

Gulf of Mexico Fishery Management Council
Ecosystem Technical Committee
Meeting Summary
December 14 – 15, 2021

The meeting of the Gulf of Mexico (Gulf) Fishery Management Council's (Council) Ecosystem Technical Committee (ETC) was convened at 8:30 AM EST on December 14, 2021. The agenda for this meeting, and the minutes from the September 10, 2021 meeting, were approved as written. [Previous meeting minutes, summaries and materials are archived here¹.](#)

Roles and Responsibilities

Dr. John Froeschke (Council Staff) reviewed the impetus for developing a fishery ecosystem plan (FEP). The Council recognizes the role of ecosystem considerations and their importance for fisheries management; however, to a large degree, many facets of ecosystem management remain difficult to integrate into contemporary fisheries management. Ecosystem considerations such as the impact of red tide has been incorporated into stock assessment, but this process has not been implemented regularly or systematically throughout the stock assessment process. In 2013, the Southeast Fisheries Science Center (SEFSC) developed the Ecosystem Status Report, which was a comprehensive report documenting the status of various ecosystem attributes in the Gulf. In 2018, the Council began work on developing an FEP that would outline a pathway to integrating ecosystem-based fisheries management (EBFM) into the Council process. The Council established the ETC to provide guidance on the development of the Gulf FEP, and this committee has met previously to guide this work. The Council contracted LGL Ecological Associates to develop the FEP for the Council, with work products developed in close coordination with Council staff, the SEFSC, and other collaborators. Dr. Froeschke then reviewed the milestones and deliverables and the roles and responsibilities of the entities and agencies involved in the development of the FEP.

A Committee member asked whether the Council's Outreach and Education (O&E) Committee and staff had been briefed on the progress of the ETC. Dr. Froeschke replied that the O&E was following the work of the ETC. Another Committee member asked whether it was necessary to follow a formal meeting format similar to the SSC meetings with motions and voting. Dr. Froeschke said it was not; the goal was just to facilitate thorough discussion.

Case Studies and Lessons Learned from Fishery Ecosystem Planning

Dr. Will Heyman (LGL Ecological Associates) reviewed guidance to the Gulf Council on the FEP development experiences of all of the other 7 regional fishery management councils (RFMCs), including major challenges, brief case studies of the FEP development experiences, and a synthesis of lessons learned by theme and a set of recommendations for the Gulf FEP. Dr. Heyman presented a table showing which issues and methods had been addressed by each of the eight

¹ <https://gulfcouncil.org/ap-archive/>

RFMCs, noting some crossover between issues (e.g., stakeholder engagement, cooperative research, and citizen science). Other Councils are recognizing that their fisheries are routinely subject to forces that are beyond their direct control, like water quality. Dr. Heyman noted differences in logistical and monetary constraints for addressing the listed issues, adding that it may not be feasible to attempt to address all of the ecosystem concerns present in the Gulf. The Council may consider acting issue by issue using task forces to develop conceptual models, formally engage stakeholders, define objectives, tasks, timelines for product delivery, and engage regular Council review. Stakeholder engagement can be improved through targeted education and outreach programs to build stakeholder understanding of EBFM, and through cooperative research and citizen science. Truly cooperative research requires stakeholder engagement throughout the scientific process, from issue identification through hypothesis generation, sampling design and data collection, analysis and interpretation of results, and incorporating findings into policy and management. Issues beyond the control of the Councils, like water quality and climate change, will likely require substantial collaborative work with many outside federal and state agencies external to the Councils. Dr. Heyman also suggested the Council could develop consortiums to call attention to and address specific issues. He also commented on using sub-regional scales to address specific fishery issues, which has been met with much success by many RFMCs. Conceptual and ecosystem models are beginning to be incorporated into decision-making and stock assessments, but systematically implementing EBFM has not yet been achieved. Regarding climate change, Dr. Heyman stated that achieving “climate-ready fisheries” required the prioritization of resilience and sustainability equally with maximizing catch. He also noted the extensive use and utility of marine protected areas (MPAs) to address specific fishery issues by other RFMCs.

