




December 1, 2017

MEMORANDUM FOR: Chris Oliver
Assistant Administrator for Fisheries

FROM: Terri Lei Beideman, Chair 
Marine Fisheries Advisory Committee (MAFAC)

SUBJECT: Comments on the 4th National Climate Assessment by the
Marine Fisheries Advisory Committee

After review of the DRAFT 4th U.S. National Climate Assessment (NCA4) Chapter 9, *Oceans and Marine Resources*, the Marine Fisheries Advisory Committee (MAFAC) offers the comments below. These comments represent input from MAFAC's Climate and Marine Resources Task Force as well as review and discussion at the subcommittee and full committee level during the MAFAC meeting held November 28-30, 2017, in Silver Spring, MD.

We respectfully request that our comments be submitted to the United States Global Change Research Program (USGCRP), of which the Department of Commerce is a member agency, via the official website for public comment on NCA4: review.globalchange.gov.

COMMENTS

In general, we felt that the authors of the NCA4 Oceans and Marine Resource Chapter did an excellent job providing an update on the impacts and risks of carbon emissions to marine ecosystems and resources in the U.S. This is a rapidly developing field and the authors captured key events and findings in a very succinct manner, using a broad range of regional examples. In addition, they offered important insights and optimism for our potential to adapt to the changes, as well as increase the resilience of marine ecosystems. The draft was well written for a general audience and the figures very much enhanced the communication of key points to a broad audience.

We found the following points raised in the draft particularly **important to retain**:

- We are living with the impacts of climate change now (e.g., extreme weather events such as 100 year floods, intense hurricanes, and marine heat waves as well as long-term shifts in fish population's distribution and productivity). Intensity and frequency of events is increasing.
- The focus on the trifecta of changes occurring in the oceans: warming, acidification, and deoxygenation is important. The cumulative impacts of these changes and their interactions will determine what species thrive in their current locations, where they may exist in the future, and which will decline or cease to exist in the future.

- The fact that the oceans play a pivotal role in the global climate system is important to emphasize. The oceans have received relatively little attention in past climate assessments (both national and international); it is important to recognize their importance to the central issue of climate change and potential feedbacks.
- The importance of identifying and continuing assessments on the most vulnerable marine ecosystems (e.g., tropical, polar, and island ecosystems in the U.S. and U.S. Territories).
- The importance of fostering resilience in our marine ecosystems and resources by taking specific actions.
- The importance of monitoring to better manage our marine resources in the face of climate change.
- Better understanding of how fisheries management and climate change interact is a key research priority.
- The need to better understand the potential impacts to Native Americans and inhabitants of U.S. Territories.
- The acknowledgement that many of the ongoing ecosystem changes can only be avoided with substantial reductions in atmospheric carbon dioxide emissions.

We offer the following suggestions to **add into the report** to promote clarification, address gaps, and enhance key points already made:

- In addition to expected impacts to fish populations, include specific examples of expected social, economic, and cultural impacts to fishers and fishing communities (e.g., increased risk of conflicts concerning allocations, increased vulnerability of small-scale fishermen).
- Share case studies of nimble, flexible, and adaptive fisheries management and technological advances relevant to climate impacts (e.g., levels of harvest are being adapted to the Pacific warm blob, changes in fishery timing, updating life history characteristics).
- Make the relationship of climate change and ocean acidification clear early in the document. The conflation of ocean acidification and climate change can generate confusion and has policy implications.
- While the phenomenon of shifting fish distributions was mentioned in the text (on numerous occasions), we recommend that the chapter point out that the distributions of marine species are shifting quite a bit faster than terrestrial species, on average. Specific examples should be provided. This is a phenomenon that very few people are aware of outside of the marine community and it speaks to the sensitivity of marine ecosystems to climate change and the immediate need to develop adaptation measures in marine resource management.

- While authors raise the importance of incorporating climate change factors into fisheries assessment, the role of management strategy evaluation should be specifically raised as an important area of scientific investment.
- Vulnerability assessments are being based on untested assumptions of the impacts of ocean acidification on high value species, such as scallops and lobster.
- Include examples where past projections have been evaluated to determine if we are over-projecting or under-projecting outcomes. This may be best shared in a visual format.