



New England Fishery Management Council

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MEETING SUMMARY
Habitat Plan Development Team
Radisson Hotel Providence Airport
2081 Post Rd., Warwick RI
December 15, 2015

The Habitat Plan Development Team met to continue work on the Omnibus Deep-Sea Coral Amendment.

Plan Development Team members present: Michelle Bachman (Chair), Maria Jacob, Kiley Dancy, David Stevenson, David Packer, Peter Auster, Carly Bari, Katherine Richardson, Geret DePiper, Page Valentine (via GoToMeeting)

Audience: Dr. John Quinn (Habitat Committee Chair), Jud Crawford, David Borden, Katie Almeida, Meghan Lapp, Grant Moore. Via GoToMeeting: Chris McGuire, Erica Fuller, Brad Sewell, Greg Wells, Aaron, other unnamed listeners.

Main outcomes of meeting: The PDT discussed the range of discrete zones alternatives, including criteria for recommending and defining boundaries of individual areas. Specific areas were recommended, and follow up work will be completed to refine the proposals. Historical coral presence records and more recently collected data should be used. The group agreed that fishing effort data would provide important context for the Committee. They also agreed on the importance of describing associations between corals and managed fish species. The PDT recommends that the Committee clarify their objectives for the amendment, as well as their intentions regarding regulation of lobster fishing, at their next meeting.

Introductions:

The group discussed timing of when updated coral zone recommendations might be ready to forward to the Committee. Given additional review of data and GIS work needed to generate recommendations, it is likely that a Committee meeting around mid-February will be the most productive. The PDT chair noted that she would like to update the Committee on any analysis related to the clam framework during that meeting as well. She also noted that the first priority after completing immediate follow up work from today will be submitting the OHA2 FEIS to GARFO.

Agenda items #1: Updated recommendations for discrete zones

The group discussed the two-tiered discrete zone recommendations made in 2011 (areas based on coral presence vs. areas based on inference about suitable habitat). Given the updated data now available, the PDT agreed that a two-tiered approach was no longer necessary. Areas between canyons that do not obviously belong on the list of recommended broad zones but that do have some evidence of coral presence would be included in the broad zone recommendation. The group discussed that it will be important to articulate the rationale for the broad zone alternatives, i.e. what additional features of interest are included in these areas. Cold seeps are one example of a feature that would be outside the discrete zones but within the broad zones. Also there may be inter-canyon areas with corals that do not make sense as a distinct discrete zone.

The group talked a bit about the historical (pre-2012 fieldwork) database. The consensus was to use the version of the database that was developed to support the habitat suitability model, where all the records have undergone detailed review by a member of the PDT. This version includes all recently identified geo-referenced records. The DSCRTP database is very similar, but may be missing a number of recently compiled records, especially in areas of interest to the Council. There are also differences between the two data sets in terms of whether gorgonians corals are classified under the soft coral order. The PDT previously adopted this classification, but the DSCRTP data set uses a different approach. While this difference could be clarified for interpretation by the Council and stakeholders, it may introduce some confusion when comparing text and alternatives in previous versions of the draft amendment.

It will be important to flesh out what is meant by ‘historical’. While some records are much older, many of the records are from the 1970s and 1980s (and some as late as 2005) and many are based on physical samples with verified taxonomy, in other words many of these records provide valuable information that complements more recent ROV and towed camera surveys. Later in the day, the PDT discussed that it will be important to consider the type of coral, data source, and positional accuracy of records in this data set that are used to adjust discrete zone boundaries, and that these records should be evaluated individually.

Fishing effort data sources (i.e. observer combined with VMS, VTR) were raised at this point in the meeting but were discussed in further detail later in the day.

A major difference between the present state of coral science and what was known in 2011 is that many minor canyons have been surveyed with towed cameras or ROVs, and have been mapped with high resolution multibeam sonar. These updated topographic maps make it easier to identify the boundaries of the canyon features, and the imagery provides clear evidence for the presence and abundance of corals of various types.

The PDT discussed that while slope (>30 degrees, especially >36 degrees) is very predictive of coral presence, it was important to understand that maps of high slope are only as finely resolved spatially as the underlying bathymetry data from which they are derived. Specifically, there are fine-scale (on the scales of tens of meters) areas of steep rock outcroppings that support corals, but might be smoothed over in a slope map derived from 25 meter bathymetry. In other words,

areas that are mapped as high slope are expected to represent true areas of high slope, but very small high slope features may be missed on these maps.