Dr. Heyman recommended that the Gulf FEP be implemented through five priority actions: 1) develop a common vision of EBFM in the Gulf; 2) use fishery ecosystem issues to address specific priorities; 3) stakeholder engagement; 4) build a citizen science and cooperative research program; and, 5) address extra-jurisdictional issues. Dr. Heyman noted the ability to build on the experiences of the other RFMCs would benefit the Gulf Council in this respect. Another Committee member asked about the visioning process for the other RFMCs, noting that the other Councils did not all appear to have a thorough visioning process. A Committee member added that the issues before the RFMCs were constantly changing, which may necessitate a broader approach to ecosystem considerations; they asked if LGL had thought about how these issues all compound upon one another. Dr. Heyman replied that having a holistic approach appropriate by scale would be necessary, with the ability to address issues in a manner that avoids neglecting other tangential issues (e.g., species-specific versus species complexes, state-specific versus Gulf-wide).

A Committee member thought that the issues outlined were appropriate for compartmentalizing tasks or goals and asked about how the synergistic effects between goals might be characterized. Another Committee member agreed that this would be important, adding that a characterization of approach by issue may be needed; detailing these approaches may be best facilitated through a SEDAR-like process. Other Committee members agreed; Council staff noted that procedural workshops may be best to address process for considering ecosystem issues. A Committee member replied that the SEFSC continually works on many of these issues, which may help expedite the development of a best-practices approach to evaluating ecosystem considerations.

Another Committee member thought that because the current SEDAR research track process was still in its infancy, there may be an opportunity to purposefully interject consideration of ecosystem issues therein for future assessments. Further, Committee members thought it necessary to review considerations with the Council's advisory panels (APs) before reporting to the Council.

The Committee recommended to:

- Create a formal mechanism for operationalizing the consideration of fishery ecosystem issues (FEIs)
 - Identify and review FEIs
 - Include an FEP Chapter dedicated to procedures for how to identify FEIs, and timelines for subsequent FEIs
- Have more regular reporting of ecosystem status reports to the appropriate entities
- Make better use of, or revisit the existing science, management, and policy infrastructure to gauge its efficiency at addressing FEIs
- Develop a set of guiding principles to follow, and/or concepts to incorporate into each FEI

Stakeholder Assessment and Concept Mapping

Dr. Stephen Scyphers reviewed their work on stakeholder mapping, engagement, and mental modeling. This effort centered around two core tasks: 1) to conduct a stakeholder assessment to develop a comprehensive list of the types and groups of individuals closely associated with Gulf of Mexico fisheries; and, 2) to conduct and analyze semi-structured interviews using concept mapping with key informants representing diverse stakeholders in the Gulf fisheries.

For the first task, Dr. Scyphers noted the importance of defining the stakeholders involved, using a definition from the scientific literature of one “*who has a legitimate stake in the management of living marine resources and therefore should have a say when decisions are made and enforced*”². Dr. Scyphers said that not all stakeholders would be equally affected by any particular FEI, and thus categorizing those stakeholders would better define the expected effects by stakeholder group. Further prioritizing these stakeholders by factors such as urgency (importance of issue for stakeholder group), power (influence over issue), and legitimacy (likely directly affected by issue) can improve the effectiveness of stakeholder engagement on FEIs. Dr. Scyphers added that work to better identify and prioritize stakeholders is continually evolving, including practical considerations such as the number of stakeholder groups to identify and levels of prioritization. In a diverse region like the Gulf, a structured process will be critical, including direct engagement to ensure diverse inclusion. He added that engagement should be continuous throughout FEI development, with deference paid to practical considerations of limitations.

