

Species Profile: Atlantic Herring

New Stock Assessment Could Lead to Management Changes

Introduction

Until recently, the Atlantic herring stock had been considered healthy and fully rebuilt from a collapsed stock in the 1980s. However, the results of the 2018 benchmark stock assessment have raised new concerns about the Atlantic herring resource. While the stock remains not overfished and was not experiencing overfishing in the terminal year (2017) of the assessment, the assessment did show very low levels of recruitment over the past five years. These results will likely have management implications for the species as regulators work to prevent overfishing from occurring in the coming years. Diminished stock size and, in turn, lowered catch limits will also impact fisheries that rely on Atlantic herring as an important source of bait, such as American lobster, blue crab, tuna, and striped bass fisheries.

Life History

Atlantic sea herring is one of 200 species in the clupeid family, which includes menhaden, shad, and river herring. It inhabits coastal waters of the U.S. from Cape Hatteras, North Carolina through Labrador, Canada, and off the coast of Europe. Herring form the base of the food web as a forage species for many animals, from starfish and whelk to economically important fish such as haddock, cod, and flounder. Even the vast amount of eggs produced during spawning events serve as an important protein source for marine mammals, seabirds, and many fishes throughout the Mid-Atlantic and Northeast.

The species' entire life cycle occurs in the ocean and is closely associated with plankton. After hatching, the larvae drift passively along coastal currents, consuming eggs and larvae of copepods, barnacles, and other invertebrates. After the larvae herring metamorphose into juveniles (called sardines), they begin to gather in schools inhabiting shallow, inshore waters during the warmer months of the year. As they grow into adults, herring continue to feed on plankton. Feeding behavior consists of nightly vertical migrations following the zooplankton that inhabit deep waters by day and surface waters by night. Adults (age three and older) migrate south from summer/fall spawning grounds in the Gulf of Maine and Georges Bank to spend the winter in Southern New England and the Mid-Atlantic.

Herring spawn as early as August in Nova Scotia and eastern Maine, and during October and November in the southern Gulf of Maine, Georges Bank, and Nantucket Shoals. When temperatures are ideal, the ripe adult herring aggregate in massive shoals over habitats consisting of rock, gravel, or sand bottoms ranging from 50-150 feet deep. A single mature female can produce between 30,000 and 200,000 eggs in one spawning event. Schools can produce so many eggs the ocean bottom is covered in a dense carpet of eggs several centimeters thick. Eggs hatch in 10-12 days depending on water temperature.

Commercial Fisheries

The earliest herring fisheries in North America date back 450 years. Today, Atlantic herring is predominantly a commercially caught species with markets in the U.S. and Canada. Since 2000, the domestic ex-vessel value of commercial herring landings has averaged \$30 million/year. The most common gears used to catch Atlantic herring are trawls (midwater and bottom) and purse seines. A small fixed-gear fishery continues in Maine.

Atlantic herring catch increased in the 1960s, peaking in 1968 at 477,767 mt (1.05 billion pounds), largely due to a foreign fishery that developed on Georges Bank. Catch declined in the 1980s, averaging 78,164 mt (172 million pounds). Landings in the 2000s were fairly stable around 113,358

Species Snapshot



Atlantic Herring
Clupea harengus

Management Unit: Maine through New Jersey

Common Names: Sea herring, sardine, sild, common herring, Labrador herring, sperling

Interesting Facts:

- Atlantic herring and other clupeid fish have exceptional hearing. They can detect sound frequencies up to 40 kilohertz, beyond the range of most fish. This allows schooling fish to communicate while avoiding detection by predatory fish.
- While most members of the clupeid family are typically 5.9-9.8 inches in length, the tarpon can grow up to 8 feet long and weigh up to 280 pounds.
- Fresh herring bait is considered premium product and demands the highest prices.
- You can find fresh herring in some high-end restaurants and fish shops. Herring is often canned, pickled, or smoked. The meat is off-white and soft. Small fish have a more delicate flavor than larger fish, which tend to taste oilier and pungent.

Age/Length at Maturity: 3 years/9.1 inches

Stock Status: Not overfished and not experiencing overfishing



THE SARDINE INDUSTRY: Washing, draining, and flaking herring at the sardine cannery, Eastport Maine. From a photograph by T.W. Smilie. Image (c) NOAA.

mt (250 million pounds), but have decreased over the past four years to 50,250 mt (111 million pounds) in 2017.

The herring resource was once primarily used for the canning industry, but now provides bait for important fisheries such as lobster, blue crab, tuna, and striped bass. The fish are also a valued commodity overseas where they are frozen and salted.

