



# Atlantic States Marine Fisheries Commission

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## MEMORANDUM

**TO:** Shad and River Herring Management Board

**FROM:** Shad and River Herring Technical Committee

**DATE:** April 1, 2021

**SUBJECT:** Recommendations on Addressing Fish Passage Performance for American Shad and River Herring Restoration

### ***Background***

The status and trends of American shad and river herring stocks on the Atlantic Coast are considered at “all time low levels of abundance” based upon stock assessments completed for American shad in 2007 and 2020 and for river herring in 2012 and 2017. These assessments demonstrate that despite significant fishery restrictions implemented under the Commission’s Fishery Management Plan (FMP) for Shad and River Herring, many stocks are not showing detectable improvements. The assessments identify several factors that may play primary roles in the reported stock status and trends. In particular, the 2020 American Shad Stock Assessment and Peer Review Report (Assessment Report) provides the most detail on the role of barriers to migration, and includes the first quantitative assessment of associated habitat loss and population impacts from existing barriers.

The Assessment Report examines shad habitat and migration barriers, and fish passage performance as of 2018 provided by Shad and River Herring Technical Committee (TC) members. Using standardized data and simulation modelling, the analysis quantified the impacts of barriers and fish passage in three sub-population areas based on shad life history and habitat (roughly New England, Mid-Atlantic, and South Atlantic). Simulation modelling was conducted to assess effects on spawner population size under three scenarios: 1) no barriers, 2) first barrier with no passage, and 3) realistic fish passage performance measures applied to barriers (i.e., upstream passage efficiency of 50%).

The analysis determined that overall, dams completely or partly block nearly 40% of the total historical American Shad habitat; within the northern iteroparous, southern iteroparous, and semelparous sub-regions of the coastwide metapopulation, respectively, American shad habitat is currently 42, 30, and 28% of what it was historically. The model results of the “no barriers” scenario yielded an estimated spawner production potential 1.7 times greater than that yielded by the scenario assuming no passage at the first barrier: 72.8 million versus 42.8 million fish. The results of the third model scenario, which applies “realistic” (i.e., current) fish passage efficiencies, resulted in a gain of less than 3 million fish, suggesting that current passage only provides a minimal improvement in spawner potential compared to no passage. Consequently, the Assessment Report concluded that “losses in [spawner production] potential are significant in each state and region.”

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### **Technical Committee Request**

The Shad and River Herring TC feels strongly that the following actions are needed to reduce the negative effects of barriers to migration on shad, river herring, and other migratory fish populations along the Atlantic Coast to provide increased opportunities for population recovery:

- 1) Dam/barrier removals as the preferred approach to restore fish species habitat access for population restoration and for habitat restoration benefits. When dam removal is not an option,
- 2) The development and use of fish passage performance standards in river systems based on available data, fish passage modeling tools, and fish passage expertise is recommended. If the required information to develop performance standards are not available, we recommend and support their development for such purposes and applications.

The TC recommends the Commission send letters to the agencies with relevant authorities to request prioritization of these actions.

### **Rationale**

The Assessment Report provides an extensive review of available literature and discussion on the topic of barriers and the many aspects of fish passage. Specifically, it highlights the issues with both outdated approaches and facilities designs/operations that are not effective by a variety of management measures (e.g., percentage of arriving fish passing) and lack of rigorous evaluations. Consequently, without changes in how fish passage objectives are generically defined as *safe, timely, and effective*, and evaluated, management and restoration goals are not likely to be achieved.

The most challenging aspect is the number of barriers fragmenting historic habitat in many systems which compounds any individual barrier/facility effects. Barriers and associated hydroelectric facilities may cause delays, injuries or stress, and mortality to both upstream and downstream migrants at both the juvenile and adult life stages. The cumulative effect barriers have on achieving ASMFC Management goals should be recognized as one of the largest and most pervasive obstacles to the recovery of American shad.

The Shad and River Herring FMP and recent stock assessments all speak to the important influence and problems associated with barriers, fish passage, and related impacts for these species. However, the ASMFC has been largely limited to addressing directed fisheries by requiring Sustainable Fishery Management Plans for commercial or recreational fisheries under Amendments 2 and 3. Over the next several years, an increased number of hydropower license expirations and relicensing projects will occur for federally licensed hydropower projects, which will affect Commission management and restoration goals for not only American shad and river herring, but also American eel and other anadromous species. Given that Federal Energy Regulatory Commission (FERC) license terms and conditions operate for 30-50 years, upcoming relicensing projects provide critical opportunities to ensure that the necessary passage and

protection measures, as well as adaptive management strategies, are established to meet fish restoration goals and objectives.

The U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) both have fish passage prescription authority under the Federal Power Act. States also often have the ability to use a required Water Quality Certificate during relicensing to address fish passage. ASMFC relies on passage counts and population benchmarks to provide guidance for science-based management of shad and river herring. This quantitative approach needs to be applied to fish passage, and has been requested by FERC: *“Commerce and Interior have not included any specific performance standards that would be used to test the effectiveness of the fish passage facilities...Without specific performance standards to analyze, there is no basis for assessing the benefits of effectiveness testing for fish passage and determining whether effectiveness testing would or would not provide benefits to alosines...”* (FERC 2018). The Assessment Report provides a strong justification for the need and benefits of requiring science-based fish passage performance criteria to achieve management goals that are not possible with status quo approaches and unquantified performance standards. Improved passage performance is an achievable goal given the current state of knowledge on fish behavior, swimming performance, and fish passage engineering. Improved passage performance criteria will be essential to provide a basis for defining what is safe, effective and timely, considering that fish passage directly impacts the ability of the ASMFC to achieve its management goals and objectives.