New England Fishery Management Council
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MEETING SUMMARY

Habitat Plan Development Team

April 23, 2019
1:00 - 4:00 p.m.

The Habitat PDT met via conference call to discuss research planning for the Great South Channel Habitat Management Area and the Fishing Effects model.

Meeting attendance

PDT members included Michelle Bachman (Chair), Peter Auster, Jessica Coakley, Geret DePiper, Marianne Ferguson, Kathryn Ford, Julia Livermore, Doug Potts, David Stevenson, Page Valentine, and Alison Verkade. Scott Smeltz from Alaska Pacific University was invited to participate in the Fishing Effects Model discussion.

Other callers included Domenic Santoro, George Maynard, Chad Brayton, Bill Silkes, Louis Legace, and Chris Shriver; additional listeners may have been on the line as well.

A long term project not on the PDT's agenda but mentioned at the start of the call is the Northeast Regional Marine Fish Habitat Assessment, which is being coordinated by the Mid-Atlantic Fishery Management Council, but involves NEFMC as well as habitat experts from NOAA, Atlantic States Marine Fisheries Commission, Nature Conservancy, academic institutions, and others. Ms. Bachman and Ms. Coakley are co-chairing the inshore fish habitat action team. More information will be provided after July 1, once the workplan has been revised.

Research program for the Great South Channel HMA

The PDT reviewed a revised draft of the research planning document. The goal is to put enough structure around the plan so that those preparing EFPs can understand that their project fits within the overall research framework, without being overly prescriptive or spending more time on details than is necessary. The PDT will be presenting the framework to the Committee on May 9. The goal of this presentation is to help them understand the possible extent of work and convey realistic expectations about what might be accomplished.

Discussing the terms priorities vs. objectives vs. research needs, the PDT agreed that the Council already uses the term 'research priorities' and that this could be confusing. During this call, the PDT agreed that "objectives" was a better term. The PDT agreed to revise bulleted lists of data gaps and rational into a narrative discussion following the list of objectives.

To begin the discussion, Ms. Bachman reviewed the objectives[1] as currently presented in the research framework document. She asked for feedback on Objective 4 as the PDT had previously debated the relative importance of this objective.

There was no disagreement that Objective 4 is an important question in general. The underlying rationale for siting this HMA to begin with was a long term look at fishery independent data, so we know the area is important fish habitat. However, some members were concerned about including Objective 4 in this research planning effort. Previous concerns about diverting limited resources from addressing the other objectives were reiterated. In this vein, a PDT member suggested Objective 4 should perhaps be described as worthwhile for future work, vs. a focus for these efforts. Regardless of funding/availability of resources, concerns were also raised about the ability to effectively address this issue. Sampling fish can be challenging. If we don't see evidence of cod in these studies what do we take from that? What if cod are just not abundant in areas/times sampled, or if the sampling effort is insufficient? Variable year class strength could make it very difficult to interpret fish distribution data. Given that sampling small juvenile fish is not really done anywhere, how would we compare what we see in the HMA with other areas? Studies that address other the objectives and can more easily be used to evaluation exemption area management.

Other members argued that the question of function of the HMA as fish habitat is fundamental and there should be consideration given to this question as a part of this research program. They asked if someone has a plan to do this work, then why not support that sort of study? While establishing relationships between fish species and habitats has been challenging, it's not a lower priority. Any study that looks at this issue will probably include objectives 1-3 as well. The PDT agrees the HMA was created to protect fish habitat. If an area within the HMA is shown to be more productive, more cod present, greater abundance of other fish species, etc., doesn't that information allow us to better prioritize access in certain areas vs. others? We are assuming three-dimensional hard bottom is important for groundfish productivity, and that is a well-founded assumption, but evaluating it here seems worthwhile. Another member noted that we should continue to recognize that the HMA is not managed in a vacuum, and effort displaced from the HMA is likely to affect fishing effort elsewhere.

A PDT member suggested reframing the objective as 'better understand <u>why</u> this area is important to managed species.' The group agreed this was a helpful change, as it is based on the premise that the HMA is important, and shifts focus somewhat to a better understanding what features of the area make it important for cod, instead of asking whether the area is important.

