DOE/EA-2130

Environmental Assessment

Pacific Northwest National Laboratory–Sequim Campus Future Development

December 2022

U.S. Department of Energy
Pacific Northwest Site Office
Richland, Washington 99352

SUMMARY

To meet the long-term federal agency mission need to enable discovery and advance science, the U.S. Department of Energy (DOE) needs to provide laboratory space and associated infrastructure for research and development capabilities at the Pacific Northwest National Laboratory (PNNL) Campus located in Sequim, Washington. This environmental assessment provides information about, and analysis of, potential DOE activities associated with the next 20 years of buildout of the PNNL–Sequim Campus. DOE will use the information contained in this EA to determine whether the Proposed Action represents a major federal action that would significantly affect the quality of the human environment.

Alternatives

Proposed Action. Under the Proposed Action evaluated in this environmental assessment, new facilities and infrastructure envisioned in the current PNNL–Sequim Campus Master Plan would be constructed and operated on the 47-hectare (117-acre) PNNL–Sequim Campus. The PNNL–Sequim Campus Master Plan provides a bounding scenario for the facilities that ultimately may be constructed and operated on the PNNL–Sequim Campus. PNNL would continue to occupy and maintain existing facilities and would refurbish existing facilities if it is reasonable and economical to do so. The decision to build new facilities or refurbish existing ones would be based on mission needs, overall lifecycle costs, and the expected return on investment. The Proposed Action includes potential demolition of buildings that DOE determines no longer support mission needs. Portions of the campus could be leased to other entities for development compatible with the PNNL–Sequim Campus Master Plan.

No-Action Alternative. 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 However, PNNL would not obtain replacement facilities for outdated existing facilities or provide new facilities for PNNL staff and future research missions.

Affected Environment. The PNNL–Sequim Campus is located on the Strait of Juan de Fuca to the east of the City of Sequim at the northern end of Sequim Bay in northeast Clallam County, Washington. The City of Sequim and surrounding areas contain a mix of commercial, recreational, cultural, agricultural, business, and residential areas. The campus consists of developed industrial areas, Douglas-fir forest, tidelands, and marine spits. Based on 2017 U.S. Census Bureau American Community Survey population data, approximately 76,000 people reside in Clallam County. The region contains some concentrations of minority and low-income populations. Much of the upland developable portion of the PNNL–Sequim Campus is classified as "prime farmland." No scarce geological resources, surface waterbodies, floodplains, or wetlands (other than tidelands) are within the boundaries of the PNNL–Sequim Campus. Biological resources on the campus consist of a mix of coniferous trees and a variety of understory shrubs in the uplands, and low-stature marine shoreline vegetation along the beaches, as well as a variety of mammals, birds, and other animals that inhabit those environments. Species potentially occurring on or near the PNNL–Sequim Campus that are listed as federally or state listed threatened or endangered species or are otherwise of regulatory concern include four birds, three insects, eight fish, and nine marine mammals. Cultural and historic resources have been identified on the campus, and appropriate measures for their management have been established.

Environmental Impacts of the Proposed Action. Table S.1 summarizes potential impacts associated with the 20-year potential buildout of the PNNL–Sequim Campus.

Table S.1. Potential Environmental Impacts Associated with the 20-Year Potential Buildout of the PNNL–Sequim Campus and the No-Action Alternative Compared to Existing Conditions

Impact Area	Proposed Alternative	No-Action Alternative
Land Use	Approximately 2.7 hectares (6.6 acres) of undeveloped land in the upland area could change from forest to build new facilities. No change in land use on the shoreline or other undeveloped part of the campus.	No Change
Air quality	Dust generation and diesel emissions during construction. Chemical and radiological emissions during operation of new facilities would be similar to or a very small increase compared to existing conditions.	No Change
Soils and Geological Resources	Some soils classified as prime farmland would be disturbed by construction.	No Change
Water Resources	Water use provided by the City of Sequim would be a small fraction (about 0.1 percent) of the City's existing demand. Average groundwater use from the existing PNNL–Sequim Campus well would increase about 11 percent, and would be within the well yield. Therefore, the Proposed Action would have a small impact on water resources.	No Change
Cultural and Historic Resources	Development of uplands area, installation of new water/sewer lines, and excavation outside of the existing building footprints along the shoreline could disturb archaeological resources. A "no development zone" in the uplands, Travis Spit, and Bugge Spit, and a "no activity zone" at the shoreline have been designated to help minimize disturbance of cultural resources.	No Change
Aquatic Ecology Resources	The installation of new piles would cause temporary noise impacts to marine mammals and fish, and also temporary reductions in water and sediment quality. But will ultimately result in long-term improvements in water and sediment quality for both benthic biota and fish. Replacement of some pier decking would increase light penetration to permanently benefit aquatic vegetation and fish, while pier decking that would not be replaced would continue to have permanent adverse effects on aquatic vegetation and fish. The above beneficial and adverse species and habitat effects also extend to some Endangered Species Act (ESA)-listed species, critical habitat, and essential fish habitat, despite the implementation of Best Management Practices and conservation measures., Any short-term project impacts to nearshore habitat quality, quantity, or function would be offset by overall long-term project improvements. No impacts on wetlands from construction or operation.	No Change
Terrestrial Ecology Resources	Development in the uplands could remove up to 2.7 hectares (6.6 acres) of coniferous forest which would disturb marginally suitable nesting habitat for marbled murrelets, an ESA-listed species, and a bald eagle nest site. Noise from construction would cause a minor, short-term impact on wildlife.	No Change
Socioeconomics	Negligible impacts of construction or operation on the local economy, small reduction in county tax revenue if the potential transfer of facilities to DOE ownership occur that would be offset by increased investment in the campus and community.	No Change
Environmental Justice	No Change	No Change
Traffic and Transportation	Small increase in traffic on local roads due to construction workers and new permanent staff.	No Change
Human Health and Safety	Estimated 1.25 injuries per year due to construction, and one injury per year to PNNL–Sequim Campus staff. There would be negligible changes in chemical or radiological health impacts.	No Change

Impact Area	Proposed Alternative	No-Action Alternative
Visual Resources	New facilities would be visible to viewers to the east and south of the PNNL–Sequim Campus; this would not be a noticeable reduction in aesthetic quality compared to the baseline.	No Change
Noise and Vibration	Short-term higher noise levels during construction, no change during operation of new facilities.	No Change
Waste Generation and Disposition	Waste generation would increase proportionately with the increase in building square footage and staffing levels. The potential increase would not strain local disposal processes or capacities.	No Change
Accidents	No Change	No Change
Intentional Destructive Acts	No Change	No Change
Environmental Sustainability	No Change	No Change
Irreversible and Irretrievable Commitment of Resources	Construction would consume resources such as concrete, lumber, steel, diesel, etc., and remove forest habitat and potentially disturb cultural resources. Operation of new facilities would consume additional electricity, water, and fuel.	No Change

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TABLES

ACRONYMS AND ABBREVIATIONS

ac	acre(s)
ac-ft	acre-foot(feet)
ANSI	American National Standards Institute
Battelle	Battelle Memorial Institute
BA	Biological Assessment
BiOp	Biological Opinion
BLM	Bureau of Land Management
BMP	Best Management Practice
B.P.	before present
BSL	Biosafety Level
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
CO	carbon monoxide
dB	decibel(s)
dBA	A-weighted decibel(s)
DOE	U.S. Department of Energy
DOE-SC	U.S. Department of Energy, Office of Science
EA	environmental assessment
EDE	effective dose equivalent
EFH	essential fish habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FR	*Federal Register*
FMO	Foraging, Migration, and Overwintering Habitat
ft	foot/feet
ft^2	square feet
ft^3	cubic feet
FY	fiscal year
gal	gallon(s)
GCRP	Global Change Research Program

gpm	gallons per minute
GSF	gross square feet
ha	hectare(s)
HPS	Health Physics Society
in.	inch(es)
ITS	incidental take statement
km	kilometer(s)
L	liter(s)
LA	Limited Area
LCF	latent cancer fatality
lpm	liters per minute
LOC	Letter of Concurrence
m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
MBA	Material Balance Area
MEI	maximally exposed individual
mi	mile(s)
mi^2	square mile(s)
MLLW	mean lower low water
MMMP	Marine Mammal Monitoring Plan
MMPA	Marine Mammal Protection Act
mrem	millirem
MSA	The Magnuson-Stevens Act
MSL	Marine Sciences Laboratory
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969, as amended
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOI	Notice of Intent

NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTU	nephelometric turbidity unit
ORCAA	Olympic Region Clean Air Agency
OWS	overwater structure
PAH	polycyclic aromatic hydrocarbons
PM	particulate matter
PNNL	Pacific Northwest National Laboratory
PNSO	(DOE) Pacific Northwest Site Office
PPA	Property Protection Area
R&D	research and development
RAEL	Radioactive Air Emissions License
SMP	Shoreline Master Program
SO_2	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasure
TED	total effective dose
TSS	total suspended solids
UGA	urban growth area
UIC	underground injection control
VOC	volatile organic compound
WA Ecology	Washington State Department of Ecology
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDOH	Washington State Department of Health
yd^3	cubic yard(s)
yr	year(s)

DEFINITION OF TERMS

background radiation. Radiation from (1) cosmic sources, (2) naturally occurring radioactive materials, including radon (except as a decay product of source or special nuclear material), and (3) global fallout as it exists in the environment (e.g., from the testing of nuclear explosive devices).

collective dose. The sum of the total effective dose equivalent values for all individuals in a specified population. Collective dose is expressed in units of person-rem.

corrosive. A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact.

cumulative impact. The impact on the environment from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

direct impacts. Impacts caused by the action and that occur at the same time and place.

dispersible. Can separate and scatter.

hazardous chemical. Any chemical that is a physical or health hazard.

- *physical hazard* – any chemical for which there is scientifically valid evidence that it is a
  - flammable or combustible liquid
  - compressed gas
  - explosive
  - flammable solid
  - oxidizer
  - peroxide
  - pyrophoric
  - unstable (reactive) or water-reactive substance.
- *health hazard* – any material for which there is statistically significant evidence that acute or chronic health effects may occur in exposed individuals. Such materials include the following:
  - carcinogens
  - mutagens
  - teratogens
  - toxic or acutely toxic agents
  - reproductive or developmental toxins
  - irritants
  - corrosives
  - sensitizers
  - liver, kidney, and nervous system toxins
  - agents that act on the blood-forming systems
  - agents that damage the lungs, skin, eyes, or mucous membranes.

hazardous waste. Waste that contains chemically hazardous constituents regulated under Subtitle C of the Resource Conservation and Recovery Act, as amended (42 U.S.C. § 6901 et seq.) and regulated as a hazardous waste and/or mixed waste by the U.S. Environmental Protection Agency (40 CFR Part 261).

indirect impacts. Impacts caused by the action that are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect impacts may include growth-inducing impacts and other impacts related to induced changes in the pattern of land use, population density, or growth rate and related impacts on air and water and other natural systems, including ecosystems.

latent cancer fatality (LCF). Death from cancer as a result of, and occurring sometime after, exposure to ionizing radiation or other carcinogens.

Limited Area (LA). Security area designated for the protection of classified matter and certain types of special nuclear material.

low-level (radioactive) waste. Radioactive waste that is not high-level waste, spent nuclear fuel, transuranic waste, byproduct material (as defined in Section 11e[2] of the Atomic Energy Act of 1954, as amended [42 U.S.C. § 2011 et seq.]), or naturally occurring radioactive material.

Material Balance Area (MBA). Security area designated for the transfer, storage, and accounting of nuclear material.

maximally exposed individual (MEI). A hypothetical member of the public residing near the PNNL–Sequim Campus who, by virtue of location and living habits, could receive the highest possible radiation dose from radioactive effluents released from the PNNL–Sequim Campus.

millirem. A unit of radiation dose equivalent that is equal to 1/1,000 of a rem.

non-dispersible. Cannot separate and scatter.

oxidizer. A chemical that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

person-rem. A unit of collective or population dose that is based on the sum of the total effective dose equivalent values for all individuals in a specified population.

PM_{10}. Particles having an aerodynamic diameter less than or equal to a nominal 10 micrometers.

PNNL. The Pacific Northwest National Laboratory is a multi-program institution overseen by the DOE Office of Science that conducts research in the areas of energy and environment, fundamental and computational science, and national security. PNNL includes the PNNL Richland Campus, facilities within the 300 Area of the Hanford Site, the PNNL–Sequim Campus, offices in Seattle, Washington, and Portland, Oregon, and satellite offices throughout the United States.

PNNL Richland Campus. The PNNL Richland Campus refers to 269 ha (664 ac) of DOE-owned and Battelle-owned land and facilities approved for PNNL use located partly within the City of Richland and wholly within Benton County, Washington, adjacent to the 300 Area of the DOE Hanford Site.

PNNL–Sequim Campus. The 47 ha (117 ac) of Battelle-owned land, tideland, and facilities reserved for PNNL use, located in Clallam County, Washington on the eastern edge of the City of Sequim. All facilities on this land are Battelle-owned except for one leased modular office building.

pollution prevention. The use of materials, processes, and practices that reduce or eliminate the generation and release of pollutants, contaminants, hazardous substances, and waste into land, water, and air. For DOE, this includes recycling activities.

property protection area (PPA). Access-controlled facilities established to protect government-owned property against damage, destruction, or theft.

radiation. The emission or transmission of energy in the form of waves or particles through space or medium. Types of radiation include electromagnetic radiation, such as radio waves or microwaves, particle radiation, such as nuclear radiation, and acoustic radiation, such as ultrasound radiation.

radiological. Relating to or involving radioactive materials.

radiological facility. A facility that contains small quantities of radioactive materials that do not meet or exceed the thresholds defined for Category 3 facilities in DOE-STD-1027 (DOE 1997). Radiological facilities are associated with the lowest risks to workers or members of the public and typically house activities involving small quantities of dispersible radioactive materials.

rem. A unit of radiation total effective dose based on the potential for impact on human cells.

risk. The product of the probability of occurrence of an event or activity and the consequences resulting from that event or activity. For example, an accident expected to occur once in 100 years and result in a 1 in 1000 probability of a LCF in the affected population would be associated with a risk of (0.01 per year [/yr]) × (0.001 LCF) = 0.00001 LCF/yr, or a risk of LCF equal to 1 in 100,000 per year of operation.

special nuclear material. A term used to classify nuclear material, such as plutonium and uranium, that have the potential for use in nuclear weapons.

total effective dose (TED). The sum of the effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures) that is expressed in units of rem.

toxic chemical. A chemical that can cause injury or death to humans or animals through ingestion, inhalation, or dermal exposure. Specific criteria for designating a chemical as toxic are defined in Title 29 of the *Code of Federal Regulations* (CFR) 1910.1200 Appendix A (29 CFR 1910.1200 Appendix A).

toxic air pollutant. Any State of Washington Class A or Class B toxic air pollutant listed in Washington Administrative Code (WAC) 173-460-150 and 173-460-160 (WAC 173-460). The term "toxic air pollutant" may include particulate matter and volatile organic compounds if an individual substance or a group of substances within either of these classes is listed in WAC 173-460-150 and/or 173-460-160. The term "toxic air pollutant" does not include particulate matter and volatile organic compounds as generic classes of compounds.

unstable (reactive). A chemical that in the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shock, pressure, or temperature.

water reactive. A chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

xeriscaping. Landscaping in a style that requires little or no irrigation.

1.0 INTRODUCTION AND BACKGROUND

The National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. § 4321 et seq.) requires federal agency officials to consider the environmental consequences of their proposed actions before decisions are made. The U.S. Department of Energy (DOE) adheres to Council on Environmental Quality (CEQ) regulations (Title 40 of the *Code of Federal Regulations* [CFR] Parts 1500–1508 [40 CFR Parts 1500–1508]) and DOE's own NEPA-implementing regulations (10 CFR Part 1021) in pursuit of NEPA compliance. This environmental assessment (EA) provides information about and analyses of DOE activities associated with the next 20 years of operation and potential buildout of the Pacific Northwest National Laboratory (PNNL)–Sequim Campus (previously referred to as the Marine Sciences Laboratory [MSL]) located in Sequim, Washington.

PNNL is managed by the Pacific Northwest Site Office (PNSO) for the DOE Office of Science (DOE-SC). The 47-hectare (ha) (117-acre [ac]) PNNL–Sequim Campus is located in Clallam County in northwestern Washington State, 74 kilometers (km) (46 miles [mi]) northwest of Seattle, Washington, and 47 km (29 mi) southeast of Victoria, British Columbia (Figure 1.1). The PNNL–Sequim Campus is located at the eastern boundary of the City of Sequim at the mouth of Sequim Bay on the northern coast of the Olympic Peninsula. The PNNL–Sequim Campus includes most of Travis Spit, which blocks most of the northern end of Sequim Bay, and a mostly submerged area, or shoal, in Sequim Bay called The Middle Ground (Figure 1.2). The developed portion of the PNNL–Sequim Campus includes facilities on the shoreline and an upland area to the southwest of the shoreline facilities (Figure 1.3).

Under the Proposed Action, future development of the PNNL–Sequim Campus could provide approximately 7500 square meters (m^2) (81,000 gross square feet [GSF]) of laboratory and office spaces, in addition to the existing 51,000 GSF, in several new or remodeled state-of-the-art facilities and associated infrastructure. As envisioned, these facilities would allow DOE to meet its strategic research objectives over the next 20 years. Specific facility locations and final facility designs for the potential buildout are speculative and still being determined; this EA provides bounding analyses of the Proposed Action. Therefore, an evaluation will be performed prior to the implementation decision for each new proposed development project to determine whether the project scope and any project associated impacts would be bounded by the scope and impacts described in this EA.

DOE will use the information contained in this EA to determine whether the Proposed Action represents a major federal action that would significantly affect the quality of the human environment. If the Proposed Action is determined to be a major action that would have potentially significant environmental impacts, an environmental impact statement would be required to proceed with the action. If the Proposed Action is determined to not be a major action that could result in significant environmental impacts, a Finding of No Significant Impact would be issued, and the action could proceed.

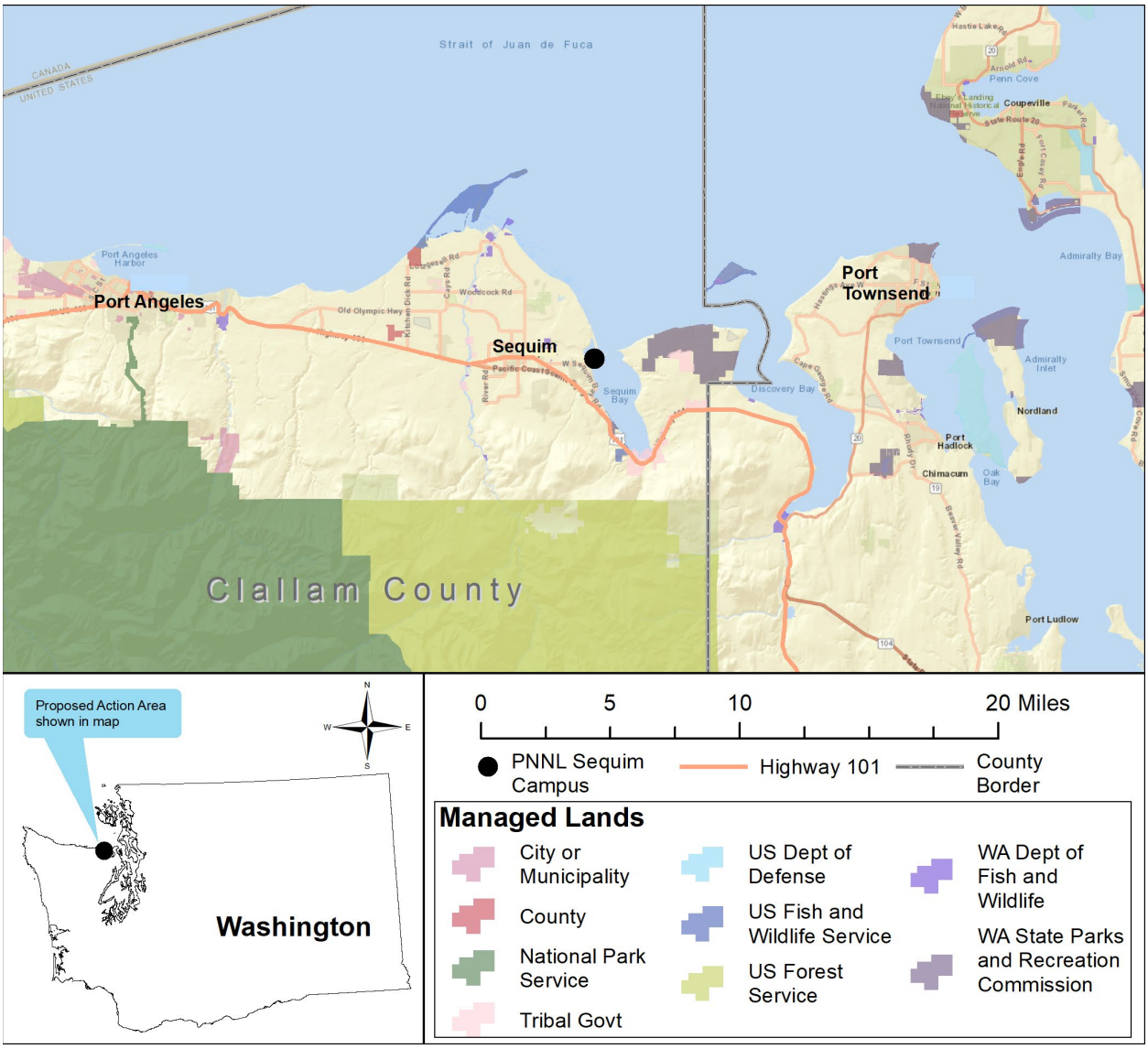

Figure 1.1. Location of PNNL–Sequim Campus near Sequim, Washington

Figure 1.2. PNNL–Sequim Campus Property Boundaries and Proposed Action Area

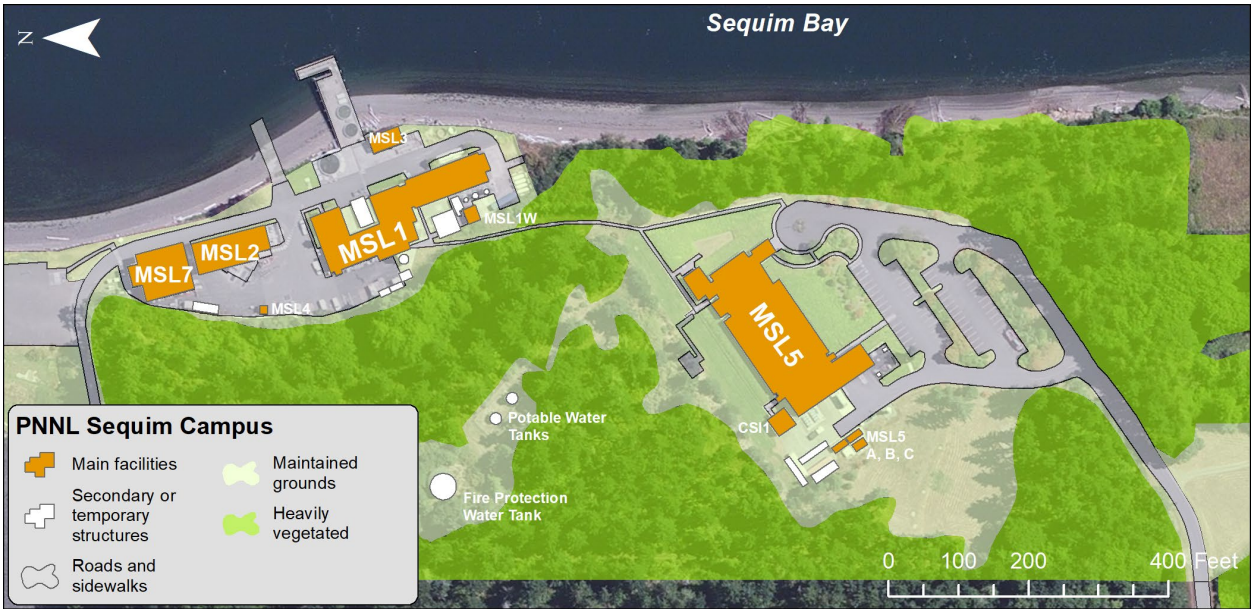

Figure 1.3. Current PNNL–Sequim Campus Shoreline and Upland Facilities. PNNL-Sequim Campus was formerly known as the Marine Science Laboratory, abbreviated MSL, and the buildings retain identifiers using the former MSL notation.

1.1 Background and Description of the PNNL–Sequim Campus

As one of 10 DOE-SC national laboratories, PNNL is a multi-program institution that conducts research in the areas of energy and environment, fundamental and computational science, and national security. Operated by Battelle Memorial Institute (Battelle) under contract to DOE, PNNL also performs work for a diverse set of clients including the National Nuclear Security Administration; U.S. Department of Homeland Security; U.S. Nuclear Regulatory Commission; U.S. Environmental Protection Agency (EPA);

other DOE Offices such as Environmental Management, Nuclear Energy, Energy Efficiency and Renewable Energy; and many others.

The 47 ha (117 ac) PNNL–Sequim Campus includes 26 ha (65 ac) of land and 21 ha (52 ac) of tidelands (Figure 1.2). Travis Spit and The Middle Ground constitute 18 ha (29 ac) of undevelopable land due to potential impacts on fish and wildlife habitat, cultural resources, recommended setbacks, and access; however, both could be used for research (e.g., instrumentation). The remaining 15 ha (36 ac) are roughly divided into two areas: the shoreline and the uplands. The shoreline and uplands have separate vehicle access routes and are only linked on campus by a pedestrian stairway. The shoreline area is located directly on the waterfront, along and below a bluff that parallels the Sequim Bay shoreline. New development in the shoreline area is limited to vertical growth within the existing developed area footprints. The upland area is located approximately 30 m (100 feet [ft]) above sea level, on top of the bluff that parallels the Sequim Bay shoreline. The undeveloped uplands area is heavily forested and has a sloping terrain that rises approximately 46 m (150 ft) above sea level to the Fire Protection Water Tank, which is about 15 m (50 feet) higher than uplands facility MSL5 (Figure 1.3).

The PNNL–Sequim Campus includes more than 4700 m^2 (51,000 GSF) of buildings and approximately 60 staff members whose research requires routine access to coastal/marine assets within the facilities, Sequim Bay, and the Salish Sea, or routine access to ultratrace chemical analytical facilities. In addition, the PNNL–Sequim Campus serves as a location for research staff from across PNNL and the outside research community who need occasional access to its resources and expertise. PNNL–Sequim Campus' unique capabilities serve as a complement to the capabilities at the Richland Campus as well as the Seattle and Portland offices, and collaboration between researchers at all locations is common.

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. Facilities at the PNNL–Sequim Campus were designed to take advantage of two unique locational assets: the high-quality coastal ocean water in Sequim Bay and the region's air, which is considered exceptionally clean.

Research facilities on the shoreline include two, single-story laboratory buildings (MSL1 and MSL2) and a leased, two-story office building (MSL7) (Figure 1.3), as well as several research and operational support structures. A pier with a floating dock and a boat ramp provides physical access to Sequim Bay and the Salish Sea. The two research facilities (MSL1 and MSL2) receive up to 760 liters per minute (lpm) (200 gallons per minute [gpm]) of seawater pumped from the Sequim Bay that can be heated, cooled, or diluted with clean artesian freshwater for use in research. These facilities are connected to a water treatment system that can handle more than 760 lpm (200 gpm) of effluent, removing chemical residues (through filtration and granular activated charcoal columns) and live biological components (through filtration and ultraviolet exposure) before returning water to the Bay through a National Pollutant Discharge Elimination System (NPDES)-permitted discharge. These facilities also house two aquatic isolation laboratories as well as more than 10 Biosafety Level (BSL) 1 and 2 laboratories. Multiple large seawater tanks outside the shoreline laboratories and on the pier enable lab-to-field research.

The uplands facility (MSL5) houses 10 research laboratories supporting ultratrace chemistry (enabled by the low-background air quality) and bench-scale algal biofuels research using BSL-1 organisms, all of which are connected to the water treatment system. MSL5 includes approximately 34 offices, and houses most of the administrative functions for the PNNL–Sequim Campus.

1.2 Purpose and Need for Agency Action

To meet the long-term federal agency mission to enable discovery and advance science, DOE needs to provide laboratory space and associated infrastructure for new and existing research and development (R&D) capabilities at the PNNL–Sequim Campus. To accomplish its scientific mission, DOE requires a variety of facilities and equipment, including radiological, biological, chemical, and other specialized laboratories, marine access and facilities, advanced computational facilities, and offices and meeting spaces. New and replacement facilities must be adequately and appropriately secure and must be efficiently managed to minimize the potential risks associated with operations. New and replacement facilities should be constructed for efficient conduct of DOE's R&D mission, with consideration of minimizing energy use, lifecycle cost, and project uncertainty. Ownership and control should be considered in the siting of new and replacement facilities and infrastructure, along with the varying regulatory burdens associated with siting options.

1.3 Factors Considered for Analysis

This EA considers the impacts of constructing and operating new and replacement facilities and infrastructure on the PNNL–Sequim Campus over the next 20 years. The actual rate of future growth in facility space and staffing levels over the next 20 years, on a year-by-year basis or cumulatively at the end of 20 years, is uncertain, but current staffing levels may double. Future facility needs and staffing levels at PNNL will be tied to federal budget priorities that feature year-to-year fluctuations. Staffing levels are not always clear indicators of impact levels. For example, new facilities would incorporate energy efficiency measures in their design, and new floor plans could include higher staff density. In addition, flexibility in workplace and work schedule arrangements available to staff are likely to continue, allowing staff to telecommute or share workspaces. As a result, energy and space savings may occur even with staff growth.

The CEQ regulations (40 CFR Parts 1500-1508) define the impacts that must be addressed and considered by federal agencies in satisfying the requirements of the NEPA process. These include direct, indirect, and cumulative impacts.

1.3.1 Direct and Indirect Impacts

Direct impacts are caused by the action and occur at the same time and place (40 CFR 1508.8). Indirect impacts are caused by the action and are later in time or farther removed in distance and are reasonably foreseeable. Indirect impacts may include growth-inducing impacts and other impacts related to induced changes in the pattern of land use, population density, or growth rate and related impacts on air and water and other natural systems, including ecosystems (40 CFR 1508.8).

1.3.2 Cumulative Impacts

Cumulative impacts are those impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes those other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time (40 CFR 1508.7). DOE did not identify any significant, reasonably foreseeable federal or state development projects in the PNNL–Sequim Campus area or Clallam County over the 20-year PNNL–Sequim Campus development period. Smaller-scale projects that were identified include the following:

- a new hotel at the Jamestown S'Klallam reservation added approximately 100 jobs to the area and increased tourism

- expansion of the Olympic Medical Center by adding staff at the Port Angeles and Sequim facilities and construction of a medication-assisted treatment facility for opioid-use disorder in Sequim
- a new sewer tie-in connecting the Jamestown S'Klallam reservation in Blyn with the City of Sequim sewage treatment plant
- improvements to U.S. Highway 101 east of Sequim, to include a new bypass route for Happy Valley and Palo Alto roads and completion of the Simdars Road intersection
- The Dungeness Off-Channel Reservoir for storing Dungeness River water during winter and spring high-flows for use later in the year
- potential future transfer of ownership of the PNNL–Sequim Campus from Battelle to DOE. The proposed action and ownership transfer are independent NEPA actions, and neither is dependent on the other.

The mid-level estimate for population growth in Clallam County is approximately 9 percent by 2040, and the high estimate is 26 percent (WOFM 2019); these increases correspond to an additional 6700 to 19,000 people in Clallam County by 2040. Development and growth in housing, commerce, and support services would be expected to correspond to the population growth.

The cumulative incremental impacts of these foreseeable actions are evaluated in each resource area in Section 3.1.

Climate is defined as temporal and spatial patterns of variations in meteorology over a period of several decades (GCRP 2018). In November 2018, the U.S. Global Change Research Program (GCRP) published the *Fourth National Climate Assessment*: *Impacts, Risks, and Adaptation in the United States* (GCRP 2018). This report collected, evaluated, and integrated observations and research on climate change in the United States, including assessments of regional climate change in the Pacific Northwest.

The GCRP (2018) report predicts that climate change in the Pacific Northwest may noticeably alter the baseline affected environment described in Section 3.1 of this EA. Climate change is a global phenomenon that the buildout of the PNNL–Sequim Campus would not appreciably alter. However, climate change may alter the baseline environment in which the proposed potential future development would occur.

GCRP (2018) identified potential climate changes in the regional environment that are relevant to the assessment of impacts from the Proposed Action, including the following:

- sea level rise
- changes in potential flooding hazards
- changes in vegetation, aridity, and potential wildfires
- changes in surface and groundwater availability and water temperature.

Changes in the affected environment and any associated considerations for the assessment of impacts of the Proposed Action are discussed by resource area below.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

DOE proposes to develop the PNNL–Sequim Campus to allow DOE to meet its current and anticipated future R&D needs consistent with the *Pacific Northwest National Laboratory Sequim Campus Master Plan* (PNNL 2020). DOE proposes to construct and operate new buildings on the campus, including research laboratories, office space, support buildings, and associated infrastructure. PNNL would continue to occupy and maintain existing facilities and would refurbish existing facilities if reasonable and economical to meet new research needs. The decision to build new facilities or refurbish existing ones would be based on mission needs, overall lifecycle costs, and the expected return on investment. The Proposed Action also includes potential demolition of buildings that DOE determines no longer support mission needs. Portions of the PNNL–Sequim Campus could be leased or transferred to other entities for use or development.

2.1.1 PNNL–Sequim Campus Development

The PNNL–Sequim Campus comprises land and facilities that are currently owned by Battelle but may be acquired by DOE. The land and facilities are currently under an exclusive use agreement between DOE and Battelle. Under the Proposed Action evaluated in this EA, the facilities and infrastructure envisioned in the current *PNNL Sequim Campus Master Plan* (PNNL 2020) provide a bounding scenario for those that may be ultimately constructed and operated on the PNNL–Sequim Campus. While specifics presented in the *PNNL Sequim Campus Master Plan* are intended to be notional, development would be consistent with the PNNL Campus Development Strategic Objectives section in the Campus Master Plan. As stated in the *PNNL Sequim Campus Master Plan* (PNNL 2020), DOE will continually make proactive campus renewal investments to acquire new and/or renew DOE's existing facility and infrastructure assets for long-term value and adaptability that support the following objectives:

- Deliver current and future mission alignment by providing a physical environment that meets current and emerging research needs required to deliver vital mission impacts in energy resiliency and national security.
- Optimize the functionality, reliability, utilization, and operating costs of facility and infrastructure capabilities to enable research operations.
- Embrace the guiding principles for developing a modern, collaborative, flexible, and sustainable campus by providing or incorporating the following:
  - state-of-the-art space and infrastructure to promote creativity, develop technical leaders, and encourage staff to be bold in their research
  - a connected campus to enable institutional and individual collaborations and research operations that accelerate high-impact research
  - flexibility in design and usage of space to rapidly respond to changing research needs
  - consideration of environmental, social, and economic costs in the design, construction, allocation, and use of space to optimize energy and materials usage while enabling research.
- Balance the intentions for long-term value with what is reasonable and achievable given available time, investment, and operational resources.

