

**Site Characterization and Video Annotation Workshop**  
**August, 30<sup>th</sup>, 2011**  
**Center for Marine Science, University of North Carolina at Wilmington,**  
**Wilmington, NC**  
**Workshop Report**

**Attendees:** Tom Hourigan, Dan Dorfman, Andrew Shepard, Andy David, Stacy Harter, Steve Ross, Sandra Brooke, David Packer, Rich Langton, Mary Yoklavich, Peter Etnoyer, Martha Nizinski

**Summary:** On August 30<sup>th</sup>, 2011, the Deep Sea Coral Research and Technology Program conducted a one day workshop at the Center for Marine Science in Wilmington, NC. The purpose of the workshop was to further define deliverables/products that will be Program standards for field surveys for deep-sea coral and sponge habitats. The workshop agenda (**Attachment A**) is attached. The workshop resulted in a Data Management Guide for field researchers, revised video annotation protocols, and a set of integrated data and information products that will allow the Program's research to be utilized by the scientific and management communities. Following the workshop, the draft data products and procedures will be vetted with additional NOAA and external researchers working on deep-sea coral and sponge ecosystems.

**Background:** Over the past year, a small group with representation from the Atlantic and Pacific, has been working with the Deep Sea Coral Research and Technology Program Regional Field Research planning teams to develop an integrated set of program-wide data products that can be used to record the locations of deep-sea corals, sponges and their habitats; summarize dives and site characteristics; and keep track of samples collected.

**Objectives:** The workshop objectives were as follows:

- 1) Review proposed major categories of data to be collected during field surveys for deep-sea corals, sponges and associated species.
- 2) Establish parameters expected from video annotation, building on specific examples from the Southeast U.S.
- 3) Review and refine draft data reporting formats from field surveys
- 4) Discuss national database contributions and the linkages to field data reporting

Progress was made on all four objectives and will continue through the work of a broader group of participants.

**Introductory Presentation** – Tom Hourigan

- **Purpose:** This presentation (**Attachment B**) focused on outlining the Deep Sea Coral Research and Technology Program objectives, explaining the current vision for integrated field data products and identifying key outstanding issues in video annotation procedures. Four primary products were identified: 1) dive summary reports, 2) site characterization reports, 3) submissions to the deep sea coral geodatabase, and 4)

scientific publications. These products are designed to provide information in formats suitable for management, and to serve as a repository of data and associated metadata that can be used by both the management and scientific communities. Products expected from each cruise include: dive logs, multibeam bathymetry and backscatter, CTD and other sensor data files, a cruise report, samples collection log, video annotation logs, and research summaries. These products can be integrated to provide an accurate synopsis of the information collected on each cruise.

Video annotation was highlighted in this presentation as the area where further refinement of protocols and expected products was needed. Key issues were: how to address abundance, e.g. counts vs. abundance categories, how to handle non-discrete colonies, e.g. *Lophelia*, how to record density, distribution, and patch size, should we include colony size, and how to record substrate information? Additional considerations included: how to capture data on managed or potentially managed species, counts vs. abundance, and how to determine association between fish and corals?

- ***Outcomes or Consensus Recommendations:*** There was consensus that the suite of proposed products was generally useful and achievable. See below for recommendations on specific products.
- ***Outstanding or unresolved issues:*** Video annotation from surveys using varied research platforms (submersibles, autonomous underwater vehicles (AUVs), remotely operated vehicles (ROVs), etc.) and survey methodologies represent a challenge for developing a national reporting standard. Further elaboration of video annotation standards should address survey methodologies. Likewise, the level of effort expended on video annotation should reflect the program's needs and be adequately funded.

## Data Management Guide

- ***Purpose:*** Dan Dorfman presented the draft data management guide and outlined the expected deliverables currently expected from field surveys. The data management guide is designed to provide field researchers with a concise summary of Program expectations for data, metadata, and information products, with timelines and formats. The Guide reflects existing NOAA requirements for data submission and archiving (e.g., submission of oceanographic and multibeam data sets to NOAA's National Ocean Data Center and National Geophysical Data Center respectively) and specific needs of the Deep Sea Coral Research and Technology Program.
- ***Outcomes or Consensus Recommendations:*** A revised Data Management Guide based on input from the workshop is attached (**Attachment C**).
- ***Outstanding or unresolved issues:*** Timelines will need to be flexible enough to reflect external factors – e.g., time-sensitive opportunities to influence Fishery Management Council decisions.

