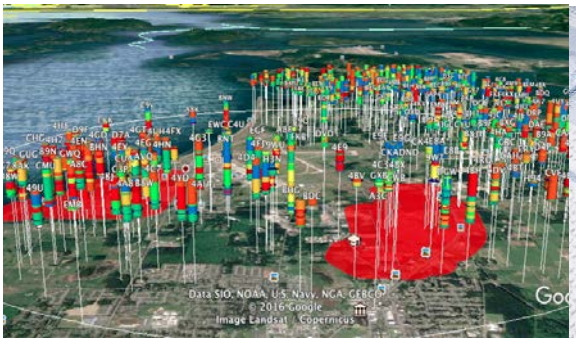
# PFAS Contamination from Navy Operations
# Whidbey Island, WA

## Complaint, Report, and Requests
## to
## U.S. Department of the Navy and Department of Defense

November 28, 2022





November 28, 2022

Honorable Lloyd J. Austin III, U.S. Department of Defense
1000 Defense Pentagon,
Washington, DC 20301-1000

Honorable Carlos Del Toro, United States Navy
1000 Navy Pentagon, Room 4D652
Washington, DC 20350-1200

Whidbey Environmental Action Network
Preservation Education Restoration
Box 53, Langley, WA 98260

Richard Abraham
2450 North Bluff Road
Greeenbank, WA 98253

**RE: PFAS Contamination on Whidbey Island**

Dear Sirs,

This open letter and the attached report concern the contamination of people and the environment resulting from Navy's use PFAS containing fire-fighting foam at Whidbey Naval Air Station and its Outlying Field. We are writing to you because the problems we address are not unlike those being reported at other military sites around the country.

It's been six years since the Navy acknowledged responsibility for the PFASs spreading in our sole source aquifer. Yet, we still don't know how far this contamination has reached or the number of people and places impacted or at risk. We don't know because the Navy doesn't know, and as explained in the attached report, hasn't wanted to know. Too much of what it does know, it doesn't reveal.

Some steps have been taken to reduce exposures, but not enough. PFASs still leak from Navy property to contaminate public and private drinking water sources, some of which the Navy missed in its limited investigation. These include Public Water Systems with PFAS levels above Washington State Action Levels and EPA's past and present health advisories.

Our PFAS contamination isn't being cleaned up or going away, and the Navy is ignoring the very exposures it said it wanted to eliminate. The PFAS levels in water being distributed to homes, schools, and a hospital in the Town of Coupeville are increasing and now exceed EPA's current health advisory. PFASs are still being discharged through farmland and Salmon restoration areas to public waters where Orcas and other marine mammals are exposed.

We ask the Navy and Department of Defense to take the specific actions identified at the end of this letter. Doing so will help to provide pollution victims with the safer water they have been promised, and all citizens with the openness and transparency they are being denied.

Please forward this letter and report to the appropriate decision makers under your command. We appreciate your attention to this matter and look forward to your response.

Sincerely,

Marianne Edain
Steve Erickson
Richard Abraham

**PFAS Contamination on Whidbey Island**
Background and Requests for Action

Report Prepared by Richard Abraham[1]

Whidbey Island has federally designated Sole Source Aquifer status because groundwater is our principal drinking water source "which if contaminated would create a significant public health hazard."[2] It is unfortunate, but predictable that PFASs leaking from Navy property would contaminate our groundwater and create public health hazards.

It is well documented that the Department of Defense and the makers of this foam knew of its dangers decades ago. Service members who used this foam and were themselves exposed to these toxic 'forever' chemicals did not know. Neither did the people living in nearby communities, many of whom are retired service members.

The preventable PFAS contamination of communities near hundreds of military installations is the consequence of information being withheld and science being ignored. We should be learning from the past instead of repeating it. Instead, the Navy and DoD are ignoring the science indicating PFASs to be far more pervasive and persistent than previously thought, and dangerous in the smallest of amounts.

It's been about six years since the Navy acknowledged responsibility for the spreading footprints of PFAS contaminated groundwater on Whidbey Island and four years since it revealed highly contaminated discharges to surface waters. After six years of on-site and off-site Navy investigations we still don't know how far this contamination has spread and the number of people and places impacted or at risk. We don't know because the Navy doesn't know, and as explained below, hasn't wanted to know. Too much of what it does know, it won't reveal. The following touches on what is known:

- The Navy's flawed drinking water investigation has failed to identify many drinking water sources likely to be contaminated—and some known to be contaminated.
- The uncontained PFASs leaking from the Navy's Outlying Field still contaminate public and private drinking water, including that being distributed to the homes, schools, and a hospital in the town of Coupeville.
- PFAS contaminated stormwater from the Navy property still runs through farmland to public waters classified as "extraordinary" for aquatic life uses, protected shellfish harvesting, and threatened and endangered species.
- The number of drinking water sources contaminated with PFASs in amounts now exceeding EPA and State Health Advisories has dramatically increased.
- The Navy is ignoring EPA's current PFAS Health Advisory[3] and Washington State PFAS Action Levels in its investigations and decision-making.[4]

**The Navy's flawed drinking water investigation has failed to identify many drinking water sources likely to be contaminated—and some known to be contaminated.**

In 2016, after finding PFAS's in its own drinking water, the Navy represented to the public that it wanted to, "Ensure people are not exposed to PFOA and PFOS resulting from Navy operations."[5] Drinking water investigations near its Outlying Field and Oak Harbor properties were initiated, "as precautionary measure to ensure residents living near our installations are not being exposed to PFAS in off-Base drinking water."[6] This was a precautionary measure not taken.