An evaluation will be performed prior to the decision for implementation for each new proposed development project to determine whether the scope and any associated impacts would be bounded by the scope and impacts described in this EA. Additional NEPA actions shall be conducted if it is determined

that a new development proposal is located within the geographical EA Proposed Action area (Figure 1.2), the development scope is different than that described in the following sections, or the environmental impacts are different than those described in Chapter 3.0.

2.1.2 Building and Infrastructure Footprint

New building development capacity for the PNNL–Sequim Campus could add approximately 7500 m^2 (81,000 GSF) and approximately 170 parking spaces, for a total of about 12,000 m^2 (132,000 GSF) and 300 parking spaces, depending on the mix of laboratory and office buildings. The campus is also capable of accommodating general site development such as stormwater management, utilities, circulation, amenities, and open spaces. Types of new facilities may include chemistry and biology laboratories, high-bay facilities (facilities capable of housing tall or large equipment), funicular (for movement of materials), storage facilities, laboratories capable of handling small amounts of dispersible radioactive material or sealed radioactive sources, computational and dry laboratory spaces, offices, and meeting facilities capable of hosting small conferences or workshops. Some facilities may be a combination of the spaces described.

New buildings would primarily be constructed within approximately 2.7 ha (6.6 ac) in the vicinity of MSL5 in the uplands portion of the campus, which would also include parking areas and laydown areas. The land available for development in the uplands is bounded by Clallam County recommended setbacks from the cliff edges and by a No Development Zone identified as part of National Historic Preservation Act (NHPA) consultation as an area where no new facilities will be constructed, but some limited low-impact research could be conducted. Figure 2.1 is a conceptual rendering of potential placement of new buildings with associated walkways, access roads, and parking areas.

Any new building activities including replacement of facilities, expansion of facilities, or renovations to existing facilities on the shoreline site would be limited to the existing building and facility footprint. Utility connections could occur within the current developed shoreline area. The No Activity Zone for the shoreline is another area identified as part of NHPA consultation where no development, research activity, or access will be allowed (Figure 2.1). Development on the shoreline would be limited to vertical growth within the existing developed footprint but may include excavation of currently developed areas to support new foundations. Additional impervious surfaces may be constructed out of concrete or similar materials for use as staging areas for research equipment but would be considered infrastructure and would be minimized to the extent practicable. These additional impervious surfaces would not expand the current footprint.

New buildings or refurbished buildings on the PNNL–Sequim Campus would typically be constructed using materials representative of industry standards for energy efficiency and aesthetics and follow DOE guidance for sustainable buildings (DOE 2020). New facilities for the uplands and the shoreline could extend as tall as 15 m (50 ft) above the surface to accommodate relocated or new R&D projects. New infrastructure necessary to support the potential buildout includes extension of service roads and utilities such as water (e.g., fire protection, potable, and irrigation), sanitary and process sewer, electrical power, communications, and natural gas, and are described in Section 2.1.8.

Figure 2.1. Conceptual Rendering of Potential Facility Development for Future PNNL–Sequim Campus

While the actual construction schedule would be driven by funding availability and need, the plan could include continuous construction or remodeling efforts during the 20-year buildout. During this buildout period, PNNL staff would continue to use existing office and laboratory space or leased office space near the campus until replacement capacity became available.

The impact analysis in this EA assumes that construction and refurbishment would be phased over the 20-year potential buildout period. At times during this process, land clearing and grading could occur simultaneously with building construction, post-construction landscaping, and operations and maintenance. Due to requirements such as infrastructure installation and foundation engineering, the entire developable portion of the campus could be impacted at some point during the 20-year potential buildout process. However, at no time is it envisioned that the entire campus would be under construction in any given year.

Typical site preparation would consist of clearing and removing surface vegetation, installing soil-erosion controls, and removing superficial fill materials. Backfill materials would consist of crushed stone and structural fill, dense-graded aggregate, or other materials placed and compacted to levels recommended by the geotechnical engineer. Excavated soils would be stockpiled adjacent to building sites within the scope footprint and would be re-used onsite to the maximum extent practical.

General maintenance of grounds, walkways, buildings, and seawall may be required to maintain campus integrity and safety. These activities include vegetation control, patching or replacement of cracked concrete, painting, roof repair and replacement, replacement of damaged shoreline seawall planks, replacement or installation of new security signage, replacement or installation of new security equipment, safety equipment to prevent and minimize safety hazards, and similar activities. Outdoor lighting fixtures may be removed, updated, or additional fixtures added to improve visibility. Directional

lighting to reduce light scatter and installation of energy-conserving lighting will be used in designing future upgrades and new lighting.

2.1.3 Radiological Facilities

Radiological work may be performed in some of the new or remodeled facilities. None of the current or future facilities would be designated as a Hazard Category 1, 2, or 3 nuclear facility, as defined in DOE-STD-1027-92 (DOE 1997). In the potential new radiological facilities, dispersible and non-dispersible (e.g., sealed sources) radioactive materials used in research would remain consistent with types and quantities currently authorized by the Washington Department of Health (WDOH) under PNNL's Radioactive Air Emissions License (RAEL)-014 (WDOH 2018). RAEL-014 provides the general WDOH regulatory requirements for radioactive air emissions at the PNNL–Sequim Campus, and as additional facility or activity-specific permits are authorized for the PNNL–Sequim Campus, they would be incorporated under this license. Currently, RAEL-014 incorporates a single, fugitive sitewide emission unit, referred to as J-MSL, that includes radiological air emissions from all the PNNL–Sequim Campus operations, including operations conducted within Sequim Bay. The list of radioactive isotopes handled or potentially handled at the PNNL–Sequim Campus can be found in J-MSL documentation. New radioisotopes are approved by the WDOH and added to the license as necessary to meet changing DOE mission requirements.

The design and operations of the potential new radiological facilities would be governed by federal and state standards, such as but not limited to the following, from the *Pacific Northwest National Laboratory Potential Impact Categories for Radiological Air Emission Monitoring* (2018):

- RAEL-014 would be updated for any new radiological emission points.
- Emissions of radionuclides to the ambient air from DOE facilities shall not exceed amounts that would cause any member of the public to receive, in any year, an effective dose equivalent of 10 millirem (mrem)/year (yr) (40 CFR Part 61 Subpart H, 61.92).
- Emissions of radionuclides in the air shall not cause a maximum effective dose equivalent of more than 10 mrem/yr to the whole body to any member of the public (Washington Administrative Code [WAC] 173-480).

The monitoring requirements for emissions from new radiological facilities would be controlled under both federal and state regulations such as, but not limited, to the following:

- EPA amended 40 CFR Part 61, Subpart H and 40 CFR Part 61, Appendix B, Method 114.
- As referenced in Subpart H, the American National Standards Institute/Health Physics Society (ANSI/HPS) Standard N13.1-2011, *Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities* (ANSI/HPS 2011) requirements for major and minor emission points when new permitting actions are approved.
- WDOH amended WAC 246-247, *Radiation Protection—Air Emissions.*

Most, if not all, of the potential radiological-capable facilities would have sufficiently low limits on their radionuclide inventories such that active monitoring of their emissions would not be required. Total radioactive emissions from a facility can be categorized by their maximum potential dose impact on a public receptor. Potential impact categories are given a ranking from 1 to 5, with lower category numbers having greater potential impacts. New facilities would be a potential impact Category 4, equivalent to a potential-to-emit of ≤0.001 mrem/yr, which is much less than typical background levels. At this level, the monitoring and sample analysis requirements would be limited to an annual administrative review of

building uses to confirm the absence of radioactive materials in forms and quantities exceeding prescribed specifications and limits (PNNL 2018).

Wastewater from radiological facilities is normally below the regulated levels for radioactive material content but does have the potential for contamination in the event of a failure of engineered containment or procedural requirements.

2.1.4 Chemical and Biological Facilities

The types and quantities of chemicals present in any facility and their usage rates would be expected to vary over time according to programmatic needs; however, because new facilities are expected to be similar to existing facilities, current chemical usage provides a reasonable estimate of inventories over the next 20 years. Based on an October 2019 review of the PNNL Chemical Management System database, the chemical inventory that could be assumed to be present on campus is provided in Table 2.1. The quantities of hazardous chemicals present in the new facilities would be managed within applicable limits specified by the applicable National Fire Protection Association Code or the International Building Code (e.g., ICC 2014 or current standard) (DOE 2017b).

Table 2.1. PNNL–Sequim Campus Hazardous Chemical Inventory[(a)]

Chemical Hazard Group	October 2019 Inventory
Flammable	
Solids (e.g., sodium sulfide)	53 kg (116 lb)
Liquids (e.g., alcohols)	1165 kg (2569 lb)
Oxidizer	
Gases (e.g., oxygen)	40 m^3 (1400 ft^3)
Solids (e.g., nitrates)	27 kg (60 lb)
Liquids (e.g., hydrogen peroxide)	239 kg (527 lb)
Corrosive	
Solids (e.g., silver nitrate)	83 kg (183 lb)
Liquids (e.g., acids)	772 kg (1703 lb)
Unstable (Reactive)	
Gases (e.g., acetylene)	5 kg (10 lb)
Solids (e.g., acrylamide)	2 kg (4.3 lb)
Liquids (e.g., fiberglass resin)	21 kg (47 lb)
Water Reactive	
Solids (e.g., sodium)	51 kg (113 lb)
Liquids (e.g., nitric acid)	144 kg (317 lb)
Toxic	
Gases, Solids, Liquids	116 kg (256 lb)
Organic-Peroxide	
Liquids (e.g., peracetic acid)	0.5 kg (1 lb)

(a) Inventory quantities are totals for each hazard group, based on data in the PNNL Chemical Management System database as of October 2019. Specific chemicals listed are examples of the types of chemicals included in each group. Numbers have been rounded.

Microbiological research is conducted at the PNNL–Sequim Campus. This research is typically conducted in laboratories for which the biosafety containment levels are specified by the U.S. Department of Health and Human Services' Centers for Disease Control (CDC) and Prevention and the National Institutes of Health (NIH) manual, *Biosafety in Microbial and Biomedical Laboratories* (CDC and NIH 2009). Biosafety containment levels are ranked from one to four (four being the maximum level of containment) and are selected based on the agents or organisms used in the research. DOE does not currently operate any microbiological laboratory facilities at the PNNL–Sequim Campus above BSL-2. New facilities constructed during the 20-year potential buildout of the PNNL–Sequim Campus may include additional BSL-2 laboratory space. The Proposed Action does not include the construction or operation of laboratories with BSL-3 or BSL-4 containment. Development of BSL-3 or BSL-4 research laboratories would require a separate NEPA evaluation.

2.1.5 Storage and Wet Lab Facilities

The shoreline facilities may be renovated or replaced with general or specialized storage capacity, such as a high-bay structure, and expanded wet lab space to accommodate temperature-controlled flumes, to adjust water temperature to specific environmental conditions, and tanks. A high-bay storage facility would be used to accommodate large equipment and research operations that require an overhead crane to move heavy items. Updates to the current wet lab facility may include installation of additional equipment to establish bench-scale systems that have adjustable pressure, temperature, and salinity capacity, and modifications such as larger entryways to allow movement of large equipment, ventilation upgrades, extreme temperature rooms, and possibly a specialized gas storage and delivery system with appropriate exhaust.

2.1.6 Aquatic Infrastructure

Upgrades and maintenance of the pier and floating dock, and maintenance of the boat ramp are projected to occur within the next 20 years. The wet lab facilities rely on intake and outfall (discharge) piping in Sequim Bay, which requires periodic maintenance (Figure 2.2).

Figure 2.2. PNNL–Sequim Campus Shoreline Features

The pier is a wooden structure made up of planking and 42 creosote support piles. It is anticipated that the small, terminal portion of the pier that is over state-owned aquatic lands will be replaced with environmentally friendly piles, such as galvanized steel or aluminum piles, and new concrete, fiberglass,

and aluminum grated decking. The 12 existing creosote piles on state-owned land would be removed using a vibratory driver, and the new galvanized metal piles would be emplaced in the same locations using vibratory installation that could involve a few impact strikes to load test or "proof" the piles. Each 0.3 m (12 inches [in.]) diameter pile would be installed into the seabed between 3 and 3.5 m (10 and 12 ft) deep. It is expected that 6 to 7 piles could be replaced per day. Additional upgrades to the pier include power and data cabling for connectivity with nearshore research equipment or land-based generators or battery storage banks, and the addition of a small lift crane for loading and unloading equipment between the dock, the pier, and research vessels. The surface is pressure-washed as needed to remove bird and biological fouling and debris, and is inspected visually for damage, condition, and the security of the railings.

The floating dock was replaced in the late summer of 2019 but may need maintenance or upgrades within the next 20 years. These activities include pressure washing the surface to remove fouling that creates slipping hazards, and periodic visual inspection for damage.

The boat ramp lies just north of the PNNL–Sequim Campus pier and is made up of 6.5 m by 0.3 m (21 ft x 1 ft) individual concrete planks, 20 cm (8 in.) thick, that interlock horizontally to the shoreline and extend out approximately 20 m (66 ft) from the shoreline into Sequim Bay. Occasional maintenance is performed to remove debris and excess sediment that may accumulate on the ramp and maintain the spacing of the concrete planks. The boat ramp is only irregularly used. A new or modified ramp could be required to support research activities in the future. Because specific actions required for a new or modified boat ramp are not known at this time, additional NEPA evaluation would be performed to determine impacts on environmental resources of any future installation or modification.

The intake piping brings Sequim Bay marine water into MSL3 where it may be filtered and used for aquatic marine research. The two 15 cm (6 in.) diameter pipes run parallel to each other and extend 0.9 m (3 ft) under the sea floor for 37.2 m (122 ft) from the shoreline in a single easement. They terminate at an intake structure that rises 1.2 m (4 ft) above the sea floor, and has two, horizontal intakes to allow an approach velocity of 0.03 m/s (0.1 fps) through 3.2 mm (1/8 in.) screen grating. The total easement area is 199.4 m^2 (2146 ft^2). The current intake capacity is approximately 760 lpm (200 gpm) total. Three pumps are operated in rotation, with at least one pump in standby mode at all times for use as a backup.

Outfall pipes return treated water and clean water to Sequim Bay. These structures extend out from the PNNL–Sequim Campus shoreline to Sequim Bay waters just south of the pier (Figure 2.2). The clean water outfall is a single pipe that returns clean process water (water used in holding tanks for temperature control, filter backwash, and clean seawater) from the uplands and shoreline facilities to Sequim Bay. The piping originates on land and extends underground offshore just beyond the point of extreme low tide. The clean water outfall runs parallel to and is immediately adjacent (though not attached) to the south side of the pier. The outfall is permitted under Washington State Department of Ecology (WA Ecology) NPDES Permit WA0040649. The treated water outfall consists of two pipes and a supporting concrete structure. The outfall returns process wastewater from the uplands and shoreline facilities to Sequim Bay after it passes through the onsite wastewater treatment plant. The two pipes are situated adjacent to each other and comprise a paired system in which they are used alternately (one is in use while the other dries out) to reduce biofouling. The piping originates on land and extends offshore approximately 7.6 m (25 ft) beyond the point of extreme low tide and ends at a concrete monument that has backflow protection (i.e., "flapper valves"). The outfall is permitted under WA Ecology NPDES Permit WA0040649.

Maintenance of the intake and outfall lines is performed regularly by inserting pigs (i.e., capsule-shaped poly-foam cleaning tools) into the pipes and using pressurized water to force them through, in a process called "pigging" the lines. The pigs are retrieved and reused. The pigs are designed to scrape biofouling

from the inside pipe walls. The intake pipes are "pigged" at least once a month; the wedge wire screens are manually scrubbed by divers using handheld tools both inside and outside the screens at the same frequency. The treated water outfall pipes are "pigged" twice a year and the flapper valves at the terminus are manually cleaned by divers to remove biofouling. The clean water outfall is "pigged" once a year.

New or modified intake or discharge structures could be required if intake or discharge volumes exceed the capacity of the existing structures. This assessment does not include these future considerations because design and technology needs may differ dramatically within the next 20 years. A new assessment would be prepared to determine the environmental impacts of future installation or modification.

2.1.7 Utilities and Infrastructure

The PNNL–Sequim Campus obtains potable water from an onsite well by the shoreline facilities under an existing 31,000 m^3/yr (25 acre-feet/year [ac-ft/yr]) water right. The groundwater is pumped into holding tanks located north of MSL5 in the uplands area, and then gravity fed to the PNNL–Sequim Campus. Groundwater can also be routed to the laboratory spaces to support R&D studies that require freshwater. Sanitary wastewater from restrooms, lunchrooms, and building mechanical spaces is disposed via a septic system located southwest of MSL5. Process water from laboratories is treated using granular activated charcoal columns, ultraviolet exposure, and filtration to remove chemical residues and live biological components. The process water treatment system is capable of processing more than 760 lpm (200 gpm) of effluent prior to being discharged to Sequim Bay under an existing NPDES permit. This system could be expanded if needed.

The PNNL–Sequim Campus is currently near the capacity of its onsite water and septic systems. New development and/or staff growth would necessitate connection to the City of Sequim utility systems to provide adequate potable water and to supply the fire-suppression system. City of Sequim water and sewer utility connections are located within approximately 1 mi west of the PNNL–Sequim Campus (Figure 2.3). New water and sewer lines would likely follow existing easements along major roads, but new easements would be required near the campus (Figure 2.3). Major utility lines on the PNNL–Sequim Campus would continue to be placed at the side of roadways or within pedestrian corridors.

Sanitary wastewater would increase with additional staff and new facilities. Sanitary wastes from restrooms, lunchrooms, and building mechanical spaces would be discharged to the City of Sequim sewer system and the existing septic system would be retired. Permitting is not required for these sanitary streams. Process wastewater from laboratory spaces would continue to be discharged to the existing wastewater treatment system as long as there is sufficient capacity. Otherwise, DOE would either modify the onsite treatment system and NPDES permit or work with the City of Sequim to develop a process for discharging to the sewer system if the discharge meets wastewater permitting limits set by the city. Process and sanitary wastewater systems would continue to be segregated within each facility as part of the design process.

Connection to the City of Sequim potable water system for drinking water and fire suppression would be required to satisfy the projected needs of additional staff and facilities on the campus. The existing groundwater supply well, and associated water right, would continue to be maintained for future operations to support R&D studies. Water needed for irrigation would be obtained from onsite groundwater wells under existing water rights. The irrigated area on the PNNL–Sequim Campus is expected to remain small because of use of native vegetation, xeriscaping, and rock landscaping where possible.

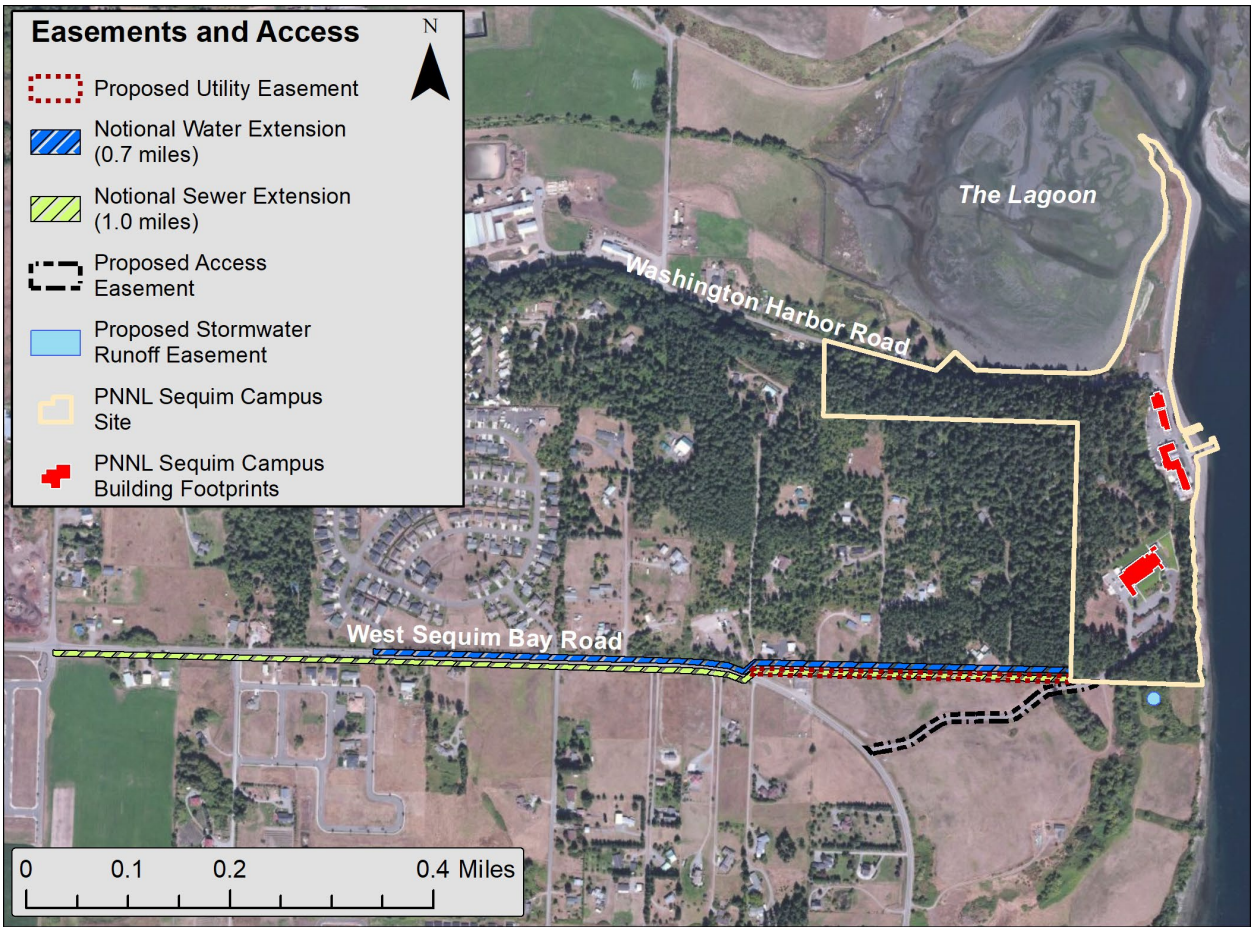

Figure 2.3. PNNL–Sequim Campus Easements and Access

Electrical power is supplied by the Clallam County Public Utility District through two separate incoming lines, one along Washington Harbor Road to the northeast corner of MSL7 that supplies power to the shoreline facilities and the second along the southwest property boundary line to the southwest corner of MSL5 for the uplands facilities. The current electrical infrastructure provides sufficient capacity and is not anticipated to require expansion over the next 20 years but may require installation of vaults, switches, transformers, and trenching for power connections between existing and new facilities onsite. Based on current operations, the buildout could also include standby diesel or natural gas fueled generators, equivalent energy storage systems, or battery backups to provide emergency backup power to meet any future mission-critical needs. Any generator would normally operate for up to 50 hours per year to perform routine maintenance and testing, an additional 50 hours per year for routine use (e.g., during planned electrical outages), and for as long as any temporary power outage may last, and consume less than 760 l/yr (200 gallons per year [gal/yr]) of diesel fuel.

The energy and water usage for the planned PNNL–Sequim Campus buildout, assuming growth from 4700 m^2 (51,000 ft^2) to approximately 12,000 m^2 (132,000 ft^2), is provided in Table 2.2.

Table 2.2. Energy and Water Estimates

Utility	2017-2018 Average Annual Usage	Future Campus Annual Demand
Electrical Power	2,000,000 kilowatt hours	5,000,000 kilowatt hours
Potable Water	6.5 million L (1.7 million gal)	16.8 million L (4.4 million gal)
Sewer Discharge	3.2 million L (0.9 million gal)[(a)]	8.4 million L (2.2 million gal)

(a) Discharge data for the sanitary wastewater to the existing septic system was assumed to be 50 percent of the potable water supplied for the PNNL–Sequim Campus

2.1.8 Access Roads and Parking Lots

Washington Harbor Road would continue to be the access route to the shoreline facilities, while upland facilities would be accessed from West Sequim Bay Road via an access easement along the existing entry road (Figure 2.3). New onsite service access roads and loading docks would be located to minimize traffic hazards. Support functions would be in the same general vicinity as the main service courtyard area of the new facilities because of the similar functional requirements for truck access and storage requirements. Parking areas would be sized to provide one parking space per employee, and additional visitor parking would amount to approximately 10 percent of the total employee parking. Parking spaces for disabled individuals would be provided in both the visitor and employee parking lots as required. A funicular to move materials from shoreline facilities to upland facilities would be considered to facilitate safety and efficiency transporting materials.

2.1.9 Post-Construction Reclamation

After building construction, all disturbed areas would be reclaimed with a combination of native and cultivated vegetation that is adapted for the local site conditions and limited areas of lawn grasses. Landscaping would transition from the manicured and ornamental characteristics found in the developed area of the current PNNL–Sequim Campus, to native landscaping (i.e., use of indigenous plant materials that are low maintenance and require minimal watering). Use of native landscaping will be included in the fiscal year (FY) 2020 revision of the PNSO Cultural and Biological Resources Management Plan (DOE/PNSO 2015). Low-water irrigation systems may be installed for an establishment period only. Irrigated lawn areas would be limited to high-traffic areas and could double as amenity spaces for passive recreation and large events (PNNL 2020).

2.1.10 Workforce

At the assumed rate of one construction project every 3–5 years and based on recent construction experience on the PNNL Richland Campus, it is estimated that the peak construction workforce would be approximately 50 workers at any given time during the 20-year potential buildout. The total buildout is assumed to house approximately 50 to 75 additional staff. The transition into new facilities would occur slowly with an average of 20 to 30 staff per year being relocated from old to new facilities.

2.1.11 Water Runoff and Spill Management

Under the Proposed Action, stormwater runoff from the new buildings, roads, and parking areas in the upland portion of the campus would be collected and discharged offsite to ground using a combination of surface swales, underground percolation beds, and underground injection control (UIC) wells. Stormwater in the shoreline portion of the campus is discharged to Sequim Bay. UIC wells used for

discharge of stormwater to ground would be registered with WA Ecology. No additional stormwater would enter the City of Sequim system.

Spill containment measures would be employed at laboratory facility loading dock areas to prevent contamination of stormwater. Such measures would include installation of spill containment trenches, staff training on spill prevention and response, and transporting chemicals or wastes using secondary containment. Overfill prevention systems and spill containment measures would also be provided at the fueling area for the diesel standby generator(s) (DOE 2017b).

PNNL maintains a Spill Prevention Control and Countermeasure (SPCC) plan for onsite generators and transformers that store diesel and oil above threshold values and have the potential to discharge diesel or oil into navigable waters of the United States. As new facilities and infrastructure projects become more defined and planned for the PNNL–Sequim Campus, reviews of potential impacts of discharges will be evaluated and the SPCC plan will be updated.

2.1.12 Pollution Prevention and Waste Minimization

Pollution prevention in construction and operation of the new facilities would be achieved through the following best practices, consistent with the PNNL Site Sustainability Plan (DOE 2020b):

- equipment or technology selection or modification, process or procedure modification, reformulation or redesign of products, substitution of raw material, waste segregation, and improvements in housekeeping, maintenance, training, and inventory control
- efficiency in the use of raw materials, energy, water, or other resources
- recycling to reduce the amount of waste and pollutants destined for release, treatment, storage, and disposal.

2.1.13 Emergency Preparedness

The PNNL Emergency Management Plan is written in accordance with state and federal regulations to protect workers, public health and safety, and the environment in the event of an emergency affecting the PNNL–Sequim Campus (2019c). For new facilities, building emergency procedures would be developed in accordance with the PNNL Emergency Management Plan to describe the types of hazards and operations associated with the facility as well as any administrative controls or engineered systems in place to mitigate the consequences of accidents or other off-normal events. The controls would be commensurate with the level of risk associated with facility operations (DOE 2017b).

The PNNL–Sequim Campus is 2 mi east of Sequim, Washington. Clallam County Fire District 3 has the authority for medical and fire services, and the Clallam County Sheriff's Office has the authority for security, criminal investigations and complaints, and land/sea searches associated with PNNL–Sequim Campus activities.

2.1.14 Safeguards and Security

PNNL employs a graded physical protection program, in accordance with requirements in DOE Order 470.4B, Change 3, *Safeguards and Security Program* (DOE 2017c), and implementing guidance, to protect DOE assets from malevolent acts (e.g., theft, diversion, and sabotage) and from other events (e.g., natural disasters and civil disorder) by considering site and regional threats, protection-planning strategies, and protection measures (DOE 2017b).

Based on threat assessments and protection-planning strategies, new facilities would be designed to provide the appropriate level of physical protection required by DOE for Property Protection Areas (PPA), Limited Areas (LA), and Material Balance Areas (MBA). PPAs would be established where required to protect government-owned property against damage, theft, or intentional destructive acts. Access control for PPAs would be implemented to protect employees, property, and facilities. Access control may include automated access control systems (i.e., proximity card readers and/or lock systems) or appropriate markings and signage. Signs prohibiting trespassing would be posted around the perimeter and at each entrance to the PPA. Physical barriers (e.g., fences, walls, and doors) may be used to identify the boundary of the PPA or to protect specific areas within a PPA. The shoreline area and MSL5 are PPAs; access is controlled near the Washington Harbor Road entrance to the PNNL–Sequim Campus shoreline facilities and to the west and east of MSL5 in the uplands.

LAs and MBAs are security areas designated for the protection of classified materials and certain types of special nuclear material. LAs and MBAs are defined by physical barriers encompassing the designated space and access controls to assure that only authorized personnel are allowed to enter and exit the area. Physical barriers (e.g., fences, walls, and doors) may be used to identify the boundary of a LA or MBA. General Services Administration-approved security containers could be used to store classified matter and some special nuclear materials.

PNNL would implement special security measures when warranted by an increased threat. The types and frequency of measures implemented would depend on the declared threat level and would employ a graded approach that involves actions by staff, trained onsite personnel, and community emergency response agencies as applicable (DOE 2017b).

2.1.15 Environmental Sustainability

The DOE-Battelle Prime Contract for the management and operation of PNNL (DOE/PNSO 2019) incorporates applicable requirements from DOE Order 436.1, “Departmental Sustainability” (DOE 2011a).

In accordance with Executive Order 14057: “Catalyzing Clean Energy Industries and Jobs through Federal Sustainability”, DOE is committed to managing its facilities, fleet, and operations in an environmentally preferable and sustainable manner. In the performance of work under this contract, the Contractor shall endeavor to provide its services in a manner that will promote the natural environment, reduce waste, and enhance the efficiency and resilience of federal infrastructure and operations.

The Site Sustainability Plan will identify the contributions toward meeting the Department's sustainability goals and will be updated annually based on annual guidance provided by the DOE Sustainability Performance Division. The Contractor will develop, implement, and maintain an Environmental Management System that is certified or conforming to the International Organization for Standardization's 14001 standard. The sustainability goals identified within the Contractor's Site Sustainability Plan will be integrated into the Contractor's Environmental Management System. The PNNL Site Sustainability Plan (e.g., DOE 2022b), which identifies the status and accomplishments of sustainability projects related to DOE’s sustainability goals, is prepared and submitted to DOE annually in accordance with DOE guidance. The PNNL Site Sustainability Plan includes Pollution Prevention Program activities, accomplishments, and continuous improvement opportunities (DOE 2022b).

This established approach to planning, implementing, and monitoring actions directed at meeting DOE sustainability goals and objectives would also be applied to the construction and operation of new facilities at the PNNL–Sequim Campus.

2.2 No-Action Alternative

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 research missions. Without new state-of-the-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.

2.3 Alternatives Evaluated but Dismissed from Detailed Analysis

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. As part of its evaluation process 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.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The affected environment and the impacts of the Proposed Action are described in Section 3.1, the impacts of the No-Action Alternative are described in Section 3.3, and the comparison of the Proposed and No-Action Alternatives are described in Section 3.4.

3.1 Affected Environment and Impacts of the Proposed Action

A conceptual version of the PNNL–Sequim Campus that could be developed under the Proposed Action is shown in Figure 2.1. Aspects of the site and its environs that might be affected by the development of the campus over the next 20 years are described in this section.

3.1.1 Land Use

3.1.1.1 Affected Environment

The PNNL–Sequim Campus includes developed industrial areas and vacant undeveloped land currently owned by Battelle Memorial Institute. The developed campus encompasses about 4.3 ha (11 ac) and is split between a relatively level parcel of Sequim Bay shoreline and a headland bluff cleared from the surrounding forest. The relatively undeveloped area 2.7 ha (6.6 ac) west of the MSL5 complex on the bluff above and behind the shoreline development is currently forested in second-growth Douglas fir and western hemlock. The lands surrounding the PNNL–Sequim Campus are generally devoted to agricultural and residential uses. Current land cover is presented in Figure 3.1 (Cropscape 2019; MRLC 2019; NWI 2019; WSDOT 2015).

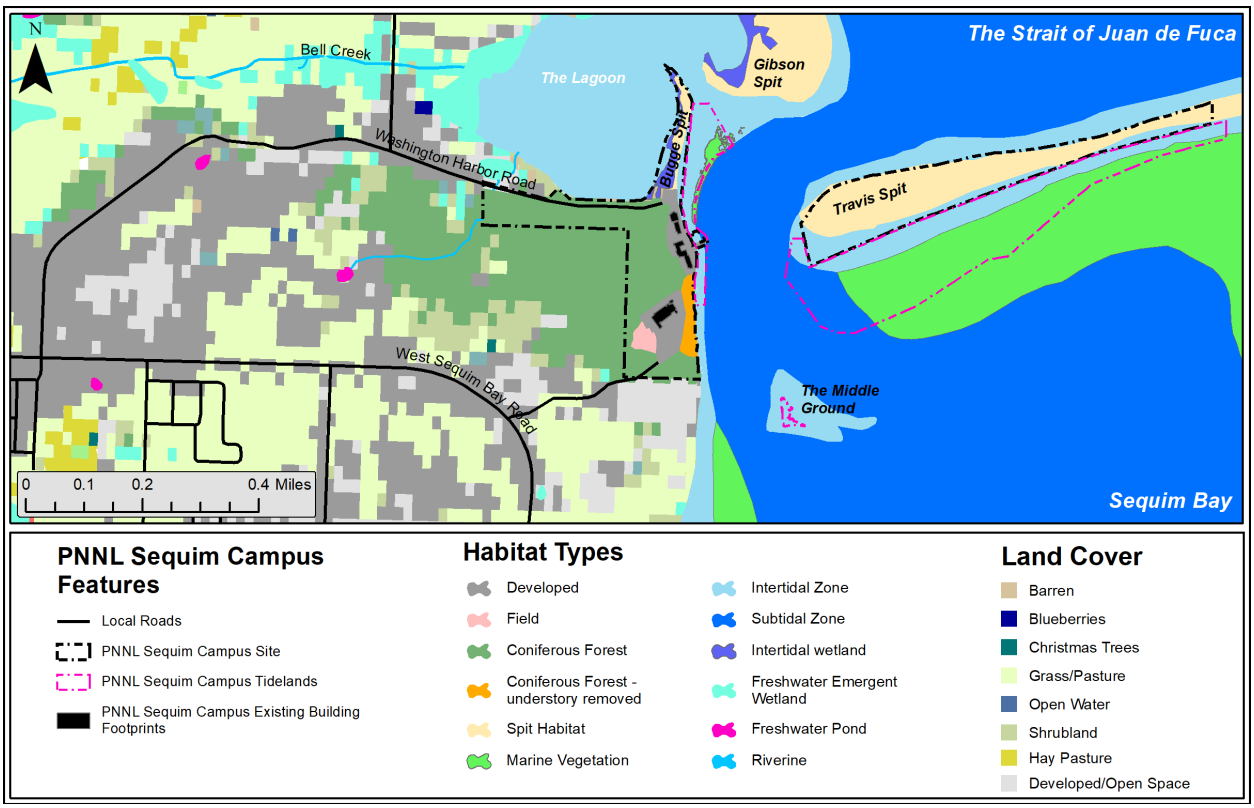

Figure 3.1. Current Land Cover on the PNNL–Sequim Campus and Surrounding Area

Land uses on the campus and in nearby areas (within 1.6 km [1 mi] of the campus) include the following:

- existing PNNL–Sequim Campus facilities, including research laboratories and support buildings
- the City of Sequim Water Reclamation Facility
- Sequim Bay, located due east, which supports a mix of commercial, recreational, and cultural uses
- several small farming and livestock operations; much of the area is designated as prime farmland
- Marlyn Nelson County Park at Port Williams, and Gibson Spit
- residential subdivisions, mobile home parks, and scattered residences
- Travis Spit, Bugge Spit, and The Middle Ground shoal are undeveloped portions of the PNNL–Sequim Campus.

