

Hypoxia: An important component of benthic habitats for U.S. west coast groundfish stocks

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Understanding the relationship between environmental variables and fish distribution and abundance has long been a goal of fisheries biologists. A recent report prepared by NMFS identified ‘insufficient research on environmental effects’ as a major obstacle (among several) to producing and using habitat science in stock assessments and management. Since 2002, hypoxic conditions have been observed on the continental shelf off the coast of the Pacific Northwest in a region not previously characterized by low bottom oxygen concentrations. Major declines in dissolved oxygen have been observed in the oxygen minimum zone (OMZ) of the southern California Current as well as a shoaling of the OMZ. Despite recent increases in the frequency, duration and spatial extent of hypoxia and the recognition of hypoxia as a threat to worldwide fish production, little is known about its effects on upper trophic levels. In 2007, the Northwest Fisheries Science Center (NWFSC) initiated studies on the extent of hypoxic conditions on the continental shelf and slope and the influence of hypoxia on demersal fishes and invertebrates. This project was an extension of the NWFSC Groundfish Bottom Trawl Survey. Studies in 2007 and 2008 focused on a segment of the Oregon coast—an established area for ongoing interdisciplinary studies on hypoxia. In 2009, working with oceanographers at Oregon State University, the NWFSC expanded its hypoxia research by incorporating an oceanographic sensor package into the NMFS coast-wide survey. This poster summarizes the results of ongoing research and discusses some implications for stock assessments and management.

Pelagic habitats and ecosystem considerations for salmon and other pelagics of the central coast of California

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The productivity of salmon and the ecosystem of central coastal California are dependent on upwelling, wind strength, and wind structure which respectively determine the degree of enrichment, concentration, and retention of nutrients and prey items regionally. To examine the role of these factors on the ecosystem we have developed a hierarchical, mechanistic ecosystem model for estimating productivity of krill, rockfish, and seabirds along central California. Once these relationships were quantified we used our findings to explore potential causes of recent poor salmon production. Evidence suggests that weak upwelling reduced enrichment and below average wind turbulence led to a shallow mixed layer and diffusion of krill (a dominant prey item) southward from the primary habitat of juvenile salmon. Also, increasing winds seaward moved the convergent zone, which retains local production and pelagic prey items, offshore and beyond the range of juvenile salmon. In total, recent years may have represented a restructuring of the marine habitat whereby krill, pelagic fish prey, and salmon were not overlapping which led to reduced survival of juvenile salmon.

Identifying coral habitat areas that are potentially vulnerable to fishing interactions

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Due to their sessile nature and slow growth rates, deep sea corals are vulnerable to a variety of anthropogenic stressors, most notably bottom trawling. Off the west coast of the continental United States, corals are encountered during research trawl surveys and recorded as bycatch by fishery observers during commercial fishing operations. With the reauthorization of the Magnuson-Stevens Fisheries Conservation and Management Act in 2006, NOAA and the regional Fishery Management

PROCEEDINGS

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Moving Towards a National Habitat Science Program

Hosted by the Southeast Fisheries Science Center, Southeast Regional Office, and Office of Science and Technology
St. Petersburg, FL
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