The PDT discussed whether substrate information is associated with the coral records. In general this information is not available for the historical records, except for pre-2012 ROV dives. The recent dives characterize both geology and biology, so that specific habitat types that support corals are now better understood. It was noted that while many corals are on large areas of rock outcrop, glacial erratics may also have corals attached. There are examples of corals on glacial erratics from recent dives. The PDT also discussed that not all structure-forming corals require hard substrate for attachment. For example, some Chrysogorgiid species (octocorals) exhibit a calcified holdfast that serves as an anchor in soft sediments. There also are bamboo corals known from mud habitats. The bamboo coral *Lepidisis caryophyllia* was found in mud at approximately 2,100 m in Gilbert Canyon. Here in the North Atlantic the bamboo coral *Acanella arbuscula* is very abundant on mud. Indeed many of the Yale specimens originally given to Verrill by captains of fishing schooners came from mud habitats. It is possible that spatially contiguous observations of soft corals in fine grained sediments, or hard sediment corals occurring outside well-defined canyon areas with steep slopes, might provide the foundation for additional discrete zones. These types of situations will be evaluated on a case by case basis as needed. At minimum, the existence of soft sediment structure-forming corals, as well as corals on glacial erratics, provides support for the broad zone approach.

The group discussed the authority for, and the implications of, coral zone designations. It is clear from the notice of intent prepared when corals were split from OHA2 that the Council's intent was to use the discretionary coral conservation authority to designate these areas, as opposed to the EFH authority. However, there was some discussion at the Habitat Committee, after discovery of new coral areas within the Gulf of Maine, that any actions focused on coral related EFH for managed species (e.g., Acadian redfish) be delayed until the coral amendment as OHA2 was nearing completion. In any case, coral zones designated using the discretionary authority would not require consultation via the EFH process. That being said, most of these zones would overlap, at least partially, with designated EFH. A smaller subset of the zones would also overlap Habitat Areas of Particular Concern proposed in OHA2. EFH consultations may result in conservation recommendations if projects are determined to have negative impacts on habitat, including coral habitats.

Adding coral zones as national system members of the National Marine Protected Areas (MPA) Inventory was mentioned as another way to highlight the importance of these sites, although such listings produce no additional restrictions, regulations or authorities. Indeed the current closed areas designated by the NEFMC/NMFS are eligible for national system membership. There have been recent efforts to ascertain the degrees of protection afforded by the various types of MPA designations at the national level in order to account for progress towards national and international marine conservation goals.

The PDT briefly discussed that it would be important to review the coral zone boundaries relative to enforcement considerations at some point in the process, likely once they were fairly close to final (i.e. following Committee/Council review, and an opportunity for industry and other stakeholders to provide input). It was noted that in general one result of the MAFMC coral

workshop was that boundaries became slightly more complex. While this could provoke enforcement concerns, these boundary refinements were developed in direct collaboration with industry members. One major task will be to convert the depth-based broad zone boundaries to straight line approximations with defined vertices. While this was done after final action in the Mid-Atlantic, it will be easier for all groups to provide feedback if these boundaries are developed earlier in the process, so that would be a short-term goal of the PDT.

The PDT reviewed a list of potential discrete zones. The major conclusions of reviewing this list were as follows:

- Canyon zones previously recommended as alternatives by the Council remain recommended. These include Alvin, Gilbert, Heel Tapper, Heezen, Hydrographer, Lydonia, Munson, Nygren, Oceanographer, Powell, Veatch, and Welker. In all cases, boundaries should be updated using updated bathymetry, coral suitability model outputs, areas of high slope, and considering data from recent dives. Historical (pre-2012) coral records considered on a case-by-case basis.
- Canyon zones not previously recommended based on earlier analysis of canyon morphology (less likely to have suitable habitat). These include Atlantis, Chebacco, Clipper, Dogbody, Filebottom, Nantucket, Shallop, and Sharpshooter. All of these (except Shallop) have been recently surveyed and found to contain coral habitats. They would be recommended as discrete zones (will evaluate Shallop further). Same approach as previously recommended areas – use bathymetry, suitability model outputs, slope, and dive information. There few to no pre-2012 coral observations in any of these areas.
- Unnamed canyons and inter canyon areas assessed in recent surveys – will need to investigate further to see if any of these warrant consideration as discrete zones. Other option would be to highlight any corals identified within these areas as part of a broad zone designation.
- Seamounts – all four seamounts in the EEZ were previously recommended and remain recommended, i.e. Bear, Mytilus, Physalia, and Retriever. There are now ROV dives on all four seamounts that indicate diverse coral fauna in each location. No changes to boundaries are needed. Prior area boundaries were recommended based on high resolution bathymetry and were drawn to encompass the entire seamount with a small number of straight line segments.
- Mt. Desert Rock, Gulf of Maine – more recent dives provide additional data points for this area but all observations within boundary as previously defined. No need to update at this time.
- Jordan Basin, Gulf of Maine – recent activity has focused around the 114 bump area, and expanded the area known to contain corals at lower and coral garden densities. Recommendation is to expand the original 114 bump area. Noted that ridges in this area have 10-20 meter relief above the seafloor. Exploration of this area was iterative, and better bathymetry data were available later on to guide dive site selection. Two other sites previously identified remain recommended; no need to adjust boundaries. Northern of the four previously identified sites should be re-evaluated and perhaps removed from the list; look at historical records to see if there are any. A site to the east in central Jordan Basin should be added to the list of discrete zones based on two dives. There is multibeam data for this central Jordan Basin site.

