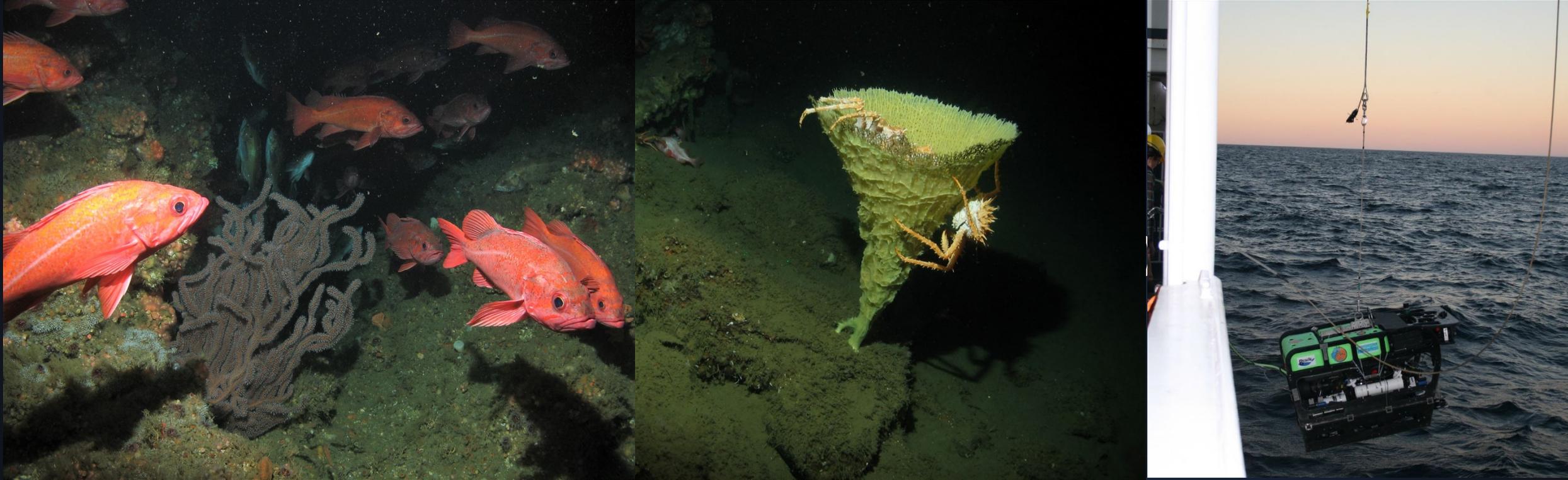


Facilitating Conservation and Management of Deep-Sea Corals and Sponge Ecosystems through Partnerships, Education and Outreach

Lizzie Duncan (Channel Islands National Marine Sanctuary & Cardinal
Point Captains, Inc.)

West Coast Deep-Sea Coral Initiative (WCDSCI)



2018 workshop prioritized:

- Research objectives to inform policies and decision making

West Coast Deep-Sea Coral Initiative (WCDSCI)



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Deep Coral Communities Curriculum

Deep-sea coral communities, like the ones found in the national marine sanctuaries of the West Coast, are home to many diverse species. This curriculum takes students into the deep sea to identify the soft corals, hard corals, invertebrates and fish found in these communities and to investigate the unique biology of deep-sea corals. Learn the threats these animals face and what we can do help protect them.

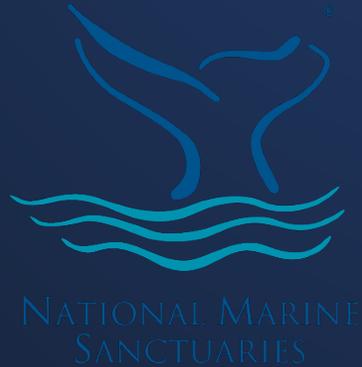
2018 workshop prioritized:

- Research objectives to inform policies and decision making
- Management & outreach objectives to communicate science and outcomes

