Quick Look

EXPRESS Cruise on RV *Bell M. Shimada* SH-18-12

EXPRESS Deep Sea Coral and Sponge Cruise

Accomplishments by the numbers…….

Sites Studied	15
AUV Dives	24
ROV Dives	37
ROV Transects	150
Water Chemistry Samples	123
Coral Samples	41
Sponge Samples	54
Geological Samples	10

The cruise was supported by NMFS' Deep Sea Coral Research and Technology Program and was jointly planned by NOAA (NOS, NMFS), BOEM, and USGS. Research conducted during this cruise is part of the four year West Coast Deep Sea Coral Initiative.

Goals of the cruise were to:

- Collect Essential Fish Habitat baseline information at 12 sites proposed for modification by the Pacific Fishery Management Council
- Revisit previously surveyed sites to document if changes have occurred over time
- Collect information to validate BOEM supported cross-shelf habitat suitability models
- Collect samples to help in identifying west coast corals and sponges and expand use of new technologies

What is EXPRESS?
In 2018, a team of federal and non-federal partners initiated a new phase of collaborative science off of the western United States. The **EX**panding **P**acific **R**esearch and **E**xploration of **S**ubmerged **S**ystems (EXPRESS) campaign targets deepwater areas off California, Oregon, and Washington.
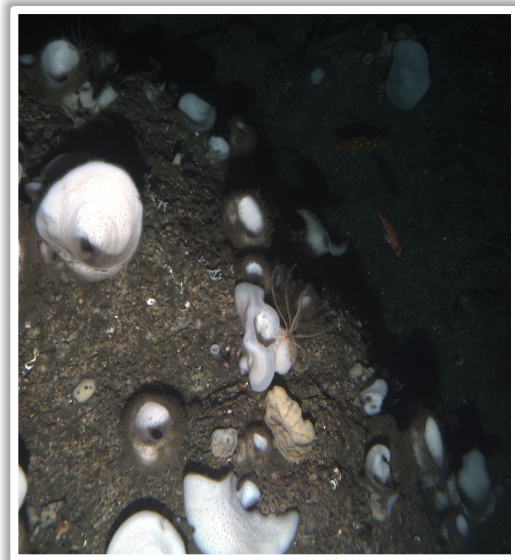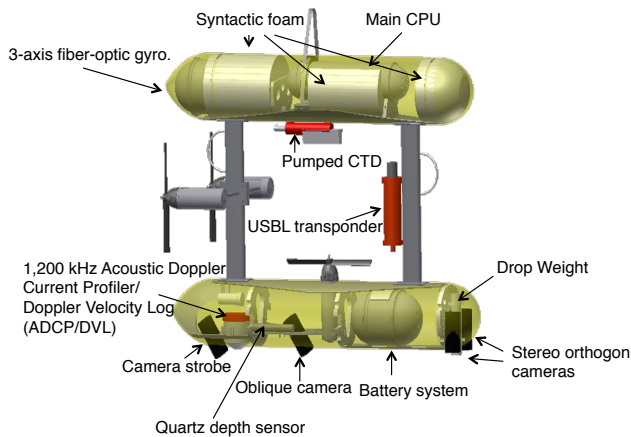

Sponge garden on Daisy Bank

The Technology

NMFS' SeaBED Autonomous Underwater Vehicle (AUV) is able to dive to depths of 2000 meters. This is a bottom-tracking AUV that can take photos on pre-programmed dives near the bottom (2.5 meters above the bottom) without being tethered to the ship.
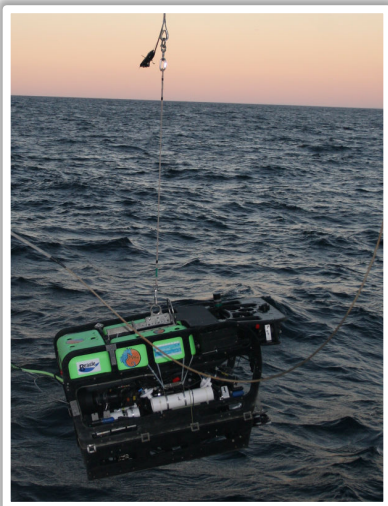

