HYPOXIA UPDATE: September 5, 2007

PISCO researchers have just finished a series of cruises along the Oregon coast. These cruises were conducted over the past 6 weeks along the central Oregon coast to closely monitor changes in dissolved oxygen levels and to work collaboratively with researchers from ODFW to examine the potential for recovery of rocky reef fish and other marine life from last year's anoxia event as well as their sensitivity to continued development of low oxygen conditions. In our last update, measurements revealed the return of severe hypoxia (oxygen levels of </= 0.5 ml l-1) in nearshore waters south of Newport in late June/early July. Since then, the coastal winds that drive much of the ocean currents have fluctuated strongly between upwelling (northerlies)- and downwelling (southerlies)-favorable states. The onset of strong southerlies have been important because they are very effective at pushing hypoxic water away from the coast and maintaining high oxygen levels along much of our nearshore waters. The bouts of strong southerlies have alternated with bouts of upwelling-favorable winds. Nearshore oxygen levels have declined temporarily as a result and we observed a rapid drop in oxygen over the past week from 2.8 ml/l to 1.38 ml/l at our 50m station off Cape Perpetua in concert with the return of upwelling winds.

Our observations from the long-term nearshore survey reefs off Perpetua have revealed a strong sensitivity of fish abundance and activity level (in terms of ROV avoidance) to back and forth changes in oxygen content. As we last reported, fish abundance and activity level on these reefs declined markedly with the arrival of severely hypoxic water in late June. Note also that low oxygen waters can be patchy and severe hypoxia this summer has been restricted to waters south of Newport. Subsequent joint ODFW/PISCO robotic submersible surveys in July and August revealed a rise in rockfish abundance in response to downwelling-caused rise in oxygen levels. During the last week of August, our surveys with ODFW took place as oxygen dropped from relatively high to moderately hypoxic levels over the course of 5 days. Rockfish activity levels appeared to be somewhat depressed by this initial decline in oxygen levels into moderate hypoxia. In contrast to the return of rockfish to these reefs, last year's exceptional event continues to have lasting impacts on bottom dwelling marine life. A number of long-lived species of large seastars, sea cucumbers and urchins that form conspicuous parts of the food web of the seafloor remain absent from the system.

In contrast to the tendency for relatively high oxygen levels in nearshore waters this summer, we have observed the formation of an offshore (to 100m depth) pool of water that has continued to lose oxygen through the summer. Offshore, we've encountered water with as low as 0.15 ml/l of oxygen in 100m off Cape Perpetua. Because this offshore pool can move shoreward with upwelling currents, we will continue to monitor the location and intensity of severe hypoxia in this pool through the end of the upwelling season.