Public Participation Plan

Paine Field Fire Training Pit PFAS Cleanup Site

Snohomish County, WA

Toxics Cleanup Program
Washington State Department of Ecology
Northwest Region Office
Shoreline, Washington

Publication 25-09-145, July 2025

DEPARTMENT OF ECOLOGY
State of Washington

Publication Information

This document is available on the Department of Ecology's Paine Field Fire Training Pit PFAS cleanup site webpage.[1]

Cover photo credit

- Aerial view of the Paine Field Fire Training Pit PFAS site location, 2023, WA State Dept of Ecology

Related Information

- Cleanup Site ID: 16912
- Facility Site ID: 49626114

Contact Information

Toxics Cleanup Program[2]

Northwest Region Office
PO Box 330316
Shoreline, WA 98133-9716
Phone: 206-594-0000

Kristen Forkeutis, Outreach Specialist
Kristen.Forkeutis@ecy.wa.gov
425-240-4353

Northwest Region Office
PO Box 330316
Shoreline, WA 98133-9716
Phone: 206-594-0000

David Unruh, Site Manager
David.Unruh@ecy.wa.gov
206-459-6287

ADA Accessibility

The Department of Ecology is committed to providing people with disabilities access to information and services by meeting or exceeding the requirements of the Americans with Disabilities Act (ADA), Section 504 and 508 of the Rehabilitation Act, and Washington State Policy #188.

To request an ADA accommodation, contact the Ecology ADA Coordinator by phone at 360-407-6831 or email at ecyadacoordinator@ecy.wa.gov. For Washington Relay Service or TTY call 711 or 877-833-6341. Visit Ecology's website[3] for more information.

Language Access

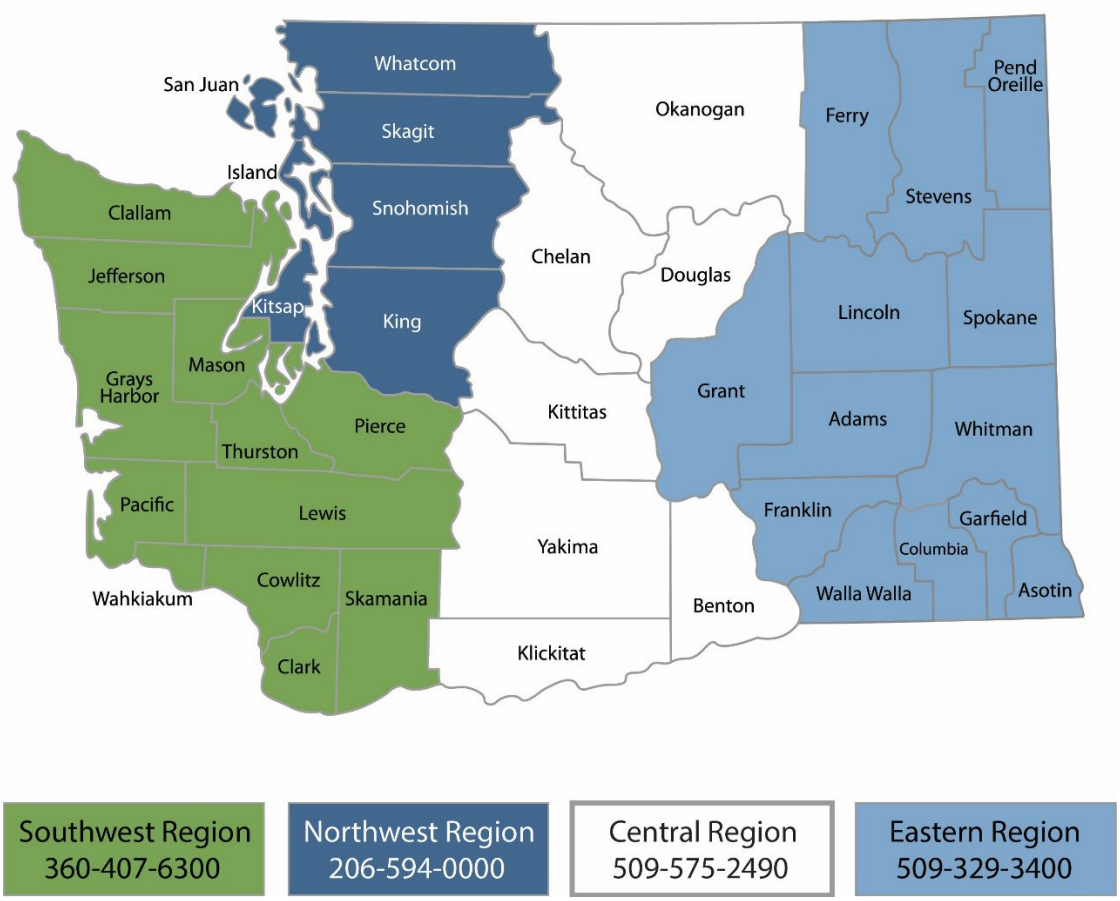
The Department of Ecology offers free translation and interpretation services. If you need help in your preferred language, please call Kristen Forkeutis at 425-240-4353 and request an interpreter, or email Kristen.Forkeutis@ecy.wa.gov.

