

# **Chapter 1**

## **INTRODUCTION**

## **General Background**

The Atlantic States Marine Fisheries Commission (hereafter referred to as ASMFC or the Commission) is the principal agency responsible for the management of many diadromous fish species in state waters. The mission of the Commission's Habitat Program is to work through the Commission, in cooperation with appropriate agencies and organizations, to enhance and cooperatively manage vital fish habitat for conservation, restoration, and protection, and to support the cooperative management of Commission managed species. One of the primary tasks of the Habitat Program is to develop habitat source documents on topics of immediate and broad interest to ASMFC Commissioners that will provide needed information to the states. In this case, Commissioners requested detailed information on the habitat use, threats to habitat, and habitat research needs for all life stages of the ASMFC-managed diadromous species.

ASMFC coordinates interstate fishery management plans for seven diadromous fish species. Of these seven species, striped bass, Atlantic sturgeon, American shad, hickory shad, alewife, and blueback herring are anadromous; the only ASMFC-managed catadromous species is American eel. Throughout their life history, diadromous fishes occupy a broad range of rivers, bays, and estuaries from Florida to Canada, as well as the Atlantic Ocean. All diadromous fish share the common need for fresh, estuarine, and marine waters at various stages in their development. Some of these species, such as the alosines, share similar life history characteristics and range of habitat as well.

Under the 1996 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act, federal Fishery Management Councils were required to identify *essential fish habitat* (EFH) for all species under federal management; federal agencies proposing projects within EFH areas would then be required to consult with NMFS to determine the impact of those projects on EFH. This mandate was required only for federally managed species, not for species solely under the management authority of interstate Marine Fisheries Commissions. The ASMFC subsequently chose to adopt EFH designations prepared by the federal Fishery Management Councils for any species managed jointly or in association with the Councils. For species solely under Commission management, the Commission has chosen to identify all habitat and Habitat Areas of Particular Concern (HAPCs), but will refrain from identification of EFH. The HAPCs identified by the Commission do not require consultations, or any other regulatory compliance authority.

HAPCs are areas within EFH that may be designated according to the Essential Fish Habitat Final Rule (2002) based on one or more of the following considerations: (i) the importance of the ecological function provided by the habitat, (ii) the extent to which the habitat is sensitive to human-induced environmental degradation, (iii) whether, and to what extent, development activities are, or will be, stressing the habitat type, or (iv) the rarity of the habitat type. Since descriptions of EFH are not currently included in Commission Fishery Management Plans (FMPs), the HAPC definition has been modified to include areas within the species' habitat that satisfy one or more of the aforementioned criteria. A HAPC is a subset of habitats the species is known to occupy, and could include spawning habitat, nursery habitat for larvae, juveniles, and subadults, and/or some amount of foraging habitat for mature adults. HAPCs are geographic locations that are particularly critical to the survival of a species.

All Atlantic coast states are impacted by numerous threats to their natural resources; diadromous fish species are particularly vulnerable because they utilize both coastal and inland habitat during portions of their life history. Poor water quality, altered habitat, blocked access, suboptimal conditions, and invasive species are just a few of the conditions that jeopardize many fish. According to the ASMFC Five-Year Strategic Plan (2009-2013), the loss and degradation of nearshore marine and estuarine fish habitat is a significant factor affecting the long-term sustainability of the nation's fisheries. Diadromous fish species occupy these habitats during a critical period in their life history; it is therefore imperative that fisheries managers provide coordinated management of these areas.

In 2006, the National Fish Habitat Action Plan (NFHAP) was adopted to address the need for improved coordination of fisheries conservation efforts throughout the nation. Currently, the existing NFHAP lacks a Habitat Conservation Plan that directly addresses the needs of diadromous fish species. This document will serve as a basis for the development of the diadromous portion of a conservation strategy for the Atlantic Coastal Fish Habitat Partnership (ACFHP). The ACFHP hopes to conserve habitat for Atlantic coastal, estuarine-dependent, and diadromous fish.

### **Ecological Significance of Diadromous Fish Species**

Diadromous fish have historically played a critical ecological role throughout the range of their habitats. For example, in freshwater, adult shad and river herring returning to spawn are assumed to be food for other fish, reptiles (e.g., snakes and turtles), birds (e.g., ospreys, green herons, eagles, cormorants), and mammals (e.g., mink). Egg, larval, and juvenile shad and river herring may also be consumed by both vertebrate and invertebrate predators in freshwater, estuarine, and nearshore environments. Shad and river herring, which spend several years in the marine environment growing to maturity, bring a significant source of nutrient input to freshwater and estuarine environments. In a second example, American eel are preyed upon by a variety of fish, mammals, and birds, including mink, raccoon, striped bass, and bald eagles. As American eel can contribute up to 25% of the biomass in individual systems, they may be a very important part of the food web. In a third example, documented freshwater predators of Atlantic sturgeon include gar and sea lamprey, and in marine waters, Atlantic sturgeon may be preyed upon by birds, seals, sharks, and other fish.

In addition, semelparous American shad in south Atlantic coastal rivers were a significant food source before their decline. Furthermore, adult blueback herring are commonly preyed upon by striped bass. Although striped bass populations were once depleted, they have now fully recovered; this increased predation may have contributed to a decline in blueback herring abundance in the Connecticut River since 1992. In recent years, predation on alewife and blueback herring by double-crested cormorants staging near the entrance to fishways has increased dramatically in Rhode Island rivers. Predation by otters and herons has also increased in the same area, but to a lesser extent.

