4th Annual Heceta Head Coastal Conference

"Oregon's Ocean: Changes & Consequences"

Florence Events Center ~ October 24-25, 2008

SUMMARY of CONFERENCE PROCEEDINGS

Saturday, October 25

Panel I. "Ocean Climate Change and Ecosystem Resilience"

Dr. Scott Heppell, Assistant Professor, Oceanic & Atmospheric Sciences, OSU, speaking on behalf of Dr. Selina Heppell, Assistant Professor, COAS

Fisheries. Scientists agree that climate change is happening and will affect Oregon's nearshore. It is not clear how dramatic the changes will be, or what species may benefit or lose as ocean currents, upwelling patterns, and temperatures affect the food web.

Extensive studies in terrestrial and intertidal ecosystems indicate that diversity plays an important role in how well a system can recover or adapt to perturbations. Systems with more species, more habitat, and more variability in the life cycle patterns of individuals are naturally able to withstand or recover from impacts. This "resilience" is of critical importance to coastal communities that rely on natural resources and productivity of our coastal ecosystems.

Oregon's nearshore is highly dynamic, so its species and habitats are naturally resilient; conserving diversity and monitoring food webs for "early warning" indicators should improve our chances of retaining a highly productive and beneficial coastal ecosystem.

Dr. Jan Hodder, Associate Professor, Oregon Institute of Marine Biology, Uinversity of Oregon

Ornithology. Marine birds live a long time, have small numbers of young each year, take a long time to raise their young and are slow to breed. These features provide them with a measure of resilience to ocean climate change. They have two phases to their life cycle. During breeding they are tied to land and nest on islands and mainland cliffs, and during their non-breeding season they move out to sea. Some stay in Pacific Northwest waters, others utilize the entire Pacific Ocean as part of their life cycle.

Marine birds are apex predators and as such are affected by changes in any part of the food web. Inter-annual cyclical events such as the El Nino/Southern Oscillation cycles provide an example of how changes in food availability due to an alteration in oceanographic processes can result in reduced reproductive success in marine birds. Marine birds however, are resilient to these cyclical changes as a result of their life history characteristics.

Long term changes in food webs that may result from ocean acidification or changes in oceanographic parameters are unlikely to be cyclical so that resilience and the ability of marine birds to respond to this type of linear change is not as clear. Because marine birds need nesting sites free from mammalian predators they are restricted to breeding on islands and steep mainland cliffs. Sea level rise, resulting from a warmer ocean and increasing ice melt, will impact the amount of habitat available for marine bird nesting sites.

Dr. Burke Hales, Associate Professor, Oceanic & Atmospheric Sciences, OSU

Oceanography. The Oregon coastal ocean is a unique upwelling system that, when operating ‘properly' supports high plankton growth rates—which ultimately are the basis of our rich coastal fishery. This upwelling draws carbon dioxide out of the air, sequestering carbon in the deep ocean, evading hypoxic and acidic conditions.

This system is extremely sensitive, however, to slight perturbations in the nature of upwelling. Upwelled waters are, and probably have long been, naturally very low in oxygen concentrations and high in carbon dioxide. If only a small fraction of the organic carbon produced by the phytoplankton blooms is degraded in coastal waters, hypoxic and corrosive acidified conditions can result.

Likewise, if upwelled source waters are slightly more oxygen depleted and CO2 rich, these conditions can be worse. Evidence of both changing upwelling wind conditions and upwelled water characteristics has been observed in recent years, and appears to have made harmful conditions more persistent.

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