Clallam County currently zones the PNNL–Sequim Campus as "Research and Development Park" (Clallam County 2019b). Development in this area is governed by the Sequim-Dungeness Regional Plan (Clallam County 2016a). This plan provides for the future expansion of the PNNL–Sequim Campus facilities and indicates that extension of Sequim municipal utility services and inclusion of the PNNL–Sequim Campus property in the urban growth area (UGA) are essential to maintaining PNNL–Sequim Campus research purposes. The plan also indicates that the county defers to the City of Sequim for land-use planning in the Sequim UGA, and that the PNNL–Sequim Campus property should be managed as a research park (Clallam County 2016b). However, specific development actions on the marine shorelines of the county are permitted by the county (Clallam County 2016c).

Thus, future land use along the Sequim Bay shoreline areas of the PNNL–Sequim Campus are governed by the Shoreline Master Program (SMP) (City of Sequim 2019), as adopted within the provisions of the Sequim-Dungeness Regional Plan. The PNNL–Sequim Campus property makes up environmental designations 1, 2, and 3 of the SMP. Area 1 includes the base of Bugge Spit, west inside Washington Harbor to the UGA boundary and is designated as "Urban Conservancy." Area 2 includes the portion of the UGA zoned by the City as Research and Development Park containing landslide hazards and is designated as "Natural." Area 3 makes up the southern and western portion of the UGA zoned by the City as Research and Development Park, to the base of Bugge Spit, excluding the area containing landslide hazards, and is designated as "Research District." These designations apply to the area up to 200 ft inland from the shoreline. Thus, the upland bluff area around MSL5 is outside of the SMP designations.

Much of the developable upland area of the PNNL–Sequim Campus is classified as prime farmland, as defined by the Natural Resources Conservation Service (Clallam County 2009).

3.1.1.2 Environmental Consequences

Land-disturbing construction activities in the upland area would include vegetation clearing for laydown areas and parking, grading, and contouring planned construction areas, and excavation of foundations and footings for new facilities. The potential buildout of new facilities would disturb up to 2.7 ha (6.6 ac) of land in the upland area that is currently forested. To the extent practicable, facility modifications and upgrades in the shoreline portion of the site would be accomplished within established building footprints and would be consistent with the provisions of the SMP Section 6.3.5 governing improvements made to the area designated as "Research District." Building heights may be extended to 15.2 m (50 ft) to keep facility upgrades within existing building footprints (PNNL 2020).

The proposed facility upgrades to the shoreline area would conform with current SMP provisions. DOE would follow the provisions of all required permits and agreements, including the Clallam County open space use agreement.

Other portions of the PNNL–Sequim Campus including Travis Spit, The Middle Ground shoal, and Bugge Spit would not be developed. Their use for potential scientific research activities would continue unchanged.

Impacts from operations would not vary from those expected for the current PNNL–Sequim Campus and are governed by established management practices (Aston 2019). These impacts include scheduled building and property maintenance activities and vegetation management. These activities would not further alter land uses. Any temporary relocation of existing staff to alternative office space would use established rental space and would not result in additional land-use impacts over the 20-year planning period.

3.1.1.3 Cumulative Impacts

The anticipated land-use impacts of the Proposed Action were evaluated in the context of the reasonably foreseeable future actions identified in Section 3.1. Taken together, those actions and the Proposed Action result in cumulative land-use impacts on the local area, including the conversion of existing land uses to new uses, conversion of prime farmland, and the clearing of other vacant land. The land disturbance expected from the proposed development of the upland area of the PNNL–Sequim Campus would convert a relatively small area of land from undeveloped to developed land use, which would represent a minor contribution to the cumulative land-use impact. Though minor, this incremental impact has been accounted for in local land-use plans and development would proceed consistent with applicable zoning and regulations.

3.1.2 Air Quality

3.1.2.1 Affected Environment

Chemical Air Emissions

The Clean Air Act (42 U.S.C. § 7401 et seq.), as amended in 1990, requires the EPA to set National Ambient Air Quality Standards (NAAQSs) (40 CFR Part 50) for pollutants considered harmful to public health and the environment. The EPA has set NAAQSs for six "criteria" pollutants, including carbon monoxide (CO), lead, nitrogen dioxide (NO_2), ozone, particulate matter (PM), volatile organic compounds (VOC), and sulfur dioxide (SO_2). The PNNL–Sequim Campus is in Clallam County, which is part of the Olympic-Northwest Washington Intrastate Air Quality Control Region (40 CFR Part 81). An Air Quality Control Region is an area designated by the EPA for the attainment and maintenance of the NAAQSs. All counties within this Air Quality Control Region are listed as "unclassified/attainment" or "better than national standards" for all criteria air pollutants (40 CFR Part 81).

Section 112 of the Clean Air Act addresses emissions of hazardous air pollutants for specific source categories. EPA regulations established under Section 112 are known as National Emission Standards for Hazardous Air Pollutants (NESHAP). The NESHAP regulations cover all pollutants not regulated by the NAAQSs that are classified as hazardous to health, including radionuclides from DOE facilities (40 CFR Part 61 Subpart H).

The Olympic Region Clean Air Agency (ORCAA) implements and enforces EPA chemical air requirements at the PNNL–Sequim Campus through ORCAA Regulations (ORCAA 2019). Two 600-

kilowatt emergency diesel generators are staged at the PNNL–Sequim Campus. Criteria and hazardous air pollutant emissions are permitted under ORCAA Approval Order 13NOI968. Table 3.1 and Table 3.2 list the permitted emissions for these generators. The approval order includes certain operating, fuel sulfur content, opacity, monitoring, record, and maintenance requirements. Because the potential-to-emit is minor for all pollutants, The PNNL–Sequim Campus is considered a "Minor" source and a Title V Air Operating Permit is not required.

Table 3.1. PNNL–Sequim Campus Criteria Pollutant Emissions Permitted in 13NOI968

Criteria Pollutants	lb/hr	ton/yr
PM	1.22	0.15
PM_{10}	1.22	0.15
NO_x	25.60	3.20
CO	1.43	0.18
VOC	0.31	0.04
SO_2	0.92	0.12
Total	30.70	3.84

Table 3.2. PNNL–Sequim Campus Hazardous Air Pollutants Permitted in 13NOI968

Hazardous Air Pollutants	lb/hr	lb/yr
Acetaldehyde	0.0003	0.07
Acrolein	0.0001	0.02
Benzene	0.0091	2.27
Formaldehyde	0.0009	0.23
Naphthalene	0.0015	0.38
Nitric oxide	24.3	6079
Toluene	0.0033	0.82
Total PAH	0.0001	0.01
Xylenes	0.0023	0.56

PAH = polycyclic aromatic hydrocarbon.

Two liquid propane boilers are also used at the PNNL–Sequim Campus. Criteria pollutant emissions from these boilers are orders of magnitude smaller than the emergency diesel generators emissions listed in Table 3.1 and Table 3.2.

Radiological Air Emissions

Permits for radioactive air emissions are issued by the WDOH as a RAEL. A single, nonpoint source minor emission unit, J-MSL, is registered with the state of Washington under the RAEL-014, Renewal-1. Radioactive air emissions are well below the criteria for classification as a minor emission unit (i.e., the potential-to-emit contribution is <0.1 millirem per year [mrem/yr] effective dose equivalent [EDE] to the maximally exposed individual [MEI]). The MEI location is just west of the PNNL–Sequim Campus.

Radiological emissions predominantly occur from laboratories in two buildings: MSL1 and MSL5. Radiological laboratory activities at the PNNL–Sequim Campus include the following:

- conduct of biological, chemical, and physical studies in which marine or aquatic environmental conditions need to be maintained
- maintenance of a "cleanroom" for ultra-low-level trace measurements in environmental media
- storage of radioactive and mixed waste
- laboratory space that could be set up for radiological work.

Federal regulations (40 CFR Part 61 Subpart H) require the reporting of radionuclides emitted from DOE facilities and the resulting offsite dose from those emissions. The regulations impose a dose standard of 10 mrem/yr to an MEI of the public, which is not to be exceeded. Washington State has adopted the 10 mrem/yr federal dose standard (WAC 246-247), but also requires inclusion of dose contributions from fugitive emissions, radon, and non-routine events under WAC 246-247-040(6). The 2018 EDE to the PNNL–Sequim Campus MEI from routine emissions was estimated to be 4.5E-04 mrem and is well below the 10 mrem/yr dose standard (PNNL 2019a).

3.1.2.2 Environmental Consequences

The largest potential for air pollution during construction would be during site clearing. Site clearing would take a few months for each building and would involve the use of larger-horsepower diesel equipment, including scrapers, bulldozers, and backhoes. Dust would be generated by earthmoving activities and vehicle movement over unpaved areas. Local air pollution regulations require that reasonable precautions be taken to prevent fugitive dust and include preventative measures such as frequent watering, the application of dust adhesion products, or other means. Building construction would take longer than site clearing and involve the use of concrete pumpers and cranes, as well as smaller-horsepower diesel equipment, such as portable lights and generators. The operation of this construction equipment would generate SO_2, NO_2, particulates, and other air pollutants, in quantities comparable to other similar-sized construction projects. Emissions from mobile, non-road engines are regulated by federal fuel and design performance standards instead of through permitting. Releases would be intermittent and occur over several months. Because construction emissions are intermittent and temporary, and the area is in attainment with criteria air pollutants, no substantial air-quality impacts associated with implementing the construction phase of the Proposed Action are expected.

Operations at the PNNL–Sequim Campus in the new laboratory spaces are not expected to substantially increase chemical air emissions. The new facilities will likely require emergency diesel or natural gas-powered generators, equivalent energy storage systems or battery back-ups, similar to the two existing generators at the PNNL–Sequim Campus; these generators would be permitted through ORCAA as a minor source. Thus, the permitted criteria and hazardous air pollutant emissions listed in Table 3.1 and Table 3.2 may increase, but the impact would be small, and the area would continue to be in attainment with NAAQSs. Radiological emissions are expected to be nearly the same and would be covered under the sitewide nonpoint source minor emission unit permit, J-MSL. Thus, estimated annual PNNL–Sequim Campus site doses are expected to be comparable to existing values and well below the 10 mrem/yr dose standard.

3.1.2.3 Cumulative Impacts

The potential air-quality impacts of the Proposed Action were evaluated in the context of the reasonably foreseeable future actions identified in Section 1.3.2. Many of the projects identified in Section 1.3.1 are associated with the development of commercial business and multifamily residences. Air-quality impacts would be primarily from emissions of criteria pollutants from construction activities. These emissions would be intermittent and temporary, and would not likely degrade the local air quality. Any major

sources would be permitted, and these emissions would need to meet the NAAQS. Thus, cumulative air-quality impacts from the PNNL–Sequim Campus in combination with the reasonably foreseeable future actions identified in Section 1.3.1 would be very low.

3.1.3 Soils and Geological Resources

3.1.3.1 Affected Environment

Ground surface elevations at the PNNL–Sequim Campus site range from about 150 ft in the upland area to sea level in the shoreline area. The MSL5 building is at an elevation of about 100 ft. The periphery of the upland area slopes steeply to the north and east, and a near-vertical bluff separates the developed uplands area from Sequim Bay. The PNNL–Sequim Campus vicinity is underlain by Quaternary-age unconsolidated glacial and interglacial deposits to a depth greater than 1200 ft (Thomas et al. 1999). Surficial deposits on the upland portion of the PNNL–Sequim Campus site are glacial till 14,500 to 17,500 years old, described as unstratified, poorly sorted, clayey, sandy silt up to 150 ft thick, with an average thickness of 30 ft throughout the greater region (Schasse and Logan 1998). These surficial deposits are underlain by undifferentiated deposits from older glacial events and interglacial periods. Water-bearing units of coarse-grained sands and gravels are found in the unconsolidated deposits throughout the region, including in the vicinity of the PNNL–Sequim Campus site (Thomas et al. 1999). Tertiary-age sedimentary (primarily siltstone, sandstone, and mudstone) and volcanic (primarily basalt and basalt breccia) rocks underlie the unconsolidated deposits (Schasse and Logan 1998).

A number of recorded earthquakes and seismically active faults are located within 5 mi of the PNNL–Sequim Campus, and the nearest fault trace is about 3.2 km (2 mi) to the southwest (WDNR 2019). The region is subject to significant seismic hazards, as evidenced by the estimated peak ground acceleration of 0.4 to 0.8 g for 2 percent probability of exceedance in 50 years (Peterson et al. 2014). Very strong shaking (Modified Mercalli Intensity VII) in the PNNL–Sequim Campus region is predicted for several of the earthquake scenarios evaluated by Washington State (e.g., the Cascadia Subduction Zone earthquake scenario) (WDNR 2013). Susceptibility to liquefaction is rated as very low or low for both the uplands and shoreline areas of the PNNL–Sequim Campus, with the exception of Travis Spit and Bugge Spit north of the shoreline parking area, which are rated as moderate to high for liquefaction susceptibility (WDNR 2019). The shoreline area of the PNNL–Sequim Campus and Travis Spit are subject to tsunami hazard (inundation) for the Cascadia Subduction Zone scenario (WDNR 2019). The glacial deposits at the PNNL–Sequim Campus support the near-vertical slopes along the bluff at the site, however, several landslides have been mapped in the region (WDNR 2019), suggesting a potential landslide hazard at the site. No volcanic hazard has been identified in the PNNL–Sequim Campus region (WDNR 2019).

Soils present on the PNNL–Sequim Campus site include moderately well-drained gravelly loam soils, 50 to 100 cm (20 to 40 in.) deep, that are present on the majority of the upland area to be developed for buildings and parking (NRCS 2019); these soils are classified as prime farmland. Shallower, gravelly sandy loam soils make up the remaining upland areas that are not steeply sloped. These soils are not prime farmland. The steeper soils above Washington Harbor Road are excessively drained, gravelly loamy sands that are not prime farmland. These steeper soils are identified as an erosion hazard (City of Sequim 2014). The shoreline area has no formal soil classification.

No commercial mineral resources are known to be present on the PNNL–Sequim Campus site. Sand and gravel have been widely mined from the glacial outwash deposits found throughout the region, and the bedrock has been mined for stone (USGS 2019b). Several operating mines within Clallam County could provide the sand and gravel needed for construction at the PNNL–Sequim Campus.

3.1.3.2 Environmental Consequences

Environmental impacts on soils and geological resources result from construction activities that would include clearing, grading, and contouring to establish the final site topography for new buildings and parking in the upland area. With the potential addition of new buildings and parking, the developed area of the uplands would more than double (see Section 2.1.2) and the surface soils would be disturbed across the entire area affected by construction. In the shoreline area, there would be minimal additional soil disturbance because construction activities would be limited to the footprints of existing buildings, and the existing paved and disturbed areas. Impacts on soils resources would mainly consist of reworking and redistributing existing surface soils on the uplands area, about half of which (less than 2.7 ha [6.6 ac]) would be soils classified as prime farmland. With development, these soils would be permanently altered. However, the use of these soils for farming is unlikely because the PNNL–Sequim Campus is within the current UGA of the City of Sequim (City of Sequim 2014).

Construction would also require excavations in the upland area, and possibly the shoreline area, for building footings and foundations, utilities, and infrastructure. The depth of disturbance for building excavations in the uplands area would be less than 15.2 m (50 ft) (PNNL 2020), allowing for basements and underground utility connections. Excavations to this depth would be in the unconsolidated glacial and interglacial deposits (glacial till with some sand and gravel). Existing soils and excavated sediments at the campus would be stockpiled and used, to the extent possible, for backfill, landscaping, grading, and contouring. Some offsite materials (e.g., sand, gravel, crushed stone) may be required for construction. As noted above, these materials are plentiful in the region.

Extension of water and sewer lines to the PNNL–Sequim Campus from existing City of Sequim infrastructure would involve excavation and ground disturbance along the approximately 1.6 km (1 mi) route (see Section 2.1.8). This excavation would affect undisturbed and previously disturbed soils, some of which may be classified as prime farmland soils, but the excavated area would be revegetated following burial of the pipes, so these impacts would be temporary.

During operation of the new facilities, there would be no additional impacts on soils and geological resources beyond the construction impacts described above. Existing site maintenance procedures would continue to be followed to reduce the risk of landslides along the bluff above Sequim Bay.

3.1.3.3 Cumulative Impacts

The future actions identified in Section 1.3.2 would affect soil and geological resources in the vicinity of the PNNL–Sequim Campus. However, because the Proposed Action would permanently alter only a small area of soils classified as prime farmland, and geological resources for construction are plentiful within the region, the incremental contribution to cumulative impacts on soils and geological resources in the region would be minimal. No additional cumulative impacts on soils or geological resources would occur.

3.1.4 Water Resources

3.1.4.1 Affected Environment

The PNNL–Sequim Campus is situated in the Sequim Bay watershed, near the inlet to Sequim Bay from the Strait of Juan de Fuca. There are no perennial streams or ponds on the PNNL–Sequim Campus. The nearest fresh surface waterbody is Bell Creek, located north of Washington Harbor Road, which drains an area of about 19.7 km^2 (7.6 mi^2) (USGS 2019a) and discharges to a tidal lagoon connected to the Sequim Bay inlet. Existing Federal Emergency Management Agency flood zones are located along, and at the

mouth of, Bell Creek (City of Sequim 2014). The Dungeness River, located about 8 km (5 mi) west of the PNNL–Sequim Campus, is the primary surface source of freshwater in the region and is used for irrigation throughout the lower Dungeness River watershed (Ecology 2010). Water resources in the Dungeness River and Bell Creek watersheds (including groundwater) are extensively managed to satisfy present and future human needs and to protect instream values and resources (WAC 173-158).

The shoreline facilities on the PNNL–Sequim Campus are located directly on Sequim Bay, and any surface water runoff from the shoreline area drains directly to the bay. Minor surface runoff from the forested upland area of the PNNL–Sequim Campus is expected; any runoff that does occur ultimately drains north to the lagoon or east to Sequim Bay. A short, intermittent stream draining to the lagoon is present near the westernmost boundary of the PNNL–Sequim Campus. Runoff from the developed upland area drains via pipeline to a manmade pond located on private property offsite south of the PNNL–Sequim Campus. Water directed to this pond either infiltrates or overflows from the pond to a channel that runs southeast and discharges over the bluff to Sequim Bay.

As described in Section 2.1.6, seawater is withdrawn from Sequim Bay for use in R&D operations at the PNNL–Sequim Campus. The offshore intake is located on the floor of Sequim Bay north of the MSL3 Filter Building. Pumping capacity is 760 lpm (200 gpm). No water right is required for the withdrawal of seawater (Ecology 1994). No freshwater use at the PNNL–Sequim Campus is from a surface water source.

Sequim Bay adjacent to the PNNL–Sequim Campus currently meets all water-quality standards for the designated uses[1] of extraordinary aquatic life use, primary contact recreational use, all harvest uses, and all miscellaneous uses (aesthetics, boating, commerce/navigation, and wildlife habitat) (Ecology 2019c). Lower Bell Creek is currently impaired for exceedance of dissolved oxygen, bacterial, and biological integrity water-quality standards (Ecology 2019b). The tidal lagoon and Strait of Juan de Fuca north of the PNNL–Sequim Campus is listed as impaired for aquatic life due to algae growth arising from human causes (Ecology 2019a).

Discharges to Sequim Bay from the PNNL–Sequim Campus are permitted at two outfalls (Ecology 2017). Clean process water, filter backwash, and clean seawater are discharged from Outfall 007 located just east of the pier (PNNL 2016). Non-sanitary wastewater from the upland and shoreline areas is treated by the onsite wastewater treatment system and discharged via Outfall 008, located at the east end of the shoreline developed area, about 12 m (40 ft) offshore (at mean lower low water [MLLW]) (PNNL 2016). Monitoring of treated wastewater discharge flow and water quality are required by the NPDES permit. Average flow varied from about 19 to 379 m^3/d (5000 to 100,000 gallons per day) for the period from September 2012 to September 2019 (PNNL 2019d). The discharge permit stipulates limits on pH for Outfall 008; measured pH values were within the permit limits for the period from December 2012 to August 2019 (PNNL 2019d).

Groundwater in the region between the Dungeness River and the Strait of Juan de Fuca/Sequim Bay occurs within the unconsolidated deposits that extend from the ground surface to the underlying bedrock (see Section 3.1.3). These deposits are thin in the foothills of the Olympic Mountains where bedrock outcrops, and they become thicker to the northeast, reaching a maximum thickness of more than 610 m (2000 ft) to the north of Sequim Bay (Thomas et al. 1999). The regional groundwater system consists of three aquifers (shallow, middle, and lower) with intervening low-permeability confining units (Thomas et al. 1999). Groundwater generally flows from recharge areas in the south to discharge areas in the north, and recharge occurs from infiltration of precipitation and subsurface inflow from fractured bedrock.

[1] Use designations for marine waters are at https://apps.leg.wa.gov/WAC/default.aspx?cite=173-201A-612.

Substantial recharge to the shallow aquifer may occur from excess irrigation and irrigation losses. Groundwater discharges to springs, streams, Sequim Bay, and the Strait of Juan de Fuca.

The shallow aquifer in the vicinity of the PNNL–Sequim Campus occurs at a depth of about 46 m (150 ft) below ground surface (Thomas et al. 1999). The middle aquifer is about 15 m (50 ft) thick in the vicinity of the PNNL–Sequim Campus, and the top of the aquifer is found at elevations between about -15 and -46 m (-50 and -150 ft) National Geodetic Vertical Datum of 1929 (Thomas et al. 1999). Information about the lower aquifer is limited because few wells are completed in it (Thomas et al. 1999). However, the well used for freshwater supply on the PNNL–Sequim Campus is screened in the lower aquifer at an elevation of about -120 m (-400 ft) National Geodetic Vertical Datum of 1929, within a sand and gravel interval that is about 14 m (45 ft) thick (Ecology 1981).

Groundwater is the primary source of drinking water and other non-irrigation water uses in Clallam County, including for the City of Sequim and the rural residences in the surrounding area (Ecology 2010; City of Sequim 2014). The City of Sequim supplies about 1,300,000 m^3 (350 million gallons) (1074 ac-ft) annually from three groundwater sources (City of Sequim 2014). The increasing population of the region has resulted in the addition of new water supply wells and has increased groundwater use over time (Ecology 2010, Thomas et al. 1999). Most wells in the region are constructed at depths less than 90 m (300 ft) below ground surface, likely in the shallow and middle aquifers (Thomas et al. 1999). Numerous residential water supply wells are located in the developed areas near the PNNL–Sequim Campus. These wells are screened at elevations well above the freshwater supply well on the PNNL–Sequim Campus (Ecology 2019e); static water levels generally are 30 to 46 m (100 to 150 ft) below ground surface in wells near the PNNL–Sequim Campus[1].

The PNNL–Sequim Campus groundwater well is located in the shoreline area near the base of the bluff. Well water is used for drinking water and sanitary purposes and as a freshwater source for use in R&D operations. When tested during development, the well yielded 720 lpm (190 gpm) of water with 11.5 m (38 ft) of drawdown after 24 hr (Ecology 1981), a rate of 370,000 m3/yr (300 ac-ft/yr) if pumped continuously. Combined water rights of 31,000 m^3/yr (25 ac-ft/yr) (with a peak flow of up to 380 lpm [100 gpm]) are held by the property owner for groundwater withdrawal (Tilden 2016). Average groundwater use was 15,000 m^3/yr (12.2 ac-ft/yr) from 2014 to 2018 and ranged from 6900 to 34,500 m^3/yr (5.6 to 28.0 ac-ft/yr), with most of the variation attributed to changing research needs (PNNL 2019b). Although no data are available to confirm the fraction of groundwater used for R&D operations, the City of Sequim estimates about 98 percent is used for process (non-domestic) purposes (City of Sequim 2014). An application for an additional water right to accommodate an increase in freshwater needs for research was filed with the state for 308,000 m^3/yr (250 ac-ft/yr), with a peak withdrawal rate of 760 lpm (200 gpm); it is currently pending (Tilden 2016).

Groundwater quality in the region is generally good, as evidenced by its extensive use for drinking water and by recent monitoring in the Sequim area (Soule 2013). However, the shallow aquifer in most areas is vulnerable to nitrate contamination from septic systems and fertilizer use (Soule 2013). The City of Sequim public water supply system is required to complete regular monitoring of water quality. This drinking water source met all water-quality requirements in 2018 (City of Sequim 2019). Groundwater from the PNNL–Sequim Campus well is monitored regularly for nitrates, inorganic contaminants, herbicides, pesticides, and volatile organic compounds. No exceedances have been observed in the last

[1] Water level measurements for wells near the PNNL–Sequim Campus were reviewed at https://maps.waterdata.usgs.gov/mapper/index.html and https://fortress.wa.gov/ecy/wellconstruction/map/WCLSWebMap/WellConstructionMapSearch.aspx.

10 years.[1] The presence of bacteria (as total coliform or *E. coli*) has been observed in the distribution system during monthly sampling.[2] When this occurs, the water system is taken out of service, repeat samples are collected as required, and the water system is disinfected and confirmed to be free of coliform before returning the system to operation. Bacterial contamination has not been detected in the groundwater source.[2]

Sanitary wastewater from the shoreline and uplands buildings are discharged to a septic system located in the uplands area south of MSL5. (PNNL 2016). The septic drainfield occupies a grassy area south of MSL5. The septic system was permitted in 1976 by Clallam County (Permit No. SEP76-03675). No other discharges to ground occur on the PNNL–Sequim Campus.

3.1.4.2 Environmental Consequences

As described above, the shoreline area of the PNNL–Sequim Campus is located adjacent to Sequim Bay, but the only surface water resource that exists on the campus itself is an intermittent stream in an area that would not be developed. As described in Section 2.1.6, construction activities may include in-water work to repair or replace the existing infrastructure in Sequim Bay. Because these activities would disturb a small area of the bay, and they would be subject to federal and state permit requirements to protect water quality, impacts on water quality would be minimal, temporary, and localized to the immediate area of the construction.

Water would be required during construction for activities such as dust suppression, but the amount used would be small and its use intermittent. Water for construction would be supplied from the existing groundwater source, or from the City of Sequim water supply following completion of a water line extension to the PNNL–Sequim Campus.

All development on the PNNL–Sequim Campus would take place outside of any Federal Emergency Management Agency-designated floodplains. Development on the campus would thus not affect or be affected by any flooding on adjacent properties. Therefore, DOE has determined that a formal floodplain assessment as described in 10 CFR Part 1022 is not required for the Proposed Action (10 CFR Part 1022).

Future construction at the site would require a Construction Stormwater General Permit, issued by WA Ecology. During construction, stormwater would be managed onsite according to a required stormwater pollution prevention plan. Construction activities on the campus would implement best management practices in accordance with the Stormwater Management Manual for Western Washington (Ecology 2019d) to control erosion, sediment transport, and water-quality degradation.

As described above, water levels in wells near the uplands area are generally 30 to 46 m (100 to 150 ft) below ground surface. Because this is deeper than new building excavations, construction in the uplands area is not expected to extend into the groundwater. Groundwater in the shoreline area is expected to be found near sea level, so any excavations in that area are assumed to be shallow enough to avoid encountering groundwater and the need for excavation dewatering.

As described in Section 2.1.7, with additional development and staffing at the PNNL–Sequim Campus, the City of Sequim would supply freshwater to the campus for potable and fire-suppression uses. The

[1] Sample results were reviewed 11/22/2019 at https://fortress.wa.gov/doh/eh/portal/odw/si/SingleSystemViews/GenInfoSingleSys.aspx?OrgNum=10351&OrgName=BATTELLE+NORTHWEST+MARINE+LAB&xid=55591

[2] Exceedances results were reviewed 11/22/2019 at https://fortress.wa.gov/doh/eh/portal/odw/si/SingleSystemViews/GenInfoSingleSys.aspx?OrgNum=10351&OrgName=BATTELLE+NORTHWEST+MARINE+LAB&xid=55591

amount of demand from the City of Sequim is assumed to be proportional to the number of staff at the PNNL–Sequim Campus, which could increase from 60 (currently) to as many as 135 (see Section 2.1.10). Conservatively, assuming 4 percent of the average groundwater use (about 620 m^3/yr [0.5 ac-ft/yr]) is currently used at the PNNL–Sequim Campus for potable and fire-suppression purposes, future demand for these purposes could increase to about 1400 m^3/yr (1.1 ac-ft/yr). This is about 0.1 percent of the existing City of Sequim demand, which would have a minimal impact on the City's existing groundwater supply.

The existing PNNL–Sequim Campus groundwater well would continue to supply water to the PNNL–Sequim Campus for research purposes. City water is chlorinated and therefore is not always appropriate for research purposes. Annual demand for well water is expected to continue to vary significantly in response to changing research needs. The future campus annual demand for well water for research purposes is projected to be about 1690 m^3/yr [3.6 ac-ft/yr] which is an 11 percent increase over the 2014–2108 average groundwater use at the PNNL–Sequim Campus. Given the large observed well yield at the time of well installation (see discussion above), this increase in average future demand for research purposes would have a minimal impact on the groundwater source. The average future demand would also be less than the existing water right of 31,000 m^3/yr (25 ac-ft/yr).

Future development will maximize use of native vegetation to minimize the need for irrigation. Water required for irrigation on the PNNL–Sequim Campus is expected to be, at most, slightly greater than the amount used currently. Any small increase in irrigation water would result in negligible to minor impacts.

Because future water use would be a small fraction of the existing City of Sequim supply, and because the increase in groundwater use from the existing PNNL–Sequim Campus well would be small and within the well yield, the Proposed Action would have a small impact on water resources. Water from Sequim Bay would continue to be used for research purposes at the PNNL–Sequim Campus but would remain a negligible use compared to the volume of seawater available.

As described in Section 2.1.7, with additional development and staffing at the PNNL–Sequim Campus, sanitary wastewater would be discharged to the City of Sequim sewer system and the existing septic system at the PNNL–Sequim Campus would be retired. Discharge of sanitary wastewater to the city would not require permitting. Average inflows to the City's water reclamation facility are about 2300 m^3/d (0.6 million of gallons per day) (672 ac-ft/yr) (Gray & Osborne 2013). Assuming the PNNL–Sequim Campus sanitary wastewater flow would be less than about 60 percent of the potable water obtained from the City of Sequim, the sanitary wastewater discharges to the City's sewer system would be about 0.1 percent of the existing wastewater treated at the City's water reclamation facility. The City discharges treated wastewater to the Strait of Juan de Fuca via an NPDES-permitted outfall located about 0.5 mi north of the Sequim Bay inlet (Gray & Osborne 2013). Because the PNNL–Sequim Campus sanitary wastewater demand would be a small fraction of the wastewater currently treated by the City of Sequim, future PNNL–Sequim Campus wastewater demand would have a minimal impact on the City's available treatment capacity and a negligible impact on the discharge water quality.

Laboratory process water would continue to be treated at the existing PNNL–Sequim Campus wastewater treatment plant, or at an expanded plant, if needed (see Section 2.1.7). If laboratory process water were to be discharged to the City of Sequim sewer system, it could require an industrial wastewater permit issued by the City. This permit likely would be similar to existing laboratory discharge permits used at the PNNL Richland Campus, which include limitations on discharge flow rates, pH, and contaminant concentrations, monitoring and reporting requirements, and an accidental spill prevention plan. These permit conditions minimize impacts from laboratory discharges to the City of Richland sewer system.

Current discharges to Sequim Bay and the septic system adhere to existing permit conditions and have minimal impacts on water quality. Future discharges to Sequim Bay are expected to be similar to current discharges and would continue to be subject to permit requirements, including discharge limits and monitoring. Because the existing process water discharges have had minimal impacts on Sequim Bay water quality, future similar discharges conforming to permit requirements would have similarly small impacts. Any impacts on local groundwater quality from the existing septic system would be eliminated when that system is retired.

During operation, stormwater would be managed to minimize the impacts of runoff on water quality. Green infrastructure/low-impact development techniques will be used to meet the requirements of Section 438 of the Energy Independence and Security Act of 2007 to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow (DOE 2011b). Applicable techniques may include bioretention planters, tree boxes, porous pavement, and revegetation with native plants. In addition, the applicable requirements and best management practices described in the *Stormwater Management Manual for Western Washington* (Ecology 2019d) would be followed. These include managing stormwater onsite using surface swales or UIC wells, preserving natural drainage systems and outfalls, and using runoff treatment best management practices to remove pollutants from runoff. The use of UIC wells for stormwater management is regulated by WA Ecology, which requires the use of best management practices to protect groundwater and prevent the spread of any underlying groundwater contamination. Continued use of the existing stormwater infiltration basin, which is located off of the PNNL–Sequim Campus, will require an easement. Stormwater on the PNNL–Sequim Campus will be managed in the future, using UIC wells or other methods so that discharge to the existing stormwater infiltration basin will not increase from current amounts. Because stormwater would be managed so that offsite runoff would not increase, would adhere to best management practices, and would be regulated under the WA Ecology programs, impacts on surface water and groundwater quality would be minimal.

3.1.4.3 Cumulative Impacts

Most of the future actions identified in Section 1.3.2 would increase use of the City of Sequim's groundwater supply and wastewater reclamation facility. The City of Sequim is planning for future growth in the population served by the City's utilities, and for increased demands for City services due to developments within the City's UGA, which includes the PNNL–Sequim Campus (City of Sequim 2014; Gray & Osborne 2013). City of Sequim average water production without additional conservation was projected to increase about 60 percent over the 20-year planning period (City of Sequim 2014). This relatively large increase in water use would have a noticeable impact on the groundwater resources in the region. City of Sequim average wastewater flows were projected to increase about 85 percent over the same 20-year planning period (Gray & Osborne 2013). Continued planning, the increased use of water conservation measures to reduce consumption, and increased use of reclaimed water (e.g., for irrigation) are expected to mitigate the impacts of projected growth on water resources in the region. Because the Proposed Action would require increases in water use and sewer discharge that are a minimal fraction of the cumulative increases already considered in the City of Sequim's planning process, the Proposed Action would be a minor contributor to the cumulative impacts on water resources.