- Outer Schoodic Ridge, Gulf of Maine – recommended as a coral zone, with boundaries based on high relief areas as indicated by multibeam data and dive sites where coral gardens were identified. Other dive sites in the vicinity did not have corals present and are outside the recommended zone.
- Lindenkohl Knoll, Gulf of Maine – also recommended as a discrete zone based on dives that identified corals and lower and coral garden densities. There is evidence of fishing activity in this area. Other dive sites in Georges Basin did not have corals present and are outside the recommended zone.

The PDT will follow up on whether recent fishery observer data have identified any catches of corals. Observers have been trained to identify corals since 2013.

Agenda Item #2: Discrete zone boundaries

Staff walked the PDT through some examples of modified discrete zone boundaries for the canyons. Takeaways from these examples include:

- An important first step in each canyon area is to identify the feature based on depth and shape. Bathymetry data other than the recently collected high resolution multibeam may be required in the heads of the canyons. These depths of 200-300 meters are on the shallow end of the operating range for deep-water multibeam systems.
- In some cases it may not be appropriate to designate a discrete zone into the head of a canyon given the slope and suitability model outputs. There are a number of smaller canyons that do not incise the shelf much or at all where highly or very highly likelihood of suitable habitat begins at deeper depths.
- It is important to include the 2 grid cell/0.4 nm buffer around the habitat suitability model outputs when using the model to define boundaries. Given the spatial resolution of the model outputs and underlying input data, this buffer ensures that any boundaries are very likely to be inclusive of suitable habitats.
- Boundary adjustments based on coral records in the historical database that are outside high suitability areas identified by the model should be considered on a case-by-case basis. Data source and spatial precision are important to consider here.

The best way to review recommendations for all areas will likely be a conference via GoToMeeting. Before then, staff will import ROV and towed camera dive locations into GIS, and identify any records of interest in the historical database. It may be useful to develop a relational database that can be used to quickly look for information about dives by location. Right now this information is in various spreadsheets in different formats depending on the cruise/data source.

In the Gulf of Maine, coral zones and their boundaries will be based on all data available, but many locations in the Gulf have not been surveyed for corals and lack high resolution bathymetric data. The Gulf of Maine discussion highlighted the fact that more comprehensive high resolution bathymetric maps would be hugely useful to this process. Given data limitations, the approach for defining discrete zones in the Gulf of Maine will be different than in the canyons, with Gulf of Maine zones encompassing dive sites with direct observations of corals, as

well as suitable habitats in the immediate vicinity. There is less ability to refine boundaries based on inference about suitable habitats in the Gulf of Maine than there is in the canyons. In both parts of the region, dive sites are a small fraction of the proposed zones, but in the canyons these dive sites are embedded within a broader footprint of high resolution bathymetry data where depth and slope are well known, so inferences about the spatial extent of coral habitats are more straightforward in the canyons.