Ms. Bachman noted that in general, concerns about inadequate sampling or poor study design could apply to any of the objectives and are not limited to this one about habitat function. She recommended that we should articulate concerns about study design if they exist for any of the

[1] Draft objectives at start of the PDT meeting: (1) Improve the Council's understanding of the distribution of living and non-living habitat features within the GSC HMA, including topography, substrate, epifauna, and infauna (i.e., develop habitat maps). (2) Improve the Council's understanding of habitat stability including epifaunal persistence in relation to substrate type, tidal flows and storm events. (3) Improve the Council's understanding of habitat vulnerability to mussel and clam dredges. Vulnerability includes both the nature of habitat/gear interactions (susceptibility) and recovery rates. (4) Improve the Council's understanding of the importance of the GSC HMA to managed species, including Atlantic cod.

objectives. We want to ensure projects are designed in a way that we have a good chance of getting results that are informative. Once results are available, the task will fall on PDT and others as appropriate to say what inferences can be drawn and what the limitations are if any with the data. We should attempt to address these issues upfront before work is done if possible.

The PDT agreed that a reasonable flow of work was an initial habitat assessment to guide sampling during stage 1, then further sampling with before/after assessment and study of recovery both with and without fishing during stage 2. The PDT agreed it was possible to address stage 2 questions (objectives 2 and 3) without a comprehensive habitat map of the entire HMA (although such a map would likely be helpful).

It was noted that in both EFPs under development, the concept is that funds will come from compensation fishing (i.e., an RSA-like funding scheme). The basic idea is to allow fishing within the research areas and then some of the proceeds from these trips would be used to pay for the research. Data can also be collected during these fishing trips to address certain questions.

The PDT discussed ways to convey ideas about the structure of the research program, and how the results might lead the Council to certain types of management outcomes and policy decisions. The group reviewed a draft decision tree that included a range of questions, each leading to additional questions, and culminating in policy choices. For example, a research question could be 'does fishing gear use in complex habitats alter abiotic habitat complexity', while a policy decision could be, 'is minimization of a certain type of impact required?' The group agreed that this sort of approach had promise but required additional work to get right without being leading.

The PDT discussed the concept of allowing mussel dredging in the HMA in general. Some members commented that mussel dredging removes complex habitat and dredging in an HMA seems to be a contradiction in terms. They felt it would not be possible fish for mussels in a way that has minimal impacts and didn't recommend dredging mussel beds in any situation, as dredging negatively effects these complex habitats. Ms. Bachman reminded the group that the Council was generally willing to let this type of gear be used in the HMA with the intent that we will continue to learn more about the issue. Right now, we understand little about the mussel distribution within the HMA. The Council's willingness to consider exemptions implies a distinction between impacts and adverse impacts that need to be minimized. A PDT member commented that we do understand mussels generally, and they can live for multiple years, with period of good and poor recruitment. Ms. Bachman asked whether we can we envision a set of questions/answers that leads us to the conclusion that mussel beds are fishable with minimal impacts? The issue of scale (of the beds, of fishing impacts) seems important here. A PDT member suggested that we attempt to answer these questions elsewhere, outside the HMA. The difference in thinking about clam vs. mussel dredging is that with clams you are trying to direct the fishing into non-complex areas, but mussels are themselves complex habitat.

An important consideration is how these studies support better decisions, and this discussion goes beyond the PDT. If we learn more about habitats and impacts in the HMA will that cause us to think about management measures are in a slightly different way and adjust them? Perhaps what we really need to know is the current distribution of complex habitats. We know that

fishing adversely impacts complex habitat. Do we need to reinvestigate that? We understand generally how fishing affects biotic and abiotic complexity but haven't documented those effects within the HMA. How do natural dynamics compare to fishing effects? Sand movement over the seabed is different to fishing gear disturbance. The PDT noted that a challenge will be that this area has largely been fished in recent years such that we don't have a true control site. While it will be possible to create reference sites that are closed beginning April 9, 2019, this issue is concerning, because these research results are intended as the foundation for future decisions about how to manage the HMA.