Target Audiences of the WCDSCI

- Management agencies

Target Audiences of the WCDSCI

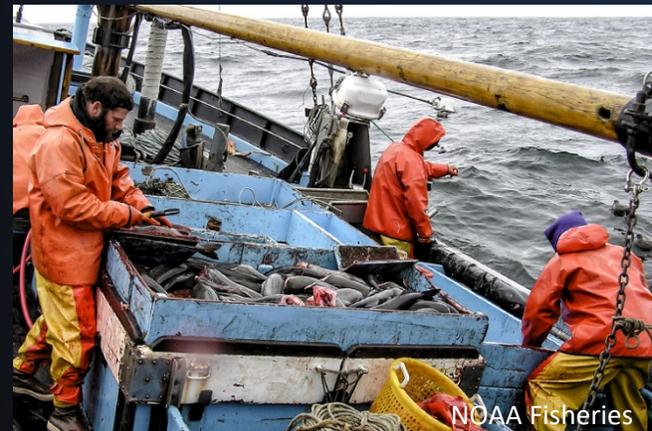


- Management agencies
 - Pacific Fisheries Management Council
 - National Marine Sanctuaries
 - National Marine Fisheries Service

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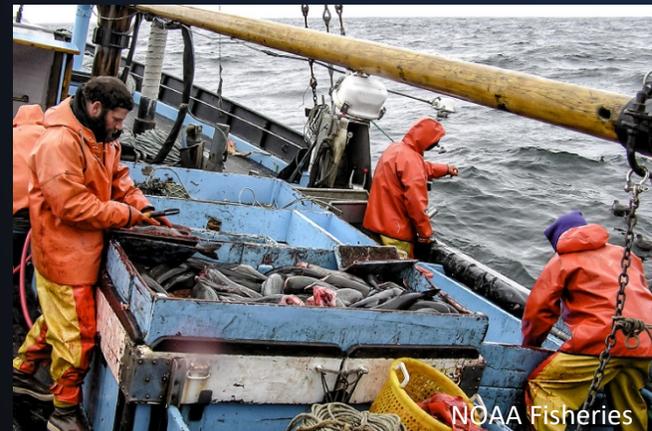
- Stakeholders
 - Fishermen
 - Other federal and state agencies like Bureau of Ocean Energy Management (BOEM)



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- Stakeholders
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 - Other federal and state agencies like Bureau of Ocean Energy Management (BOEM)



- The public
 - General public
 - Coastal and inland communities
 - Students and teachers



Students & Teachers

National Marine Sanctuary Online Deep Sea Communities Curriculum

Students & Teachers

National Marine Sanctuary Online Deep Sea Communities Curriculum

<https://sanctuaries.noaa.gov/education/teachers/deep-coral-communities/>

Students & Teachers

National Marine Sanctuary Online Deep Sea Communities Curriculum



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Education

Deep Coral Communities: Sentinels of a Changing Ocean



Black coral with squat lobsters. Photo: NOAA



Spider hard coral polyps. Photo: NOAA

Grade Level

9th-12th

Time Frame

2-5 hours

Materials

- Computer, projector and screen
- Visual materials (all available for download):
 - ◊ Deep-Sea Coral Video
 - ◊ Introduction Training Power-Point
 - ◊ Deep-Sea Coral Community Video
 - ◊ ROV Deployment and Transect Training Video
 - ◊ Sanctuary Transect Videos
 - ◊ Deep-Sea Species ID Guide
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 - ◊ Outline of Transects
 - ◊ Question Sheet for Students
 - ◊ Teacher Answer Guide
 - ◊ Transect Data Sheet
 - ◊ Abundance Graph Template

Activity Summary

This lesson focuses on the species found in deep-sea coral communities, the threats that face them and what individuals and communities can do help protect them. Students will learn about the five national marine sanctuaries on the West Coast, protected ocean places in Washington and California. They will investigate the unique biology of deep-sea corals and learn to identify the soft corals, hard corals, invertebrates and fish found within these communities. Students will view real scientific transects taken with Remotely Operated Vehicles (ROVs), while recording data on the presence of specified species. They will then graph and analyze their data to evaluate the composition of deep-sea coral communities according to habitat type, depth and temperature.

