



New England Fishery Management Council

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MEETING SUMMARY

Habitat Plan Development Team

Boston, MA

The Habitat Plan Development Team held a meeting on July 28, 2016 to discuss the coral amendment and clam framework. Related to the coral amendment, there were three agenda items: (1) updates to the Central Jordan Basin coral zone, (2) revenue and fishing effort analyses and (3) other analysis related to impacts on corals. Related to the clam framework there were two agenda items: (4) a SCeMFIS project to map clams, gravels, and bycatch captured during the federal hydraulic clam dredge survey and (5) and video survey image analysis to develop updated habitat maps in areas being considered for clam dredge exemption.

Plan Development Team members: Michelle Bachman (Chair), Peter Auster (via webinar), Jessica Coakley (via webinar), Kiley Dancy (via webinar), Geret DePiper, Kathryn Ford, Dave Packer, Doug Potts, Katie Richardson, David Stevenson, Page Valentine (via webinar), Carl Wilson.

Other participants: John Quinn (Habitat Committee Chair); Alison Verkade, NMFS GARFO HCD; Megan Ware, ASMFC staff, Eric Powell (Director, Science Center for Marine Fisheries)

Audience: In person: Heather Coleman, David Wallace, Joe Myers, Roger Mann. Via webinar: Katie Almeida, Peter Himchak, Patrice McCarron, Tom Alspach, Peter Hughes, Libby Etrie, Gib Brogan, Molly Masterton, Brad Sewell

Major conclusions:

- The PDT recommended updating and expanding the boundary of the Central Jordan Basin Zone to include both recent dive sites where corals were found. (The imagery/coral abundance data for one of these sites were reviewed just prior to the last Committee meeting and not referenced in discussions at that time.) The PDT will review the best available bathymetry data to develop a new boundary based on the likely extent of rough/steep terrain.
- The PDT suggested that it would be helpful for the coral amendment to (1) explicitly suggest a timeframe for review, and (2) outline coral-related research priorities relevant to fishery management.

- The PDT continued to advance its understanding of fishing activity in coral zones, and adjusted its approaches for summarizing the VTR-based data sets. The PDT agreed it will be important to combine these data with other sources of information such as the Area 3 lobster survey, Area 1 lobster harvester reports, VMS, and at-sea observer. Data regarding recent, at-sea observations of coral bycatch are available. While it is not clear yet how these might be used to inform development of the coral amendment as there are only a handful of cases to date, they clearly indicate that gear interactions with corals do occur in our region.
- The PDT discussed a clam survey data project conducted by SCeMFiS and agreed that both the survey and clam vessel distribution data would be useful towards the development of exemption/access area alternatives in the framework.
- The PDT continued to refine a proposed image analysis of video survey data that will be used to develop updated habitat maps to support the clam framework. Following some additional exploratory work to confirm the exact approach, it will be possible to begin review of all the images.

The meeting began at 9 a.m. with a brief overview from the chair. The purpose of the meeting was to discuss various analyses to support the two ongoing habitat-related management actions. Information from the June 28 call and this meeting will be presented to the Committee on August 18.

Agenda Item 1: Central Jordan Basin coral zone

The PDT discussed updated information on the Central Jordan Basin coral zone that was not available in February when the PDT made boundary recommendations to the Committee. High coral abundance observed during a dive with the remotely operated vehicle ROPOS suggest that an expanded coral zone in Central Jordan Basin is warranted. While the observations made during this dive are convincing evidence of coral habitat, the spatial extent of corals in Central Jordan Basin is not fully understood. Similar to other Gulf of Maine sites, this location also suffers from incomplete bathymetric mapping that could be used as the basis for a zone boundary, where coral habitat is inferred based on areas of relatively steep terrain. Map products available to the PDT at this time suggest more rugged features in the region immediately surrounding the ROPOS dive, where corals were locally abundant. Another dive a few kilometers to the north found corals as well, but in lower abundance. This northern dive was completed with the Kraken ROV during a different cruise and was the basis for the February 2016 Central Jordan Basin zone boundary.

The team agreed that it made sense to recommend an updated boundary that includes the area covered by the southern ROPOS dive, but agreed that if possible any dive track and bathymetric data should be combined in a single geographic information system. This will allow us to develop a boundary that expands the footprint of the coral zone beyond the two dive tracks based on reasonable inference about the extent of steep/complex terrain in this part of Jordan Basin. This would mirror the approach taken for other Gulf of Maine zones.

