

# 2007 STELLWAGEN BANK NATIONAL MARINE SANCTUARY CONDITION REPORT

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## REVIEWERS AND AFFILIATIONS

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## REVIEWER COMMENTS (IN NO PARTICULAR ORDER)

### Reviewer 1 of 4:

Focus: Habitat

The report impresses me as comprehensive summary of the issues affecting the ecological, historical and cultural integrity of the SBNMS. It is certainly consistent with my own somewhat limited knowledge of the Sanctuary, gained from participation in the Ecosystem Based Management and Zoning Working Groups. I think there is appropriate emphasis on the major human impacts on the Sanctuary, namely the effects of commercial and recreational fishing on bottom habitats, fish biomass and population structure, overall biodiversity, and entanglement with marine mammals. There is also appropriate attention given to shipping traffic and its impact on whale populations through collisions and introduction of underwater noise. In the last case, both moving shipping lanes to cross parts of the Sanctuary that have historically seen lower concentrations of whales, and reducing speeds during transit are high priority measures that the SAC and Sanctuary staff should promote as much as possible, with the support of NMFS and in cooperation with the Coast Guard.

I was surprised that invasive species are mentioned only in passing, with the notation that some have recently been observed in the Sanctuary. I had understood that the invasive and rapidly proliferating colonial tunicate *Didemnum* was present in SBNMS just as it now is in much of coastal New England waters and on Georges Bank. This is a potentially very disruptive invader, particularly for attached fauna on hard ground, and it seems to me that monitoring its presence and spread in the Sanctuary could be a higher priority.

Otherwise, I thought the report was comprehensive yet concise, and clearly laid out the status of principal impacts on the Sanctuary with proposed actions. The staff has plenty to do if all these recommendations are to be carried out.

I noted one typographical error on page 6 where the date for the sinking of the Portland is given as 1998.

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**Reviewer 2 of 4:**

Focus: Water Quality

My review comments are restricted to the section on water quality with some marginal comments on statements in other parts of the document.

General

The “Site Report” cited in the Condition Report was apparently completed in 1995 so many relevant sources are not included. This Site Report document is unwieldy as currently presented on the website (hard to find references cited), but appears to be a primary document for the Condition Report. I may have missed things in the Site Report that are mentioned below. I recognize that the Condition Report is intended to be an Executive Summary but it is still important to have a clear link to more substantive background documents. The physical oceanography of Massachusetts and Cape Cod Bays has been well-characterized (Geyer et al., 1992) but a summary of that knowledge (which to me underlies most any conclusion regarding water quality) is missing from the Condition Report.

The “report card” presented on page 3 displays four questions regarding water quality, the rationale for these questions is elaborated in the Appendix.

*Question 1 (Water): Are specific or multiple stressors, including changing oceanographic and atmospheric conditions affecting water quality?* The report has selected a rating of good/fair: Selected conditions may preclude full development of living resource assemblages and habitats, but are not likely to cause substantial or persistent declines.