## Video Annotation Methods:

- **Purpose:** A draft protocol and data entry sheet for annotating video to record deep-sea coral and sponge occurrences was sent to the participants prior to the workshop. The draft protocol built on a model previously used by the Hawaii Undersea Research Laboratory, with revisions designed to capture specific Deep Sea Coral Research and Technology Program objectives. The format and data fields are designed to capture key data and metadata associated with observations of structure-forming deep-sea corals, sponges, and associated biota – especially species of potential commercial interest (e.g., fishes or golden crab, etc.), and provide these in a format that can be submitted to NOAA’s Deep-Sea Coral Geodatabase.

Drs Sandra Brooke and Steve Ross presented a slightly revised version to the workshop that reflected difficulties in identifying discrete colonies of framework-forming scleractinian corals, and constraints in the manner in which video data were collected in the southeast research.

- **Outcomes or Consensus Recommendations:**
  - The Program should strive for measures that reflect the density of organisms of interest, rather than just abundances or presence/absence. Depending on the manner in which historical data were initially collected and the funding available to mine existing video, this may not always be possible.
  - The approach proposed by Ross and Brooke for enumeration of corals and sponges in abundance categories (for discrete colonies) and estimates of cover (for framework-forming stony corals) from the southeast research was generally acceptable with certain revisions provided subsequently to the researchers. Video annotation will be recorded in 5 minute “bins” accept where habitat changes creating a new “bin”
  - Given the limited number of species, actual counts were requested of all observed fishes and invertebrates of potential commercial interest.
  - These are minimum standards, and researchers were encouraged to include data on additional species.
  - The revised Video Annotation Protocol is attached (**Attachment D**).

**Outstanding or unresolved issues:** Many of the constraints on recording densities of organisms and on providing comparable data across research teams reflect differences in survey methodologies. There is scope for future work in identifying survey methodologies that will optimize the information provided to the needs of the Program. The current methodology does not yet address annotation of still photos which are collected by the AUV used in some west coast surveys. It was recommended that the Program approach the NMFS Advanced Fisheries Sampling Technology Working Group for recommendations on quantifying the field-of-view in rugose habitats on various vehicles in order to better estimate densities from video.

## Video Annotation and Reference System (VARS):

- **Purpose:** The next session involved a brief discussion of the VARS systems developed at the Monterey Bay Aquarium Research Institute. A number of NOAA labs, including the Olympic Coast National Marine Sanctuary office and the Center for Coastal Environmental Health and Biomolecular Research, have begun using VARS as their primary video annotation software. VARS is an established system developed as library tool that links species to imagery, The software is free and it can export data in a variety of formats.
- **Outcomes or Consensus Recommendations:** Researchers currently using VARS identified pros and cons of the system:
  - *Pros:* Provides standardized entries, integration with navigation logs, includes a “knowledge base (taxon)” with species identifications, automated frame grabs; MBARI support is available.
  - *Cons:* Learning curve is steep, requires considerable IT support, requires Mac computer as a server; the “knowledge base” currently only includes west coast species and habitats (Pacific Island taxa under development by HURL); video deck must have RS-422 connector in order to provide time-code; early in wide distribution process so still working out bugs; Cannot query like dbase.

There was no consensus as to whether the Program should encourage and support using VARS as the Program standard.

- **Outstanding or unresolved issues:** This issue should be reassessed as NOAA and partner labs gain additional experience with VARS.

### Site Characterization and Dive Summary Logs:

- **Purpose:** The Deep Sea Coral Research and Technology Program has adopted a format for summarizing the results of individual survey and research submersible, ROV or AUV dives; and for summarizing the results of multiple dives to characterize specific geographic sites where research has been conducted. This format builds upon the Southeastern United States Deep-Sea Corals (SEADESC) Initiative format.<sup>1</sup> This type of summary has been found useful by the South Atlantic Fishery Management Council in identifying areas for management action. Based on field trials of this format by the West Coast Research Team, an enhanced report format (Level II) was recommended that included summary tables and graphs of coral and sponge density or cover, taxa present, and associated fish species.