---

[1] https://apps.ecology.wa.gov/cleanupsearch/site/16912
[2] https://ecology.wa.gov/About-us/Who-we-are/Our-Programs/Toxics-Cleanup
[3] https://ecology.wa.gov/about-us/accessibility-equity/accessibility

Department of Ecology's Region Offices

Map of Counties Served



Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	PO Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	PO Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
Headquarters	Across Washington	PO Box 47600 Olympia, WA 98504	360-407-6000

Table of Contents

Public Involvement in Contamination Cleanup **6**

Site contacts 6

Public Participation Activities **6**

How we share information with the community 7

How to share information with us 8

Public Participation Grants 9

Site Information **10**

Site background 10

Contamination 10

Cleanup plans 11

Neighborhood 11

Environmental Justice 13

Area Community 16

Tribal engagement 17

Washington's Cleanup Laws **17**

Model Toxics Control Act 17

State Environmental Policy Act 18

Plan Amendments **18**

Appendix – Steps in the cleanup process **19**

List of Figures

Figure 1: Paine Field Fire Training Pit PFAS site location 10

Figure 2: 2024 installation of monitoring well..... 10

Figure 3: City of Mukilteo zoning map and approximate cleanup site location..... 12

Figure 4: Washington Environmental Health Disparities Map for Census Tract 041901 with an environmental health risk ranking of 9..... 13

Figure 5: Washington Environmental Health Disparities Map demographic details (age/sex) for Census Tract 041901..... 14

Figure 6: Washington Environmental Health Disparities Map demographic details (race/ethnicity) for Census Tract 041901 14

Figure 7: Washington Environmental Health Disparities Map for Census Tract 042006 with an environmental health risk ranking of 6..... 15

Public Involvement in Contamination Cleanup

The Washington State Department of Ecology (Ecology) developed this public participation plan (plan). The purpose of the plan is to promote meaningful community involvement during cleanup of the Paine Field Fire Training Pit PFAS cleanup site.

This plan outlines how Ecology will keep the public informed about contamination investigations and cleanup options at each stage of the process. Please review the Appendix for more information about the cleanup process. The plan also details when and how the community can participate in the cleanup process. We encourage the public to engage with the decision-making opportunities and provide input.

Site contacts

To be included in the site record, comments about the cleanup process must be submitted during comment periods. Questions and informal comments or information about the site's history are welcome anytime.

WA State Dept of Ecology

Northwest Region Office
PO Box 330316
Shoreline, WA 98133-9716
Phone: 206-594-0000

David Unruh, Site Manager
David.Unruh@ecy.wa.gov
206-459-6287

Kristen Forkeutis, Outreach Specialist
Kristen.Forkeutis@ecy.wa.gov
425-240-4353

Snohomish County, Washington

Paine Field, Snohomish County Airport
Andrew C. Rardin, CM,
Airport Environmental and Wildlife Manager
9901 24th PL W, Suite A, Everett, WA 98204

Andrew.Rardin@snoco.org
425-388-5115

If you are unable to reach these contacts, please visit the Paine Field Fire Training Pit PFAS cleanup site webpage[4] for up-to-date contact information.

Public Participation Activities

Members of the public may ask questions, submit informal comments, or share site information at any time. Interested parties do not need to wait for a formal public comment period to contact Ecology.

However, to be included in the formal site record, comments about the site investigation, cleanup alternatives, or cleanups must be submitted during formal comment periods. In addition, the public is invited to review site documents before they become final. This is the

[4] https://apps.ecology.wa.gov/cleanupsearch/site/16912

most direct and influential way to learn more about the site and be involved in the cleanup's decision-making.

How we share information with the community

During specific stages of the cleanup, Ecology will mail notices about public comment periods to addresses surrounding the site. The mailing list area will vary depending on the type of contamination and where it's located. However, the list will at least include addresses within a 1/4-mile radius of the site and other interested organizations and individuals. These notices will provide general information about the site, contact information for submitting comments, and times and locations of public meetings or hearings or how to request one if not yet scheduled.

Comment period notices will be available online and at document repositories (for example at the library closest to the site). Notices may also be posted in various locations throughout the community (for example, local businesses, schools, or post offices).

Ecology may also develop documents outside of comment periods to keep the community updated on the site's status. These informational documents will be available online and print copies may be mailed to the nearby community if we feel the message warrants the associated cost and resources.

Postal mailing list

Ecology maintains a mailing list that includes addresses within at least a 1/4-mile radius of the site and relevant local, state, and federal government contacts. All contacts receive public comment notices when draft documents are available.

We will add additional individuals, organizations, and other interested parties to the mailing list as requested. If you would like to be added to the mailing list for this site, please contact Kristen Forkeutis at 425-240-4353 or Kristen.Forkeutis@ecy.wa.gov.