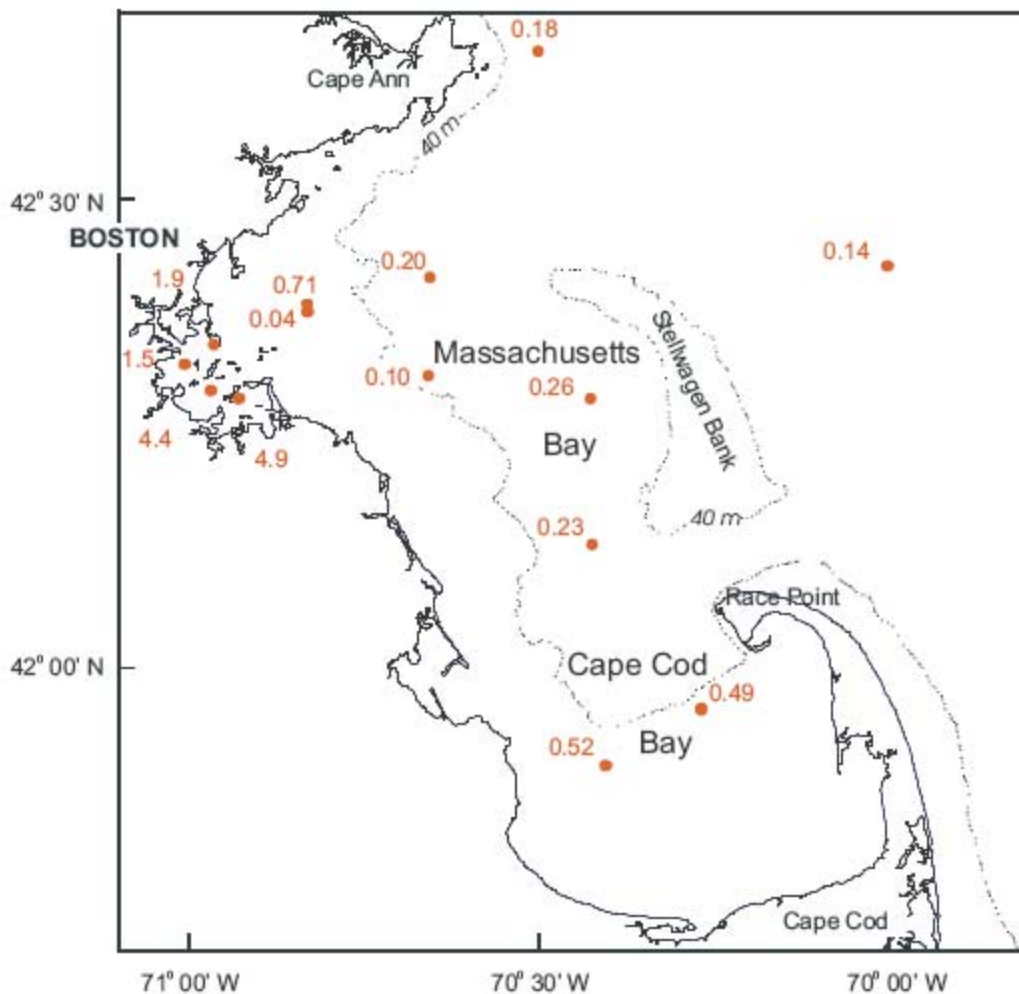
This conclusion seems reasonable based on the evidence presented: numerous contaminants have been identified in the water, but they are at low levels and condition appears stable at present.

The report correctly identifies the key potential stressors: MWRA outfall, dredged material disposal site, seafloor disturbance from industrial installations (cables, pipelines, LNG terminals)

and non-point sources (atmospheric input and runoff). The report contains no discussion of the potential for oceanographic conditions to change due to global warming and potential circulation changes in the North Atlantic. These are not likely to directly affect water quality and are certainly long-term concerns but because of the distinctive internal wave and upwelling conditions over the Bank it may be prudent to reference coastal ocean models, temperature projections and establish a baseline condition. Several coastal areas appear to be shifting ecologically due to temperature shifts and biotic resources in the Sanctuary may be affected by general shifts in temperature regime.

The data collected since 2001 by the MWRA are not discussed, they may support the conclusions but it is not clear from the text that they have been examined at all. I was not able to find a link to reports on these data. The discussion of water quality in the report (and in the Site Report) focus on studies conducted close to the Sanctuary. While this is helpful, there are a large number of studies projecting temporal and spatial changes in contaminant concentration that are not cited or discussed. These principally concern Boston Harbor and Western Massachusetts Bay including studies of the MWRA outfall, but their quality and quantity of data (time series, sediment trap and historical core analyses) provide critical information for the entire Massachusetts Bay contaminant flux characterization. Some references are listed below. The results of these studies do not alter the conclusions of the report but their absence suggests a less than complete understanding of the relevant literature. Much of the sediment trap data has not been published but there are sediment data not cited in this report:

Silver sampling from USGS 2005-1250



**Figure 6.6.** Distribution of silver in surface sediments. Silver has accumulated in regions of fine-grained sediments in Boston Harbor, locally offshore of Boston, and in Cape Cod Bay and Stellwagen Basin.