Agenda item #3: Broad zone boundaries

Next the PDT discussed broad zone boundaries. The Mid-Atlantic Fishery Management Council used a 450m with a 50m buffer/tolerance. Currently, NEFMC alternatives include 300, 400, and 500 m depth contours. Given the MAFMC experience, the PDT agreed it would be prudent to convert the depth-based boundaries to a series of straight line segments. The group discussed developing lines based on the 300, 400, and 500 meter contours, with a 50 meter buffer. This can be done for a portion of the continental shelf edge as an example. The simplify line, point remove tool in ArcGIS will be used as a starting point, with vertices examined individually to ensure that they fall within the 50 meter buffer. This tool works by dropping vertices out of the original contour, according to a specified tolerance, which indicates how far apart vertices can be. Different tolerance settings will be explored. The goal is to represent faithfully the true shape of the shelf break and slope with as few line segments as possible. Similar to the MAFMC approach, the PDT agreed that the broad zone boundary should follow the discrete zones boundaries in areas of overlap. Thus, at this time, since the discrete zone boundaries are still in development, it makes sense to focus on sample portions of the broad zone boundary for illustrative purposes.

Agenda Item #4: Fishing effort data

The PDT reviewed fishing effort data overlapping various coral zones. Heat maps of fishery revenues are based on VTR data, and can be displayed by gear, fishery management plan, species, and year. These results can be compared to VMS data. Tow tracks are based on observer haul start/end data with VMS data used as way points to refine the tow paths. These observer/VMS datasets are a work in progress, but can be used to understand effort with respect to seabed topography, and can be linked to catch by species to indicate which stocks are targeted in various locations. It was noted that the observer data are a subset of fishing effort and that they are more valuable for understanding overall patterns of activity vs. the total magnitude of effort or revenue.

There is no fishing activity in the seamounts. In the canyons, the following activities were identified using the VTR revenue maps from 2007-2012: very limited large mesh multispecies revenue along the shelf break; small mesh multispecies revenue along the shelf between Heezen and Powell canyons; monkfish revenues along the shelf break between Veatch and Alvin canyons; deep-sea red crab revenue in deeper waters from Heezen to Alvin Canyons; squid revenue along the shelf edge, especially between Heezen and Munson Canyons, lobster revenues along the shelf edge, particularly between Heezen and Powell Canyons, Jonah crab revenues near the heads of Hydrographer and Veatch Canyons, and tilefish revenues just inshore of Alvin Canyon.

Based on comments from a lobster fisherman in attendance, the apparent gaps in activity between Lydonia and Hydrographer Canyons may be an artifact of only a subset of vessels reporting via the VTR system. He indicated that the fishery works in the heads of the canyons all along the edge of the shelf. Federally permitted Area 3 lobster vessels only report via VTRs if they carry other federal permits, which means that the VTR data set is an underestimate of lobster fishing effort and revenue in the canyons. VTR data can be compared to overall landings from the dealer data, but only at the spatial resolution of statistical areas. This may allow for an estimate of revenue generated within groups of canyons, as there are four statistical areas overlapping the canyons, but overall this lack of spatial data would make analysis of lobster fishing by discrete zone fairly uncertain. Note that after the meeting, staff contacted the Atlantic States Marine Fisheries Commission to ask for assistance in understanding patterns of lobster fishing effort in the canyons and the two staffs are actively collaborating on this issue.

In the Gulf of Maine, there are large mesh multispecies revenues coming from Jordan Basin, herring revenues along the coast overlapping the Mt. Desert Rock area, and lobster revenues in all four locations (Mt. Desert Rock, Jordan Basin, Outer Schoodic Ridge, and Lindenkohl Knoll). Lobster effort is most concentrated in the inshore GOM, and these areas are generally in lower to moderate revenue areas. After the meeting, Carl Wilson, the PDT member from Maine Division of Marine Resources, commented that in nearshore Maine waters, dealer data will get 100% of the activity down to a port/statistical area. Spatial data can be derived from harvester logs, which randomly capture 10% of harvesters. Maine records zone (A-G) and distance from shore (0-3, 3-12, 12+). It would be best to expand based on a combination of dealer reports and harvester reports. These data sources will be further explored in the near future.

The PDT agreed it would be helpful to share revenue information with the Committee so that they can understand more about the potential fishery impacts of coral zones, and to help ensure that potentially affected industries are identified and provide input to the Council.

Other issues not specifically included on the agenda

The PDT circled back to the earlier discussion about management authorities (discretionary vs. EFH). If there is any desire to link any of these coral zones to the EFH authority, the PDT discussed that the cleanest way to do this would be in a subsequent

The PDT also discussed available guidance related to management of lobster gear by NEFMC for the purpose of coral protection. The group agreed that it was an issue that the Committee should address at their next meeting.

Finally, the group discussed the importance of providing information to the Committee regarding what is known about fish associations with corals. An obvious example here is the linkage between sea pens and larval redfish, but many other species have been observed in association with corals during recent survey dives.

The meeting adjourned shortly after 5 p.m.