Contaminated Site Register

Public comment periods, events, and other cleanup notices are published in Ecology's *Contaminated Site Register*.[5] To receive the *Contaminated Site Register* by email, please subscribe online,[6] or contact Sarah Kellington at sarah.kellington@ecy.wa.gov or 360-280-3167.

Newspaper display ads or legal notices

We announce public comment periods and events for this site in ads or notices published in the *Everett Daily Herald*[7] newspaper and the *Mukilteo Beacon*.[8] We will also publish notice on our Public Input & Events Listing webpage.[9]

---

[5] https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Site-Register-lists-and-data
[6] https://ecology.wa.gov/site-register
[7] https://www.heraldnet.com/about/
[8] https://www.mukilteobeacon.com
[9] https://ecology.wa.gov/Events/Search/Listing

Email lists

Ecology maintains an email list to update interested persons about this site. If you would like to be added to the email list for this site, please contact Kristen Forkeutis at 425-240-4353 or Kristen.Forkeutis@ecy.wa.gov.

Ecology's website and social media platforms

We maintain a website for the Paine Field Fire Training Pit PFAS cleanup site.[10] The website provides site information, and you may download cleanup documents.

We may also share information about cleanup sites through news releases, our ECOconnect blog, and social media.[11]

Automatic site updates

You can subscribe to this site from our Paine Field Fire Training Pit PFAS webpage. You'll receive a weekly email if we change the site's status, add documents to the site's webpage, or open a comment period.

Places to see print documents

During public comment periods, you can find print documents at the following locations:

Mukilteo Library
4675 Harbour Pointe Blvd
Mukilteo, WA 98275
Phone: 425-493-8202

Washington Department of Ecology
Northwest Region Office
15700 Dayton Ave N.
Shoreline, WA 98133-9716

To schedule an appointment with Ecology, please contact the Northwest Region Office Central Records staff at (206) 594-0016 or nwro_public_request@ecy.wa.gov.

If you would like to be mailed print documents, please contact Kristen Forkeutis at 425-240-4353 or Kristen.Forkeutis@ecy.wa.gov.

How to share information with us

We hold public comment periods and sometimes public events to learn your thoughts, opinions, and concerns about cleanup at a site. We may also identify public concerns and cleanup goals by meeting with and soliciting information from interested community members and organizations. To collaborate with us about this site, please contact Kristen Forkeutis at 425-240-4353 or Kristen.Forkeutis@ecy.wa.gov.

[10] https://apps.ecology.wa.gov/cleanupsearch/site/16912
[11] https://ecology.wa.gov/about-us/who-we-are/news

Public comment periods

At a minimum, the Model Toxics Control Act (MTCA, see page 17 for more information) requires 30-day comment periods to allow interested members of the public to comment on draft documents, legal agreements, and proposed cleanup actions. If there is significant interest, Ecology may extend the public comment period.

When Ecology oversees the State Environmental Policy Act (SEPA) determinations (see page 18 for more information), we hold comment periods for at least two weeks and may extend to 30 days or more when other cleanup documents are concurrently available for review.

Following a comment period, we publish all the input we received and respond to significant comments and questions, as appropriate. If the comments result in significant changes to the cleanup documents, then the documents will be revised and re-issued for public review. If the comments do not result in significant changes, the documents will become final.

Public events

We hold public meetings, workshops, open houses, and hearings based on community interest. At meetings, workshops, and open houses, attendees can ask questions, learn more about the site, and submit written comments when a comment period is open. At a public hearing, verbal comments are transcribed for the record, and Ecology responds to them after the comment period in our response to comments.

If we have not scheduled an event, we will hold one if 10 or more people request it. This may cause us to extend a public comment period, so the event occurs during it.

Events are held at locations close to the site that meet Americans with Disabilities Act standards. Public events are always announced in advance using a variety of methods.

Public Participation Grants

Grants may be available to neighborhood committees, non-profits, and other groups interested in the site. For contaminated sites, these funds can be used to:

- Hire an expert to help interpret technical information
- Conduct activities that enhance the public's understanding of, and participation in, the cleanup process

For more information about public participation grants, please contact Laura Busby at 360-280-5088 or laura.busby@ecy.wa.gov and Wendy Kovach at 564-250-2909 or wendy.kovach@ecy.wa.gov. You may also visit the Public Participation Grant website.[12]

[12] https://ecology.wa.gov/PPG

Site Information

Site background

The Paine Field Fire Training Pit PFAS site is located north of 10727 Bernie Webber Drive in Mukilteo, WA, 98275 and airport taxiway K-6. This 30-acre site is located on the western boundary of Paine Field in unincorporated Snohomish County between South Everett and Mukilteo. It is zoned for light industrial use. The site is owned by Snohomish County and includes the southwestern part of the airport and several aircraft hangars.

