

## Mummichog

### *Fundulus heteroclitus*

Contributor (2005): Wayne Waltz (USFWS)

Reviewed and Edited (2013): Erin Levesque (SCDNR)

#### DESCRIPTION

#### Taxonomy and Basic Description

The Mummichog belongs to a group of fishes known as killifish, which are members of the family Cyprinodontidae. The Mummichog was described by Linnaeus in 1766 as *Corbitis heteroclitus*. He soon after created a new name for the species, *Fundulus heteroclitus*, which remains as the accepted nomenclature today. It is also thought that different “forms” of this species may exist. For example, *Fundulus heteroclitus macrolepidotus* is considered by some to be a northern form of the species that is distinguished from *F. heteroclitus heteroclitus* by egg structure and spawning behavior. The word “Mummichog” comes from an Indian word meaning “going in crowds” and refers to its common schooling behavior.

The Mummichog is a sexually dimorphic fish. Breeding males are easily distinguished from females by their more brilliant, intense pigmentation. Males also display vertical bars along the sides which the females lack. Females, in general, tend to be much paler than males. Very small fish of both sexes show dark transverse bars on their sides which are later lost. This species can vary in shade based on background surroundings (Bigelow and Schroeder 1953).

The Mummichog is an omnivore, feeding on plant matter, small crustaceans, small mollusks, and fish. Adults are reported to reach sizes as large as 17.8 cm (7 in.) with females growing larger than males. The Mummichog is oviparous. Spawning takes place during the summer months during the new and full moon. Eggs are sticky, about 2 mm (0.08 in.) in diameter, and sink after being spawned. Eggs then cling to the insides of mussel shells, oyster shells, and on vegetation. The eggs can develop out of water and typically hatch in 9 to 18 days after being submerged again in water during the following high tide. At 20 mm (0.8 in.) the fry are fully developed and resemble adults (Bigelow and Schroeder 1953).

#### Status

The Mummichog is not a state or federally listed species; however, is an extremely important food source for many larger fish as well as wading and sea birds. It is harvested commercially as bait and, because of its hardiness, is a favorite for biological experimentation and education. The species is also used as an indicator species in severely polluted systems and is sometimes the only species found in these areas. Significant levels of cancer and precancerous lesions have been found in the livers of small Mummichogs. Scientists have correlated these to high levels of PAH in the mud associated with the wood preservative creosote (The Elizabeth River Project).



Mummichogs have been known to consume as many as 2,000 mosquito larvae a day and can be used as a natural mosquito control in ponds and ditches.

#### POPULATION SIZE AND DISTRIBUTION

Mummichogs occur from the Gulf of St. Lawrence along the Atlantic Coast south to the Gulf coast of Texas. The Mummichog has reportedly been introduced into Hawaii, the Philippines, Portugal, and Spain. It was also introduced to ponds in New Hampshire via bait bucket release, and was later collected from the upper Ohio and Beaver River systems in far western Pennsylvania (Froese and Pauly 2004; Richart and Incze 2004; Fuller 2004).

The species is present year round in South Carolina and is abundant in the State's estuaries and tidal creeks. One of the earliest records of the Mummichog in South Carolina was collected on January 11, 1891 from the Ashley River (Anonymous 2001). Very little scientific information exists on abundance and distribution; however it is assumed to be an abundant species. Cain and Dean (1976) sampled in a high salinity creek in South Carolina and found Mummichogs as the most abundant (29.7%) species in their samples. The SCDNR electrofishing survey, that began in 2001 and continues to the present, has captured Mummichogs in low salinity waters (<10 ppt) in each of the estuaries sampled along the coast (Winyah Bay system, Charleston Harbor system, ACE Basin system), with Mummichogs representing the 6<sup>th</sup> most abundant species.

#### HABITAT AND NATURAL COMMUNITY REQUIREMENTS

The Mummichog is a benthopelagic, eurohaline species. They are commonly found in saltwater marshes, tidal creeks and in sheltered shores. The fish's upper salinity limit is reported to be 106 to 120.3 parts per thousand (ppt) (Abraham 1985). However, it is also reported that Mummichogs living in Chesapeake Bay prefer to live in freshwater. This is an extremely tolerant species that can survive at very low oxygen levels and in heavily polluted ecosystems. It can also withstand temperatures as warm as 34°C (93°F) and temperature fluctuations from 6°C to 35°C (43°F to 95°F). Because of the hardiness of the Mummichog, no specific critical habitats have been established. During cold weather months, Mummichogs burrow into the mud to depths up to 20.3 cm (8 in.) to avoid freezing temperatures. In other cases, they may move to deep channels (Bigelow and Schroeder 1953).

#### CHALLENGES

In South Carolina, there is a small bait industry that targets Mummichogs. For a license fee of \$25, an individual may fish up to 50 pots with the option to pay \$1 extra for each pot over 50. Another \$25 license is required for the sale of Mummichogs as bait. As of January 2010, commercial minnow trap license holders are also required to report monthly to the SCDNR on their catch and fishing effort. In January 2013, there had been 15 minnow trap licenses purchased for the 2013 fiscal year. Since reporting began in 2010, between 9,979-10,750 kg (22,000-23,700 lbs.) of Mummichogs have been harvested; over half of this catch has come from creeks between James Island and Folly Beach (Charleston County) (Brad Floyd pers. Comm.). The gregarious nature of the Mummichog makes it vulnerable to localized population depletion if heavily fished repeatedly in the same areas. More information on the impacts of localized population depletions

due to harvest would be beneficial in describing potential ecological implications of Mummichog removal (SCDNR final report).

#### CONSERVATION ACCOMPLISHMENTS

The Mummichog bait industry is currently regulated through license sales and reporting requirements in South Carolina.

#### CONSERVATION RECOMMENDATIONS

- Continue to examine the Mummichog bait fishery in South Carolina to collect fishery dependent data on catch and effort.
- Examine ways to use Mummichog as an indicator species for water quality in South Carolina.
- Determine Mummichog relative abundance and distribution in coastal waters.
- Track Mummichog population trends including localized depletions related to harvesting for bait.

#### MEASURES OF SUCCESS

By implementing a monitoring protocol for Mummichog in South Carolina, SCDNR will be able to infer water quality which, in turn, will benefit all marine life. Another measurement of success would be to document whether localized depletions of Mummichog occur due to bait harvest.

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