

Cobia

Rachycentron canadum

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DESCRIPTION

Taxonomy and Basic Description

Cobia, *Rachycentron canadum* (Linnaeus, 1766), is in the sole representative of the family Rachycentridae. This family is characterized by having a depressed head, protruding lower jaw, and short separate spines in the first dorsal fin. It is a very popular species, heavily targeted by the state's recreational fishery. While considered a coastal migratory species similar to king mackerel and Spanish mackerel, over 85 percent of the harvest occurs in state territorial waters with the overwhelming majority of the harvest taking place in Beaufort County (Hammond 2001). This species is of minor importance to South Carolina commercial fisheries.



The cobia has an elongate body that is strongly rounded with a broad flat head. The mouth is terminal in position with a projecting lower jaw. The first dorsal fin is comprised of seven to nine short, stout isolated spines and the second dorsal fin is long



with anterior rays forming a raised lobe in adults. The anal fin is similar to second dorsal and both are covered in thick skin. The caudal fin is lunate and crescent shaped in adults with the upper lobe longer than the lower lobe. The caudal fin in the very young is paddle shaped. Scales are small and embedded in the skin.

Coloration of the cobia is highly variable. Adults are uniform chocolate brown to bronze on their back and sides with a white to cream color belly. Two lateral stripes run the full length of their body may be present. The stripes can range from stark white to bronze in color. Stripes in juveniles tend to be brighter in color ranging from stark white to chartreuse possibly with a touch of rose on the caudal fin.

Smith (1995) found that males collected in North Carolina matured at age 2 when they were 60 to 65 cm (24 to 26 inches) in length. Females also matured at age 2, but averaged 80 cm (32 inches). Burns et al. (1998) reported that Gulf males mature as early as one year of age and at 64 cm (25 inches). Although all males were mature by age 2, females in the Gulf began to mature at roughly age 3 and 83 cm (33 inches) in length; most females were mature before age 4. Cobias were found to be fully mature by age 4. Franks et al (1999) reported the oldest fish sampled in

the Gulf to be an 11 year old female and a 9 year old male. Smith (1995) reported encountering significantly older fish off the Carolinas with oldest specimens being a 13 year old female and a 14 year old male.

The South Carolina State Record Marine Gamefish Program operated by the Marine Resources Division recognizes a 39.3 kg (87 pound) cobia caught in Port Royal Sound in May 2004 as the largest cobia caught in the state. Franks et al. (1999) reported a female cobia taken from the Gulf of Mexico that measured over 160 cm (63 inches) in fork length (measured from tip of upper jaw to fork in tail) and weighed 62.2 kg (137 pounds). The largest specimen encountered by Smith (1995) in his study of cobia from the Carolinas was a female that measured 142 cm fork length and weighed 32.2 kg (71 pounds).

Status

Cobia are a popular recreational and commercial species caught along the entire coast of South Carolina. In South Carolina, it is harvested primarily by recreational fishermen and sustains an economically important spring fishery in Port Royal Sound, providing thousands of pounds of seafood annually to both state and out-of-state residents. They are also one of the apex predators occurring on offshore artificial reefs. Little is known about the oceanic period in the cobias life or the condition of the Atlantic stock of cobia. Amendment Number 5 to the Fisheries Management Plan for the coastal Migratory Pelagic Resources, the South Atlantic and Gulf of Mexico Fisheries Management Councils identified overfishing as the primary concern in the management of cobia (SAFMC 1990).

The lack of an accurate stock assessment leaves the Atlantic stock in a position where its condition is unknown. The South Atlantic Fisheries Management Council recognizes the importance of the species to the recreational fishery. With the recent growth in the fishery, managers are concerned that the species could become over fished if growth in the fishery continues unchecked.

POPULATION DISTRIBUTION AND SIZE

The cobia enjoys world-wide distribution occurring in tropical and subtropical seas except for the eastern Pacific (Briggs 1960; Shaffer and Nakamura 1989). Cobias occur in the western Atlantic Ocean from Massachusetts and Bermuda to Argentina (Briggs 1958). Shaffer and Nakamura (1989) reported cobia to be most abundant along the US south Atlantic coast and the northern Gulf of Mexico. The Marine Recreational Fisheries Statistical Survey (MRFSS) conducted by the National Marine Fisheries Service (NMFS) has recorded recreational cobia landings from Texas to New York. Tagging studies have documented the movement of fish in both directions between the Gulf and the Carolinas suggesting gene exchange between Atlantic and Gulf stocks.

