

Summary of the Workshop on Marine Life Data and Mid-Atlantic Regional Planning

**Wednesday, August 17, 2016
Baltimore National Aquarium
Harbor View Room
501 E. Pratt St., Baltimore, MD 21202**

WORKSHOP OBJECTIVES

- Review the draft framework for identifying Ecologically Rich Areas (ERA's)
- Review and discuss a potential range of criteria for cataloging ERA components
- Identify short and longer term opportunities for data development to fill gaps

EXECUTIVE SUMMARY

- On August 17, 2016 MARCO and members of the Mid-Atlantic Regional Planning Body (RPB) Data Synthesis Work Group (DSWG) and the Ocean Data Portal Team convened a workshop to engage Mid-Atlantic Ocean science experts in a review of the Marine-life Data Analysis Team (MDAT) data and other ERA-relevant data. The workshop agenda can be found on page 10 of this document.
- Participants included scientists from Mid-Atlantic States and representatives from NOAA, BOEM and USFWS with expertise in several relevant topic areas including fish, birds, marine mammals, invertebrates, benthic ecology and oceanography (see page 10 for participant list).
- Laura McKay (Chair, MARCO Management Board) and Dr. Pat Halpin (Principal Investigator, MDAT), gave presentations to orient the workshop group to the MDAT component base models and data products produced to date.
- Using the World Café format, participants were asked for feedback regarding further data development, potential near and longer-term approaches to improve data and derived products, and selection of criteria for identification of “Ecologically Rich Areas” (ERAs).
- The 5 component tables were each headed by a MDAT team facilitator and a designated table note taker. Though each component table had unique questions to ask science experts in attendance, found on pages 6-9 of this document, several consistent questions were asked across all five tables, as follows:
 1. How well do the data characterize each component?
 2. What is missing (data gaps)?
 3. What could be done to improve or supplement analysis?
- Within each component table, data were displayed in both SeaSketch and the MARCO Portal Marine Planner mapping systems to ensure science experts would have the ability to view data dynamically while reviewing the information.
- The World Café table rotation format achieved the workshop goals of compiling and sharing notes amongst all experts in attendance. When one group participated in a table, they were presented and informed with notes taken from the previously

interviewed group. This format set the stage for significant feedback compilation in a short period of time.

- The following are summary notes compiled from each component table:

Table/Component 1: Areas of High Productivity

- Data evaluation: There is a need for a sharper definition of what “high productivity” means. It was discussed that proxies/drivers are effective gap fills.
- Missing: Some fisheries data and avian data on feeding areas are missing. Using models can be an effective way to fill some of the data gaps (i.e. oceanographic models). Productivity relating to river discharge may need to be incorporated.
- Improve Analysis: It was noted that focusing on the highest productivity can lose information. There was interest in focusing on ecological processes. Long term climate cycles should also be considered/included. Finally, there was a general sense that we are over focusing on the data gaps, and that the key to remember is the need to understand information even if it is limited in areas.

Table/Component 2: Areas of High Biodiversity

- Data evaluation: There was a general sense that the products being developed are useful, and that the team should continue to develop upon them. There seemed to be agreement that the Simpson analysis products could be useful but there is a need for a better explanation of how to apply them. It was clear that there need to be discussions around the scale at which these should be represented, both spatially and temporally. A discussion around depth should also take place. There is a need to determine how to appropriately characterize the information that we don’t know about all the species in this area (particularly invertebrates). Finally, there was a lot of interest in being able to deconstruct the synthesis products and be able to drill back down to the raw data layers.
- Missing: There was a sense that information about nearshore species and data was missing, however again here it is important to remember the focus area of the OAP being the open ocean and less nearshore.
- Improve Analysis: There was a sense that the cold water coral and avian foraging guilds analyses were interesting and can be moved forward. There were also discussions about taking a guided approach to additional foraging guilds with expert input.

