Ocean Conservancy®

2023-2024 | TIP SHEET

California Current Ecosystem Status Report

Heatwave vs. Upwelling – The Battle Continues

Large marine heatwaves in the California Current Ecosystem (CCE) have occurred offshore every year since 2019. In 2023, the West Coast experienced its 4th largest marine heatwave, based on surface area (Section 2 and Appendix F). Similar to 2022, there were many heatwave intrusions into nearshore waters in the summer and fall, bringing related harmful algal blooms (HABs). Notably, a major HAB in southern California began in late spring and lasted about three months, resulting in the strandings of over 100 long-beaked common dolphins and more than 1,000 California sea lions and other pinnipeds (Section 3.8 and Appendix O). Upwelling, which brings cooler waters to the surface, was lower overall compared to previous years along most of the coast, but it was highly variable with strong upwelling events and periods of downwelling. In the fall, we transitioned from La Niña conditions to what is likely to be a "strong" El Niño. Impacts from the last strong El Niño (in 2014-2015) are described in Appendix E.

Foraging for Cheeseburgers

Northern copepod (i.e., lipid-rich "cheeseburgers" for fish) abundance was average and southern copepod biomass was below average. Total krill abundance in 2023 was the second lowest since the start of the time series in 2007, driven by decreases off northern Washington and southern California. Anchovy and juvenile groundfish remained highly abundant in the central and southern CCE, with notable increases in young rockfishes in the central and northern CCE. Adult sardine were moderately abundant, but young of the year sardine continued a four-year trend of low abundance and market squid abundance was also relatively low. There was a high abundance of Dungeness crab megalopa (pelagic life stage evolving from larvae) in the northern region, and the highest hake larvae abundance since 2011 in the southern region.

A Blurry (Salmon) Slurry

To the north, ocean conditions in 2023 suggested average survival for adult coho salmon, while indicators for chinook returning to the Columbia Basin include a mix of good, poor, and intermediate conditions (Section 3.3). With upwelling variability, marine heatwaves, and the current El Niño added to the mix, the outlook for salmon returns in 2024 is blurry at best. Looking beyond 2024, juvenile salmon surveys indicate low to average abundance of yearling chinook and juvenile sockeye, and above average abundance of juvenile coho. To the south, indicators for adults returning to California basins were relatively poor for most age classes. Thiamine deficiency, which has been linked to the recent high abundance of anchovy and can lead to high mortality in the early stages of chinook salmon, is also thought to have negatively affected survival rates for Central Valley chinook in brood years 2019-2023.

Climate Effects on Sablefish – The Short and Long of It

Within the Dover sole-thornyhead-sablefish (DTS) complex, juvenile sablefish abundance increased significantly in 2021 and, while it continues to be high, it appears that the high biomass observed in 2022 was due to slow growth of the 2021 cohort (Section 3.4). Longspine thornyhead showed a large increase in 2022, while shortspine and Dover abundances remained relatively static. New to this year's report are long-term projections of how climate change will shift the longitudinal and depth distributions of the DTS complex based on the species' tolerances for temperature and dissolved oxygen (Appendix E). While Dover sole is expected to stay at a similar abundance over the long-term, projections indicate that sablefish (and shortspine thornyhead) will significantly decline by the end of the century across all climate change scenarios despite high juvenile abundance in the short-term.

Communities and Groundfish Fleets at Risk

Communities with high Community Social Vulnerability Index scores and with high reliance on fishing are especially vulnerable to fishery declines. West Coast communities that are highly reliant and socially vulnerable are described in Section 5.1 and Appendix R. A recent study also concludes that groundfish fleets in more northern ports are at greater risk from the effects of climate change (Appendix E). A new analysis presented for the first time examines "livelihood diversification," a metric showing revenue streams that include non-fishing activities and found that the proportion of responding vessel owners who derive 100% of their household income from fishing decreased from 2016 to 2022, and households that derive less than 50% of their income from fishing increased during this same period (Appendix S).

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