



YSI Instruments Help the Partnership for Interdisciplinary Studies of Coastal Oceans Determine Hypoxic Zones

For the fifth time in as many years, a hypoxic “dead zone” has formed off the Oregon coast according to Oregon State University (OSU) researchers. Hypoxia means “low oxygen” and typically indicates an oxygen concentration of less than 2 mg/L. In many cases, hypoxic waters don’t have enough oxygen to support fish and other aquatic animals.

A fundamental new trend in atmospheric and oceanic circulation patterns in the Pacific Northwest appears to be occurring and apparently expanding its scope beyond Oregon waters. The hypoxic zone in the Gulf of Mexico is well known but the zone off Oregon is now being seen in coastal waters off Washington. There have been reports of dead crabs stretching from the central Oregon coast to the central Washington coast. According to Francis Chan, marine ecologist with OSU Department of Zoology and with the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO), the researchers at OSU have documented this year’s region of low-oxygen bottom waters from Florence to Cascade Head. The lack of consistent upwelling winds allowed a low-oxygen pool of deep water to build up. Now that the upwelling-favorable winds are blowing consistently, the pool of water comes close to shore and begins to suffocate marine life. If these winds continue to blow, the researchers expect to see continued and possibly significant die-offs.

As these hypoxic events become more regular, they appear less like an anomaly and more like a shift in marine conditions and oceanic behavior. In particular, a change in intensity and timing of coastal winds seems to play a significant role in these events. Researchers are working on new circulation models that may allow predictions on hypoxic occurrences.

The lack of wide-scale ocean monitoring makes determining the size and movement of the dead zone difficult. Recently, several dissolved oxygen sensors have been deployed on the sea floor both close to shore and in 260 feet of water off Newport, some of which send data in near real-time. In addition, a new underwater

unmanned vehicle equipped with multiparameter instruments measuring temperature, salinity, chlorophyll and dissolved oxygen is routinely sampling across central Oregon waters.

During normal years, cold water rich in nutrients but low in oxygen upwells from the deep ocean off Oregon, mixes with oxygen-rich water near the surface, causes some phytoplankton growth and provides the basis for a thriving fishery and healthy food chain. During abnormal periods, some of the typical conditions don’t exist allowing huge masses of plant growth to die, decay and in the process consume even more of the available oxygen near the sea floor, causing hypoxic conditions.



Chris Holmes and Francis Chan from PISCO use the YSI 556 multiparameter handheld to measure ocean samples.

Collaborating in the research are scientists from OSU, PISCO, the Oregon Department of Fish & Wildlife, NOAA, University of Washington and the Olympic Coast National Marine Sanctuary. The researchers say it’s difficult to tell what long-term ecological impacts these dead zone events may have on marine ecosystems. Jane Lubchenco, the Valley Professor of Marine Biology at OSU and principle investigator for PISCO, also said that

the biological monitoring of species health and impacts in the nearshore Pacific Ocean is “grossly inadequate”, making it difficult to evaluate the long-term impacts of hypoxic events. The use of YSI instruments in the process is one step to understanding current conditions and attempting to predict events prior to major occurrences.

To learn more about the efforts of PISCO please visit www.piscoweb.org.

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