

National Marine Sanctuaries as Sentinel Sites for a Demonstration Marine Biodiversity Observation Network (MBON)

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and partners

Background

- National Ocean Partnership Program (NOPP) issued a call for proposals in late 2013 in support of demonstration MBONs
- Three proposals were selected, one in the Channel Islands, a second in the Arctic/Alaska region and a third in the Florida Keys and Monterey Bay National Marine Sanctuaries
- CeNCOOS, MBARI, MBNMS, Stanford, SWFSC
- NASA is primary sponsor, NOAA (IOOS, SWFSC) in as well

Primary goals

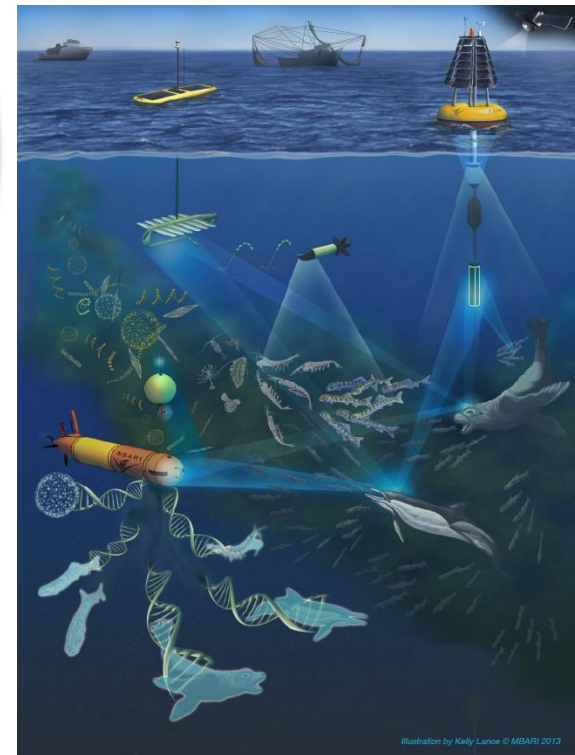
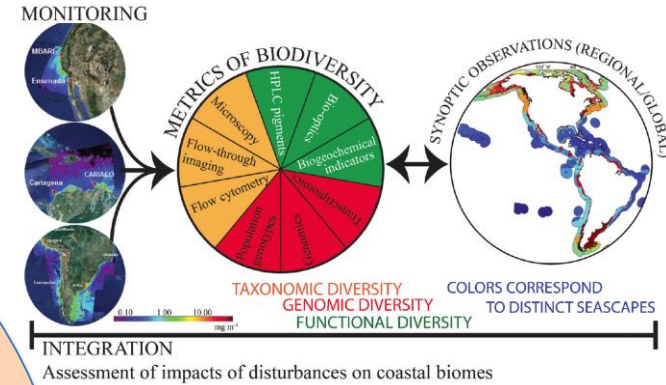
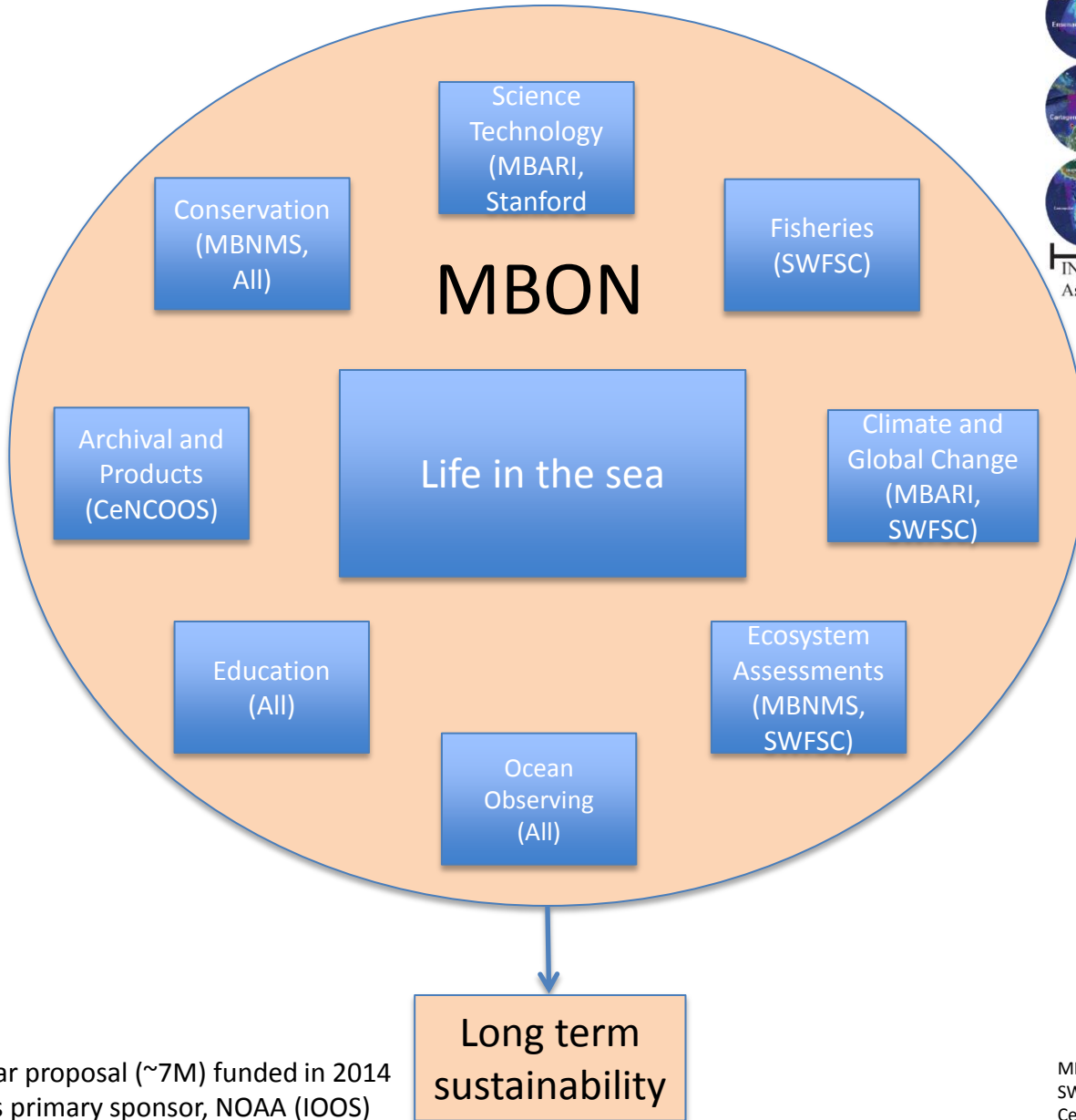
- Implement a demonstration MBON
- Integrate, synthesize and augment information from ongoing programs
- Relate MBON information to social-economic context and provide MBON information rapidly to stakeholders
- Develop a plan to transition the demonstration MBON into an operational system

