



Mid-Atlantic Fishery Management Council

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Richard B. Robins, Jr., Chairman | Lée G. Anderson, Vice Chairman
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July 11, 2014

Ms. Adrienne Antoine
COCA Program Manager
NOAA Climate Program Office

Dear Ms. Antione,

Please accept this correspondence as the Mid-Atlantic Fishery Management Council's (Council) letter of intent to submit a proposal for funding consideration under the Federal Funding Opportunity (FFO) entitled *NOAA Climate Program Office – Understanding Climate Impacts on Fish Stocks and Fisheries to Inform Sustainable Fisheries Management*. The Council is currently developing an Ecosystem Approach to Fisheries Management (EAFM) Guidance Document to inform Council policy with respect to the incorporation of ecosystem considerations into its current management programs. Foremost amongst these considerations are impacts of climate change on the ocean environment and the associated impacts on the productivity and distribution of fish populations within the Northeast Large Marine Ecosystem.

The Council recently hosted a series of workshops to evaluate the current state of climate science and the expected range of impacts of climate change on fish stock distribution and productivity, and to evaluate the impacts of these changes on fisheries management given the current governance structure. Presentations at these workshops revealed that significant changes in the distribution of fish stocks along the Atlantic Coast have already occurred and are expected to continue, creating significant assessment and management challenges. Workshop discussions also identified the need to conduct additional climate velocity analyses (i.e., the rate and direction that climate shifts across the landscape) as explanatory mechanisms of the response of fish distributions to climate change.

The proposed research project entitled "*Climate velocity over the 21st century and its implications for fisheries management in the Northeast U.S.*" will be a collaborative effort between the Mid-Atlantic Council and Rutgers University and will be submitted under Option 2 of the FFO announcement. Specifically, the proposed research will:

- Focus on managed and forage species in the northeast U.S., as well as species likely to move into this zone from adjacent areas
- Test whether species distribution models are improved by the inclusion of benthic habitat data
- Develop climate velocity and species distribution projections for 2030, 2050, and 2100 using IPCC-class models
- Analyze the likely impacts on stock definitions, coordination among Councils, and fishing opportunities
- Develop a website to share these projections with the public and other stakeholders (building from the National Climate Assessment fish distribution website currently under development at Rutgers)

- Transfer the methods and results to NOAA through coordination with Dr. Jon Hare, Chief of the Oceanography Branch at the NMFS Northeast Fisheries Science Center.

The Council will enter into a two year contractual agreement with Rutgers University to complete the proposed analyses. Dr. Malin Pinsky will serve as the lead investigator at Rutgers and Richard Seagraves (Council Senior Scientist) will serve as the overall Project Lead. Expected cost of the project will be \$144,000 in year 1 and \$145,000 in year 2. The Council proposes a novel, adaptive approach to conducting this work by utilizing its EAFM Working Group to oversee the research and guide additional analyses as the modeling work unfolds. The EAFM WG membership includes Dr. Hare, Dr. Sarah Gaichas (an ecosystem modeler with NMFS Northeast Fisheries Science Center) and Dr. Terra Lederhouse (NMFS Office of Habitat). Collaboration with these scientists through EAFM WG oversight is expected to ensure that results of the proposed work will directly address the information and analytical needs required for inclusion in the Council's EAFM Guidance Document.

Understanding climate change and the associated impacts on the ocean environment has emerged as one of the major challenges facing fishery science and management. The purpose of this research is to inform the Council about the scope of distributional changes likely to occur as a result of climate change and to describe the ecosystem impacts/changes which have already occurred and are likely to persist or intensify over the next century. The results of the proposed research will help the Council in the development of an adaptive fishery management framework that can deal effectively with ecosystem responses related to climate change, especially as they relate to shifting distributions of both managed and unmanaged fish stocks.

Thank you for the opportunity to submit this LOI. Please do not hesitate to contact me or Rich Seagraves or my staff if you have any questions or require additional information.

Sincerely,



Christopher M. Moore, PhD.
Executive Director
Mid-Atlantic Fishery Management Council

Cc: R. Robins, M. Pinsky, J. Hare, S. Gaichas

MAFMC Research Activity Prioritization Task
First Draft for SSC Discussion (24 July 2014)
Not to be cited

The Magnuson-Stevens Act requires each Regional Council to submit multi-year research priorities to NOAA for the purposes of informing the research priorities and budgets for the region of the Council. This requirements is outlined in Section 302 of the Act:

Section 302(h) FUNCTIONS.—Each Council shall, in accordance with the provisions of this Act...