Fishing Effects model

Scott Smeltz from Alaska Pacific University joined the call to discuss Fishing Effects Model results and next steps. Mr. Smeltz reviewed the figures they prepared for the model report and addressed questions.

- *Time series of habitat disturbance figure:* Sums the percent disturbance for each grid cell across all grid cells, including fished and unfished area. Oscillation in the trap results is due to seasonality of the fishery. PDT had previously raised a concern about the baseline for these percentages; i.e. they cover the whole domain, but many parts of the domain have little to no fishing. The domain was kept as-is, but text was added to the report to describe the percent of grid cells in the domain with fishing effort.
- *Histograms of percent disturbance by gear type:* Shows the distribution of percent disturbance. For all gears, most of the grid cells in the domain have percent disturbance values that are above but close to zero. Another way to look at the percent disturbance data is to use a given EFH map designation as the baseline. In the North Pacific region these results have been provided to stock authors for the relevant assessments. The modeled levels of habitat disturbance have not raised any red flags for the assessment authors, but in the North Pacific the disturbance values using the EFH footprints as the baseline are relatively small, and universally below 10%. Stock authors also examined the time series trend of disturbance and looked for relationships with stock parameters. This doesn't require re-running the model, just clipping the model outputs according to the EFH maps. However, you might run the model with just the habitat features important to the species of interest. This would require some level of confidence in your underlying habitat distribution maps.
- *Habitat disturbance maps:* Shows the percent disturbance by grid cell. Combined output for all gears is not simply a sum of the individual gear types because the model accounts for spatial overlap in fishing effort on a monthly basis. The output for all gears uses fixed gear or hydraulic dredge recovery parameters when the area swept values for these gears exceed trawl and scallop dredge values (this condition occurs over a small fraction of the domain).
- *Swept area ratio vs. habitat disturbance figure:* SAR is simply raw swept area per grid cell divided by the area of the grid cell. A value of one means the total swept area covers an area equal to the size of the grid cell. The figures show the relationship between swept area ratio and habitat disturbance, with the columns showing different time periods for the swept area data, and the rows showing 2017 and 2010 disturbance. The 95% confidence intervals are smaller when the time period for the fishing area swept data is shorter, indicating a tighter relationship between disturbance and recent effort.

- *Sensitivity analyses:* This figure shows two different sensitivity analyses. First, how the model responds to different sets of initial conditions. After about ten years, reliance on initial conditions isn't that important. Also, the figure shows what disturbance values would result if the susceptibility and recovery estimates are drawn randomly from a range of values, if they are fixed at the upper end of the range of values or fixed at the lower end of the range. (Remember that S and R scores of 0-3 translate into ranges of percent of the feature impacted or years to recovery.)
- *Z∞ analysis:* These model runs apply fishing effort area swept evenly across all grid cells. Median values and 95% quantile tested. Habitat disturbance estimates are lower for the median values as compared to the larger 95% quantile values.

Recovery function for the model is asymptotic – i.e. a constant proportion recovers at every time step. The original model used an arithmetic relationship, such that a constant amount of recovery occurred during each time step. The constant proportion approach was based on another model developed for the North Pacific by Fujioka (2006). This approach could be adjusted in the future.

The PDT identified the following items as potential next steps:

- Continue adding years of effort data to the model.
- Consider presenting model results using EFH designations as a baseline/footprint, similar to the approach taken in the North Pacific.
- Consider exploring different recovery functions (of interest to North Pacific team as well).
- Given monthly timestep, consider when within the year recruitment and growth occurs and test different scenarios.
- Consider how the model outputs can be used as indicators in other assessments (Northeast Regional Marine Fish Habitat Assessment, ICES Integrated Ecosystem Assessment, Northeast Ocean Health Index).

Not certain yet how this longer term collaboration will be structured (one-off contracts to address specific topics, or a more general ongoing contract, and/or ongoing sharing of ideas/approaches).

The meeting concluded at 4:00 p.m.