For the second task, Dr. Scyphers said that conceptual modeling would benefit the development of the Gulf FEP. He noted that in many cases, empirical data to evaluate FEIs may be lacking, but that public participation was needed to evaluate the effects of stakeholder actions on the ecosystem by scale (e.g., county, region). Conceptual modeling allows for the analysis of complex feedback

² Mikalson, K.H. and S. Jentoft (2001). From user-groups to stakeholders? The public interest in fisheries management. *Marine Policy* 25(4): 281-292. doi: [https://doi.org/10.1016/S0308-597X\(01\)00015-X](https://doi.org/10.1016/S0308-597X(01)00015-X)

loops with some speed, and for visualizing the potential effects of policy outcomes. As stakeholder groups are mapped, differences and similarities can be identified and characterized, and simulation of different policy options becomes feasible. Dr. Scyphers used an example from the Northeastern US herring fishery³, with the conceptual model based on the collective input of various user groups to predict the effects of recovering the herring stock on those stakeholders. Another example⁴ relied on the collective knowledge of stakeholder expertise to evaluate the predicted effects, with the engagement of diverse stakeholders demonstrating the greatest assumed accuracy for effects to user groups.

Dr. Scyphers continued by discussing the Mental Modeler tool⁵ and its ability to evaluate stakeholder effects on four key Gulf stakeholder groups. These groups all view these FEIs differently, and weight the urgency of these issues in sometimes disparate ways. However, by aggregating and averaging concepts from these stakeholder groups, a more usable model is developed which performs better at addressing stakeholder sentiments regarding FEIs. Thus, the diverse knowledge of these stakeholder groups can then be combined in a more discreet way to better inform how to address a given FEI. Dr. Scyphers also demonstrated the cost-benefit of addressing an FEI beyond just that single FEI, such as the negative effect on fishing access due to expanded habitat conservation.

A Committee member discussed regional and sub-regional differences in FEI prioritization, and asked whether an FEI could be approached on a finer scale. Dr. Scyphers replied that geographic constraining of FEI urgency was possible, but at the expense of increasing model complexity. A Committee member wondered whether it would be appropriate to have a separate conceptual model for each FEI, and to then connect each model to better evaluate the system as a whole. Dr. Scyphers agreed, urging a common set of core concepts that would be used uniformly across all FEI models. Council staff asked whether the outcomes of the comments received as input to inform how to address an FEI could be influenced by who is being asked to provide information. Dr. Scyphers replied that some stakeholders will inherently provide higher quality information than others, and that the collective response from a stakeholder group could be compared to an individual response or public comment at a meeting. Council staff also asked whether a weighting scheme was being used when combining the different issues being evaluated by a conceptual model, acknowledging that not all issues are likely of equal urgency. Dr. Scyphers replied that different weightings are explored to see if the model is being influenced by some facet or another; concurrently, for some issues, it may be appropriate to upweight responses from one stakeholder group over another to better account for that group's legitimacy and power about that specific FEI. Dr. Scyphers added that having a process for determining when and how to apply these weights would be very helpful to the modeling process. Dr. Heyman stated that he was largely in agreement with the application of conceptual modeling for these purposes, and would continue to work with Dr. Scyphers on these approaches.

³ Stier, A.C., et al. 2016. Integrating expert perceptions into food web conservation and management. *Conservation Letters* 10(1): 67-76. doi: <https://doi.org/10.1111/conl.12245>

⁴ Aminpour, P., et al. 2021. The diversity bonus in pooling local knowledge about complex problems. *PNAS* 118(5). doi: <https://doi.org/10.1073/pnas.2016887118>

⁵ <https://www.mentalmodeler.com>

The Committee recommended the following with respect to stakeholder assessment and conceptual mapping:

- More clarity in the stakeholder selection process
- Elaborate on the potential biases with different stakeholder inputs/perspectives
- Elaborate on the information content obtained from current Council processes (particularly with respect to scope and complexity)
 - Public comments
 - Fishermen Feedback (formerly Something's Fishy)
 - Participatory modeling
 - SEDAR Data Workshops
- Establish best practices for incorporating evaluation of FEIs in Council processes
- Have two stakeholder engagement processes
 - General high level
 - Stakeholder specific

The Committee discussed the merits of spatially-explicit stakeholder engagement specific to individual FEIs. A Committee member thought regional use of conceptual modeling of stakeholder input by FEI would be most effective. Another Committee member was cautious about the intention of regional modeling given the data and resources available to do so; Council staff added that many stocks are managed at the stock level across their distribution. Despite diverse user groups, all fishing effort is still pulling biomass from the same stock.