Stock Status

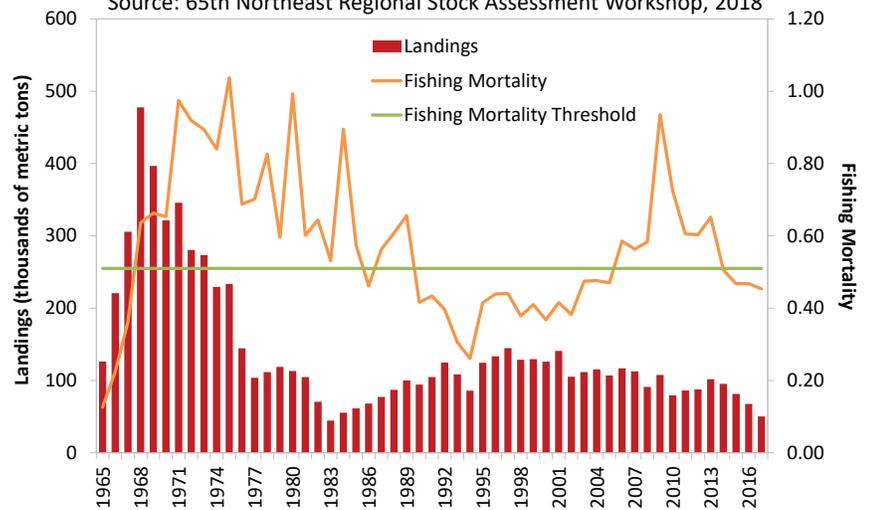
The 2018 benchmark stock assessment, conducted by the Northeast Fisheries Science Center, provided an updated picture of stock health. While Atlantic herring were not overfished and overfishing was not occurring in the terminal year (2017) of the assessment, the report highlighted concerns about trends in recruitment and spawning stock biomass (SSB). Recruitment, a measure of how many herring are born into the population, has been well below the time series average for the past five years. In particular, 2016 recruitment was the lowest on record at 1.7 million fish. While recruitment has been variable throughout time, recent and continuing low levels of recruitment indicate there will be fewer fish available to harvest in future years. SSB, the portion of the population that is capable of reproducing, has also declined in recent years. In 2017, SSB was estimated at 141,473 mt (312 million pounds). Fishing mortality has also decreased in recent years, with a 2017 level of 0.45, below the fishing mortality threshold of 0.51.

Atlantic Coastal Management

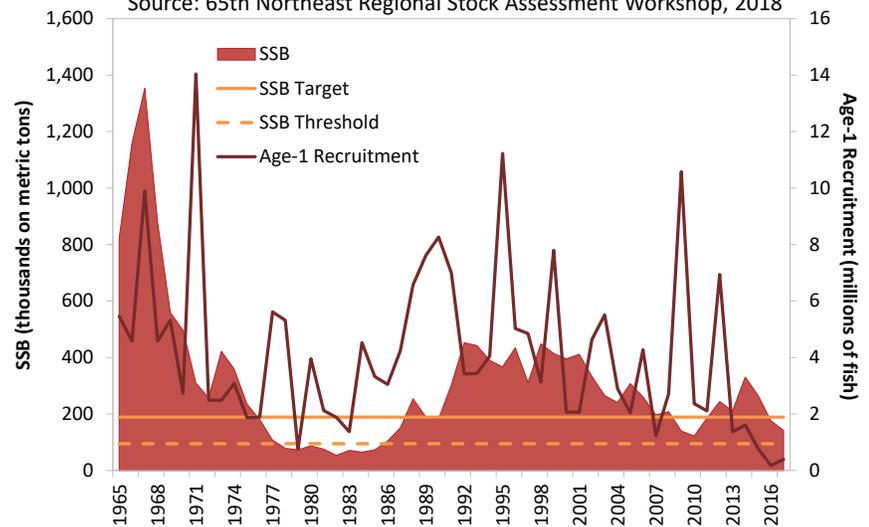
Atlantic herring is cooperatively managed by the Commission and the New England Fishery Management Council (Council). The Commission's fishery management program seeks to prevent overfishing, provide protection to spawning herring, and promote full utilization of herring catch. Both the Commission and Council use annual quotas, called a total allowable catch (TAC), to manage catch in four areas. Management of Atlantic herring includes conservation of its relatives, alewife and blueback herring, collectively known as river herring. River herring populations have declined and remained low in recent years. As a result, river herring and shad catch caps were implemented in order to minimize bycatch in the directed Atlantic herring fishery.

A key component of the Commission's Amendment 3 is the implementation of seasonal closures in the Gulf of Maine (GOM) to protect spawning herring. These closures use a modified GSI-based spawning monitoring system to track reproductive maturity and better align the timing of closures with the onset of spawning. To address the fact that spawning generally occurs earlier in the eastern GOM, as opposed to western GOM, the closures are implemented in three distinct areas at different times. At its most recent meeting, the Atlantic Herring Management Board initiated two

Atlantic Herring Commercial Landings
Source: 65th Northeast Regional Stock Assessment Workshop, 2018



Atlantic Herring Spawning Stock Biomass & Recruitment
Source: 65th Northeast Regional Stock Assessment Workshop, 2018



addenda to strengthen the spawning protections in the GOM and consider establishing a spawning protection program in Area 3 (off of Cape Cod and Georges Bank). This was prompted by the results of the 2018 benchmark stock assessment.

In 2017, the Commission implemented Addendum I to Amendment 3 to establish management measures to stabilize the rate of catch in the Area 1A (inshore GOM) fishery and distribute the seasonal quota throughout Trimester 2 (June through September). The Addendum modifies the 'Days Out' program by adding management tools to the FMP, including a weekly harvester landing limit and potential restrictions on transfers-at-sea and carrier vessels. In addition, the Addendum allows state staff to access daily catch report data to better monitor landings in the fishery.

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