Scientists and crew deploy AUV from RV Shimada

Primary Payload on SH-18-12
- Three digital still cameras lighted by a strobe
- Temperature, Salinity, Oxygen Sensors
- OAR's MAPR (miniature autonomous plume recorder for identifying methane seeps)

MARE's Remotely Operated Vehicle (ROV) can be controlled remotely from the ship. The vehicle can dive to over 600 meters and the cameras and thrusters are controlled from the surface via a tether. A manipulator controlled from the surface can be used to collect samples.
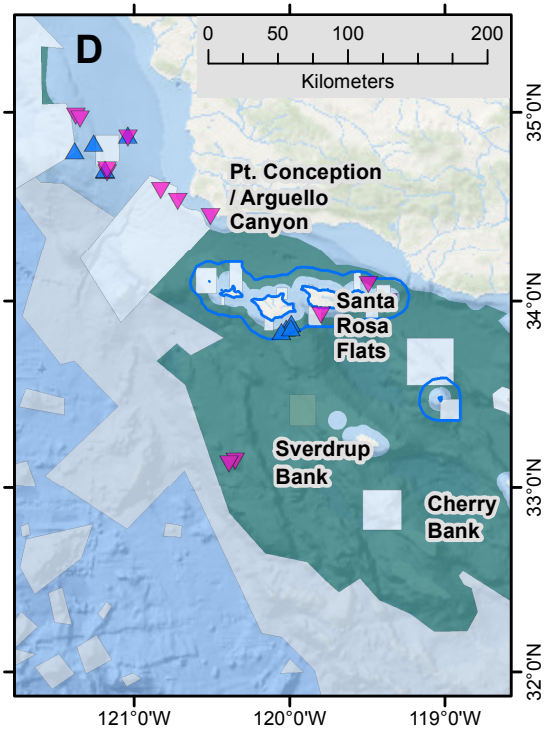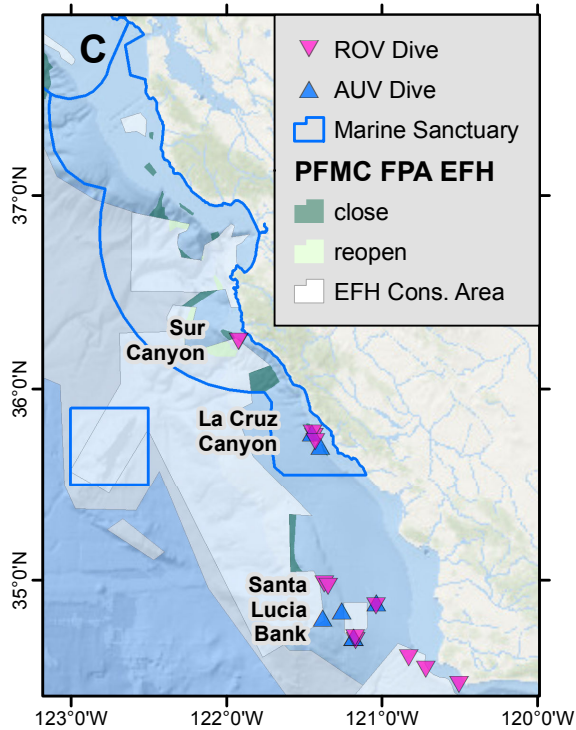