The Navy's investigation was not conducted to identify all locations with potential PFAS exposures. It was designed to find some locations where only three PFAS's were found over a certain amount. The Navy's intention, as indicated by its actions, was to ignore some of the PFASs identified in EPA's Unregulated Monitoring Rule 3, and to ignore exposures to those PFASs.[7]

The Navy's community drinking water investigations didn't look for all PFASs known to be in the water—and didn't look for lower amounts that could easily have been found.

• The Navy only sampled for three PFASs in the community's water even though six had been found on its own property.[8]

• The Navy used higher detection limits when sampling the community's water than were used on its own property. This allowed for some levels of PFASs found in water on Navy property to go undetected in community water.[9]

The Navy did the very thing that EPA once objected to a Dupont facility doing. It failed to measure PFOA pollution at the lowest possible level. According to EPA, this sampling approach "was not acceptable or appropriate."[10]

Two hundred plus community drinking water samples taken by the Navy from November 2016 to July 2017 failed to measure PFOA pollution at the lowest possible levels and could have missed exceedances of EPA's most recent Health Advisory.[11]

The laboratory used by the Navy used a Detection Limit of around 9 parts per trillion (ppt) for PFOA and 15 ppt for PFOS for sampling residents water in Oak Harbor and Coupeville.[12] However, it had the ability to detect both at much lower levels than the 'project levels' chosen by the Navy.[13] For example, The Navy used a Detection Limit of less than 1 ppt when it looked for PFOS and PFOA in groundwater under its own property.[14] The State Department of Ecology looked for PFASs down to 1-2 ppt to assess PFAS impacts on fish and wildlife from wastewater treatment plants discharges as far back as 2008.[15]

Finding a PFAS at a laboratory's lowest possible Detection Limit, even if it can't be quantified, indicates the presence with a 99% degree of certainty.[16] Had the Navy wanted to determine how far contamination had reached and how many residents were being exposed, it would have used detection limits reveal *any* amount and it would have sampled wells for all PFASs it knew to be in the aquifer. Doing so would have identified more contaminated wells and established baselines levels for PFASs expected to be covered by anticipated federal and State health advisories. This was an opportunity deliberately missed.

Alleviating people's concerns, rather than their exposure to toxic chemicals, appeared to be the Navy's priority. A Navy letter conveying "preliminary" sampling results was sent to residents served by community wells in the Navy's Phase 1 investigation areas. The Detection Limit of 15 ppt for PFOA would have missed lesser amounts. Some letters asked that customers "outside the sample area" be contacted to "alleviate any concern those households may have regarding their drinking water.[17]

**The Navy's investigations missed PFAS contaminated wells, some with amounts exceeding state and federal health advisory levels.**

Investigations were conducted in phases, the first within a mile radius of a suspected source of contamination on Navy property. If PFOA or PFOS were found above EPA's 2016 health advisory amounts, the investigation was to "step out" half of a mile in the "presumed" direction of groundwater flow. If contamination wasn't found at the Navy's level of concern, the investigation didn't "step-out".[18] Homes beyond the Navy's arbitrary investigation boundaries were not eligible for PFAS sampling.

We now know the Navy's incremental 'step-out' investigations did not step-out far enough, or always in the right direction. Contaminated wells and PFAS exposures were missed.

A homeowner living beyond one of the Navy's Phase 1 investigation boundaries in the Oak Harbor area was concerned enough to have the well on her property independently tested. Her own testing found the well serving nine homes, some with children, to be contaminated with PFAS.[19]

After being convinced to test the well, the Navy confirmed levels of PFAS that were reported to be triple the Agency for Toxic Substances and Disease Registry's minimum risk level. Because these levels did not meet Navy's amount of concern, she was left to pay for her own under sink filters and bottled water. The Navy did nothing to provide

alternative water to families relying on the contaminated well.[20] The Navy's subsequent sampling of other wells in the area found other contaminated wells, at least one of which exceeded EPA's health advisory limits and resulted in the Navy providing alternative water supply.

**Washington's Department of Health finds contaminated public water systems beyond the Navy's investigation boundaries.**

- A Public Water System with wells located to the northeast of the Navy's Outlying Field contained nine PFASs totaling over 250 parts per trillion. Levels of PFOA exceeded the previous and current EPA health advisory, the new EPA advisory for PFOA and PFOS, and Washington State Action Levels for PFOS.[21] A dozen or more wells between this contaminated well and the Navy's Outlying Field were not eligible for the Navy's testing.

- A Public Water System serving 116 residents just across the street from a Navy PFAS investigation area in Oak Harbor contained seven PFASs with amounts of PFOA and PFOS exceeding EPA's most recent health advisory level for PFOA and PFOS.[22] Had the Navy found this contamination and 'stepped-out' its investigation in accordance with its policy, approximately twenty wells would have been included in its investigation.

