The Relationship between Climate Change, Sardine Abundance and Commercial Fisheries Production in the California Current Large Marine Ecosystem

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Abstract

Pacific sardine (Sardinops sagax) in the California Current Ecosystem (CCE) has exhibited extreme sensitivity in its abundance and distribution in the face of decadal-scale climate regime changes. Warm regimes enhance the abundance of Pacific sardine and expand its distribution. Cold regimes lessen the abundance and restrict the distribution. For instance, between the late 1940s and 1970s, a cold regime shift in the California current system, combined with overfishing by excess fishing effort, resulted in the collapse of Pacific sardine resource. As abundance decreased, the spatial availability for commercial fisheries shifted from a wide range - Canada (British Columbia), U.S. (Washington, Oregon, California) and Mexico (Baja California), to the limited Southern region - Southern California and Mexico. The collapse of the sardine resource not only affected their fisheries, but also fisheries for higher trophic level species of commercial, recreational and ecological importance. Based on observations over the last century we investigate the linkages between climate variability, the sardine resource and commercial fisheries production within the CCE. We use these findings to herald the impacts of global climate change on commercial fisheries production within the CCE.