Table/Component 3: Areas of High Abundance

- Data evaluation: There is a clear need to define terms, including all of the components as well as to define the goals of the ERAs. There is also a need to incorporate uncertainty and effort into these data syntheses. Incorporating tribal knowledge could be a separate layer used to validate models. A determination of temporal scale was discussed as well. Species shifts over decades should also be considered and incorporated. There needs to be a consideration about the static nature of ERAs, i.e. can they be dynamic and shift through time based on oceanographic parameters?
- Missing: There are many existing datasets with potential for continued synthesis. There may be an opportunity to incorporate more detail from fisheries management plans and fisheries feeding plans.

Table 4 Components 4 & 5: Areas of High Vulnerability

- **Data evaluation:** There is a need to consider how to choose and prioritize what is considered vulnerable in this scenario. There is general consensus that some habitats and species are vulnerable but not necessarily rare, but generally all rare species are vulnerable. There is also a need to account for the dynamic and changing nature of the ocean. Again we heard that crisper definitions for vulnerability and rarity are needed. It was suggested that the team consider population status level and trends when evaluating vulnerability as well as location specific vulnerabilities. There was a sense that all three taxa groups do need to be considered more holistically. It may be important to look at variations in genetics. Again there were comments around the documentation and communication of the work. The team needs to make clear the framing of the data and the work as well as the limitations. This group reiterated the need for a deconstruction of the aggregated synthesis products.
- **Missing:** Attendees provided the team with a long list of specific missing data.
- **Improve Analysis:** The team should try to move towards an ecosystem based approach and consider how to account for what is lost when reducing the ocean to a 2D computer screen. It was pointed out that the team has used species data most to address vulnerability, but since an underlying principle is around ecosystem based approaches, this analysis should also address habitat equally as much as species.

Table 5/ ERA Framework & Integration:

- Definitions
- Framework (summarize comments re: the framework)
- Methodology (comments re: analytical methods)
- Scale
- Ocean dynamics and ERAs
- Use of ERAs
- Communications, Public Process, Next Steps

Most participants thought the framework was very good. There were some concerns expressed regarding the vulnerability component, and whether human use data were being used to define vulnerability. It was also noted that there is a need for clear definitions, particularly for ERAs. Some specifics mentioned were: what are the defined boundaries? How static/dynamic are ERAs? How graded? What are non-ERAs? Is this binary? Are we creating winners and losers?

For each component the team should consider both thresholds and criteria. Scale was also brought up in this group as well as the need to consider incorporation of regional vs. site specific data, i.e. you can have local, regional, and global ERAs. There was some concern that the team is catching the edge of a species range, and how can that be incorporated in the consideration? Here too, the need to deconstruct the synthesis products was mentioned.

Laura McKay, Chair, MARCO Management Board

Concluding Words:

- Today this group talked a lot about nearshore issues, a key reminder is that the RPB is careful not to get too involved with nearshore issues (such as non-point source pollution) that are already very well covered by other programs. The RPB focus is more offshore, while maintaining awareness of those nearshore connections.
- We also heard today about the need to describe more explicitly how the ERAs will be used. In the OAP under the HOE action, the RPB proposes only to identify the ERAs, do an assessment of their health and ecological function, overlay the human uses and finally develop factual reports that characterize the areas and their current management. That is all. The RPB will not make management recommendations and has no regulatory authority. All of the Portal's data and these ERA reports are intended to support decision making by the appropriate authorities. The RPB could choose to follow the HOE action on identifying and assessing ERAs with a case study or pilot report to work with Federal Agencies to evaluate how they might use this information to help inform specific management actions.