Butman, B., Bothner, M.H., Alexander, P.S., Lightsom, F.L., Martini, M.A., Gutierrez, B.T., Strahle, W.S. 2004. Long-term oceanographic observations in western Massachusetts Bay offshore Boston, Massachusetts: data report for 1989-2002. USGS Data Report, DDS-74.

Bothner, M.H., Butman, B. eds. Processes influencing the transport and fate of contaminated sediments in the coastal ocean – Boston Harbor and Massachusetts Bay. USGS Open-File Report 2005-1250.

Bothner, M.H., Bucholtz ten Brink, Marilyn, Parmenter, C.M., d'Angelo, W.M., and Doughten, M.W., 1993, The distribution of silver and other metals in sediments from Massachusetts and Cape Cod Bays: U.S. Geological Survey Open-File Report 93-725. 31 p.

Bothner, M.H., Bucholtz ten Brink, Marilyn, Butman, Bradford, Knebel, H.J., Manheim, F.T., and Signell, R.P., 1994, Circulation and contaminant transport in Massachusetts coastal waters -- A summary of achievements and future plans: U.S. Geological Survey Open-File Report 94-649, 43 p.

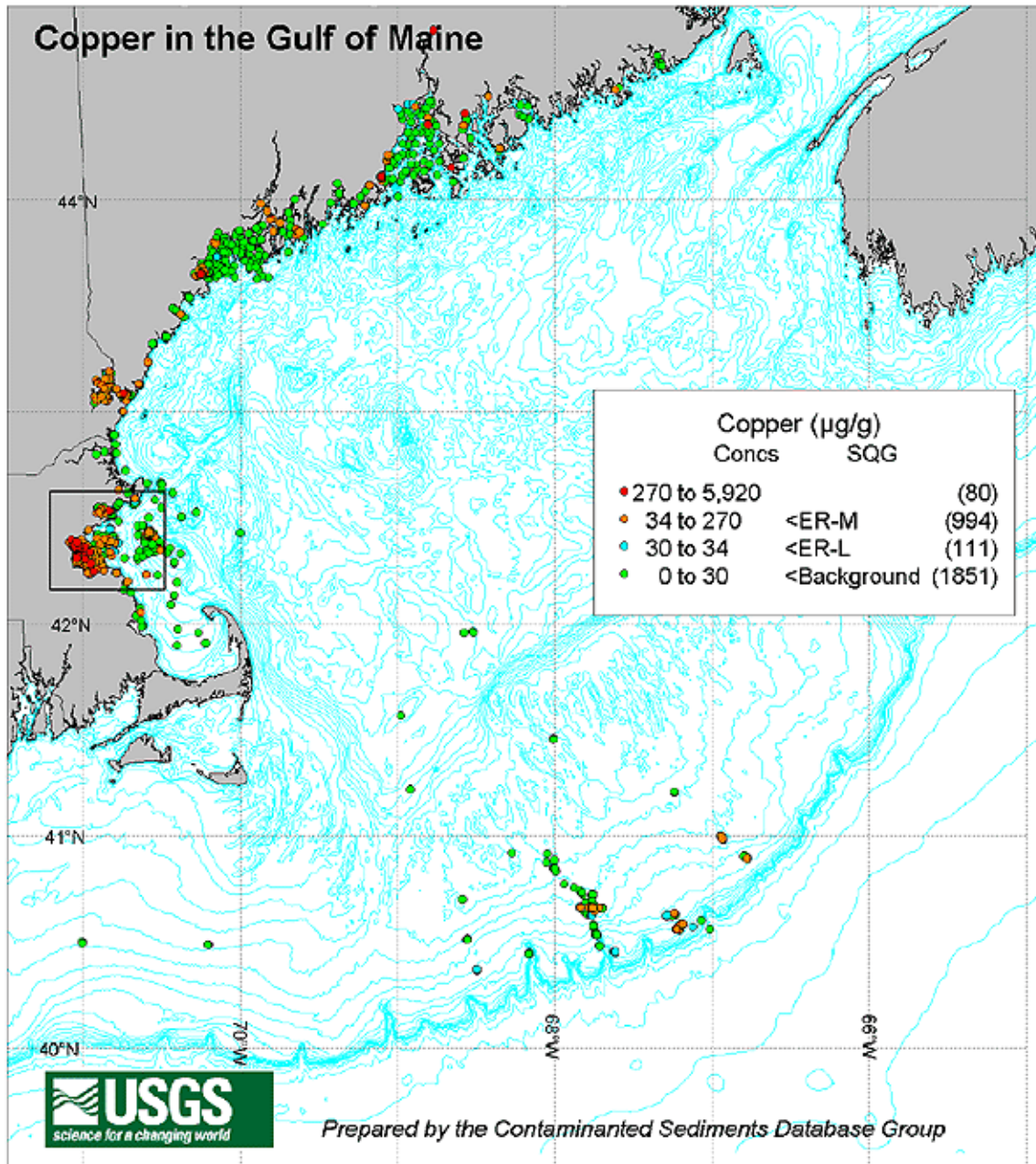
Another important reference is the contaminated sediment database for the GOM:

