



Life History and Habitat Needs

Geographic Range

Blueback herring range from Cape Breton, Nova Scotia and the Miramichi River, New Brunswick to St. Johns River, Florida. Bluebacks are most abundant in warmer waters of the Chesapeake Bay southward, occurring in most tributaries of the Chesapeake Bay, in the Delaware River, and in adjacent offshore waters.

Movement/Migration

Adults and sub-adults spend most of their lives at sea following a north-south seasonal migration along the Atlantic coast, only returning to rivers to spawn. Adults begin moving coastward in response to changes in water temperature and light intensity. After spawning, fish return downstream. Eggs are negatively buoyant in flowing water, but settle along the bottom in still water. Larvae drift passively downstream. Juveniles spend 3 – 9 months in their natal rivers before moving to the ocean. They move downstream in waves in response to dropping water temperatures beginning in late summer and are generally found in the lower ends of rivers and in freshwater tributaries. Other factors prompting downstream migration include changes in water flow, water levels, precipitation, and light intensity. Many juveniles spend their first winter close to the mouth of the river.

Spawning

Bluebacks are able to adapt spawning behavior under certain environmental conditions and disperse to new areas if conditions are suitable. They generally spawn in freshwater inland of the tidal influence. Spawning runs begin in the south and move progressively north as the season progresses and water temperatures increase. Spawning typically occurs over an extended period with groups or waves of migrants. Bluebacks are repeat spawners that are assumed to return to their natal rivers. In regions where bluebacks co-occur with alewife (*Alosa pseudoharengus*), they select fast-moving waters, but in regions where they do not co-occur with alewife they may select slower-flowing tributaries. Bluebacks often spawn in the vicinity of alewife, but some researchers believe the two species utilize separate sites to reduce competition.

Habitat Use

Bluebacks can tolerate a wide range of salinities. Adults often spawn in areas of rivers where there is gravel or clean sand substrates. In the Rappahannock River, Virginia, spawning substrates include sand, pebbles, and cobbles. Substrates with 75% silt or other soft material containing detritus and vegetation are suggested as optimal for spawning, egg, and larval habitat. Juvenile bluebacks have been found among submerged aquatic vegetation beds in the lower Chesapeake Bay, which have been linked to improved water quality. Juveniles stay in their natal rivers for three to nine months before migrating to the ocean. Bluebacks are found at depths of 27 – 55 m throughout their offshore range. As adults, blueback herring feeds on zooplankton, which are selected based on size, and includes ctenophores, copepods, amphipods, mysids, pelagic shrimps, and smaller fish.

Threats to Habitat

- Dams and other physical obstructions
- Thermal and toxic discharges
- Land use (farming, logging, and urbanization)
- Climate change impacts to aquatic environments
- Oil prospecting and drilling practices, as alosine species are highly sensitive to sound
- Water withdrawal facilities
- Channelization and dredging
- Aluminum and other metals
- Changes in pH levels

ASMFC Fish Habitats of Concern

ASMFC Fish Habitats of Concern include spawning sites; nursery areas; inlets that provide access to coastal bays, estuaries, and riverine habitat upstream to spawning grounds; and sub-adult and adult nearshore ocean habitat.

Recommendations to Improve Habitat Quality

- Remove obstructions or improve passage to upstream migration. Evaluate effectiveness of passage at existing bypass facilities. Mitigate hydrological changes from dams. Determine if earlier upstream passage of migrating adults would increase production and larval survival, and opening downstream bypass facilities sooner would reduce mortality of early emigrants.
- Take into account water flow needs for alosine migration, spawning, and nursery use when deciding river flow allocation. Alter water withdrawal rates or water intake velocities to reduce alosine mortality. Locate water withdrawal facilities along the river where impingement will be low.
- Improve water quality. Upgrade wastewater treatment plants. Reduce thermal effluent into rivers and discharge earlier in the year to reduce impacts to migrating fish. Determine the effects of dredging on alosine habitat. Implement erosion control measures and best management practices.
- Identify, quantify, and evaluate potential alosine spawning and nursery habitat. Coordinate with other agencies responsible for habitat restoration plans and promote cooperative interstate research, monitoring, and law enforcement. Evaluate water quality standards and criteria to ensure they meet special needs of alosines. Review proposed projects for alosine spawning and nursery areas.
- Limit development projects.
- Determine biotic effects of alosine passage into previously restricted habitats and on other native species.

Habitat Research Needs

- Use a multiple-scale approach for restoring alosine habitat and identify and assess indicators of suitable habitat, including potential spawning habitat.
- Document the impact of power plants and other water intakes on early life stage mortality in spawning areas.
- Focus research on within-species variation in genetic, reproductive, morphological, reproductive, and ecological characteristics.
- Review studies dealing with effects of acid deposition on anadromous alosines.
- Determine how abundance and distribution of potential prey affect growth and mortality of early life stages.
- Conduct additional studies on the effects of land use on riverine stages.
- Determine if pH and aluminum levels lead to reduced reproductive success and if chlorinated sewage effluent slows recovery of depressed stocks.

Additional Information

Blueback herring are managed under Amendment 3 (2010) to the Fishery Management Plan for Shad and River Herring. Amendment 3 includes a requirement for states to develop habitat plans for shad and river herring, which includes blueback herring. As of June 2017, ME, NH, MA, NY, and SC all have River Herring Sustainable Fishery Management Plans. Additional information is contained in the ASMFC's Diadromous Fish Habitat document (2009). These documents can be found on the ASMFC website at www.asmf.org or by contacting the ASMFC Habitat Program Coordinator at 703.842.0740.

The most recent river herring stock assessment was completed in 2012, and results led to NOAA Fisheries committing to partner with the Commission and other stakeholders to develop a comprehensive plan for river herring throughout its entire range. The plan can be found online at <http://www.greateratlantic.fisheries.noaa.gov/protected/riverherring/conserv/index.html>. The stock assessment was updated in 2017, and includes additional data from 2011 – 2015. The assessment found that of the 54 stocks for which data were available, 16 experienced increasing trends over the ten most recent years of the update assessment time series, two experienced decreasing trends, eight were stable, 10 experienced no discernable trend due to high variability, and 18 did not have enough data to assess recent trends.

