

Bay Anchovy

Anchoa mitchilli

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DESCRIPTION

Taxonomy and Basic Description

Bay anchovy, *Anchoa mitchilli* (Valenciennes, 1848), is a small silvery forage fish and is a member of the family Engraulidae (the anchovies and anchovetas). With a total length 100 mm (4 inches), it is the smallest anchovy species occurring in South Carolina. Compared to the co-occurring and larger striped anchovy, *Anchoa hepsetus*, the bay anchovy has a shorter snout and the silvery stripe on the side of the body is less distinct. All life stages of the bay anchovy occur in South Carolina. Bay anchovies are characterized by a single dorsal fin, a silvery head and lateral stripe, silvery belly and a very long jaw. The larger striped anchovy has a more distinct lateral stripe and longer snout (longer than eye diameter).

Status

This widespread species is a good indicator of estuary pollution stress (Bechtel and Copeland 1970; Livingston 1975) and is an important trophic link in South Carolina waters. The bay anchovy consumes zooplankton and small invertebrates and, in turn, is a prey base for several species of fish including sea trout and bluefish (Sheridan 1978; Scharf et al. 2002). In addition, birds such as the endangered least tern (*Sterna antillarum*) feed extensively on anchovies (Sprunt and Chamberlain 1970). The bay anchovy is included as a priority species because of its importance as a prey base for many animals.

POPULATION DISTRIBUTION AND SIZE

The bay anchovy is an abundant member of estuarine and nearshore species assemblages along the Atlantic and Gulf coasts (Sheridan 1978) from Maine south to the Yucatan (McEachran and Fehhelm 1998). In South Carolina, this species has a broad distribution, occurring from the coastal ocean to the upper polyhaline reaches of estuaries.

Long-term sampling by SEAMAP's shallow trawl survey seems to indicate a decline in abundance of the bay anchovy off South Carolina and the region since 2000, although numbers improved in 2004. This survey and gear may well underestimate abundance of small species such as bay anchovy.

HABITAT AND NATURAL COMMUNITY REQUIREMENTS

The bay anchovy ranges in South Carolina waters from the state territorial sea limit (3 miles offshore) into the coastal sounds, bays, rivers, tidal creeks and impoundments. It can tolerate a wide range of salinities, from full strength seawater, 35 to 36 parts per thousand (ppt), to brackish waters of less than 1 ppt salinity (Anderson et al. 1977; Wenner et al. 1981; SEAMAP 2000; Van Dolah et al. 2002; McGovern and Wenner 1990). During the warmer months this

species is found in sounds, rivers and tidal creeks up into near fresh water (Hildebrand and Schroeder 1972; Wenner et al. 1981). Spawning occurs during the warmer months in estuarine and oceanic waters, most likely over various bottom types and water depths from shallow to 30 m (100 feet), with the growth of young occurring throughout its range. Therefore, no specific habitat is probably critical; however, a broad range of estuarine habitats is important to the bay anchovy.

CHALLENGES

Like other estuarine species, the bay anchovy is dependent on some minimal measure of water quality and hydrographic features such as normal river discharge (Fraser 1997) and rates of sedimentation to maintain quality habitat and food supply of plankton. Future demand for freshwater and increased development, including impervious surfaces, may alter the flow of surface waters, thereby affecting estuarine species distribution. Anthropogenic effects, such as global warming, extreme eutrophication due to nutrient loading and runoff of pollutants and sedimentation degrade the estuarine habitats upon which the bay anchovy and many other species depend.

A better understanding of the relative abundance, population structure and spawning success of bay anchovy is needed. In the Chesapeake Bay, the bay anchovy is recognized as one of the most important species in ecological terms. Surveys conducted on that population of bay anchovies include spawner abundance and seasonality; egg, larval and juvenile distribution; and predation effects of jellyfish.

Additionally, basic research in energy flow through marine systems and the impact of manipulating levels of managed predatory species by catch controls and stock enhancement are lacking. Periodic assessments of important forage fish stocks, like the bay anchovy, are necessary to assess ecosystem health in the state.

CONSERVATION ACCOMPLISHMENTS

Federal laws that were passed in the early 1970's, such as the Clean Air and Clean Water Acts and Coastal Zone Management Act, have improved conditions in most estuarine systems, including those in South Carolina. Continued monitoring of pollutants and coastal development as required by law will hopefully continue to protect the systems that are important for the bay anchovy and the species that prey upon it.

CONSERVATION RECOMMENDATIONS

- Conduct a study of carbon isotope composition of anchovy and prey categories. Such a study would provide baseline data as well as be useful in identifying the relative importance of prey produced by different estuarine systems, such as the marsh-tidal creek systems or open sound and bay water. These efforts could elucidate potential changes in the ecosystem due to human or climatic changes.
- Determine the relative importance of anchovies in the diets of piscivorous fishes and birds.

- Model potential changes in anchovy populations as the result of human population growth and urban/suburban development in South Carolina.
- Continue to enforce pollution and land use laws that protect water quality.
- Reduce nutrient run off (primarily phosphorus and nitrogen) from urban development, agricultural operations and other sources by educating the public about “best management practices.”
- Reduce sediment runoff by encouraging the use of natural buffers or physical barriers during construction.
- Encourage the development of less harmful biological control agents (pest control) and less harmful chemical herbicides and pesticides.
- Continue to monitor the effects of global warming on marine ecosystems.

MEASURES OF SUCCESS

As research and surveys yield a better understanding of the biology of the bay anchovy, the ability to detect shifts in abundance and population structure of this species may serve as an early warning system to assess estuarine ecosystem health.

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