Additionally, diadromous fish have historically been a significant food source for human consumption. The American shad is responsible for saving George Washington's army from starvation at Valley Forge during the winter of 1778. The spring American shad run up the Schuylkill River was so plentiful that thousands of fish were netted with each haul, providing enough fish to feed the starving soldiers. Another species, American eel, was once an important

food source to Native Americans and early European settlers due to their high nutritional value. They are considered to have the highest nutritional value of fish. In addition, Atlantic sturgeon have been a valuable resource since pre-colonial times. This species was often used by Native Americans, as evidenced by remains at archeological sites. Atlantic sturgeon were harvested as early as the 1600's by colonists, and were the primary cash crop in Jamestown before tobacco. Their leather was used for clothing and bookbinding, and swim bladders were used for carriage windows and to make gelatin for jellies, wine, beer, and glue. Atlantic sturgeon were also used as fertilizer for plants and fuel for steam-powered vessels. In the 1870's, a major fishery was established for caviar, and within a hundred years, the fishery had completely collapsed.

Most American shad stocks are at historically low levels, and landings have plummeted from a peak of 30,000 metric kg at the turn of the century to a low of 0.6 million kg in 1996. Hickory shad, whose meat is bony and regarded as inferior to American shad, but is prized for its roe, has supported minor commercial fisheries. It is highly sought after by sport fishermen when adults ascend rivers and tributaries during their spawning run, and numbers of fish and landings have increased significantly in recent years. For American eel, landings in the United States have fallen from a high of 1.8 million pounds in 1985 to a low of 641,000 pounds in 2002. For Atlantic sturgeon, in the late 1800's a caviar fishery was established, and by 1890, harvest peaked at approximately 3350 mt (7 million lbs), which led to a significant reduction in population size. By 1901, landings were 10% of the former peak at 295 mt. Further reductions in populations occurred in the 1970's and 1990's, with landings in the 1990s averaging 84.2 mt. As a result, in 1998, the ASMFC initiated a 40-year commercial fishing moratorium.

## Document Content

This document is the most comprehensive compilation of habitat information to date on Commission-managed diadromous species. The primary focus of this document is on inshore and nearshore habitats along the Atlantic coast for all life stages of the included species, but offshore habitat is also discussed. In contrast with the catadromous American eel, the six anadromous species discussed spawn in fresh or brackish waters and spend a portion of their juvenile/sub-adult life stage in freshwater and/or brackish waters. However, American eel spawn in saltwater; following an oceanic larval stage, they migrate to fresh or brackish waters to grow to maturity. Inland and coastal waters provide critical habitat for spawning, growth, feeding, and in some cases, residential habitat for diadromous fish species. Thus, impacts to these areas are likely to have consequences for species that rely on these areas.

In 1998, the Commission published the *ASMFC Guidance for the Development of FMP and Source Document Habitat Sections* (since revised in the *2008 ASMFC Habitat Program Operational Procedures Manual*), which served as the primary guide for preparation of this document. Currently, Commission FMPs and FMP amendments contain varying degrees of habitat information, including habitat-related management objectives and recommendations. Therefore, this document will serve as a tool for fisheries managers to amend existing FMPs to include the most current and comprehensive habitat information.

The Commission's FMP guidance document indicates that the best available information and data should be used in the development of habitat sections, including, but not limited to, peer reviewed literature, gray literature, personal communication with knowledgeable professionals, and unpublished information with adequate citations. In accordance with this directive, this

document has utilized many available sources, including state, federal, and private sources to cover the major sections required for FMPs. Furthermore, maps were developed using a GIS interface that provide a comprehensive source of spawning habitat information for Commission-managed anadromous species (see DVD supplement).

The authors of this document mined existing data sources that identified confirmed or suspected habitats, and those that were deemed important or essential (see text of this document as well as tables included on supplemental DVD). Many new studies have been conducted in recent years, including physical, chemical, and ecological requirements, and are included in this document. Information about the condition of existing habitat has been assessed in some areas, as well as recommendations for reversing impacts or preserving the status quo.

In addition, all Atlantic coastal states submitted a State Wildlife Action Plan (SWAP) to the U.S. Fish and Wildlife Service in 2005. The purpose of the State Wildlife Grants Program is to provide federal dollars to every state and territory to support conservation efforts to prevent wildlife from becoming endangered. The amount of information on diadromous fish species varies within individual SWAPs, but collectively, this represents a significant amount of data that was not previously available before publication of this document. Inclusion of this information provides fish habitat managers with additional resources to identify and protect important habitats.

Unfortunately, we still lack a complete understanding of what habitats are essential to a given species, what the effects of anthropogenic activities are on habitat, and what can be done to mitigate these impacts. This document attempts to address some of these concerns. By identifying all known and suspected habitat, habitat managers can begin to piece together the full range of habitat that each species occupies. Information about physical, chemical, and ecological requirements may help managers to delineate essential habitat for each species at various life history stages. Where information exists on present condition of habitat, managers can predict the fate of resident species. Finally, recommendations for conservation and restoration can be developed to ensure that there will be adequate habitat for all diadromous fish species.