This line of discussion prompted a more general conversation about how the Council intends to respond to new information regarding coral habitats. While essential fish habitat regulations recommend a five-year interval for review of information to support EFH designations, there is no similar recommendation that would apply to coral zones designated via the Magnuson Stevens Act section 303(b) discretionary provisions. While the Council can certainly choose to update coral zones and measures in the future, potentially via framework adjustment if those aspects of the amendment are approved, the PDT suggested that it would be helpful for the coral amendment to (1) explicitly suggest a timeframe for review, and (2) outline coral-related research priorities relevant to fishery management.

Next steps:

- Investigate conversion of Olex data for Central Jordan Basin into ArcGIS compatible bathymetric map (Bachman, Auster)
- Get final dive track vs. dive plan for Central Jordan Basin ROPOS dive (Bachman)
- Update document summarizing data on CJB area for Committee meeting (Bachman)
- Draft a memo to the Habitat Committee summarizing coral-related research priorities and recommending that the Committee suggest that review of the coral zones be completed after a specific time interval, e.g. after five years (Bachman, PDT to review)

Agenda Item 2: Coral amendment revenue and fishing effort analyses

The PDT has been exploring data to help characterize fishing activity in and around deep-sea coral zones. A relatively large amount of time has been spent on data to characterize the lobster fishery, as the data for this fishery are somewhat different than others, and it is less familiar to staff and many PDT members. While the Council has not yet recommended analyzing exclusion of lobster gear from coral zones, the goal is for the PDT to provide information to support this decision.

Dr. DePiper described vessel trip report-based metrics to evaluate fishing activity in coral zones. The analysis uses the same approach as the one developed for the habitat amendment (for details see DePiper 2014¹). A paper in preparation will compare the confidence interval approach used here to apportion revenue and effort spatially with VTR data gridded by ten minute squares. Here, Dr. DePiper examined data for the broad 300, 400, and 500 m zones individually, and grouped the canyons/seamounts and Gulf of Maine zones. For each zone or group of zones, metrics examined included revenue (by species and by gear type), percent of revenue for each species or gear type relative to overall New England revenue for the species or gear type, number of permits by gear type, number of trips by gear type, number of days at sea by gear type, and percent of owner revenue from deep-sea coral zones relative to total revenue for that owner from all areas fished. Most of the analyses included five years, 2010-2014, except the percent of

¹ DePiper, G. S. (2014). Statistically assessing the precision of self-reported VTR fishing locations. NOAA Technical Memorandum NMFS-NE-229. 16pp.

owner revenue, which was summarized for 2013 and 2014 only. Data for 2015 are still being processed and will be added at a later time.

The PDT discussed that given differences between patterns of fishing in the inshore vs. offshore Gulf of Maine, these zones should be examined separately. For the Committee meeting, the analysis will be updated to consider the Mt. Desert Rock, Outer Schoodic Ridge, and Lindenkohl Knoll sites separately, and pool the four Jordan Basin sites. Also for the Committee meeting, the analyses will exclude pelagic species and gears (a number of the top ten species by percent New England revenue were pelagic, e.g. tuna, sharks). In addition, updated analyses will evaluate percentages of revenue by species and gear type relative to the entire northeast region, rather than using New England as the denominator, given that many of the species and their fisheries are prosecuted in the Mid-Atlantic as well. Maps of revenue by gear type and species will be prepared to complement the figures. The PDT discussed that it will be important to provide appropriate context for the lobster fishery data, as this fishery is known to be underrepresented in the vessel trip report data.

Next, the PDT discussed lobster harvester report data pertinent to the Mt. Desert Rock and Outer Schoodic Ridge zones, which are within Lobster Management Area 1, Maine Zones A (OSR) and B (MDR). An introduction to this data set was provided during the June 28 PDT conference call. Since the call, Carl Wilson and other DMR staff have developed additional data summaries that explore seasonal changes in lobster catch per trip and depth fished according to zone (A, B, or C) and distance from shore (0-3, 3-12, or 12+ nm). Across all zones and distances from shore, there are distinct seasonal patterns in catch per trip, with peaks in the fall for the 3-12 and 12+ distances, vs. peaks around August or September for the inshore (0-3 nm) distance. There is also a strong summer peak in effort (number of trips) in the inshore zone, with a less obvious peak in the 3-12 zone and relatively consistent levels of effort year-round in the 12+ distance zone. Depth fished varies seasonally as well, generally reaching an annual minimum in mid to late summer, except for 3-12 nm from shore in zone A, where depth fished remains relatively constant year-round.

Harvester data only represent a subsample of fishing activity, as they are required for 100% of trips fished by a 10% sample of vessels from each zone A-G. However, they paint a fairly detailed picture of effort in the Area 1 fishery that could be used to estimate total lobster revenue and number of trips within the MDR and OSR coral zones.

