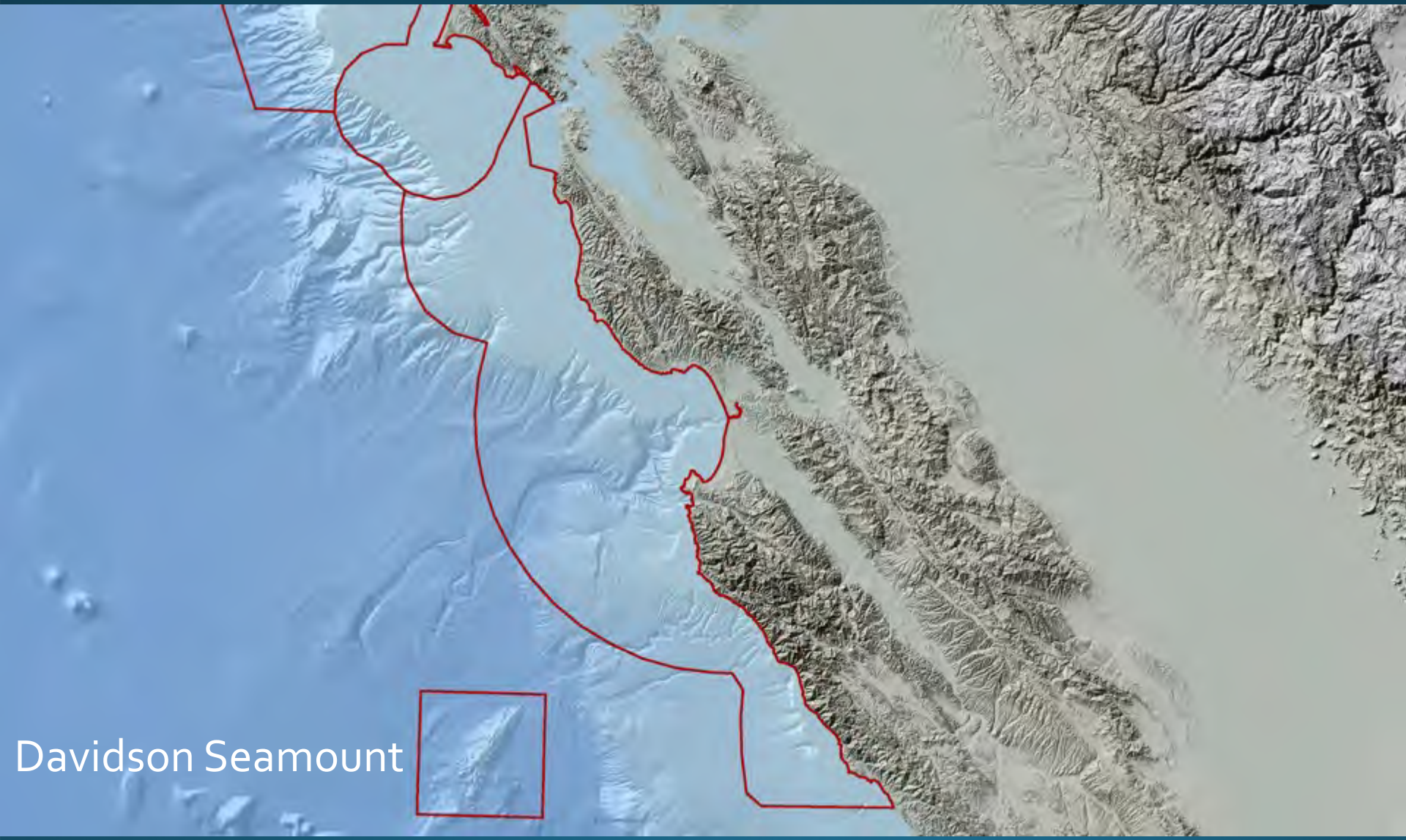
Research at Davidson Seamount
FSV *Bell M. Shimada*
July 15-24, 2018

Chad King

Monterey Bay National Marine Sanctuary



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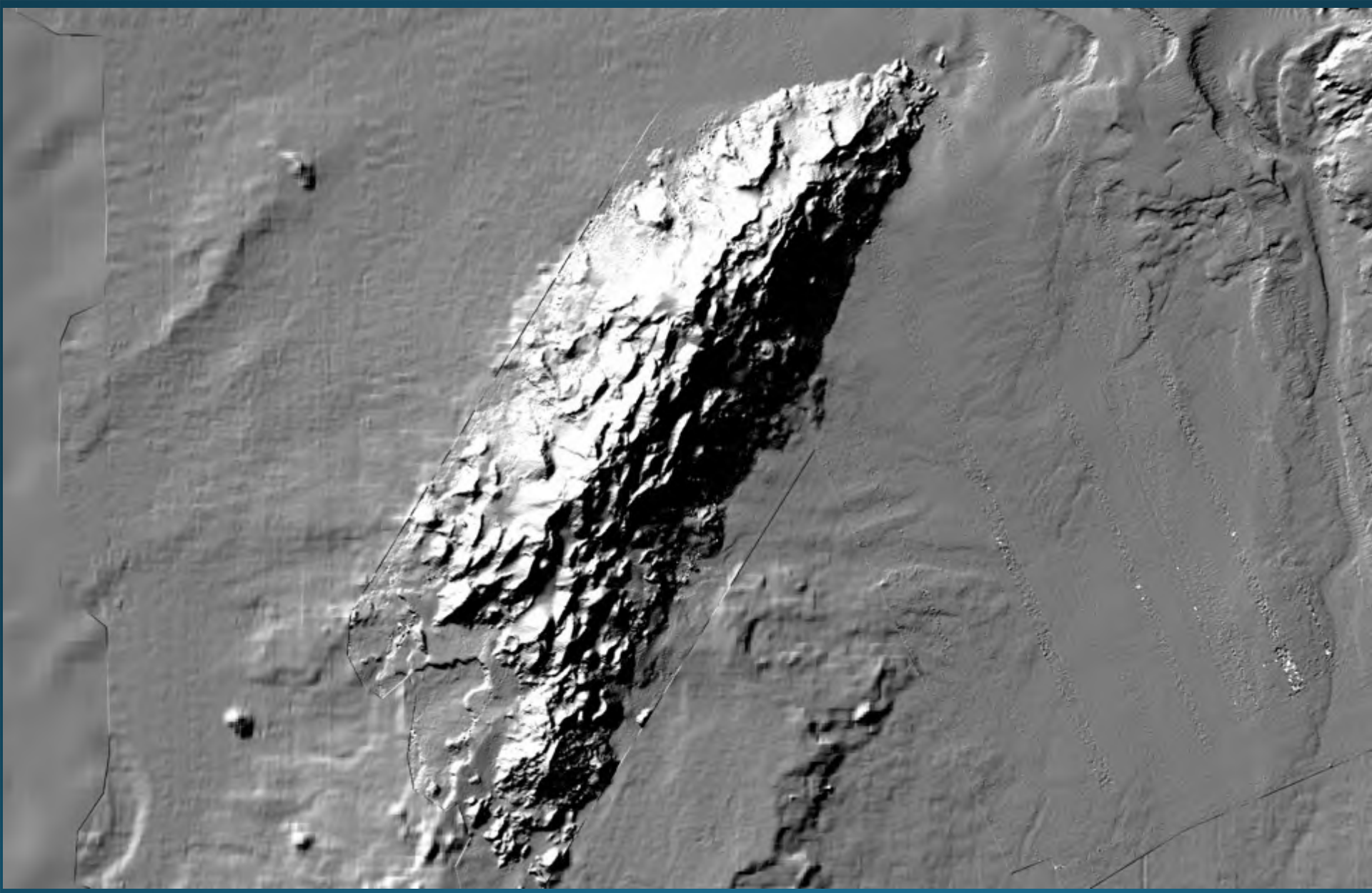