Contamination of these Group A Public Water Systems was only discovered because of very limited sampling sponsored by the Washington Department of Health. Smaller potentially contaminated Group B systems and single party wells were not eligible for testing by the State, and if outside the Navy's investigation boundaries, not eligible for the Navy's testing.

**A Secret Plan and Flawed Investigation**

Residents whose water was "investigated" by the Navy, had no input into what PFASs were tested for or at what detection levels. At the Navy's request, the Island County Health Department kept the Sampling and Analysis Plan for testing the community's water from the public until after testing was underway.[23] [24]

The Navy's (and Island County's) refusal to make the Plan and testing protocols public contradicted claims of being open and transparent. When the investigation plans for Oak Harbor and the Coupeville OLF were finally made public, the names of those responsible for their design and implementation, including Island County officials, were blacked-out.[25]

The results of this flawed investigation did more than determine who would be getting safer water. Results were used to limit eligibility for future and better testing.

In September of 2017, the Department of the Navy changed the way it sampled the community's water for PFAS.[26] Unlike previous sampling, the Navy looked for more PFAS's using more sensitive detection limits. This improved sampling and analysis could identify all, not just some of the PFASs the Navy knew to be leaking to groundwater. It could also detect smaller amounts that would have been missed in previous sampling.

In October of 2017 the Navy offered to re-sample some wells. Had it wanted to identify and reduce exposures, it would have made this improved sampling available to all those in its investigation areas. It didn't. This improved sampling was only available where PFAS had previously been detected, or where PFAS on an adjacent property exceeded 70 ppt of PFOA and PFOS individually or combined.[27]

Wells that may have been contaminated with up to 9 ppt of PFOA and up to 15 ppt of PFOS were effectively excluded from this improved sampling because these levels would not have been detected in the Navy's earlier sampling.[28]

The limited eligibility for the improved sampling excluded potentially contaminated wells and ignored the reality of a spreading plume of contamination that could have reached previously uncontaminated wells. For instance, the well at the County's Rhododendron Park, where children and Little League Teams play, was not eligible for the Navy's improved sampling despite being close to the Navy's OLF and Coupeville's contaminated supply well.

In October of 2019 the Navy confirmed and continued what was in effect, its 'one-test-and-walk away' policy for many well owners.[29] After being criticized for excluding potentially contaminated wells, the Navy stated that it would test any well in its investigation areas *that had not been sampled.* However, the Navy did not send letters to all well owners about the availability of this improved sampling. According to a Navy spokesperson, "We made phone calls to residents we have phone numbers for."[30]

**Levels of PFAS in water distributed to homes, schools, and the hospital in Coupeville are increasing and now exceed EPA's current Health Advisory.**

The Navy's Out Lying Field is the undisputed source of the PFASs in Coupeville's water and area private wells. The public was led to believe that the filtration system provided by the Navy would drop levels in the Coupeville's water below EPA's Health Advisory Limit, and probably below levels that could be detected by the laboratory. Instead, PFASs have steadily increased since early 2021.

According to after treatment test results, PFAS's totaled 42.9 ppt in May of 2022 compared to less than 1 ppt in February of 2021.[31] The May 2022 levels of PFOA (the last posted as of this report date) exceed EPA's current Health Advisory Level for PFOA and are approaching Washington State's proposed Action Level.

The upward trend of contamination in Coupeville's water has not been attributed to problems with its PFAS filtration system. It has been attributed to the amounts of PFASs leaking from the Outlying Field.[32] PFASs in a private well downstream from the OLF increased from 250 ppt in 2018 to 413 when last sampled in 2021.[33]

OLF on-site inspection reports reflect the upward trend in levels of PFOA and PFOS in OLF monitoring wells on both the East and West side of the runway—and in shallow, medium, and deep groundwater levels.[34] These are the PFAS's of greatest concern being targeted by updated state and federal health advisories.

Both were found in soil samples from the surface to a depth of 100 feet in "release areas" on the OLF. Levels of PFAS's found at shallower were much higher than those found above the water table levels. Rainwater seeping through the OLF's soils will continue to carry PFAS to groundwater and increase levels of contamination expected to impact off site locations in estimated time frames stretching far into the future.[35]

Potential PFAS "release areas" are scheduled for investigation on the West side of the OLF where Coupeville's Keystone well is located. These areas correspond with locations identified by residents who witnessed foam being sprayed up and down the OLF's runway in years past. This, and information about the 1985 jet crash next to the OLF runway was given to the Navy at its public meetings and not acted on at least five years ago.[36]

**PFAS contaminated stormwater from the Navy's Oak Harbor property runs through farmland and waters classified by the State as "extraordinary" for aquatic life uses, protected shellfish harvesting, and threatened and endangered species.[37]**

These discharges were first made public in an October 2018 news article when the Navy announced that two PFASs had been found in stormwater draining to Clover Valley Creek and Duagalla Bay.[38] The Navy waited a year to tell the public that six PFASs, not just two, had been found.[39]

After news coverage of the issue in November and December 2019, the Navy stopped the sampling program that revealed the contamination—or stopped making the results public. The last PFAS sampling results posted for public view were for September of 2019.[40]

The two PFASs the Navy first admitted to finding were PFOA and PFOS. Also found in every sample taken from September 2018 through September 2019 were PFHXS, PFHXA, PFHPA, and PFBS. Of the six chemicals found, PFHXS was found at the highest level—up to 90.8 parts per trillion (ppt). PFHXS is linked to child development and other health problems and takes about 8 years for the body to rid itself of just half of what it accumulated. PFOA was found up to 39.3 and PFOS up to 143 ppt. Both were many times the level of State, ATSDR, and EPA health advisories. The total of all PFASs in a monthly sample was as high as 266 ppt.[41]

There are about 114 properties in the Clover Creek and Lake area where groundwater and surface water were used for irrigating.[42] Cattle grazed on grass flooded by PFAS containing water. Swans, Geese and Ducks can be seen in the same fields and in the contaminated water nearby.

