



The NOAA Chesapeake Bay Office requested the assistance of the Scientific and Technical Advisory Committee (STAC) of the Chesapeake Bay Program to coordinate a peer review of the Fisheries Ecosystem Plan (FEP) for Chesapeake Bay. Two members of STAC agreed to undertake coordination of the review. Originally, the document was provided to 5 individuals who had initially agreed to conduct a review. Over the course of the review, 3 reviewers opted not to complete the task so that the final review consisted of three reviews from experts outside the region. In addition to the two review coordinators, one other member of STAC also provided comments.

We evaluate the FEP relative to the goals set for it by the FEP Technical Advisory Panel:

- *Clearly describe the structure and function of the Chesapeake Bay ecosystem, including key habitats and species interactions.*
- *Serve as an umbrella document to support ecosystem-based approaches in individual Fishery Management Plans.*
- *Include recommended actions to implement ecosystem-based approaches to fisheries management for Bay-resident and coastal species.*
- *Recommend specific research to enhance knowledge of the ecosystem and its fisheries to support long-term management objectives.*

General Comments

The external review comments were rather consistent in their praise of the document as reflected by the following:

“What I see before me is very informative about the Chesapeake, and reading between the lines, about the conceptualization of further FEPs. Congratulations on being the first;”

“When adopted, I am confident that the Bay FEP will have substantial impact on the future well-being of the Bay;”

“I think the FEP has done a good job at completing the task of providing the structural elements that the NMFS Ecosystem Principles Advisory Panel has outlined. I particularly liked the approach contained in many of the sections, wherein there was a list of panel recommendations both for management and research.”

There is substantial basis for the conclusions expressed above. The Fisheries Ecosystem Plan (FEP) is an impressive and for the most part comprehensive document that is extremely well written with a wealth of detailed information on many aspects of the Chesapeake Bay ecosystem. The document will prove valuable to the implementation of fisheries ecosystem management in the Chesapeake Bay.

Despite these positive comments there are some aspects of the document as it currently exists that are problematic. It is unclear exactly who the intended audience is for this document. If it is the scientific community, then the presentation and length may be appropriate. However, we suspect the audience is more than the scientific community, and is probably more specifically the managers making decisions that affect the condition and use of Chesapeake Bay. Assuming, the managers are the real target of the authors, then we would suggest significantly focusing and shortening the document for that audience. Perhaps a companion plan that extracts and integrates the real nuggets contained in this version should be developed. For example, the information in Chapter 2 indicates that the current status of managed stocks in Chesapeake is either unknown or overfished for every stock addressed except striped bass (which is currently doing very well). That kind of overarching integrating conclusion (assuming it is correct) is the kind of statement that ought to be the topic sentence in a brief representation of the current status of managed stocks in Chesapeake Bay. The necessary data to convince the reader that that is indeed what the current scientific information says should follow the topic sentence (but in much shorter a way than is currently the case). This companion document, not weighed down by the depth of information provided in the current version can concentrate more on integrating the information across chapters, something that is lacking in the current version. Using Chapter 2 again as an example should also address in a concise integrated fashion the effects of fishing on all plants (e.g. submerged aquatic vegetation) and animals (e.g., turtles, marine mammals, and birds) and on the habitats (e.g. Essential Fish Habitat) required by Chesapeake Bay managed species.

Chapter Comments:

Chapter 2 – Managed Fisheries

Two reviewers felt there was the need for some form of summary, either visual or tabular that would enhance the reader's concept of the state of managed fisheries. Information provided should include the type of stock assessment and type of management. The conclusions about managed species should be consistent with NOAA's overfishing report to Congress (to the extent that the data allow), and reasons for any inconsistencies should be provided.

Reviewers also felt that there was a lack of integration of the information provided here and the other chapters of the report:

“Managed Fisheries did not contain a good synopsis or summary at the end with recommendations with regard to ecosystem effects on managed fisheries in the

Bay. Laying those out more clearly would be important (though perhaps some of the recommendations actually are in Ch. 3). Ch 2 could more clearly outline the key factors influencing production of managed species and management actions that could be taken from an ecosystem point of view to enhance/improve production;”

In Chapter 2, it is difficult to tell whose authority applies where and whose authority is pre-emptive over whose. Further the federal statutes operating in Chesapeake Bay is incomplete. It lacks the Coastal Zone Management Act, Endangered Species Act, Marine Mammal Protection Act, and National Environmental Policy Act (at least). The Federal Regional Councils don't manage. They prepare draft Fishery Management Plans, but they are not effectuated until the Secretary of Commerce approves and finalizes implementing regulations.

