Hardhead Catfish

Ariopsis felis
Contributor: Pearse Webster

DESCRIPTION

Taxonomy and Basic Description

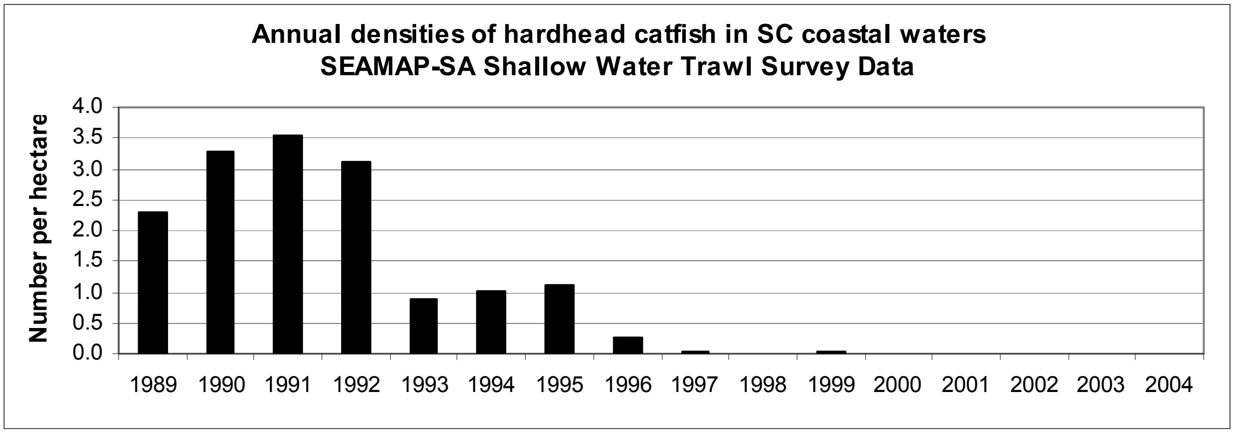
Ariopsis felis is one of two species of marine catfish, both in the family Ariidae, common to coastal South Carolina estuarine and marine waters. The common name, hardhead catfish, is derived from the presence of a hard, bony plate extending rearward toward the dorsal fin from a line between the catfish's eyes. The head is moderately flattened with the upper jaw forming a broad arc. One thread-like barbel is located on either side of the mouth just above the rear corners and two pairs of white barbels are located on the chin. The three forward-most fins (two pectoral and the first dorsal) possess very stout, but sharp, serrated spines which contribute to this animal's poor reputation. The rear dorsal fin is fleshy and black, unlike the other fins, which are membranous and translucent. The back of this fish is generally silvery with blue, green or brownish tones, while the belly is generally white. The hardhead catfish has been reported at sizes up to 70 cm (27 inches) (Acero 2002) but is more commonly found at sizes up to 36 cm (14 inches) in South Carolina's coastal waters (pers. obs.). The second species, *Bagre marina*, the gafftopsail catfish, is readily distinguished from the hardhead by long threadlike extensions from its dorsal and pectoral fins and more strap like, rather than rounded, barbels extending from the upper jaw.

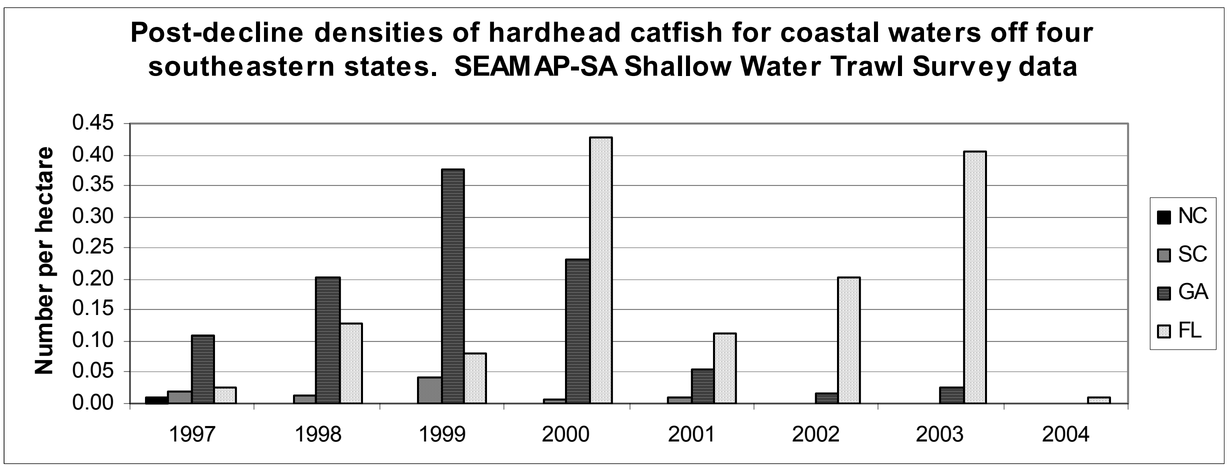
Status

The hardhead catfish currently has no special protection under state or federal regulation. On occasion, mass mortalities of this species have been observed along the Gulf coast and it appears to be a declining species in South Carolina. There are no known directed fisheries for hardhead catfish in South Carolina.