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<sup>1</sup> Partyka, M.L., S.W. Ross, A.M. Quattrini, G.R. Sedberry, T.W. Birdsong, J. Potter, S. Gottfried. 2007. Southeastern United States Deep-Sea Corals (SEADESC) Initiative: A Collaborative Effort to Characterize Areas of Habitat-Forming Deep-Sea Corals. NOAA Technical Memorandum OAR OER 1. Silver Spring, MD. 176 pp. [http://explore.noaa.gov/media/http/pubs/SEADESC\\_Report.pdf](http://explore.noaa.gov/media/http/pubs/SEADESC_Report.pdf)

- ***Outcomes or Consensus Recommendations:*** Sample Dive Summary is attached (**Attachment E**). There was general consensus that the format was informative and that the enhancements proposed by the West Coast Team added to its overall usefulness.
  - Data Management guide should include example logs with guidance for different kind of content (e.g., counts versus categorical abundance estimates).
  - The Program should be more specific about requirements for physical and biological descriptions.
  - The format is useful both for summarizing information from new field research, as well as previous historical work at specific sites.
  - Site summaries are not static, but will evolve as more dives occur within the same general area.
  
- ***Outstanding or unresolved issues:***
  - An approach for Level II summaries in areas where densities cannot be derived needs to be developed. As an interim recommendation, the Level II summaries should include tables with species observed and level of quantification, but omit pie diagrams that require density measures.

### Sample Logs:

- ***Purpose:*** Consistent Sample Logs ensure that metadata are collected on samples, and that specimens and subsamples collected by the Program but sent out for further analysis can be adequately tracked. The proposed sample log format also allows information on individual samples to be linked to the National Deep-Sea Coral Geodatabase (see below) and to photos taken of the organisms in the field.
  
- ***Outcomes or Consensus Recommendations:***
  - The sample log format is attached (**Attachment F**).
  - Recognizing the potential difficulty in tracking all samples, priority should be given to recording full documentation for deep-sea coral and sponge specimens collected.
  
- ***Outstanding or unresolved issues:***
  - Some cruises may result in several thousand specimens, e.g., Brown expedition had 473 sample records and thousands of specimens sent to various labs
  - Need to simplify logging for associated species, so it can be done at-sea or immediately post-cruise

### Deep-Sea Coral and Sponge Geodatabase

- ***Purpose:*** The Deep Sea Coral Research and Technology Program is required to identify known locations of, deep-sea corals, locate and map locations of deep-sea corals, and make this information available to the Fishery Management Councils and the public. NOAA collaborated with the U.S. Geological Survey in the development of a Cold-Water

Coral Geodatabase (CoWCoG v.1)<sup>2</sup>. The Program is developing a National Deep-Sea Coral and Sponge Geodatabase, building on and refining the CoWCoG v.1. The various data products identified in the Data Management Guide are designed to integrate data as seamlessly as possible into the Deep-Sea Coral and Sponge Geodatabase.

- ***Outcomes or Consensus Recommendations:*** The proposed geodatabase format is attached (**Attachment G**). This includes a number of fields that were not included in the original USGS CoWCoG v.1. The Program should establish a small working group to develop requirements of the geodatabase including all products that need to be integrated and recommend architecture.
  
- ***Outstanding or unresolved issues:***
  - The USGS CoWCoG v.1 database has certain limitations and potential errors that will need to be addressed in a revised version.
  - CoWCoG was developed to record information from curated museum collections, so it lacks fields for important types of information gained through fieldwork (e.g. temperature, salinity, dissolved oxygen)
  - It is currently not a simple matter to ingest the required data products into this existing database.
  - The sponge component of the database is new and will require significant additional work before it is ready to be made public.
  - The participants recognized additional limitations inherent in a centrally-managed, relatively static, database. It was recommended that the Program explore approaches that could facilitate importation of data from other existing efforts. The program would benefit from drawing on the expertise of additional data management experts.