Learning Objectives

Students will be able to:

- Describe the physical and biological components of the deep sea in the five national marine sanctuaries on the West Coast;
- Experience the challenges associated with identifying species and recording data taken with ROVs;
- Explain how scientists analyze data by using species diversity and abundance from recorded video;
- Explain the importance of characterizing habitat and be able to describe the various habitat types found in deep-sea coral communities;
- Understand the human-caused threats that face deep-sea coral communities;
- Explain actions that individuals and communities can take to protect these special places

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Name: _____

Ecosystem Monitoring Questions

1. Why do you think it is important to monitor a marine ecosystem?

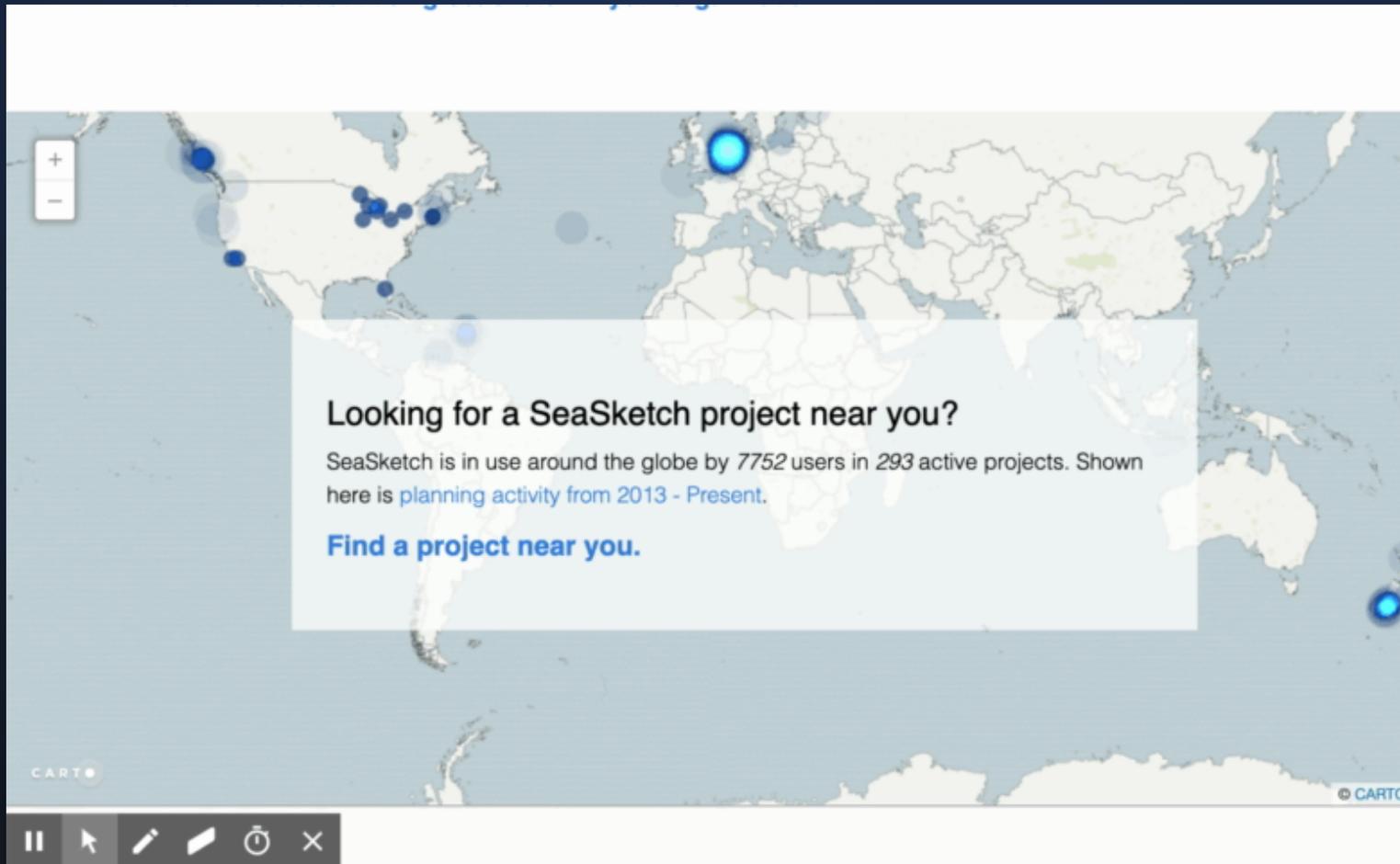
2. If designing a study around a habitat you know nothing about, what pieces of information would help you to best set up a study?