Presentation of Proposed FEP Structure

Dr. Heyman reviewed the LGL recommendations for the FEP outline and structure, with the purpose of providing “*a framework for integrating ecosystem science into the Council's decision making for long term ecological and socioeconomic sustainability of Gulf of Mexico resources.*” A Committee member questioned whether that stated purpose best captured the purpose of the FEP, or rather the ETC. Other Committee members disagreed, thinking that the statement adequately captured the intent of the FEP. The Committee agreed that actionable recommendations were certainly necessary for the success of the FEP. Council staff added that the Council has not provided specific advice to the ETC so as to not influence the organic development of the FEP; nonetheless, the Council is looking for a FEP that can be implemented with demonstrable effects.

Dr. Heyman outlined the proposed FEP, from the development of a joint vision through addressing specific FEIs, maximizing stakeholder engagement, developing a cooperative research and citizen science program, and addressing extra-jurisdictional issues. Council staff noted the typical five-year cycle upon which many Council projects are revisited and re-evaluated. A Committee member added that some performance goals may be measurable in shorter time frames, and binning by prioritizing when an FEI should be addressed or evaluated may be appropriate.

Dr. Heyman continued with a chart showing the work already being performed by the Council, with the addition of actionable work on addressing FEIs, cooperative research and citizen science, and extra-jurisdictional issues. Council staff reiterated the performance of the Council's

Something's Fishy tool, which can and has been used to directly inform decisions where empirical data are missing, representing a viable and useful citizen science tool. Dr. Scyphers noted that mobile applications do have drawbacks in terms of long-term buy-in and use. Despite not being fully representative of the stakeholders, the Council's efforts to continually improve the Something's Fishy tool is wise. Another Committee member thought the ability to have fishermen at the ready to perform on-the-water sampling was a great idea and would represent a great asset in evaluating FEIs. A Committee member stated that other Councils have established dedicated, stand-alone, citizen science programs that require substantial Council resources to maintain.

In developing a joint vision for a Gulf FEP, Dr. Heyman recognized the need for a long-term vision for sustainable and resilient fishery ecosystems in the Gulf respective of diverse stakeholder groups, visioning, and limited resources. A four-step approach was proposed, which would include development of a technical report to inform an education and outreach plan, with stakeholder visions for the future considered before synthesizing a joint vision for adoption by the Council. Dr. Heyman reviewed aspects of the joint vision report, characterizing the current state of the Gulf with respect to human dimensions and socioeconomics, biophysical and institutional considerations, and future opportunities. A Committee member thought the visioning process would benefit from an outline of what is currently being accomplished against that which has been proposed to be accomplished.

To institutionalize FEIs, identifying the proper scale (space and time) will be critical, as will characterizing stakeholder urgency, power, and legitimacy to best inform how to evaluate these FEIs, with the ultimate intent of addressing and mitigating those issues through actionable management advice. The many APs and other committees used by the Council could be leveraged to inform these evaluations, once vetted by the ETC, and make direct recommendations to the Council. Resource allocation to prioritize which FEIs to address, and how, will need to be a Council priority, with the ETC assisting the Council in this process. A Committee member was cautious about the process being too focused on fishermen. Dr. Heyman replied that fishermen have demonstrated an ability to facilitate change better than other stakeholder groups, and affecting those changes may be better achieved by cultivating the concern and ideas of those fishermen. The Committee member thought it also important that otherwise under-represented stakeholder groups be offered a place to provide input into the process. Other Committee members agreed, and added that direction from the Council will be very useful in capturing the broader suite of involved stakeholders. Fishermen can certainly drive changes, and should be involved, but should not constitute the sole stakeholder group.