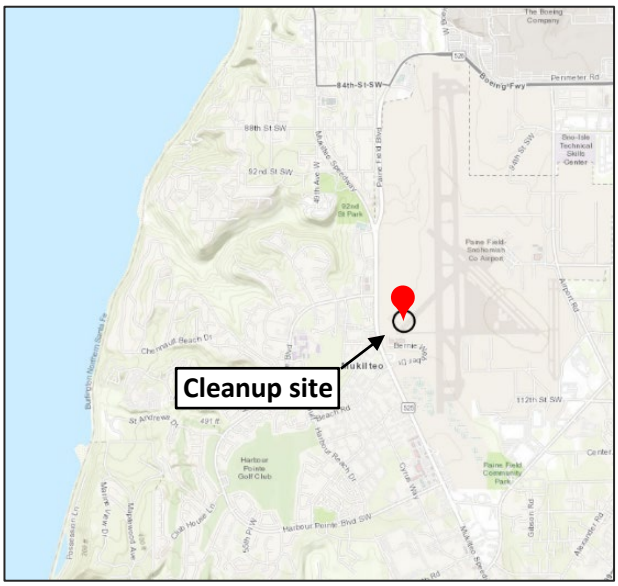


Figure 1: Paine Field Fire Training Pit PFAS site location

Historical uses of the site included firefighting training exercises conducted by Paine Field and local fire departments, as well as equipment calibration and compliance testing required by the Federal Aviation Administration (FAA). Training exercises involved filling a pit in the ground with flammable materials like petroleum and igniting the materials. These fires were extinguished using fire suppressants, including aqueous film forming foam (AFFF), which contains PFAS. Fire truck calibration and FAA compliance testing were conducted by spraying AFFF mixtures directly onto the ground near the fire training pit. These practices were modified in 2019 so that AFFF was no longer discharged onto the ground.

Contamination

Voluntary investigations at the site began in 2018 to understand the extent of PFAS contamination caused by using AFFF during training, calibration, and testing activities. Soil, groundwater, and surface water samples were collected from the area of the fire training pit. The most recent data collected in 2024 shows that contaminated groundwater extends from the intersection of runway 34L-16R and taxiway K-6 west to Mukilteo Speedway. Surface water samples collected from the wetlands to the north and the stormwater pond to the west also contained PFAS. A groundwater user survey completed in 2023 found that no one was using groundwater within a 1-mile radius of the site.

Figure 2: 2024 installation of monitoring well

The following contaminants have been found at concentrations greater than WA State screening levels.

- **Soil:** Perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), and perfluorohexanoic acid (PFHxA)
- **Groundwater:** PFOA, PFOS, PFNA, and PFHxS
- **Surface Water:** PFOA, PFOS, PFNA, and PFHxS

Cleanup plans

In 2025 Ecology will finalize the following documents after considering all the comments received during the public comment period:

- **Agreed Order:** Legal agreement between Ecology and Snohomish County (County) requiring the County to investigate environmental conditions, and complete a remedial investigation, feasibility study, and cleanup action plan.
- **Public Participation Plan:** Describes how Ecology will inform the community about the site activities and ways to become involved.

As part of the agreed order, the County and Ecology will be responsible for working cooperatively to adequately investigate the site and recommend potential options for cleaning up contamination. The County will complete a remedial investigation, feasibility study, and cleanup action plan. Each of these documents will be available for public review and comment.

Neighborhood

The Paine Field Fire Training Pit PFAS site is located on the western boundary of Paine Field adjacent to the City of Mukilteo. The site and Paine Field are part of the SW Everett Industrial Center.[13] The areas east, northeast, and southeast of the site are part of the Paine Field airport grounds. Immediately west of the site—across the Mukilteo Speedway and within the City of Mukilteo—the area is zoned for business (see figure 3). Beyond that, the zoning transitions primarily to residential. Southwest of the site, the land is mostly designated for industrial and commercial use. Open space areas, including the Big Gulch Trail System, are situated within about two miles of the site to the west, southwest, and northwest.

[13] https://everettlink.participate.online/alternatives/sw-everett-industrial-center.html