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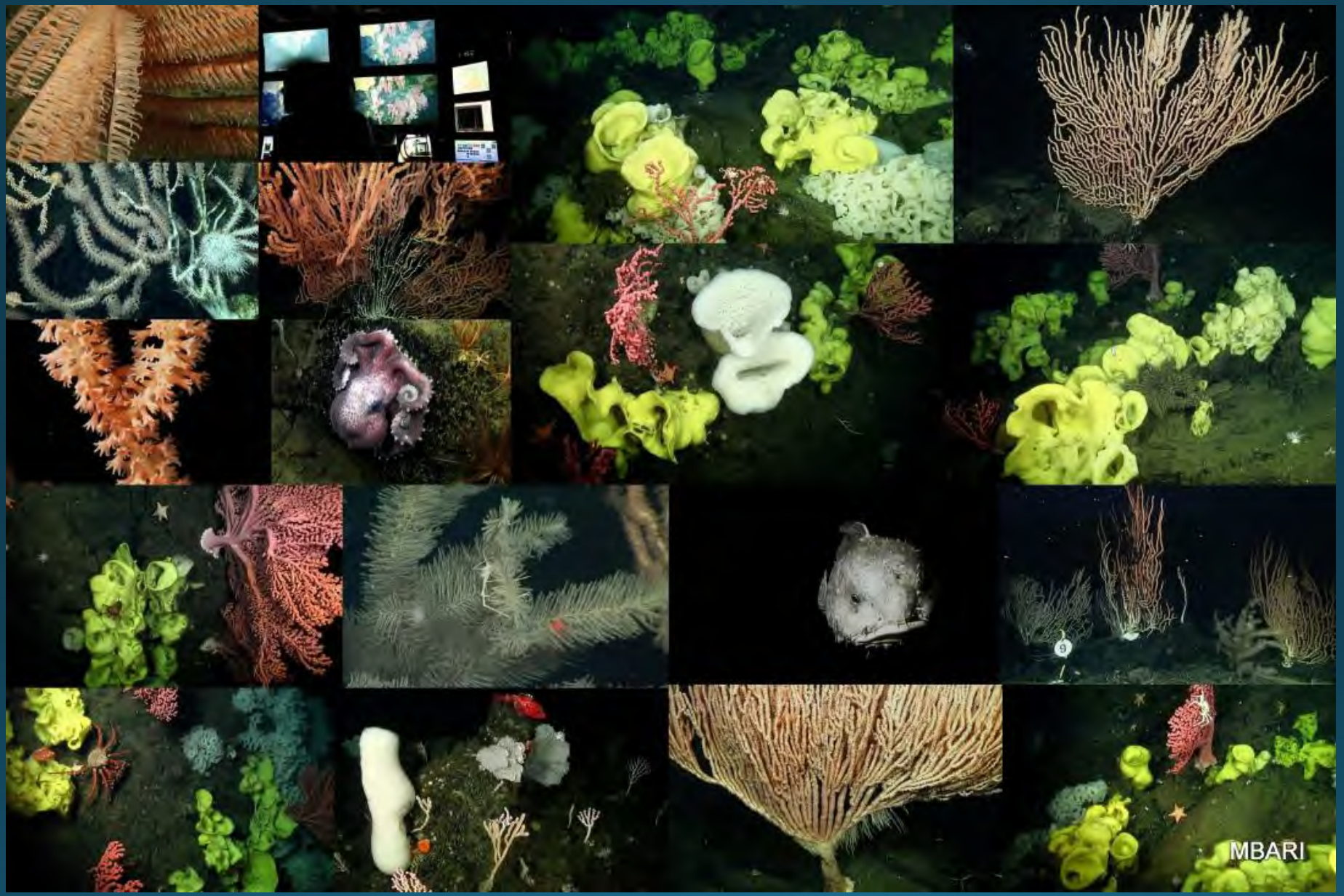

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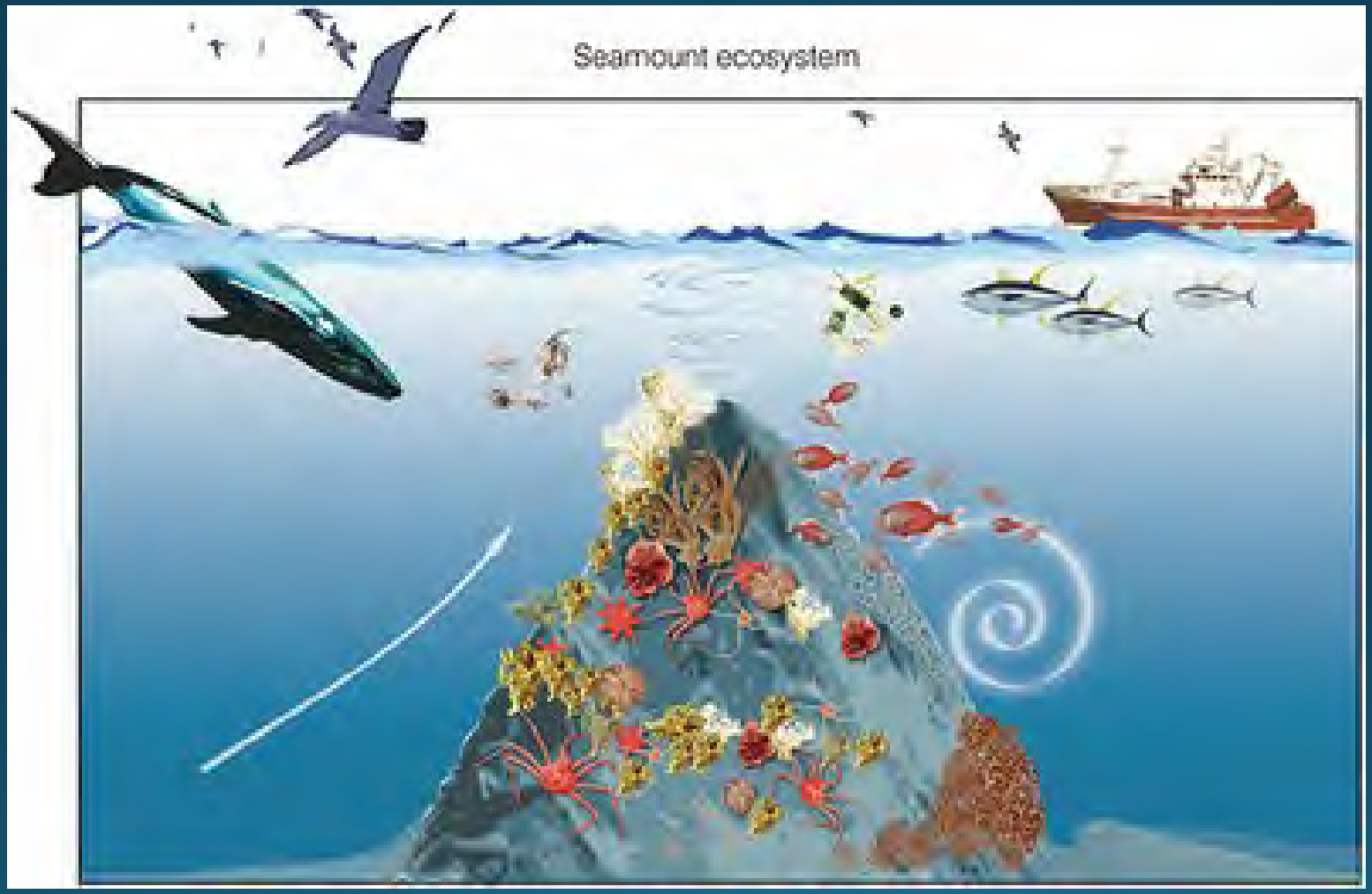

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Previous Expeditions

- MBARI - ROV (2000, 2002, 2006)
- NOAA Ship – surface (2004, 2010, 2015)

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NOAA FSV Bell M. Shimada

- Named after a Japanese oceanographer
- Considered one of the most advanced fishery science vessels
- Commissioned Aug 25, 2010
- 209 feet long
- Top speed 14 knots
- Range of 12,000 nm
- 13 science crew, 24 ship crew
- 24/7 operations
- Built to be "quiet" in the ocean

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Bell M. Shimada Equipment

- Wet and dry labs
- Echosounder
- CTD
- Oceanographic winch (6,800 lbs and 5,100 m of cable)
- 2 additional hydrographic winches (3,600 m)
- 2 trawl winches (7,200 lbs each, 4,300 m)
- Hydraulic third-wire winch (4,700)
- A-frame (22,000 lbs)
- Walk-in science fridge and freezer