Similarly, for Lobster Management Area 3, the ASMFC permit holder survey can be used to better understand patterns of lobster and Jonah crab fishing effort in the New England canyons. Megan Ware (ASMFC staff, lobster FMP coordinator) first presented the results during the June 28 PDT conference call and provided some updated analyses for this meeting. Similar to the harvester reports for Area 1, Zones A-C, this survey indicated that there is seasonal variation in fishing activity in terms of the number of trips and the depth fished. Approximately one quarter of respondents fished more traps between July and September, but most respondents fished similar numbers of traps year-round. Traps were fished deeper during the winter months. Most traps (96%) were fished in depths less than 400 m, although 42% of respondents had set traps at depths beyond 400 meters during 2014 and 2015.

Some canyons were preferred lobster grounds. In particular, Veatch, Atlantis, Hydrographer, and Lydonia were fished by a greater percentage of survey respondents than other canyons, and Veatch, Atlantis, and Lydonia canyons were most often referenced as top contributors to 2015 revenue. The canyon region is also an important and increasing source of Jonah crab revenue. While this survey covered 2014 and 2015 only, a 2014 spike in Jonah crab revenue is evident in the VTR analysis as compared to the period 2010-2013. Given the effects of the recently implemented Jonah crab FMP, subsequent years of VTR data may not show quite the same magnitude of Jonah crab revenue as 2014, but the canyon region is expected to remain an important source of Jonah crab revenue in the near term.

Next steps:

- Update VTR analysis including figures and raster data sets (DePiper)
- Generate maps of revenue by gear type or species and year to accompany figures (Bachman)
- Expansion of harvester report data to estimate total revenue generated in Mt. Desert Rock and Outer Schoodic Ridge coral zones (Wilson, with DMR staff)
- Map lobster effort and revenue in region as a whole (ASMFC Lobster Technical Committee)
- Summary report on fishing effort in coral zones (Bachman, PDT to review)

Agenda Item 3: Analysis of impacts on deep-sea corals

The PDT briefly discussed how to evaluate impacts of the alternatives on deep-sea corals. The Mid-Atlantic amendment takes a three-pronged approach, evaluating the likely distribution of corals relative to zone boundaries based on (1) historical records, (2) recent ROV and towed camera dives, and (3) high and very high suitability habitat. Given that similar data are available for New England, the PDT agreed that it makes sense to take a similar approach to evaluating the potential conservation benefits of the zones in our region. Staff will work more on these analyses in the coming month, and provide both an overview to the Committee and an opportunity for more detailed PDT review.

The PDT also discussed the availability of some at-sea observer data on coral bycatch. Historically, coral bycatch data from the observer program were not particularly reliable, but given recent changes to vouchering and verification protocols, these recent events are much better documented. Species observed included the sea pens *Pennatula aculeata* and *Halipteris finmarchica*, the soft coral *Leptogorgia virgulata*, as well as larger structure forming soft coral species *Paramuricea placoma* and *Primnoa resedaeformis*. The PDT did not discuss the specifics of how these data might be used to support development of the amendment, but it is clear from these events that coral bycatch occurs on at least an occasional basis, and that fishing restrictions could serve to prevent these types of interactions from occurring in the future. Documented coral bycatch remains a rare occurrence relative to the overall number of trips observed.

Next steps:

- Continue to develop background information for affected environment section of amendment (Packer, Stevenson)
- Continue work on coral impacts analysis (Bachman)
- Maps of coral bycatch records (Packer)

Agenda Item 4: Science Center for Marine Fisheries clam survey data project

Dr. Eric Powell (Director, Science Center for Marine Fisheries, SCeMFiS) provided an overview on a project nearing completion that investigates clam catches and ancillary data in the Northeast Fisheries Science Center surfclam/ocean quahog survey. The project digitized survey logs from the initiation of the survey in the late 1970s through 1999, and then used these logs in combination with other data already in the survey database (FSCS) to standardize and map metrics related to complex habitat across the entire survey time series (1978-2014). The data presented in the project report include presence and relative abundance of the following: sediment, i.e. cobble, rock, and boulder; mussels; total attached epifauna; gear codes indicative of rough/difficult bottom conditions; and of course data on clams and clam shells (surfclam, ocean quahog, and other species combined). Relative abundance (absence, presence, or predominance) was assigned for each type of data for each survey tow, as detailed in a draft report provided to the PDT. The PDT generally agreed these data would facilitate the development of exemption/access area alternatives within the two habitat management areas being considered in the framework. Specific clarifying questions about the approach will be provided to Dr. Powell. One general comment was that it seems important to plot absence and not just presence/predominance, as survey coverage of the Great South Channel HMA is patchy, and the absence of data on the map cannot be interpreted as the absence of gravel sediment, clams, epifauna, etc.