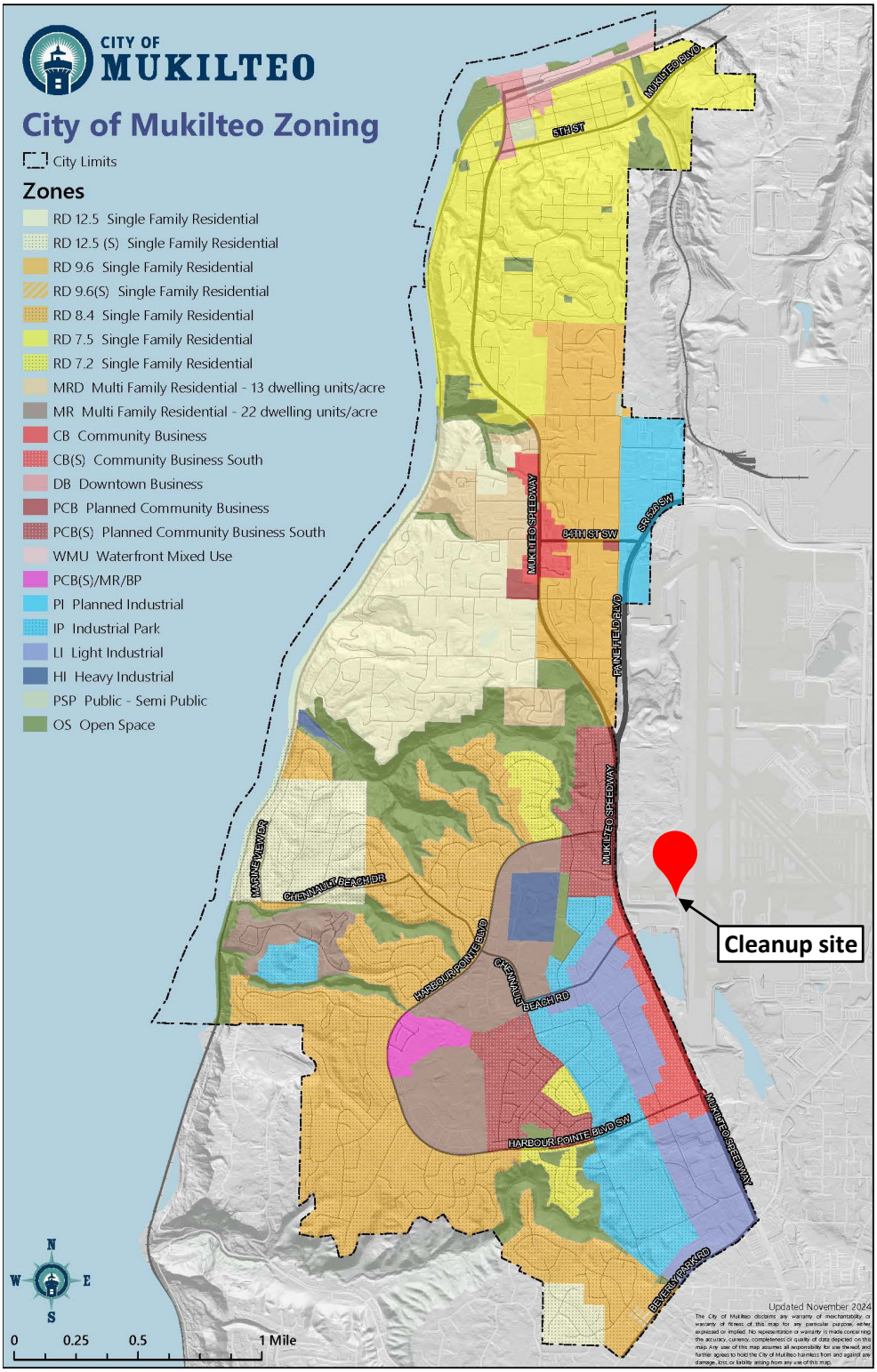


Figure 3: City of Mukilteo zoning map[14] and approximate cleanup site location

[14] https://wa-mukilteo.civicplus.com/DocumentCenter/View/934/Mukilteo-Current-Zoning-2024-PDF?bidId=

Environmental Justice

Ecology uses external data sources to better understand the environmental and demographic information of the communities impacted by cleanup sites. When appropriate Ecology considers special accommodations based on the needs of the community.

WA Environmental Health Disparities Map

The Washington Environmental Health Disparities Map[15] evaluates environmental health risk factors in communities.

Ecology does not interpret rankings as absolute values, and we do not use them to diagnose a community health issue or to label a community. Environmental health disparity is ranked on a scale of 1-10 (low to high) and is relative to other locations in the state.

Census Tract 041901, where the Paine Field Fire Training Pit PFAS site is located, has an environmental health risk ranking of 9 (see Figure 4). Demographic data show that females, ages 20-34, and males, ages 35-49, comprise the largest segment of the population (see Figure 5). White, Asian, and Hispanic individuals make up the highest proportions by race/ethnicity (see Figure 6). It is important to note that the portion of this census tract closest to the site is primarily composed of the Paine Field airport grounds. As a result, these demographics likely reflect the northwest and southern parts of this tract, where most residential populations are located.