Buchholz, M. T. and others. 2002. Contaminated sediments database for the Gulf of Maine. USGS Open-File Report 02-403.

<http://pubs.usgs.gov/of/2002/of02-403/index.htm>

The Site Report relies upon an earlier version of this database.

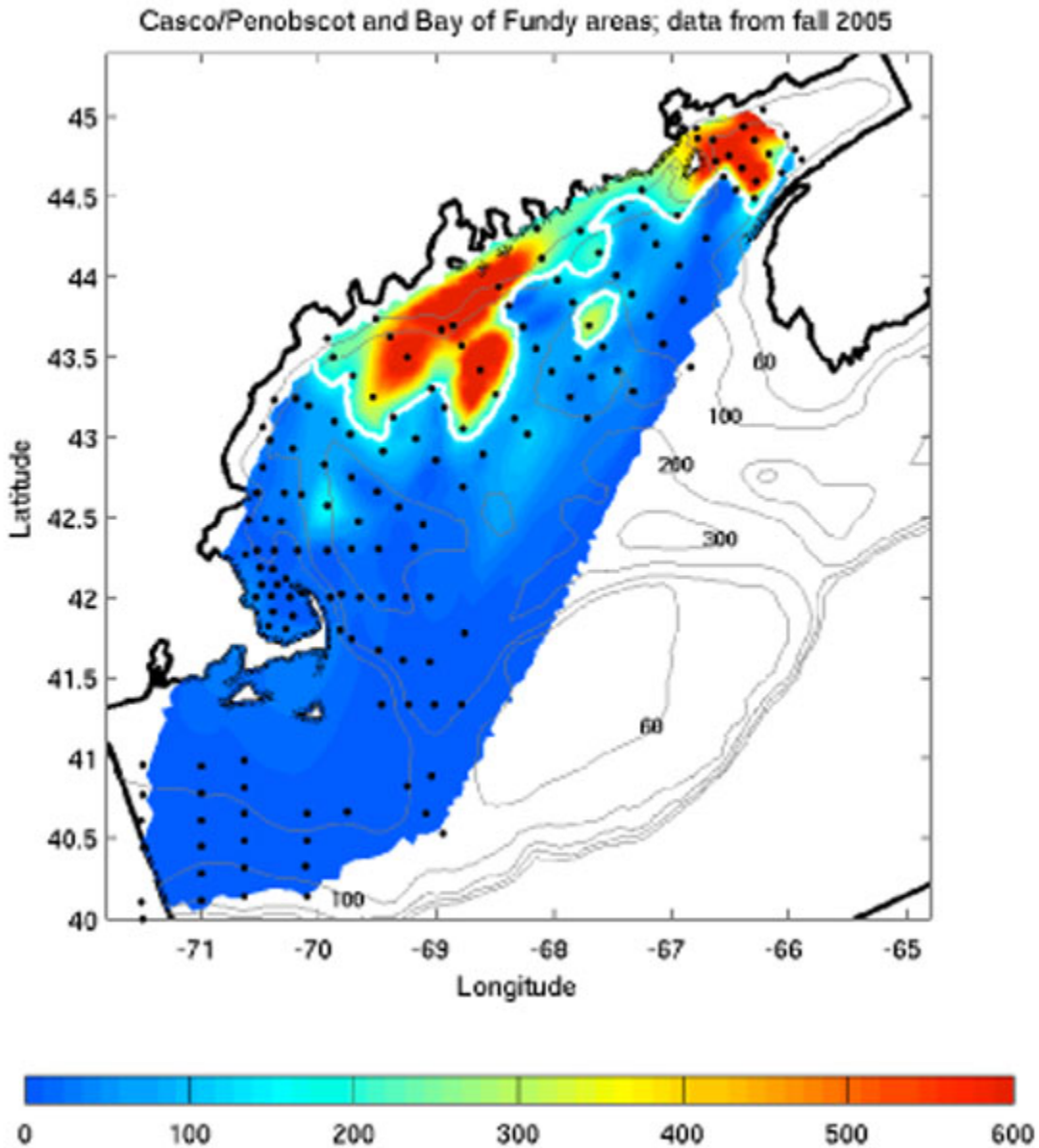
From this source there are plots of some metals with sampling locations in and near the sanctuary.



