



Research Brief

Changes in Krill Distribution

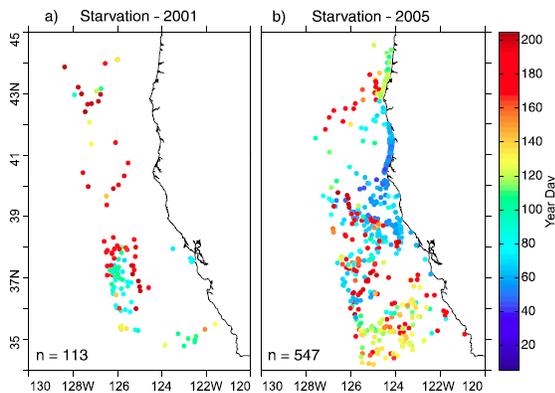


Why are krill studied so often?

Krill play a key role in marine food webs; they consume large phytoplankton and are consumed by a host of upper-level species including marine mammals and commercially important fishes such as salmon. Even if a marine organism does not directly depend on krill for sustenance, few species will go through their entire life cycle without having been within two trophic links of krill at some point. The high connectivity of krill within the marine food web means that krill availability strongly impacts the productivity and survival of upper-level species.

What did we do?

During 2005, krill availability in the northern California Current region was anomalously low. In order to investigate the cause (or causes) of this decrease, we modeled data from that year and compared it to winter/spring of 2001, which was considered to be a time of “normal” abundance. These models laid out the krill distribution for this time period and indicated how it differed from previous years.



What factors could have incited the 2005 decrease in krill availability?

During wintertime, there is often a northward current off the California coast, but the 2005 current was unusually strong and persisted for an abnormal amount of time. These differences in the alongshore currents caused krill particles to move poleward. In addition, these anomalous currents also affected upwelling along the California and Oregon coast; upwelling was delayed and reduced in comparison to “normal” years, which led to low chlorophyll a levels. Without a sufficient

concentration of this essential nutrient, the productivity of this region decreased significantly.

Caveat

We did not attempt to investigate the interannual variation in predation that could have impacted our results. However, species lower on the food chain are generally considered to be most directly affected by “bottom-up,” or physical, processes rather than “top-down” effects such as predation, so it is logical to conclude that krill population biology was most likely not significantly affected by differences in predation between 2001 and 2005.

-Brief by Marie M. Sydeman

Citation: Dorman, J.G., T.M. Powell, W.J. Sydeman, and S.J. Bograd. 2011. Advection and starvation cause krill (*Euphausia pacifica*) decreases in 2005 Northern California coastal populations: Implications from a model study. *Geophysical Research Letters* 38:L04605. doi: 10.1029/2010GL046245.