Annual precipitation in the region during the last 30 years has increased compared to the first half of the 20th century, but the amount of winter precipitation has decreased (USGCRP 2017). Reductions in snowfall and changes in the timing of snowmelt and streamflow due to climate change are expected to reduce the overall supply of water in the Pacific Northwest (USGCRP 2017). Reductions in streamflows are likely to most affect water availability in the late summer. Water supply is managed by WA Ecology to support a variety of competing uses, and adaptation to a reduced supply may be required in the future. However, the depth of the groundwater well at the PNNL–Sequim Campus is likely to insulate it from the

short-term impacts of climate change. In addition, water use of the Proposed Action is a minimal fraction of the City of Sequim water supply.

Average temperatures on the northern Olympic Peninsula during the last 30 years have increased between 1.0 and 1.5°F since the first half of the 20th century, and are expected to continue to increase during the remainder of this century (USGCRP 2017). With increasing temperatures and reduced winter precipitation, irrigation water needs in the region are expected to increase. The use of native vegetation will reduce irrigation demand for PNNL–Sequim Campus landscaping.

3.1.5 Cultural Resources and Historic Properties

3.1.5.1 Affected Environment

Cultural resources are considered objects or areas of cultural significance to human history at a local, state, or a national level. Cultural resources generally include sites, objects, landscapes, structures, or natural features of significance to a group of people traditionally associated with them. Further, cultural resources include human remains as well as resources of traditional use or religious value to Native Americans.

The cultural resources on the Olympic Peninsula are diverse, ranging from the early precontact period to the historic era. To understand the cultural resources in the study area, one must refer to the overall history of the region. Historically, the S'Klallam people inhabited the shorelines what we now know as Sequim Bay. S'Klallam is the English spelling of the name nəxʷsƛ̓ayə̓m, which means "strong people" in the Klallam language. By European arrival in the late 1700s, the S'Klallam territory ranged across the northern Olympic Peninsula and across the Strait of Juan de Fuca to Vancouver Island. Today, the S'Klallam are composed of three federally recognized tribes: the Jamestown S'Klallam, Port Gamble S'Klallam, and the Lower Elwha Klallam.

The S'Klallam people traditionally hunted and fished for subsistence, using local water sources. At the PNNL–Sequim Campus, this would have included Sequim Bay and its drainage basin, including Jimmycomelately Creek in nearby Blyn. Fishing for salmon and other anadromous fish was a major component of the subsistence patterns of the S'Klallam and other native groups of the Olympic Peninsula. Subsistence was also supplemented with shellfish, clams, and berries. Game species such as elk, black bear, mountain goats, beaver, and waterfowl were also consumed.

Prior to European contact, more than two dozen villages were spread along the shores of the Peninsula, including Sequim Bay. Sxʷčkʷíyəŋ (pronounced "sh-tch-kwung") was a moderately large village site that controlled the mouth of Sequim Bay (Figure 3.2). The village was located under the bluff and was surrounded by a palisade wall. Village sites were connected mainly through familial ties and were structured by class. The siʔámə̓ (prominent families) controlled major resources, such as fish traps or fishing banks, and the rights to resources within a particular watershed. Below the top class were the commoners, who passed on artisanal and technological traditions from generation to generation and provided specific activities such as canoe making, hunting, or tool making. The lowest class were slaves, who were captured in battle or purchased through trade.

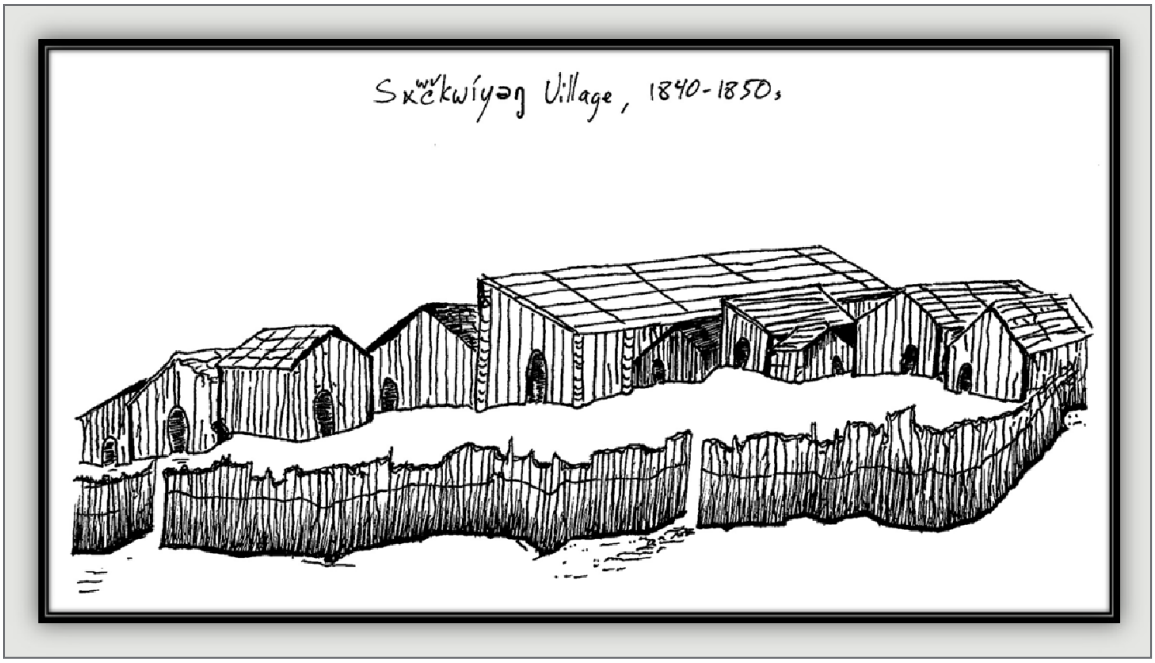

Figure 3.2. Sxʷčkʷíyəŋ Village During the Mid-1800s (Brownell 2018)

Ethnographic records detail how the S'Klallam kept slaves. Slaves typically provided labor and performed menial duties. Slaves were positioned in sandspits or other vulnerable locations so that they could bear the brunt of an attack in war. At sxʷčkʷíyəŋ, this location was Bugge Spit. The slave village was located at the base of Bugge Spit. Between Bugge Spit and the beachfront village was a row of poles that displayed the heads of enemies that were taken during war. Gunther (1927) described how the poles always remained standing. Slave families that became too large to live with their master were sent up to the uplands to live. They were expected to construct their own homes, which according to ethnographic records, were small and poorly made.

The S'Klallam seasonally occupied winter villages and summer camps. Sxʷčkʷíyəŋ was considered a winter village, which were mainly permanent, contained between 100 and 500 people, and were occupied from late fall through mid-spring. Villages were composed of one or more longhouse structures with outlying cabins and huts for the lower class and slaves. Most villages had a potlatch or ceremonial meeting house, as did sxʷčkʷíyəŋ. Winter was considered the season of ceremonies, feasting, and strengthening of family and kin bonds.

Summer camps were occupied seasonally, ranging from a few days to an entire summer (Brownell 2018). Summer camps were focused around resource procurement sites, such as the mouths of rivers and estuaries, plant gathering areas, or near marine resources like fishing banks or whale lookouts. Seasonal camps were constructed of tents or huts made of cedar or rush mats layered over a wooden frame. Kiapot Point on Travis Spit was historically used as a camping site. Sequim Prairie and Dungeness Spit were also summer camping spots.

Similar to other S'Klallam village sites from the 19th century, sxʷčkʷíyəŋ suffered from events such as epidemics of contagious diseases and the encroachment of European settlers into their ancestral lands, causing S'Klallam members to move elsewhere. By 1874, under the leadership of James Balch, some S'Klallam families joined together to purchase 210 ac of land, approximately 4 miles west of the present day PNNL- Sequim campus, which they called Jamestown. By this time, the population of sxʷčkʷíyəŋ

was dwindling, and families were slowly transitioning to Jamestown. By the 1890s, more S'Klallam families moved from sxʷčkʷíyəŋ to Jamestown (Brownell 2018).

Around 1899, Hans J. Bugge purchased Washington Harbor to develop Bugge Cannery (Figure 3.3). He expanded his business by processing clams, salmon, and produce. Bugge also operated a creamery. The original cannery burned in 1929, but the Bugge family rebuilt and continued to operate the cannery into the 1960s (Russell 1971).

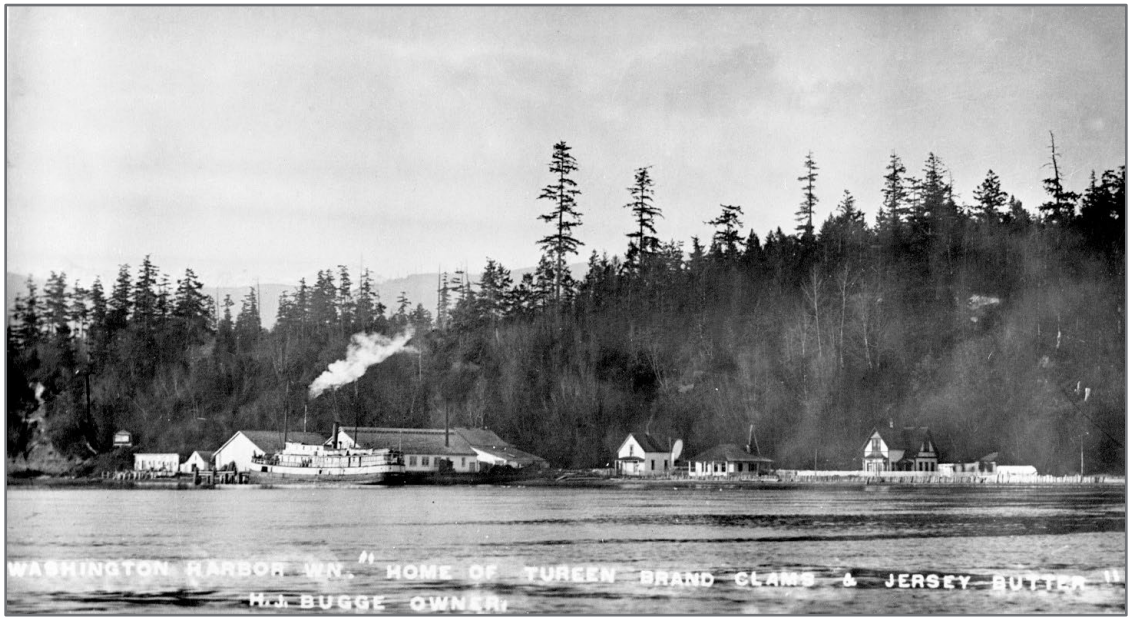

Figure 3.3. Bugge Cannery, circa 1910 (Clallam County Historical Society)

The clam cannery operated seasonally between October and April. Originally, the cannery operated with 10–15 employees, mainly of S'Klallam ancestry. Bugge built a series of cabins and apartments south of the cannery that were constructed specifically for the S'Klallam cannery workers that he employed. Some S'Klallam workers also lived on Kiapot Point by this time. Seasonal workers from Jamestown were based at the camp at the south end of the cannery complex, on the site of the former sxʷčkʷíyəŋ village. There are still living members of the Jamestown S'Klallam who worked at the cannery until the 1950s, when operations began to slow down (Brownell 2018).

In 1966, Anphin Bugge (son of Hans Bugge) sold the property to Battelle for the future construction of the Marine Science Laboratory (now PNNL–Sequim Campus). Most of the cannery and outbuildings were removed by the early 1970s, and the remainder of sxʷčkʷíyəŋ residents relocated to Jamestown (Brownell 2018).

Though there are recorded archaeological sites on the PNNL-Sequim Campus, no campus wide archaeological surveys had been conducted, prior to the survey conducted as part of the Section 106 process associated with this EA. In conjunction with this NEPA review and pursuant to 36 CFR 800 (36 CFR Part 800), DOE has completed NHPA Section 106 consultation and has completed a separate NHPA Section 106 assessment, that includes a campus-wide survey. Further detailed discussion of cultural resources are included in that NHPA Section 106 review.

Currently, there are two known previously recorded archaeological sites within the study area of the Proposed Action (Table 3.3). The aforementioned village sxʷčkʷíyəŋ is the largest cultural resource

present. Most of the original work surrounding this site was reviewed by Blukis Onat and Larson in the 1980s, when a series of archaeological surveys, excavations, and construction monitoring were conducted due to the discovery of human remains along the beachfront during construction of the PNNL–Sequim Campus shoreline facilities (Blukis Onat and Larson 1984).

Table 3.3. Previously Registered Cultural Resources within the Study Area of the Proposed Action

Resource Type	Time Period	National Register of Historic Places (NRHP) Status	Description
Sxʷčkʷíyəŋ Village	Precontact/ Historic	Listed in the Washington Heritage Register. Being evaluated as part of the NHPA Section 106 review process with a preliminary recommendation of eligible.	Village site and associated shell midden
Camp	Historic	Being evaluated as part of the NHPA Section 106 review process with a preliminary recommendation of eligible	Historic Jamestown S'Klallam camp consisting of metal and charred wooden remains

Excavations were performed at the shoreline on two occasions. Rice and Woodruff (1981) excavated a 1.5 m by 1.5 m unit in the winter of 1981. The unit was terminated at 280 cm. Findings of that excavation were incorporated in the Blukis Onat and Larson 1984 report (Blukis Onat and Larson 1984).

Blukis Onat and Larson (1984) performed the second excavation. Soils excavated from ongoing trenching were screened and cultural material was separated. While their efforts were limited to the construction activities that were occurring at the time, Blukis Onat and Larson uncovered significant archaeological deposits that indicated there was a strong possibility of intact cultural resources throughout the remainder of the shoreline (Blukis Onat and Larson 1984). Artifacts including chipped stone, ground stone, modified bones, and faunal remains were recovered, cataloged, and analyzed. In addition to the extensive marine mollusk remains that made up the middens, an extensive faunal assemblage, including remains of fish, birds, and mammals, was recovered. The full collection of artifacts from the 1980s excavations are in the possession of the Jamestown S'Klallam. More than 14,000+ artifacts were recovered.

A radiocarbon sample collected from a hearth feature located in the sand layer beneath the midden deposits indicated a date of 650 ± before present (B.P.). According to Blukis Onat and Larson (1984), this date places the site within the Specialized Resource Management period, approximately 2500 to 250 years B.P. Based on stratigraphy, ethnohistory, and historic data, the site had been continuously occupied from 650 years B.P. to the present. Sxʷčkʷíyəŋ is currently listed in the Washington Heritage Register for local significance (Harper 1969).

In 2019, a large-scale archaeological survey covering the entire study area was conducted in association with this Proposed Action to support the NHPA Section 106 assessment, expanding upon the work that was originally done in the 1980s. Preliminary information from the 2019 fieldwork indicated that there has been extensive land use both in precontact and historic times within the study area. Preliminary survey results indicated that the site boundaries of the sxʷčkʷíyəŋ village site go significantly beyond the beachfront as originally recorded.

The 2019 archaeological fieldwork recorded a separate intact shell midden throughout most of the beachfront site. An intact shell midden was also found on Bugge Spit. Tools characteristic of the precontact period have been identified in various areas of shell midden in both areas. In the uplands, evidence of subsistence activities and tools (lithics) were encountered, indicating that site use was not

limited to the beachfront. In addition to the shell midden recorded on Bugge Spit, a historic component was also identified. Evidence, such as bottles, animal remains, shell, and similar artifacts, indicates that there are deep and intact deposits. These data support a preliminary conclusion that the sxʷčkʷíyəŋ village site is eligible for inclusion in the National Register of Historic Places (NRHP). Documentation to support this conclusion is now complete as part of the NHPA Section 106 assessment.

The second site listed within the study area is on the west end of Travis Spit. The site is currently registered as a historic campsite composed of burned wood and metal (Blukis Onat and Larson 1984). This site marks the former houses that were located on Travis Spit for the S'Klallam workers that worked at the Bugge Cannery. In the 2019 survey, archaeological evidence indicated that there is still a strong precontact and historic component to this site that goes beyond what was originally recorded. These data support a preliminary conclusion that the historic Jamestown S'Klallam camp is eligible for inclusion in the NRHP. Documentation to support this conclusion is now complete as part of the NHPA Section 106 assessment.

The PNNL–Sequim Campus not only has archaeological and historical value, it also continues to be a place of cultural and religious importance to the Jamestown S'Klallam. The area today still has resources that were and are considered traditional use items important in their cultural practices. The PNNL–Sequim Campus is one of the few locations where large portions of traditional native plants are accessible because they have not been obliterated by construction or modern development.

The cultural resources present at the PNNL–Sequim Campus today are direct evidence of the past life that continued well into the 1960s before Battelle took ownership. Historic aerial imagery and ethnographic information indicate that the site was being used by the Jamestown S'Klallam until the site was converted to the existing campus in the 1960s. Although the Bugge Cannery no longer exists, the cannery was an important local business that was well known and brought local significance to the area. The archaeological record reflects such existence on both the beachfront and Bugge Spit. Artifacts consistent with domestic life (ceramics, glass, earthenware, etc.) were documented as part of the 2019 survey.

3.1.5.2 Environmental Consequences

As described in Section 2.1.2, any new construction on the shoreline would be limited to the existing building footprint, but the expansion of the uplands area of the PNNL–Sequim Campus could include the construction of several additional facilities and associated infrastructure This would require the clearing of vegetation and trees for proposed construction laydown areas, parking, grading, and excavating for foundations and footings for said new facilities. The development of the PNNL–Sequim Campus would also require the expansion or modification of some of the current infrastructure. Removal of the existing septic system is not anticipated to affect any unknown cultural resources because the original installation of the system already disturbed any potential intact cultural deposits. However, cultural resources could be affected if the PNNL–Sequim Campus is connected to the City of Sequim's sewer and water systems. Currently, it is unknown whether there are any cultural resources present within that area. The planned connection to the City of Sequim's utilities is not addressed in the concurrent NHPA Section 106 review and will require the completion of its own Section 106 consultation activity.

A preliminary architectural survey was done in support of the NHPA 106 assessment. Currently, none of the buildings are eligible for inclusion in the NRHP because they have not met the 50-year threshold to be considered a historic resource. However, MSL5 exhibits characteristics that suggest it could be determined to be NRHP-eligible under Criterion C (embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master) when it achieves the 50-year threshold in 2031. The shoreline facilities currently do not exhibit characteristics that would make them eligible for inclusion in the NRHP within the next 20 years.

The pier piles and associated planking replacement would have limited to no impact on cultural resources. The new piles would be placed in the same location as the existing piles. Any cultural resources that may have been present have either been destroyed or are in highly disturbed contexts.

Proposed construction has the potential to alter the historic characteristics that contribute to sxʷčkʷíyəŋ's NRHP eligibility as well as other known cultural resources. The proposed expansion would significantly affect the physical and visual setting that is associated with traditional and historic use of the area during prehistoric and historic periods. Ethnographic documentation indicates that many parts of the PNNL–Sequim Campus are visually the same as in prehistoric and historic eras because there has been little development compared to surrounding areas.

Although sxʷčkʷíyəŋ was destroyed by the Bugge Cannery and the later construction of the PNNL–Sequim Campus shoreline facilities, there are still archaeological remnants of sxʷčkʷíyəŋ present today. Evidence of precontact and historic use has frequently been encountered during routine maintenance activities. As recently as 2017, the replacement of a wastewater and fire supply piping exposed an intact shell midden in an area that was previously unknown to have cultural resources.

A No Development Zone was established in the upland portion, Bugge Spit, and Travis Spit to assist in minimizing construction impacts on cultural resources. A separate No Activity Zone was established in the southern portion of the shoreline area to avoid affecting cultural resources associated with sxʷčkʷíyəŋ (Figure 2.1).

There may be detrimental impacts on shoreline archaeological sites or cultural resources if excavations for repair or maintenance of utilities occur. The human remains and other cultural resources that were previously encountered were at shallow depths. These burials are directly associated with sxʷčkʷíyəŋ and do not exclude the possibility of other burials that may still remain in place. In the uplands, depending on location, impacts on cultural resources may be limited.

Outdoor research activities may have a limited impact on cultural resources. Cultural resources are present at different depths, depending on site location. Research activities that may take place on Bugge Spit or Travis Spit have a higher probability of affecting intact cultural deposits, because archaeological materials present there are at shallower depths than in other portions of the site. Operational impacts on facilities are not anticipated to affect the built environment as the buildings are not historic and have already been altered. Routine maintenance of facilities and any potentially eligible historic buildings such as MSL5 would be addressed separately in a Programmatic Agreement.

In conclusion, the Proposed Action would have a range of impacts on cultural resources at the PNNL–Sequim Campus depending on the location of new buildings, the addition of new infrastructure, and the timing of the project activities. Construction of new buildings, renovation or replacement of existing buildings on the shoreline would not go beyond the existing developed footprint. In the uplands, the construction of new buildings and infrastructure would be both a physical and visual impact.

3.1.5.3 Cumulative Impacts

The construction of Bugge Cannery destroyed sxʷčkʷíyəŋ, and the construction of the Battelle Memorial Institute (BMI), Marine Science Laboratory (MSL), demolished the Bugge Cannery and its associated outbuildings. Historic aerial imagery indicates that portions of the village existed until the 1970s before they were torn down during construction of the BMI-MSL (now PNNL–Sequim) Campus shoreline facilities. Construction and related activities have resulted in alterations to the natural setting of sxʷčkʷíyəŋ and the Bugge Cannery. The Proposed Action would further alter the overall feeling, condition, and experience of these historic cultural resources.

As described in Section 1.3.2, current and future development occurring around Sequim could affect cultural resources on a regional scale. Little is known about the cultural resources beyond the PNNL–Sequim Campus because few cultural resources studies have occurred in the vicinity. Therefore, impacts from development, construction, and associated activities could result in the loss of archaeological resources, if present.

Tribes will continue to have access to the PNNL–Sequim Campus.

Overall, cumulative impacts on cultural resources from past, current, and future activities are considered to be significant. The cultural resource impacts as a result of future research activities associated with the Proposed Action are considered to be limited, but could have the potential for greater impacts, depending on the location and proposed research activity. Most actions on the PNNL–Sequim Campus are already reviewed for compliance with NHPA Section 106 because of DOE's involvement as a federal agency. However, if the proposed ownership transfer to DOE occurs this review will be clearly required for all actions on the site. DOE ownership may provide more reliable long-term protection of cultural resources within the no-development portions of the campus.

The separate NHPA Section 106 assessment and consultation has been completed for this Proposed Action. DOE consulted with the Washington State Historic Preservation Officer and consulting parties as part of this process, and have developed a Memorandum of Agreement and associated treatment plan to resolve any adverse impacts on National Register-eligible historic properties that may occur as a result of this Proposed Action.

3.1.6 Aquatic Ecology Resources

3.1.6.1 Affected Environment

Sequim Bay is a 2000 ha (5000 ac) saltwater body connected to the Strait of Juan de Fuca by a relatively narrow channel (about 200 m [660 ft] wide at MLLW]) between Travis Spit and the PNNL–Sequim Campus dock. The bay has a maximum depth of approximately 30.4 m (100 ft) at MLLW. The tidal exchange between the bay and the Strait of Juan de Fuca results in moderate tidal currents in this channel with up to a 2.7 m (8.9 ft) tidal exchange at the channel connection with the strait. Sediments in Sequim Bay can be characterized as mostly mixed-fine sediment or mud with some gravel/cobble in areas of swifter current such as the channel near the PNNL–Sequim Campus dock. Seagrass meadows consisting of eelgrass are patchy and are primarily located in fringe habitat around the shoreline. Sequim Bay is not currently listed as a 303(d) waterbody, but it has been designated as such in the past and surrounding areas currently have this designation. A 303(d) water body is impaired and may have low dissolved oxygen, point source contamination of polycyclic aromatic hydrocarbons (PAH), and fecal coliform (Elwha-Dungeness Planning Unit 2005), all of which may limit commercial and recreational shellfish harvest activities. The bay also has a small boat marina (John Wayne Marina) and is bordered by residential properties, Sequim Bay State Park, and the PNNL–Sequim Campus. Recreational and commercial vessel traffic is common throughout the potential project area.

Gibson, Bugge, and Travis Spits border the opening of Sequim Bay (PNPTC 2006). The Middle Ground (Figure 1.2) is a sandy shoal that is submerged except during lower tides. There are two dominant streams that enter the bay: Jimmycomelately Creek and Dean Creek. Jimmycomelately Creek is in south Sequim Bay and is the largest stream in the Sequim Bay watershed, flowing 14.5 km (9 mi) from headwaters to the bay (Clallam County 2005), while Dean Creek is approximately 6.4 km (4 mi) long (Clallam County 2005). These creek channels were reconfigured in 2005 during restoration efforts to reintroduce connectivity and channel complexity (PNPTC 2006) and provide a substantial tidal flat (PNPTC 2006). Habitat provided by the connectivity between Jimmycomelately and Dean Creeks (i.e.,

tidal marsh, lagoon, and tidal flats) is considered "functional" (PNPTC 2006). These habitats are essential for species' reproduction and rearing, particularly for several species of salmonids (PNPTC 2006).

Typical bay and estuary aquatic assemblages are similar to those found in the Dungeness National Wildlife Refuge, and include habitats such as beaches, lagoons, mudflats, eelgrass beds, and salt marshes (USFWS 2013). Sequim Bay provides habitat to many marine animals, including commercially valuable species (Pacific herring and surf smelt), anadromous and resident fishes, otters, macroinvertebrates, seals, and shellfish (crab, clams, mussels, oysters, scallops, snails) (Lefebvre et al. 2008; Dungeness River Audubon Center 2015; Clallam County 2005; USFWS 2013). Common aquatic species that occur in the area include fish species such as sole, sculpin, Pacific tomcod, striped perch, Pacific herring, sand lance, and spiny dogfish (Miller et al. 1980). Scientific names for aquatic plant and animal species are provided in Appendix A. Beaches provide habitat for marine mammals including harbor seals and occasionally northern elephant seals, while lagoons and mudflats provide food resources for crab and anadromous and forage fish (USFWS 2013). Eelgrass beds are essential for many species because they provide forage and habitat. Birds, snails, and crab species rely on eelgrass as forage, and bacteria in the sediment of eelgrass beds provide food for invertebrates (e.g., crab larvae). Some fish species use eelgrass for spawning habitat, and other anadromous and forage fish use eelgrass beds for cover or to find food (e.g., oysters) in the water column surrounding the eelgrass beds (USFWS 2013). Salt marshes are extremely productive ecosystems. They provide habitat for phytoplankton, a species at the base of many general aquatic assemblages and consumed by many other species (e.g., zooplankton, anadromous and forage fishes, invertebrates; USFWS 2013).

Most PNNL–Sequim Campus shorelines border estuarine intertidal wetlands, which in turn border estuarine subtidal wetlands that compose the majority of Sequim Bay (USFWS 2019b). Marine wetlands, especially intertidal wetlands, are influenced by the tidal exchange between Sequim Bay and the Strait of Juan de Fuca (moderate tidal currents up to 1.5 m/s with up to a 2.7 m tidal exchange at the channel connection with the Strait). Freshwater emergent wetlands and floodplains occur just outside of the PNNL–Sequim Campus, mostly in association with Bell Creek (Figure 3.1), but there are none on campus property (City of Sequim 2014). Similarly, while Jimmycomelately and Dean Creeks experience annual flooding (Clallam County 2005), flooding does not affect the PNNL–Sequim Campus.

Estuarine intertidal wetlands consist of deepwater habitats and adjacent tidal wetlands that are semi-enclosed by land (e.g., Travis, Bugge, and Gibson Spits [Figure 1.2]) but have open, partly obstructed, or sporadic access to the open ocean (e.g., Strait of Juan de Fuca [Figure 1.1]). As such, ocean water is at least occasionally diluted by freshwater runoff from land (USFWS 2019b). The shoreline in the intertidal wetlands at the PNNL–Sequim Campus is primarily rocky with some emergent vegetation, and experiences periodic flooding and exposure as dictated by the tides.

There are several aquatic species of conservation concern (via the Endangered Species Act [ESA] or Marine Mammal Protection Act [MMPA]) that are either known to occur or potentially occur at the PNNL–Sequim Campus; these species are listed in Table 3.4.

Table 3.4. Protected Aquatic Animal Species Known to Occur or that Potentially Occur at and in the Vicinity of the PNNL–Sequim Campus.

Common Name	Genus and Species	Federal Status[a]	State Status[b]
Fish			
Bull trout[c]	*Salvelinus confluentus*	Threatened	Candidate
Hood Canal summer-run chum salmon[c]	*Oncorhynchus keta*	Threatened	
North American green sturgeon[c]	*Acipenser medirostris*	Threatened	

Common Name	Genus and Species	Federal Status[a]	State Status[b]
Pacific eulachon	*Thaleichthys pacificus*	Threatened	
Puget Sound bocaccio[c]	*Sebastes paucispinis*	Endangered	
Puget Sound Chinook salmon[c]	*Oncorhynchus tshawytscha*	Threatened	
Puget Sound steelhead	*Oncorhynchus mykiss*	Threatened	
Puget Sound yelloweye rockfish[c]	*Sebastes ruberrimus*	Threatened	
Marine Mammals			
California sea lion	*Zalophus californianus*	MMPA[d]	
Dall's porpoise	*Phocoenoides dalli*	MMPA	
Gray whale	*Eschrichtius robustus*	MMPA	
Harbor porpoise	*Phocoena phocoena*	MMPA	
Harbor seal	*Phoca vitulina*	MMPA	
Humpback whale	*Megaptera novaeangliae*	Endangered, MMPA	Endangered
Minke whale	*Balaenoptera acutorostrata*	MMPA	
Northern elephant seal	*Mirounga angustirostris*	MMPA	
Southern resident killer whale[c]	*Orcinus orca*	Endangered, MMPA	Endangered

(a) Endangered species are those in danger of extinction throughout all or a significant portion of their range. Threatened species are in danger of becoming endangered within all or a significant portion of their range (USFWS 2013).
(b) Endangered species are those that are native to the state of Washington and are seriously threatened with extinction throughout all or a significant portion of their range within the state (WAC 232-12). Candidate species are those that the Washington Department of Fish and Wildlife will review for possible listing as endangered, threatened, or sensitive. List updated in 2022.
(c) Species with designated critical habitat.
(d) MMPA = Marine Mammal Protection Act (16 U.S.C. § 1361 et seq.).

In addition, the PNNL–Sequim Campus project area contains designated critical habitat and essential fish habitat (EFH). Critical habitat is a specific area within the geographical range occupied by the species that is essential to conservation, as well as areas outside the geographical range that may be essential for conservation (NMFS 2017). Species with critical habitat designations for those federally listed are identified in Table 3.4. In estuarine and marine areas, the features of critical habitat common to each of these listed species are water quality and forage or prey. For Chinook and chum salmon safe migration areas are also a feature of critical habitat. For juvenile bocaccio and Chinook salmon nearshore habitat with suitable conditions for growth and maturation, including sub-aquatic vegetation, is also a feature of critical habitat (NMFS 2022). The Magnuson-Stevens Act (MSA) (16 U.S.C. § 1801 et seq.) defines EFH as the waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity, and provides a means of addressing non-fishing impacts on EFH. Sequim Bay has been identified as EFH for Pacific Coast groundfish (all life stages), coastal pelagic species (all life stages), and Pacific salmon (juveniles and adults). Pacific Coast groundfish that may occur in Sequim Bay include flatfish, rockfish, roundfish, and sharks, skates, and chimaeras (PFMC 2019). Coastal pelagic species that may occur in Sequim Bay include Pacific sardine, Pacific mackerel, northern anchovy, jack mackerel, market squid, and krill. Salmon species that may occur in Sequim Bay include Chinook, Coho, and Puget Sound pink salmon.

There are also several species with designated critical habitat or EFH (green sturgeon, Hood Canal summer-run chum salmon, Puget Sound Chinook salmon, Puget Sound bocaccio, and Puget Sound yelloweye rockfish) in Sequim Bay. Native populations of salmon use Jimmycomelately and Dean Creeks for feeding, refuge, and spawning; however, declines in the availability and suitability of habitat from human-induced changes and increases in sediment deposition have led to severe declines in their populations (Clallam County 2005). Juvenile Chinook and chum salmon use nearshore marine habitat whereas adults of these species, as well as both adult and juvenile steelhead, tend to use deeper waters

(NMFS 2022). There is EFH for salmon in Sequim Bay as part of the restoration efforts to improve the habitat and prevent further degradation. Bull trout have critical habitat in Sequim Bay (75 FR 63898), which serves as foraging, migration, and overwintering (FMO) habitat (USFWS 2015a), but the species is unlikely to occur there as it is rare in Clallam County (USFWS 2022). Green sturgeon also have designated critical habitat in Sequim Bay (NMFS 2018a) but are unlikely to occur there (NMFS 2022). It is very unlikely Pacific eulachon would occur in the project area and there is no critical habitat for the species (Table 3.4) (NMFS 2022). Sequim Bay is an estuarine habitat and a nearshore coastal marine area that may provide food resources, appropriate water quality (e.g., viability for all life stages), a migratory corridor (e.g., for safe passage between riverine, estuarine, or marine habitats), or appropriate depth and sediment quality (e.g., for shelter, foraging, migration; NMFS 2018). Similarly, rockfish species have EFH in nearshore, estuarine, and intertidal habitats, which includes Sequim Bay (NMFS 2005). Near shore, a benthic habitat with a vegetated bottom is of particular importance for juvenile and larval bocaccio and larval yelloweye rockfish, whereas juvenile and adult yelloweye rockfish and adult bocaccio tend to use deeper marine waters (NMFS 2022). Vegetation may include canopy kelp and seagrass, and invertebrates that inhabit the vegetation are critical for habitat suitability (NMFS 2005).

More detailed information regarding the occurrence and habitat use, including critical habitat, of bull trout (Table 3.4) in the vicinity of the PNNL-Sequim Campus is provided in a biological assessment submitted to the U.S. Fish and Wildlife Service (USFWS) in May 2020 pursuant to Section 7 of the ESA (DOE's BA; DOE 2020c) and the USFWS letter of concurrence (LOC) received by DOE in August 2022 (USFWS 2022).

More detailed information regarding the occurrence and habitat use, including critical habitat, of the fish species other than bull trout listed in Table 3.4, as well as the humpback whale and southern resident killer whale (Table 3.4), and EFH, in the vicinity of the PNNL-Sequim Campus is provided in a BA and EFH assessment submitted to the National Marine Fisheries Service (NMFS) in May 2020 pursuant to Section 7 of the ESA and Section 305(b) of the MSA (DOE's BA/EFHA; DOE 2020d). The NMFS Biological Opinion (BiOp) was received by DOE in August 2022 (NMFS 2022). The NMFS BiOp included an incidental take (50 CFR 402.02) statement (ITS) with reasonable and prudent measures and associated terms and conditions that must be implemented by DOE. Some of the terms and conditions are noted in Section 3.1.6.2. DOE's EFH conservation measures are also provided in Section 3.1.6.2.