3. Based on what you observed on your transect, what further questions would you want to address in a ecosystem monitoring program?

Tools for Students & Teachers

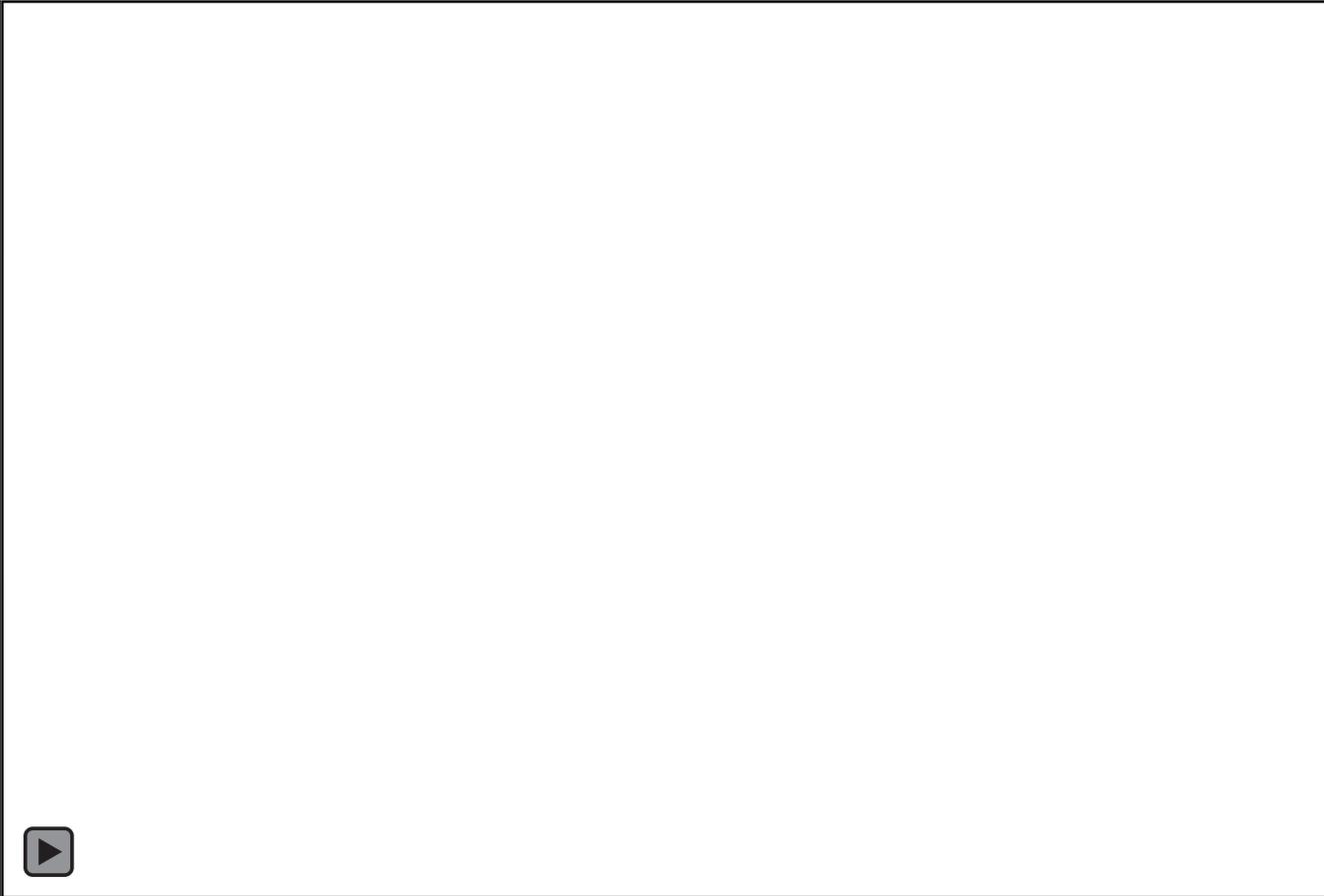
National Marine Sanctuary Online Deep Sea Communities Curriculum

- WCDSCI education and outreach priority: Update the curriculum to include an interactive web-based mapping tool, called **SeaSketch**.