*Question 2 (Water): What is the eutrophic condition of sanctuary waters and how is it changing?*

The report has selected a rating of good: Conditions do not appear to have the potential to negatively affect living resources or habitat quality. This conclusion seems reasonable based on the evidence presented: eutrophication does not appear to be a problem and conditions appear favorable. Again, this does appear to be a reasonable conclusion but there is no discussion of harmful algal blooms (HABs) which have received intense study in greater Massachusetts Bay. In 2005, studies funded by NOAA and WHOI Sea Grant and reported on NOAA's CSCOR website [http://www.cop.noaa.gov/news/fs/ne\\_hab\\_200505.html](http://www.cop.noaa.gov/news/fs/ne_hab_200505.html) showed that harmful cysts were

present within the NMS (see figure). While this year is better, it is clear that HABs are a concern for the NMS. They should be included in this condition report and in the monitoring design (page 14).



*Question 3 (Water): Do sanctuary waters pose risks to human health?* The report has selected a rating of good: Conditions do not appear to have the potential to negatively affect human health. This conclusion seems reasonable based on the evidence presented: water quality does not pose a risk to human health and conditions appear stable based on outfall monitoring studies. However the HABs issue described above is clearly a potential human health risk that might involve NMS management as an area with a reservoir of cysts.



*Question 4 (Water): What are the levels of human activities that may influence water quality and how are they changing?* The report has selected a rating of good/fair: Some potentially harmful activities exist, but they do not appear to have had a negative effect on water quality. This conclusion seems reasonable based on the statement: the levels of human activities are numerous (discharge from vessels) but are not currently having an adverse effect on water quality and conditions appear stable. However, I could find no discussion of evidence supporting this statement.

Marginal comments:

Page 3. In the table under Habitat, the basis for judgment lists bottom dragging and dredging as contributing to alteration of microhabitat. In the Appendix, there is a general statement: “Dredging removes, alters, and fragments habitats”. It is not clear if this entry refers to clam dredging or dredging of navigational channels. Clearly there is no dredging of navigational channels within the NMS. This should be clarified or removed.