The Navy was quick to say that contaminated surface water doesn't mean groundwater is contaminated. But, buried within the Navy's websites were summaries of test results from January 2019 showing the contamination of three Clover Creek area wells with PFOA, PFHXS and/or PFBS.[43] The family with the most contaminated well didn't receive results until October 21, 2019. The well contained PFOA at 19.2 ppt and PFHXS at 33.6 ppt.

The Navy's practice has been to phone well owners if their test results exceed EPA's Health Advisory Level of 70 ppt for PFOA and PFOS—but not tell them if lesser amounts or other PFASs were found.[44]

The EPA proposed a NPDES and Storm Water Permit for Whidbey Naval Air after determining its identifying discharges as "significant contributors to of pollutants to the waters of the United States.[45] EPA permit writers were unaware of the PFAS being found when the permit was drafted. Neither did they know the chemicals had been found in in nearby drinking water wells.[46] The public comment period on the proposed permit ended November 14, 2019, much of it having passed without the public and EPA permitting personnel knowing about the PFASs.[47]

The Navy's illicit PFAS discharges were also unknown to the Washington Department of Ecology, on and before June 20, 2019, when it granted Clean Water Act 401 Final Certification for Permit WAS026611. That certification was based, in part, on conformance with the "prohibition on discharges that cause or tend to cause pollution of waters of the state of Washington."[48]

The waters of Dugualla Bay and the Strait of Juan de Fuca are rated as "extraordinary" in terms of their importance and value to marine life. Ironically, the proposed EPA Permit called on the Navy to educate the public about "Resident Killer Whales"—but it didn't require monitoring for the PFASs known to accumulate in those endangered marine mammals and fish.[49]

Citizens wanting to know all the chemicals found in the Creek were told at the Navy's April 2019 Restoration Advisory Board meeting that the analysis reports were completed but not available. WNAS Commander Arny stated that providing the complete analysis reports was an "action item."[50] It was an action never taken.

According to EPA permit documents, contaminants in the stormwater include: AFFF (Aqueous Film Forming Foam), petroleum, oil, lubricants, steam condensate, cleaners, solvents, metals, and paint. Beside the PFASs in the foam, ingredients may include: butyl carbitol; and hydrocarbon surfactants; ethylene glycol and urea.[51]

The Navy's Stormwater Pollution Prevention Plan that was produced in response to a Freedom of Information Act Request at the time of the permit challenge was heavily redacted to conceal information about leaks from "Fire Suppression Systems."[52] These systems contained the fire-fighting foam with PFAS.

The Navy attributed the PFAS in its stormwater to "historically contaminated groundwater entering its sewer system." However, documents regarding the Navy's internal investigation suggests otherwise:[53]

- Releases occurred during the "testing of hanger and other fixed systems" and from the collecting and storing of "spent AFFF solution". AFFF systems are referenced for Hanger 6, Hanger 8, Hanger 9 Hanger 11, and the C-40 hanger.
- PFAS was found in the storm water sewer line leading from a ground support maintenance shop towards Hanger 6.
- Samples collected in November 2018 "indicate contamination is not limited to Hanger 6. Elevated PFAS levels were found in the two laterals leading from Hanger 8/10 and 11 at levels of 843 ppt (parts per trillion) and 31.
- PFASs were found at 122,000 ppt in an oil water separator on the north side of the hanger that formerly served the interior trench drains.
- PFAS were found at 639 ppt in a storm sewer line leading from building 995 ground support maintenance shop towards hanger 6.

- PFASs above EPA's advisory limit were also found in a Clover Creek tributary leading from the former Area 6 landfill to the runway ditches. In addition to PFAS, Area 6 landfill contains 1,4 Dioxane, Trichloroethylene, Dichloroethene, Trichloroethane, and Vinyl Chloride.
- A May 2017 Navy document noted, "Currently approximately 70,000 gallons of AFFF-contaminated water is being stored in tanks that are not designed for long term storage and may be leaking to the environment."

The Navy has released no information to indicate PFASs have stopped seeping to the aquifer or discharging to Clover Valley Creek, Clover Valley Lake, Dugualla Bay and the Straight of Juan DeFuca.

**EPA's new and far more protective advisory levels of June 2022 and Washington State's PFAS Action Levels are being ignored by the Navy**

When it decides which PFAS victims do or don't get clean water, the Navy still relies on EPA's outdated Health Advisory of 2016 in its decision making. The EPA's June 2022 updated and far more protective Health Advisory for PFASs is being ignored. Also ignored are the US Department of Health ATSDR minimum risk levels and Washington State's proposed PFAS action levels.

