the filtration system they used, they cautioned that additional research is needed to understand the most effective way to use bioretention filtration on a larger scale.

EPA funding is essential for supporting research that not only identifies specific pollution problems in Puget Sound, but also points toward solutions and how best to implement them in the real world. However, the Trump administration's proposed budget for the EPA slashes research funding by nearly half, limiting the EPA's ability to fund research that solves water quality problems in Puget Sound.

Impacts of Budget Cuts

The administration's budget proposal slashes the EPA's overall research and development budget by nearly half.[112] The Safe and Sustainable Water Resources research program would lose a third of its funding.[113] In the proposed budget, the key grant program under which the EPA supports university research programs for better environmental science and management, called Extramural Science to Achieve Results, would not receive any funding.[114]

Reducing research and education limits the capacity of the EPA and Washington to develop new standards and regulations for both old and new contaminants. Moreover, budget cuts mean the EPA will support fewer scientific research programs focusing on Puget Sound-specific issues, like better solutions for stormwater treatment or understanding the impacts of POPs on the Sound's emblematic and endangered species. The administration's budget proposal risks jeopardizing water quality and Americans' health by delaying the development of new water quality standards and innovative tools to meet them.

Photo: BLM CC BY 2.0

Spawning coho salmon.

The Health of Puget Sound Depends on a Strong EPA

Water in Puget Sound would not be as clean as it is today without action by the EPA. The EPA – along with state and local government, citizens, academics, and philanthropic and business partners – has been critical to this effort. The EPA has established and enforced limits on pollution, helped to restore waterways, and supported research and education about the threats to Puget Sound and solutions that can return it to health.

The job is not done, however. The EPA and the state's efforts to protect and restore Puget Sound have not been enough to stem the flow of pollution from human activity in the watershed. Fish consumption advisories and shellfish bed closures, as well as declining orca populations, show that we still have work to do in cleaning up the Sound.[115] Existing sources of pollution – from industrial facilities to sewage pipes to urban and farm runoff – continue to require vigilance and comprehensive efforts to address contamination. New sources of pollution, meanwhile, may add to the region's water quality problems.

Now is not the time to hobble the EPA's essential work to protect Puget Sound. To build on the progress that has been made and to ensure that Puget Sound is restored to health, funding for the EPA and the state and local efforts it supports should be *increased*, not cut. For example, aging drinking water and sewage infrastructure across the nation need replacing, at a cost of $600 billion over the next 20 years.[116]

Continued progress at cleaning up existing sources of pollution and addressing new sources of contamination requires full funding for the EPA's clean water efforts. The agency needs resources to establish pollution limits that protect human health, and to make sure that polluters abide by those pollution standards. The agency needs money to continue its critical role in supporting cleanup of past pollution, and restoring damaged rivers and streams so that they can provide clean water. The EPA also needs funding to help it identify and respond to future threats to clean water. Ensuring that people who live in the Puget Sound region have continued access to clean water requires full funding for the EPA.

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