3.1.6.2 Environmental Consequences

Temporary Impacts

Overall, short-term project impacts to nearshore habitat quality, quantity, or function (water quality reductions, increases in noise, and reductions in prey/forage) would be offset by long-term project improvements (creosote removal via piling replacement and replacement of some solid decking with grated decking) (NMFS 2022 and USFWS 2022). Further, construction, at or below, marine waters (i.e., piling removal and replacement and pier repair and decking replacement) will occur during the marine in-water work window from July 1 to February 15 (NMFS 2022 and USFWS 2022). Construction would also occur in accordance with federal, state, and local permits (USACE 2012). Construction during the in-water work window would minimize potential adverse impacts to salmon species, steelhead, bull trout, and forage fish because these species are less likely to be present. However, the in-water work window overlaps fall spawning of rockfish potentially exposing larval bocaccio and larval yelloweye to temporary adverse effects (NMFS 2022). The specific short-term project impacts of noise and turbidity are discussed in greater detail. Short-term project impacts are anticipated to occur, especially to benthic species and those pelagic species and life stages with a greater likelihood of occurring in nearshore waters

(e.g., juvenile Chinook and chum salmon, juvenile and larval bocaccio and larval yelloweye, and some marine mammals [Table 3.4]), as described below.

Noise

Noise impacts to aquatic ecology would result from the Proposed Action. The most intense underwater noise generated by the activities described in Section 2.1, would be from replacing pilings for the pier and floating dock, which would involve both vibratory and impact pile driving (Section 2.1.6). A vibratory hammer would be used to remove the existing creosote-treated piles and drive new steel piles, with work occurring over much of the workday during the two days of piling replacement (separate bouts of 30 minutes each for the 6 piles, 3 hours per day). Impact pile driving, used only to proof or set the new steel piles, would occur over a total of about 2.3 minutes (separate bouts of 25 seconds for each of 6 piles) during each of the two days of piling replacement (DOE 2020d). During the two days of piling replacement, elevated noise levels from vibratory pile pulling and driving; and impact pile driving would occur that could potentially cause auditory injury to species of concern (e.g., permanent threshold shift [hearing loss]) and non-auditory injury (barotrauma), which could increase the risk of mortality of aquatic species of concern. Other effects include temporary deafness, temporary stunning (which could lead to individuals being unwilling to forage and also being more susceptible to predation), as well as behavioral modifications. Furthermore, both driving techniques could affect the suitability of the habitat for marine species. However, such effects are not expected to be measurable at the population level.

Noise impact analyses for ESA-listed species and species protected under the MMPA in Table 3.4 were performed in DOE (2020d) and NMFS (2022). Distances from the source within which injury to marine mammals could occur from vibratory or impact pile driving extend to about 20 m (DOE 2020d). Distances within which injury to fish could occur from impact pile driving extend to about 50 m from the source (DOE 2020d). Distances from the source within which behavioral effects to marine mammals and fish could occur from vibratory pile driving exceed those of impact pile driving and extend to about 2150 m and 630 m, respectively (DOE 2020d). Vibratory behavioral effects for marine mammals would extend through Sequim Bay channel for a substantial distance into the Strait of Juan de Fuca to the east of Gibson Spit (DOE 2022d). Marine mammals would only incur injury or behavioral effects if they remain within these distances for the entire duration of the respective vibratory or impact pile driving activity within a 24-hr period (NMFS 2018b). Given the mobility of marine mammals and the extensive open water environment of Sequim Bay and the Strait of Juan de Fuca, this impact is unlikely for such activities with relatively short effect distances (e.g., injury from vibratory or impact pile driving), but may be more likely for activities with long effect distances (e.g., behavioral effects from vibratory pile driving).

Potential injury effects to marine mammals and fish would be minimized via use of sound attenuation measure(s) (double walled piles, wooden block, bubble curtain, etc.) and a "soft-start" method for impact pile driving, as prescribed in the NMFS (2022) ITS terms and conditions. A "soft-start" requires three sets of initial strikes from an impact hammer at a reduced percent energy, followed by a 30-second waiting period before impact pile driving begins (84 FR 53689). Potential injury effects to some fish species (salmon species, steelhead, bull trout, and forage fish) would be further minimized by working only during the in-water work window (July 1 – February 15). Potential injury and behavioral effects to marine mammals would also be minimized by implementing a Marine Mammal Monitoring Plan (MMMP), as prescribed in the NMFS (2022) ITS terms and conditions, to ensure pile driving ceases before marine mammals enter the area where sound will exceed 120 dB_{RMS} (marine mammal behavioral disturbance threshold for vibratory pile driving [DOE 2022d]). The MMMP would be implemented from the initiation ("soft-start") to completion of all vibratory and impact pile driving.

There are no monitoring measures for fish, but it is anticipated that fish would move to nearby unaffected habitat, except for some larval fish that may be without significant capacity for avoidance (e.g., larval rockfish) (NMFS 2022).

Killer whales are in Puget Sound June through September, which means that they may be present in the Strait of Juan de Fuca in the designated in-water work window that begins on July 1 (NMFS 2022). However, killer whales are very unlikely to occur in Sequim Bay; for this reason Sequim Bay was eliminated from critical habitat for the species (71 FR 69054). Humpback whales are also very unlikely to occur in Sequim Bay (DOE 2020d). Thus, the above-noted potential noise effects to these two marine mammals within Sequim Bay are extremely unlikely. However, both species could incur behavioral effects from vibratory pile driving in the Strait of Juan de Fuca. Implementation of the MMMP would minimize the possibility of such impacts.

The above-noted potential noise effects may also temporarily reduce both the suitability of critical habitat for species in Table 3.4 and EFH, and the use of the habitat due to avoidance behavior. However, any effects would occur only over a two-day period and be localized to within the effect distances noted above, and thus are considered minor.

Turbidity

Creosote pilings contaminate sediment up to 2 m that may be mobilized upon piling removal (NMFS 2022). Replacement of creosote-treated pilings would occur over two days and cause short-term localized increases in turbidity and suspended creosote-contaminated sediment as well as uncontaminated sediment during that time but would improve water and sediment quality in the long-term (NMFS 2022 and USFWS 2022). Short-term, localized increases in turbidity can affect aquatic species multiple ways. Sediment may reduce primary productivity of aquatic plants, interfere with fish respiration and feeding, alter the suitability of spawning areas, reduce bottom habitat diversity, and/or smother benthic organisms (Nightingale and Simenstad 2001). Turbidity may also elicit avoidance behavior in juvenile salmonids and that may reduce or avoid harm (NMFS 2022). However, larval rockfish are likely passively distributed with prevailing currents, are without significant capacity for avoidance, and may be more likely to incur greater harm (NMFS 2022). Short-term reductions in growth or fitness up to and including mortality may occur in some exposed fishes, but such effects are not expected to be measurable at the population level.

Turbidity could also affect other aquatic species and habitats, including wetlands, marine mammals (but not ESA-listed marine mammals, as killer whales and humpback whales are very unlikely to occur in Sequim Bay [71 FR 69054 and DOE 2020d]), and EFH. Overall, the amount of affected intertidal wetland would be small and functionally minor relative to available intertidal wetland habitat that exists around most of the perimeter of Sequim Bay, and any impacts would be temporary. Therefore, disturbance of intertidal wetland habitat at PNNL–Sequim Campus is considered minor.

Information from a pile driving project at Jimmycomelately Creek (Weston 2006) indicated baseline mean total suspended solids (TSS) concentrations prior to commencement of work ranged from 6 to 12 mg/L. Upon commencement of work, mean TSS concentrations ranged from 15 to 162 mg/L. Mean TSS concentrations returned to baseline levels prior to pile removal, generally within 5 minutes. During the pulling of the piles, mean TSS concentrations ranged from 20 to 82.9 mg/L and suspended sediment extended at least 4.6 to 6.1 m (15 to 20 ft) away from the pulling event. Mean TSS concentrations decreased following the pull, ranging from 16 to 55 mg/L. Mean TSS concentrations immediately following the work ranged from 21 to 134 mg/L (Weston 2006). The concentration of PAHs released into surface water upon pile removal increased but decreased rapidly (NMFS 2022). These data indicate pile replacement could generate elevated TSS and PAHs in the near vicinity (assumed to be 150 ft [NMFS

2022] [WAC 173-201A-210]) of the piles, which would quickly decrease to baseline levels following installation. However, sediments at Jimmycomelately Creek are not representative of the benthos near the PNNL–Sequim Campus pier, which is primarily gravel, and the current is swift, so drifting sediments, including creosote-contaminated sediments, would be swept away except for during a slack tide. Therefore, any TSS from in-water work would be expected to return to baseline faster than the activity at Jimmycomelately Creek. Any creosote-contaminated sediment or materials settled in the vicinity of the pier would become permanent in the substrate (see below subsection on Permanent Impacts).

Open pile structures like those of the PNNL–Sequim Campus pier and dock reduce light to the underwater environment and prevent interference with water and sediment movements (Nightingale and Simenstad 2001); thus, disturbed substrate and associated marine vegetation are expected to be restored with the passage of time. The speed of recovery by benthic communities is affected by several factors, including the intensity of the disturbance, with greater disturbance increasing the time to recovery. Additionally, the ability of a disturbed site to recolonize is affected by whether or not adjacent benthic communities are nearby that can re-seed the affected area via tides and currents. Thus, recovery may range from several weeks to many months (NMFS 2022).

The nearest eelgrass bed is located about 46 m north of the pier (Figure 3.4) and, based on the above data, is not expected to be mechanically disturbed but could be affected by redistribution of TSS and resulting reduced light availability. Marine vegetation and substrate located closer to the pier and floating dock—likely comprising marine algae and/or vascular plants other than eelgrass—may be both mechanically disturbed and affected by reduced light availability and redistribution of TSS (Nightingale and Simenstad 2001). The impacts of any turbidity would be localized and short-lived (USFWS 2022) due to the 2-day duration of pile replacement and are thus not expected to result in long-term effects to benthic production.

Mechanical disturbance and sedimentation of forage fish spawning habitat (sand lance) is not expected because the nearest habitat is located about 200 ft (50 ft beyond the assumed possible extent of potential turbidity impacts [NMFS 2022]) south of the pier (DOE 2020c). Critical habitat for each species in Table 3.4 except killer whales (critical habitat begins about 400 ft north of the pier and extends north into the Strait of Juan de Fuca [71 FR 69054]) would experience temporary and episodic localized declines in water quality due to turbidity, despite the use of BMPs, and could result in minor reductions in benthic prey and dependent prey fishes (e.g., due to gill damage) for the associated ESA-listed fish species in Table 3.4 (NMFS 2022).

As EFH conservation measures, DOE will fill any holes left in the substrate by removed piles (i.e., any holes not filled with replacement piles) with clean native sediments to reduce the likelihood of resuspension of any creosote-contaminated sediments. Further, DOE proposes to replace piles only during low water conditions, consistent with EPA best management practices (BMP) (EPA 2016) to reduce the likelihood of pile breakage and increase the likelihood of retrieval of any broken piles. Creosote piles will be disposed of in approved upland facilities, as prescribed in the NMFS (2022) ITS.

Episodic hand shoveling of sediment from the boat ramp and pier repair and decking replacement conducted at low tide (described further in the below subsection on Permanent Impacts) are also anticipated to cause some localized short-term localized increases in turbidity and TSS (NMFS 2022). Such increases in TSS are expected occur over a much smaller footprint than those associated with piling replacement.

Turbidity and suspended sediment levels would be limited by conducting water quality monitoring during all in-water structure removal and construction, as prescribed in the NMFS (2022) ITS. Thresholds for turbidity levels were identified as; five nephelometric turbidity units (NTUs) above background would

not be exceeded when background turbidity is 50 NTUs or less, or a 10 percent increase in turbidity above background would not be exceeded when background turbidity is more than 50 NTUs. If monitoring indicates that these thresholds are exceeded, work will pause until the NTUs return to background levels. Monitoring would also assess that the 150 ft buffer from the point of suspended sediment generation (WAC 173-201A-210), would also not be exceeded.

During operation, maintenance activities would continue for the pier, dock, intake pipeline, and the treated water and clean water outfall pipelines (Figure 2.2). The pier and dock are pressure-washed as needed (generally two times per year) when surfaces get slick and to remove biofouling and debris. Annual preventative maintenance activities may include inspecting the following: ladders for functionality; pile guard condition; pile roller condition; signage; railings; and ramp condition; and ensuring that the dock surface is smooth (i.e., nothing on the surface, such as nails, is raised that would create a tripping hazard) and general maintenance of the personal flotation devices in the box on the pier. Maintenance activities would occur as needed (i.e., when a problem is observed it is fixed as soon as is reasonable). Maintenance of the intake and outfall pipelines is required to keep the pipelines clean of biofouling. Activities involve the use of pigs (capsule-shaped poly-foam cleaning tools) that are inserted into the pipes and pushed with pressurized water through the pipelines in a process called "pigging" to clean them out, as described in detail in Section 2.1.6 (Aquatic Infrastructure). The intake pipelines are cleaned a minimum of once a month. Additionally, the wedge wire screens associated with the seawater intake are manually scrubbed by divers using handheld tools both inside and outside the screens. The treated water outfall pipelines are "pigged" twice a year, and the flapper valves at the terminus are manually cleaned by divers to remove biofouling at least once per year. The clean water outfall pipeline is "pigged" once a year. Pier and dock and intake and outfall pipeline maintenance activities are expected to cause zero to minimal turbidity.

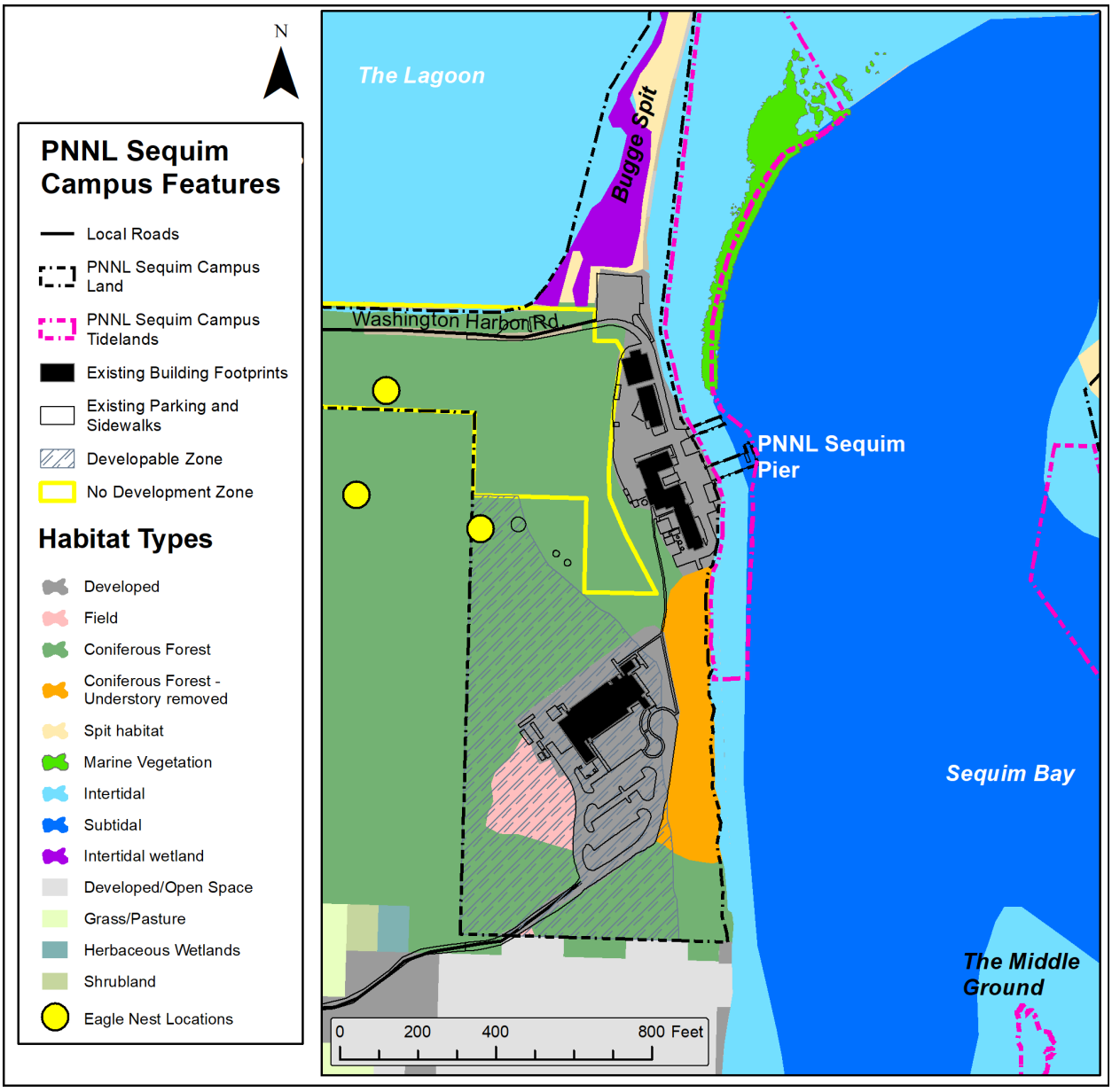

Figure 3.4. Habitats at the PNNL–Sequim Campus

Permanent Impacts

The Proposed Action may cause both beneficial and adverse long-term-term project impacts to nearshore habitat quality, quantity, and/or function. Beneficial impacts include those resulting from replacement of some solid pier decking with grated decking. Adverse impacts include those resulting from solid pier decking that will not be replaced, and exposure to creosote contaminated sediments and associated reductions in prey/forage). These are discussed below.

Pier Decking

The current solid decking on the portion of the pier that is over state-owned aquatic lands will be replaced with grated decking to allow required light penetration (WAC 220-660-380), yet still maintain deck functionality for lift crane installation and use. Grate openings would increase light penetration to the benthos over the life of the new decking (assumed to be 40 years before requiring additional action to maintain its structural integrity [NMFS 2022]). The increased light penetration will likely increase primary productivity, prey (but not forage) fish productivity, bottom habitat diversity, fish movement and prey capture, and thus also increase the quality of critical habitat for each ESA-listed fish species in Table 3.4 except killer whales (critical habitat begins about 400 ft north of the pier and extends north into the Strait of Juan de Fuca [71 FR 69054]), as well as the quality of EFH. Salmon fry are known to migrate along the edges of shadows (using shadow edges for cover) rather than penetrate them (Nightingale and Simenstad 2001). Replacement of pier decking with openings would have a positive impact on the local epibenthos, including the juvenile salmonid prey epibenthos, as well as shorten juvenile salmonid (e.g., Chinook and chum) migration and increase prey capture.

However, the land-ward portion of the solid decking on the pier that is *not* over state-owned aquatic lands will not be replaced. This pier decking would continue (as it has in the past) to shade underlying substrate and thus decrease primary productivity, prey (but not forage) fish productivity, bottom habitat diversity, disrupt and lengthen fish migration and increase exposure to predation, and thus concomitantly also reduce the quality critical habitat for each ESA-listed fish species in Table 3.4, except killer whales, as well as reduce the quality of EFH. Swimming around overwater structures (OWS) (rather than swimming into shadows) increases migration distance and is correlated with increased mortality (NMFS 2022). For example, juvenile salmonids migrating around OWS may be temporarily displaced to deeper water and be more exposed to predation by harbor seals or birds perching on OWS or using deeper water. Steelhead and yelloweye rockfish and bocaccio are not dependent on the nearshore for their migration, so the presence of solid decking is not likely to affect their behavior (NMFS 2022). The above beneficial and adverse effects are expected to be minor as are they are associated with only one relatively small OWS, but would also be chronic, persistent, and co-extensive with the design life of the replaced pier decking (NMFS 2022).

Creosote Contaminated Sediment

Any settled creosote-contaminated sediment from piling replacement may provide a long-term source of associated contaminants (e.g., PAHs) to which the local benthic community and higher-level biota could be exposed. It is the chronic release of PAH that ultimately impacts the sediment and associated benthic environment (Poston 2001). Within three years after construction, the removal of the creosote-treated timber will begin to reduce PAH levels and exposure to PAHs is expected continue to decline over the long-term (NMFS 2022). Juvenile salmonids in estuaries are prone to inhabit near-shore areas where they feed predominantly on amphipods, shrimp larvae, and small fish (organisms that could be exposed to contaminated sediment); they may also consume worms (oligocheates) common to organically enriched sediments; and they may inadvertently ingest sediment (Poston 2001). The primary response of exposed salmonids to PAHs (from dietary exposure and gill uptake) is immunosuppression and reduced growth, which increase the risk of mortality (NMFS 2022).

Key physical variables in the deposition of sediment and the binding of PAHs (and thus resultant exposure to PAHs in that sediment) are the turn-over of water (currents or tidal action) and sediment characteristics (organic carbon content), respectively (Poston 2001). Because substrate near the pier and dock is rocky, there is relatively little sediment, and because settling of sediment would mostly occur during slack tides, the amount of any locally redistributed sediment is expected be minimal. The majority of sediment would be swept away during stronger currents associated with high and low tides. Further, the rocky substrate near the pier is expected to be low in organic matter; thus, the relatively little sediment that would be released from disturbance of such substrate is expected to be low in organic matter and

consequently pose little potential to bind PAHs. Therefore, chronic exposure of the local benthic community to sediment-borne PAH contamination and any resultant toxic food chain effects are expected to be minimal.

Food chain transfer of PAHs to or resulting in substantive reductions in the prey base of juvenile salmonids or juvenile bocaccio (that also feed nearshore on small fishes and invertebrates), due to sediment toxicity are considered unlikely and not measurable at the population level. Further, food chain transfer to top predators such as killer whales, that feed primarily on Chinook salmon originating from a variety of populations in many different river systems that enter Puget Sound (NMFS 2021), would be even more unlikely, and difficult to attribute to a single contaminant source amongst many to which Chinook salmon may be exposed during a long migration (Ross et al. 2013). However, settled creosote-contaminated sediment from piling replacement would constitute a minor but enduring impairment of critical habitat for each ESA-listed fish species in Table 3.4 (NMFS 2022), except for killer whales, as critical habitat for the species begins about 400 ft north of the pier and extends north into the Strait of Juan de Fuca (71 FR 69054), beyond the area anticipated to be affected by piling replacement (see above subsection on Turbidity).

3.1.6.3 Cumulative Impacts

Sequim Bay intertidal wetlands have been influenced by shoreline residential and commercial development (e.g., John Wayne Marina, private and public overwater structures) and changes in tributary watersheds (e.g., Bell Creek, Jimmycomelately Creek, Dean Creek) that affect the Sequim Bay nearshore water quality. Activities that affect water quality include timber harvest (Weston 2006), land conversions, growth-related commercial and residential development, and agriculture. DOE did not identify any significant, reasonably foreseeable federal or state development projects in the Sequim area over the 20-year PNNL–Sequim Campus development period that have a direct nexus to Sequim Bay intertidal wetlands (Section 3.1). No ongoing or future projects have a nexus to intertidal wetland resources within several kilometers of the PNNL–Sequim Campus (Section 3.1, Affected Environment), except if the transfer to DOE ownership occurs there may be more reliable long-term protection of tidelands and eelgrass beds within the PNNL–Sequim Campus. Construction related to pile and decking replacement, as well as ongoing operations impacts, would be a minor contributor to cumulative impacts on wetland resources along the fringes of Sequim Bay, which have resulted primarily from land use associated with human population growth. As discussed in NMFS (2016), human population growth would be the main cause of most of the future negative impacts on marine species and their habitat, including ESA-listed species and critical habitat (DOE 2020d and NMFS 2022).

3.1.7 Terrestrial Ecology Resources

3.1.7.1 Affected Environment

Approximately 107 plant species have been observed on the PNNL–Sequim Campus (Duncan et al. 2019). Shoreline habitats include beach habitat, Travis Spit and Bugge Spit, and The Middle Ground shoal (Figure 1.2). The shoreline habitat at the base of the bluff that overlooks Sequim Bay is eroded by longshore currents and is maintained by the adjacent ~25 ft high feeder bluff through erosion processes (Clallam County 2018). Because of erosion, shoreline vegetation is sparse and is situated mostly above tidal influence near the base of the bluff. Shoreline vegetation includes small stature trees of species such as grand fir, Rocky Mountain maple, red alder, Douglas fir, black cottonwood, and Indian plum. Shrubs include Saskatoon serviceberry, Scot's broom, ocean spray, and red flowering currant. Because of erosion, the bluff itself is even more sparsely vegetated, mostly with herbaceous species, including harsh Indian-paintbrush (PNNL 2014; Becker 2019). Beach habitat where research facilities are located (Figure 1.3) supports virtually no vegetation, and the upper portion of the beach is protected from erosion by a

fixed seawall structure. Spit habitats of Travis and Bugge Spit are slightly elevated above sea level and consist of sediments deposited by tidal movements that may be periodically inundated during higher tides. Spit habitats on the PNNL–Sequim Campus support mostly herbaceous vegetation consisting largely of forbs and grasses. Characteristic flora include silver bursage, common yarrow, Puget Sound gumweed, blue wild-rye, bare-stemmed biscuitroot, low glasswort, and yellow sand verbena (PNNL 2014; Becker 2019). Associated scientific names for terrestrial plant and animal species are provided in Appendix A. The Middle Ground (Figure 1.2) is a sandy shoal that is submerged except during lower tides. It does not support terrestrial vegetation.

Upland coniferous forest habitat begins above the ordinary high-water mark of Sequim Bay and extends west of the facilities and rises to approximately 46 m (150 ft) above sea level on the ridge above Washington Harbor Road (Figure 3.4) (PNNL 2020). Most of the forest is mature naturally regenerated second growth estimated to be 100−160 years old (Becker 2019). The dominant and subdominant canopy species are Douglas fir and western red cedar, respectively. Subcanopy tree species include bigleaf maple, red alder, madrone, grand fir, Indian plum, and Rocky Mountain maple. Characteristic understory flora includes common snowberry, Saskatoon serviceberry, ocean spray, vine maple, salal, Oregon-grape (*Berberis* spp.), western swordfern, rose, blackcap, and redflower currant (Duncan et al. 2019). The mature coniferous forest on the PNNL–Sequim Campus is part of a somewhat larger mature coniferous forest complex that includes private property west of the PNNL–Sequim Campus (Figure 3.1). A small field that overlies a septic drain field, SW of MSL-5, is surrounded by upland forest habitat (Figure 3.4). The field supports primarily grasses and several forbs such as chocolate lilies and hairy cat's ear.

Terrestrial wildlife observed at the PNNL–Sequim Campus includes approximately 87 bird species and 7 mammal and herpetofauna species (Duncan et al. 2019). Avian species are representative of common avian groups that inhabit the habitat types described above as well as the nearshore marine environment (Section 3.1.7). These include waterfowl (e.g., bufflehead); birds of prey (e.g., bald eagle; seabirds (e.g., Olympic gull); upland game birds (e.g., mourning dove); colonial nesting waterbirds (e.g., great blue heron); woodpeckers (e.g., downy woodpecker); and a variety of perching birds. Common mammal species include raccoon, mink, coyote, and black-tailed deer. The southwest tip of Travis Spit (Figure 1.2), provides a haulout area for harbor seals. Common herpetofauna species include the rough-skinned newt, Pacific tree frog, and common garter snake. Canopy nesting species observed at the PNNL–Sequim Campus include barred owl, Cooper's hawk, bald eagle, western tanager, and evening grosbeak. Further, nine species known to occur at the PNNL–Sequim Campus have been positively correlated with total area of mature forest (area-sensitive or forest interior)—brown creeper, chestnut-backed chickadee, golden-crowned kinglet, Pacific-slope flycatcher, Wilson's warbler, Townsend's warbler, red-breasted nuthatch, hairy woodpecker, and evening grosbeak—all of which have shown significant positive responses to the amount of mature forest in an area (Manuwal and Manuwal 2002; Altman and Alexander 2012).

Species of conservation concern, including species listed under the ESA, that are either known to occur or potentially occur at the PNNL–Sequim Campus are listed in Table 3.5.

There are three known bald eagle nest sites in the coniferous forest at the PNNL–Sequim Campus—one in the northwest corner of the developable area, one in the No Development Zone about 106 m (350 ft) from the developable area, and one on private land about 90 m (295 ft) west of the developable area (Figure 3.4). Observations of nest occupancy have been made incidentally over the years, but nest site use has not been intentionally and regularly monitored. The last observation of an eagle on the nest within the developable area was in 2017. It is unknown whether this was an active or alternate nest at that time. This nest site was visited again in September 2022. It is apparently used as a feeding spot (goose feathers and fish bones on the ground nearby), but appears to be old, weathered, and probably not in use as a nest site. There have been no observations of eagles at the other two nest sites, so it is unknown

Table 3.5. Protected and Candidate Animal Species Known to Occur or that Potentially Occur at and in the Vicinity of the PNNL–Sequim Campus

Common Name	Genus and Species	Federal Status[a]	State Status[b]
	Wildlife		
Marbled murrelet	*Brachyramphus marmoratus*	Endangered	Threatened
	Invertebrates		
Island marble	*Euchloe ausonides insulanus*	Endangered	Candidate
Sand-verbena moth	*Copablepharon fuscum*		Candidate
Taylor's checkerspot butterfly	*Euphydryas editha taylori*	Endangered	Endangered

(a) Endangered species are those in danger of extinction throughout all or a significant portion of their range. List updated in 2022.

(b) Endangered species are those that are native to the state of Washington and are seriously threatened with extinction throughout all or a significant portion of their range within the state. Threatened species are those native to the state of Washington that are threatened with becoming endangered in Washington (WAC 232-12-297). Candidate species are those that the WDFW will review for possible listing as endangered, threatened, or sensitive. List updated in 2022.

when these nests were last active or were alternate nest sites. The bald eagle was removed from the federal list of threatened and endangered species in 2007, then from Washington State's list in 2017. The bald eagle is still protected by the Bald and Golden Eagle Protection Act (16 U.S.C. § 668-668d et seq.) and the Migratory Bird Treaty Act (16 U.S.C. § 703 et seq.). The Bald and Golden Eagle Protection Act prohibits actions that cause (1) injury to an eagle, (2) a decrease in its productivity, and (3) nest abandonment, and includes regulations for permitting take of bald eagles (50 CFR 22.27). Current federal guidelines for activities that may affect eagles, including nests (active or inactive), are provided by the USFWS (2007). Conformance to these guidelines or the need for a permit are based on timing and restrictions related to the distance of nests from tree removal and construction activities (USFWS 2015b). Two proposed activities that may cause such impacts are tree removal (a single tree such as a hazard tree or multiple trees such as timber harvest or vegetation clearing) and facility construction (including installation and maintenance of infrastructure). DOE will satisfy any monitoring requirements of eagle activities at historic nest sites that may be needed for permit acquisition (see Section 3.1.7.2).

The marbled murrelet uses the nearshore marine waters of Sequim Bay and is known to nest in mature conifer forest at the southwest end of Sequim Bay. Forest on the PNNL-Sequim Campus and adjacent private land (see Figure 3.1 and Figure 3.4) is surrounded by sparse residences and suburban Sequim to the west and by agricultural areas and very little contiguous forest to the north, south, and west; and is located more than 3 mi from the nearest known murrelet nest site. Given this landscape context, it qualifies only as marginally suitable nesting habitat and is therefore unlikely to be used by marbled murrelets (DOE 2020c). At the forest stand scale, there are trees with suitable nesting platforms for marbled murrelets in the developable zone on the PNNL–Sequim Campus (Figure 3.4) (DOE 2020c and USFWS 2022) but these trees lack adequate horizontal and vertical cover, are exposed to existing forest edge and potential predation, and are thus extremely unlikely to be used by murrelets (USFWS 2022). However, there are trees with suitable nesting platforms and adequate cover for marbled murrelets in the adjacent no development zone (Figure 3.4) (DOE 2020c and USFWS 2022) that could be used by the species. More detailed information regarding the occurrence and habitat use of marbled murrelets in the vicinity of the PNNL-Sequim Campus is provided in DOE's Biological Assessment (BA) submitted to the USFWS in May 2020 pursuant to Section 7 of the ESA (DOE 2020c) and the USFWS letter of concurrence (LOC) received by DOE in August 2022 (USFWS 2022).

A suitable habitat for Taylor's checkerspot butterfly consists of short-statured vegetation communities that have specific larval and adult food resources (78 FR 61451; Potter 2016), such habitat is found on Travis Spit. The nearest checkerspot population is 2–3 mi north of the PNNL–Sequim Campus at

Graysmarsh. More detailed information regarding the occurrence and habitat use of Taylor's checkerspot butterflies in the vicinity of the PNNL-Sequim Campus is provided in DOE's BA submitted to the USFWS in May 2020 pursuant to Section 7 of the ESA (DOE 2020c) and the USFWS letter of concurrence (LOC) received by DOE in August 2022 (USFWS 2022).

Suitable habitat for sand-verbena moth consists of spit habitat containing coastal sand verbena, the species' only host plant (COSEWIC 2013), and such habitat is found on Travis Spit and Bugge Spit. The nearest population of sand-verbena moth is at the Dungeness National Wildlife Refuge in Sequim (73 FR 9309). Suitable habitat for the island marble butterfly includes spit habitat supporting mustard species, and such habitat is found on Travis Spit (Miskelly and Potter 2005). The nearest (and to date only) known island marble population is located on San Juan Island (Miskelly and Potter 2005; Potter 2019[1]). Travis Spit was surveyed but the checkerspot, sand-verbena moth, and island marble were not found.

3.1.7.2 Environmental Consequences

Affected habitats in the uplands developable area include about 2.7 ha (6.6 ac) of mature coniferous forest and 0.4 ha (1 ac) of field (Figure 3.4). It is assumed that the forest and field habitat would be completely replaced by proposed facilities and infrastructures (Figure 2.1).

Open field habitat is abundant in the vicinity (e.g., on privately owned land located offsite and just south of the developable area). Loss of the 0.4 ha (1 ac) of field could affect avian species that nest in field/grassland habitat, such as mourning dove and dark-eyed junco. Loss of this small parcel of field habitat would have no measurable impact on local populations of field/grassland nesting species due to the large expanses of similar habitat available nearby.

Removal of about 2.7 ha (6.6 ac) of mature coniferous forest would reduce the amount of contiguous forest, increase the amount of forest edge in the area, and may affect forest birds in a variety of ways. At the stand level, species associated with a well-developed canopy and cavity nesting birds show the most negative response to increasing canopy reduction, whereas species associated with the ground or shrub layer are least affected (Manuwal and Manuwal 2002). Numbers of canopy and cavity nesting species, as well as area-sensitive species, may decline as a result of the removal of mature coniferous forest. However, numbers of edge species, which often nest or forage in open, shrubby habitats may increase (Manuwal and Manuwal 2002). An increase in forest edge may also increase predation and brood parasitism by the brown-headed cowbird (Manuwal and Manuwal 2002; Altman and Alexander 2012) which also occurs on campus (Duncan et al. 2019).

DOE is submitting a bald eagle nest take permit (50 CFR 22.27) to the U.S. Fish and Wildlife Service Pacific Region Migratory Bird and Habitat Program Office in Portland, Oregon in December 2022 for removal of the bald eagle nest located in the developable zone (Figure 3.4). DOE will adhere to all conditions and guidelines established in the permit. Permit conditions are expected to minimize potential impacts on individual bald eagles, and no measurable impacts at the local population level are anticipated. In accordance with the *Memorandum of Understanding between the United States Department of Energy and the United States Fish and Wildlife Service Regarding Implementation of Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds"* (DOE and USFWS 2013), forest would be removed outside the migratory bird nesting season (conservatively March 1–September 30). It is therefore expected that there would be (1) no direct impacts on nesting migratory birds; (2) indirect impacts on migratory birds by precluding future nesting in the forest habitat that would be removed; and (3) disproportionately greater adverse impacts on canopy and cavity nesting and area-sensitive migratory

[1] A Potter, Washington Department of Fish and Wildlife, telephone conversion with J Becker, November 18, 2019.

birds. Note that if forest removal also needs to be restricted to outside the bald eagle nesting season to comply with federal guidelines or permit conditions, as indicated above, the effective season for tree removal would be between October 1 and December 31.