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Main Goals

- To better understand the linkages between climate, oceanographic conditions, and the abundance and distribution of seabirds, marine mammals, and their primary prey species such as zooplankton and fish.
- To better understand the distribution of microplastics in the offshore environment, as it is an emerging issue that can threaten human health
- To better understand the distribution of persistent organic pollutants from main coastal sources to the offshore environment

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Main Objectives

- Conduct visual surveys along fixed transects to collect abundance and distribution data for seabirds, marine mammals, and other surface wildlife above and adjacent to Davidson Seamount Management Zone
- Drop CTD to collect profile of water data including temperature, salinity, fluorescence, dissolved oxygen, and turbidity;
- Collect underway temperature, salinity, and fluorescence data along preplanned transects;
- Collect underway acoustic data with the EK 60 to estimate zooplankton and ichthyoplankton biomass;

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Main Objectives (cont'd)

- Krill and midwater fishes survey above and adjacent to DSMZ ;
- Microplastics survey above and adjacent to DSMZ ;
- Collect three ≥ 200-liter samples of surface water along a transect from Monterey Bay to Davidson Seamount for analyses of persistent organic pollutants;
- Collect small amounts of water within chlorophyll maxima to analyze for domoic acid (harmful algal blooms)

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Projects

- Marine mammal and seabird surveys
- CTD casts
- Plankton tows (hoop net)
- Krill and fish tows (tucker trawl)
- Microplastics sampling
- Persistent Organic Pollutants (POP) sampling
- Echosounder
- Harmful algal bloom sampling

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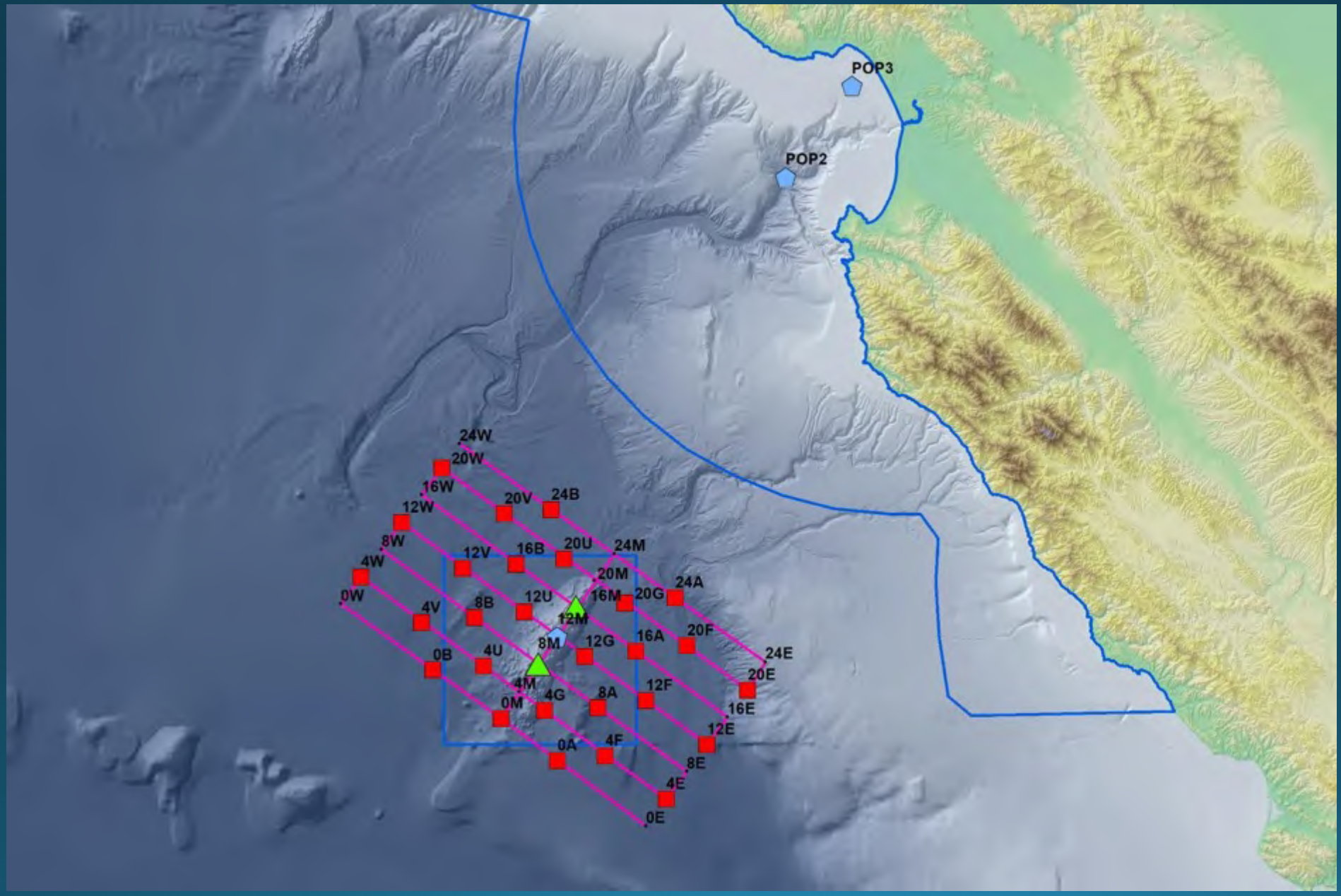
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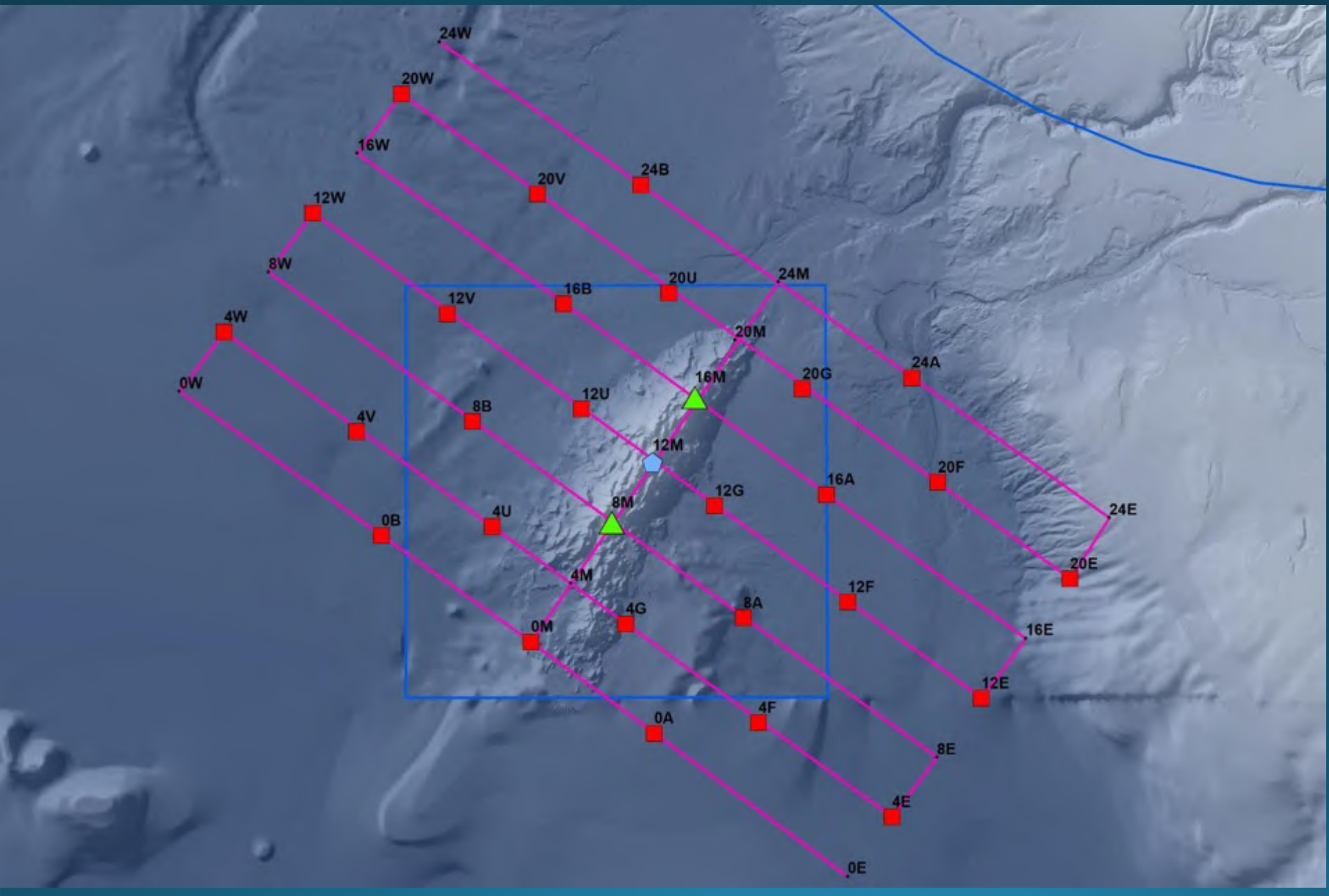
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Leaving San Francisco