Pat Halpin, Principal Investigator, Duke MDAT

Concluding Words:

- The team heard the need to address semantics and definitions at several different levels.
- There is a need for presentation methods that help data users easily deconstruct synthesis products to understand input component data.
- There is potential for dynamic ERAs. Others in the world have established a variety of ERA spatial forms including: single fixed, multiple clustered, ephemeral areas, and dynamic areas. The RPB could look to these methods to consider how ERAs in the Mid-Atlantic are identified.
- There is a need to consider trends and climatic change; this might mean extrapolating to develop forecasts.
- The team started out looking very much at species; there is now interest in focusing more on moving forward on habitats and ecosystems.
- Today we considered illustrations about how data might be used to represent each ERA component. Now the project team needs to think about how to make that jump to the next level.
- The team has been provided with some lists of additional data they may want to include in synthesis products. The team now needs to consider how to fill known data gaps.
- The space and time dimensions of these synthesis products should be considered in order to address management decisions most effectively, moving from a 2D map to 4D contexts that include depth and time.
- The team now needs time to digest and see how to condense all the great insight gained from the day down into useful products.

PRESENTATIONS AND DISCUSSION

(The following represent general questions raised at component tables is for reference only. It is not intended to represent the specific or totality of detailed discussions.)

Questions to Guide World Café Discussions

Component 1 – Areas of High Productivity

Component 1 overview

- Data Table from draft OAP Appendix (just have a copy handy, may not be time for detailed review)
- SeaSketch tour of current work on primary productivity
 - o There are 3 subgroups: primary productivity, secondary productivity, proxies
 - o For primary productivity there are several layers – each different but important ways to characterize chlorophyll data and describe the dynamics of primary productivity

Chlorophyll a layers and analyses

- Seasonal medians (existing)
- Spring and fall bloom strength (new)
- Chlorophyll-a anomalies (new)

Secondary productivity

- Species/season summaries (existing)
- Total bio-volume, by season (new)
- Contrast between two above demonstrates why not to interpolate

Proxies

- These are drivers, not just proxies
- Canyons – from global dataset, probably needs work
- Seamounts – from global dataset, probably needs work
- Frontal boundaries
- Long term climatologies vs. individual seasons from 1 year

Questions

1. There are many ways to represent productivity – what approach do you think is most useful for identifying ERAs?
2. Do we have enough to work with now? What’s missing in terms of additional data or additional analysis of data in hand?
3. Methodology type question
4. Methodology type question (maybe we can cover all the bullets below but which are most important?
 - o Get explanation from Pat about primary productivity covariates used in MDAT models and ideas/comments about “double counting”
 - o Are there relationships between primary and secondary productivity that could strengthen the depictions of this Component?

- Satellite data are masked in the nearshore – can eelgrass/wetlands data be used to fill this gap? (also address issue of nearshore productivity/eutrophication here)
- Do the proxies tell us things that the observational data do not? Could they be used beyond the boundaries of the observational data? Should we be looking for quantitative relationships?
- If a depiction of upwelling areas is desired, how to approach this?

Component 2 – Areas of High Biodiversity

Component 2 overview Definition from IEA framework

- Data table from draft Plan Appendix
- SeaSketch tour of existing representations of biodiversity
- New data under biodiversity are options – is there a preferred approach to characterizing biodiversity?
- Brief explanation of rationale behind trophic approach – this is an example of what could be done for other taxa; directly addresses EBM WG recommendations
- Brief explanation of coral approach
- Introduce initial questions to consider as we review the data

Biodiversity overview

- Cetacean, avian, fish species richness (existing)
- NEAMAP fish species richness (new)
- Monthly cetacean species richness examples (new)
- Simpson index for cetaceans and fish (new)
- Richness of bird foraging guilds (new)
- Cold water coral model combination (new)

Proxies

- Overview of areas of complex seafloor
 - Several exploratory options
 - This information is useful for a variety of purposes, so trying to be careful to get this right
 - Started with methods already used in the region at smaller scales
 - Terrain ruggedness and Bathymetric position index
- Overview of Probability of hard bottom
 - Quick methodological overview
 - Zoom in and look at the prediction vs. USGS data quality layer

Questions

1. There are many ways to represent biodiversity – what approach do you think is most useful for identifying ERAs?
2. Do we have enough to work with now? What’s missing in terms of additional data or additional analysis of data in hand?
3. Methodology type questions -- maybe we can cover all the bullets below but which are most important?
 - Do we need to have “parallel” data across all marine life categories (i.e., richness for birds but Simpson index for cetaceans/fish ok?)
 - Taxonomic and/or trophic approaches?

