NOAA Update
AICC Winter 2021 Meeting
February 4, 2021

David Allen, NOAA Arctic Research Program
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Updates from the 2020 NOAA Ship Oscar Dyson
DBO/EcoFOCI Cruise Aug 24-Sept 26, 2020

Jackie Grebmeier, Chief Scientist

At sea:
Catherine Berchok, NMML
Sarah Donohue, NOAA Corp
Charlie Wright, USFWS,
AMBON/UAF, plus Dyson
Officers and crew
2020 NOAA Arctic Cruise DY-20-12 (DBO/EcoFOCI Joint Cruise)

August 24-September 26, 2020; Seattle-to-Kodiak; NOAA Ship Oscar Dyson

**Goal:** evaluate ecosystem status and change at the DBO and EcoFOCI time series stations and deploy/retrieve ~25 NOAA time series moorings

**Standard measurements and process studies:**
- Physical: CTD/rosette; mooring retrieval and replacement (NOAA and UAF), deploy pop-up buoys
- Water column: nutrients, oxygen, chlorophyll-a, eDNA, Harmful Algal Blooms (HAB) phytoplankton type
- Bongo net: zooplankton abundance and biomass
- Seabird surveys

**Contact:**
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- Phyllis Stabeno/NOAA: phyllis.stabeno@noaa.gov
The Distributed Biological Observatory (DBO): Linking Physics to Biology

- **Core Ship-based sampling:**
  - CTD and ADCP
  - Chlorophyll, nutrients, carbon products
  - Plankton (size, biomass and composition)
  - Benthos (size, biomass and composition)
  - Seabird and marine mammal surveys
  - Fishery acoustics
  - Bottom trawling (every 3-5 years)

- **Autonomous sensor sampling:**
  - Gliders, moorings, saildrone
  - Satellite observations

- **DBO lines also embedded in process cruises**

- **DBO sites** (red boxes) are **regional “hotspot”** transect lines and stations, based on high productivity, biodiversity, and/or overall **rates of change**

- **DBO serves as a change detection array** for consistent monitoring of biophysical responses

- **Sites occupied by national and international entities** with shared data plan

[updated from Grebmeier et al. 2019, DBO DSR Special Issue 162:1-7]
NOAA’S EcoFOCI program:
- conducts research in the Gulf of Alaska, Bering Sea and US Arctic to understand the dynamic relationships among climate, fisheries, and the marine environment to ensure sustainability of Alaskan living marine resources and healthy ecosystems.
  
  ● LONG TERM ECOSYSTEM RESEARCH TO UNDERSTAND, ADVANCE AND PROTECT RESOURCES
  ● PRODUCTS THAT BENEFIT STAKEHOLDERS & FISHERY MANAGERS
  ● PARTNERS ACROSS FEDERAL and NON-FEDERAL

NOAA’s Arctic Program:

- provides science, service and stewardship to the Arctic and its inhabitants. During the last decade, the program has supported a research cruise to explore Distributed Biological Observatories in the Bering Sea and Chukchi Sea.

www.ecofoci.noaa.gov
EcoFOCI:
- ~6 cruises/year
- >100 days at sea/year
- Includes an Arctic Research Program cruise to the U.S. Arctic


• But in 2020...
• EcoFOCI participated in one research cruise, Oscar Dyson

  • maximum ice extent in 2020
  • 4 time series moorings: M2, M4, M5, M8

[Phyllis Stabeno]
R/V Dyson accomplishments

- >6,000 km traveled, 25 days at sea
- Sampled 5 Distributed Biological Observatories (DBO)
- Seabird Observer
- ~20 mooring sites (biophysical, marine mammals, and echo sounders), pop-up buoys,
- 68 CTD (nutrients, oxygen, chlorophyll-a), satellite-tracked drifters,
- 24 eDNA genetics samples
- 30 water column HABS
- 50 zooplankton tows

This cruise was a collaborative effort by NOAA’s Arctic Research Program, AFSC, PMEL, and academic partners. It was accomplished through the hard work of the shore-based staff, sea-going scientists, and the crew and officers of Dyson.
NORSEMAN II
October 2-22, 2020
Nome to Nome

- Chukchi Ecosystem Observatory recovery and re-deployment; new deployment at SLIP1 (near M8)
  - Arctic Marine Biodiversity Observing Network: zooplankton and e-DNA sampling
  - Distributed Biological Observatory grid
Norsemen II Cruise

- Connection between surface water column plant production and animals living in the underlying sediments
- Time series effort in the Distributed Biological Observatory (DBO) evaluates water column and sediment samples at regional biological hotspots
- RV Norseman II Oct 3-22 to sample marine sediment and macrofauna, physical, chemical, and zooplankton measurements at DBO sites
- Joint program between DBO, Arctic Marine Biodiversity Observing Network (AMBON), Chukchi Ecosystem Observatory (CEO) and NOAA EcoFOCI
- Deploy CEO and M8 moorings/sed traps

• DBO serves as a change detection array for consistent monitoring of biophysical responses

• Sites normally occupied multiple times during the year, but limited due to COVID 19 this year

(updated from Grebmeier et al. 2019, DBO DSR 162:1-7)
2021 EcoFOCI/DBO-NCIS Cruise
August 10-September 30, 2021; Seattle-to-Kodiak; TBD

Goal: evaluate ecosystem status and change at time series stations and deploy/retrieve ~25 NOAA moorings & Chukchi Environmental Observatory (CEO) mooring

Standard measurements and process studies:
- Physical: CTD/rosette; mooring retrieval and replacement (NOAA and UAF)
- Chemical: nutrients, oxygen-18
- Chlorophyll-a (chl-a), carbon components
- Water column: zooplankton and larval fish abundance and biomass
- Benthos: macrobenthos abundance, biomass and population structure
- Sediment: organic carbon/nitrogen content, chl-a content, grain size, harmful algal blooms
- Benthic oxygen uptake and nutrient exchange
- Seabird surveys

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