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Wet and dry labs

Marine mammal surveys

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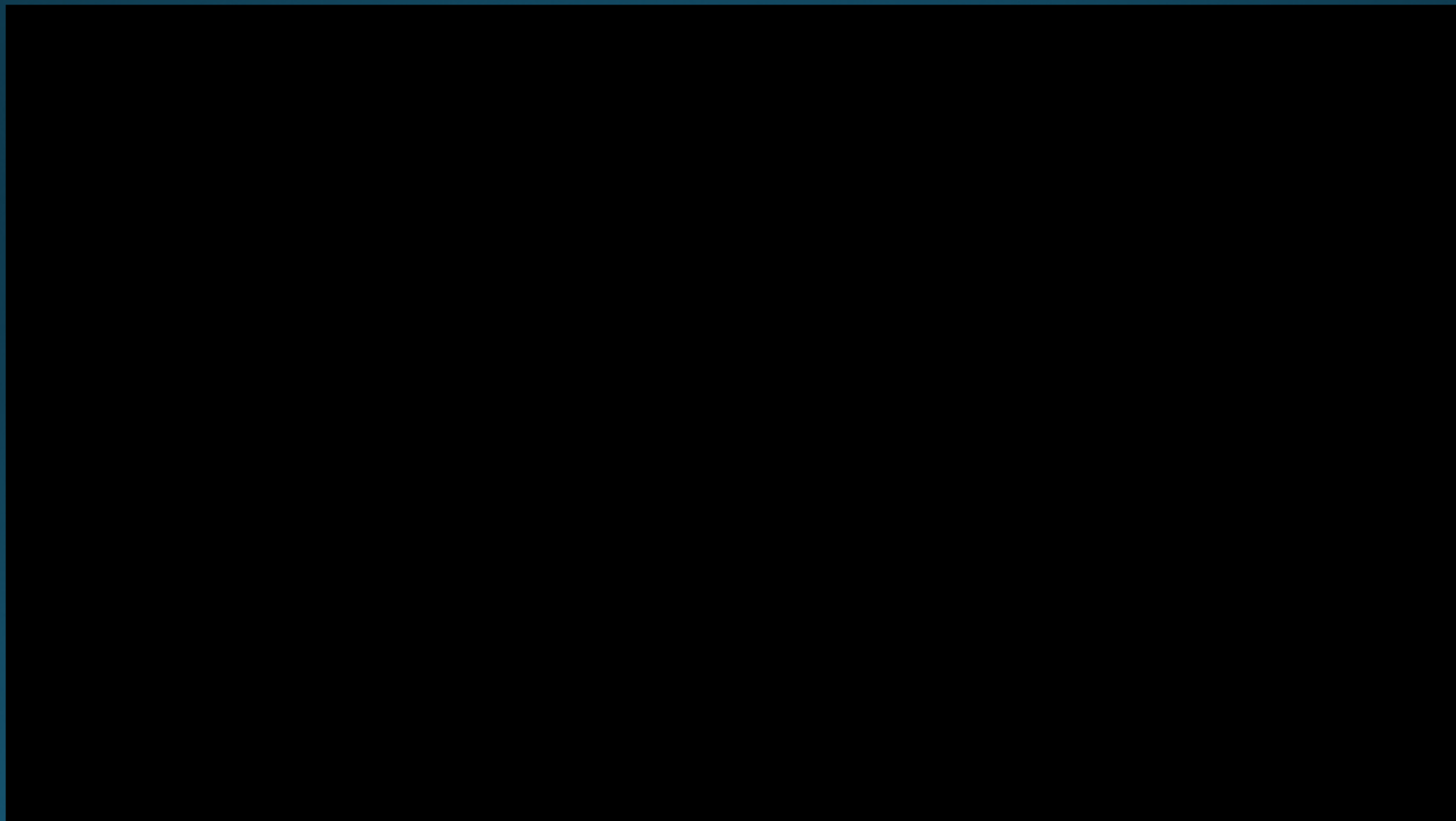
Seabird surveys



Sophie Webb

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Mammal	Type	Total
Short-beaked Common Dolphin	Cetacean	677
Unidentified Dolphin	Cetacean	180
Unidentified Whale	Cetacean	63
Fin Whale	Cetacean	58
Unidentified Fur Seal	Pinniped	23
Northern Fur Seal	Pinniped	15
Humpback Whale	Cetacean	6
Unidentified Mammal	Mammal	3
Blue Whale	Cetacean	2
Cuvier's Beaked Whale	Cetacean	2
Unidentified Otariid	Pinniped	2
Unidentified Cetacean	Cetacean	1
California Sea Lion	Pinniped	1
Guadalupe Fur Seal	Pinniped	1
Northern Elephant Seal	Pinniped	1
	Total	**1035**

Data are preliminary

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BIRDS	Grand Total
Cassin's Auklet	317
Red-necked Phalarope	215
Sooty Shearwater	132
Unidentified Phalarope	46
Leach's Storm-Petrel	36
Black-footed Albatross	23
Guadalupe Murrelet	9
Pink-footed Shearwater	7
Ashy Storm-Petrel	4
Unidentified Alcid	4
Northern Fulmar	3
Unidentified Storm-Petrel	3
Scripps' Murrelet	3
Rhinoceros Auklet	3
Whimbrel	2
Unidentified Murrelet	2
Common Murre	2
Red Phalarope	1
Unidentified Duck	1
TOTAL	**813**