Integrate, synthesize and augment

- Provide geographically-integrated time-series metrics of biodiversity and ecosystem health
- Define a minimum set of observations required for implementing a practical MBON
- Develop environmental DNA technology and autonomous sample collection methods for conducting biodiversity assessments
- Bring biodiversity measurements together in a relational database with links to national and international databases

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Focus on Florida Keys and Monterey Bay National Marine Sanctuaries



Five year proposal (~7M) funded in 2014
NASA is primary sponsor, NOAA (IOOS)

MBNMS = Monterey Bay National Marine Sanctuary
SWFSC = South West Fisheries Science Center (NOAA)
CeNCOOS = Central and Northern Californian Ocean Observing System

Next-generation sequencing methods

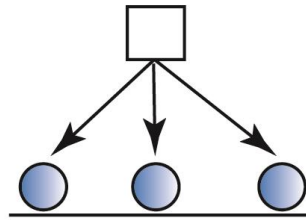
collect sample

triplicate filters (0.2um)

preservation

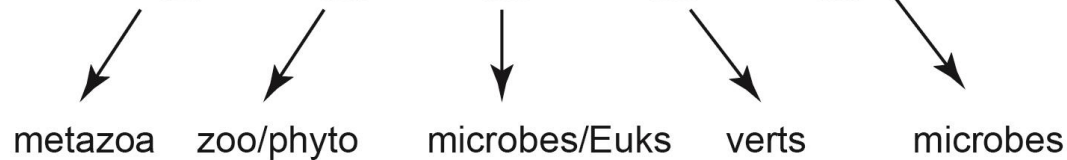
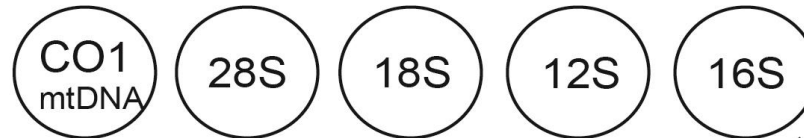
primers