In addition, the researchers obtained fishing vessel plotter data directly from captains, filtered those data to identify likely fishing vs. non-fishing events, and then converted the data for use in Geographic Information System software such as ArcMap. These data are not a census of effort, and similar to vessel monitoring system data, indicate vessel position, not active fishing time. Nonetheless, given the very limited at-sea observer data, the GIS-compatible plotter data will be a useful complement to logbook-based maps of fishing activity.

The researchers then combined both of these data sources to assess whether commercial clam dredging activity was occurring in areas of complex habitat. First, they set thresholds in the survey data that they felt were indicative of complex habitat, specifically larger numbers of mussels, predominance of cobbles, rocks, or boulders, larger numbers of epifauna, and dredge damage during the tow. Using these thresholds, they calculated what percentage of survey stations in each habitat management area were considered complex. Next, they determined how many fishing events were in close proximity to survey stations. Finally, they used a binomial test to evaluate whether the intersections between fishing and survey locations indicated more or less fishing in complex habitat than would be expected by chance, given the fraction of survey stations with complex habitat. The PDT had some concerns about the approach taken and will follow up with Dr. Powell with specific questions.

Next steps:

- Work with Eric Powell and collaborators to obtain GIS data (Bachman)
- Provide detailed comments on project report (Bachman with PDT input)

Agenda Item 5: Clam framework image analysis

Another source of information on habitats within each of the proposed management areas is imagery collected during the School for Marine Science and Technology video survey. Although we are already using sediment maps based largely on these data, additional data could be collected from the images in order to develop more refined habitat maps. The PDT obtained images and the associated database of station locations, sediment, and epifauna from SMAST this winter, and has been working since then on how best to extract additional useful data from the images in a way that is repeatable, straightforward, and minimizes costs (time), while providing more nuanced habitat maps that will support development of alternatives in the framework.

The PDT's initial group discussion of this approach is summarized in the meeting summary dated June 28, 2016. The current analytical framework was refined over two discussions with the full PDT and numerous small group conversations. The proposed analysis will confirm the accuracy of the existing database records and will also gather new information. For each image, the PDT will confirm presence of attached epifauna and flag longer lived species, and will confirm presence of pebble, cobble, and boulder-sized sediments. Confirmation of existing data are important for two reasons, first, for some stations only video data have been analyzed, not digital still images, and digital still images are the preferred data source here because of their higher resolution. Second, as many different analysts have participated in image analysis at SMAST over the years covered by the survey (2005-2015 digital images), there is value in having a single analyst review all of the imagery to ensure a consistent approach. The primary new data element that has not been assessed previously is percent cover of gravel sediments, and most of the discussion at this meeting related to the best way to conduct this assessment.

The PDT discussed a straight visual estimation of percent gravel coverage, and also explored various grid-based approaches to sub-divide each image and hopefully attain more accurate and consistent results. The group also discussed the importance of being able to call up and review specific images quickly during alternatives development, by geotagging the photos (this can be done in ArcGIS for desktop, as well as other software such as Picasa, although Picasa is no longer supported for web but has a desktop application). There are also software products to allow for batch geotagging of images.

Next steps:

- Second revision of image analysis plan including SMAST comments (Bachman)
- Exploratory analysis to refine percent gravel estimation method (Verkade)
- Explore image organization/geotagging approaches (Ford, Bachman)

- Once images are analyzed, explore mapping approaches (Ford, Bachman; hold over from June PDT call)

Other business

The PDT briefly discussed additional clam dredge sampling in the northern part of the Great South Channel HMA, and whether it might be helpful to development of the amendment. The Northeast Fisheries Science Center is evaluating the spatial extent of their clam survey and the federal survey may include these areas in the future, but in the near-term stations could perhaps be completed by industry. These areas are actively fished. The PDT concluded that since habitat characterization data for this location are available from the SMAST video survey, there would not be a large benefit in terms of seafloor characterization of a dredge survey in this area, but that it would be helpful to have clam catch rates in this area, which is heavily fished, to compare with other areas. This potential near term survey work would obviously support federal survey expansion efforts as well. The group discussed that if it was possible to put video cameras on the dredge, it could advance our understanding of sediments and epifauna observed visually translate into bycatch of these items in a hydraulic dredge. It seems like camera work is technologically feasible.

The meeting adjourned at approximately 4 p.m.