

Floodplain Assessment for Activities Related to Pacific Northwest National Laboratory Sequim Campus Future Development

May 2026

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Prepared for
the U.S. Department of Energy
under Contract DE-AC05-76RL01830

Pacific Northwest National Laboratory
Richland, Washington 99354

Acronyms and Abbreviations

BFE	Base Flood Elevation
DOE	U.S. Department of Energy
FA	Floodplain Assessment
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
PNNL	Pacific Northwest National Laboratory
R&D	Research and Development
SFHA	Special Flood Hazard Area

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1.0 Introduction

Title 10 of the Code of Federal Regulations Part 1022 establishes procedures for the U.S. Department of Energy (DOE) compliance with Executive Order 11988, Floodplain Management. This regulation requires DOE to evaluate the potential effects of proposed actions in floodplains, consider alternatives to avoid adverse impacts and incompatible development, and design or modify actions to minimize harm to or within floodplains.

DOE conducted a floodplain assessment (FA) for the proposed federal action involving construction and development activities within a floodplain at the Pacific Northwest National Lab (PNNL) Sequim Campus in Clallam County, Washington. The Proposed Action would provide new facilities and infrastructure for research and development (R&D) capabilities to meet the long-term mission to enable discovery and advance science.

Initial planning and analysis of environmental impacts for the Proposed Action was documented in DOE/EA-2130 utilizing the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) effective at that time, which was valid from the time of publication in 1989 until April 23, 2025. All upland and shoreline development on the PNNL Sequim Campus was planned to occur outside of any FEMA-designated floodplains, and the Proposed Action was determined to not affect or be affected by flooding. No significant impacts from the Proposed Action on floodplains were identified. In 2025, FEMA issued an updated FIRM indicating that portions of the Proposed Action on the shoreline are now located within the base floodplain of Sequim Bay. DOE completed this FA to reflect this updated designation.

2.0 Project Description

PNNL is a DOE National Laboratory overseen by the Pacific Northwest Site Office within the DOE Office of Science. The DOE-owned PNNL Sequim Campus (Figure 1) is located in Clallam County and encompasses approximately 47 hectares (117 acres), including:

- Uplands area: Approximately 30 meters (100 feet) above sea level, containing research and administrative facilities, with undeveloped portions consisting of mature second-growth coniferous forest. This area is outside the floodplain.
- Shoreline area: Located directly on the waterfront along and below a bluff that parallels the Sequim Bay shoreline, containing research laboratories and marine access infrastructure. The undeveloped Middle Ground and Bugge and Travis Spits are part of this area. Portions of this area are within the floodplain.
- Tidelands: Approximately 21 hectares (52 acres) of land that is intermittently inundated based on the ebb and flow of the tide.

The PNNL Sequim Campus builds upon a history of research related to marine and coastal resources, environmental chemistry, water resources modeling, ecotoxicology, biotechnology, and national security. To meet the long-term federal agency mission to enable discovery and advance science, the DOE needs to provide laboratory space and associated infrastructure for R&D capabilities at the PNNL Sequim Campus.