According to EPA, "Health effects may occur with concentrations of PFOA or PFOS in water that are near zero." [54]The Lifetime Health Advisory for each has been lowered from 70 parts per trillion to less the one part per trillion—equivalent to one drop of water in twenty Olympic sized swimming pools."

EPA based its decision on the "best available peer-reviewed science" linking PFASs to child development disorders, cancers, immune system disorders and other harms. This is the science the Navy has chosen to ignore.

PFASs accumulate in the body, which is why people drinking contaminated water for years would be expected to have higher than average levels in their bodies and be at greater risk of health harms. The average PFOA blood levels in the general U.S. population in 2017-2018 was 1.4 parts per billion (or 1,400 ppt).[55] A resident relying on a contaminated well near the Navy's Outlying Field reported a PFOA blood level of 71 parts per billion (71,000 ppt).[56] Health studies near other military installations have documented increased PFAS levels in the blood of nearby residents.

The Navy's refusal to consider the new EPA Health Advisory Level, Washington State PFAS Action Levels, or ATSDR's minimum risk levels in its decision making, flies in the face of its stated commitment to reduce PFAS exposures. This refusal also contradicts Department of Navy Policy calling for, "immediate action to remove imminent threats to human health and the environment."[57]

In 2017, a Whidbey Naval Air Station Emergency Action Memorandum, signed by the WNAS Commander, acknowledged that EPA's advisory levels might be lowered—in which case "all analytical data from all residences' drinking water sampled" were to be "re-evaluated." If, "additional adversely impacted drinking water" were indicated, "additional removal actions by the Navy may be warranted (i.e., alternate drinking water to impacted residents)."[58]

The Navy's bi-annual sampling program of eligible drinking water sources was supposed to, "ensure residents living near our installations are not being exposed to PFAS in off-base drinking water." [59] Sampling results from September 6, 2016, to June 6, 2022, identified thirty (30) drinking water sources with PFAS *over* EPA's previous Health Advisory Limit. However, PFASs in more one hundred (100) samples exceeded EPA's New Health Advisories.[60] Over thirty (30) samples exceed Washington State's PFAS Action Levels for one or more of six PFASs.[61]

The reality of "additional adversely impacted drinking water" on Whidbey Island has been well documented, and the Navy has the names and addresses of many residents for whom PFAS exposures continue. The following common-sense actions, if taken is a timely manner, will reduce exposures and risks to public health.

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**REQUESTS FOR NEEDED ACTIONS:**

1. The Navy should immediately contact the owners of the Group A Public Water Systems that were found by the State Health Department to be contaminated with PFASs exceeding EPA's previous health Advisory. Pursuant to current Navy/DoD policy, they should be offered clean water options, including connection to clean water systems,

whole-house filtration, or a new well in an uncontaminated area.

2. The Navy should extend its investigation boundaries to include other potentially contaminated wells in the area. The names and addresses of these well owners are a matter of public record.

3. All well owners in the Navy's investigation areas who did not have their water sampled for the Navy's updated list of PFASs should be notified, in writing, of the opportunity to have their water tested. The lowest achievable detection and reporting limits should be used in the analysis. This includes the wells sampled for just two PFAS in November 2016 through July 2017, sampling events that were not included in the Navy's follow-up biannual sampling. The Navy has the names and addresses of these well owners.

4. The Navy should track the location of wells with PFAS detections to ascertain the direction and extent of groundwater contamination. The general location of these wells can be revealed, as has been done in other places, without violating the privacy rights of well owners. This information should be shared with the County and State Health Departments and be made available to the public. This allows people living in potentially contaminated areas to take steps to protect themselves (such as installing in-home water filters)) and track progress in efforts to contain and remediate contamination.

5. The Navy should do targeted soil sampling and/or sampling of wells located near historic Island County fire stations and fire training areas. According to former County employees, the Navy gave surplus fire-fighting foam to the County for fire-fighting training. The Navy should want to know if people living near these potentially contaminated sites are exposed or at risk.

6. The Navy should resume regular PFAS sampling at stormwater discharge points to Clover Valley Creek, in Clover Valley Lake, and the discharge point to Dugualla Bay. The results of this sampling should be posted on a publicly accessible Navy website. The sampling results of Navy groundwater monitoring wells near Clover Valley Creek should also be posted.

7. The Navy should post an unredacted Stormwater Prevention Plan and status reports on efforts to contain or remediate PFAS leaking to groundwater and stormwater.

8. The Navy's PFAS bi-annual sampling results posted on the Department of Defense website should identify the general location where the sample was taken (such as the investigation and phase area). The Navy should also note if samples were taken from a single family well or public supply well that might be serving hundreds of homes. No such information is currently provided.

9. The PFAS Treatment System for Coupeville's water, which the Navy pays for, should be upgraded to eliminate the PFAS not being captured, including PFOA that now exceeds EPA's current Health Advisory. The Navy should post monitoring results that clearly identify the post treatment levels of PFAS in water distributed to water customers. The Town of Coupeville has failed to do so.

The Navy's documents that hard to find may have been moved or taken down. Requests for the referenced documents may be emailed to: kendra.r.clubb.civ@us.navy.mil, laura.m.himes.civ@us.navy.mil, michael.welding@navy.mil, or leslie.yuenger@navy.mil.

