

Science.
Technology.
Innovation.

Solving Complex Issues of Water Quality and Quantity

The concerns of plentiful energy and a healthy environment meet at the water's edge

From local concerns about breaching four hydropower dams on the Snake River to international concerns about water availability, water issues are increasingly influencing our daily lives and choices.

At Pacific Northwest National Laboratory (PNNL), our scientists, engineers, and planners are finding new ways to restore, protect, and sustain water resources. Our expertise and technology advances are helping our government and private clients solve complex issues of water quality and quantity.

Key capabilities

- ◆ Watershed hydrology
- ◆ Water resource modeling
- ◆ Hydrogeology
- ◆ Data visualization
- ◆ Remote sensing and GIS
- ◆ Marine chemistry
- ◆ Water and sediment quality
- ◆ Marine and fresh water ecology
- ◆ Ecotoxicology
- ◆ Contaminant fate and transport

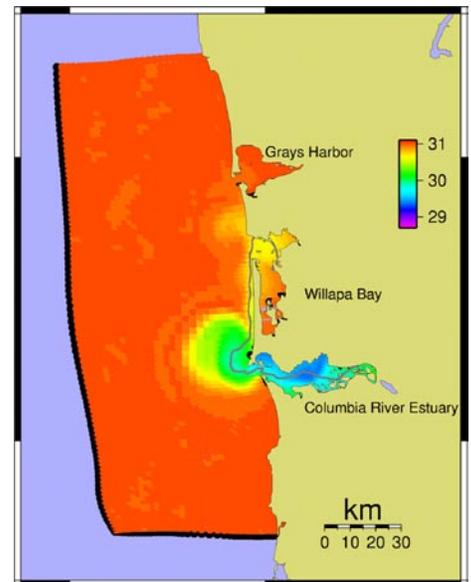
Make Informed Decisions About Water and Energy Tradeoffs

Government resource managers who must balance water uses and energy production have relied on PNNL's research and technology to provide a sound scientific basis for decision making. PNNL develops innovative sensor and data fusion systems to monitor and assess water, energy, and natural resources. On the Columbia River, PNNL provides reliable, verified data on fish passage to help the Army Corps of Engineers, Bonneville Power Administration, and others meet regulations and legal mandates as well as resolve stakeholder concerns.

To enhance the decision-making process, PNNL researchers develop and use hydrologic and hydrodynamic modeling systems to predict the consequences of possible alternatives. Our modeling work ranges from simple one-dimensional river flow, effluent dilution, and watershed runoff models to complex three-dimensional hydrodynamic, water quality and chemical fate and transport models, and distributed, coupled ground and surface water hydrologic models. PNNL can also link water models to other environmental models, creating integrated data systems for climatic and ecological forecasting.

Make Informed Decisions About Water Quality

For our clients, PNNL's capabilities have contributed significantly to managing water resources and to detecting, treating, and using impaired waters.



PNNL conducts 3-D surface water modeling. The plot of a section of the Washington-Oregon coast shows the estimated surface salinity for a condition with northward winds and moderate Columbia River discharge. The gray line shows a simulated float trajectory.

Pacific Northwest National Laboratory

Operated by Battelle for the
U.S. Department of Energy



For more than 40 years, our researchers have extensively monitored, analyzed, and modeled groundwater and surface water at the U.S. Department of Energy's Hanford Site, a former nuclear materials production complex.

Plan for Sustainable, Affordable Growth

Sustaining water resources for competing demands requires careful planning and the ability to forecast changes in water quality and quantity. PNNL researchers work with water resource managers to help them assess the tradeoffs between conflicting objectives.

In a recent project for the Tulalip Tribes, our researchers developed a computational infrastructure to identify appropriate adaptive management actions for climate change impacts in Puget Sound. For King County in Washington State, they are creating a model that simulates the potential impacts of urban activities, including population growth, on the area's watersheds, rivers, lakes and estuaries.

Protect Water Resources from Adversaries

Protecting coastlines, rivers, aquifers, and reservoirs is not only an environmental priority but a security priority as well. For our clients, PNNL researchers develop methods, including biosensors, to detect and monitor pathogens in water. As part of a coastal security program, PNNL scientists are developing

advanced methods for detecting weapons and then integrating, modeling, and communicating the information to decision-makers and responders.

Restore Coastlines

Off of sandy beaches and rocky coasts, human activities can adversely affect marine ecosystems. For government agencies, our researchers conduct coastal restoration projects, including planning, implementation, assessing performance, performing adaptive management, and disseminating results. Drawing upon remote sensing technologies, modeling, and extensive field experience, our coastal restoration experts help reduce the impact of ferry terminal construction and maintenance.

Bring Us Your Problems

Researchers at PNNL, an Office of Science laboratory within the U.S. Department of Energy, are advancing the frontiers of scientific knowledge and rapidly translating their discoveries into innovative technologies. Using facilities in Sequim, Seattle, and Richland, PNNL combines innovation with experience to solve challenges in the environment, energy, and national security for government and private clients.

We have easy contracting methods for government agencies, and through Battelle, which operates PNNL for DOE, we can also conduct research for private companies. Contact us today!

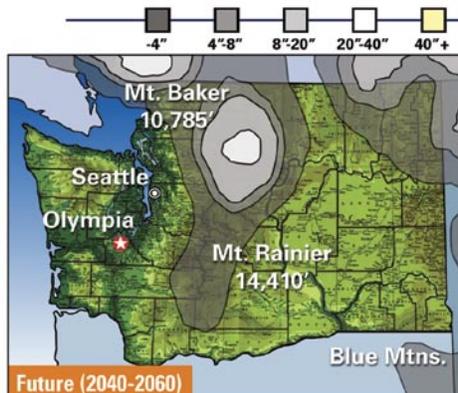
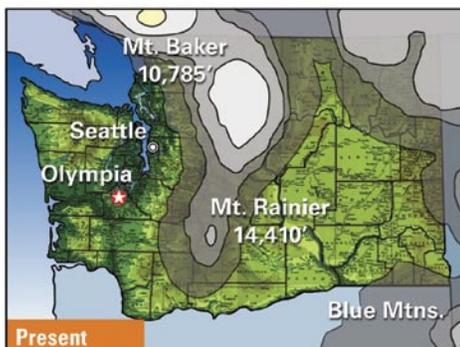


To help transportation agencies and private businesses comply with regulations and reduce adverse effects, PNNL researchers provide information to support eco-friendly docks and ferry terminals.

Key clients

- ◆ Army Corps of Engineers
- ◆ Avista Energy
- ◆ Bonneville Power Administration
- ◆ Department of Defense
- ◆ Department of Energy
- ◆ Department of Homeland Security
- ◆ Environmental Protection Agency
- ◆ Idaho Power Company
- ◆ Mexican National Petroleum Corporation
- ◆ National Oceanic and Atmospheric Administration
- ◆ National Aeronautics and Space Administration
- ◆ Portland General Electric
- ◆ Tulalip Tribes
- ◆ Washington State Department of Transportation

Washington State Snow Pack



Regional climate models developed at PNNL show snow pack and water resource changes in the Northwest.

Contacts

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