- Higher temporal resolution than annual averages?
- Keep in mind corals will reappear in other Components – is this the best representation for biodiversity?

Component 3 – Areas of high species abundance including areas of spawning, breeding, feeding, and migratory routes.

Component 3 overview

- Definition from IEA framework
- SeaSketch tour of abundance data
- Introduce initial questions to consider as we review the data

Abundance (need to add grouped layers to SeaSketch to complement Core Abundance layers?)

- Cetacean abundance data (all cetaceans, biological groups)
- Avian abundance data (all birds, spatial & ecological groups)
- Fish abundance data (all species, biological groups, scallops)

Core Abundance

- Cetaceans
- Avian
- Fish

New MGEL

EFH composite layers

Areas of spawning, breeding, feeding and migratory routes (describe what may be possible with current data)

- Cetaceans
- Avian
- Fish

Questions

1. We can represent abundance of birds and marine mammals (model approach) and fish (density maps). There are many different ways to group and map these species -- what approaches do you think are most useful for identifying ERAs?
2. Do we have enough to work with now? What's missing in terms of additional data or additional analysis of data in hand?
3. How can we use these abundance data to identify areas of spawning, breeding, feeding and migratory routes?
4. What additional approaches should be considered – e.g. EFH data, expert workshops to delineate these areas?

Components 4 & 5 – Areas of vulnerable marine resources & Areas of rare marine resources

Components 4 & 5 overview

- Data table from draft Plan Appendix – What
- SeaSketch tour of Vulnerable/Rare resources data:
- Stressor sensitivity groups (V)
- Coral zones (R, V)
- EFH data (V)

- Hard bottoms data (R, V)
- Seafloor complexity, surficial sediment stability (V)
- Other...

Questions

1. Do you think the data currently in SeaSketch for these components illustrates rare and vulnerable areas?
2. We are just getting started with these components, in review of the Appendix data tables – what should be priorities? Probe how we might use core abundance with thresholds to represent rarity, keeping in mind need to define Component 3.
3. What’s missing in terms of additional data or additional analysis of data in hand?
4. What additional approaches should be considered – e.g. EFH data, expert workshops to delineate these areas?

Table 5 – Participant’s ideas and advice regarding process and methods for ERA data development

Questions

1. General thoughts re: development of ERAS – whatever is on their mind, hopes, dreams and fears.
2. Process – doing it fast vs doing it perfect. This has dimensions of public engagement and transparency in service of legitimacy as well as getting better data in service of accuracy (e.g. a model based approach for fish, large pelagics that are missing entirely, new and improved models for this and that, representing ocean dynamics, etc.).
3. How do you envision ERAs might be used and how might data product design be tuned to best support those use cases?
4. Methodology – development and application of thresholds, construction rules. Perhaps also probe people’s thoughts re: using expert judgment approach to back fill missing data (though this could be covered also or instead as part of Component 2) – e.g. how do we get from abundance data to spawning, foraging, migration area areas.