— (7) develop, in conjunction with the scientific and statistical committee, multi-year research priorities for fisheries, fisheries interactions, habitats, and other areas of research that are necessary for management purposes, that shall—

(A) establish priorities for 5-year periods;

(B) be updated as necessary; and

(C) be submitted to the Secretary and the regional science centers of the National Marine Fisheries Service for their consideration in developing research priorities and budgets for the region of the Council;

In the following sections a definition of a research activity is provided; a process for inventorying management goals is then suggested, along with our current list of research activities and the option for filling in any gaps. A proposed method to determine relative importance of different Mid-Atlantic fisheries is outlined, followed by a draft set of criteria for evaluating the priority of research projects relative to the management goals. This is all subject to SSC review prior to and for discussion at the July meeting.

1.0 Definition of Research Activity: The SSC task in assessing research priorities is to look at the trade offs between research projects for different FMPs/species, as well as prioritizing projects for the same FMPs/species, to pick the highest overall priority research projects. We need to distinguish, however, what constitutes a research project from more routine activities, which may also need more attention and funding than currently being provided.

In the past the SSC prioritization efforts mixed specific research needs with general data and information needs. Many fisheries lack sufficient fishery dependent and fishery independent data and information that contribute to knowledge of the life history of the species and the conduct and performance of the fishery. Normally these are ongoing activities of information collection with no endpoint specified. If a research topic has no beginning or end, it can be considered an activity. Activities are worked upon day after day, but they seldom result in a completed outcome.

In contrast, research topics that have a beginning and an end are actionable and have a higher likelihood to contribute something specific or measurable to the improvement of fisheries management performance. We want to focus our

attention on research needs. We can still acknowledge data and information shortcomings outside our prioritization output if there is agreement by the SSC.

2.0 Management Goals: In this context, research should be linked to accomplishing the goals of management. From the top down, the management goals we have in the Mid-Atlantic include:

National Standards and Goals in the MSA

Specific Goals for rebuilding and sustainability in each FMP

Research goals for improving stock assessment/ABC-setting process taken from SSC's Annual ABC Terms of Reference

Eg., from level 4 assessment to level 1

Eg., to reduce scientific uncertainty in current stock status and predicted stock status

Other biological and ecological research the SSC wants to adopt or endorse

But we also have research goals necessary for management purposes that are associated with improving management success (management outcomes as measured in catch, catch value, profits, employment, recreational opportunities, fishing community sustainability)

Eg., to have catches more closely approach OY and sustainability targets; stay within ACL, don't trigger AM's, but don't leave any ACL on the table.

Eg., reduce management uncertainty; improve flexibility in fisherman decision making, increase local control and choice

These examples focus on attaining management goals and oftentimes rely on improved social science research.

Our task will thus include looking at biological and social science research priorities that will help improve the attainment of our management goals. How do we assess the scope of management goals?

1. With the assistance of Council staff, the content of each FMP will be reviewed to extract the management goal statements regarding rebuilding, or sustainability of the stocks and/or fisheries.
2. With the assistance of Council staff, additional Council documents (e.g., Committee reports, vision document, statements of policy, etc.) will be evaluated to extract additional high-level management goals (for example for habitat, ecosystem approaches, fishing community sustainability) that the Council has adopted that could be supported or helped to be achieved by a research activity.

These goals will comprise the basic management outcomes the Council is seeking to achieve.

In identifying the scope of research activities to support these management goals and outcomes, in the past the SSC has primarily relied on the research priorities from the SSC ABC Terms of Reference process. With the assistance of Council staff,

these priorities will be updated to amend the list of 5-year research plan activities provided to the SSC at its last meeting by staff.

However, there is also an **option** to look at the just described prior step on identifying management goals and have the SSC identify any gaps in research projects (biological or social science) that should be added to the list for consideration and prioritization (e.g., research on fisheries interactions and habitat come to minds from MSA Section 302). Council staff could also bring ideas and suggestions to the SSC from other sources (such as the recently published Proceedings of *Managing Our Nation's Fisheries III* and/or National SSC workshops).

This could also be a timely opportunity to open a broader research dialogue between the SSC and Council members, and if approved by the Council, a discussion between the SSC and representatives from the Region and Center on future research priorities that they may already have under consideration.

3.0 Method for Relative Importance of Different Mid-Atlantic Fisheries

Should we conduct research projects for scup ahead of research projects for surf clams? On what criteria should we base our choices? In setting up a ranking of research projects these types of questions typically arise, e.g., which species/fisheries are “more important?” While all fisheries in the Mid-Atlantic rank high in importance to their participants and stakeholders, some invariably will rank higher in importance than others when compared on any given scale.

