



Supporting Online Material for

Emergence of Anoxia in the California Current Large Marine Ecosystem

F. Chan, * J. A. Barth, J. Lubchenco, A. Kirincich, H. Weeks, W. T. Peterson, B. A. Menge

*To whom correspondence should be addressed. E-mail: chanft@science.oregonstate.edu

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Movie S1 caption

Other Supporting Online Material for this manuscript includes the following:
available at www.sciencemag.org/cgi/content/full/319/5865/920/DC1

Movie S1

Supplementary Online Material

Movie S1. Example clips from remotely operated vehicle (ROV)-based video surveys of 50m rocky reef habitats off Cape Perpetua, Oregon, USA (44.25°N). (A) August 26th 2000 pre-anoxia survey showing dense aggregations of black rockfish (*Sebastes melanops*), (B) August 6th 2001 pre-anoxia survey showing species-rich demersal fish communities that include quillback rockfish (*Sebastes maliger*), tiger rockfish (*Sebastes nigrocinctus*), (C) spotted wolf-eel (*Anarhichthys ocellatus*) and abundant macrobenthic invertebrates including giant sea cucumber (*Parastichopus californicus*), (D) leather star (*Dermasterias imbricate*), sunflower star (*Pycnopodia helianthoides*), (E) giant plumose anemone (*Metridium farcimen*) and additional fish species including yelloweye rockfish (*Sebastes ruberrimus*), canary rockfish (*Sebastes pinniger*), copper rockfish (*Sebastes caurinus*) and (F) Pacific halibut (*Hippoglossus stenolepis*), total fish densities from 38 transects carried out in 2000 and 2001 averaged 30.4 ± 9.3 (s.d.) individuals m⁻², (G) August 8th 2006 anoxia survey revealing the complete absence of fish species, moribund or decomposing carcasses of Dungeness crabs (*Cancer magister*) and sunflower star (*Pycnopodia helanthoides*), (H) August 21st 2006 anoxia survey further revealing moribund unidentified sipunculid worms and sea cucumbers, (I) down-camera close-up of moribund brittlestars, (J) retracted *M. farcimen* individuals and development of putative sulphide-oxidizing bacterial colonies not previously observed in 5 years of prior surveys. Red laser-reference spots are spaced 10cm apart in all videos. Video surveys were carried out using a Deep Ocean Engineering Phantom HD2 ROV along designated repeat transect lines that bisected rocky reef habitats. Surveys were carried out during the

upwelling season over the same GPS-referenced transect lines in 2000, 2001, 2002, 2003, 2004 and 2006. Fish density estimates were enumerated to lowest possible taxonomic resolution (typically to species for adult individuals) and transect area was estimated from ROV flight track and laser-referenced and camera-declination defined field of views.