# **Deep Sea Data Management**

NOAA Deep Sea Coral Research and Technology Program

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Presentation Update: 03/23/2015

# People - Thank you!

### NOAA - NMFS – DSC-RTP

- Tom Hourigan
- NOAA CCEHBR
  - Peter Etnoyer
  - JD Dubick
  - Leslie Wickes
  - Ren Salgado
- NCDDC
  - Matt Dornback
  - Scott Cross
  - Betsy Gardner
  - David Sallis
  - Eric Roby
  - Lenny Collazo

- NOAA BioGeography
  - Dan Dorfman
  - Brian Kinlan
  - NOAA NWFSC
    - Curt Whitmire
  - USGS
    - Kathy Scanlon
  - OBIS-USA
    - Phil Goldstein

# What are we doing?

- National Database of Coral and Sponge Occurrence Records
  - Database Schema Refinement
  - Documentation of the Database
  - Data QA/QC Process Improvement
  - Visualization and Mapping
  - Taxonomic Refinement
- Data and Information Management System (DIMS)
  - Field Team Guidance
  - Data Inventory and Archive
  - Web site and Mapping Portal Development



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### **Deep-Sea Corals**

While many of us might not ever have the chance of seeing deep-sea corals in their natural setting, we still have an interest in making sure they are left unharmed. They provide vital habitat for numerous fish and invertebrate species, including commercially important grouper, snapper, sea bass, rockfish, shrimp, and crab. They are also home to organisms that produce chemicals with great potential for biomedical uses.

Scientists have discovered deep-sea coral habitats on continental shelves, slopes, canyons, and seamounts throughout U.S. marine waters, yet their full geographic extent is still unknown. NOAA's Deep Sea Coral Research and Technology Program studies and provides scientific information needed to conserve and manage deep-sea coral ecosystems.

#### What are Deep-Sea Corals?

Deep-sea corals can live for hundreds or thousands of years, creating complex communities at ocean depths where the light is dim down to more than 10,000 feet deep. Some deep-sea coral species form reefs that very slowly grow more than 300 feet tall. Other species, shaped like bushes or trees, can form assemblages similar to groves or forests on the seafloor.

#### What's Happening to Deep-Sea Coral Habitats?

Most deep-sea corals grow extremely slowly. Once damaged, the corals and the communities they support may take centuries to recover, if they recover at all. Deep-sea corals are vulnerable to disturbance caused by fishing gears such as bottom trawls that contact the seafloor. They can also be damaged by activities associated with energy exploration and development, cable deployment, and other activities that disturb the seafloor. Additionally, ocean acidification—a result of the ocean absorbing increased carbon dioxide—can affect corals' ability to grow and maintain their structures.

#### About the NOAA Deep Sea Coral Research and Technology Program Data Portal

This website provides access to deep-sea coral and sponge data, images, and technical reports from research funded by NOAA's Deep Sea Coral Research and Technology Program and its partners.

**Digital Map** 

![](_page_4_Picture_12.jpeg)

Click on image to load map ...

#### Latest Library Additions

NOAA DSC Strategic Plan May 20, 2014

2014 DSC Report to Congress Jun 24, 2014

2012 DSC Report to Congress May 20, 2014

2010 DSC Report to Congress Jun 24, 2014

<b>Strategic Plan</b> Strategic Plan for Deep-Sea Coral and E Ecosystems: Research, Management, and tional Cooperation <b>Report to Congress</b> Sea Coral Research and Technology Program teport to Congress <b>Report to Congress</b> Sea Research and Technology Program 2012 to Congress <b>Report to Congress Report to Congress Research and Technology Program Research and Technology Program</b>	Full-Text Search Filter            • all items         • in current results          Resource Category Multi-Filter            • Report (4)         • Technical Report (1)
Strategic Plan for Deep-Sea Coral and e Ecosystems: Research, Management, and tional Cooperation Report to Congress Sea Coral Research and Technology Program Report to Congress Report to Congress Sea Research and Technology Program 2012 to Congress	<ul> <li>Full-Text Search Filter</li> <li>all items Search</li> <li>in current results</li> <li>Resource Category Multi-Filter</li> <li>Report (4)</li> <li>Technical Report (1)</li> </ul>
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to Congress	<ul> <li>Report (1)</li> <li>Technical Report (1)</li> </ul>
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	2014 (1)
	2012 (1)
	2010 (2)
	Report to Congress to Congress on the Implementation of the iea Coral Research and Technology Program