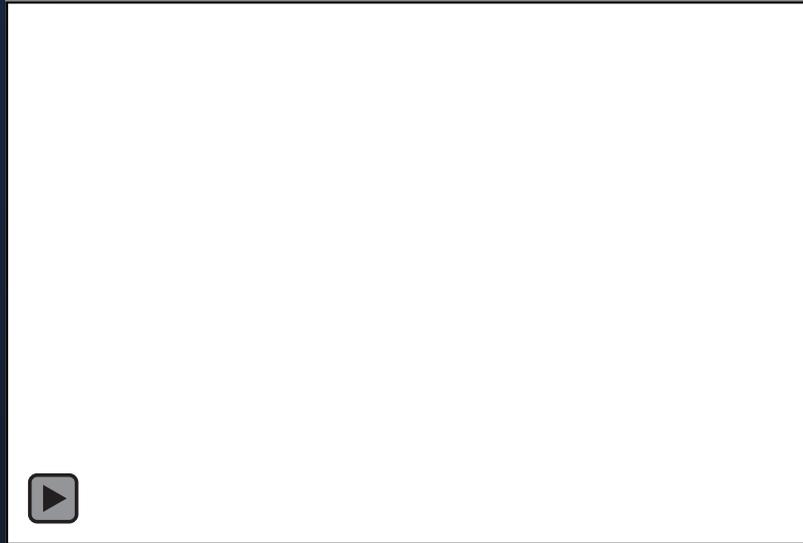
- Partnerships with aquaria or learning centers with deep-sea exhibits

