

Tiny marine creatures could help diagnose the health of Puget Sound

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This foraminifera species, *Elphidium incertum*, is a half-millimeter in diameter and bears a striking resemblance to a chambered nautilus.

(PhysOrg.com) -- University of Washington researchers are using tiny sea creatures called foraminifera to help diagnose the health of Puget Sound.

From low [oxygen levels](#) in areas of Hood Canal to pollution in Elliott and Commencement bays, scientists have documented some serious environmental issues in Puget Sound, whose shores are home to more than 3 million Western Washington residents.

Now University of Washington researchers are using tiny [sea creatures](#) called foraminifera as a diagnostic tool, to determine what's wrong -- or what's right -- with the Sound.

Foraminifera are single-cell organisms typically less than half a millimeter in size. They develop shells that look remarkably similar to much larger [marine organisms](#) (a chambered nautilus, for example). Because their responses to pollution vary, foraminifera can serve as a barometer for the health of the Sound and often carry the evidence in their shells.

So far, samples have turned up a large percentage of a common foraminifera species, *Buccella frigida*, in Seattle's Elliott Bay and Everett's Port Gardner bay, which suggests a good marine environment, said Ruth Martin, a postdoctoral researcher at the Burke Museum of Natural History and Culture at the UW.

That species, however, makes up a much smaller percentage of the foraminifera in samples taken from Tacoma's Commencement Bay, where it is replaced by species more tolerant of degraded water quality.

Worldwide, there are perhaps 10,000 living species of foraminifera -- Martin calls them "amoebas with shells" -- but only about 30 species have been found in Puget Sound.

"What we've seen so far is that this is a pretty limited community, and there is one species that we would have expected to see that is missing," Martin said. That species, *Ammonia beccari*, is tolerant of a variety of conditions and is typically abundant in coastal waterways, but it is unclear why it has not been seen in Puget Sound.

Martin works in the laboratory of Liz Nesbitt, a UW associate professor of Earth and space sciences and the Burke Museum's curator of

invertebrate paleontology and micropaleontology. Nesbitt began the project two years ago in the hope of establishing a baseline of data to judge long-term changes in the health of the Sound.

"One of the reasons I took this on is because it is a perfect opportunity for undergraduate students to be involved in research," Nesbitt said. "They have given us data we can use."

Martin's initial findings are being presented Monday (Nov. 1) at the Geological Society of America annual meeting in Denver.

The scientists are culling information from samples taken from the surface of the sediment on the floor of the Sound from 1997 through this year by the state Department of Ecology and the National Oceanic and Atmospheric Administration.

The samples come from throughout the Sound, but the limited time frame makes it hard to discern trends, Martin said. However, she has noted an increase in foraminifera species in Elliott Bay during the last decade, a possible sign of changing water quality.

Nesbitt and Martin hope to conduct further sediment sampling in the coming years to get a clearer picture of the Sound's overall health and how it has changed over time. They hope to include core samples from deeper in the sediment that will produce foraminifera shells, which can provide data on changes that have taken place over decades or even centuries.

"The foraminifera hang around, or their shells hang around. They respond to pollution, and to mitigation, and that information is incorporated into their shells and into their communities," Martin said. "They can give us insights on what has been happening in a given area."

Provided by University of Washington

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