Data are preliminary

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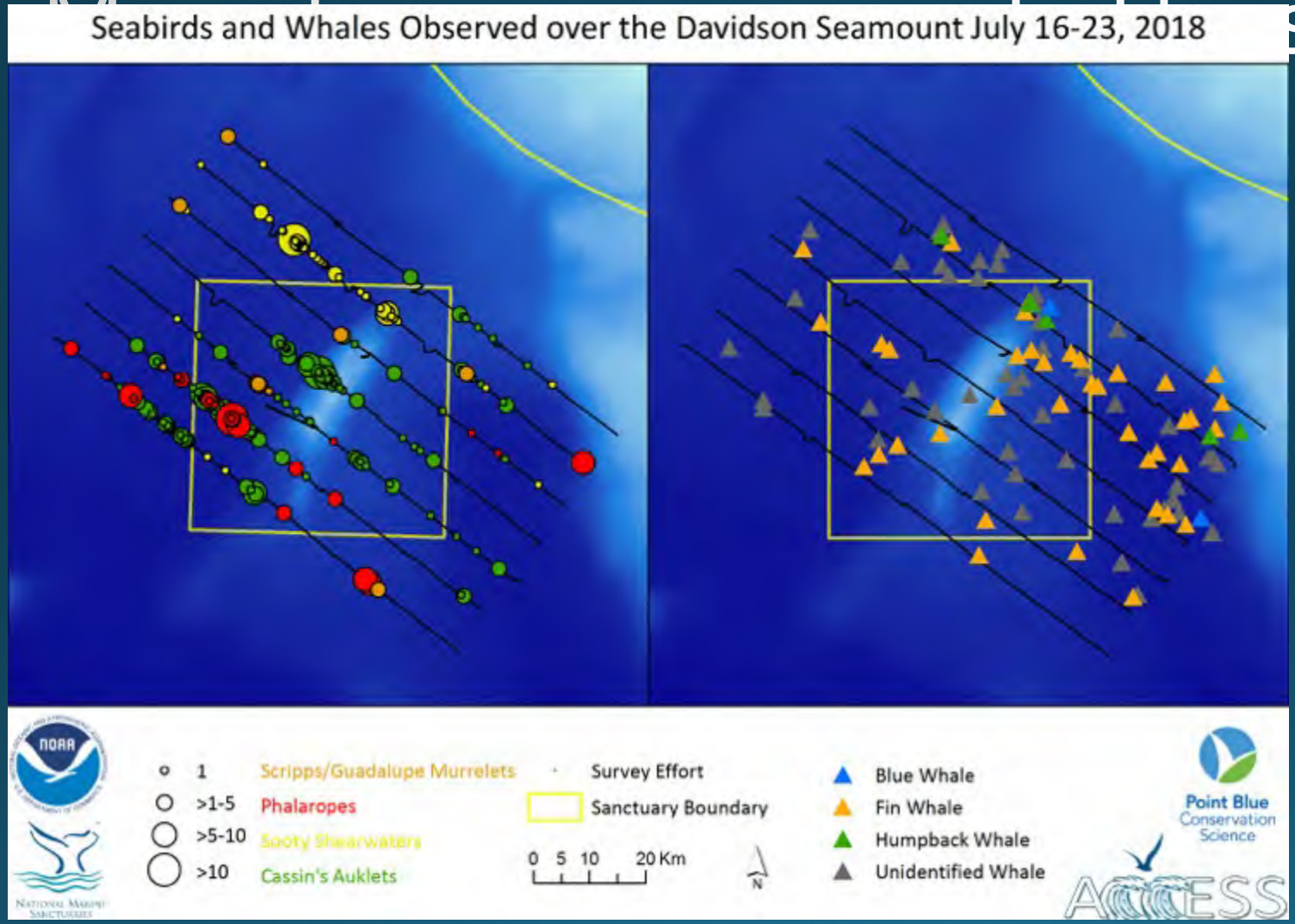
Map of [illegible] spp



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Oceanography - CTD

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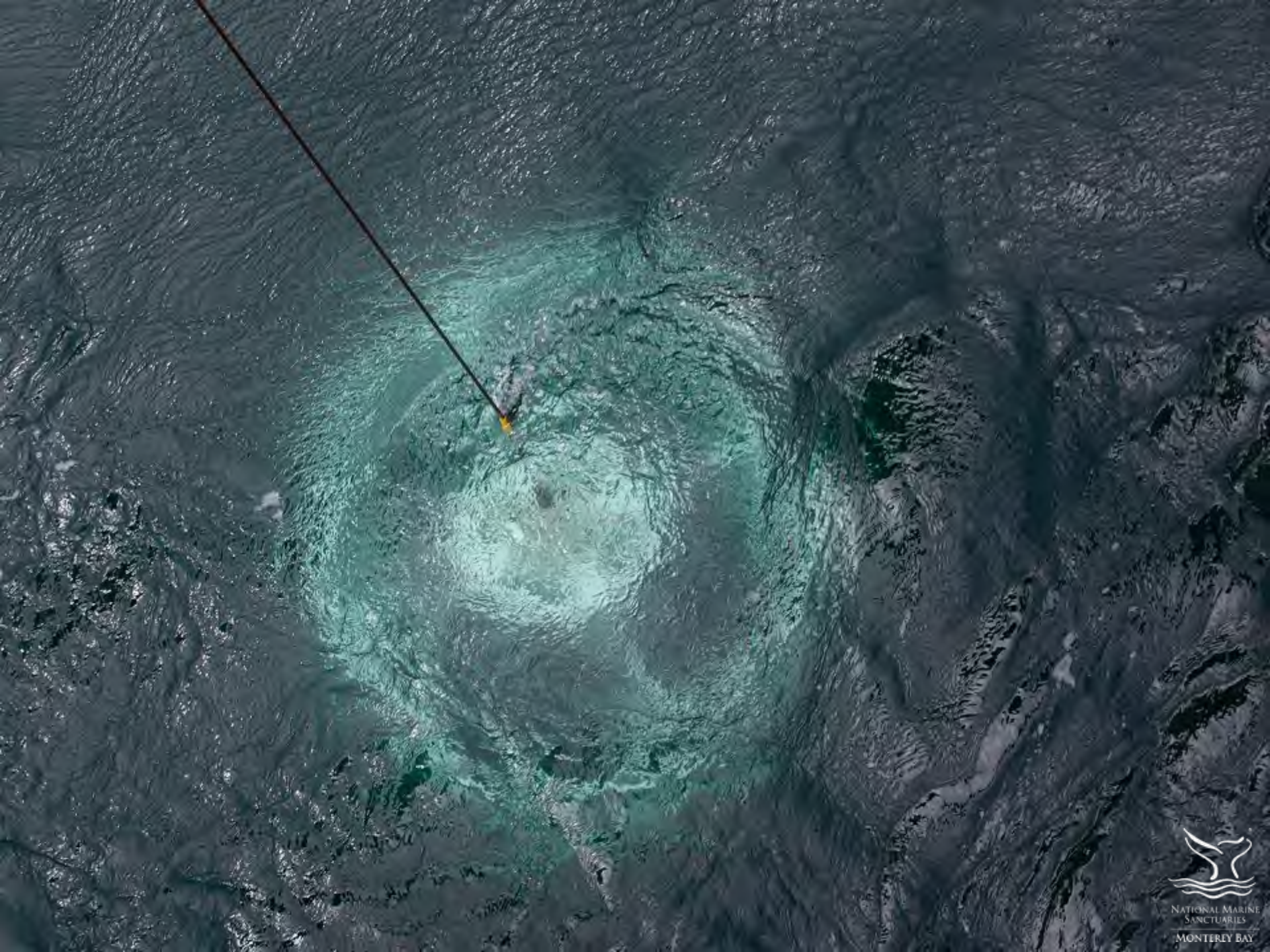
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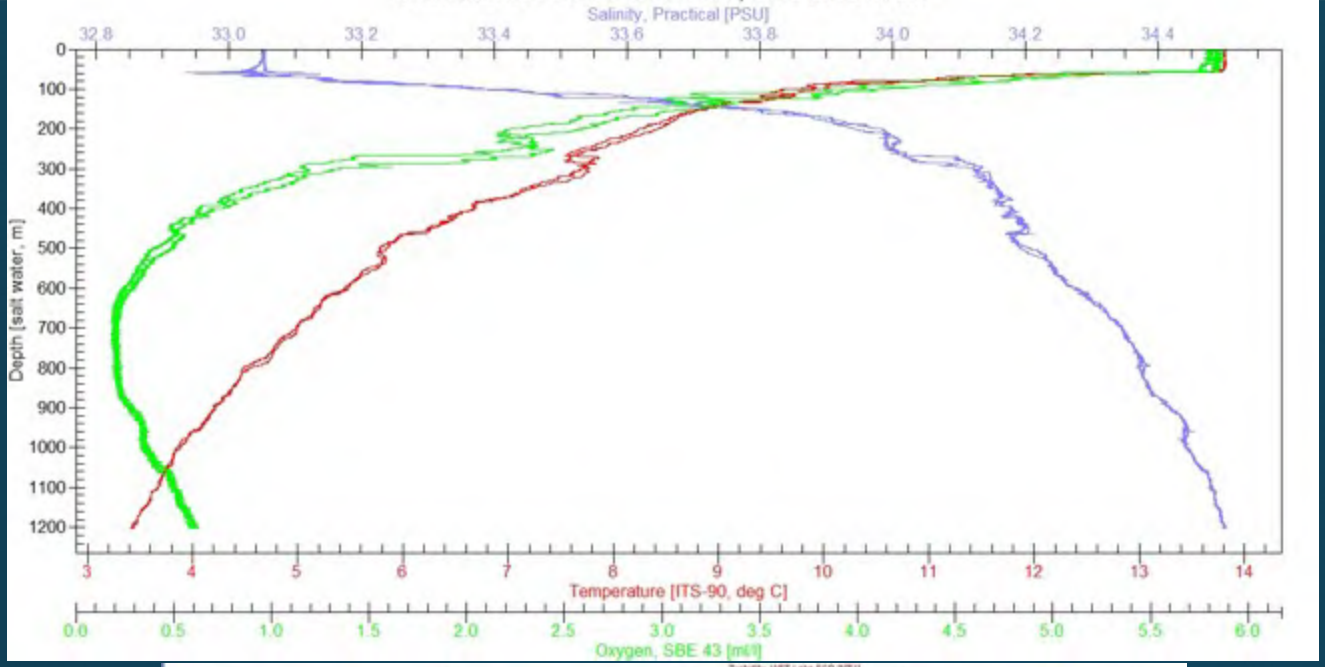