Dr. Heyman thought that meaningful stakeholder engagement could be increased. Time and travel expenses for stakeholders to participate in the Council process can be considerable, and management decisions often receive the most feedback from the most engaged participants. Dr. Heyman felt that public comment received at Council meetings is ineffective. Council staff acknowledged the limitations and challenges that Dr. Heyman identified, but noted that the Council relies on this input and many issues have been identified, and ultimately addressed through management action as a result of this process. He suggested that stakeholders should be further incorporated into all aspects of research proposal development and evaluation. Council staff countered that the NMFS Cooperative Research Program, of which the Council benefits, requires in-depth involvement of stakeholders throughout the identification and research of priority

issues. A Committee member asked about the cooperative research program in the northeastern U.S., and asked that Dr. Heyman characterize that program when possible. Committee members expressed general consensus that the FEP should avoid being overly prescriptive to the extent possible. Council staff further recommended addressing citizen science and cooperative research as separate issues.

The Committee made the following recommendation on the proposed FEP structure:

- To have more detail in the comparison to, and contrast of the NEFSC cooperative research programs to those coordinated by the SEFSC.

To address extra-jurisdictional issues, Dr. Heyman recommended the Council appoint a full-time position to develop partnerships and synergies to address issues affecting Gulf fishery ecosystems that are outside the Council jurisdictional boundary. Dr. Heyman proffered several cooperative strategies, such as market-based solutions, incentives, consortium action, blue carbon credits, and nitrogen credits; however, an expert should be brought in to advise on these strategies. He conceded that some objectives may be more difficult to address and implement than others, and that Council prioritization in visioning would help guide resources where the Council thought they were most needed. A Committee member thought there were likely some very targeted outreach opportunities for contemporary issues like offshore wind, offshore oil and gas, and offshore aquaculture development. Another Committee member noted the many university centers dedicated to different objectives that may be helpful to the Council in addressing FEIs.

A Committee member thought the FEP should be a plan that sets out clear courses of action in response to available information. Once an issue is identified, the plan is used to respond accordingly in a uniform manner. The Committee agreed that there would be a great deal learned by working through the detailed definition of an FEI at a subsequent meeting, which would be expected to greatly improve the ETC's ability to make valuable recommendations to the Council.

Indicator Development for Fishery Ecosystem Planning

Dr. Nathan Putman discussed a plan for developing ecosystem indicators to inform fishery ecosystem planning. These indicators can communicate shifts in the state and function of the ecosystem. When a suite of these indicators can be examined collectively, the condition and trajectory of the status of the ecosystem can be better understood and ecosystem planning can be conducted from a more informed position. Dr. Putman suggested that these indicators will be of most use to the Council when considering potential ecosystem impacts resulting from management decisions, with the goal of providing a framework for incorporating the relevant information into Council decision-making.

Dr. Putman broke down the relationships among categories of indicators, including climate, habitat, trophic level, physical and chemical, human dimensions, and ecosystem services. Each of these categories contains within itself a constantly evolving number of ecosystem indicators which can be collectively examined to explore their interconnectedness. Further, these relationships can be characterized in terms of their association to fisheries management topics, such as biomass, landings, and stock status. Dr. Putman suggested that indicators associated with "human dimensions" (as defined in the 2017 Ecosystem Status Report for the Gulf of Mexico) should

probably be priorities for consideration. Dr. Putman acknowledged challenges with identifying ecosystem indicators, which may demonstrate multiple dimensions of complexity which may confound the detection of relationships. Degrees of heterogeneity, connectivity between indicators, and contingency linking among indicators are some factors which must be evaluated to determine what the indicator is informing, and to what degree the information derived from that indicator depends on its relationship(s) with other indicator(s)⁶. Dr. Putman added that before ecosystem indicators can be used for actionable fisheries management recommendations, research must be completed to provide a better understanding of the state of the Gulf (descriptive science). Fisheries management issues are often proffered as a particular question to answer (hypothesis-driven science), and research will help identify how to best match ecosystem indicators to these research questions to best support hypothesis testing. As linkages between indicators are identified and support for those linkages builds, the rugosity of the relationships between these indicators and fisheries management issues would be expected to increase.

