

October 12, 2017

Atlantic States Marine Fisheries Commission  
1050 N. Highland Street, Suite 200 A-N  
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Dear Commissioners of the Atlantic States Marine Fisheries Commission's Menhaden Management Board,

The undersigned 117 scientists write to you about Atlantic menhaden. We hail from a wide variety of areas of expertise, including fisheries ecology, quantitative fisheries biology, marine mammal and bird ecology, and others. We applaud your hard-fought efforts to improve how this key Atlantic forage species is managed coastwide through Amendment 3.<sup>1</sup> We acknowledge that: 1) multiple competing stakeholder interests are at play, 2) there is an ongoing endeavor to generate menhaden-specific ecological reference points (ERPs), and 3) the debate over how to manage menhaden in a way that prioritizes their forage role has continued for over a decade. Nonetheless, we note that there are straightforward and widely accepted options available to you now. Specifically, we urge you to adopt either interim ERP Option C (Pikitch *et al.*) or Option E (75% target, 40% threshold), and manage with the goal of achieving the corresponding targets, while the Biological/Ecological Reference Points (BERP) workgroup continues to develop menhaden-specific ERPs. Options C and E were derived based on formally peer-reviewed and published ecosystem models that included numerous predator groups and examined broad ecosystem dynamics.

#### **THE SCIENCE IS UNEQUIVOCAL: FORAGE SPECIES MUST BE TREATED MORE CAREFULLY.**

There is broad and ever-growing recognition<sup>2</sup> that forage species are the primary energy conduits between the bottom and top of many marine food webs, and must therefore be managed in a way that protects ecosystem function. These conclusions have been reached using multiple lines of evidence that include field research, models, and analysis of existing data; they rely upon fundamental ecological principles. It is well-documented that predators have lower survival and reproductive rates when forage populations decline, and in many cases, predator population sizes have been linked to forage populations. As a result, top fisheries scientists, ecologists, and others recommend that decision makers should be cautious when managing key prey, especially in light of changing ocean conditions.

There is strong evidence that points to the critical role that menhaden play as food for numerous predators including important recreational and commercial species like striped bass, tunas, bluefish, sharks, as well as marine mammals and seabirds. Importantly, populations of these predators have been

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<sup>1</sup> ASMFC (2017). [Draft Amendment 3 to the Interstate Fishery Management Plan for Atlantic Menhaden For Public Comment](#).

<sup>2</sup> For example, see: Cury, P.M. *et al.* (Dec. 2011). [Global Seabird Response to Forage Fish Depletion—One-Third for the Birds](#). *Science*: 334(6063), p. 1703-1706; Essington, T.E. *et al.* (2015). [Fishing amplifies forage fish population collapses](#). *Proc. Natl. Acad. Sci.*: 112(21), p. 6648-6652; Pikitch, E. *et al.* (2012). [Little Fish, Big Impact: Managing a Crucial Link in Ocean Food Webs](#). Lenfest Ocean Program, Wash., DC; Pikitch, E. *et al.* (2017). [The strong connection between forage fish and their predators: A response to Hilborn \*et al.\* \(2017\)](#). *Fisheries Research*; J.P. Roux, J.P. *et al.* (2013). [Jellyfication of marine ecosystems as a likely consequence of overfishing small pelagic fishes: lessons from the Benguela](#). *Bull. Mar. Sci.*: 89(1), p. 249-284; Smith, A.D.M. *et al.* (July 2011). [Impacts of Fishing Low-Trophic Level Species on Marine Ecosystems](#). *Science*: 333(6046), p. 1147-1150.

shown to respond negatively to increased fishing pressure on menhaden. Recently, Buchheister *et al.* (2017), used a northwest Atlantic ecosystem model to show that "...birds, highly migratory species, sharks, and marine mammals were ... negatively affected by increased fishing on menhaden," though none so much as the highly dependent striped bass.<sup>3</sup> Given these and other findings, including some of our own peer-reviewed work, we emphasize that menhaden abundance significantly impacts predator population abundance. Consequently, we stress that reference points are the crux of Amendment 3.

### **THE STATUS QUO IS SIMPLY NOT ACCEPTABLE. IT IS INCONSISTENT WITH YOUR OBLIGATIONS.**

Reference point Options A (keep single-species reference points and discontinue multi-species modeling work) and B (use single-species reference points until multi-species model and menhaden-specific candidate ERPs are ready in 2020 or later) are unacceptable choices. They would violate the ASMFC Charter to use the best scientific information available.<sup>4</sup> Options A and B would also result in additional years of the fishery being managed using single-species guidelines that could be used to enact substantial increases over current catch levels while ignoring likely negative impacts on predators, and possibly in reversal and loss of the recently accrued menhaden population growth. The Menhaden Management Board should avoid such risks. It would contradict the scientific consensus on how to manage forage species. More to the point, enabling such increased risk would be counter to the spirit of Amendment 3.