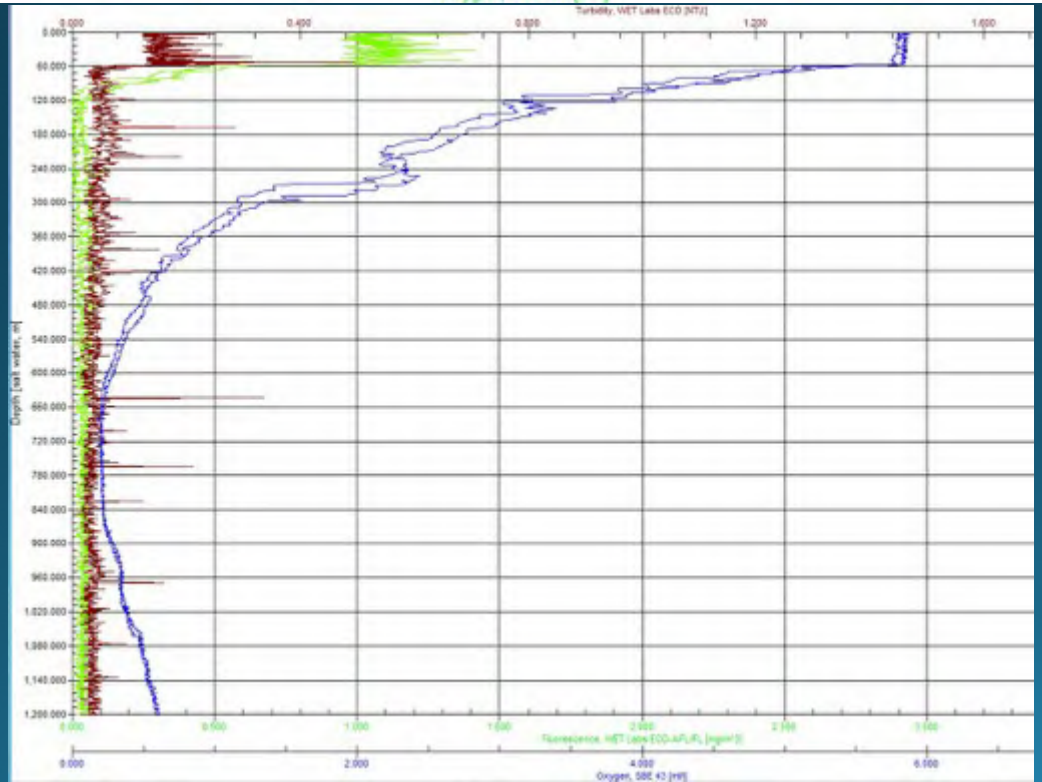

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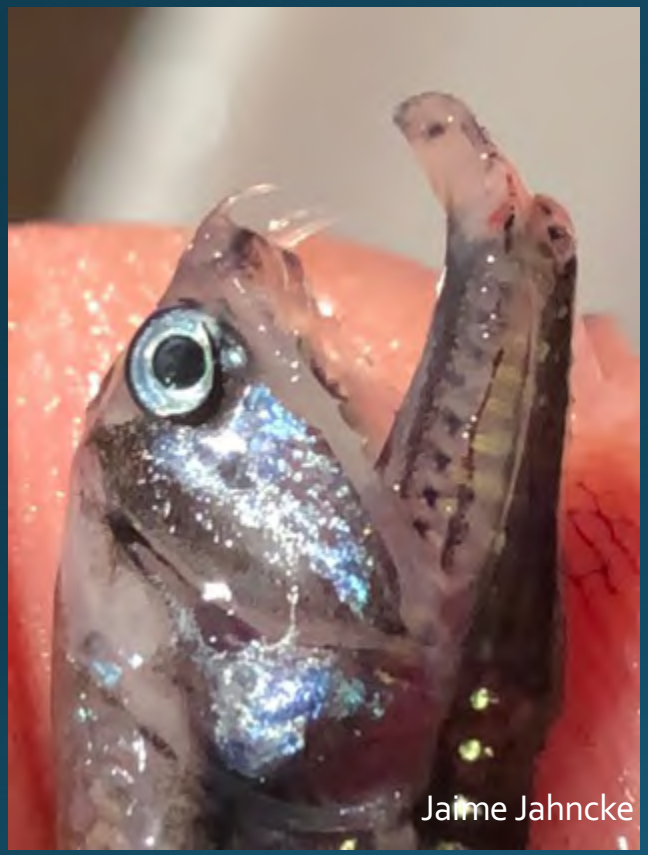
Hoop net (plankton)

Hoop net (plankton)

Hoop net (plankton)

Krill and fish sampling



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Jaime Jahncke

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Microplastics

Persistent Organic Pollutants

- Worked with Applied Marine Sciences
- 200 liters (@ 1 liter per min) is pumped over sampling media embedded within a steel column that attracts pollutants
- Pollutants include:
  - Polychlorinated biphenyls (PCBs)
  - Flame retardants
  - Chlorinated pesticides
- Sampling media to be tested in Canada

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Persistent Organic Pollutants

Mid-cruise transfer

KSBW-8 Report on 7/20/18

Summary of Survey Operations

	July 16	July 17	July 18	July 19	July 20	July 21	July 22	July 23	TOTAL
Fisheries Acoustic Survey(NM)	71	71	73	71	71	71	84	72	**584**
Phyto Net	0	0	0	0	0	1	1	0	**2**
Manta Net	0	0	0	3	0	3	0	0	**6**
Hoop Net	6	6	6	3	0	3	3	3	**30**
Tucker Trawl	2	7	6	0	0	6	6	4	**31**
POP Sample	0	0	0	0	1	0	1	1	**3**
Marine Mammal Transects(NM)	47	48	48	48	48	48	47	48	**382**
CTD	6	6	6	3	0	3	3	3	**30**
Sea Bird Transects(NM)	47	48	48	48	48	48	47	48	**382**

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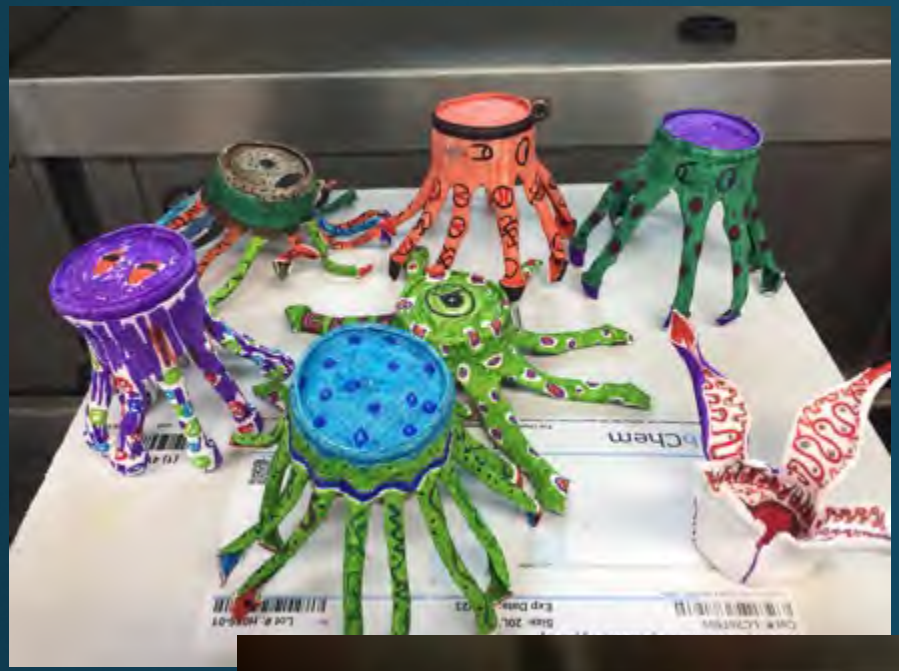

