MBON in the Northern California Current: understanding patterns and drivers of biodiversity and ecosystem function from plankton to seascapes

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Establish an MBON node for the Northern California Current

- leverage existing ecological surveys (NOAA NWFSC) integrates data through IOOS, the Ocean Observing Initiative, and National Marine Sanctuaries (OCNMS)
- Advances MBON science through integration of remote sensing and in situ data, new technologies
- provides end to end coverage for the MBON along the US West Coast
1. Build from existing surveys: NOAA Shimada & Newport Hydrographic Line

**NH Line:** biweekly for >22 years
- 1996 - present
- 7 stations (1 – 25 nm)
- Single transect but high frequency (only 10 missing months)

**NCC Shimada cruises:** 2-3 x year
- CTD, chlorophyll, nutrients
- Phytoplankton (HABs), copepods, krill, fish larvae, pteropods (OA), invertebrate larvae (e.g., Dungeness crab)
2. Apply MBON remote sensing practices to the NCC: develop meaningful species-habitat relationships and functional diversity indices.

Advance multivariate, dynamic seascapes and regionally-tuned satellite plankton functional type algorithms.
3. Increase taxonomic resolution & technological capacity of MBON in situ sampling

Recurring NOAA Shimada Surveys:
Imaging flow cytometer (Cytobot)
In situ Ichthyoplankton Imaging System (ISIIS),
Environmental DNA (NWFSC and Smithsonian)

Ecosystem function: net community production
Traditional optics, microscopy, zooplankton, chemistry, and physics
IFCB (< ~200 um)+ISIIS (> 250 um): broad size spectrum and multitrophic level imaging
4. Develop & contribute pipelines/best practices for big ecological data

Segmentation & Classification
  CNN: ISIIS
  Random Forest: IFCB

Raw Storage
Darwin Core Compliant
5a. Build on a suite of robust, existing indicators developed through NOAA’s NWFSC (https://www.nwfsc.noaa.gov/oceanconditions), to inform CCIEA.
5b. While testing hypotheses on environmental drivers of biodiversity, seascape habitat distributions, ecosystem functioning

Seascape-specific:
- Plankton composition
- Size distribution
- Net community production

Christian Briseno-Avena & Moritz Schmid
6. Contribute to a community of practice and stakeholder engagement

NANOOS Partnerships
Sanctuary Partnerships: Northwest Indian Fisheries Commission
Habitat Framework
EBVs: Ecosystem Structure, Ecosystem Function, Community Composition, Species Traits (e.g. size).

RCRV Taani: RCRV Datapresence partnership