

U.S. Integrated Ocean Observing System

The U.S. Integrated Ocean Observing System (IOOS) is a national-regional partnership working to provide new tools and forecasts to improve safety, enhance the economy, and protect our environment. Integrated ocean information is available in near real time, as well as retrospectively. Easier and better access to this information is improving our ability to understand and predict coastal events - such as storms, wave heights, and sea level change. Such knowledge is needed for everything from retail to development planning. IOOS' mission is to

produce, integrate, and communicate high quality ocean, coastal and Great Lakes information that meets the safety, economic, and stewardship needs of the Nation. IOOS' Operations Division coordinates the contributions of Federally-owned observing and modeling systems and develops and integrates non-federal observing and modeling capacity into the system in partnership with IOOS regions. Included below is a highlighted project by IOOS-supported researchers and their partners.

eDNA can Provide Detailed information about Ecosystem Dynamics and Key Species as Indicators of Change

NOS is using environmental DNA (eDNA) to study organisms across trophic levels and ecosystems and provide critical information about species interactions in the face of ecosystem change. The U.S. Marine Biodiversity Observation Network (MBON) Sanctuaries Team — coordinated by IOOS with interagency funding and support — has been a key player in developing best practices for eDNA and demonstrating its utility for biological observing and biodiversity assessment. A team of MBON partners across multiple research institutions and state government agencies used eDNA methods to survey biodiversity in Monterey Bay, CA, during an 18-month period (2015-2016). The researchers created a dataset from the resulting seawater samples, encompassing 663 taxonomic groups from microorganisms to mammals. The team concluded that “eDNA-based analyses can provide detailed information about marine ecosystem dynamics and identify sensitive biological indicators that can suggest ecosystem changes and inform conservation strategies.”



Niskin bottles for eDNA collection, as shown here on a Global Foundation for Ocean Exploration cruise, were used by the research team aboard the R/V Rachel Carson and Western Flyer. Image credit: NOAA.

FY20 Accomplishment(s): Findings from this study were published in the journal *Nature Communications*.

Peer reviewed journal article: Djurhuus et al. 2020 *Nature Communications*
<https://www.nature.com/articles/s41467-019-14105-1.pdf>

IOOS MBON Website:
<https://ioos.noaa.gov/project/bio-data/>