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[1] This report was prepared as a contribution to the community. The author conducted on-site PFAS investigations in five states as consultant to the United Steelworkers and a researcher/investigator for law firms representing PFAS and other toxic pollution victims; Southern Regional Organizer for the National Toxics Campaign; Director Texans United Education Fund (Environmental); Director, Hazardous Waste Project for the Texas Center for Policy Studies. Work History at richardabrahamconsulting.com.

[2] Sole Source Aquifers for Drinking Water, US EPA, https://www.epa.gov/dwssa

[3] EPA Lifetime Health Advisories as of June 2022: PFOA .004 ppt (4 ppt Minimum Reporting Level Limit); PFOS .02 ppt (4 ppt Minimum Reporting Level Limit); Gen X Chemicals 10 ppt (5 ppt Minimum Reporting Level Limit); PFBS 2000 ppt (3 ppt Minimum Reporting Level Limit). https://www.epa.gov .

[4] Washington State Action Levels (SAL) effective January 1, 2022: PFOA (10 ppt), PFOS (15 ppt), PFHxS (65 ppt), PFNA (9 ppt), and PFBS (345 ppt). Detections over the SALs by affected water systems are supposed to trigger monitoring, reporting, and public notification. https://doh.wa.gov

[5] Ault Field and OLF Coupeville Phase 1 Drinking Water Sampling Poster, December 2016.pdf, https://pacific.navfac.navy.mil .
[6] OLF Coupeville Off-Base Drinking Water Sampling Fact Sheet Update, January 2018.pdf, https://pacific.navfac.navy.mil.
[7] In 2012 the EPA added a requirement to the Third Unregulated Contaminant Monitoring Rule (UCMR 3).requiring all large and 800 small public water systems (PWS) to test for six PFASs of concern between 2013 and 2015.; Phase 2 Ault Field Off-Base Drinking Water Sampling Fact Sheet, February 2017.pdf https://pacific.navfac.navy.mil .
[8] 10/11/16, "Analytical Report for Service Request No: K1611172, 10/11/16," The Navy found PFOA, PFHpA, PFHxS, PFHxA and PFBS on Navy property, The Navy only looked for PFOA, PFOS, and PFBS in the community; Final Sampling and Analysis Plan Investigation of Perfluorinated Compounds in Drinking Water Oak Harbor January 2017.pdf and Final Sampling and Analysis Plan Investigation of Perfluorinated Compounds in Drinking Water Outlying Landing Field Coupeville, Janu.pdf,; https://pacific.navfac.navy.mil .
[9] Restoration Advisory Board Presentation, https://pacific.navfac.navy.mil .
PFOS was found in OLF monitoring wells MW05M, MW14M, MW03D and MW07M at 3.26, .898, .914, and .844 ppt respectively. These were below the Detection Limit used in the Navy's PFOS analysis of community water. PFBS was found in OLF monitoring wells MW05S and MW09M at 11.2 and 12.9 ppt respectively. The Detection Limit for PFBS in the Navy's community investigation was between 44 and 50 ppt, (Sources: Table 1 Navy Results of PFOS, PFOA and PFBS in Groundwater, Outlying Landing Field Coupeville; Restoration Advisory Board Presentation, https://pacific.navfac.navy.mil .
[10] "U.S. EPA finds C-8 in drinking water near Circleville," Akron Beacon Journal (Ohio), 8/17/05. This site was investigated by the author in 2005.
[11] Ault Field and OLF Coupeville Drinking Water Investigation Results (2016-2017), https://pacific.navfac.navy.mil .
[12] Final Sampling and Analysis Plan Investigation of Perfluorinated Compounds in Drinking Water Oak Harbor, January 2017.pdf; Final Sampling and Analysis Plan Investigation of Perfluorinated Compounds in Drinking Water Outlying Landing Field Coupeville, Janu.pdf, https://pacific.navfac.navy.mil .
[13] November 2016 Test America email to R. Abraham identifying PFOA Reporting Limit of 2 ng/L (ppt) and Method Detection Limit of .748 ng/L (less than 1 ppt); Limits and MDLs from Laboratory Data in New Jersey Department of Environmental Quality Laboratory PFAS Data Base, 2015. https://dep.nj.gov .
[14] Final SAP Site Inspection for Perfluorinated Compounds in Groundwater, January 2017.pdf; Final SAP Site Inspection for Perfluorinated Compounds in Groundwater, January 2017.pdf, https://pacific.navfac.navy.mil .
[15] Department of Ecology, Quality Assurance Project Plan, Survey of Per- and Poly-fluoroalkyl Substances (PFASs) in Rivers and Lakes, 2016, https://ecology.wa.gov/.
[16] "A DL may be used as the lowest concentration for reliably reporting a detection of a specific analyte in a specific matrix with a specific method with 99% confidence," (DoD Quality System Manual [QSM] version 5.1, 2017). https://pacific.navfac.navy.mil .