![](_page_6_Figure_1.jpeg)

## Products

- National database of DSC occurrences
  Data Portal
- Data Archiving and Inventory
- Site characterization reports\*
- Habitat suitability models \*
- Scientific publications \*

\* supplied by funded data providers

# Clients

- Fisheries Management Councils
- Managers for MPA's (Sanctuaries and Monuments
- Marine Spatial Management Input
- Government and Academic Researchers
- Other Stakeholders

## Work Flow

![](_page_9_Figure_1.jpeg)

# **Data Synthesis**

![](_page_10_Figure_1.jpeg)

# National Database (One Stop)

Comprehensive
Quality Controlled
Standardized Terms
Networked (AphiaID (WoRMS), GenBank)

# The Numbers (Global)

Total number of records in the database (flagged + unflagged, global): 287069
Total number of unflagged records: 237013
Proportion of records that are flagged: 17.44%
Total number of unique Scientific Names: 1489

# The Numbers (Region)

Western Pacific: 1685 Pacific Region: 182262 North Pacific: 37438 Gulf of Mexico: 21464 South Atlantic: 2960 Caribbean Region: 135 Mid-Atlantic Region: 1977 New England Region: 316

## **Report to Congress**

![](_page_14_Picture_1.jpeg)

<u>http://www.coris.noaa.gov/activities/reportcongress\_dscrtp\_2014/</u>

# **Simplified Data Schema**

### Survey Data

SurveyID Vessel VehicleName PI PIAffiliation SamplingEquipment DepthMethod NavType LocationAccuracy

### Environment

Habitat

Substrate

Temperature

Salinity

Oxygen

### Event Data

Locality Station EventID StartLatitude StartLongitude EndLatitude EndLongitude MinimumDepthInMeters MaximumDepthInMeters

### Biomass

IndividualCount Density (or Cover) Size Condition Weight (for catch data) AssociatedTaxa

### **Observation Data**

RecordType SampleID ScientificName WormsID\* Latitude Longitude DepthInMeters ObservationDate ObservationTime\* IdentifiedBy IdentificationQualifier ImageFilePath\*

Metadata DataProvider DataContact Citation Modified

# Required Fields

	Description
Locality	A specific named place (e.g., Sur Ridge) for the specimen or observation.
EventID	ID of the survey event (e.g., dive number, camera drop, or trawl haul number) on which the sample was made.
SampleID	Unique ID for specimens. If no specimen was collected, use 'ImageFilePath' to provide an image name, or 'Citation' to provide a reference.
Latitude	Latitude in decimal degrees where the sample or observation was collected. Datum should be WGS1984. If another datum, use 'LocationComment'.
Longitude	Longitude in decimal degrees using datum WGS1984.
DepthInMeters	Best single depth value for sample as a positive integer in units of meters.
ObservationDate	Date as YYYY-MM-DD. If month or day is unknown use YYYY-MM or YYYY. Please convert from local date to Universal Time Code (UTC).
ObservationTime	Time as hh:mm:ss when the sample or observation occurred. Use UTC.
ScientificName	Taxonomic identification of the sample as a Latin binomial (e.g., "Primnoa pacifica"), or lowest practical taxonomic level (e.g., "Primnoidae").
AphialD	AphialD of 'ScientificName' from the World Register of Marine Species (WoRMS). These numeric codes can be accessed here: http://www.marinespecies.org/index.php
IndividualCount	Number of individuals represented by the sample as a positive integer. If unknown, use -999. If categorical, use 'AbundanceCategory'.