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 - Photomosaics

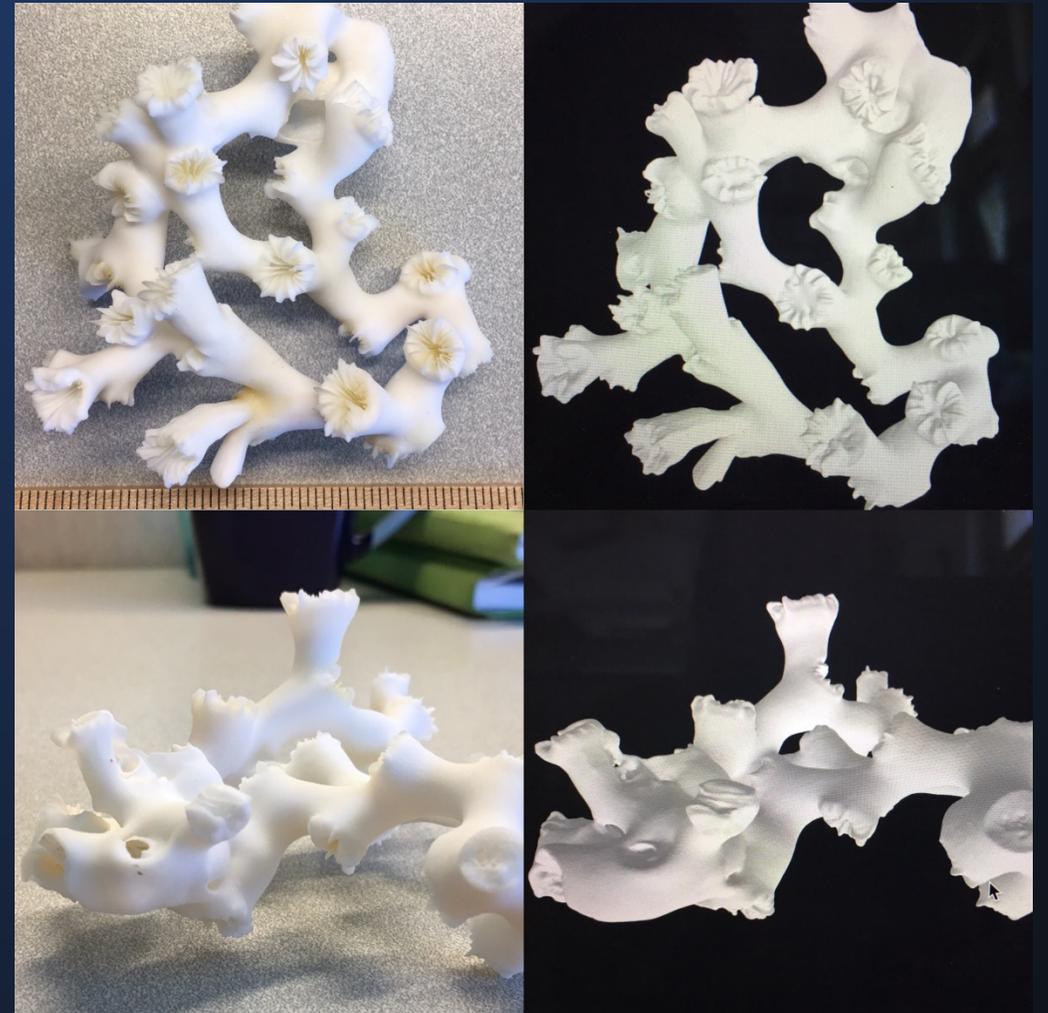


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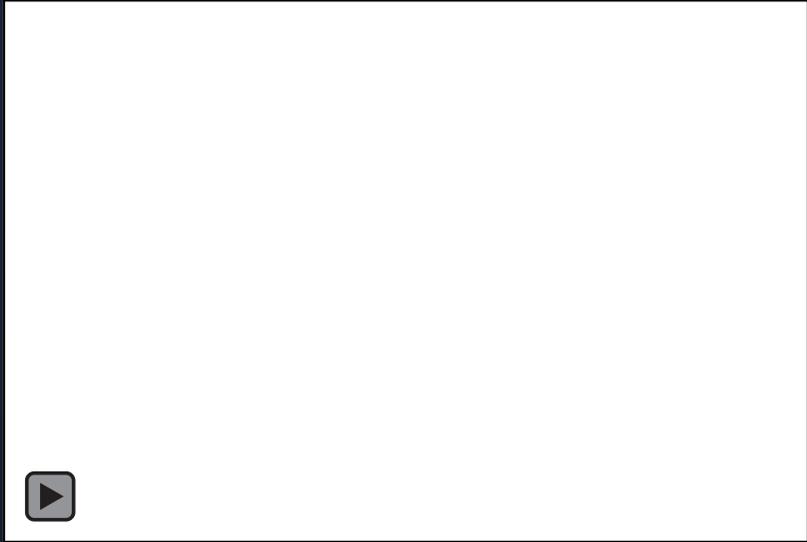
- Photomosaics



- 3D printed DSCS models



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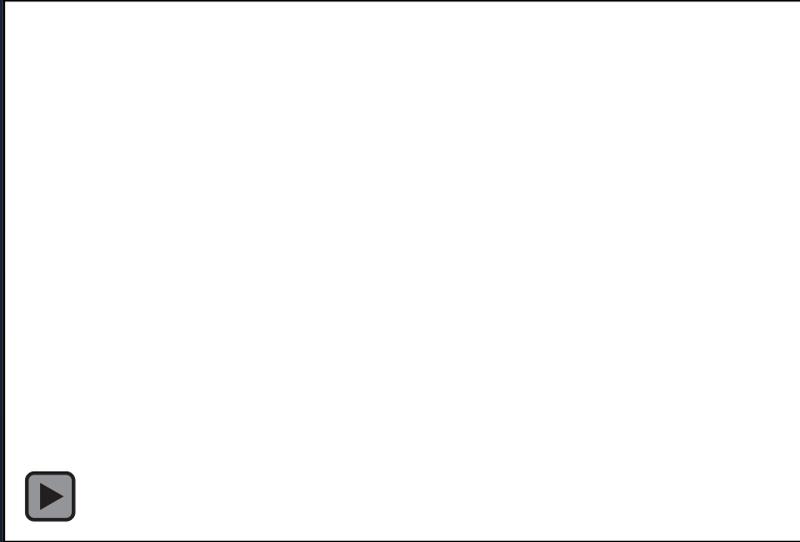