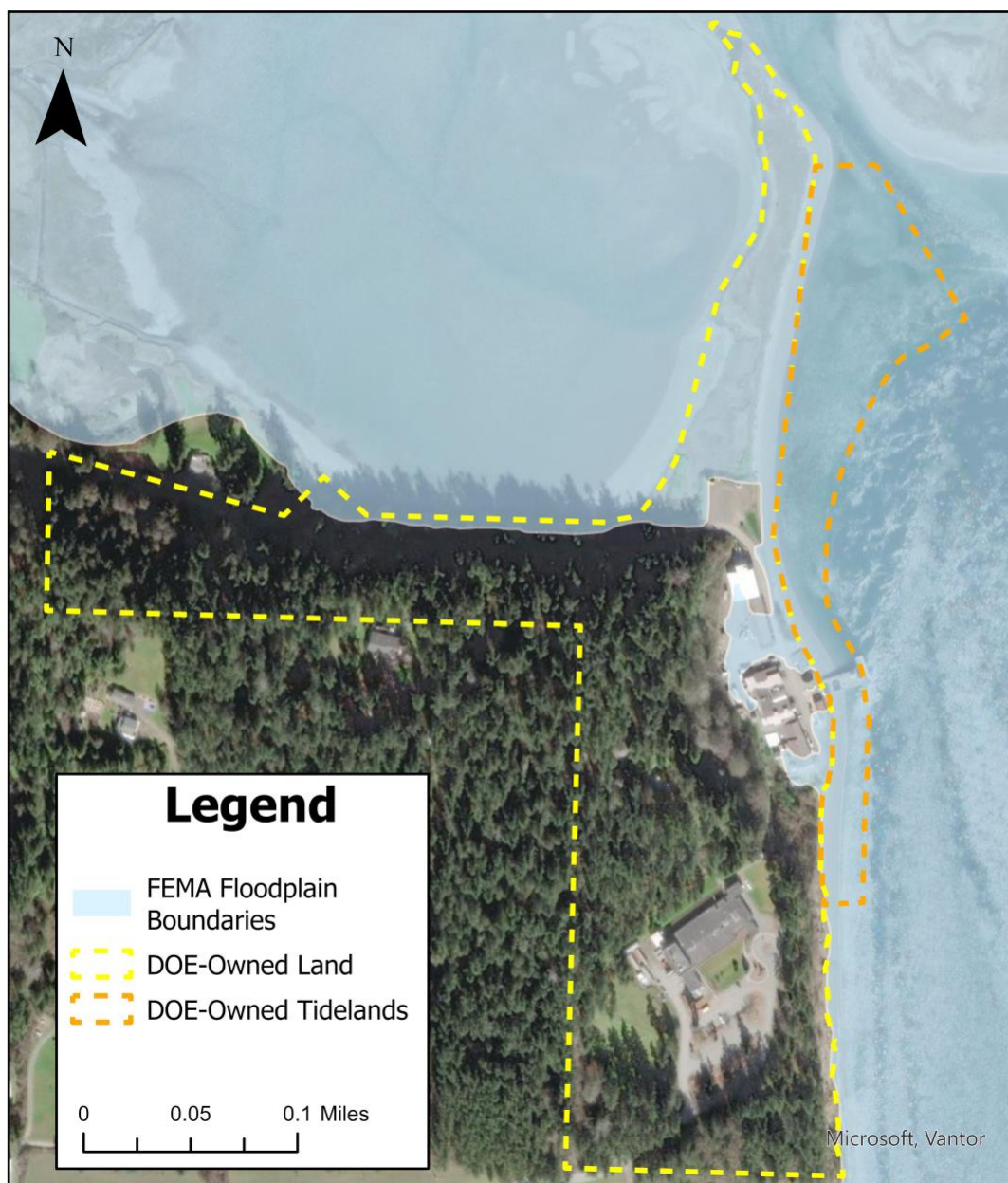


Figure 1. Map of the PNNL Sequim Campus with boundaries of DOE-owned land (yellow) and tidelands (orange) relative to the FEMA-designated base floodplain of Sequim Bay (blue).

2.1 PNNL Sequim Campus Shoreline: Current Use

The shoreline area includes developed land behind a seawall and a beach that runs along the PNNL Sequim Campus. The floodplain encompasses the entire beach and a portion of the developed land (Figures 1 and 2). The developed land is a mix of asphalt, gravel, and landscaped areas that are protected from erosion by a seawall that extends the length of the PNNL Sequim Campus. The beach area is where PNNL aquatic infrastructure is located, including a boat ramp, pier, and floating dock. The research facilities receive seawater pumped

from Sequim Bay and are connected to a water treatment system. Multiple large seawater tanks located outside the shoreline laboratories and on the pier enable lab-to-field research.