# **Desired Fields**

	Description
Density	Number of individuals (or colonies) per square meter for an observation.
Size	Colony height or width in centimeters is preferred, or size category, or maximum size category for the taxon if the observation is multiple colonies. Size method can be indicated in 'OccurrenceRemarks'.
Condition	Condition of the organism when collected or observed. The method of White et al. 2012 uses categories 1 for less than 10% damaged, 2 for 10 to 50 %, 3 for 50 to 90%, 4 for > 90%, and 0 for no damage. Values of "live", "dead", "damaged", and "live and dead" are also acceptable.
AssociatedTaxa	Notable organisms that are observed to co-occur with a coral or sponge. A list of organisms may be separated by semicolon. Commercially fished species are of particular interest to regional fishery management councils.
ImageFilePath	Unique file name or hyperlink to an image (or video) of the observation. The purpose of this field is to match an image with a reported observation.
Temperature	Temperature in degrees Celsius at or near the location of sample.
Oxygen	Dissolved oxygen in ml/l at location of sample or nearest measurement.
Salinity	Salinity in PSU at location of sample or nearest measurement.
Habitat	Habitat or biotope of the organism sampled or observed, e.g., sandy plain, steep ledge. References include CMECS and Greene et al. 1999.
Substrate	Contact substrate (e.g., dropstone, outcrop, or boulder) of the organism observed. The purpose is to distinguish habitat (like a sandy plain) from an attachment point (for instance, a dropstone in a sandy plain).

## **Site Characterization**

#### DIVE NUMBER: ROV 0001

#### STUDY AREA: Piggy Bank

#### GENERAL LOCATION AND DIVE TRACK

![](_page_18_Figure_4.jpeg)

#### STATION OVERVIEW

Project	U.S. West Coast Deep Coral Cruise
Chief Scientist	M. Yoklavich
Contact Information	NMFS, SWFSC, mary.yoklavich@noaa.gov
Purpose 🛛 🔍	Survey deep coral communities at Piggy Bank off southern CA
Vessel	NOAA Ship McArthur II Leg 3; Kraken 2 ROV
Science Observers	L. Krigsman, T. Laidig, M. Love, L. Lundsten, A. Taylor
External Video Tapes	1 HD, 3 SD
Internal Video Tapes	n/a
Digital Still Photos	138
Positioning System	Ship: GPS; ROV: USBL
CTD Sensors	No
O <sub>2</sub> Sensor	No
pH Sensor	No
Specimens collected	Yes
Other	Logbook, Access database
Report Analyst	D. Watters
Date Compiled	11 May 2011

#### DIVE NUMBER: OC10004 SURVEY AREA: 63 GENERAL LOCATION AND DIVE TRACK Floret, and SITE OVERVIEW 2010 Deep Sea Coral Research Cruise, Olympic Coast National Project Marine Sanctuary Chief Scientist Ed Bowlby Contact Info ed.bowlby@noaa.gov Olympic Coast National Marine Sanctuary 115 E Railroad Ave, Suite 301, Port Angeles, WA, 98362 Purpose Locate coral and sponge assemblages in OCNMS, Olympic 2 EFH Conservation Area and/or proposed boundary expansion of Olympic 2. Characterize the diversity, distribution, abundance and richness of species associatied with corals and sponges. Characterize substrates/habitats of coral and sponge communities.

Vehicle Science Observers Forward View HD File Hrs Forward View Tape Count Digital Still Images Oxygen mg/L (Avg) Salinity (Avg) Temp C (Avg) # of Samples Collected Date Compiled Acknowledgements Locate coral and sponge assemblages in OCIMIS, Olympic 2 El Conservation Area and/or proposed boundary expansion of Olympic 2. Characterize the diversity, distribution, abundance a richness of species associatied with corals and sponges. Characterize substrates/habitats of coral and sponge communitie Collect and assess fish-habitat association information. NOAA Ship McArthur II, UCONN Kracken 2 ROV J. Bright, P. Etnoyer, S. Rooney, C. Brady, E. Bowlby 9 4 77 unavailable unavailable unavailable unavailable no samples collected

NOAA CRCP. OCNMS, ONMS, NOAA/NCCOS, NOAA

Report Analysts

Fisheries, UCONN, WSU, Makah Tribe J. Bright, K. Brenkman

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# **Example Application - Modeling**

- Brian Kinlan, National
- David Huff, Pacific
- John Guinotte, Pacific
- Chris Rooper, North Pacific

![](_page_20_Picture_0.jpeg)

![](_page_21_Picture_0.jpeg)

![](_page_22_Figure_0.jpeg)

![](_page_23_Picture_0.jpeg)

# Conclusion

- Creation of a one stop (value added) database for DSC
- Simplified approach for contributors
- Standardization is the key!
- Look for:
  - New user-friendly web site and data portal
  - Updated database schema
  - Updated field team guidance
  - Release of initial database to OBIS in June 2014!!

# **Questions?** Comments?

### Deep Sea Coral Research and Technology Program

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Call me! 843-762-8640