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**Inclusion of DNA Sequencing into an Ecosystem Observing Program in the Southern California Bight**

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**Abstract**

DNA sequencing has been employed since 2014 to complement and augment observations taken as part of the 65 year old the California Cooperative Oceanic Fisheries Investigations (CalCOFI) program. Based on 16S and 18S identification, relationships between microbial taxa and environmental factors such as temperature, nutrients, and mixed layer depth were observed. Relative to the past 15 years, 2014-2015 was anomalous with respect to warmer temperatures, lower nutrients, and deeper nitracline depths. Despite this, phytoplankton biomass as assessed by chlorophyll *a* remained reasonably consistent relative to anomalies in other biotic and abiotic variables. In contrast, ‘omic-derived biotic measurements better reflected abiotic conditions, suggesting a relationship between nitracline depth and phytoplankton community structure and demonstrating potential benefits of providing a more refined characterization of food web structure. Taxa that increased with temperature included oligotrophic organisms such as Pelagibacter and Prochlorococcus. Taxa with a negative correlation to temperature included those known to respond to upwelling conditions, including Flavobacteria and Chlorophyte groups. Network analysis, including relationships with higher trophic levels, is on-going.

**Keywords:** DNA sequencing, CalCOFI, microbes

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