

# Advancing standards for biological data in the US and globally

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# MBON Core Activities

- Field data collection
- Integrate existing monitoring, fill gaps
- New approaches:
  - Remote sensing (“Seascapes”)
  - Environmental DNA (eDNA)
  - Acoustics, imagery
  - Machine learning/automated image analysis
- Engage users
- Advance biological data schema for IOOS and operational applications
- Guide integration of biological observations into the ocean observing system
- Advance data standards for interoperability and widest accessibility; OBIS partnership

# Ocean Biogeographic Information System (OBIS)

- OBIS brings data and metadata together using international standards for consistent meaning and usability for applications.
- Data in OBIS are mapped to the ratified, globally accepted Darwin Core standard.
- Scientific names are aligned with the World Register of Marine Species (WoRMS).
- Darwin Core and OBIS provide a framework to ensure interoperability and to enable local to global assessments of marine life.



OBIS is a global open-access data and information clearing-house on marine biodiversity for science, conservation and sustainable development.

# Value of Data Integration

- When data are integrated, users can subset data from multiple datasets easily.
  - Interested in particular species? When the data are described with metadata but not standardized and integrated you have to download each dataset and pull out the observations for just those species.
  - In an integrated standardized system you can select just those observations from multiple datasets.
- Integrated, standardized data facilitate building global scale indicators.
- Darwin Core allows for integration of disparate datasets.

# OBIS, Darwin Core and EML

- Darwin Core (DwC) is a globally recognized data standard for biological data.
- EML (Ecological Metadata Language) is a metadata standard.
- Darwin Core data and EML metadata are packaged together in the Darwin Core Archive.
- Data producers can exploit the full capabilities of EML metadata and make use of the EML-ERDDAP integration that some in the US advocate; OBIS only requires data aligned to Darwin Core.
- OBIS is looking at ways to ingest from ERDDAP; key is that the data must align to Darwin Core.

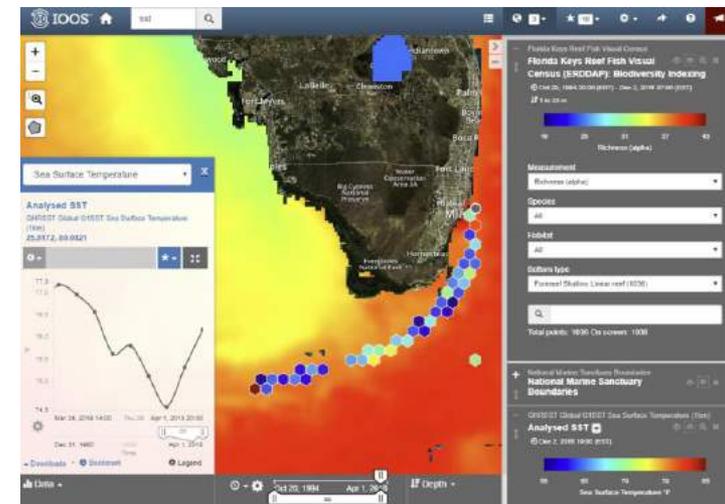
# Biological Data Management

## Building a Community of Practice

- EOV (and EBV) implementation
- Refined IOOS core bio variables
- Darwin Core data alignment
- ERDDAP web services
- IOOS Biological Data Workshops

## MBON Portal V 2.0

- <https://mbon.ioos.us/>
- A platform for scientists, managers, and other users to discover and visualize data
- Access to a suite of tools tailored from more- to less-technical users.



# IOOS Core Biological Variables

- Species and abundance
  - Phytoplankton, zooplankton, fish, corals, invertebrates, marine mammals, microbes, sea birds, sea turtles, and submerged aquatic vegetation (benthic and pelagic)
- Biological vital rates
  - including but not limited to production, recruitment, mortality, fecundity, growth, feeding rates , and microbial activity)
- Nekton diet
  - Diets of fish, sea birds, sea turtles, and marine mammals); and
- Environmental DNA
  - MBON projects are evaluating methods for collecting and analyzing water samples and proof of concept for eDNA in an MBON

# Matt Howard Memorial Funds

\$15,000, to each RA, to:

- Advance IOOS Biology through biological data stewardship activities in the region, in coordination with the Program Office
- Contribute to an IOOS synthesis report articulating regional needs for and prioritization of biological observations and data
- Enable IOOS RA/DMAC teams to work with regional data providers to align biological datasets to the Darwin Core standard and make them available through ERDDAP servers and the MBON Portal.
- FY18, FY19

# 2018 Biological Data Training Workshop

**February 8-9 2018**  
**Seattle, Washington**

## Scope

- IOOS and OBIS standards and tools for biological data
  - Darwin Core, WoRMS and metadata
- Web services for data access
  - MBON Portal, iOBIS
- Hands-on data exercises
  - Aligning data
  - Working with ERDDAP



# 2020 Biological Data Standards Workshop

- US IOOS, BCO-DMO, OBIS
- Goals:
  - Community agreement around use of biological data and metadata
  - Bridge data management across communities (eg NSF research and the ocean observing community)
  - Work on issues around managing and serving marine biology and biodiversity data to OBIS, GBIF, IOOS Portals, and DataOne
  - Discuss integration of biology with other types of ocean observations for increased ecosystem understanding

# 2020 eDNA Bioinformatics Workshop

- Organized by the Alliance for Coastal Technologies with NOAA, US IOOS, MBON and other expert input
- Build on MBON successes, strong partnership with NOAA and global researchers
- 'Omics approaches require significant bioinformatic capacity, including definition of pipelines and a repository for organizational taxonomic units (OTUs) from processing extracted eDNA

# Thank you!

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