Primary Payload on SH-18-12
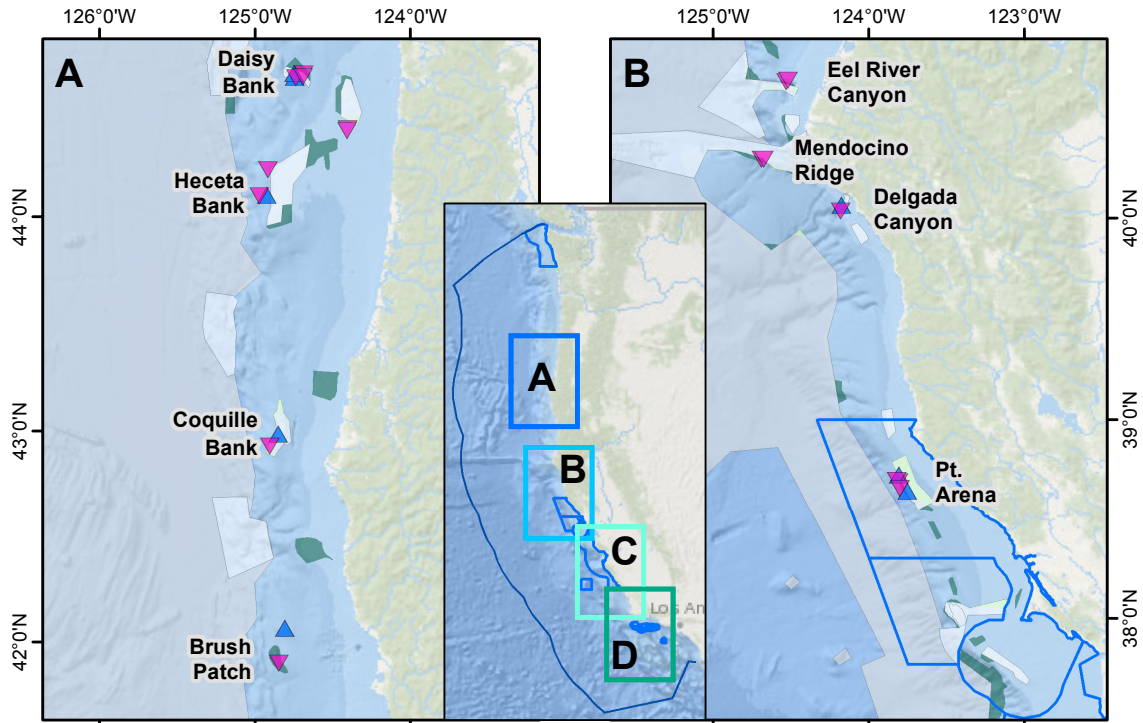- Forward and Vertical Video Cameras
- Forward HD Still Camera
- Manipulator
- Temperature, Salinity, Oxygen Sensors
- OAR's MAPR (miniature autonomous plume recorder for identifying methane seeps)

ROV being deployed from RV Shimada

Fifteen Sites Successfully Surveyed

A
- Daisy Bank
- Heceta Bank
- Coquille Bank
- Brush Patch

B
- Eel River Canyon
- Mendocino Ridge
- Delgada Canyon
- Pt. Arena

C
- Sur Canyon
- La Cruz Canyon
- Santa Lucia Bank

D
- Pt. Conception / Arguello Canyon
- Santa Rosa Flats
- Sverdrup Bank
- Cherry Bank

Legend:
- ▼ ROV Dive
- ▲ AUV Dive
- ▢ Marine Sanctuary

PFMC FPA EFH
- close
- reopen
- EFH Cons. Area

Scale: 0 — 50 — 100 — 200 Kilometers

Coral, Swiftia sp., collected at Daisy Bank

Range Extensions - New Species?

We collected numerous samples for taxonomic and genetic identification and isotope analysis of sponge and coral species. We also have identified many fish species based on video transects. Already we have identified several range extensions, collected several potential new species of sponges and collected coral samples that will aid in description of a new species that has only been observed twice before on the West Coast.