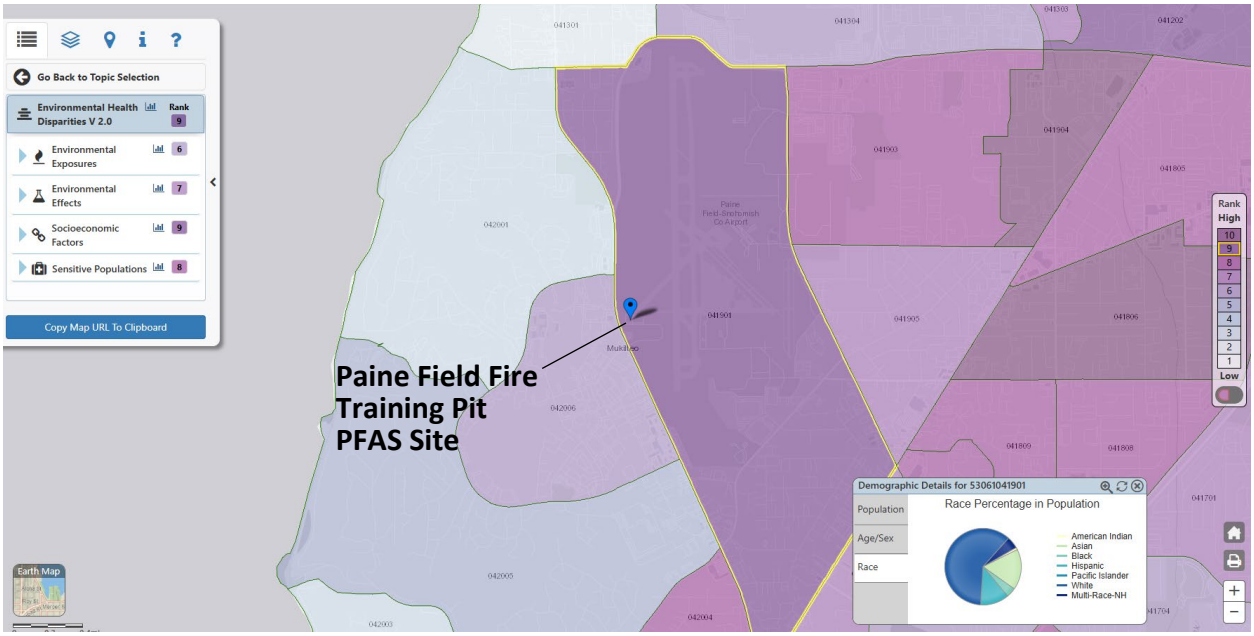


Figure 4: Washington Environmental Health Disparities Map for Census Tract 041901 with an environmental health risk ranking of 9

[15] https://doh.wa.gov/data-and-statistical-reports/washington-tracking-network-wtn/washington-environmental-health-disparities-map

Figure 5: Washington Environmental Health Disparities Map demographic details (age/sex) for Census Tract 041901

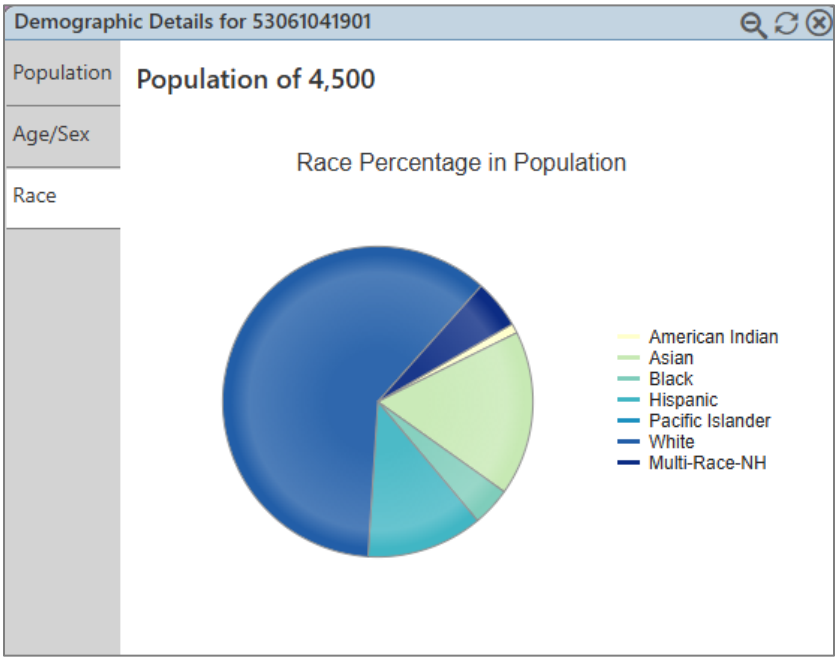


Figure 6: Washington Environmental Health Disparities Map demographic details (race/ethnicity) for Census Tract 041901

The adjacent Census Tract 042006, just west of the site and home to many businesses and residents, has an overall Environmental Health Disparities ranking of 6 (see Figure 7). White, Asian, and Hispanic individuals also make up the highest proportions by race/ethnicity within this tract.