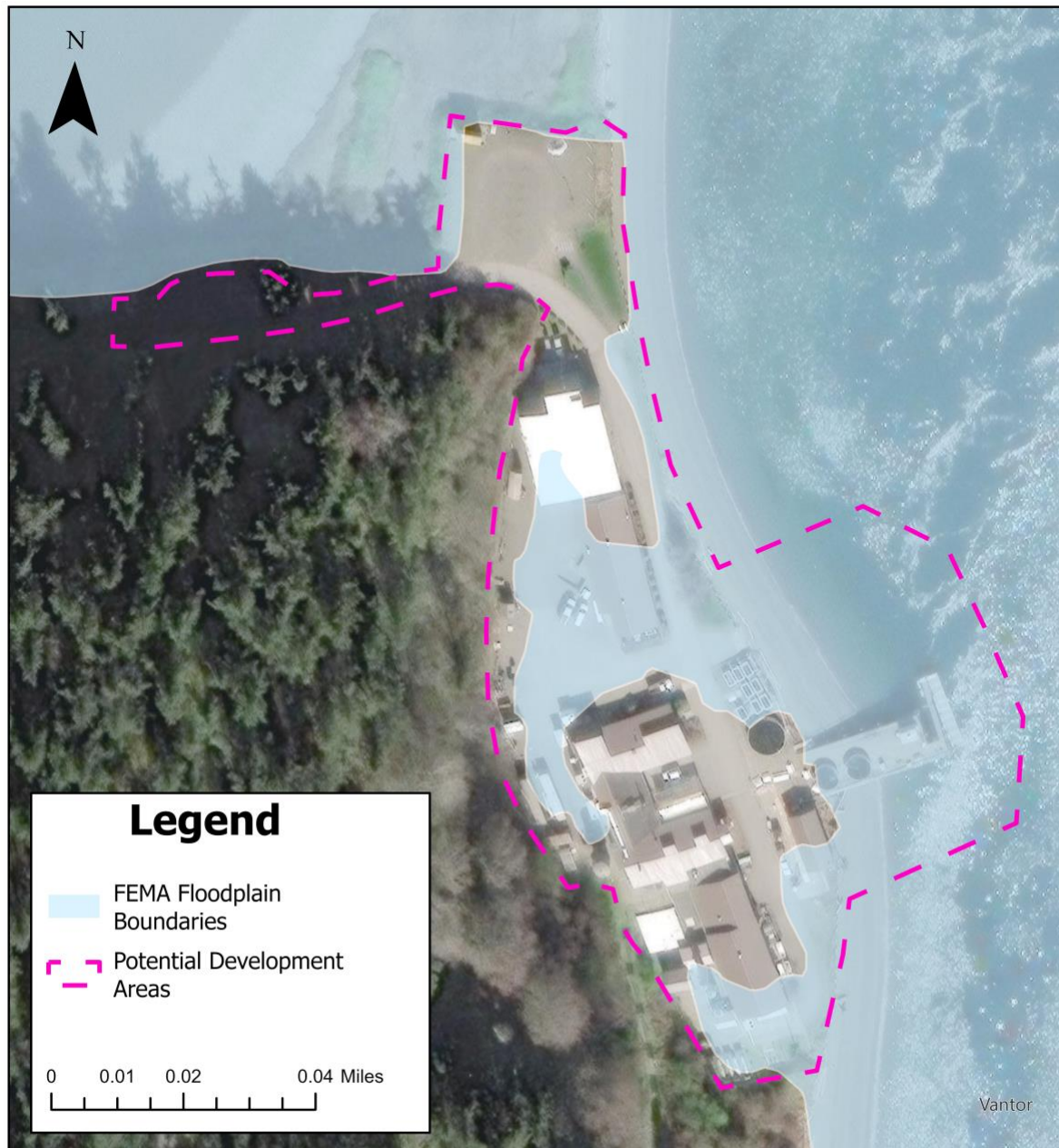


Figure 2. Boundary of potential development areas (pink) on the PNNL Sequim Campus relative to the FEMA-designated base floodplain of Sequim Bay (blue).

2.2 Proposed Action

To accomplish its scientific mission, DOE proposes to construct, improve, operate, and remove buildings and infrastructure (e.g., roads, utilities, pier, floating dock) on the campus, including specialized research laboratories, marine access, facilities, office space, and support buildings.