Forest harvest timing would also minimize impacts on 11 bat species that may roost in trees during the maternity season (West et al. 2004). Although most bat species known to occur on the north Olympic peninsula hibernate outside forested areas, some (e.g., silver-haired bat) may hibernate in forests. In areas with mild winter climate, such as the Puget Sound Lowlands, mature forest is assumed to provide suitable hibernation sites such as the exfoliating bark and tree hollows of snags and live western red cedar and Douglas-fir trees (Hayes and Wiles 2013). Consequently, direct impacts on hibernating individuals of such species from forest clearing (or hazard tree removal [addressed below]) are expected, but such impacts are not expected to measurably affect local bat populations.

It is unlikely that removal of trees in the developable zone would adversely affect the possible, but unlikely, use of trees in the no development zone for nesting by murrelets because trees in the no development zone are isolated by distance, slope, and aspect. Therefore, Proposed Action development would not measurably degrade or diminish potential nesting habitat or nesting habitat function for marbled murrelets, or the ability of the species to nest and rear young (USFWS 2022).

No construction is proposed for Travis Spit or Bugge Spit; however, scientific measurement devices may be installed there periodically. Such installations involve little ground disturbance. Scientific instruments would be installed to avoid host plants of the above butterflies and moth species and to minimize disturbance of substrate. Thus, it is anticipated such activities would not degrade habitat considered suitable for potential future colonization by Taylor's checkerspot butterfly (USFWS 2022), sand-verbena moth, and/or island marble butterfly.

If required, existing PNNL–Sequim Campus sewer and water lines could be extended westward 1.6 and 1.1 km (1.0 and 0.7 mi), respectively, to tie into existing Sequim utilities (Figure 2.3). It is assumed trenching would occur to emplace the sewer and water line extensions, which would involve ground disturbance. The extensions mostly parallel existing roads and would be installed at road margins. Consequently, it is expected that only weedy, road-side vegetation would be affected, which would not affect any of the species noted in Table 3.5.

On the shoreline, any new facilities, renovations or refurbishments of existing facilities, and equipment staging areas would be limited to within the existing developed footprint that consists of pavement or gravel. Consequently, neither habitat nor habitat-related wildlife impacts are anticipated from such modifications.

Construction includes removal and replacement of existing pier creosote piles on state-owned lands and pier repair and decking replacement as described in Section 2.1.6. An analysis of the potential impacts of underwater and in-air noise from vibratory and impact pile driving on marbled murrelets was performed in DOE's BA (DOE 2020c). The probability of murrelet exposure to underwater noise that could cause auditory injury (permanent threshold shift) or non-auditory (barotrauma) injury or in-air noise that could mask communications is considered discountable or unlikely to occur, and the behavioral impacts of underwater noise are also anticipated to be minor (DOE 2020c and USFWS 2022).

Construction and renovation or refurbishment activities would generate in-air noise typical of using heavy equipment such as bulldozers and cranes, transport of materials, and pneumatic tools that could temporarily cause noise levels of over 80 or 90 dBA near the source (Section 3.1.13). Prediction of the impacts of noise on wildlife is limited by the lack of information linking sound levels to impacts on individual species (Caltrans 2016; Ortega 2012; USDOT 2004). Wildlife (especially bird) responses to

noise are variable and may range from habituation to varying degrees of avoidance (leaving habitat unoccupied) and even minor injury. For example, birds and small mammals may be startled or frightened around the 80- to 85-dBA threshold (Golden et al. 1979), and sound pressure levels at or above 93 dBA may cause a temporary threshold shift (temporary hearing loss that recovers over a period of minutes to days following noise exposure) in birds (Caltrans 2016). Noise can affect wildlife by inducing nest or habitat abandonment, or behavioral modifications, or it may mask or cause the inability to detect environmental cues or communications required for breeding or defense. It is also not unusual for wildlife to habituate to noise (AMEC 2005; Larkin 1996). It is therefore anticipated that some upland wildlife as well as avifauna using the nearshore waters of Sequim Bay may experience such impacts or habituate to construction noise. Any impacts would likely be intermittent and temporary because there would be periods of relative quiet between bouts of noise and between building activities, which may occur periodically over the next 20 years.

Vehicle traffic (50 construction worker vehicles and an assumed additional 10–15 concrete and delivery trucks/day) would increase during periods of facility construction and would increase traffic on local roads (Section 3.1.10). The current risk of traffic-related wildlife mortality, given the PNNL–Sequim Campus's small workforce (60 staff [Section 3.1.10]), semi-rural setting, and the residential speed limits in the vicinity, is extremely low. The construction workforce commute and truck traffic would marginally increase the risk of traffic-related wildlife mortality and only do so periodically. Consequently, it is anticipated that the increased risk of traffic-related wildlife mortality during construction would be negligible and would have no impact on local wildlife populations.

Relatively small construction, renovation, or refurbishment projects such as those foreseen under the Proposed Action would likely not occur at night. However, if nighttime construction lighting were to be employed, it would be shielded downward to reduce light scatter and the risk of potential adverse impacts on nocturnal wildlife.

It is anticipated that facility noise during operations would be much less than construction noise and therefore would have little to no impact on wildlife. Light fixture shielding is required for new facilities and as a replacement for failed lighting on existing facilities. Consequently, facility lighting would pose no risk of adverse impacts on nocturnal wildlife during operations. Staffing is projected to more than double during the next 20 years and would increase traffic on local roads (Section 3.1.10). The additional workforce commute would only marginally increase the risk of traffic-related wildlife mortality during operations, and it is expected that traffic-related wildlife mortality would have no measurable impact on local wildlife populations. A certified arborist inspects large trees every 3–5 years (Aston 2019) and those that pose a threat to worker safety or facilities are removed. Large tree inspection would continue as part of landscape maintenance during future operations. Removal of hazard trees would conform to federal guidelines or permit conditions to protect bald eagles and their nests. Typical landscape maintenance includes lawn and ornamental tree and shrub care. Weeds are controlled with organic mulch (Aston 2019). Operation impacts on natural habitats and wildlife would be negligible.

3.1.7.3 Cumulative Impacts

Within the last 150 years, land within several miles of the PNNL–Sequim Campus to the north and south has been converted from old-growth forest and native prairie to agriculture, and the City of Sequim and associated suburban areas have been developed on land to the west of the PNNL–Sequim Campus. Overall, terrestrial resources in this area are highly fragmented and little contiguous forest or virgin prairie remains. Other than continued housing and other development associated with increased population growth, DOE did not identify any significant, reasonably foreseeable federal or state development projects in the Sequim area over the 20-year PNNL–Sequim Campus development period that would result in significant change in habitat or land use (Section 3.1). PNNL–Sequim Campus

development would disturb a total of about 2.7 ha (6.6 ac) of mature coniferous forest, which would contribute little to the existing habitat loss and fragmentation in the area. If the transfer to DOE ownership occurs there may be more reliable long-term protection of habitat and biological resources within the no development portion of the campus. PNNL–Sequim Campus development would therefore be a minor contributor to cumulative impacts on local terrestrial resources, including ESA-listed species (DOE 2020c and USFWS 2022).

3.1.8 Socioeconomics

3.1.8.1 Affected Environment

Activities at the PNNL–Sequim Campus make a minor contribution to the economic and social characteristics of the Olympic Peninsula generally and eastern Clallam County specifically. Historically, Clallam County's economy has been based on forestry and fisheries production, agriculture, and marine manufacturing. Currently, PNNL employs approximately 60 people at the PNNL–Sequim Campus (PNNL 2020), most of whom reside in Clallam County.

Based on 2017 U.S. Census Bureau American Community Survey data, 76,010 people reside in Clallam County (USCB 2019b). From 2010 to 2019, Clallam County grew at a slower rate than Washington State as a whole. The state population grew 12.2 percent, while Clallam County grew 6.5 percent in that period (USCB 2019a). Table 3.6 contains the 2019 population estimates for Clallam County and the state as well as population forecasts through 2050. Clallam County's population is projected in increase by 25.9 percent by 2050, compared to the state projected increase of 50.9 percent.

Table 3.6. 2019 State and County Population Estimates and Projections (WOFM 2019)

	2019	2020	2025	2030	2035	2040	2045	2050
Clallam County	76,010	78,084	81,846	85,298	88,348	90,762	93,220	95,679
Washington	7,546,410	7,891,296	8,533,830	9,151,524	9,746,207	10,303,292	10,848,404	11,384,950

Note: published projection scaled based on difference between 2019 updated estimates and original 2019 projection.

The PNNL–Sequim Campus comprises land parcels currently owned by Battelle, which has paid an annual average of $100,000 in property taxes to Clallam County over the last 3 years. On average at current staffing levels, the annual payroll is an estimated $5 million. In addition, the PNNL makes local purchases of goods and services in Clallam County amounting to an estimated $1.8 million annually, based on current operations.

These direct economic impacts of the current operation of the PNNL–Sequim Campus on Clallam County are minor in the context of the county's wider economy. The employment of 60 staff makes up 0.18 percent of Clallam County employment. Although the jobs are relatively well-paying, the $5 million payroll is only a minimal fraction of Clallam County's total payroll of over $891 million (WESD 2019a). Similarly, the local purchasing made by the PNNL–Sequim Campus and the current County property tax revenue levels also make up minimal fractions of county totals.

Table 3.7 shows 2017 employment by industry for Clallam County. Clallam County's economy is somewhat self-contained due to its relative isolation on the Olympic Peninsula. Thus, it is a regional center of trade, medical care, and government services. Local government is the largest sector of employment, followed by retail trade, health care, and the tourism industry.

Unemployment in Clallam County is generally higher than the state level. The state designates counties with unemployment rates at least 20 percent higher than the state as being economically "distressed" (WESD 2019b). Table 3.8 indicates that Clallam County has been a distressed economy every year since the nation emerged from the Great Recession of 2009-2010. The state of Washington saw a greater proportional impact on employment from that recession than Clallam County, which translated into a decrease in the gap between Clallam County's unemployment rate and the state's unemployment rate during the 2009–2011 period. Since 2016, both the county and the state unemployment rates have dropped below pre-recession levels. Because the state's recovery continues to outpace Clallam County's in terms of employment, Clallam County remains a distressed economy.

Table 3.7. 2017 Clallam County Employment by Industry

Description	Clallam County
Total employment (number of jobs)	34,119
Wage and salary employment	25,415
Proprietor employment	8,704
Farm proprietors' employment	449
Nonfarm proprietors' employment	8,255
Farm employment	612
Nonfarm employment	33,507
Private nonfarm employment	25,176
Forestry, fishing, and related activities	783
Mining, quarrying, and oil and gas extraction	182
Utilities	52
Construction	2,086
Manufacturing	1,429
Wholesale trade	395
Retail trade	4,326
Transportation and warehousing	637
Information	281
Finance and insurance	856
Real estate and rental and leasing	1,348
Professional, scientific, and technical services	(D)
Management of companies and enterprises	(D)
Administrative and support and waste management and remediation	1,193
Educational services	311
Health care and social assistance	3,350
Arts, entertainment, and recreation	722
Accommodation and food services	2,965
Other services (except government and government enterprises)	2,483
Government and government enterprises	8,331
Federal civilian	459

Description	Clallam County
Military	527
State and local	7,345
State government	1,178
Local government	6,167

(D) = Undisclosed.
Source: BEA 2019

Table 3.8. 2008–2018 Clallam County and State Unemployment Rate

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Clallam County	7.6%	10.1%	11.0%	10.9%	10.5%	9.6%	8.4%	8.2%	7.5%	6.8%	6.4%
Washington	5.4%	9.2%	10.0%	9.3%	8.1%	7.0%	6.1%	5.7%	5.3%	4.8%	4.5%
Distressed[a]	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(a) County unemployment rate at least 20 percent higher than the state rate.
Source: WESD 2019c

Neither the precise design of the proposed new facilities nor the timing of their construction is known, other than the construction would accommodate the addition of 60 new staff for a total of up to 135 staff over a 20-year period. Because the precise design of the facilities is not known, reasonable approximations were made based on typical construction experience. DOE may construct additional small commercial office/laboratory buildings of approximately 25,000 ft^2 each. These projects would be periodic during the 20-year planning period and would likely employ a maximum of 50 workers during peak construction (Section 3.2.10) and none during times of no construction activity. Typical construction projects would be expected to last 12–24 months.

3.1.8.2 Environmental Consequences

Construction activities for PNNL–Sequim Campus facilities would have minimal economic impacts in the context of the wider economy and would likely have little impact on the existing community. It is likely that any construction workforce and much of the materials would be sourced locally. Therefore, adverse impacts on related community services and infrastructure, including housing and schools, would not be expected.

The proposed facilities would house existing research staff and up to a doubling of new research staff. Existing staff initially would be relocated to available space on campus or to other leased facilities near the campus. As campus facilities are replaced, relocated staff would move into the newly constructed facilities. The doubling of PNNL–Sequim Campus staff would be added incrementally over the 20-year planning period and represent a minimal increase in local employment. The expected payroll increase from $5 million to approximately $10 million would result in minor beneficial socioeconomic impacts. Minimal impacts to community infrastructure would be expected from operations associated with implementing the Proposed Action.

3.1.8.3 Cumulative Impacts

The anticipated socioeconomic impacts of the Proposed Action were evaluated in the context of the reasonably foreseeable future actions identified in Section 1.3.2. Taken together, those actions and the Proposed Action result in cumulative socioeconomic impacts on the local area (e.g., increased economic activity, employment, traffic, and increased demand on community infrastructure and services). However, the likely incremental impacts of construction worker employment and the addition of new research staff would be minor in the context of the activities listed in Section 1.3.2. There would be a minor net increase in operations employment from the Proposed Action.

Currently, DOE is also pursuing, as a separate NEPA activity, the potential transfer of ownership of the PNNL–Sequim Campus from Battelle to DOE. Should this transfer occur there could be a loss of approximately $100,000 per year on average in property tax currently paid by Battelle to Clallam County; DOE would not be subject to property taxes as an agency of the federal government. While this revenue could be lost, it represents a minor fraction of Clallam County's annual property tax revenue of nearly $92 million (Clallam County 2019a).

The Proposed Action would likely offset the loss of property tax revenue because it would entail DOE investing funds for the development the PNNL–Sequim Campus, increases in local staffing and associated payroll taxes, increases in the number of visiting scientists and collaborators, construction of new facilities, and other spending in the community that, in the context of the local area and Clallam County, are expected to have an overall positive economic impact. Although the PNNL–Sequim Campus would continue to operate even if DOE does not purchase the property, DOE is more likely to make larger investments in the campus and local community if the ownership transfer occurs.

3.1.9 Environmental Justice

3.1.9.1 Affected Environment

Executive Order 12898, "Federal Action to Address Environmental Justice in Minority and Low-Income Populations," directs federal agencies to identify and address the human health or environmental impacts of federal actions, which might have disproportionately high and adverse impacts on minority populations and low-income populations (59 FR 7629). U.S. Census Bureau data were used to identify minority populations including Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and other Pacific Islander, other races, two or more races, and Hispanic or Latino. Census data also are used to identify the proportion of the population residing below the federal poverty level.

According to the U.S. Census Bureau 2017 5-year American Community Survey (USCB 2019a) population data, the population of Clallam County is over 73,000 and includes approximately 17 percent minority persons (Nonwhite Hispanic and Latino, Asian, Native American, and African American). The Hispanic and Native American populations make up the principal racial and ethnic minorities in the County. The population of Clallam County includes 17 percent low-income residents (USCB 2019a). Table 3.9 illustrates the county distribution of minority and low-income populations in comparison to the state. Figure 3.5 shows the distribution of minority and low-income census block groups in eastern Clallam County that exceed the state average percentages for minority or low-income.

Table 3.9. 2017 Minority and Low-Income Populations in Clallam County and the State of Washington

Demographic	Clallam County	Percent	Washington	Percent
White	61,144	83.3%	5,077,103	68.6%
African American	783	1.1%	262,211	3.5%
Native American	3,218	4.4%	75,535	1.0%
Asian	1,102	1.5%	625,939	8.5%
Pacific Islander	46	0.1%	46,110	0.6%
Some other race	285	0.4%	15,487	0.2%
2 or more races	2,442	3.3%	362,566	4.9%
Non-Hispanic	69,020	94.0%	6,464,951	87.3%
Hispanic/Latino[(a)]	4,419	6.0%	940,792	12.7%
Total population	73,439	100.0%	7,405,743	100.0%
Aggregate minority	12,295	16.7%	2,328,640	31.4%
Low-Income	12,353	16.8%	802,159	10.8%

(a) Of any race, counted separately from the racial categories.

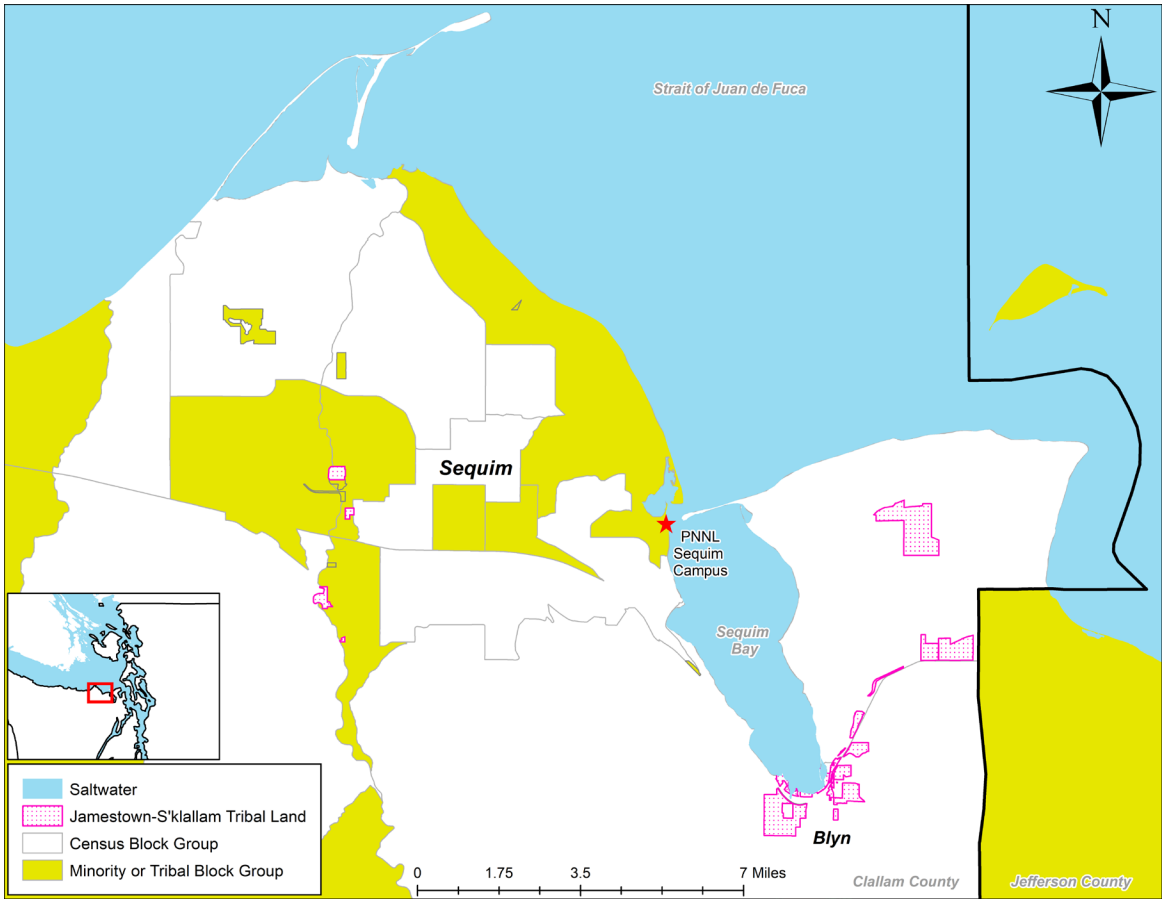

Figure 3.5. 2017 Minority and Low-Income Populations

3.1.9.2 Environmental Consequences

The operational impacts of the proposed facilities and/or additions and proposed infrastructure are expected to be similar to those from ongoing PNNL operations. Currently, there are no known impact pathways associated with PNNL operations that have been determined to affect minority or low-income populations disproportionately; therefore, operation of the proposed facilities and/or additions and proposed infrastructure is not expected to have the potential for disproportionately high and adverse impacts on minority or low-income groups as defined above. Hence, thresholds for environmental justice-related impacts are not reached. Some Tribal resources may be affected by the Proposed Action; these impacts are discussed in Section 3.1.5.

3.1.9.3 Cumulative Impacts

Because the impact pathways associated with the Proposed Action are not specific to minority or low-income populations, disproportionately high and adverse impacts on these groups combining the Proposed Action with past, present, and reasonably foreseeable future projects would not be expected.

3.1.10 Traffic and Transportation

3.1.10.1 Affected Environment

Whitefeather Way and West Sequim Bay Road currently serve as the primary connections to the PNNL–Sequim Campus from U.S. Highway 101 and downtown Sequim, and also provide access to the John Wayne Marina and local residents. West Sequim Bay Road and Whitefeather Way enable access to the upland facilities. Washington Harbor Road, off West Sequim Bay Road, is the only access for the shoreline facilities. These routes would be used for construction, PNNL staff, and routine delivery access during facility buildout and infrastructure projects.

3.1.10.2 Environmental Consequences

It is assumed that the construction period for each structure or building would be approximately 12–24 months. Timing of construction is dependent on mission need and funding authorization. Construction activities may occur within the PNNL–Sequim Campus footprint. Exceptions are: the No Development Zone and No Activity Zone, and expansion outside the current shoreline footprint (see Figure 2.1). As a bounding scenario, during larger scale construction, up to 50 construction workers may be traveling to and from the PNNL–Sequim Campus on one of the access roads identified above. It is assumed construction workers would travel an average distance of 40 km (25 mi) one way to the PNNL–Sequim Campus. Assuming 250 construction days per year, 25,000 one-way trips and 1 million km (~0.62 million mi) would be traveled annually. Parking for construction workers would be established on the PNNL–Sequim Campus, along with equipment and laydown yards, to support construction.

Concrete deliveries during larger construction efforts could result in increased truck traffic (10–15 trips/day) during installation of building foundations and are anticipated to occur sporadically over a 1- to 2-month period per construction project. Larger loads would also be delivered (e.g., steel and other building materials), but deliveries would be less frequent. Because these periods of peak delivery to the construction site would be of short duration, increases in traffic related to construction deliveries are anticipated to be minor.

Currently, there are 60 PNNL staff at the PNNL–Sequim Campus, and a majority of them live within a 32 km (20 mi) radius the PNNL–Sequim Campus. The addition of new facilities and research at the PNNL–Sequim Campus could potentially more than double the staffing level to 135 total staff. Assuming 225

working days per year for each additional staff member, annually this would result in an increase of 31,000 one-way trips and up to 0.99 million km (0.61 million mi) traveled. Additional parking for PNNL staff would be incorporated as part of the PNNL–Sequim Campus buildout to accommodate anticipated parking volumes. Local traffic impacts resulting from the PNNL–Sequim Campus expansion are anticipated to incrementally increase as a result of PNNL staff usage and more frequent deliveries of materials used in facility operations, resulting in minimal overall impacts.

3.1.10.3 Cumulative Impacts

U.S. Highway 101 serves as significant transportation and distribution corridor between the Seattle area and the Olympic Peninsula. As stated above, access to the PNNL–Sequim Campus is limited to a few arterial roads that connect to U.S. Highway 101. The potential traffic impacts of facility construction and increased PNNL staff under the Proposed Action were evaluated against traffic data available in the 2012 City of Sequim Transportation Master Plan (Fehr & Peers 2013); see Table 3.10. To assess cumulative impacts, it was assumed that continuous construction and the projected additional staff would be commuting simultaneously; it is more likely that construction and hiring of staff would be phased over time. The Proposed Action results in minor cumulative traffic impacts on the local area and natural degradation of roadways over time caused by the additional vehicle use.

Table 3.10. Traffic Counts and Impacts for Principal Access Routes to the PNNL–Sequim Campus

Data Collection Point	2018 Annual Traffic Count[(a)]	Annual Construction Count[(b)]	Additional PNNL–Sequim Campus Staff Count	Percentage Increase
U.S. Highway 101	6,772,610	36,500	49,640	1%
Whitefeather Way	380,959	18,250	24,820	11%
West Sequim Bay Road	1,269,864	36,500	49,640	7%
Washington Harbor Road	423,288	36,500	24,820	14%

(a) 2018 Annual Traffic Count based on 2012 City of Sequim Transportation Master Plan (Fehr & Peers 2013), escalated 2.5 percent annually.
(b) Anticipated for a larger scale construction project lasting 12 months.

3.1.11 Human Health and Safety

3.1.11.1 Affected Environment

Physical Hazards

The total number of work-related injuries or illnesses that resulted in death, days away from work, job transfer or restriction, or other recordable cases, consistent with U.S. Occupational Safety and Health Administration definitions are termed "total recordable cases." Over a 5-year period from 2014 to 2018, the total recordable cases of injuries and illnesses at PNNL averaged 0.76 cases per 200,000 worker-hours (DOE 2019). For the 4400 PNNL-wide workers, this results in an average of 35.1 total recordable cases annually. The PNNL incidence rate is well below the Bureau of Labor Statistics rate for U.S. private industry of 2.9 cases per 200,000 worker-hours during the same 5-year period from 2014 to 2018 (BLS 2019a).

Nonradiological Hazards

The PNNL–Sequim Campus is not a large source of nonradiological air emissions, but past and present emissions include greenhouse gases, ozone-depleting substances (primarily refrigerants), hazardous air pollutants, and criteria air pollutants. The air effluent program does not monitor any stacks for nonradiological constituents, and compliance is assured by complying with regulatory standards for equipment and permit conditions. Compliance typically involves activities such as using clean fuels and monitoring fuel use, adhering to required operating hours for boilers and diesel engines, and adhering to maintenance and operating requirements. Permit applications contain emission estimates based on vendor data (e.g., emission rate/hour), so the monitoring of run time or fuel use is an acceptable method of determining permit compliance. In addition, reviews of research and facility construction/renovation projects are conducted to maintain compliance with all applicable requirements.

The PNNL–Sequim Campus discharges liquid effluent to Sequim Bay through two outfalls, Outfall 007 and Outfall 008. Freshwater and seawater that are unaltered (e.g., by chemical additions or association with non-native species) are discharged through Outfall 007. There were no regulated discharges from Outfall 007 in 2018. Wastewater from the PNNL–Sequim Campus is discharged to an onsite wastewater treatment plant and then directly discharged to Sequim Bay at Outfall 008 under the authorization of WA Ecology NPDES Permit WA0040649. This permit identifies liquid effluent limitations and monitoring requirements for this facility. Monitoring data required by the NPDES permit for 2018 are listed in Table 3.11. One grab sample was taken each month from Outfall 008 and analyzed for the parameters identified in Table 3.11. All parameters met the NPDES permit effluent limitations (Duncan et al. 2019).

Table 3.11. PNNL–Sequim Campus 2018 NPDES Monitoring Results for Outfall 008

Parameter	Total Samples	Quantity Found Below Method Reporting Limit	Reporting Limit [(a)]	Maximum Value
Maximum flow (gpd)	NA	NA	NA	179,900
Chlorine, total residual (µg/L)	12	12	50	<50
Antimony (µg/L)	1	1	0.5	<0.5
Arsenic (µg/L)	1	0	5	5.1
Beryllium (µg/L)	1	1	0.2	<0.2
Cadmium (µg/L)	1	1	0.2	<0.2
Chromium (µg/L)	1	1	2	<2
Copper (µg/L)	12	5	4	11.8
Lead (µg/L)	12	9	0.4	0.53
Mercury (µg/L)	1	0	0.0005	0.00142
Nickel (µg/L)	1	1	2	<2
Selenium (µg/L)	1	0	10	12
Silver (µg/L)	1	1	0.2	<0.2
Thallium (µg/L)	1	1	0.2	<0.2
Zinc (µg/L)	12	11	40	92
pH[(b)]	12	NA	NA	7.7

(a) The highest Method Reporting Limit reported for all months is listed.
(b) pH limits of 6−9 standard units are specified in the current permit.
gpd = gallons per day; NA = not applicable; µg/L = micrograms per liter.

Radiological Hazards

Radiation dose to members of the public is evaluated annually against the EPA standard of 10 mrem per year. Emissions at the PNNL–Sequim Campus are low, the radionuclide inventory is relatively small, and radiological impact estimates are well below the EPA regulatory standard, even when highly over-estimating assumptions are applied (Snyder et al. 2019).

Radiological data are available for the entire PNNL complex, which includes both the PNNL Richland and PNNL–Sequim Campuses. Based on DOE (2018), Exhibit B-12, 2238 PNNL workers were monitored for occupational radiation exposure in 2017. Of that number, 473 workers had a measurable TED. No doses exceeded 0.500 rem TED in 2017, which is well below the DOE administrative control level of 2 rem (20 mSv) TED.

Staff, contractors, and visitors at PNNL practice principles of keeping exposure to ionizing radiation as low as reasonably achievable by minimizing the time of exposure, maximizing distance from sources, and by using shielding to keep radiation doses as far below the dose limits as possible. No radiological impacts on construction workers or the general public resulting from construction are anticipated.

Estimates of human health consequences following exposure to ionizing radiation are expressed in terms of the probability of latent cancer fatality (LCF) for individuals or number of LCFs for populations and are based on a dose-to-LCF factor of 0.0006 LCF per person-rem for both workers and the public. Because radiological operations for new facilities would be similar to current operations, the impacts on worker health and safety from future operations were estimated based on 5 years of recent experience from PNNL general research activities. The estimates are considered conservative for the PNNL–Sequim Campus because the radionuclide inventory is low in comparison to the Richland Campus. Worker doses over the 5-year period from 2013 to 2017 at PNNL are presented in Table 3.12 (DOE 2017b, DOE 2017a, DOE 2018).

Table 3.12. Worker Doses from PNNL General Research Activities

	Number of Workers with Measurable Doses by Category (mrem)					Total Worker Collective Dose (person-rem)
Year	Not Measurable	Less than 100	100 to 250	250 to 500	500 to 750	
2013	1,935	367	36	8	0	15
2014	1,937	441	21	9	3	16
2015	1,978	430	28	3	0	13
2016	1,816	371	20	5	0	11
2017	1,765	443	25	5	0	13

Data from: DOE 2017b, DOE 2017a, DOE 2018

At the dose levels presented in Table 3.12, the inferred probability of an LCF for the maximally exposed worker over a 30-year career (at 0.75 rem/yr) would be 0.01, with no inferred LCFs for the worker population as a whole over a 30-year period, assuming a 5-year average collective dose of 13.6 person-rem per year.

3.1.11.2 Environmental Consequences

Physical Hazards

Over a 20-year period, various building projects are expected to occur at the PNNL–Sequim Campus at a rate of one project every 3 to 5 years. Construction workers would be employed during building projects and, at a maximum, each project is estimated to require up to 50 workers. Assuming a conservative full-time schedule for 50 workers, based on the 2018 U.S. Department of Labor total recordable case rate for nonresidential building construction (i.e., 2.5 cases of injury/illness per 100 full-time workers), about 1.25 cases of injury/illness might occur per year associated with building projects on the PNNL–Sequim Campus (BLS 2019b).

Assuming new buildings are constructed at the PNNL–Sequim Campus, up to approximately 135 staff may eventually occupy the site. If the current PNNL average incidence of 0.76 cases of illness/injury per 200,000 labor-hours is still representative in 20 years and workers work 250 days per year, approximately 1 injury per year could be expected within the working staff population at the PNNL–Sequim Campus.

Nonradiological

Chemical quantities and types anticipated for use in facilities within the PNNL–Sequim Campus over the next 20 years would increase proportionately with the increase in building square footage and staffing levels (Table 2.1). Research work is performed in laboratories designed for safe use of chemicals, including equipment such as ventilation-controlled fume hoods. Toxic chemicals are generally used only for bench-scale projects assuring that quantities at any one location are small. Chemical hazards associated with construction work would likely be related to emissions from construction equipment and finishing activities, such as painting.

As a research laboratory, PNNL recognizes there are buildings on the PNNL–Sequim Campus in which chemicals are used and/or stored for research operations and maintenance activities. PNNL has therefore introduced controls to avoid potential hazards. These controls include training, inventory control procedures, approvals prior to chemical requisitioning, and work procedures for chemical use including safety and disposal requirements. Because management practices and activities at the PNNL–Sequim Campus would be similar in nature to current practices and activities, the potential impacts from use of hazardous chemicals are expected to remain low.

Radiological

The expected radiological impacts on the members of the public and biota from routine operations would be similar to current impacts. Current radiological emissions are presented in the PNNL Annual Site Report for calendar year 2018 (Duncan et al. 2019). During calendar year 2018, semiannual radiological external dose rate surveys results were at background levels that could be occupied by the public (Duncan et al. 2019). In calendar year 2018, the MEI location was 0.23 km (0.15 mi) west of a central PNNL–Sequim Campus emission location. The annual calculated dose to the MEI was 4.5 x 10-4 mrem EDE. This dose is many orders of magnitude below the average annual dose from background radiation that includes natural terrestrial and cosmic radiation and inhalation of naturally occurring radon. DOE's experience indicates that operation (or modification) and subsequent decommissioning of such facilities normally pose no potential for significant environmental impacts (10 CFR Part 1021). Baseline ambient air sampling and environmental dosimetry is expected to continue. Expectations are that future work at the PNNL–Sequim Campus will continue to operate with a MEI dose below the minor emissions unit limit of 0.1 mrem/yr (Snyder et al. 2019). Before any property is released from the PNNL–Sequim Campus, staff follow established procedures to evaluate, radiologically characterize, and—where appropriate—decontaminate the property before it is released. The level of residual radioactivity in property to be released to the public (land, structures, personal property, materials, and equipment) is as near background levels as is reasonably practicable and meets DOE-authorized limits. In 2018, no

property with detectable residual radioactivity above the pre-approved surface activity guidelines was released from PNNL (Duncan et al. 2019).

3.1.11.3 Cumulative Impacts

The potential for building projects and subsequent increase in construction on the PNNL–Sequim Campus over a 20-year period is expected to be minor, relative to the new commercial and residential construction within the local economy and in the surrounding area. Physical impacts resulting from operation of the PNNL–Sequim Campus are small and would generally be similar to those from current activities. Overall, the cumulative physical impacts on the surrounding area as a result of building out the PNNL–Sequim Campus are expected to result in a minimal net change. Similarly, because the chemical management practices and activities at the PNNL–Sequim Campus over the next 20 years would be similar in nature to current practices and activities, the cumulative impacts on staff, construction workers, and the environment surrounding the PNNL–Sequim Campus are expected to result in a minimal net change. Cumulative radiological impacts are expected to be minimal. The area around the laboratory is generally residential, and no ongoing or planned actions have a known radiological impact or other health and safety impacts.