### Other Issues:

Other potential products derived from DSCRTP efforts:

- Google Earth ocean layer products (.kmz or .kml)
- Expand exposure via Web and social networking (Facebook, Twitter)

Integrate data and derivatives with other systems (OBIS)

### Conclusions:

- The integrated field data products approach is generally workable and will help promote consistent approaches across the Deep Sea Coral Research and Technology Program.

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<sup>2</sup> Scanlon, K.M., Waller, R.G., Sirotek, A.R., Knisel, J.M., O'Malley, J.J., and Alesandrini, Stian, 2010, USGS cold-water coral geographic database—Gulf of Mexico and western North Atlantic Ocean, version 1.0: U.S. Geological Survey Open-File Report 2008–1351, CD-ROM.  
<http://pubs.usgs.gov/of/2008/1351/>

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- Video is a primary form of data collection for field surveys conducted under the program.
  - Recognizing the limitations of different survey methodologies, video annotation of corals and sponges from the past cruises can be analyzed in abundance categories or estimated cover over five-minute periods, while future surveys will strive to record actual counts and density measurements.
  - These are minimum standards, and researchers were encouraged to include data on additional species.
- Site Characterization and Dive Summary Logs (SEADESC style logs) are an effective way to communicate results from field surveys. The Program will collate site descriptions nationally and make these available through the web.
- Identifying a way to track samples that is not overly burdensome needs further discussion. In the interim, field research teams will strive to use the sample logs and identify ways in which sample recording can be streamlined.

### Next Steps:

Based on the discussion at the workshop, the Data Management Guide and draft data products have been further reviewed and revised. These products are attached (**Attachments C-G**) and along with the workshop report will be circulated for review to workshop participants and invitees that were not able to participate. Later this fall, Dan Dorfman, the Program's Data Manager will convene a webinar go over the draft data products and other potential revisions prior to finalizing these documents.

The Deep Sea Coral Research and Technology Program views these documents as works in progress that should (1) clearly identify minimum standards; and (2) encourage researchers under the program to further enhance the information content, scientific rigor, and management relevance of the Program's surveys.

Attachment A:  
**Workshop Agenda**

Site Characterization and Video Annotation Workshop  
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- 8:30 – 9:00 Coffee, gathering
- 9:00 – 9:15 Welcome, quick introductions
- 9:15 – 10:00 Present expected deliverables & Discuss data sets being collected on research cruises
- 10:00 – 11:00 Review current practices for video annotation used by participants in relation to the proposed format
- 11:00 – 12:00 Identify best practices for video annotation
- 12:00 – 1:00 Lunch
- 1:00 – 2:30 Establish minimal video annotation log content and suggested format
- 2:30 - 3:00 Identify practices for collecting imagery to provide both coral and fish population quantification
- 3:00 – 4:00 Refine site characterization reports and develop standards
- 4:00 – 4:30 Review submissions to DSCRTP (national database, samples log)
- 4:30 – 5:00 Parking lot issues

Attachment B  
**Introductory Presentation**  
(separate attachment)

Attachment C  
**NOAA DEEP-SEA CORAL RESEARCH AND TECHNOLOGY PROGRAM  
DSCRTP DATA MANAGEMENT GUIDE**

[Revised 10/05/11 by DSCRTP Data Management Team]  
(separate attachment)

Attachment D  
**Deep Sea Coral Research and Technology Program  
Video Annotation Logsheet**  
(separate attachment)

Attachment E  
**Deep Sea Coral Research and Technology Program  
Sample Site Characterization and Dive Summary Logs**  
(separate attachment)

Attachment F  
**Deep Sea Coral Research and Technology Program  
Sample Logs**  
(separate attachment)

Attachment G  
**Deep Sea Coral Research and Technology Program  
National Deep Sea Coral Geodatabase Fields**  
(separate attachment)

The attachments listed here are living documents which are being updated and revised on a regular basis. For more information or to obtain the most recent versions of these documents please contact Dan Dorfman at [dan.dorfman@noaa.gov](mailto:dan.dorfman@noaa.gov).