This FA considers the impacts of constructing, modifying, operating, and removing facilities and infrastructure on the PNNL Sequim Campus shoreline (Figure 2) and managing the PNNL Sequim Campus over the next 20 years, as described in DOE/EA-2130. Activities in the upland portion of the campus are not described in detail within this document as they are outside of the floodplain.

2.3 Nature and Extent of Flood Hazard

Portions of the potential development area of the shoreline are located within a FEMA floodplain boundary that is designated as a Special Flood Hazard Area (SFHA) Zone AE (Figure 2). Zone AE is a base floodplain that has a 1.0 percent chance of flooding in any given year and a BFE of 12 ft. The other potential development areas on the shoreline are designated as Zone X, which is outside the SFHA and represents areas with minimal flood hazard. These areas are not subject to base flood inundation.

3.0 Floodplain Impacts

Floodplains play an important role in the environment, including creating wildlife habitat, providing flood control, and improving water quality. The positive, negative, direct and indirect, and long- and short-term effects of the Proposed Action on the floodplain were assessed.

The impact analysis in this FA assumes that the Proposed Action would be phased over the 20-year potential buildout period. Although the entire developable portion of the campus could be impacted at some point during the 20-year potential buildout process, at no time is it envisioned that the entire campus would be under construction in any given year.

The floodplain present at the PNNL Sequim Campus shoreline has the potential to be affected by the Proposed Action activities. However, the proposed activities occur in a SFHA Zone AE which is not a high-hazard floodplain area subject to frequent floods or an area that has a high likelihood of flood losses and adverse impacts. FEMA has also designated the project area as outside a regulatory floodway (i.e., the watercourse and adjacent land needed for base flood discharge to maintain the same water surface elevation). Therefore, the proposed development is not expected to obstruct floodwaters, increase the base flood elevation (BFE), or worsen flooding for the surrounding area. The Proposed Action may have minimal indirect impacts to ecological resources. There are no anticipated impacts to lives and property.

3.1 Impacts on Natural and Beneficial Floodplain

Ecological resources can be affected by impacts to floodplains through direct loss of habitat or indirect degradation of habitat, such as through reduced water quality. Activities occurring within the floodplain would occur only in previously developed areas, which do not have existing native habitat, so direct loss of floodplain habitat would not occur.

Though most of the shoreline is developed and paved, there may be additions of impervious surfaces supporting construction activities. This could increase stormwater runoff and increase localized flooding, which may degrade water quality within the floodplain. Additional impervious surfaces would be minimized to the extent practicable to lessen the impacts described above. In some instances, existing impervious areas may be retrofit with infrastructure to improve water quality and drainage. In addition, applicable stormwater management practices (Section 4.1) would minimize negative impacts that may occur during a flooding event.

Proposed activities occurring within the sandy beach area include maintenance of the boat ramp and floating dock and maintenance and upgrades of the pier. These aquatic infrastructure activities would disturb a small area of Sequim Bay and are subject to federal and state permit requirements to protect water quality, aquatic species, and habitat. Proposed activities are not anticipated to modify flooding patterns. Impacts to water quality and aquatic habitat within the floodplain would be minimal, temporary, and localized to the immediate area of the activity.

3.2 Effect on Lives and Property

The fact that the Proposed Action is not within a FEMA identified high-hazard area or regulatory floodway suggests this area is infrequently flooded and has a small likelihood of flood losses and adverse impacts on the floodplain's beneficial values (e.g., storing flood waters, erosion control). In addition, development activities within the Proposed Action area are not expected to obstruct floodwaters, increase the BFE, or worsen flooding for the surrounding area.

The Proposed Action is not anticipated to impact the lives of the public. The PNNL Sequim Campus is on DOE-owned land that is not accessible to the public. There are also no anticipated effects of national concern, meaning there are no foreseeable impacts to the floodplain that would have a wide geographic range (10 CFR 1022.4).

Only PNNL-approved individuals have access to the section of the floodplain where activities are proposed. The risk of flooding hazards to these individuals is low as the floodplain only has a 1.0 percent chance of flooding in any given year. In the event of an emergency, the shoreline area can be accessed by vehicle from Washington Harbor Road. In the case that Washington Harbor Road is flooded, the shoreline area can be accessed via stairs that connect from the upland portion of the campus.

