Pacific Northwest NATIONAL LABORATORY

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U.S. DEPARTMENT OF ENERGY

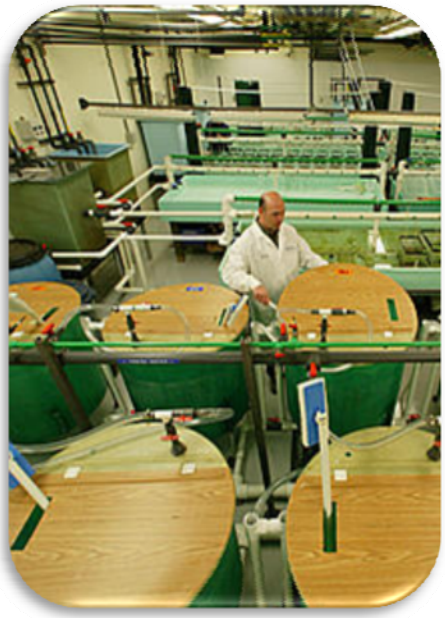
Sequim Marine Sciences Laboratory Water Resources

The Marine Sciences Laboratory, located in Sequim, Washington on the Strait of Juan de Fuca, provides an ideal platform for marine and freshwater ecological research, instrument and method development, and biotechnology research. The lab has regional access to oceans and rivers that have experienced human impacts ranging from the uninhabited and protected coastlines of Olympic National Park to heavily developed shores around Seattle and Tacoma.

Primary Laboratory Features

- Pristine seawater and deep aquifer freshwater sources
- 5300 ft^2 of wet/bioassay laboratories supplied with seawater and freshwater
- Over 6,000 ft^2 of additional analytical and general purpose lab space
- Flexible test and exposure system configurations, including temperature and light regimes
- Two certified aquatic animal isolation facilities for infectious disease work and Biosafety Level 2 (BSL2) laboratories
- A variety of indoor and outdoor tank configurations that can be used as large-scale outdoor mesocosm systems and for other studies using aquatic plants and animals.
- A state-of-the-art wastewater treatment system
- An atmospherically controlled greenhouse plumbed with both freshwater and seawater and connected to the wastewater treatment system.

The facility at Sequim is part of the U.S. Department of Energy's Pacific Northwest National Laboratory (PNNL) operated by Battelle Memorial Institute.



Capacity

The Marine Research Operations' Wet Laboratory provides a large space in which to perform innovative, water-oriented research. High quality, Class AA seawater is obtained from Sequim Bay through an all-PVC system with two independent intakes providing a continuous supply of filtered and unfiltered seawater. An emergency generator ensures continuous seawater supply and other essential services in the event of electrical failure. Seawater is filtered through a sand bed to approximately 35 µm at up to 100 gpm. Additional cartridge filtration can provide filtration to 0.45 µm at approximately 0.5 gpm. Seawater at ambient temperature (generally 9ºC to 11ºC) can be provided at a rate of 250 gpm, and up to 20 gpm of seawater can be supplied at heated temperatures. Cooling is possible for indoor experiments. Freshwater is supplied to the laboratories from an uncontaminated artesian well. Up to 30 gpm of freshwater can be supplied at temperatures ranging from 11ºC to 30ºC. Seawater and freshwater can be mixed in two head tanks to provide for flow-through testing at a variety of salinities.

Water tables and experimental lab space can be reconfigured to suit the needs of individual studies. Lighting can be automated to provide various day/night scenarios. Two isolation facilities are available for work involving infectious disease, radiological or hazardous wastes. Tanks of various sizes are used for a wide variety of studies. Existing outdoor tanks range in size from 33 gal to over 16,400 gal. Indoor experiments are currently conducted at a wide range of scales ranging from test tubes to tanks in excess of 350 gal.

Wastewater Treatment

All water leaving the laboratory is passed through a centralized wastewater treatment facility to remove chemical and biologic agents from laboratory wastewater and to ensure no impact is made on the receiving environment. The system is designed to operate at continuous wastewater flow rates of up to 250 gpm.

The Wastewater Treatment System has the following features:

- Capture areas for chemical treatment;
- Removal of particulates through sedimentation and filtration to 100 µm;
- Disinfection of biological agents and breakdown of organics using ozonation;
- Removal of organics and disinfection byproducts through a 10,000-lb granular activated carbon (GAC)bed

Visiting the Sequim Marine Sciences Laboratory

Visits to the Sequim facility are by appointment only. All approved visitors must be badged and escorted.

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