3.1.12 Visual Resources

3.1.12.1 Affected Environment

Visual resources are the natural and manmade physical features that give a particular landscape its character. Visual resources include landforms, vegetation, water, color, adjacent scenery, scarcity, and manmade modifications.

Evaluating the aesthetic qualities of an area is a subjective process because the value that an observer places on a specific feature varies depending on their perspective and judgment. DOE does not have a standardized approach to the characterization and management of visual resources, nor could DOE identify any formal visual resource study performed for the PNNL–Sequim Campus location or Sequim Bay in general. A qualitative visual resource assessment was conducted to determine whether alterations associated with planned project activities would alter the visual environment. The baseline assessment was guided by the standardized approach developed by the U.S. Bureau of Land Management (BLM) in their Visual Resource Inventory Manual (BLM 1986).

The BLM approach identifies three mapping distance zones that qualitatively describe how landscapes are observed under good viewing conditions. The zones are as follows:

- Foreground-middleground zone: Areas seen from highways, rivers, or other viewing locations less than 3 to 5 mi away. This is the point where the texture and form of individual plants are no longer apparent in the landscape.
- Background zone: Areas seen from beyond the foreground-middleground zone, but less than 15 mi away. Vegetation in this zone is visible just as patterns of light and dark.
- Seldom-seen zone: Areas that are hidden from view or not distinguishable and more than 15 mi away.

Classifications were derived from an inventory of scenic qualities, sensitivity levels, and distance zones for particular areas:

- Class I: Very limited management activity; natural ecological change.

- Class II: Management activities related to solitary small buildings and dirt roads may be seen but should not attract the attention of the casual observer.
- Class III: Management activities may attract attention but should not dominate the view of the casual observer; the natural landscape still dominates buildings, utility lines, and secondary roads.
- Class IV: Management activities related to clusters of two-story buildings, large industrial/office complexes, and primary roads, as well as limited clearing for utility lines or ground disturbances, may dominate the view and be the major focus of viewer attention.

The PNNL–Sequim Campus is visually isolated at the mouth of Sequim Bay. It is visible to boating traffic entering and exiting the bay, scattered residences on the west shoreline of the bay, and very distantly visible to the more concentrated commercial development at the back (south) end of the bay, approximately 4.5 mi distant. The PNNL–Sequim Campus location on the west shoreline of the bay, tucked into the shoreline and upland area and screened by forest and bluffs, prevents it from being visible to most nearby locations to the west. Facilities are clearly visible from Gibson Spit, to the immediate north of the site, and from Paradise Cove/Kiapot point to the immediate east of the site. Visibility is highest on clear nights, when facility lights and navigation lights on the pier are noticeable in the foreground-middleground zone north, east, and south of the site.

Using the BLM approach, the areas of foreground-middleground to the north, east, and south of the PNNL–Sequim Campus are consistent with a Visual Resource Management Class III rating, and the areas west are consistent with a Visual Resource Management Class I rating. The natural landscape dominates the view from areas north, east, and south; however, some facilities and their operations during the day and lights during the night would be noticed by the casual observer. The PNNL–Sequim Campus is most visible from the marine navigation route entering and exiting the bay. From areas west of the campus, the facilities and operations are not visible. The PNNL–Sequim Campus facilities and operations are not visible from the background zone or from the seldom-seen zone.

3.1.12.2 Environmental Consequences

The visual resource analysis focuses on the degree of contrast between the Proposed Action and the surrounding landscape, the sensitivity levels of key observation points, and the visibility of the Proposed Action from those key observation points in reference to the PNNL–Sequim Campus. No visual resource study was identified, nor have specific visual resource regulations been imposed for the Sequim Bay viewshed. The distances from key observation points to the affected area were also considered, because distance could diminish the degree of contrast and visibility. To determine the range of the potential visual impacts, the viewshed analysis considered the potential impacts in light of the aesthetic quality of surrounding areas, as well as the visibility of possible activities and facilities from key observation points.

During construction, equipment and activities would be visible within the PNNL–Sequim Campus; however, as expected, visibility would diminish as a function of the viewer's distance from the campus. Construction activities would be periodic and temporary. Depending on the location of anticipated facilities, construction activities could result in a temporary change in the Visual Resource Management classification of the campus from Class III to Class IV, because the contrast of buildings and infrastructure under construction on the site would become the primary focus for viewers. Some structures could be up to 50 ft tall, which is taller than any current structures on the site. Building exterior colors would continue to be natural tones, as is current practice. Upon completion of the new facilities, it is anticipated that views of the site would return to Class III where the natural landscape still dominates buildings, utility lines, and secondary roads.

Under continued operations, viewers from key observation points to the north, east, and south would not be likely to detect any meaningful visual changes in PNNL–Sequim Campus operations. Continued periodic movements of equipment on the shoreline, marine transport activities, and night lighting of facilities would not change noticeably. From key observation points, these future activities would not cause noticeable visual impacts from the current baseline.

3.1.12.3 Cumulative Impacts

The anticipated visual resource impacts of the Proposed Action were evaluated in the context of the reasonably foreseeable future actions identified in Section 1.3.2. Taken together, those actions and the Proposed Action result in cumulative visual impacts on the local area. However, as discussed for the Proposed Action, the likely impacts of the Proposed Action would be minor in the context of the existing viewshed. Thus, the Proposed Action's contribution to cumulative visual resource impacts would not be significant.

3.1.13 Noise and Vibration

3.1.13.1 Affected Environment

Formal background noise analyses have not been performed at the PNNL–Sequim Campus; however, the noise levels on campus are typical of low population density areas—most sound and vibration emanates from vehicular traffic and operation of heating and ventilation systems.

3.1.13.2 Environmental Consequences

Construction activities would generate noise typical of using heavy equipment such as bulldozers and cranes, transport of materials, and pneumatic tools that temporarily could cause noise levels of over 80 or 90 dBA near the source. The nearest residences are located approximately 500 ft west of the PNNL–Sequim Campus property line; sound attenuation over this distance is usually about 20 dBA (WSDOT 2018). The Washington State maximum permissible sustained environmental noise levels (WAC 173-60) limit daytime noise to 57 dBA for residential locations from a commercial source. Sounds originating from temporary construction activities are exempt from Washington State maximum permissible noise provisions between 7:00 a.m. to 10:00 p.m. It is unlikely that construction would occur between 10 p.m. and 7 a.m., but if needed, louder activities would be scheduled to occur during daytime hours. Pile driving associated with refurbishment of the pier could have short-term sound levels over 100 dBA. This is expected to be intermittent over a 2-day period but would be detectable from locations along Sequim Bay and into the Strait of Juan de Fuca within several kilometers of the PNNL–Sequim Campus. The impacts of noise on wildlife are considered in Sections 3.1.6 and 3.1.7.

The commercial limit of 60 dBA would apply to facilities on the campus (WAC 173-60). Existing campus buildings could be affected by noise from potential construction activities, depending on where on campus those activities take place. Attenuation of noise by walls and windows would reduce indoor noise levels, although episodic noise events or associated ground vibrations could disturb building occupants.

Operation of new office and laboratory facilities and their heating and air conditioning systems are not likely to produce appreciably greater amounts of acoustic noise or vibration than current facilities on the PNNL–Sequim Campus. The movement, loading, and unloading of trucks onsite would generate temporary acoustic noise and vibration.

3.1.13.3 Cumulative Impacts

Taken together, reasonably foreseeable future actions (Section 1.3.2) and the Proposed Action would result in small cumulative noise impacts on the local area. The likely impacts of construction noise would be minor and kept within prescribed limits. There would be relatively small changes in local traffic, and no net change in operations noise compared to the No-Action Alternative. Thus, the Proposed Action's contribution to cumulative noise impacts would not be significant.

3.1.14 Waste Generation and Disposition

3.1.14.1 Affected Environment

DOE uses a comprehensive approach to implement the requirements of Executive Order 13834 *Efficient Federal Operations* (83 FR 23771) by integrating sustainability into the various phases of operations at PNNL. The PNNL sustainability program contains three focus areas: environmental stewardship, social responsibility, and economic prosperity. Waste-management activities associated with construction and facility operations would be conducted in accordance with the environmental stewardship aspects of this program.

In calendar years 2016–2018, the PNNL–Sequim Campus annually generated an average of 225 kg (496 lb) of hazardous waste and 187 kg (412 lb) of low-level radioactive wastes annually. PNNL maintains the capability on the PNNL–Sequim Campus to manage hazardous and radioactive waste in accordance with federal and state regulatory requirements. Final disposition of hazardous and radioactive wastes is performed offsite under contracts with permitted treatment, storage, and disposal facilities. The design of new facilities would incorporate areas to properly manage wastes generated from R&D and facility operations.

PNNL–Sequim Campus operations annually generate 477 m^3 (624 cubic yards [yd^3]) of sanitary trash that is sent to the regional transfer station and 55 m^3 (72 yd^3) of cardboard that is processed through a local recycling company. Mixed paper, aluminum, steel, and plastic are also recycled through a sanitary trash vendor.

3.1.14.2 Environmental Consequences

The PNNL–Sequim Campus expansion is anticipated to construct an additional 7500 m^2 (81,000 ft^2) of space and the majority of the existing structures will remain intact. Construction activities would generate metal and wood debris that would be sent through local companies for recycling or disposal Approximately 124 m^3 (162 yd^3) of general construction debris and other recyclables (e.g., asphalt, treated wood, and concrete) would require transport to the regional transfer station where it would be transported (i.e., barged) to processing centers in the Puget Sound area.

With the addition of new facilities, it is anticipated the volume of each waste type will increase, but the types of wastes will generally remain consistent. Assuming PNNL–Sequim Campus expansion increases from 4700 m^2 (51,000 ft^2) to approximately 12,300 m^2 (132,000 ft^2), and the ratio of laboratory, office, and support spaces remains relatively consistent, the estimated annual waste volumes that would be generated are shown in Table 3.13.

Table 3.13. Current and Potential Annual Waste Volumes

Waste Type	Current PNNL–Sequim Campus Operations	Future Anticipated Volume
Sanitary trash	477 m^3 (624 yd^3)	1236 m^3 (1615 yd^3)
Cardboard	55 m^3 (72 yd^3)	143 m^3 (186 yd^3)
Hazardous waste	225 kg (496 lb)	582 kg (1284 lb)
Low-level radioactive waste	187 kg (412 lb)	483 kg (1066 lb)

The construction of new facilities at the PNNL–Sequim Campus would generate waste and debris; however, the amounts would be low, the generation rate and peaks would be spread over a period of months, and the anticipated impact on regional waste and recycle processing centers would be minimal. Minor increases in sanitary trash, hazardous waste, and low-level radioactive waste volumes would occur as new research and support facilities are constructed and become operational, but it is unlikely that existing waste-management processes and disposal companies would realize any impacts.

3.1.14.3 Cumulative Impacts

Taken together, reasonably foreseeable future actions (Section 1.3.2) and the Proposed Action would result in small cumulative waste generation impacts on the local area. While construction of new facilities would generate waste and debris, these impacts would be relatively low and the anticipated cumulative impact of this waste on regional waste and recycle processing centers would be minimal. Increases in waste and recycle associated with operations are also expected to be negligible. Thus, the Proposed Action's contribution to cumulative noise impacts would not be significant.

3.1.15 Postulated Accidents

3.1.15.1 Affected Environment

Potential impacts from postulated accidents are described in this section. Impacts from the routine release of chemicals and radionuclides are described in Section 3.1.11 (Human Health and Safety). New facilities would include radiological and chemical laboratories; impacts from postulated accidents at such facilities are discussed below.

The PNNL–Sequim Campus could include new buildings with laboratories capable of working with toxic chemicals. In general, the quantity and type of chemicals would remain within the envelope of what is currently in use at the PNNL–Sequim Campus.

3.1.15.2 Environmental Consequences

Chemical work would be performed in laboratories designed for safe use of chemicals, including equipment such as ventilation-controlled fume hoods and worker protective clothing. WA Ecology regulates the emissions of toxic chemicals under WAC 173-460, "Controls for New Sources of Toxic Air Pollutants" (WAC 173-460). At the PNNL–Sequim Campus, toxic chemicals are generally used in bench-scale projects, so quantities at any one location tend to be small. Laboratory-scale research activities are exempt from WAC 173-460 requirements. Because toxic chemical quantities are expected to be small, no accident scenario is envisioned that would lead to an offsite consequence due to chemicals.

Buildings on the PNNL–Sequim Campus may include laboratories capable of working with small amounts of radiological material. In general, the quantity and type of radioactive materials would remain

within the envelope of what is currently authorized under PNNL's existing radioactive air permits. The current published list of radioactive materials handled or potentially handled on the PNNL–Sequim Campus can be found in the PNNL Annual Site Environmental Report (Duncan et al. 2019). The new facilities would be designated as less than Hazard Category 3 nuclear facilities, meaning that the hazard analysis indicates the potential for only significant localized consequences. Thus, no radiological accident scenario is envisioned that would lead to a significant offsite consequence.

3.1.16 Intentional Destructive Acts

3.1.16.1 Affected Environment

Prior to 2001, DOE NEPA documents did not typically include an analysis of intentional destructive acts. After the events of September 11, 2001, DOE implemented measures to minimize the risk and consequences of potential intentional destructive acts on its facilities. Consistent with DOE guidance, DOE currently analyzes the potential impacts of intentional destructive acts in NEPA documents. DOE (2002) provided guidance for this analysis.

It is not possible to predict whether intentional destructive attacks would occur, or the nature or types of such attacks. Nevertheless, DOE has evaluated security scenarios involving intentional destructive acts to assess potential vulnerabilities and identify improvements in security procedures and response measures. Security at its facilities is a critical priority for DOE. Therefore, DOE continues to identify and implement measures to defend and deter attacks at PNNL. DOE maintains a system of regulations, Orders, programs, guidance, and training that form the basis for maintaining, updating, and testing site security to preclude and mitigate any potential intentional destructive attacks.

3.1.16.2 Environmental Consequences

Although unlikely, an intentional destructive act targeting the PNNL–Sequim Campus is possible. However, conservative assumptions inherent in the accidents analyzed in DOE facility-specific safety analysis reports and documented safety analyses (e.g., PNNL 2017) assume initiation by natural events, equipment failure, or inadvertent worker actions. The accidents evaluated in these documents include earthquakes, fires, criticalities, and airplane crashes, all of which could cause a release of radiological materials or chemicals to the environment. Intentional destructive acts could also cause a release of these materials to the environment, but radiological inventories in new buildings would be less than Hazard Category 3, and a release, if one occurred, would not result in adverse impacts off the PNNL–Sequim Campus. If an intentional destructive act were to occur, the resulting consequences to workers and the public would be similar to those occurring from natural or human-caused events. In addition, the Proposed Action would not increase the likelihood of an intentional destructive act or the resulting consequences.

3.2 Irreversible and Irretrievable Commitment of Resources

Construction of the facilities on the PNNL–Sequim Campus would require an irreversible and irretrievable commitment of the resources such as construction materials (fill dirt, concrete, steel, asphalt, lumber, etc.) and fuels such as gasoline, diesel, and propane. The amount would depend on the number of buildings constructed and the specific designs of those buildings. None of these resources are unique or regionally in short supply and DOE use of these resources would not result in any shortage or impact on other regional users.

The proposed potential development in the upland portion of the PNNL–Sequim Campus would require the removal of existing forest habitat as discussed in Section 3.1.7 and potential disturbance of cultural resources as described in Section 3.1.5.

Operation of the new facilities on the PNNL–Sequim Campus would require an irreversible and irretrievable commitment of resources such as diesel fuel for backup generators as well as electricity, propane, and water.

The future actions described in Section 1.3.2 combined with the Proposed Action would result in small cumulative-resource impacts on the local area. The timing of the Proposed Action likely would occur relatively evenly over the 20-year span, such that the likelihood of "peak" demand for resources is not anticipated to be an issue. The impacts from the Proposed Action to resources in the region would be relatively minor in the context of total future development in the area.

3.3 Environmental Impacts of the No-Action Alternative

Under the No-Action Alternative, DOE would not obtain replacement facilities or provide new facilities for PNNL staff and existing and future research missions. PNNL would continue to occupy and operate the existing facilities on the PNNL–Sequim Campus. Existing facilities may be refurbished or demolished based on mission needs and lifecycle cost assessment. Impacts of the No-Action Alternative, in all the resource areas described above for the proposed alternative, are therefore expected to be similar to those associated with current operation and maintenance of the PNNL–Sequim Campus.

3.3.1 Adverse Impacts

PNNL–Sequim Campus' capability to support of the nation's strategic goals in marine science, national security, energy, and the environment for DOE and other federal clients over the next 20 years would be substantially reduced. Declines in facilities and capabilities could lead to losses in new employment opportunities. The local community economic benefits associated with construction of new facilities and infrastructure would not be realized.

3.3.2 Beneficial Impacts

The forest and other native habitat and cultural resources on the PNNL–Sequim Campus would be undisturbed, and emissions and noise from construction activities would not occur. The resource commitments necessary for the future buildout would not occur.

3.4 Comparison of Impacts of the Proposed and No-Action Alternatives

Table 3.14 provides a summary of the potential impacts of the Proposed and No-Action Alternatives. More detailed discussion of each impact area is provided in the preceding sections.

Table 3.14. Comparison of the Impacts of the Proposed and No-Action Alternatives

Impact Area	Proposed Alternative	No-Action Alternative
Land Use	Approximately 2.7 ha (6.6 ac) of undeveloped land in the upland area could change from forest to built facilities. No change in land use on the shoreline or other undeveloped parts of the campus.	No Change
Air quality	Dust generation and diesel emissions during construction. Chemical and radiological emissions during operation of new facilities would be the same or a very small increase compared to existing conditions.	No Change
Soils and Geological Resources	Some soils classified as prime farmland would be disturbed during construction.	No Change
Water Resources	Water use provided by the City of Sequim would be a small fraction (about 0.1 percent) of the City's existing demand. Average groundwater use from the existing PNNL–Sequim Campus well would increase about 11 percent, and would be within the well yield. Therefore, the Proposed Action would have a small impact on water resources.	No Change
Cultural and Historic Resources	Development of uplands area, installation of new water/sewer lines, and excavation outside of the existing building footprints along the shoreline could disturb archaeological resources. A No Development Zone in the uplands and a No Activity Zone at the shoreline have been designated to help minimize disturbance of cultural resources.	No Change
Aquatic Ecology Resources	Minor impacts on marine mammals, fish, and water quality from installation of new piles. Replacement of pier decking would increase light penetration to benefit aquatic vegetation. No impacts on wetlands from construction or operation.	No Change
Terrestrial Ecology Resources	Development in the uplands could remove up to 2.2 ha (6.6 ac) of coniferous forest and could disturb a bald eagle nest site. Noise from construction would cause a minor, short-term impact on wildlife.	No Change
Socioeconomics	Negligible impacts of construction or operation on the local economy; small reduction in county tax revenue should the potential transfer of facilities to DOE ownership occur that would be offset by increased investment in the campus and community.	No Change
Environmental Justice	No change	No Change
Traffic and Transportation	Small increase in traffic on local roads due to construction workers and new permanent staff.	No Change
Human Health and Safety	Estimated 1.25 injuries per year due to construction, and 1 injury per year to PNNL–Sequim Campus staff. There would be negligible changes in chemical or radiological health impacts.	No Change
Visual Resources	New facilities would be visible to viewers to the east and south of the PNNL–Sequim Campus; this would not be a noticeable reduction in aesthetic quality compared to the baseline.	No Change
Noise and Vibration	Short-term higher noise levels during construction, no change during operation of new facilities.	No Change
Waste Generation and Disposition	Waste generation would increase proportionately with the increase in building square footage and staffing levels. The potential increase would not strain local disposal processes or capacities.	No Change
Accidents	No change	No Change
Intentional Destructive Acts	No change	No Change
Environmental Sustainability	No change	No Change

Impact Area	Proposed Alternative	No-Action Alternative
Irreversible and Irretrievable Commitment of Resources	Construction would consume resources such as concrete, lumber, steel, diesel, etc., and would remove forest habitat and potentially disturb cultural resources. Operation of new facilities would consume additional electricity, water, and fuel.	No Change

4.0 ENVIRONMENTAL PERMITS AND REGULATORY REQUIREMENTS

PNNL is required to carry out operations in compliance with all federal, state, and local laws and regulations; Presidential Executive Orders; DOE Orders; and procedures (DOE/PNSO 2019). Environmental regulatory authority over the DOE-SC and its laboratories is vested in federal, state, and local agencies. Federal, state, and local laws apply to construction and operation of the new future facilities. The environmental regulatory framework includes requirements regarding planning for facilities to protect air and water quality, human health, and the environment. It is anticipated that the following environmental permits, consultations, or other regulatory compliance would be required for future construction and operations on the PNNL–Sequim Campus. Existing permits are identified in the discussion below.

- **NPDES Permit**. Process wastewaters from R&D operations are discharged to Sequim Bay under an existing NPDES permit (WA0040649, administratively extended on December 1, 2022, and remain in effect until Ecology issues a new permit). Water discharged through Outfall 008 is first treated in an onsite wastewater treatment plant. Discharges are sampled, monitored, and reported to WA Ecology in accordance with permit requirements. As research volume and scope evolve, and new facilities and infrastructure are planned, potential impacts on the wastewater treatment system and NPDES permit would be considered and revised permits obtained, if needed.
- **Stormwater/Underground Injection Control Program**. WA Ecology regulates underground injection under WAC 173-218, *Underground Injection Control* (UIC) *Program*, to preserve and protect the waters of the state. UIC infiltration systems may be used for onsite management of stormwater and would be constructed and registered in accordance with WA Ecology requirements.
- **Onsite Septic System Permit**. The existing sanitary sewer from the PNNL–Sequim Campus is routed to an onsite septic system that is currently permitted by Clallam County (SEP76-03675). Future PNNL–Sequim Campus expansion would still incorporate segregation of sanitary liquid waste streams and process wastewater (e.g., from R&D operations). Long-term plans for the PNNL–Sequim Campus incorporate routing sanitary wastewater to the City of Sequim sewer treatment plant, as described in Section 3.1.14.
- **SPCC Plan.** PNNL maintains a SPCC plan to meet federal requirements under 40 CFR 112 (40 CFR Part 112) for facilities that store oil above threshold values and have the potential to discharge oil into navigable waters of the United States. The SPCC plan is in place for diesel fuel storage in backup generators and electrical transformers that support facility operations. As new facilities and infrastructure projects become more defined and planned for the PNNL–Sequim Campus, reviews of the potential impacts of discharges will be evaluated and the SPCC plan will be updated.
- **Drinking Water Operating Permit**. Drinking water for the PNNL–Sequim Campus currently is supplied through a groundwater well adjacent to MSL1. The drinking water system is a Group A Non-Community, Non-Transient system that is permitted under WAC 246-290 (WAC 246-290) by WDOH (#103517, expires 11/2023) and supplies groundwater for PNNL–Sequim Campus domestic, facility operations, and R&D uses. Long-range plans are to eventually connect the PNNL–Sequim Campus facility infrastructure to the City of Sequim municipal water supply system, thereby eliminating the need to maintain the drinking water permit.
- **Construction Stormwater General Permit**. WA Ecology is delegated authority by EPA to implement the water-quality permit. The regulatory drivers are *Water Quality Standards for Groundwaters of the State of Washington* (WAC 173-200), *Water Quality Standards for Surface Waters of the State of Washington* (WAC 173-201A) and the *Clean Water Act* (33 U.S.C. § 1251 et seq.). Construction activities that would disturb more than 1 ac and have the potential to discharge stormwater to a surface water, would be performed in accordance with the Washington State Construction Stormwater NPDES permit. In addition, construction projects would need to develop a

stormwater pollution prevention plan in accordance with the *Stormwater Management Manual for Western Washington* (Ecology 2019d).

- **Energy Independence and Security Act**. Section 438 of the Act (42 U.S.C. § 17001 et seq.) establishes stormwater runoff requirements for federal development or redevelopment projects with a footprint that exceeds 5000 square feet. Site planning, design, construction, and maintenance strategies for the property must be used to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of runoff flow.
- **Radioactive Air Emissions**. WDOH regulates radioactive air emissions under *Radiation Protection—Air Emissions* (WAC 246-247), *Ambient Air Quality Standards and Emission Limits for Radionuclides* (WAC 173-480), and *NESHAP* (40 CFR Part 61 Subpart A; 40 CFR Part 61 Subpart H; and 40 CFR Part 61 Appendix B). PNNL currently maintains a RAEL (RAEL-014, expires 1/1/28) issued by WDOH for R&D activities on the PNNL–Sequim Campus. As new radiological facilities are identified, permit applications identifying anticipated radioactive materials, potential environmental impacts, and proposed control technologies would be submitted under the existing license to WDOH for review and approval.
- **Nonradiological Air Pollutant Notice of Intent (NOI)**. The ORCAA regulations are applicable to nonradiological air emissions from the PNNL–Sequim Campus, and implement the Washington State requirements for *General Regulations for Air Pollution Sources* (WAC 173-400). The existing NOI for the PNNL–Sequim Campus (NOI 13NOI968) is for the use of backup diesel generators to maintain safe R&D operations during unplanned or temporary power outages. Because new facilities and equipment that have the potential to generate air emissions are identified, applications for new authorizations would be submitted to ORCAA for review and approval before a new emission source is constructed.
- **Protection of Plant and Animal Species**. Federal agencies must preserve and protect plant and animal species and their critical habitats to the extent feasible given the agency's mission. The ESA (16 U.S.C. § 1531 et seq.), *Bald and Golden Eagle Protection Act* (16 U.S.C. § 668-668d et seq.), and *Migratory Bird Treaty Act* (16 U.S.C. § 703 et seq.) all identify requirements that must be met to protect native plant and animal species and the ecosystems upon which they depend. DOE must comply with requirements of an approved bald eagle nest take permit for work within the developable zone. Research at the PNNL–Sequim Campus and nearby waters is covered under several existing ESA consultations with NMFS (WCR-2015-3761, WCR-2018-11181) and USFWS (01EWF00-2016-I-0176).
- **Cultural and Historic Resource Protection**. Federal agencies must preserve and protect cultural resources in a spirit of stewardship to the extent feasible given the agency's mission. DOE responsibilities are defined by a number of regulations and policies, including the *NHPA* (54 U.S.C. § 300101 et seq.), the *Archaeological Resources Protection Act of 1979* (16 U.S.C. § 470aa et seq.), the *Native American Graves Protection and Repatriation Act* (25 U.S.C. § 3001 et seq.), and the *DOE Native American Indian and Alaska Native Tribal Government Policy* (DOE 2006). DOE has consulted with the Washington State Historic Preservation Officer and local tribes on numerous actions at and near the PNNL–Sequim Campus.
- **Transportation**. Transportation of hazardous materials on the PNNL–Sequim Campus and shipments to offsite entities is conducted in accordance with 49 CFR *Transportation* requirements (49 CFR).
- **Hazardous and Radioactive Waste**. Hazardous waste generated on the PNNL–Sequim Campus is temporarily accumulated in accordance with the Washington State Dangerous Waste Regulations, WAC Chapter 173-303. Temporary accumulation requirements include centralized accumulation that

is limited to 90 days or less, controls to prevent releases or other hazards, and closure and cleanup of centralized accumulation areas. Hazardous waste is then shipped to offsite facilities for treatment and ultimate disposal. Radioactive waste is managed according to the requirements of the *Atomic Energy Act of 1954* (42 U.S.C. § 2011 et seq.) and DOE Order 435.1, Change 1, *Radioactive Waste Management* (DOE 2001). Radioactive waste is shipped to the Hanford Site or commercial facilities for treatment and ultimate disposal. These practices are not expected to change during the buildout of facilities under this EA. As new facilities are designed, waste accumulation areas shall be factored in to enable compliant management of hazardous and radioactive waste materials.

- **Shoreline Permitting**. Development projects within 200 ft of the shoreline may require shoreline development permits from Clallam County in compliance with the *Washington State Shoreline Management Act*, Revised Code of Washington (RCW) 90.58 (RCW 90.58). Some development and research activities may require certification by WA Ecology for consistency with the *Coastal Zone Management* (16 U.S.C. § 1451 et seq.). Shoreline Substantial Development Permit Exemption SHR-2015-00023 (expires 4/6/23) is maintained for research activities in Sequim Bay.
- **Work in Waterways**. Any work within waters of the United States, such as repair and maintenance of the pier, boat ramp, or intake/outfall structures, as well as various research activities may require a permit issued by the U.S. Army Corps of Engineers under Section 404 of the *Clean Water Act* (33 U.S.C. § 1251 et seq.) and/or Section 10 of the *Rivers and Harbors Act of 1899* (33 U.S.C. § 401 et seq.). A Hydraulic Project Approval, issued by the Washington Department of Fish and Wildlife (WDFW) under RCW 77.55, may also be required (RCW 77.55). The floating dock, the offshore end of the pier, and the intake/outfall structures are located over state-owned aquatic lands. Other research activities also may be located over state-owned aquatic lands. Access to these aquatic lands is controlled by rights-of-entry, aquatic use authorizations, or aquatic leases that are issued by the Washington State Department of Natural Resources under WAC 332-30. For research near the PNNL–Sequim Campus PNNL maintains Army Corps Permit NWS-2015-1063 (expires 4/6/2023), Hydraulic Project Approval 2021-6-36-02 (expires 01/18/2026), and Aquatic lands right of entry 23-093552 (expires 4/6/23). The end of the pier and the floating dock are partly located on WDNR land and are leased under 20-A11988.
- **Water Rights**. The water rights (Claim 121052CL, Permit G2-25585P) for the PNNL–Sequim Campus authorize withdrawal of water from a groundwater well for both domestic and industrial uses. Water is withdrawn from a well located at the Shoreline Facility behind MSL1. Water is withdrawn continuously year-round and is used to supply the PNNL–Sequim Campus with drinking water and freshwater for facility operations and research purposes. The water right issued by WA Ecology limits groundwater withdrawal to 25 ac-ft total per year.

5.0 PUBLIC, AGENCIES, AND TRIBAL GOVERNMENT NOTIFICATIONS

5.1 Public Notice of Intent

On December 17, 2019, DOE sent notifications of its intention to prepare this EA to interested parties on its stakeholder list, and the recipients were invited to send their questions or comments regarding the EA to DOE for consideration. The notification briefly identified an anticipated time frame for the draft EA and a point of contact for questions and comment submittal.

NEPA distribution list:

- William Ron Allen, Jamestown S'Klallam Tribe
- William Armacost, City of Sequim
- Connie Beauvais, Port of Port Angeles
- Maia Bellon, Washington State Department of Ecology
- Linda Benson, League of Women Voters of Clallam County
- Allyson Brooks, Washington State Historic Preservation Officer
- Sissi Bruch, City of Port Angeles
- Steven Burke, Port of Port Angeles
- Charlie Bush, City of Sequim
- Maria Cantwell, Washington State Senate
- Mike Chapman, Washington State Representative
- Francis Charles, Lower Elwha Klallam Tribe
- Raquel Crowley, Washington State Senate
- Rich Doenges, Washington State Department of Ecology
- Mikel Elsen, Washington Department of Health
- Kathy Estes, Clallam County Historical Society
- Dawn Gomez, Hoh Tribe
- Matt Heins, Clallam Conservation District
- Chris Hladick, U.S. Environmental Protection Agency
- Leanne Hom, Washington State Legislature
- John Ides, Makah Tribe
- Brian Jackson, Sequim Chamber of Commerce
- Brandon Janisse, City of Sequim
- Randy Johnson, Clallam County
- Jeremiah Julius, Lummi Nation Tribe
- Bridget Kaminski-Richardson, Washington State Department of Natural Resources State Agency

- Derek Kilmer, U.S. Representative
- Bob Lake, City of Sequim
- Theo Mbabaliye, U.S. Environmental Protection Agency
- Colleen McAleer, Clallam Economic Development Corporation
- Francea McNair, Olympic Region Clean Air Agency
- Ted Miller, City of Sequim
- Patty Murray, Washington State Senate
- Jill Nogi, U.S. Environmental Protection Agency
- Allison O'Brian, Department of Interior
- Dan Opalski, U.S. Environmental Protection Agency
- Mark Ozias, Clallam County
- Bill Peach, Clallam County
- Annika Peterson, Washington State Legislature
- Erik Peterson, U.S. Environmental Protection Agency
- Candace Pratt, City of Sequim
- Pam Sanguinetti, U.S. Army Corps of Engineers
- Fran Sant, Washington State Department of Ecology
- Anji Scalf, Sequim Chamber of Commerce
- Rich Sill, Clallam County
- Dennis Smith, City of Sequim
- Carolyn St. James, Chair of Board
- Jennifer States, City of Sequim
- Peter Steelquist, Washington State Legislature
- Jeromy Sullivan, Port Gamble S'Klallam Tribe
- Annie Szvetecz, Washington State Department of Ecology
- Steve Tharinger, Washington State Legislature
- Kevin Van De Wege, Washington State Senate
- Nathan West, City of Port Angeles
- Judy White, Olympic Peninsula Audubon Society
- Mary Ellen Winborn, Clallam County
- Krishna Wiswanathan, U.S. Environmental Protection Agency
- Doug Woodruff, Quileute Tribe

DOE received no responses or comments as a result of the NOI sent on December 17, 2019 to the distribution list identified above.

5.2 Draft Environmental Assessment Public Review

The Draft EA was posted on the PNSO web page and Requests for Comment on the draft Environmental Assessment were sent on April 15, 2020 to the interested parties listed in Section 5.1. Two comment letters were received, one from WA Ecology and the other from the EPA. These letters and responses to each comment are provided in Appendix B.

Two virtual public meetings were held on May 5, 2020, to discuss and receive public comments on and questions about the EA regarding future development at the PNNL–Sequim Campus. The first meeting went from 2:00 p.m. to 4:00 p.m. and the second meeting went from 7:00 p.m. to 9:00 p.m.; the phone lines were open and available to the public for the entire scheduled time for each meeting. No questions or public comments were received during either of the virtual public meetings.

6.0 REFERENCES

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40 CFR Part 61 Subpart A. *Code of Federal Regulations*, Title 40, *Protection of Environment*, Part 61, "National Emission Standards for Hazardous Air Pollutants," Subpart A, *General Provisions*. U.S. Environmental Protection Agency.

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APPENDIX A – TABLE OF SPECIES AND SCIENTIFIC NAMES

The following table contains the common and scientific names of all the species identified in this environmental assessment.