taxa



Liquid Nitrogen

Functional group tags



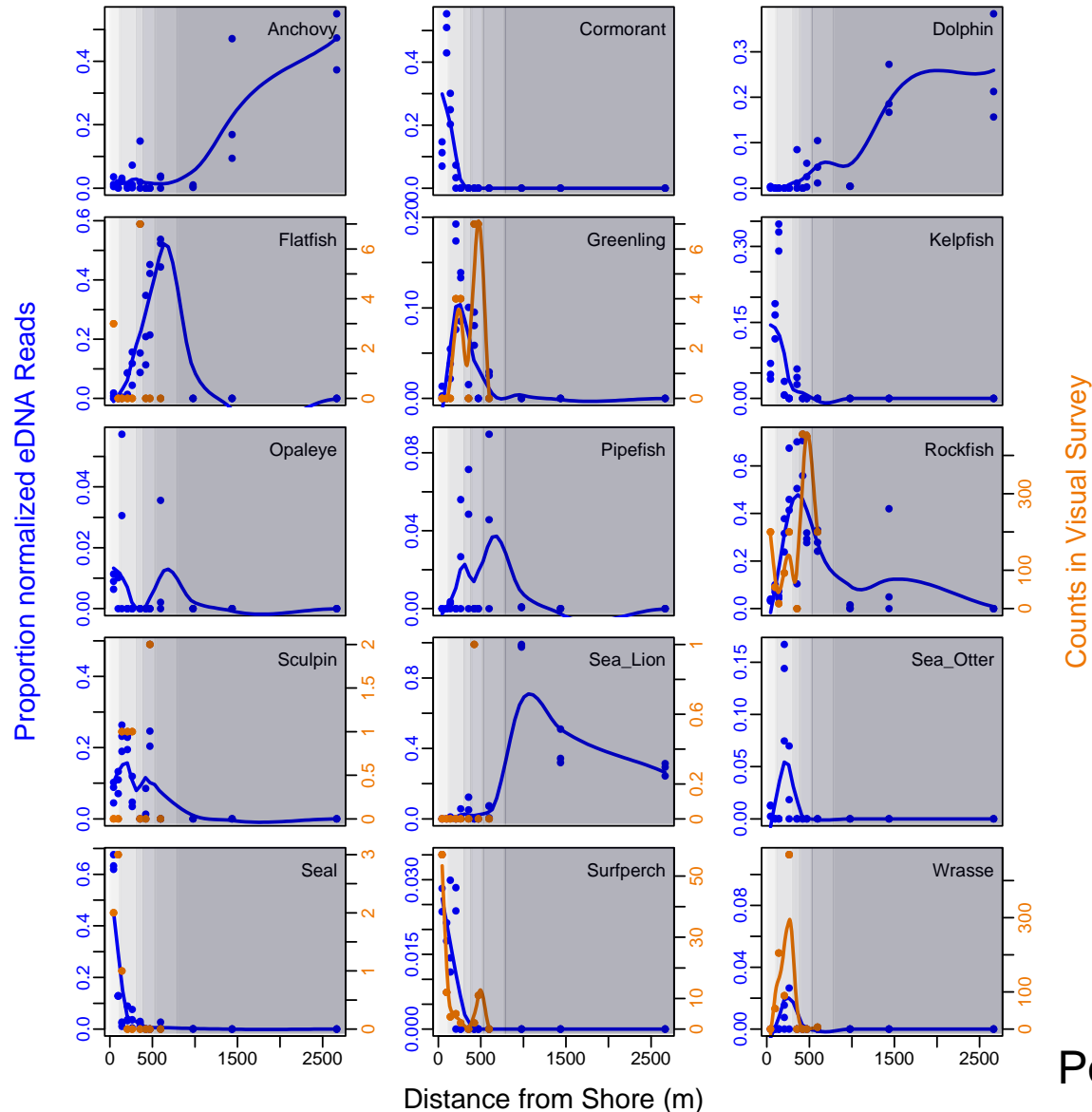
How to manage information

Bioinformatics

Comparison with traditional estimates

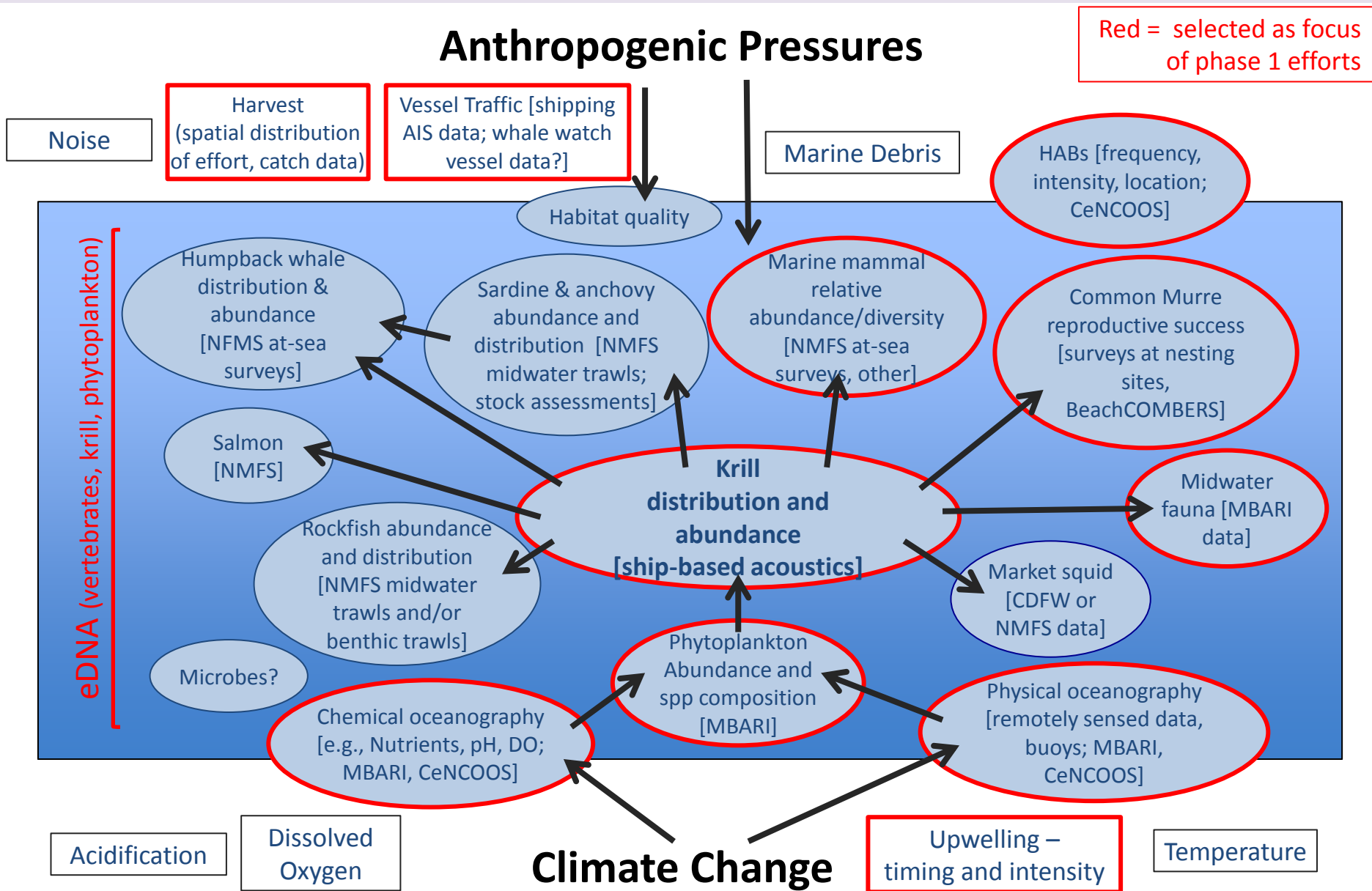
Strength

Spatial trends in eDNA and visual count data across the transect and habitats



MBON MB Case Study:

How does krill distribution and abundance influence patterns of biodiversity in the Monterey Bay National Marine Sanctuary?



Human in the loop
(samples from ships,
observers, etc.)

Sensor data
(moorings, gliders,
AUVs, floats, drifters,
etc.)

Video, acoustics,
genetics

Gridded products
(Satellites, models,
climatologies)

Integration (relational
database?)

Product generation

CeNCOOS partners

- Biological/biodiversity information from the MBNMS
- MPA enterprise
- PISCO
- Other?