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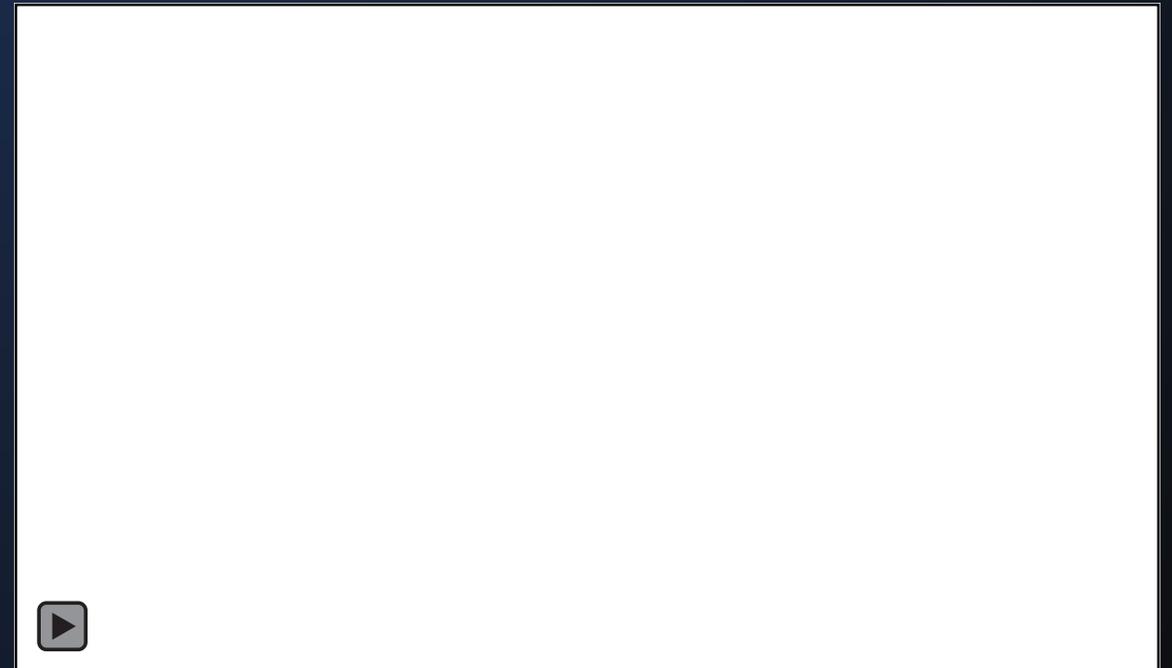
- Photomosaics



- 3D printed DSCS models



- Story Maps



- DSCS Infographics

TOOLS OF THE TRADE
How NOAA Scientists Map What Lies Beneath the Waves

WHILE SCIENTISTS USE DIFFERENT METHODS TO MAP WHAT LIES BENEATH THE WAVES, TWO OF THE MOST IMPORTANT TOOLS ARE SONAR AND VIDEO.

- 1 SHIP Multibeam & Fish Sonar**
Some NOAA ships are equipped with high-tech sonar systems that use sound to efficiently map large swaths of the ocean. Multibeam sonar is used to 'paint the seafloor with sound' to create highly detailed maps. Scientific grade fish sonar is used to map where fish and other objects are located in the water column.
- 2 GLIDER Autonomous Ocean 'Robots' Collect Data**
Glider are used for many things, from collecting ocean characteristics such as temperature, to finding where fish are spawning by recording underwater sounds. Once these torpedo-shaped vehicles are launched, they operate independently and report their findings back to the ship.
- 3 ROV Hi-Def Video**
While sound (sonar) is a great way to create detailed underwater maps of large areas of the ocean, remotely operated vehicles (ROVs) are used to take a closer look at what lies below. ROVs equipped with mounted cameras help scientists confirm fish species, find out if corals are healthy, and identify specific objects.

HOW IS THIS INFORMATION USED?
The maps created with these tools allow people to visualize the seafloor, coral reef ecosystems, and fish populations in amazing detail. These data are used to update nautical charts, to help preserve and protect underwater ecosystems, and to simply better understand what lies beneath the waves.

Thank you!

Email: lizzie.duncan@noaa.gov

Sanctuaries.noaa.gov

SeaSketch.org “Exploring Deep-Sea Coral and Sponge
Communities”