In March 2012 the SSC was given a multi-criteria decision matrix to evaluate a set of research priorities. A variant of the Analytical Hierarchy Process, the method uses ranked scores from judgments made by SSC members on criteria and weights they voted to adopt. In this past SSC effort on prioritization, one of the criteria was the importance of each FMP species relative to conducting research, and it was evaluated based on scores given on the following factors:

1. Commercial value
2. Recreational value
3. Overfished (in this case a species overfished was more important candidate for research)
4. Overfishing (if this was occurring this species was more important candidate for research)
5. Positive spillover on other species (e.g., forage species as opposed to a choke species or a species with a lot of bycatch)

Based on SSC conference call results and further reflection in 2012, we identified seven other criteria besides species importance.

- 1) Species is important - We need to simply evaluate the need to pick research projects benefiting important species versus less important species compared to the other criteria.
- 2) Decreases scientific and/or management uncertainty and risk - Species are put into various tiers based on how much information is available. In this way, tier 3

species have a lot of uncertainty, while tier 1 species have the least uncertainty related to their stock assessments. When addressing this criterion, the ability of a particular project to decrease uncertainty and move the species from a higher tier to a more desirable lower tier should be taken into account. The same process can be used to evaluate the importance of a project to reducing management uncertainty, i.e., it lowers risk to Councils associated with achieving the chosen ACL. If a research project lowers the risk of not achieving the chosen ACL (and the repercussions to the Council and fish stocks that go along with that) by increasing the accuracy of scientific data or creating a new management mechanism that has a higher likelihood of success, then the project is more desirable.

3) Positive social impacts - Social considerations must be taken into account when evaluating any research proposal, as coastal and fishing communities are major stakeholders. These include the research's benefit to these communities, whether it is through increased access to jobs, recreational fishing, artisanal fishing, etc., with a particular emphasis on sustainability.

4) Positive economic impacts - Economic considerations also must be taken into account when evaluating research proposals. This includes the potential the research has for increasing net economic values over time with a particular emphasis on sustainability.

5) Is widely applicable - If a research project contributes results that are widely applicable to the greater understanding of multiple species or attributes it is to be rated highly as "applicable." For instance, if developing a new method for assessing the length at age of a mackerel can be applied to other species, this research will be considered highly applicable. Data collection on a single species may not be considered highly applicable, while analytical and assessment tasks may be more so.

6) Contributes to a better understanding of the big-picture ecosystem - It should be considered whether research projects may be beneficial to the larger ecosystem—not only to a specific species. For example research that helps sustain forage fish would help sustain other fish that eat these fish. Important ecosystem attributes to consider when evaluating research proposals include: bottleneck species, bycatch, and ecosystem indicators. This is similar in concept to criteria 6 but is not identical. Given the special interest in ecosystem based fishery management of the Council we kept this separate.

7) Quick achievement of an outcome - Research projects require different amounts of time before the achievement of an outcome is expected. Some projects may be implemented and expected to achieve an outcome within the year (a one-shot deal), while others may need to be conducted over a much longer period of time with several trials before results can be conclusive. Projects that are valuable to fisheries management and achieve an outcome quickly should have priority over slower projects.

8) Has elements of applied research (as opposed to basic) - Projects may either be basic or applied. The goal of basic research is to improve scientific understanding, while applied research builds off of basic research and is used to solve practical problems. Applied research is often much easier to implement because it already has tools and technologies available to tackle an issue. Much of the Council's focus is on decisions hinging on applied research so we give deference to applied research.

If we choose this path again, we will need to confirm existing or establish new criteria, like we did before, to establish how important different outcomes are to us. We can easily add or subtract criteria if these are not to everyone's liking. This time around we will have the advantage of explicit management goals to serve as a reference to help us make choices of the most important research from the SSC perspective. Our output will be given to the MAFMC leadership to discuss and negotiate with the NOAA leadership, and possibly form the basis for a joint strategic research prioritization with the agency.

In practice this means we will need to compare how the SSC values less scientific uncertainty as expressed in stock assessment level changes, higher ABC fractions of OFL, more stable ABCs from year to year, lower probability of triggering AMs and less fraction of ACLs left on the table. This will be compared to research that results in regulations that result in FMPs that are more consistent with fishing business practices, give greater flexibility and decision making to fishermen, give greater stability and longer lead times for change, and provide integrated management of multispecies w.r.t. data, permits, allocations, areas, seasons, gear and bycatch mgt.

The path described above appears consistent with the comments received by Council staff from the SSC by the May 20th deadline (Tomberlin's what are we going to do with these research results-- really means what are the outcome of our research and more importantly how do we value the different outcomes; Brian's comment on what priorities are doable is a criterion on feasibility and cost; Sunny's comment of exogenous/endogenous goes to the applicability and value of modeling research).

In summary, we need to get our management goals identified as a context, establish the final scope of research projects to rank, agree on a prioritization process including criteria and weights to apply, and proceed to make judgments on the relative importance of a project. This iteration will give us the added benefit of understanding how the choice set of priority projects will move us closer to meeting a specific set of management goals.