Page 7. Under Outfall Discharges and Dumping Sites it is mentioned that there is concern that toxic materials dumped in the 1940’s and 1950’s are leaching. It should be clarified that these materials were dumped in a variety of containers and that there is evidence that many, if not, most of these containers have been breached releasing their contents to the water column. Some contaminants have been found in sediments in the Basin, but due to the sedimentation rate and seafloor processes, “leaching” from the sediments is not likely (no flow of groundwater through ocean sediments in this basin). What is much more likely is that periodically since the 1940’s toxic material (radioactive waste, metals and organic chemicals) has been released into the water column and distributed throughout Massachusetts Bay. There is potential for future releases if relict containers (glass, concrete) have not yet been breached. There is also potential for bioturbation and resuspension of metals and organic contaminants adsorbed to sediments. These sediments can be transported during significant storm events into the sanctuary.

Conclusion

The “conditions” reported in the Condition Report for water quality appear to be consistent with a reasonable review of the existing information. There are several lines of evidence missing from the report and at least one potential harmful condition (HABs) that is not discussed. The report would be strengthened with a more complete discussion of the lines of evidence supporting the Water Quality Status and Trends assessment.

Geyer, W. R. and others 1992. Physical oceanographic investigation of Massachusetts and Cape Cod Bays. Massachusetts Bays Program Report MBP-92-03.

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**Reviewer 3 of 4:**



## Focus: Maritime Archaeological Resources

Pursuant to the letter dated May 25, 2006 from Michael Weiss, Deputy Director of NMSP, I welcome this opportunity to provide comments on the report entitled "Condition Report for the Stellwagen Bank National Marine Sanctuary." On a general level, this condition report provides a clear and succinct picture of the state of the SBNMS. The following comments are offered less as a criticism and more to illustrate areas where the report could be enhanced and strengthened.

In reviewing **Condition Summary Table** (page 3), the rating responses for Questions 5, 6, and 8 are inconsistent conclusions with respect to Questions 15 and 17. With respect to habitat, the report (p. 10) states "the levels of human activities...are decreasing due to area fishing restrictions." With respect to marine archaeological resources, the report (p. 13) states "commercial and recreational fishing activities are degrading maritime archaeological resources." If the levels of fishing activities are decreasing, then how does the gear impact threat get worse? If fishing activities are increasing in SBNMS areas outside the restricted zones, this should be noted in both sections and the impact better explained in the report.

While the section, **Maritime Archaeological Resources** (page 6), does a good job in summarizing and highlighting the sites listed on the National Register of Historic Places, little attention is played to the other 100 potential shipwrecks (noted on page 13). The three National Register sites, while significant resources, do not represent other vessel types (e.g., fishing) which now lie within SBNMS that once exploited the marine resources of Stellwagen Bank or the fishing grounds beyond. The potential historic and archaeological value of these resources could be better articulated. Also, the report notes "dozens" of possible wrecks (p. 6) and later states (p. 13) over "100 shipwrecks" within SBNMS with "eight shipwrecks now being documented." This latter information should be highlighted in the **Site History and Resources** section as well to strengthen the description.

Under the **State of Sanctuary Resources**, the section on **Maritime Archaeological Resources** (page 13) provides a good overview of the issues of concern and the three shipwrecks previously investigated. As noted previously, the report mentions 100 shipwrecks with 8 currently being documented. A brief description of the other eight shipwrecks being documented would serve to highlight the variety of cultural resources located in the SBNMS. The report notes three primary concerns which came out of public meetings held in 2002. The report should include a statement at that point to show the staff of SBNMS are actively addressing all three concerns. Fishing gear impacts and their ratings may be unduly pessimistic assessments. Further, the sample size investigated may not be representative of all shipwrecks within the SBNMS or adjacent waters. Under integrity, the status might be characterized as good/fair and trend as "not changing" given three vessels investigated have been listed on the National Register of Historic Places. Similarly under human activities, the status might be characterized as fair and trend as "not changing" given the decline in commercial fisheries as well as the federal regulatory regime in place at SBNMS. While the section opens with an acknowledgement of "paleontological remains," there is no further mention of these potential resources or efforts to identify native american material culture within SBNMS. Similarly, the report does not address diver impacts. While these might be of minor effect and subject to existing regulations/prohibitions, none-the-less divers are

concerned users and diving is a human activity within SBNMS. They should be noted in the status report.