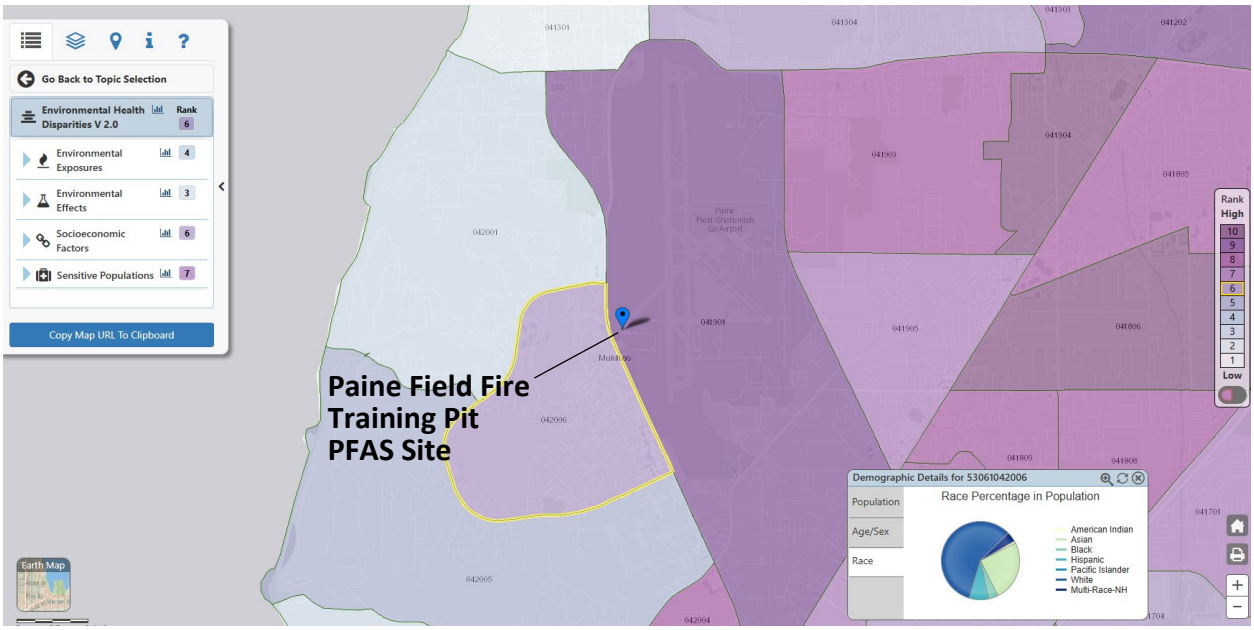


Figure 7: Washington Environmental Health Disparities Map for Census Tract 042006 with an environmental health risk ranking of 6

The Washington State Department of Health mapping tool model was "specifically adapted from CalEnviroScreen – a cumulative environmental impacts assessment mapping tool developed by CalEPA and used in California. It estimates a cumulative environmental health impact score for each census tract reflecting pollutant exposures and factors that affect people's vulnerability to environmental pollution.

The model is based on a conceptual formula of Risk = Threat * Vulnerability, where threat and vulnerability are based on several indicators.

The threat is represented by indicators that account for pollution burden, which is a combination of environmental effects and environmental exposures in communities. Environmental effects include indicators that account for adverse environmental quality generally, even when population contact with an environmental hazard is unknown or uncertain. Environmental exposures include the levels of certain pollutants that populations come into contact with.

Vulnerability is represented by indicators of socioeconomic factors and sensitive populations for which there is clear evidence that they may affect susceptibility or vulnerability to an increased pollution burden. Indicators in socioeconomic factors measure population characteristics that modify the pollution burden itself. Sensitive populations refer to those who are at greater risk due to intrinsic biological vulnerability to environmental stressors.

In the model, threat is multiplied by vulnerability in order to reflect the scientific literature that indicates population characteristics often modify and amplify the impact of pollution exposures on certain vulnerable populations. The rankings help to compare health and social factors that may contribute to disparities in a community."

American Community Survey

The American Community Survey (ACS)[16] is an ongoing survey conducted by the U.S. Census Bureau. It provides updated yearly data on the social, economic, housing, and demographic characteristics of the U.S. population. Ecology uses this information to help identify socioeconomic indicators, including limited English proficient (LEP) populations and languages spoken at home.

Limited English Proficient (LEP) Populations

The 2023 ACS 5-year estimates (at the Public Use Microdata Areas level) include the following LEP data for Snohomish County (West Central, including Mukilteo and Martha), with a total population of 105,383 people.

- **Korean:** 3,078 LEP individuals
- **Spanish:** 2,881 LEP individuals
- **Vietnamese:** 1,687 LEP individuals
- **Chinese (includes Cantonese, Mandarin, and Min Nan Chinese):** 1,180 LEP individuals

Languages Spoken at Home

The percentage of the population that speaks a language other than English at home include the following based on the representative census tracts.

- **Census Tract 419.01** (where the site is located):
  - **51.9%** of the population speaks a language other than English at home
- **Census Tract 420.06** (just west of the site):
  - **38.8%** of the population speaks a language other than English at home

Area Community

Data from the WA Environmental Health Disparities Map and the American Community Survey, in conjunction with community research, helps Ecology plan our public outreach to consider this population's needs.

As part of our public involvement efforts, Ecology will reach out to cultural community organizations (when available) and provide information in other languages as needed and in accordance with federal guidance.[17] Demographic data and community research indicates that the most limited English proficient populations include Spanish, Korean, Vietnamese, and

[16] https://www.census.gov/programs-surveys/acs/about.html
[17] https://www.federalregister.gov/documents/2004/06/25/04-14464/guidance-to-environmental-protection-agency-financial-assistance-recipients-regarding-title-vi

Chinese. These alone make up more than 5% of the population of Snohomish County (West Central). Additionally, the non-English languages most widely spoken at home include Spanish and Korean. In response, fact sheets for this site will be translated into Spanish, Korean, Vietnamese, and Chinese, and available on the site webpage.