Common Name	Genus and Species
FAUNA	
Birds	
Bald eagle	*Haliaeetus leucocephalus*
Barred owl	*Strix varia*
Brandt's cormorant	*Phalacrocorax penicillatus*
Brown creeper	*Certhia Americana*
Brown-headed cowbird	*Molothrus ater*
Bufflehead	*Bucephala albeola*
Chestnut-backed chickadee	*Parus rufescens*
Cooper's hawk	*Accipiter cooperii*
Dark-eyed junco	*Junco hyemalis*
Downy woodpecker	*Picoides pubescens*
Evening grosbeak	*Coccothraustes vespertinus*
Golden-crowned kinglet	*Regulus satrapa*
Great blue heron	*Ardea herodias*
Hairy woodpecker	*Picoides villosus*
Marbled murrelet	*Brachyramphus marmoratus*
Mourning dove	*Zenaida macroura*
Olympic gull	*Larus glaucescens x occidentalis*
Pacific-slope flycatcher	*Empidonax difficilis*
Peregrine falcon	*Falco peregrinus*
Red-breasted nuthatch	*Sitta canadensis*
Townsend's warbler	*Dendroica townsendi*
Western tanager	*Piranga ludoviciana*
Wilson's warbler	*Cardellina pusilla*
Mammals	
Black-tailed deer	*Odocoileus hemionus*
Coyote	*Canis latrans*
Mink	*Mustela vison*
Raccoon	*Procyon lotor*
Silver-haired bat	*Lasionycteris noctivagans*
Herpetofauna	
Common garter snake	*Thamnophis sirtalis*
Pacific tree frog	*Pseudacris regilla*
Rough-skinned newt	*Taricha granulosa*
Butterflies and Moths	
Island marble	*Euchloe ausonides insulanus*
Sand-verbena moth	*Copablepharon fuscum*
Taylor's checkerspot butterfly	*Euphydryas editha taylori*

Common Name	Genus and Species
Fish	
Bull trout	*Salvelinus confluentus*
English sole	*Paraphrys vetulus*
Hood Canal summer-run chum salmon	*Oncorhynchus keta*
Jack mackerel	*Trachurus symmetricus*
North American green sturgeon	*Acipenser medirostris*
Northern anchovy	*Engraulis mordax*
Pacific eulachon	*Thaleichthys pacificus*
Pacific herring	*Clupea pallasii*
Pacific mackerel	*Scomber japonicus*
Pacific sardine	*Sardinops sagax*
Pacific staghorn sculpin	*Leptocottus armatus*
Pacific tomcod	*Mircogadus proximus*
Padded sculpin	*Artedius fenestralis*
Puget Sound bocaccio	*Sebastes paucispinis*
Puget Sound Chinook salmon	*Oncorhynchus tshawytscha*
Puget Sound steelhead	*Oncorhynchus mykiss*
Puget Sound yelloweye rockfish	*Sebastes ruberrimus*
Sand lance	*Ammodytes hexapterus*
Sand sole	*Psettichthys melanostictus*
Sharpnose sculpin	*Clinocottus acuticeps*
Spiny dogfish	*Squalus acanthias*
Striped perch	*Embiotca lateralis*
Surf smelt	*Hypomesus pretiosus*
Marine Mammals	
California sea lion	*Zalophus californianus*
Dall's porpoise	*Phocoenoides dalli*
Gray whale	*Eschrichtius robustus*
Harbor porpoise	*Phocoena*
Harbor seal	*Phoca vitulina*
Humpback whale	*Megaptera novaeangliae*
Minke whale	*Balaenoptera acutorostrata*
Northern elephant seal	*Mirounga angustirostris*
Southern resident killer whale	*Orcinus orca*
Marine Invertebrates	
Dungeness crab	*Cancer magister*
European green crab	*Carcinus maenas*
Market squid	*Doryteuthis opalescens*
Oyster	*Ostrea lurida*
Red rock crab	*Cancer productus*

Common Name	Genus and Species
FLORA	
Aquatic	
Eelgrass	*Zostera* spp
Terrestrial	
Bare-stemmed biscuitroot	*Lomatium nudicaule*
Bigleaf maple	*Acer macrophyllum*
Black cottonwood	*Populus trichocarpa*
Blackcap	*Rubus leucodermis*
Blue wild-rye	*Elymus glaucus*
Bursage	*Ambrosia chamissonis*
Chocolate lilies	*Fritillaria affinis*
Common snowberry	*Symphoricarpos albus*
Common yarrow	*Achillea millefolium*
Douglas fir	*Pseudotsuga menziesii*
Grand fir	*Abies grandis*
Hairy cat's ear	*Hypochaeris radicata*
Harsh Indian-paintbrush	*Castilleja hispida*
Indian plum	*Oemleria cerasiformis*
Low glasswort	*Salicornia depressa*
Madrone	*Arbutus menziesii*
Ocean spray	*Holodiscus discolor*
Oregon-grape	*Berberis* spp
Puget Sound gumweed	*Grindelia integrifolia*
Red alder	*Alnus rubra*
Redflowering currant	*Ribes sanguineum*
Rocky Mountain maple	*Acer glabrum*
Rose	*Rosa* spp
Salal	*Gaultheria shallon*
Saskatoon serviceberry	*Amelanchier alnifolia*
Scot's broom	*Cytisus scoparius*
Vine maple	*Acer circinatum*
Western red cedar	*Thuja plicata*
Western swordfern	*Polystichum munitum*
Yellow sand verbena	*Abronia latifolia*

APPENDIX B – COMMENTS ON THE DRAFT PNNL–SEQUIM CAMPUS FUTURE DEVELOPMENT EA AND DOE RESPONSES

Two comment letters were received, one from the Washington State Department of Ecology and the other from the U.S. Environmental Protection Agency. Comments provided in the two comment letters were organized by resources area, and responses to each comment are provided below in Section B.1. Copies of the letters are provided in Section B.2.

B.1 Comments on the Draft EA and DOE Responses

Water Quality Comments

Comment: This facility is covered under Ecology's Industrial NPDES Individual Permit No. WA0040649. If permit modifications occur from the proposed action, then the permit may need to be updated with Ecology. For questions regarding this permit, contact the Industrial Operations Unit of the Water Quality Program within Ecology's Southwest Region Office via (360) 407-6300. (WDOE-1)

Response: The potential need for permit modifications is acknowledged in Section 4.0 of the EA. No changes to the EA were made in response to this comment.

Comment: Erosion control measures must be in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or stormdrains that lead to waters of the state. Sand, silt, clay particles, and soil will damage aquatic habitat and are considered to be pollutants.

Any discharge of sediment-laden runoff or other pollutants to waters of the state is in violation of Chapter 90.48 RCW, Water Pollution Control, and WAC 173-201A, Water Quality Standards for Surface Waters of the State of Washington, and is subject to enforcement action. (WDOE-2)

Response: Section 3.1.4.2 of the EA acknowledges the need for a Construction Stormwater General Permit to proceed with future construction at the site. As noted there, the stormwater pollution prevention plan will identify best management practices that will be followed during construction to control erosion, sediment transport, and water-quality degradation. Section 4.0 of the EA was revised to include the surface water quality standards (WAC 173-201a) as a regulatory driver for the Construction Stormwater General Permit.

Comment: Construction Stormwater General Permit:

The following construction activities require coverage under the Construction Stormwater General Permit:

1. Clearing, grading and/or excavation that results in the disturbance of one or more acres **and** discharges stormwater to surface waters of the State; and
2. Clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more **and** discharge stormwater to surface waters of the State.
    a. This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, **and** discharge to surface waters of the State; and
3. Any size construction activity discharging stormwater to waters of the State that Ecology:

a. Determines to be a significant contributor of pollutants to waters of the State of Washington.

b. Reasonably expects to cause a violation of any water quality standard. (WDOE-3)

Response: Section 3.1.4.2 of the EA acknowledges the need for a Construction Stormwater General Permit to proceed with future construction at the site. No changes to the EA were made in response to this comment.

Comment: If there are known soil/ground water contaminants present on-site, additional information (including, but not limited to: temporary erosion and sediment control plans; stormwater pollution prevention plan; list of known contaminants with concentrations and depths found; a site map depicting the sample location(s); and additional studies/reports regarding contaminant(s)) will be required to be submitted. (WDOE-4)

Response: Section 3.1.4.2 of the EA acknowledges the need for a Construction Stormwater General Permit to proceed with future construction at the site. Consistent with Permit Special Condition S2, application for a permit would include notification of any known contaminated soil or groundwater. No changes to the EA were made in response to this comment.

Comment: Additionally, sites that discharge to segments of waterbodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, high pH, or phosphorous, or to waterbodies covered by a TMDL may need to meet additional sampling and record keeping requirements. See condition S8 of the Construction Stormwater General Permit for a description of these requirements. To see if your site discharges to a TMDL or 303(d)-listed waterbody, use Ecology's Water Quality Atlas at: https://fortress.wa.gov/ecy/waterqualityatlas/StartPage.aspx.

The applicant may apply online or obtain an application from Ecology's website at: http://www.ecy.wa.gov/programs/wq/stormwater/construction/ - Application. Construction site operators must apply for a permit at least 60 days prior to discharging stormwater from construction activities and must submit it on or before the date of the first public notice. (WDOE-5)

Response: The water quality of potentially affected water bodies is described in Section 3.1.4.1 of the EA. Sampling and record-keeping requirements of the Construction Stormwater General Permit, such as those identified in Permit Special Condition S8, will be followed, as applicable. No changes to the EA were made in response to this comment.

Comment: We recommend that that DOE work with Washington State Department of Ecology and affected tribes to ensure that water quality and other water resources are protected. The Final EA should include information on the permit application process and recommended measures to protect water quality from stormwater runoff during construction and should include changes to contributions to the wastewater treatment plant. The Draft EA indicates that water quality may be adversely affected by the project construction activities, so in addition to working with the Ecology on obtaining a proper construction stormwater NPDES permit, as the Draft EA indicates, we recommend working with Ecology to discuss changes to wastewater treatment plant operations. (EPA-1)

Response: As described in Section 3.4.1.2 (and other sections) of the EA, future construction and operation activities at the site will follow the requirements of applicable permits to minimize water quality impacts on potentially affected water bodies. The application process for coverage under the Construction Stormwater General Permit is described by the Washington Department of Ecology (https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Construction-stormwater-permit) and is not repeated in the EA. The existing wastewater treatment plant is used to treat laboratory process water prior to discharge to Sequim Bay. As described

in Section 2.1.7 of the EA, if future development at the site results in the capacity of the treatment plant being exceeded, DOE would modify the onsite treatment system and NPDES permit or work with the City of Sequim to develop a process for discharging to the city sewer system if the discharge meets wastewater permitting limits set by the city. In addition, process and sanitary wastewater systems would continue to be segregated within each facility as part of the design process. Any changes affecting the NPDES permit would be made in consultation with the Washington Department of Ecology. Tribal consultations are discussed in EA Section 3.1.5. No changes to the EA were made in response to this comment.

Comment: With the expansion proposed in the Draft EA, there will be more wastewater and process water generated that will flow to the wastewater treatment plant. We recommend working with Ecology to confirm that the new operations do not exceed the permitted capacity. Exceeding the WWTP capacity can lead to operational failures such as overflows and permitted effluent limit exceedances due to inadequate treatment, which would negatively impact Sequim Bay. (EPA-2)

Response: As described in Section 2.1.7 of the EA, if future development at the site results in the capacity of the treatment plant being exceeded, DOE would modify the onsite treatment system and NPDES permit or work with the City of Sequim to develop a process for discharging to the city sewer system if the discharge meets wastewater permitting limits set by the city. In addition, process and sanitary wastewater systems would continue to be segregated within each facility as part of the design process. Any changes affecting the NPDES permit would be made in consultation with the Washington Department of Ecology. No changes to the EA were made in response to this comment.

Comment: We appreciate the information about the current status of adjacent Sequim Bay and other nearby waterbodies (Lower Bell Creek, the tidal lagoon, and the Strait of Juan de Fuca) provided in the Draft EA. Please note that antidegradation provisions of the Clean Water Act and the State of Washington water quality standards apply to Sequim Bay, therefore we recommend DOE works with Ecology to make sure that water quality is maintained or improved in Sequim Bay. The Draft EA states that Lower Bell Creek is impaired for dissolved oxygen, bacterial, and biological integrity water quality standard exceedances; the tidal lagoon and the Strait of Juan de Fuca are impaired for aquatic life due to algae growth. We encourage DOE to work with Ecology to ensure that the proposed project does not further degrade water quality in these impaired waters. (EPA-3)

Response: As described in Sections 2.1.6 and 3.1.4.1 of the EA, current discharges to Sequim Bay are permitted by a Washington Department of Ecology NPDES permit. As described in Section 3.1.4.1 of the EA, Sequim Bay adjacent to the PNNL–Sequim Campus currently meets all water-quality standards for the designated uses. In addition, no permit exceedances for water quality have been observed during discharge monitoring (2012 to 2019). As described in Section 3.1.4.2 of the EA, future process water discharges to Sequim Bay are expected to be similar to current discharges and would continue to be subject to permit requirements, including discharge limits and monitoring. Future discharges are expected to comply with the antidegradation provisions of Washington State surface water quality standards (WAC 173-201A).

Comment: We encourage considerations for zero or low impact development techniques in project design due to their potential to reduce stormwater volumes and mimic natural conditions. Examples include:

- Minimizing creation of new impervious surface;
- Maximizing use of pervious pavement;
- Avoiding building over groundwater recharge areas; and

- De-paving areas as mitigation for any new impervious surfaces needed for the project, to achieve no net increase in pollution generating impervious surface.

These techniques can lessen the impacts of stormwater runoff from impervious surfaces and can provide energy and other utility savings. Under Section 438 of the Energy Independence and Security Act, federal agencies are required to reduce stormwater runoff from federal development projects in order to protect water resources. The EPA Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of EISA can be accessed online. (EPA-4)

Response: Sections 3.1.4.2 and 4.0 of the EA were revised to acknowledge the requirements of Section 438 of the EISA of 2007 with respect to stormwater runoff.

Air Quality Impacts

Comment: The Draft EA describes the current air quality conditions in the project area and indicates that the project is within an area designated as an unclassified/attainment area. We recommend that the DOE maximizes the implementation of mitigation measures described in the Draft EA in order to reduce the emissions associated with the proposed project. We also recommend that the DOE continues to coordinate with other entities in the area, especially Ecology, to ensure that the project would meet both the state requirements and the National Ambient Air Quality Standards throughout the project's life cycle. Air quality may be impacted due to cumulative impacts from other activities (e.g., road construction and site operations, traffic on unpaved roads, local traffic emissions, use of woodstoves, agriculture, fire, civilian air traffic), so we recommend air quality be monitored locally and corrective measures be taken to prevent exceedances. (EPA-5)

Response: Mitigation measures to reduce air emissions during construction are discussed in the EA Section 3.1.2.2 and include fugitive dust controls, such as frequent watering and application of dust adhesion products to disturbed lands to limit local impacts from dust. Engine exhaust from construction equipment would be mitigated by the use of equipment meeting federally regulated engine design standards and associated fuels; these emissions would be intermittent and temporary. Air emissions from operations would be primarily from permitted emergency diesel engines; these emissions would be mitigated through short-duration usage, engine design standards, and operating procedures including the use of low-sulfur fuel, opacity monitoring, and engine maintenance requirements. Collectively, the use of these mitigation measures is intended to assure air emissions meet local, state, and federal air requirements over the project's life cycle. No changes were made to the EA as a result of this comment.

Land-Use and Farmland Impacts

Comment: The Draft EA states that there would be disturbance of soils classified as prime farmland during construction to convert 5 acres into other uses (e.g., research facilities). Because of the project's potential impacts to prime farmland, we recommend DOE coordinate with the Farm Service Agency and the Natural Resources Conservation Service and/or USDA Service Center in assessing project impacts to farmlands and determine measures for avoiding and minimizing any significant impacts. We recommend the Final EA include information about consultation with other agencies and planned activities to restore farmlands and compensate any owner for losses incurred due to the project. (EPA-6)

Response: Section 3.1.3.2 indicates that up to 5 ac of soils designated as prime farmland would be permanently altered by planned construction. However, this section also states that farming use is unlikely because the land is currently part of the PNNL–Sequim Campus and designated as a research park within the Sequim Urban Growth Area. Section 3.1.1.1 indicates that development of the affected land is governed by the Sequim-Dungeness Regional Plan. No agricultural use has been or is currently

occurring on the affected 5 ac, nor is it likely as a future use, based on the governing land use plan. Thus, no need exists to compensate any owner for, or to restore, lost farmland production potential. No changes to the EA were made as a result of this comment.

Cultural Resources

Comment: Because the proposed project may impact cultural resources, we recommend that the Final EA discuss the results of the Memorandum of Understanding development discussion and document the State Historic Preservation Office's recommended measures protecting the cultural and historical resources from project impacts. We appreciate that DOE is developing this MOU and is also undertaking a National Historic Preservation Act Section 106 consultation and assessment and establishing a No Development Zone and No Activity Zone from NHPA consultation. We encourage DOE to include in the Final EA outcomes of that work and recommended measures to protect cultural resources in the project area. (EPA-7)

Response: A Memorandum of Agreement was completed between DOE, the State Historic Preservation Officer, and the consulting parties. The EA was updated to reflect the completion of this agreement.

Permits and Other Authorizations

Comment: We appreciate that the Draft EA discusses several permits and other regulatory requirements that the project has or would obtain in Section 4.0 of the Draft EA, and we recommend that the Final EA include updated information on the various permits, approvals, and authorizations. The additional information could include the current status, expected issuance and expiration dates, and recommended measures to ensure protection of human health and the environment. This information will assist in understanding the risks posed by the project and required measures to address those risks. (EPA-8)

Response: Applicable permit numbers and expiration dates have been added to the text in Section 4. Most of these permits are for the current operation of the PNNL–Sequim Campus Facilities and for research conducted on or in the vicinity of the campus. These permits will be renewed when required and modified as needed to include new facilities as they are built, but it is expected that the basic permit requirements will not change. Other permits, such as stormwater control, will be obtained as needed and are expected to include requirements specific to each development project.

B.2 Original Comment Letters

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

May 15, 2020

Theodore P. Pietrok, Acting Manager
US Department of Energy
Pacific Northwest Site Office
PO Box 350, K9-42
Richland, WA 99352

Dear Theodore P. Pietrok:

Thank you for the opportunity to comment on the National Environmental Policy Act (NEPA) Draft Environmental Assessment for the Pacific Northwest National Laboratory (PNNL) Sequim Campus Future Development Project (DOE/EA-2130) located in Clallam County, Washington. The Department of Ecology (Ecology) reviewed the information provided and has the following comment(s):

WATER QUALITY/INDUSTRIAL OPERATIONS UNIT:
Steve Eberl, Unit Supervisor

This facility is covered under Ecology's Industrial NPDES Individual Permit No. WA0040649. If permit modifications occur from the proposed action, then the permit may need to be updated with Ecology. For questions regarding this permit, contact the Industrial Operations Unit of the Water Quality Program within Ecology's Southwest Region Office via (360) 407-6300.

WATER QUALITY/WATERSHED RESOURCES UNIT:
Sheila Marcoe, Unit Supervisor (360) 407-6329

Erosion control measures must be in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or stormdrains that lead to waters of the state. Sand, silt, clay particles, and soil will damage aquatic habitat and are considered to be pollutants.

Any discharge of sediment-laden runoff or other pollutants to waters of the state is in violation of Chapter 90.48 RCW, Water Pollution Control, and WAC 173-201A, Water Quality Standards for Surface Waters of the State of Washington, and is subject to enforcement action.

Construction Stormwater General Permit:
The following construction activities require coverage under the Construction Stormwater General Permit:

1. Clearing, grading and/or excavation that results in the disturbance of one or more acres **and** discharges stormwater to surface waters of the State; and
2. Clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more **and** discharge stormwater to surface waters of the State.
   a) This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, **and** discharge to surface waters of the State; and
3. Any size construction activity discharging stormwater to waters of the State that Ecology:
   a) Determines to be a significant contributor of pollutants to waters of the State of Washington.
   b) Reasonably expects to cause a violation of any water quality standard.

If there are known soil/ground water contaminants present on-site, additional information (including, but not limited to: temporary erosion and sediment control plans; stormwater pollution prevention plan; list of known contaminants with concentrations and depths found; a site map depicting the sample location(s); and additional studies/reports regarding contaminant(s)) will be required to be submitted.

Additionally, sites that discharge to segments of waterbodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, high pH, or phosphorous, or to waterbodies covered by a TMDL may need to meet additional sampling and record keeping requirements. See condition S8 of the Construction Stormwater General Permit for a description of these requirements. To see if your site discharges to a TMDL or 303(d)-listed waterbody, use Ecology's Water Quality Atlas at: https://fortress.wa.gov/ecy/waterqualityatlas/StartPage.aspx.

The applicant may apply online or obtain an application from Ecology's website at: http://www.ecy.wa.gov/programs/wq/stormwater/construction/ - Application. Construction site operators must apply for a permit at least 60 days prior to discharging stormwater from construction activities and must submit it on or before the date of the first public notice.

Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action.

If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above.

Theodore P. Pietrok
May 15, 2020
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Department of Ecology
Southwest Regional Office

(MLD: 202002012)

cc: Steve Eberl, Ecology WQ/IOU
Sheila Marcoe, Ecology WQ/WRU
Tom McDermott, U.S. DOE PNW Operations Division
Genevra E. Harker-Klimes, PNNL (Proponent)
Nichole K. Sather, PNNL (Contact)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101-3188

REGIONAL
ADMINISTRATOR'S
DIVISION

May 14, 2020

Tom McDermott, Operations Division
U.S. Department of Energy
Pacific Northwest Site Office
PO Box 350, K9-42
Richland, Washington 99352

Dear Mr. McDermott:

The U.S. Environmental Protection Agency has reviewed the Department of Energy's April 2020 Draft Environmental Assessment for the proposed Pacific Northwest National Laboratory Sequim Campus Future Development project (EPA Region 10 Project Number 20-0018-DOE) in Clallam County, WA. Our review was conducted in accordance with our responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act.

The Draft EA evaluates the potential environmental impacts associated with the construction and operation of multiple buildings including laboratory space and associated infrastructure for research and development capabilities at the PNNL Sequim Campus over the next 20 years. The PNNL Sequim Campus covers about 117 acres. The project would provide new laboratory and office space and new or remodeled facilities and associated infrastructure. The proposed project would allow the DOE to meet its goals to provide the necessary infrastructure to meet its strategic research objectives.

Most of the impacts of the project are related to expansion and construction activities, which would generate both temporary and permanent environmental impacts. We therefore recommend that the Final EA include more clarifying information as discussed in the following comments.

Water Quality Impacts
We recommend that that DOE work with Washington State Department of Ecology and affected tribes to ensure that water quality and other water resources are protected. The Final EA should include information on the permit application process and recommended measures to protect water quality from stormwater runoff during construction and should include changes to contributions to the wastewater treatment plant. The Draft EA indicates that water quality may be adversely affected by the project construction activities, so in addition to working with the Ecology on obtaining a proper construction stormwater NPDES permit, as the Draft EA indicates, we recommend working with Ecology to discuss changes to wastewater treatment plant operations. With the expansion proposed in the Draft EA, there will be more wastewater and process water generated that will flow to the wastewater treatment plant. We recommend working with Ecology to confirm that the new operations do not exceed the permitted capacity. Exceeding the WWTP capacity can lead to operational failures such as overflows and permitted effluent limit exceedances due to inadequate treatment, which would negatively impact Sequim Bay.

We appreciate the information about the current status of adjacent Sequim Bay and other nearby waterbodies (Lower Bell Creek, the tidal lagoon, and the Strait of Juan de Fuca) provided in the Draft

EA.[1] Please note that antidegradation provisions of the Clean Water Act and the State of Washington water quality standards apply to Sequim Bay, therefore we recommend DOE works with Ecology to make sure that water quality is maintained or improved in Sequim Bay.[2,3] The Draft EA states that Lower Bell Creek is impaired for dissolved oxygen, bacterial, and biological integrity water quality standard exceedances; the tidal lagoon and the Strait of Juan de Fuca are impaired for aquatic life due to algae growth. We encourage DOE to work with Ecology to ensure that the proposed project does not further degrade water quality in these impaired waters.

We encourage considerations for zero or low impact development techniques in project design due to their potential to reduce stormwater volumes and mimic natural conditions. Examples include:

- Minimizing creation of new impervious surface;
- Maximizing use of pervious pavement;
- Avoiding building over groundwater recharge areas; and
- De-paving areas as mitigation for any new impervious surfaces needed for the project, to achieve no net increase in pollution generating impervious surface.

These techniques can lessen the impacts of stormwater runoff from impervious surfaces and can provide energy and other utility savings. Under Section 438 of the Energy Independence and Security Act, federal agencies are required to reduce stormwater runoff from federal development projects in order to protect water resources. The EPA Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of EISA can be accessed online.[4]

Air Quality Impacts

The Draft EA describes the current air quality conditions in the project area and indicates that the project is within an area designated as an unclassified/attainment area. We recommend that the DOE maximizes the implementation of mitigation measures described in the Draft EA in order to reduce the emissions associated with the proposed project. We also recommend that the DOE continues to coordinate with other entities in the area, especially Ecology, to ensure that the project would meet both the state requirements and the National Ambient Air Quality Standards throughout the project's life cycle. Air quality may be impacted due to cumulative impacts from other activities (e.g., road construction and site operations, traffic on unpaved roads, local traffic emissions, use of woodstoves, agriculture, fire, civilian air traffic), so we recommend air quality be monitored locally and corrective measures be taken to prevent exceedances.

Land Use and Farmland Impacts

The Draft EA states that there would be disturbance of soils classified as prime farmland during construction to convert 5 acres into other uses (e.g., research facilities).[5] Because of the project's potential impacts to prime farmland, we recommend DOE coordinate with the Farm Service Agency and the Natural Resources Conservation Service and/or USDA Service Center in assessing project impacts to farmlands and determine measures for avoiding and minimizing any significant impacts. We recommend the Final EA include information about consultation with other agencies and planned activities to restore farmlands and compensate any owner for losses incurred due to the project.

[1] Draft EA, p. 3-8
[2] 40 CFR § 131.12
[3] https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-quality-standards/Antidegradation
[4] https://www.epa.gov/greeningepa/technical-guidance-implementing-stormwater-runoff-requirements-federal-projects
[5] Draft EA, p. 3-7

Impacts on Cultural and Heritage Resources
Because the proposed project may impact cultural resources, we recommend that the Final EA discuss the results of the Memorandum of Understanding development discussion and document the State Historic Preservation Office's recommended measures protecting the cultural and historical resources from project impacts. We appreciate that DOE is developing this MOU and is also undertaking a National Historic Preservation Act Section 106 consultation and assessment and establishing a No Development Zone and No Activity Zone from NHPA consultation.[6] We encourage DOE to include in the Final EA outcomes of that work and recommended measures to protect cultural resources in the project area.

Permits and other authorizations
We appreciate that the Draft EA discusses several permits and other regulatory requirements that the project has or would obtain in Section 4.0 of the Draft EA, and we recommend that the Final EA include updated information on the various permits, approvals, and authorizations. The additional information could include the current status, expected issuance and expiration dates, and recommended measures to ensure protection of human health and the environment. This information will assist in understanding the risks posed by the project and required measures to address those risks.

Thank you for the opportunity to comment on this Draft EA. If you have questions about our review, please contact Caitlin Roesler of my staff at (206) 553-6518 or at roesler.caitlin@epa.gov, or you may contact me at (206) 553-1774 or by email at chu.rebecca@epa.gov.

Sincerely,

Rebecca Chu

Rebecca Chu, Acting Chief
Policy and Environmental Review Branch

[6] Draft EA, p. 3-19

U.S. Department of Energy
Finding of No Significant Impact

Pacific Northwest National Laboratory
Sequim Campus Future Development
(DOE/EA-2130)

AGENCY: U.S. Department of Energy

ACTION: Finding of No Significant Impact

DESCRIPTION OF THE PROPOSED ACTION

Proposed Action: The United States Department of Energy (DOE) would construct and operate multiple buildings on the Pacific Northwest National Laboratory (PNNL) Sequim Campus, including research laboratories, office space, and support buildings over the next twenty years. The development of the PNNL-Sequim Campus would be bounded by the 2020 PNNL-Sequim Campus Master Plan (CMP). Per the PNNL-Sequim CMP, the future development of the campus could provide approximately 81,000 gross square feet of laboratory and office spaces over the next twenty years.

The Proposed Action also includes:

- The continued occupation, use, refurbishment, and maintenance of existing facilities as needed.
- Associated site preparation, utilities, infrastructure, landscaping, and standard environmental protection measures.
- Potential decontamination and demolition of buildings that DOE determines no longer support mission needs.
- Potential lease of property to other entities for development compatible with the PNNL Sequim Campus Master Plan.

Purpose and Need: To meet the long-term federal agency mission need to enable discovery and advance science, DOE needs to provide laboratory space and associated infrastructure for existing and future research and development capabilities at the PNNL Campus located in Sequim, Washington.

Alternatives: In addition to the No Action Alternative, DOE considered leasing private facilities as an alternative to meet DOE's long-term mission needs. The lack of adequate facilities in the Sequim area as well as the potential loss of research synchronicity led to the ultimate dismissal of this alternative. As such, potential environmental impacts associated with this alternative were not evaluated in detail.

Potential Environmental Impacts Associated with the 20-Year Potential Buildout of the PNNL–Sequim Campus and the No-Action Alternative Compared to Existing Conditions

Impact Area	Proposed Alternative	No-Action Alternative
Land Use	Approximately 2.7 hectares (6.6 acres) of undeveloped land in the upland area could change from forest to build new facilities. No change in land use on the shoreline or other undeveloped part of the campus.	No Change
Air quality	Dust generation and diesel emissions during construction. Chemical and radiological emissions during operation of new facilities would be similar to or a very small increase compared to existing conditions.	No Change
Soils and Geological Resources	Some soils classified as prime farmland would be disturbed by construction.	No Change
Water Resources	Water use provided by the City of Sequim would be a small fraction (about 0.1 percent) of the City's existing demand. Average groundwater use from the existing PNNL–Sequim Campus well would increase about 11 percent, and would be within the well yield. Therefore, the Proposed Action would have a small impact on water resources.	No Change
Cultural and Historic Resources	Development of uplands area, installation of new water/sewer lines, and excavation outside of the existing building footprints along the shoreline could disturb archaeological resources. A "no development zone" in the uplands, Travis Spit, and Bugge Spit, and a "no activity zone" at the shoreline have been designated to help minimize disturbance of cultural resources.	No Change
Aquatic Ecology Resources	The installation of new piles would cause temporary noise impacts to marine mammals and fish, and also temporary reductions in water and sediment quality. But will ultimately result in long-term improvements in water and sediment quality for both benthic biota and fish. Replacement of some pier decking would increase light penetration to permanently benefit aquatic vegetation and fish, while pier decking that would not be replaced would continue to have permanent adverse effects on aquatic vegetation and fish. The above beneficial and adverse species and habitat effects also extend to some Endangered Species Act (ESA)-listed species, critical habitat, and essential fish habitat, despite the implementation of Best Management Practices and conservation measures. Overall, short-term project impacts to nearshore habitat quality, quantity, or function would be offset by long-term project improvements. No impacts on wetlands from construction or operation.	No Change
Terrestrial Ecology Resources	Development in the uplands could remove up to 2.7 hectares (6.6 acres) of coniferous forest which would disturb marginally suitable nesting habitat for marbled murrelets, an ESA-listed species, and a bald eagle nest site. Noise from construction would cause a minor, short-term impact on wildlife.	No Change
Socioeconomics	Negligible impacts of construction or operation on the local economy, small reduction in county tax revenue if the potential transfer of facilities to DOE ownership occur that would be offset by increased investment in the campus and community.	No Change
Environmental Justice	No Change	No Change
Traffic and Transportation	Small increase in traffic on local roads due to construction workers and new permanent staff.	No Change
Human Health and Safety	Estimated 1.25 injuries per year due to construction, and one injury per year to PNNL–Sequim Campus staff. There would be negligible changes in chemical or radiological health impacts.	No Change
Visual Resources	New facilities would be visible to viewers to the east and south of the PNNL–Sequim Campus; this would not be a noticeable reduction in aesthetic quality compared to the baseline.	No Change

Impact Area	Proposed Alternative	No-Action Alternative
Noise and Vibration	Short-term higher noise levels during construction, no change during operation of new facilities.	No Change
Waste Generation and Disposition	Waste generation would increase proportionately with the increase in building square footage and staffing levels. The potential increase would not strain local disposal processes or capacities.	No Change
Accidents	No Change	No Change
Intentional Destructive Acts	No Change	No Change
Environmental Sustainability	No Change	No Change
Irreversible and Irretrievable Commitment of Resources	Construction would consume resources such as concrete, lumber, steel, diesel, etc., and remove forest habitat and potentially disturb cultural resources. Operation of new facilities would consume additional electricity, water, and fuel.	No Change

PUBLIC COMMENT ON THE DRAFT ENVIRONMENTAL ASSESSMENT (EA)

On April 15th, 2020, DOE announced, via e-mail, the availability of the draft Environmental Assessment (EA) for a 30-day review period and the scheduling of two virtual public meetings to various stakeholders, interested parties, and government offices.
Two virtual public meetings were held on May 5th, 2020. The first went from 2:00 p.m. to 4:00 p.m. and the second meeting went from 7:00 p.m. to 9:00 p.m. The public meetings were held virtually due to the ongoing COVID-19 pandemic.
No comments were received during the public meetings, however, correspondence containing comments in the noted subject areas was received from the following entities. Responses to these comments are in Appendix B of the EA.:

Washington Department of Ecology
- Water Quality and Stormwater Management

Environmental Protection Agency
- Water Quality
- Air Quality
- Land-Use and Farmland Impacts
- Cultural Resources
- Permits and Other Authorizations

MITIGATION

A Memorandum of Agreement (MOA) was completed to resolve adverse effects to historic properties that could occur as part of the proposed action. The MOA includes various mitigation stipulations that shall be carried out over the life of the MOA.

DETERMINATION

The EA for PNNL Sequim Campus Future Development is hereby approved. Based on the analysis contained therein, consideration of comments received on the draft, and mitigation commitments, DOE has determined that the Proposed Action does not constitute a major Federal action that would individually or cumulatively have a significant effect on the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA) of 1969, 42 U.S.C 4321 et seq.

Therefore, preparation of an environmental impact statement is not required. With this determination, DOE may proceed with the Proposed Action.

Although NEPA compliance on the Proposed Action has been achieved through preparation of the EA, most or all projects within the scope of the EA would fall within the bounds of 10 Code of Federal Regulations, Section 1021, Subpart D, Appendix B; Categorical Exclusions Applicable to Specific Agency Actions, assuming, B. Conditions That Are Integral Elements of the Classes of Actions in Appendix B, are met. To ensure the Proposed Action, as implemented, retains compliance, an evaluation shall be performed prior to the implementation decision for each new proposed development project to determine whether the scope and any associated impacts would be bounded by the scope and impacts described in the EA. Additional NEPA review shall be conducted if it is determined that a new development proposal would not fall within the scope of the proposed action described in Section 3.1(including sub-sections) or the environmental impacts would be substantially different than those described in Section 5.2 (including sub-sections).

Issued in Richland, Washington, this 27th day of December 2022.

Theodore P. Pietrok

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Date: 2022.12.27 08:29:47 -08'00'

Theodore Pietrok
US Department of Energy,
Pacific Northwest Site Office,
Acting Site Office Manager

PUBLIC AVAILABILITY

The EA may be viewed on-line at https://science.energy.gov/pnso/nepa-documents/pnso- ea-eis/.

Physical copies of the EA may be provided by contacting:
PNSO Manager
U.S. Department of Energy
Pacific Northwest Site Office
Richland, WA 99352
Telephone: 509-372-4005 (or x4365)
E-Mail: pnsomanager@science.doe.gov

For further information regarding the PNNL Sequim Campus Future Development Environmental Assessment process or the DOE NEPA process in general, contact:

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