The discussion regarding overcapitalization confuses causes and effect. For example, the statement “overcapitalization can lead to pressure to catch fish faster” has cause and effect reversed. It is the economic incentive to catch fish faster (so that no one else captures those fish) that leads to overcapitalization. The discussion is similarly muddled on the following page (31) that suggests effort entered the blue crab fishery “as a consequence” of a flat catch–effort relationship in the early 1960's?

Finally, while the Chapter provides excellent background about the institutions that manage fisheries or affect fisheries management in the region, it does not discuss the underlying reason for failure which is attenuation of property rights. It is not the number or complexity of the institutions that creates problems, but the fact that without clear property rights the incentives for the different institutions may not be compatible. What is the incentive to the PRFC to improve habitat or reduce fishing pressure if the benefits to such actions are increased harvests in another jurisdiction? Why should Virginia reduce the harvest of menhaden to improve food web relationships for species caught in Maryland?

Chapter 3 – Ecosystem Boundaries

No substantive comments.¹

Chapter 3- Food Web Interactions and Modeling

Similar to the general comments, reviewers were concerned about meeting the needs of the target audience and not summarizing the information in a more concise and user-friendly way. A second reviewer was also concerned about the lack of integration of the material in this chapter with the discussion of Ecosystem Health and Biological Reference Points. This criticism of failure to integrate with other sections of the document is a common theme.

¹ The term “no substantive comments” is used here to mean that the review coordinators felt that they or the reviewers had no major concerns that needed to be highlighted here; however, there may be insightful comments in the individual reviews that should be considered.

Chapter 3 – Habitat

As one reviewer points out the focus should be on reducing uncertainty about the role of habitat in population and ecosystem dynamics, and perhaps not as strongly on the adoption of a precautionary approach (which is more of a policy issue). The reviewer also urges adoption of an adaptive experimental approach to habitat modifications that can help provide information for future decisions.

Chapter 3 – Patterns in Total Removals

No substantive comments.

Chapter 3 – Uncertainty

A reviewer emphasizes the difference between precaution embodied in management recommendations (e.g. explicitly considering uncertainty in the underlying modeling) to the *ex post* precautionary approach. Maryland's recent experience with the blue crab demonstrates the issue. The Bi-State Blue Crab Advisory Committee incorporated uncertainty about stock assessments into their analysis and developed highly conservative management recommendations. The managers then, adopting a precautionary approach, took an even more conservative approach that perhaps failed to consider that extra precaution was already built in to the recommendation.

Chapter 3 – Indicators

One reviewer suggested a greater emphasis on indicators of human effects, although it is not clear from the discussion exactly what they mean. This may refer to inclusion of indicators related to causes of pollution such as population, land conversion, etc.

“I would have liked more emphasis on the need to also include indicators of human effects...Since we don't fully understand the links between some of our actions and the ecosystem, providing an historical view of the status and trends of human and ecological indicators may help us see the role that various processes or human actions may have on either individual ecosystem components (species) or more aggregate ecosystem properties (communities, ecosystem level properties).”

A comment, noted earlier, was made to link this section to the food web section. There is also a recommendation to look at integrated indicators as opposed to a collection of individual ones with the example of an indicator of total system productivity

Chapter 3 – Monitoring

The reviewers felt that the description of monitoring programs is excellent, but what is missing is a critical evaluation of the adequacy of existing monitoring and what gaps need to be filled.

Chapter 3 – Externalities

While the section was well-liked by reviewers, the lack of integration with other sections remains a problem. One reviewer suggested that utility could be increased by discussing, for example, the interaction between environmental conditions and species interaction.

Chapter 3 – Socio-Economics

As mentioned by one of the reviewers, this is probably the section where a more detailed discussion of property rights needs to be incorporated.

The discussion of valuing natural resources is helpful once it gets to the economic-based approaches, with the discussion of non-economic approaches a little esoteric for a document of this type. The description of ecological economics as “an entirely new approach” ignores practically the entire field of resource economics.

As the section points out, determining the total value of ecosystem components is not a very helpful exercise. However, what should be recognized is that economists prefer to emphasize marginal or incremental analysis. The damage function is one way of expressing this, but it is the marginal analysis that is key, not that everything be expressed as damages.

Again, the section could be improved by linking to other elements of the document. For example, two recent papers in a special edition of *Estuaries* look at the economic benefits and costs of improvements in water quality (dissolved oxygen) to commercial blue crab and recreational striped bass fishing in the Chesapeake Bay.

Final Comments

This document goes a long way in meeting the objectives set out by the FEP Technical Advisory Panel. While it is not perfect and can be improved by the recommendations laid out here and in the individual reviews, it forms an excellent reference document regarding implementation of Fisheries Ecosystem Planning in the Chesapeake Bay. However, next steps are the key. Producing a companion document that can be used by the fisheries management community to begin to incorporate the recommendations made here into fisheries management planning should be the next major step following publication of this report.

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