[17] 1/23/17 letter from G.C. Moore, Captain US Navy Commanding Officer, attached sample results addressed to Rhododendron Park, Coupeville, WA.
[18] Off-base Drinking Water Sampling Near Ault field and OLF Coupeville, Ault Field and OLF Coupeville Phase 2 Drinking Water Sampling Poster, February 2017.pdf, "Ault Field: The Phase 3 sampling area includes a step-out a half-mile in the direction of groundwater flow from a Phase 2 exceedance of the PFOS and/or PFOA LHA"; "OLF Coupeville: A Phase 3 sampling area will not be established as Phase 2 data did not identify any additional drinking water samples above the LHA.", https://pacific.navfac.navy.mil .
[19] Case 2:19-cv-00167, Filed 02/05/19 United States District Court for the Western District of Washington at Seattle; Jessie Stensland,, "Federal lawsuit filed over drinking water contamination on Whidbey," Whidbey News Times, Feb 5, 2019.
[20] Case 2:19-cv-00167, Filed 02/05/19 United States District Court for the Western District of Washington at Seattle; Jessie Stensland,, "Federal lawsuit filed over drinking water contamination on Whidbey," Whidbey News Times, Feb 5, 2019.
[21] Washington State Department of Health, March 2022 Post Treatment Sample Result for Harrington Lagoon Water Assn., WSID 31440P. Division of Environmental Health, Office of Drinking Water, https://doh.wa.gov
[22] Washington State Department of Health Office of Drinking Water, Division of Environmental Health, Office of Drinking Water, February 2022 Post Treatment Sample Result for Whispering Pines Homeowners Coop, WSID 88215V, https://doh.wa.gov
[23] 10/31/16 Request to Island County Board of Health from R. Abraham and emailed denial response of 11/23/16; 2/3/2017 R. Abraham public records request for Final Sampling and Analysis Plan. The Island County Health Dept. is described by the Navy as a "partner," participated in the development of the plan to test wells in the community and helped with the Navy's "messaging" to the public.
[24] 10-27-16 email from Leibman, Kendra R CIV NAVFAC NW, EV32. Sent to Doug Kelly, Rhonda Kaetzel, Steve Hulsman requesting feedback on attached "Draft SAP for the off-base drinking water sampling effort near OLF Coupeville." Email obtained in response to a Public Records Request.
[25] Final Sampling and Analysis Plan Investigation of Perfluorinated Compounds in Drinking Water Oak Harbor, January 2017.pdf, Final Sampling and Analysis Plan Investigation of Perfluorinated Compounds in Drinking Water Outlying Landing Field Coupeville, Janu.pdf, https://pacific.navfac.navy.mil
[26] 9/14/15 Navy Drinking Water Sampling Policy for Perfluorochemicals Perfluorooctane Sulfonate and Perfluoroocatonoic Acid, From: Director, Energy and Environmental Readiness (OPNAV N45), To: Commander, Navy Installations Command (N4), secnav.navy.gov
[27] Navy Drinking Water Summary, September 2017; Final Sampling and Analysis Plan Periodic Off-Base Drinking Water Sampling, OLF and Ault Field, October 2017.pdf https://pacific.navfac.navy.mil
[28] Ault Field and OLF Coupeville Drinking Water Investigation Results (2016-2017), https://pacific.navfac.navy.mil
[29] 10-25-19 Email to R. Abraham from Public Affair Officer, Johnson, James K CIV USN NAVFAC NW SVD WA (USA), "Any well owner within these areas can have their 'drinking water well' tested, provided the well was not already tested by the Navy.; Any well owners whose wells were previously sampled, and no detections being found, can only have their well re-tested if their property is adjacent to a well were PFOA/PFOS exceeded EPA's Health Advisory Level of 70 ppt individually or combined..
[30] 7-8-22 email to R. Abraham from Clubb, Kendra R CIV USN NAVFAC NW SVD WA (USA).
[31] Town of Coupeville Water Utility website posted test results, https://townofcoupeville.org
[32] Personal communication with Coupeville employee regarding the operation of the filtration system and increasing levels of PFAS.
[33] Navy bi-annual sampling results from November 2018 to October 2021 (the last date available) of private well on Big Cedar Lane.
[34] OLF Coupeville SSI Report Addendum, Jan 2022, https://pacific.navfac.navy.mil
[35] OLF Coupeville SSI Report Addendum, Jan 2022, https://pacific.navfac.navy.mil