Monitoring Change

We revisited sites surveyed by the same AUV in 2005. This will give us an indication if, after the original Essential Fish Habitat closures put in place in 2005, there are any changes in the fish, coral and sponge populations evident. We also collected baseline information in many areas in which new EFH boundaries are proposed.
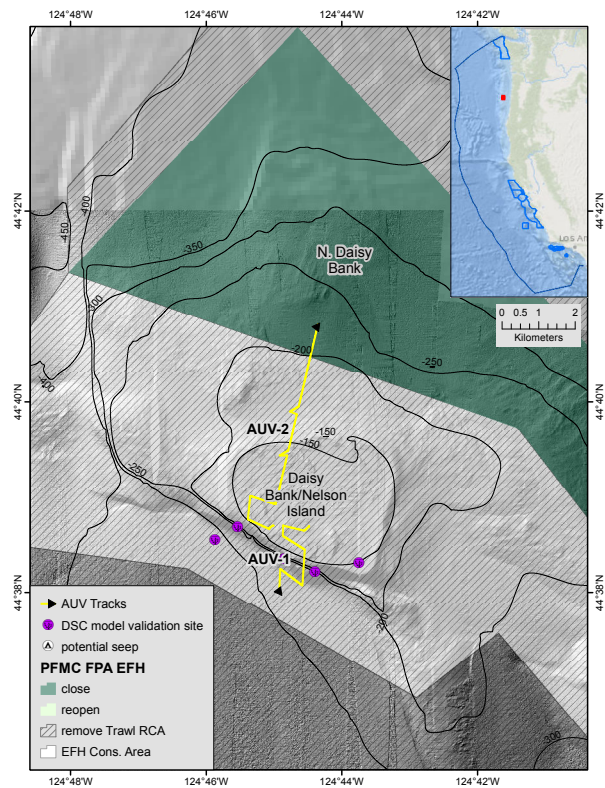
AUV dive tracks on Daisy Bank
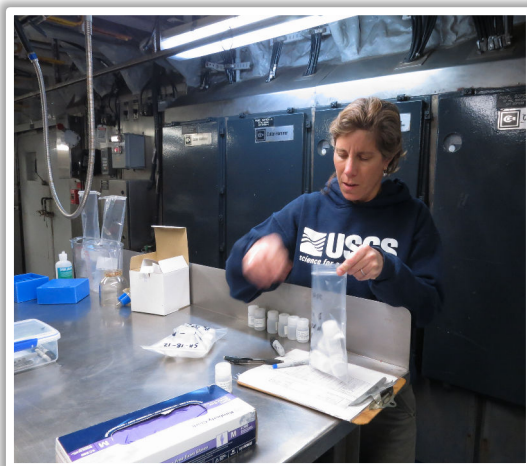
Testing New Technology - eDNA

One of the most promising new techniques in marine genetics is the analysis of environmental DNA (eDNA). Analysis of eDNA may be able to tell us the what corals and sponges are in the area by merely a looking for their DNA in water samples. Meredith Everett collected 27 samples of water near corals to see if the DNA of the corals can be identified in the surrounding water.

Meredith Everett filters water for eDNA analysis

Information to refine models to predict coral and sponge presence

With support from BOEM, NCCOS is working to develop a cross shelf model to predict suitable habitat for sponges and corals. However, to get the best results every model should be validated. We were able to survey areas, supplied by Matt Poti at NCCOS, that the model predicted were suitable. We successfully surveyed dozens of "Poti points" as they were dubbed by the scientists on the ship. This data will improve the model. This will allow the model to improve its results using data collected on this cruise.

Corals and sponges near La Cruz Canyon

Water Chemistry

Nancy Prouty and her team of Nancy Foster Scholars, Carina Fish and Nissa Kreidler, and Chelsea Souza, collected water column samples for vertical profiles of nutrients (n=104, major/minor elements (n=104), water isotopes (n=87), alkalinity (n=91), pH (n=91) and dissolved inorganic carbon (n=49). These measurements will provide a spatial gradient of water column properties that influence coral and sponge habitat, including nutrient availability and aragonite saturation state.

Nancy Prouty prepares water samples

With many thanks to the officers and crew of the RV *Bell M. Shimada*. Their skill, enthusiasm, and dedication made this work possible.