To request information in another language, call Kristen Forkeutis at 425-240-4353 or email Kristen.Forkeutis@ecy.wa.gov. If calling for interpretation services, please ask for an interpreter and stay on the line while we connect you.

We strive to make our public participation efforts as inclusive as possible and welcome your input about how to best reach the nearby community.

Tribal engagement

The following Tribes could be affected by the contamination, and the cleanup process may also uncover cultural resources.

- Tulalip Tribes
- Stillaguamish Tribe
- Sauk-Suiattle Tribe
- Suquamish Tribe
- Snoqualmie Tribe
- Swinomish Tribe

We will reach out to these Tribes to offer opportunities to engage with Ecology in the cleanup process.

Washington's Cleanup Laws

Ecology uses the Model Toxics Control Act (MTCA)[18] and accompanying regulations for cleanup activities. Passed in 1989, MTCA provides guidelines for contaminated site cleanup in Washington state. This law sets standards to ensure the cleanup protects human health and the environment. MTCA requires the creation of this plan.

Model Toxics Control Act

MTCA began in 1988 as a citizen-led effort to clean up contaminated sites in Washington state. The law holds property owners or operators responsible for cleaning up contamination on, or coming from, their property.

Ecology carries out MTCA, making sure cleanups happen according to state rules and regulations. These rules are found in Chapter 173-340 Washington Administrative Code (WAC).[19] Ecology investigates reports of contamination, and the property is placed on the

[18] https://www.ecology.wa.gov/mtca
[19] https://apps.ecology.wa.gov/publications/publications/9406.pdf

Contaminated Sites List,[20] if the pollution is determined to pose a serious risk to human health or the environment. This starts the cleanup process at the site.

The cleanup process under MTCA includes several steps (see Appendix). Public involvement is a key part of MTCA's cleanup process.[21] Nearby residents, businesses, community groups, and other interested parties can review and comment on documents related to steps that make crucial decisions or plans regarding the cleanup.

State Environmental Policy Act

MTCA cleanups also require evaluation under the State Environmental Policy Act (SEPA).[22] Under SEPA, the potential for significant adverse environmental impacts from a project or action must be evaluated by state and local agencies when making decisions. This evaluation is subject to public review and comment in parallel with cleanup documents.

Plan Amendments

Ecology developed this plan following MTCA regulations (WAC 173-340-600). We review it as the cleanup progresses and amend it as necessary. You may suggest amendments to Kristen Forkeutis at 425-240-4353 or Kristen.Forkeutis@ecy.wa.gov.

This plan intends to provide the public with information on opportunities for public involvement and comment. The outreach activities discussed reflect Ecology's current plans to keep the public informed. It also provides ways for those interested in the site to communicate their concerns and questions to us.

If you feel the planned outreach activities and mechanisms found in this plan are insufficient or would like to modify them in some way, please contact us. We will work to find solutions. We can implement new activities or outreach tools right away, with or without amending this plan.

[20] https://apps.ecology.wa.gov/cleanupsearch/reports/cleanup/contaminated
[21] https://ecology.wa.gov/MTCA-process
[22] https://app.leg.wa.gov/WAC/default.aspx?cite=197-11

Appendix – Steps in the cleanup process

The cleanup process is defined in the Model Toxics Control Act (MTCA), Washington's cleanup law. See the accessible PDF on the next page for details.

Washington's Cleanup Process

Public participation plans and comment periods are only required for cleanups under a legal agreement with Ecology. Otherwise, all cleanups follow the same steps. The steps are defined by Washington's cleanup law, the Model Toxics Control Act.

DEPARTMENT OF ECOLOGY State of Washington

Public input opportunity

Initial investigation
Find out if there's contamination needing cleanup.

Assess the site
Evaluate potential threat to humans and the environment.

Study the site (remedial investigation)
- Find out what and where the contamination is.
- Determine how contamination might impact living things.

Consider options (feasibility study)
- Compare ways to keep the contamination from harming people or the environment.
- Weigh benefits versus costs of each cleanup option.

Plan the cleanup (cleanup action plan)
- Describe Ecology's selected cleanup option.
- Set cleanup standards that will protect living things.
- Schedule next steps.
- Set requirements for monitoring and maintenance.

Design the cleanup
Make detailed construction plans for the cleanup action.

Clean up the site!
Complete the cleanup action. For example:
- Constructing a multi-layered capping system.
- Installing a treatment system.
- Removing contamination to a special landfill.

Monitor, maintain, and review
- Operate treatment systems and monitor progress.
- Prevent activities that could disturb the cleanup.
- Review regularly to ensure cleanup still protects living things.

Remove from Contaminated Sites List
Move to No Further Action list if site meets all standards and requirements.

Interim actions may clean up some contamination before the final cleanup.

Legal orders or agreements define required tasks and schedules.

Public participation plans explain how Ecology will ask for input from the local community.

January 2024 | publication 19-09-166