

# Researchers embark on wave energy again

## Scientists study potential effects on ocean ecosystem

By Terry Dillman Of the News-Times

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*Sarah Henkel, left, an assistant research professor in Oregon State University's Department of Zoology, discusses wave energy sites with James Riley, director of business development at Portland-based engineering firm CH2M HILL, after an April 10 presentation Henkel gave at Hatfield Marine Science Center. (Photo by Terry Dillman)*

After a series of fits and starts, including the sinking of a wave energy buoy off the coast near Newport in 2007, wave energy proponents are about to embark on another tide of releasing and observing test buoys.

Many questions remain about a variety of issues, including the potential effects of wave energy equipment on the ocean's flora and fauna and the overall marine ecosystem, as well as encroachment on commercial and recreational fishing grounds.

Sarah Henkel, a marine ecologist at Oregon State University's Hatfield Marine Science Center (HMSC), discussed the potential effects of "wave energy capture" during an April 10 public presentation at the center, and what researchers have already done and plan to do to determine those effects.

She referred to New Jersey-based Ocean Power Technologies, Inc. (OPT) and the company's plans to deploy a state-of-the-art wave energy buoy - 140 feet long (with 30 feet above the water's surface), 40 feet wide, weighing 200 tons - about 2.5 miles off the southern coast shoreline near Gardiner in autumn 2010. Oregon Iron Works, Inc. in Clackamas County is currently building the buoy at a cost of \$4 million. OPT officials intend to deploy nine more buoys to make an array of 10 sometime in 2011. "Each buoy is connected to three anchors," said Henkel, noting that they expect to see some changes in species types and behavior. "All of a sudden, there are a lot of hard structures - anchors, mooring lines, and buoys - that attract rock-associated species to a sandy bottom habitat. These habitats have been studied less than others."

The uncertainties and unknowns have stirred questions and concerns from the outset, but the underlying question is who "owns" - or should own - Oregon's territorial sea? And should private enterprises receive long-term "deeds?"

Much depends on the costs incurred - financial, social, ecological - and benefits gleaned. Determining impacts

Many fishermen and others were concerned when the possibility of wave energy buoys and arrays first emerged, and many remain concerned that wave energy development could damage fishing, recreation, and tourism.

Much has happened since the idea of commercial wave energy systems rolled into coastal communities.

In 2008, state officials began to work with local governments, the Oregon Coastal Zone Management Association, and others to develop an ocean plan to protect sensitive marine ecosystems and important recreational and commercial fishing grounds from new types of development, including wave energy facilities. A mix of cooperative and collaborative efforts have produced some positive results, including mapping of commercial fishing grounds along the Oregon coast, and - after three years of negotiation - a pending agreement between OPT and 15 local, state, and

federal agencies .

That agreement requires OPT to submerge itself in a set of intensive studies, and if any problems arise, OPT must adapt its mode of operation to alleviate them. It gives fishermen and other groups like the Southern Oregon Ocean Resource Coalition (SOORC) a say in the process.

"These are big decisions," Henkel noted. "So we want to make sure we have as much information as possible."

Among the concerns are effects on water circulation, currents and stratification; sediment and sand transport to and from beaches; and potential changes in seabird and mammal behavior caused by lights and sound. Scientists can't study the buoys and their effects until they actually go into the water. "We can't really use a 'lessons learned' approach yet," said Henkel.

But they do have years of observations from other offshore structures elsewhere, such as oil platforms and wind farms. Gathering data

What they need most is baseline data - information about what the ecosystem is like now, such as the current crab distribution and movement study funded by the Oregon Wave Energy Trust (OWET), for comparison purposes.

"We need to know as much as possible about what's going on before they (buoys) go in, so we are better able to detect changes," Henkel said.

Studies are already underway, especially with seabirds and migrating gray whales. "Whales are really close to shore, moving primarily through all the prime areas for wave energy," noted Henkel. Entanglement and effects on acoustics are the primary concerns.

Researchers have deployed hydrophones to determine background noise levels, and later buoy sounds and how they move through the water. Baseline surveys already going would continue , and other surveys, lab investigations , and environmental studies of sandy bottom sites should begin this summer. Surveys of adjacent rocky sites would start next summer, along with the launch of OSU's wave energy buoy test berth offshore from Yaquina Head. Monitoring and other investigations would continue in 2012 and beyond. Post-deployment surveys would determine any changes.

"One obstacle has been inadequate guidance from agencies about information needs for decision-making ," said Henkel.

That leads to gaps in information , duplication of effort, missed opportunities, and a lack of usable data. They want to close those gaps and resolve those issues through cooperative efforts before commercial wave energy becomes a reality.

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