Workshop Agenda

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|----------|---|
| 9:30 am | Registration opens |
| 10:00 am | Welcome and Introductions, Review Agenda |
| 10:15 am | Review of Work to Date <ul style="list-style-type: none"> ▪ Base data, modeling approaches and synthetic products ▪ Review draft definitions for ERA framework, components, and criteria* |

- Illustrating ERA components: initial concepts and examples
 - Questions and Answers
- 11:00 am ERA Component's Roundtables:
1. Areas of high productivity
 2. Areas of high biodiversity
 3. Areas of high species abundance including areas of spawning, breeding, feeding, and migratory routes
 4. Areas of vulnerable marine resources
 5. Areas of rare marine resources
- 12:15 pm Lunch Roundtables --participants share their impressions of the morning's best ideas and/or biggest concerns in two minutes or less.
- 1:15 pm ERA Component's Roundtables (1-5 see above)
- 3:15 pm Plenary – Present and Integrate component roundtable's results (as assigned)
- 4:15 pm Closing Remarks
- 4:30 pm Adjourn

Attendees

- 1 Joe Atangan U.S. Navy, Chairman Joint Chiefs of Staff
- 2 Helen Bailey, UMCES
- 3 Laura Bankey, National Aquarium
- 4 Mary Boatman, on behalf of Northeast Ecosystem Based Management Work Group and Mid-Atlantic RPB Data Synthesis Work Group Co-lead
- 5 Donald Boesch, Center for Environmental Science, UMD
- 6 Sarah Bowman, DOD RPB Alternate
- 7 Aimee Bushman, Conservation Law Foundation
- 8 Ed Camp, Mid-Atlantic Regional Council on the Ocean
- 9 Kevin Chu NOAA, U.S. Department of Commerce
- 10 Karen Chytalo, NY Department of Conservation
- 11 Jesse Cleary, Duke University
- 12 Heather Coleman, NOAA
- 13 Kaycee Coleman, U.S. Fish and Wildlife Service
- 14 Corrie Curtice, Duke University
- 15 Jeff Deem, MARCO Stakeholder Liaison Committee representing recreational fishing
- 16 Kyle Dettloff, U.S. Fish and Wildlife Service
- 17 Fanny Girard, Pennsylvania State University
- 18 Kaity Goldsmith, Mid-Atlantic Regional Council on the Ocean
- 19 Matt Gove, Surfrider Foundation
- 20 Pat Halpin, Duke University
- 21 Annie Hawkins, Fishery Survival Fund

- 22 Kris Hoellen, National Aquarium
- 23 Ingrid Irigoyen, Meridian Institute
- 24 Todd Janeski, Virginia Commonwealth University
- 25 Michael Jones, U.S. Navy, Department of Defense
- 26 Francine Kershaw, Natural Resources Defense Council
- 27 Robert LaBelle, U.S. Department of the Interior, Bureau of Ocean Energy Management and Mid-Atlantic RPB Federal Co-lead
- 28 Zach Lees, Clean Ocean Action
- 29 Tony MacDonald, Monmouth University/Mid-Atlantic Ocean Data Portal Team
- 30 Meghan Massaua, Meridian Institute
- 31 Will McClintock, UCSB
- 32 Laura McKay, Virginia Coastal Zone Management Program, MARCO Chair, and Mid-Atlantic RPB Data Synthesis Work Group Co-lead
- 33 Anne Merwin, Ocean Conservancy
- 34 Christine Mintz, NAVFAC Atlantic, Department of Defense
- 35 Katie Morgan, Ocean Conservancy
- 36 Jay Odell, The Nature Conservancy and Mid-Atlantic Ocean Data Portal Team
- 37 Mat Ogburn, Smithsonian Institution
- 38 Marta Ribera, The Nature Conservancy
- 39 Steve Ross, University of North Carolina at Wilmington
- 40 Gwynne Schultz, Maryland Department of Natural Resources, MARCO, and Mid-Atlantic RPB State Co-lead
- 41 Emily Shumchenia, North East Ocean Council
- 42 Paul Snelgrove, Memorial University Newfoundland
- 43 Mark Swingle, Virginia Aquarium and Science Center
- 44 Megan Treml, NOAA, U.S. Department of Commerce
- 45 Richard Veit, City University of New York
- 46 Arliss Winship NOAA, U.S. Department of Commerce
- 47 Cindy Zipf, Clean Ocean Action