[36] Information provided to Navy representatives by the author and others at Navy sponsored public information meeting in 2017. The information was characterized by Navy the representative as not important.
[37] EPA Fact Sheet for NPDES Permit # WAS026611, states that Clover Valley Creek and Lagoon are, "protected for core summer salmonid habitat; extraordinary primary contact recreation; water supply uses (domestic, industrial, agricultural, stock); and miscellaneous uses (wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics)."; PFAS (polyfluoroalkyl or perfluoroalkyl) chemicals are harmful to humans, persistent in the environment, and accumulate in fish, and marine mammals. US EPA, https://www.epa.gov
[38] 10-23-2018, By Laura Guido, "Routine Maintenance Reveals Firefighting Foam in Base Stormwater," Whidbey News Times., "In early October, results came back that showed the contaminates were leaving the base via the creek. Results found 172 ppt at the installation's eastern boundary and 149 ppt near the inlet to Dugualla Bay."
[39] 11-1-2019, R. Abraham, "Navy withheld info on water contamination," Whidbey News Times, Letter to The Editor:
[40] 11-10-2019, Hal Bernton, "Chemicals contaminate Whidbey Island storm-water runoff from Naval Air Station," Seattle Times
[41] Clover Valley Creek Surface Water Sampling Results posted on Restoration Advisory Boards Website, https://navfac.navy.mil/NWPFAS
[42] September 2019, EPA Fact Sheet for NPDES Permit # WAS026611, Clover Valley Creek is, "protected for core summer salmonid habitat; extraordinary primary contact recreation; water supply uses (domestic, industrial, agricultural, stock); and miscellaneous uses (wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics)."; Personal inspections of the area and interviews with property owners identified surface water and groundwater being used for irrigation.
[43] Ault Field Phase 4 Drinking Water Results, January 2019.pdf, Ault Field Phase 4 Drinking Water Sampling Poster, January 2019.pdf
[44] 10/24/2019, Personal conversation with Kendra Leibman, Co-chair, Navy Restoration Advisory Board meeting
[45] U.S. EPA Designation of Naval Air Station Whidbey Island as a Small Municipal Separate Storm Sewer System (MS4), US EPA, https://www.epa.gov
[46] Author's telephone conversation with Misha Vakoc, EPA Region 10 Municipal Stormwater Coordinator, wherein she stated that she and other permitting personnel were unaware of the Navy's PFAS sampling results.
[47] 9/30/19 Public Notice: Proposed Stormwater Permit for Naval Air Station on Whidbey Island in Washington. EPA proposed to "designate the Municipal Separate Storm Sewer System (MS4) owned and operated by Naval Air Station Whidbey Island as a regulated small MS4 and simultaneously issue a National Pollutant Discharge Elimination System (NPDES) stormwater permit to Naval Air Station Whidbey Island." US EPA, https://www.epa.gov
[48] 6/20/2019, letter to Michael Lidgard, Manager Permitting, Drinking Water & Infrastructure Branch, Water Division EPA from State of Washington Department of Ecology Program Services Section, Water Quality Program. RE: Clean water Act Section 401 Certification EPA National Pollutant Discharge System Permit WAS-026611; Administrative Order 16552, US Naval Air Station Whidbey Island, Attached Administrative Order 16552; Revised Code of Washington 90.48.080, Discharge of polluting matter in waters prohibited.
[49] Chemicals within this family are known to have impacts on some vertebrates that are consistent with the reproductive (and other) problems experienced by Endangered Species Act (ESA) listed Southern Resident Orca. The Governor's Southern Resident Orca Task Force considered "legacy and new toxic contaminants" as one of three primary factors threatening this population. p. 73, Southern Resident Orca Task Force Report and Recommendations, Nov.16, 2018. https://www.governor.wa.gov/sites/default/files/OrcaTaskForce_reportandrecommendations_11.16.18. Earlier drafts of Task Force recommendations specifically include PFAS. See p. 25, Draft Orca Task Force recommendations – October 24, 2018. https://www.governor.wa.gov/sites/default/files/Draft_recommendations_OrcaTaskForce_10-24-18.pdf. While this recommendation is couched in terms of cleanup in central Puget Sound, the omission of the PFAS emanating from NAS Whidbey is likely because it was unknown.
[50] 4/4/2019 Meeting Minutes reflect citizens' questions and the Navy responses: "What else was found in Clover Creek and the drainage ditch leading to Clover Creek besides PFOA and PFOS? I understand 14 compounds were tested. Ms. Leibman and Ms. Bengston did not have the results with them at the meeting…Captain Arny added an action item to provide the results to Mr. Abraham." Restoration Advisory Boards, https://navfac.navy.mil/NWPFAS
[51] U.S. Environmental Protection Agency Designation of Naval Air Station Whidbey Island as a Small Municipal Separate Storm Sewer System (MS4), https://www.epa.gov
[52] Stormwater Pollution Prevention Plan, Naval Air Station Whidbey Island, December 2015. The unredacted Naval Air Station Whidbey Island Phase II Stormwater Management Program Plan is dated March 2022. https://pacific.navfac.navy.mil
[53] These documents were provided by an anonymous person(s) following news coverage of the issue. Copies are available.
[54] 6-15-22, EPA News Release, US EPA, https://www.epa.gov
[55] PFAS in the US Population, Agency for Toxic Substances and Disease Registry. https://www.atsdr.cdc.gov
[56] Personal communication
[57] Final Action Memorandum, Point-of-Use Drinking Water Treatment, April 2018.pdf https://pacific.navfac.navy.mil
[58] Final Emergency Response Action Memorandum, Ault Field, OLF Coupeville, February 2017.pdf, https://pacific.navfac.navy.mil
[59] PFAS Groundwater and Drinking Water Investigation, Off-Base PFAS Drinking Water Investigation, Investigations and Response, https://pacific.navfac.navy.mil
[60] Department of Defense Website where PFAS WNAS bi-annual sample results are posted is: https://denix.osd.mil/dod-pfas/section-345-data-search/section-345-data-reporting/.
[61] Washington State Action Levels (SAL) effective January 1, 2022: PFOA (10 ppt), PFOS (15 ppt), PFHxS (65 ppt), PFNA (9 ppt), and PFBS (345 ppt). Detections over the SALs by affected water systems are supposed to trigger monitoring, reporting, and public notification. https://doh.wa.gov