Dr. Putman stated that, for the purpose of informing fisheries management, ecosystem indicators and their linkages to fisheries management should be easily described and understood, and be provided in context to their ability to inform specific fisheries management questions. These indicators would be classified as either base or auxiliary indicators. Base indicators would be informative for improving understanding related to catch, effort, and fishery participation, and would be expected to inform most FEIs. Auxiliary indicators would represent effects influencing base indicators, and also affected by changes to those base indicators. Dr. Putman used regional habitat divisions in the Gulf and gradients of bottom longline fishery catch-per-unit effort as examples to describe how base and auxiliary indicators can be used to interpret trends in fishery performance and, subsequently, to inform any proposed changes to fisheries management. These indicators can then be fed into the FEP loop, and be used to inform not only the decision to be made, but also to evaluate whether that decision is achieving the desired result.

Dr. Putman showcased the Online Indicator Dashboard⁷, which can be used to examine a suite of ecosystem indicators, their interconnectedness, and relationships with fisheries. The tool allows for the evaluation of indicators regionally, and permits the user to download the supporting data used in the tool. Dr. Putman encouraged the ETC to explore the tool and provide feedback for its improvement. Base indicators to consider should include catch, effort, and participation by fleet, with auxiliary indicators like human dimensions and physical/biological variables used to better inform those base indicators. An indicator taskforce could be created to advise the Gulf Council on indicator development, selection and use throughout the FEP for addressing FEIs. Dr. Putman recommended that future indicator work focus on specific sub-regional issues, and that some resources should be allocated to produce regular Ecosystem Status Reports. To his previous point about these indicators being easily understood and interpreted, Dr. Putman recommended use of a public-facing indicator visualization dashboard like the version presented to the ETC.

A Committee member thought the correlation analysis presented to describe the interconnectedness of indicators lacked rigor. They also thought some indicators needed to be

⁶ Cadenasso, M.L., S.T.A. Pickett, and J.M. Grove. 2006. Dimensions of ecosystem complexity: Heterogeneity, connectivity, and history. *Ecological Complexity* 3:1-12. doi: <https://doi.org/10.1016/j.ecocom.2005.07.002>

⁷ <http://lgl.theisience.org/>

better described with respect to their relationships to fisheries management, and that more work needed to be done to use current scientific literature to accurately describe what forces or variables, as opposed to “indicators”, are being considered and how those are evaluated.

A Committee member thought some market indicators may be worth considering, such as individual fishing quota share price, lease price, and the proportion of quota being leased. Analyses of these data points can inform decisions related to changes in proposed catch limits, as was noted by the commercial fishing industry ahead of a large increase in the red grouper quota, which was opposed by the same fishermen. The Committee member cautioned against ignoring the utility of these indicators, as doing so in the recent past allowed for a decision at that time to increase the red grouper catch limits beyond what was seen as healthy for the stock by the fishery participants. Another Committee member thought it important to regularly update the Ecosystem Status Reports, and to re-evaluate ecosystem indicators considered for informing management annually if possible.

The Committee recommended:

- To prioritize indicators directly related to fish abundance and health
- To examine economic indicators related to the individual fishing quota programs like share and quota pricing, leasing, and CPUE
- To consider other statistical analyses beyond the correlation analysis presented
- To include auxiliary indicators to the indicator dashboard for consideration as a planning tool and further indicator refinement
 - E.g., Climate drivers such as the Atlantic Multi-decadal Oscillation (AMO)
- To identify a core set of ecosystem indicators to be used to track ecosystem status, and potentially consider examination of FEIs
- To include indicators in FEI development for tracking progress

Draft FEP Outline

To facilitate further development of the FEP, a Committee member introduced a proposed outline that could be used for the Gulf FEP (provided in Appendix at the end of the report). The Committee reviewed the outline and was supportive of the concept and overall approach. Council staff noted that some of the procedural components may be developed by the Council after completion of the contracted work by LGL. Dr. Heyman was receptive of the outline and agreed to use this format in the revised version of the FEP.