POPULATION DISTRIBUTION AND SIZE

South Carolina is well within the northern limits for the hardhead catfish, which has a coastal range from North Carolina to Florida and throughout the Gulf of Mexico to the Yucatán peninsula (Acero, 2002). Other sources indicate that this species may range as far north as Cape Cod at times (Jones et al. 1978). Population genetics have not been investigated for this species; genetic population structure remains unclear. Hardhead catfish have been prominent in a number of mass mortality incidents in the Gulf of Mexico and appear to be in decline along the southeastern Atlantic coast (Wardle et al. 1998; SEAMAP unpub. data). As suggested by trawl surveys, abundance of the hardhead catfish in South Carolina experienced two drastic drops during the 1990's. Additional sampling along the Atlantic coast of the southeastern United States indicates that abundance remains depressed from North Carolina to Florida (SEAMAP unpub. data). However, in the last eight years, sampling of coastal waters from Cape Hatteras, North Carolina, to Cape Canaveral, Florida, indicate that this species might be in poorest shape in the northern portion of this range. Despite reduced abundance over the shallow coastal shelf, hardhead catfish are likely to be encountered by anglers in estuaries, through the surf zone and into near-coastal waters of the shelf. A true estimate of population size, considering abundance through all of these habitats, has not been calculated.





HABITAT AND NATURAL COMMUNITY REQUIREMENTS

The hardhead catfish is a generalist, tolerating a wide range of salinities from open ocean to fresh water; however, its occurrence in fresh waters is less common. It is generally found over muddy bottoms, or at least in murky waters (Acero 2002).

The hardhead catfish species is a mouthbrooder. Once spawning has occurred, the male will carry the eggs in his mouth until they hatch into larvae in about a month. He may then carry the young for a few more weeks until they are larger and stronger (Jones et al. 1978).

CHALLENGES

Mass mortalities of hardhead catfish have generally been ascribed to one of three causes: disease (R. Overstreet, USM, pers. comm., June 7, 2005), harmful algal blooms and/or extremely low levels of dissolved oxygen (hypoxia) (Wardle et al. 1998). It is unclear which, if any, of these agents is the cause of the recent decline of hardhead catfish observed in South Carolina. A simple decline in abundance, as generally seen for this species in the Atlantic, does not tend to garner the immediate attention elicited by the mass mortalities witnessed along the Gulf coast and in Indian River Lagoon, Florida. Additionally, it is unknown what other factors may affect the population, particularly what role disease may play in the continued apparent depression of this stock.

Chemical contamination in the catfish's environment provides two very different possible threats. Nonpoint source pollution may contribute to the occurrence of algal blooms, which, depending on the algal variety may simply cause hypoxic events (Wardle et al. 1998) or may result in the release of deadly toxins (Steidinger et al. 1998). The second threat comes from contaminants accumulated in the muddy sediments with which this fish is associated. Metals, polycyclic aromatic hydrocarbons (PAHs), and pesticides all accumulate in muddy sediments (Sanger et al. 1999a,b) and have been shown to have detrimental effects on benthic creatures exposed to them. While limited studies have been conducted on the effects of certain compounds on hardhead catfish (Steele 1983a, b), the effects of other pollutants and combination effects are not known. Catfish both live and feed primarily along the bottom, which increases their exposure to contaminants since much of the lower end of their food chain is anchored in benthic organisms. This challenge is not unique to catfish. Bioaccumulation is a threat to the entire food chain, including humans.

CONSERVATION ACCOMPLISHMENTS

There are no known conservation accomplishments for the hardhead catfish.

CONSERVATION RECOMMENDATIONS

- Identify whether single or multiple Atlantic and Gulf of Mexico hardhead catfish populations exist.
- Examine long-term trends in hardhead catfish population size and distribution and relate, where possible, to disease, hypoxia, harmful algal blooms and pollution loads.
- Identify causative factors in future hardhead catfish mortality events.
- Determine if latent pathogens exist in the hardhead catfish population. Monitor the population to determine pathogen temporal prevalence and determine whether mortality events are triggered by pathogens themselves or by some other stressor.
- Investigate whether wild saltwater catfish are plagued by similar diseases to their captive freshwater relatives such as: visceral toxicosis, proliferative gill disease and enteric septicemia. If so, determine if effluent from aquaculture operations is a significant threat to the hardhead catfish.
- Develop the capacity to properly investigate possible harmful algal blooms and monitor for such blooms.
- Determine effects of pollutants on hardhead catfish reproduction, growth and longevity.
- Determine hardhead catfish spawning seasons, spawning locations and recruitment mechanism for the Atlantic coast.

- Determine hardhead catfish predator/prey relationships and examine contaminant loads across these relationships.
- Monitor the effectiveness of existing Best Management Practices (BMPs) such as setbacks, retention ponds and vegetated buffers for preventing nutrient and contaminant runoff into coastal waters.
- Apply and enforce BMPs, such as those utilized by proactive communities.
- Educate the public about the importance of the hardhead catfish in terms of ecological value. While this species is not commonly utilized as a food fish and it is generally maligned due to its pain-inducing spines, it does have a role to play in coastal ecosystems.

MEASURES OF SUCCESS

If stressors depressing abundance of hardhead catfish are identified, it may be possible to halt and reverse the downward trend. One indication of this would be a move toward abundance or density values at least approaching those seen in 1993 through 1995 by the SEAMAP trawl survey off of South Carolina. Future actions proposed to remove stresses on hardhead catfish will likely benefit other benthic organisms as well and, thus could be quite valuable from an ecological and even a human health perspective.

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