On a general level under **Responses to Pressures**, the reader is left wondering what happens to SAC recommendations. This is not clearly evident when each section ends with "SAC has proposed" or "SAC has recommended" strategies or actions to address the various concerns. SBNMS staff are actively implementing these recommendations, engaging in significant research efforts, and management activities. The report would be strengthened considerably by adding paragraphs after each section highlighting the steps taken by the SBNMS staff to implement these recommendations. With respect to **Marine Archaeological Resources**, this section needs to highlight more than the regulatory responses to pressure (p. 19). It should reiterate the results of its inventory activities - National Register sites and ongoing documentation of other sites - and describe staff efforts to exploit "the keen public interest" through its interpretive activities.

With respect to shipwreck resources, they possess a number of potential values - historical/archaeological, recreational, educational, commercial speculation, and ecological/habitat. Given the ecosystem-based management approach, the report does not connect the value of shipwrecks as (potentially important) habitats. Through the processes of structural deterioration and plant/animal colonization, shipwrecks are transformed from their original function to habitats. It is their ability to function as habitat and thereby support the food web that expands their resource value beyond their archaeological/historical value. In economic terms, it might be viewed as ecological/habitat value as derived from the cost of replication. The role of shipwrecks as habitats (bottom-structures supporting diverse living species) needs to be acknowledged as well as their archaeological and historical value.

Finally, the reviewer takes this opportunity to provide a general observation concerning the treatment of marine archaeological resources with respect to SBNMS. It is both very encouraging and yet quite ironic to find marine archaeological resources highlighted as one of the four major categories in the report. The inclusion of these resources as a key category and SAC recommendation (p. 19) that SBNMS staff include a maritime/marine archaeologist are extremely encouraging and commendable. However, it is quite ironic that such a key resources has no recognized expertise or advocate among the SAC membership by membership category (including ex officio members) as described in its charter or even individual member professional expertise as currently constituted.

Again, thank you for this opportunity to provide comments.

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**Reviewer 4 of 4:**

Focus: Living Resources

I have completed my review of the manuscript titled "Condition Report for Stellwagen Bank National Marine Sanctuary"

Overall I found this report to be an excellent document. It is well organized, easily read and to the point. Occasionally it becomes uses a few words that might not be understood by the uniformed reader, but this is a minor problem. The graphics are excellent. The science appears sound and the conclusions follow appropriately from the science.

I do have a few specific comments that I will reference to page and paragraph in the report.

On page 6, first column, last paragraph. "The 291- foot ship was lost in a 1998 gale that now bears her name." Since the ship was located in 1989 I don't think she sank in 1998. Perhaps this should read 1898 or 1798

On page 7, first column, last paragraph. " 1950's are leaching". I think the word here should be leaking not leaching.

On page 11, second column, third paragraph. "...recreational fishing has cascading effects..." I would recommend changing this sentence to read "... recreational fishing has been shown to have cascading effects..."

On page 11 second column, fourth paragraph sentence that reads "...is receding northward of Cape Cod..." should read "...is receding northward from Cape Cod..."

On page 11 second column, fourth paragraph sentence that reads '...important prey species of sand lance...' should read "...important prey species for sand lance..."

On page 11 second column, fourth paragraph the last sentence is not clear. Consider reworking this sentence so that the meaning is clear.

On page 12 first column, second paragraph last sentence. Change the word "contention" to "probability" and add after the word serious "and demands immediate attention".

Do you need for me to mail you the original document and comments or is this email sufficient for your review purposes. Please let me know.

I emailed the Conflict of Interest form earlier. I trust this is OK. Let me know if you need this mailed as well.