Development activities within the floodplain have the potential to alter existing drainage patterns. To the extent practicable, activities would be designed and implemented to minimize alterations to the floodplain water storage capacity and drainage (Section 4.1) so that flood risk to neighboring property is not increased.

Proposed Action activities are not expected to increase the risk of flooding to the DOE-owned property relative to the current use. Current and proposed development within Zone AE is subject to flood damage from inundation during a base flood event. To reduce vulnerability, proposed structures within this zone would follow applicable mitigation measures (Section 4.1). Buildings and associated infrastructure proposed in Zone X are outside the SFHA and are not anticipated to be at risk from base flood events.

4.0 Alternatives

DOE considered alternatives to the Proposed Action that avoid adverse impacts and incompatible development in the floodplain.

To meet the future mission needs of DOE, the aging offices and laboratories at the PNNL Sequim Campus must be updated and new facilities must be provided. DOE evaluated leasing privately owned facilities near the campus. Leasing private facilities outside the PNNL Sequim Campus could potentially meet DOE's need for additional facility space. However, this option has considerable uncertainty due to the lack of leasable facilities in the Sequim area that could both accommodate research and provide access to water and tidelands habitats. Renovations may be required to convert leased space to meet DOE's mission needs, and DOE's investment in these improvements would be lost upon expiration of the lease. In addition, the use of privately-owned facilities could collocate research activities that have potential public risk with other public-use facilities. Further, privately owned facilities may be subject to additional regulatory restrictions compared to federally owned facilities. This alternative also would not result in optimum collocation of technical capabilities to promote collaboration and efficient use of unique or common resources needed by different programs because it would result in fragmentation of the laboratory and isolation of research staff from other resources in existing PNNL facilities.

Under the no action alternative, PNNL would continue to occupy and maintain existing facilities, and would remodel these facilities if reasonable and economical to do so. However, DOE would not replace outdated facilities or provide new facilities for future DOE R&D missions. Without new state-of-the-art science facilities, under the no action alternative, at some time during the next 20 years PNNL would be unable to perform the scientific research at the PNNL Sequim Campus required to meet DOE's future mission needs.

4.1 Mitigation Measure Evaluation

Adverse impacts to floodplains from the Proposed Action would be mitigated by the following:

- Construction activities would be limited to the existing developed footprint.
- Additional impervious surfaces would not expand the existing developed footprint.
- Following established operating procedures, maintenance plans, safety protocols, and design standards.
- Obtaining and abiding by applicable federal, state, and local regulations, including minimum grading requirements.
- As applicable, activities would incorporate protection of ecologically sensitive areas through biological review requirements.
- Activities would use operating controls, as applicable, such as:
 - Implementing best management practices in accordance with the Stormwater Management Manual for Western Washington (Ecology 2019) to control erosion, runoff, sediment transport, and water-quality degradation.

- Stormwater Pollution Prevention Plans would be developed for construction activities disturbing one acre or more.
- After building construction, all disturbed areas would be stabilized and reclaimed with a combination of native and cultivated vegetation that is adapted for the local site conditions.

5.0 References

10 CFR Part 1022. *Code of Federal Regulations*, Title 10, *Energy*, Part 1022, “*Compliance with Floodplain and Wetland Environmental Review Requirements.*”

Ecology (Washington State Department of Ecology). 2019. Stormwater Management Manual for Western Washington. Publication Number 19-10-021, Olympia, Washington.

Executive Order 11988. *Floodplain Management*. 42 Fed. Reg. 26951 (May 24, 1977).

U.S. Department of Energy. *Final Environmental Assessment and Finding of No Significant Impact for the Pacific Northwest National Laboratory Sequim Campus Future Development (DOE/EA-2130)*. Richland, WA: U.S. Department of Energy, Pacific Northwest Site Office, December 27, 2022.

Pacific Northwest National Laboratory

902 Battelle Boulevard
P.O. Box 999
Richland, WA 99354

1-888-375-PNNL (7665)

www.pnnl.gov