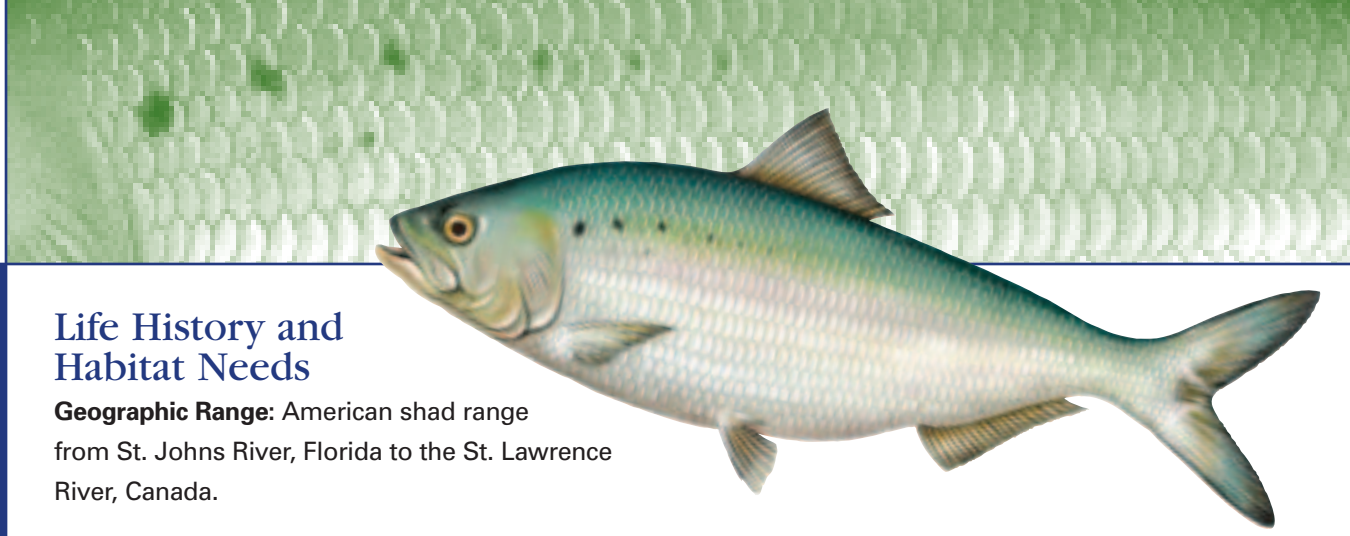

AMERICAN SHAD

Alosa sapidissima

Life History and Habitat Needs

Geographic Range: American shad range from St. Johns River, Florida to the St. Lawrence River, Canada.

Movement/Migration: Shad spend most of their life in the Atlantic Ocean but migrate to coastal rivers and tributaries to spawn. Spawning adults are capable of migrating hundreds of miles upstream where impediments do not block movement; however, in most river systems, they do not spawn as far upstream as they did historically. Adults return to the sea soon after spawning. Eggs and larvae are found at or downstream of spawning locations. Juveniles disperse downstream and spend their first summer in the lower portion of their natal river, before emigrating to the ocean. Adults are highly migratory along the coast with primary summer feeding grounds located in the Bay of Fundy and three primary offshore wintering grounds located off the Scotian Shelf/Bay of Fundy, in the Middle Atlantic Bight (Maryland to North Carolina), and off the Florida coast.

Spawning: Spawning typically occurs in tidal and non-tidal freshwater regions of rivers and tributaries and is primarily triggered by water temperature, and other factors including photoperiod, water flow and velocity, and turbidity. Spawning runs begin in the south and move progressively north as the season progresses and water temperatures increase. Most fish return to their natal rivers and tributaries to spawn. Fish that spawn north of Cape Hatteras are repeat spawners, while most fish that spawn to the south die after spawning. Spawning generally occurs between 12-21°C and in river areas that are less than 10 feet deep. Eggs are released and fertilized in open water.

Habitat Use: Spawning occurs in areas where the bottom substrate often consists of sand, silt, muck, gravel, or boulders. Factors influencing egg survival include current velocity, dissolved oxygen, pH, water temperature, suspended sediments, pollution, and predation. Although bottom substrate type may not be predictive of spawning areas, egg survival may be higher where gravel and rubble structures are present. Rivers, bays and estuaries associated with spawning rivers are used as nursery areas. Factors triggering juvenile emigration include water temperatures and reduced water flow. Juveniles were found to be most abundant where boulder, cobble, gravel and sand were present.

Threats to Habitat

- Dams and other physical obstructions
- Water withdrawal facilities
- Thermal and toxic discharges
- Channelization and dredging
- Land use (farming, logging and urbanization)
- Aluminum and other metals
- Changes in pH levels

ASMFC Habitat Areas of Particular Concern

ASMFC Habitat Areas of Particular 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

- Determine optimal tolerances for salinity, dissolved oxygen, pH, current velocity and suspended solids for various life stages
- 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

American shad are managed under Amendment 1 (1999), Technical Addendum I (2000) and Addendum I (2002) to the Fishery Management Plan for Shad and River Herring. Additional information is contained in the ASMFC's Diadromous Fish Habitat document. These documents can be found on the ASMFC website at www.asmfc.org or by contacting the ASMFC Habitat Specialist at (202) 289-6400.

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