Public Comment

Mr. Chad Hanson provided public comment each day of the meeting. He thanked Dr. Chagaris for providing a proposed FEP outline. He requested that a list of proposed FEIs and their priority levels be included in either chapter 3 or 4. He stated this list would help with FEI identification and the order in which they should be completed. Prioritization levels such as short-term, mid-term, and long-term may also help if FEI development is an ongoing annual process.

Other Business

No other business was brought before the Committee.

The meeting was adjourned at 12:00 pm eastern time on December 15, 2021.

Meeting Participants

Ecosystem Technical Committee

Mandy Karnauskas, *Chair*
Casey Streeter, *Vice Chair*
Eric Brazer
David Chagaris
Michael Drexler
Nick Farmer
Joshua Kilborn
Matthew McPherson
Steven Saul
Steven Scyphers

Council Liaison

Kevin Anson

Council Staff

John Froeschke
Carrie Simmons
Ryan Rindone
Ava Lasseter
Carly Somerset
Jessica Matos
Karen Hoak
Bernie Roy

Consultants

William Heyman
Nathan Putman

Public

Aaron Adams
Jason Adriance
Steven Atran
Eduardo Benitez
Taylor Beyea
Dennis Crosby
FJ Eicke
Bob Gill
Gary Graham
Martha Guyas
Chad Hanson
Scott Hickman
Alex Johnson
Julien Lartigue
Jordan Lorgarbo
Rich Malinowski
Michelle Masi
David Moss
Peter Mudrak
Jay Mullins
Kelli O'Donnell
Frank Parker
Kellie Ralston
Ashford Rosenberg
Skyler Sagarese
Chris Schieble
Savannah Swinea
Brendan Turley
Orian Tzadik
Nathan Vaughn
Giovanna Venezia

Appendix: Proposed Outline for Draft FEP

Visioning, Goals, Objectives

- FEP Guiding Principles, Overarching concepts
 - *FEIs*: What are they and why take an FEI approach? Define fishery ecosystem;
 - *Stakeholder Engagement*: A process for identifying FEIs, ecosystem linkages, focus areas for further analysis, and potential tradeoffs
 - *Regional subdivisions*: Describe how spatial consideration factor into FEP, via FEIs
 - *Conceptual and ecosystem modeling*: What is their role in the process?
 - *Extra jurisdictional issues*: How will these be addressed in the FEP, via FEIs? Who are the major players (BOEM, EPA, States)?
 - *IEAs and Indicators*: Describe how these fit into the process and FEIs
 - *Research Recommendation*: Broadly, cooperative Research, citizen science, agency--industry-academic partnerships; contributing to RFP and funding programs; specific to each FEI
 - *Cumulative Effects*: Need to address how to consider cumulative effects of individual FEIs
 - *Management Tools*: What are the management levers we can actually turn (MPAs, seasonal closures, discard mortality, bycatch reduction, catch limits); these will be specific to each FEI
- Procedural Stuff
 - *Identifying FEIs*: Process description; How do they “bubble up”; largely influenced by fishermen but need to be inclusive to other stakeholders;
 - Timeline for updating, adding, removing, and reassessing FEIs
 - *Scientific Review Process*: What role does the ETC and FEP play in scientific review?

- *Ecosystem model review?* Who vets the claims of ecosystem linkages, causal relationships, etc?
- *Integrating with Management:* The what, when, and who...; list different APs; describe management framework we are trying to influence; assessment, SSC, SERO, IPTs, FMP amendments, mgmt. options paper; The mgmt. process and where this all fits in.
- *Measuring Progress of the FEP:* How do we determine success with the FEP? What are some metrics for success?
- Fishery Ecosystem Issues
 - *Issue #1*
 - *Background*
 - *Scoping and Stakeholder Engagement*
 - *Ecological considerations*
 - *Socio-economic considerations*
 - *Extra jurisdictional considerations*
 - *Indicators relevant to issue, reference points, targets, and thresholds*
 - *Management Integration*