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https://sanctuarysimon.org/davidson2018

SIMoN
Sanctuary Integrated Monitoring Network

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Cruise Blog: Exploring sea life over Davidson Seamount: a research cruise in the Monterey Bay National Marine Sanctuary (July 15-24, 2018)

Overview | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 | Day 6 | Day 7 | Day 8 | Day 9 | Videos

Day 3 - July 18, 2018

Science Spotlight: zooplankton sampling with a hoop net

Another science goal on this cruise over Davidson Seamount is to collect zooplankton (drifting animals) at 50 meters (164 feet) depth using a type of sampling net called a hoop net. This equipment is comprised of a towing line and bridles, to be able to deploy and retrieve the net, attached to a large steel hoop. A nylon mesh net is attached to the large hoop, with varying mesh size, depending upon the target species to be collected. For sampling zooplankton at this depth, we are using a 200µm diameter net, which acts like a funnel for species caught inside the net. A cod end is at the base of the net and acts as a trap for anything larger than 200µm, yet allows seawater and anything smaller to pass through.

A hoop net is cast off the NOAA ßell Shimada. (Photo: Amity Wood/NOAA)

A Time Depth Recorder (TDR) is also attached to the hoop net, recording depth every 10 seconds to verify the net reached 50 meters deep. Once depth is reached, the hoop net is returned to topside

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Thanks to….

- Science Crew
  - Erica Burton
  - Sophie DeBeukelaer
  - Jennifer Brown
  - Amity Wood
  - Camisha Few
  - Ryan Anderson
  - Olivia Boisen
  - Sara Driscoll
  - Julie Howar
  - Nicholas Ingram
  - Jaime Jahncke
  - Grace Kumaishi
  - Miya Pavlock-McAuliffe
  - Cotton Rockwood
  - Rudyard Wallen
  - Sophie Webb
- Others
  - Point Blue Conservation Science
  - Andrew DeVogelaere
  - Dawn Hayes
  - Dane Hardin – Applied Marine Service
  - Kendra Negrey – UCSC
  - Phil Sammet
  - Bryan Begun
  - Crew of the Shimada!
  - KSBW & KION

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NA103: Monterey Bay National Marine Sanctuary

Science Objectives

Oct 21 – Nov 1, 2018

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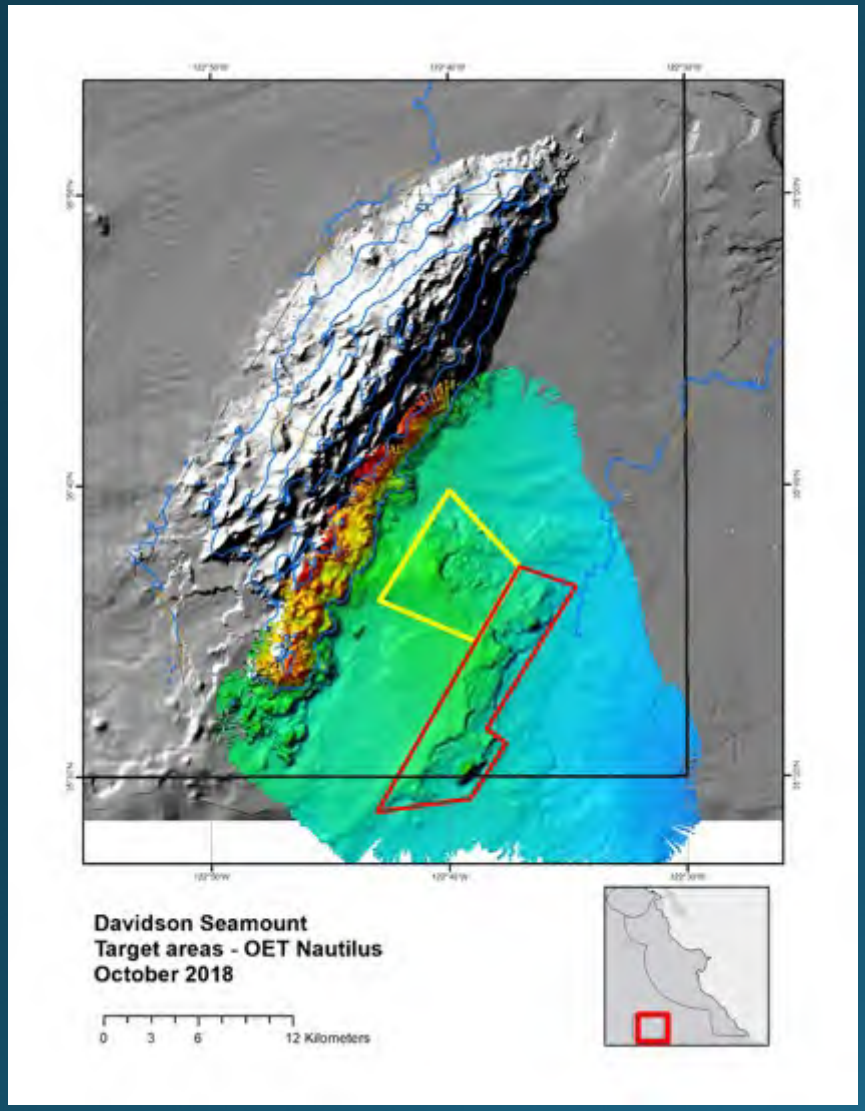
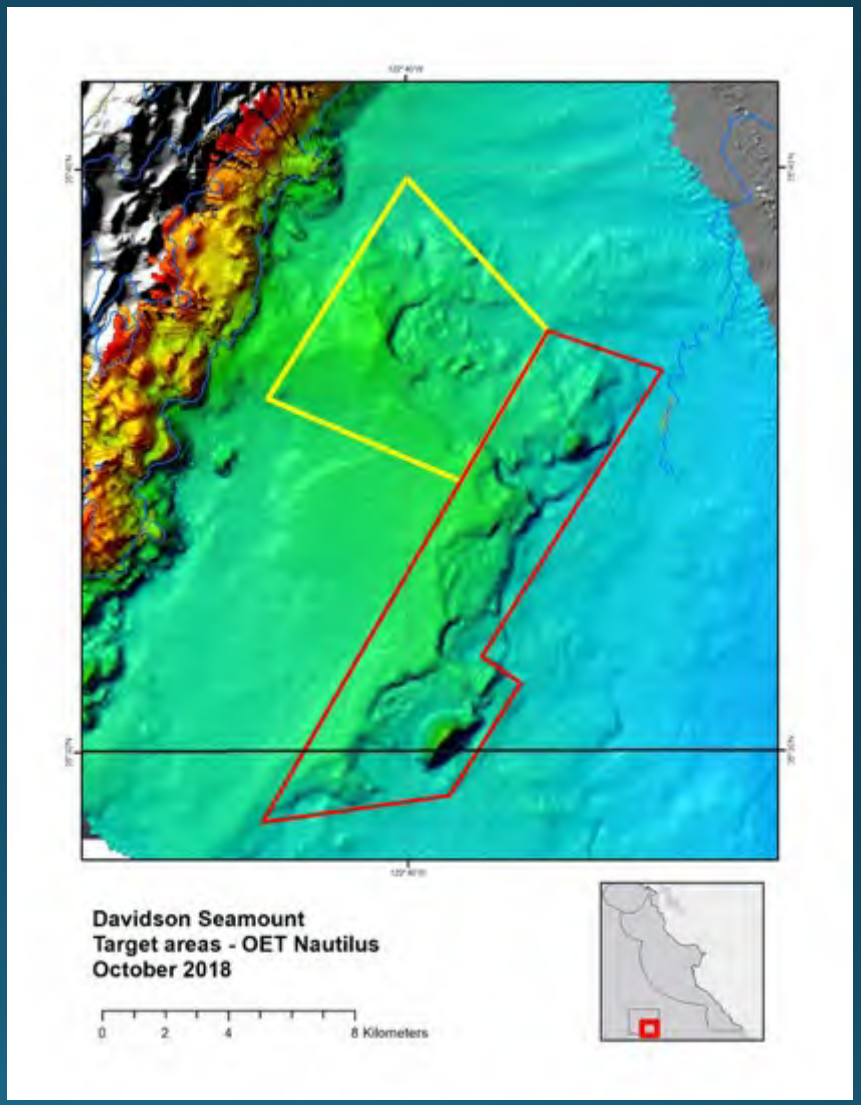
OCEAN EXPLORATION TRUST





