



# Advancing Aquatic Ecosystem Science to Promote Sustainable Water-Energy Resources

Oak Ridge National Laboratory's Aquatic Ecology Group strives to provide the scientific knowledge and technical innovation to address highly complex and multi-faceted water-energy resource challenges. Research builds on strengths in water resource evaluation and ecological restoration, including long-term evaluations of field sites, unique laboratory capabilities, and national-level geospatial databases and modeling tools. The research team focuses on improving understanding of aquatic ecosystem interactions through fundamental science and translating those discoveries into new technologies and solutions that will sustain energy-water resources.

## Research Areas

**Water-energy nexus**—Understanding and predicting environmental responses to energy alternatives such as hydropower, fossil fuels, biofuels and nuclear

**Technology development**—Developing scientifically sound technologies that can enhance energy security and minimize environmental impacts

**Data analysis and tools**—Providing society and stakeholders the information and tools necessary to inform policy and decision-making

## Mercury Science and Solutions

Scientists at ORNL's Aquatic Ecology Laboratory are advancing knowledge about mercury's impact on fish, wildlife, and streams, and using the lab's one-of-a-kind capabilities to research effective and affordable remediation solutions that can be adopted across the country and worldwide.

**A complex local and global challenge** — Mercury undergoes complex transformations in aquatic environments, changing into the neurotoxin methylmercury. Mercury concentrations increase as it moves up the food chain, presenting risks to environmental and human health.

**Developing solutions** — With support from the Department of Energy and its Office of Environmental Management, ORNL aims to provide innovative, science-based solutions that reduce human and ecological risk while avoiding environmentally destructive and costly large-scale soil and sediment removal.



**UNDERSTANDING** environmental and biological affects on mercury cycling



**MODELING** mercury concentrations and flux



**DEVELOPING** sorbents to absorb mercury and stabilize soils



**MANIPULATING** ecology to limit mercury methylation



**ALTERING** water chemistry through alternative treatments



## New Capabilities to Accelerate Technology Development

With funding from the Oak Ridge Office of Environmental Management, the Aquatic Ecology Laboratory is adding new capabilities to accelerate technology development for mercury remediation.

The expansion will allow mercury-contaminated stream water to flow through the tanks and soil columns in the laboratory. This one-of-a-kind facility will replicate real-world conditions to:

- Better test technology effectiveness on mercury removal in a stream environment
- Allow researchers to transport in and study water from different streams and locations in a controlled environment
- Speed the development of alternative cleanup methods that are more effective, less costly, and less destructive to the environment.

The partnership between DOE's Office of Environmental Management, Office of Science, and ORNL highlights the benefits that are possible when DOE pairs the resources and expertise within these two essential programs. The collaboration is a leading example of how DOE is using science and applied research to solve complex challenges.

### Contact

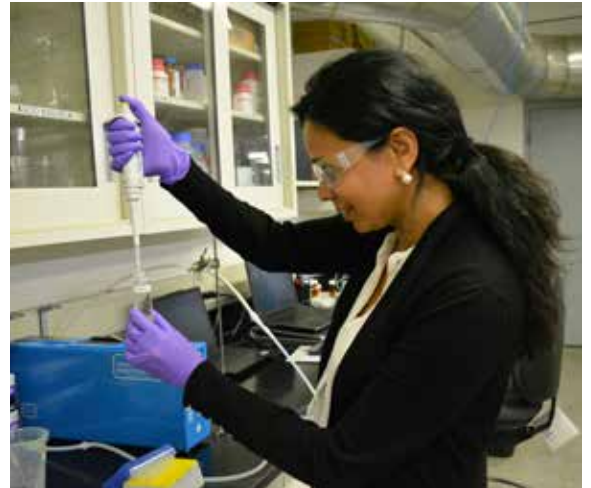
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