For those inclined to support Option B because it seems like a guaranteed path to robust, menhaden-specific ERPs, we note that this choice does not mandate that the Menhaden Management Board adopt ERPs derived from the BERP's models. The BERP's models are being designed to meet as many management objectives as possible, though they will still require the Board to make hard decisions about tradeoffs. That is, the BERP models are not a panacea that will generate ERPs and fishing quotas to satisfy everyone's needs. These models also do not directly account for predation mortality from important but sometimes overlooked menhaden predators whose own recoveries are being facilitated by, and are largely relying on, the menhaden recovery. These include such species as humpback whales, osprey, weakfish, and others. Options C and E, in contrast, were derived based on formally peer-reviewed and published ecosystem models that examined broad ecosystem dynamics and included a large number and wide variety of predator groups.

### **IN THE ABSENCE OF SPECIES-SPECIFIC MODELS AND ERPs, INTERIM OPTIONS THAT ACCOUNT FOR FORAGE ROLES ARE APPROPRIATE AND ESSENTIAL.**

In light of the strong evidence that current management approaches are not designed to take into account the variability in forage fish stocks, their unusual life history characteristics, and the role they play in the ecosystem, there are a variety of default recommendations available for fishery managers to use for situations in which species-specific ERPs are unavailable. These alternatives to single-species approaches are based on a comprehensive accounting of forage fish and their ecosystems, developed over the course of many years for a diverse array of ecosystems. Importantly, these alternatives invariably agree on: 1) the need for reference points that aim to generate higher prey biomasses (targets); 2) higher minimum biomass limits (thresholds) to avoid; 3) and fishing mortality rate maximums that are lower than those used in traditional fisheries management.

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<sup>3</sup> Buchheister, A, Miller, T.J., & E.D. Houde (2017). [Evaluating ecosystem-based reference points for Atlantic menhaden \(\*Brevoortia tyrannus\*\)](#). *Marine and Coastal Fisheries*, DOI: 10.1080/19425120.2017.1360420

<sup>4</sup> ASMFC (Feb. 2016). [Interstate Fisheries Management Program Charter](#).

In Amendment 3, both reference point Options C and E would achieve these objectives, and once implemented, should help the menhaden population to continue to increase in abundance and biomass. At a time when many of their predator populations are in decline and showing cause for concern, this is not the time to wait for a different solution. Options C and E would not preclude the BERP workgroup from continuing its important work to finalize menhaden-specific multispecies models that can be used to generate ERPs. When available, their findings and recommendations can (and should) be compared to the results of Buchheister *et al.* (2017) to better understand the performance of reference points.

Option C is a more conservative approach than Option E, and would be highly protective of the role that menhaden play as forage. The inclusion of a harvest control rule in Option C ensures that managers will respond to changes in menhaden biomass in a rapid and predictable way. The fishing prohibition required at biomasses below 40% virgin biomass ( $B_0$ ) and the maximum allowed fishing mortality of one-half of natural mortality ( $\frac{1}{2}M$ ) would help to avoid stock statuses that might impact menhaden spawning potential and the diets of predators.

Option E does not prescribe a control rule and thus provides a degree of flexibility for managers, but one that could result in potentially risky decisions at low menhaden biomasses, though it is still more protective of the dietary needs of predators than Options A and B. Option E is structured in a way that is similar to the current biological reference points, with a biomass-based target and threshold and corresponding fishing mortality-based target and threshold. There is insufficient information in draft Amendment 3 to compare the differences in expected outcomes between Options C and E and to assess the management tradeoffs, but the implementation of such ERPs is not novel.

### **THERE IS PRECEDENT FOR USING ERPs FOR FORAGE FISH.**

As the scientific consensus converges around the need to manage forage species in a precautionary manner, forward-thinking managers and industries are adopting these recommendations in practice. Early adopters include:

- The Convention on the Conservation of Antarctic Marine Living Resources (which manages krill in such a way that prioritizes the needs of predators) which was one of the first to adopt a maximum fishing mortality rate of  $\frac{1}{2} F_{msy}$  and a 75% biomass target;<sup>5</sup>
- The Monterey Bay Aquarium's Seafood Watch program<sup>6</sup> (which adopted assessment criteria embodied in Option C);
- The Marine Stewardship Council<sup>7</sup> (which adopted certification criteria similar to Option E, including a 75% biomass target and a high minimum biomass threshold); and,
- The Pacific, North Pacific, and Mid-Atlantic Councils, as well as several west coast states (which have prohibited the directed, commercial-scale harvest of many forage – or ecosystem component – species).

We urge the Menhaden Management Board to pursue swift implementation of ERPs through Amendment 3 to protect the growing menhaden population and its many predators. This historic step forward would be in keeping with the recommendations of a large and growing body of science, and will serve to set the stage for the eventual release of BERP-derived ERPs.

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<sup>5</sup> Gascón, V. & R. Werner (2006). [CCAMLR and Antarctic Krill: Ecosystem Management Around the Great White Continent. Sustainable Development Law & Policy: 7\(1\): p. 14-16.](#)

<sup>6</sup> Monterey Bay Aquarium (Dec. 2016). [Seafood Watch Standard for Fisheries Version F3.2.](#)

<sup>7</sup> Marine Stewardship Council (Oct. 2014). [Fisheries Certification Requirements and Guidance, Version 2.0.](#)

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