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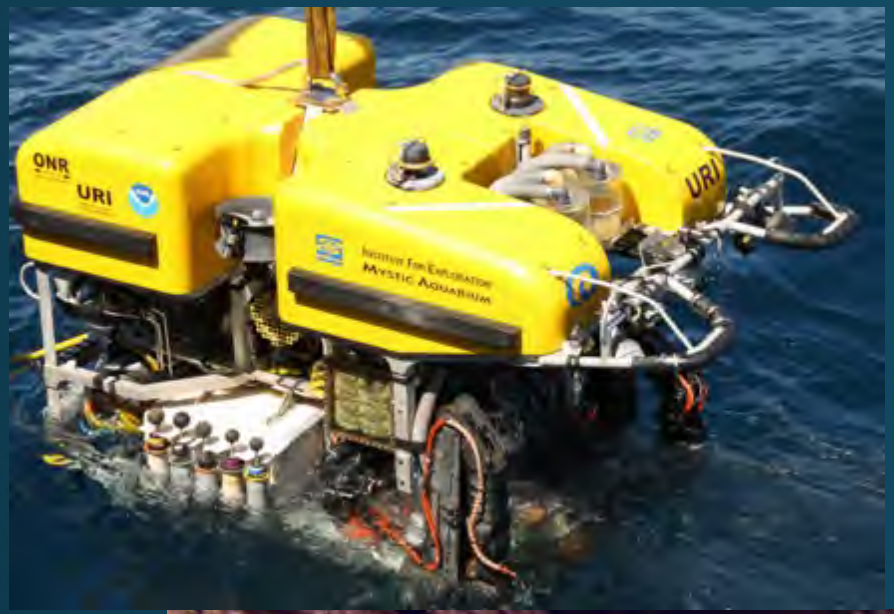

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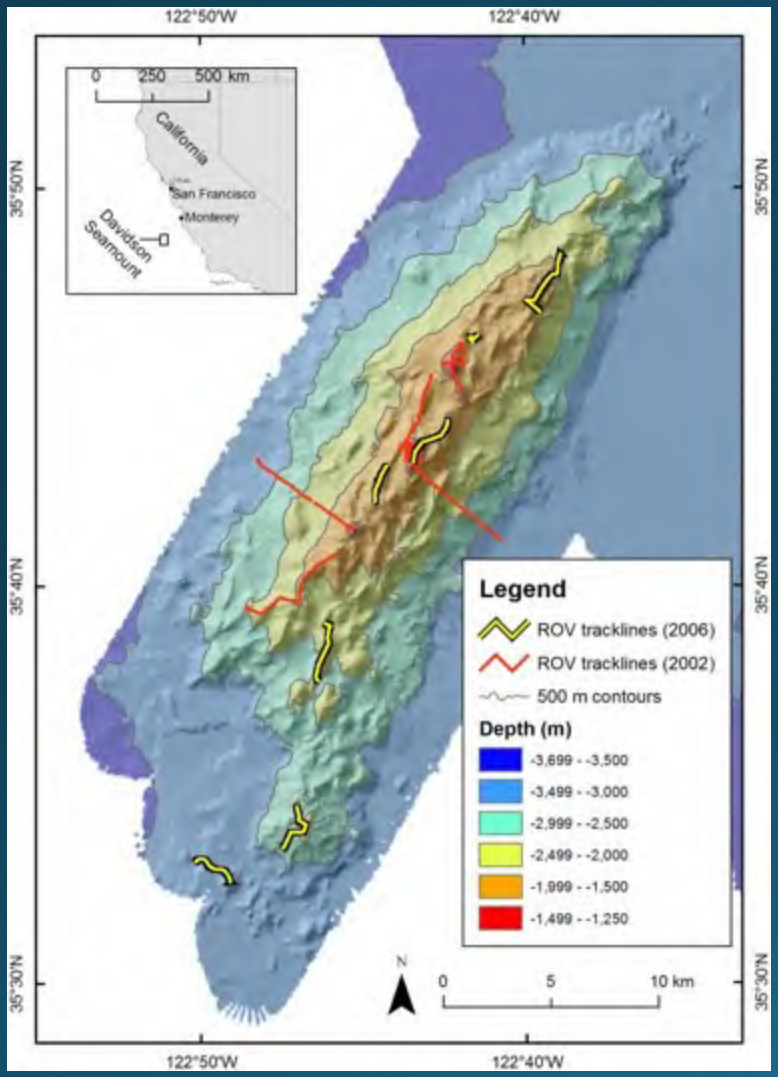

ROV Dive Tracks

- 2002: 6 dives
- 2006: 11 dives
- 140 hours video and sample collection

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Main Objectives

- use a remotely-operated vehicle (ROV) to complete initial surveys of the unexplored rocky habitat to characterize the area and document distribution, abundance, and species associations of deep water corals, sponges, and other biota;
- collect biological specimens to accurately describe and study the species observed;
- analyze fish tissue for poly-chlorinated biphenyls (PCBs); and
- analyze water and sediment samples for PCBs and organochlorine pesticides (such as DDT)

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OET Communications Workshop

U of Rhode Island, April 2018

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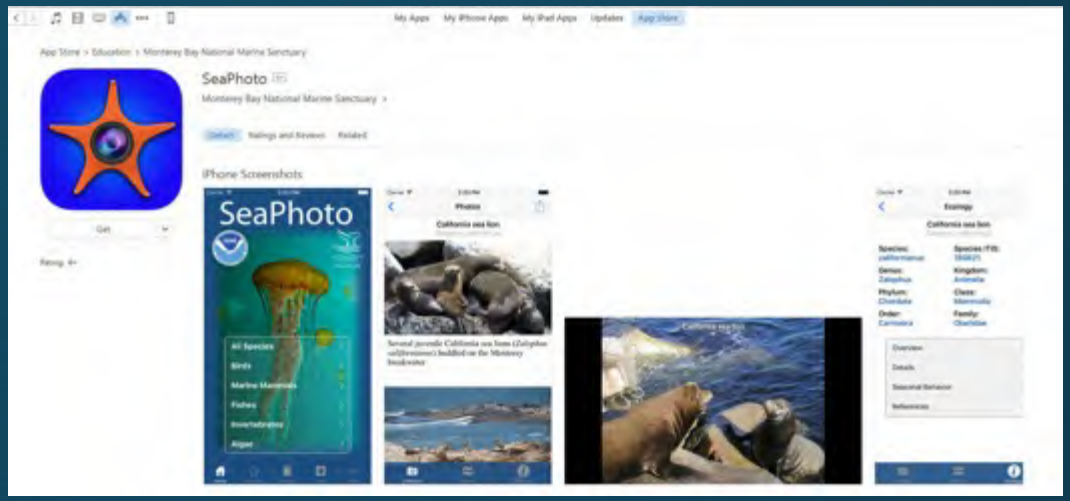
NautilusLive.org

Thanks!



- Resources
  - Sanctuarysimon.org
    - Photo library, research projects, species database and more
  - SeaPhoto (both iOS and Android)
  - Montereybay.noaa.gov
  - Davidson Seamount Taxonomic Guide - https://sanctuaries.noaa.gov/science/conservation/taxonomic.htm

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