In South Carolina, cobias first show up in early April on coastal artificial reefs located in 15 to 27 m (49 to 89 feet) of water. They begin to enter shallower nearshore waters (Smith 1995) such as Calibogue, Port Royal and St. Helena Sounds in mid-April and peak in numbers in May and June. The number of fish in the sounds drops sharply by July with the large adult fish being

replaced by sub-adult fish. By October, cobia have disappeared from the inshore waters. North of St. Helena Sound, cobia seldom enter the sounds and bays preferring to stay the waters just outside these shallow estuaries. Along this stretch of coast, cobia are most prevalent on offshore artificial reefs and shipwrecks. Cobia have been reported caught on offshore live bottom areas throughout the winter period (Smith 1995).

Tagging studies have shown that cobia using estuarine areas possess strong homing instincts (Hammond 2001; Richards 1965). Hammond (2001) reported that out of 85 cobia tagged in Port Royal Sound and later recovered, 66 were recaptured in the same area where they were released as much as three years later. Strong site fidelity was also noted for cobia tagged on shipwrecks in the Gulf of Mexico off Key West, Florida (Hammond 2001).

In the Gulf, the general belief is that there are two stocks of fish, an offshore migratory group and an inshore residential group (Franks et al. 1991; Howse et al. 1992). The offshore group over-winters in the Florida Keys moving northward and westward around the Gulf in spring and returning in fall (Franks et al. 1991; Burns and Neidig 1992). The inshore or residential group moves inshore in the spring from offshore live-bottom areas and returns to these areas in late summer where they over-winter (Howse et al. 1992). A similar population structure may exist in the Atlantic since cobia have been caught off the South Carolina coast in every month of the year. Tag returns show that most cobia tagged in South Carolina are recovered in South Carolina with a few, roughly 8 percent, moving north to North Carolina or southward to Florida. The movement of a tagged fish from Florida's east coast to New Jersey helps supports the theory of a migratory Atlantic component.

Currently, no accurate stock assessment exists for either the Atlantic or the Gulf of Mexico stocks of cobias. The last stock assessment for Gulf and Atlantic cobia was conducted in 1996 using a VPA analysis (Virtual Population Assessment). This analysis was considered to be very unreliable because of the weak data on which it was based. A recent assessment for the Gulf of Mexico cobia stock was conducted by the Gulf of Mexico Fisheries Management Council in 2001 (Williams 2001). His main conclusion was that the population status of the Gulf of Mexico's cobia is virtually unknown, given the degree of uncertainty in the estimates from this assessment model. Depending on which natural mortality (M) factor is chosen, from 0.2 to 0.4, the stock would appear to be in healthy to severely declining shape. However, Williams (2001) did determine that the cobia population in the Gulf of Mexico has increased since the 1980's.

HABITAT AND NATURAL COMMUNITY REQUIREMENTS

Cobia normally occur singularly or in small pods. They commonly associate with any structure in the water (buoy, trash, shipwrecks, artificial reefs) or large animals (sharks, turtles and stingrays) (Hammond et al. 1977; Shaffer and Nakamura 1989). They are opportunistic feeders conducting most of their feeding near the bottom targeting crabs, shrimp, squid and benthic fish (Smith 1995). Based on winter collections of cobia taken from the continental shelf by various government research vessels, Smith (1995) suggested that cobia found along the Carolinas probably over winter on the outer continental shelf.

Cobias are batch spawners with spawning reported for the Gulf stock from April to September (Burns et al. 1998). Cobias may spawn as frequently as every four days during the peak period with mean batch fecundity estimates ranging from 377,000 to 1,980,500 eggs (Burns et al. 1998). Spawning has been shown to occur in the mouth of bays and sounds (Joseph et al. 1964; Richards 1967; Smith 1995). Additionally, larval cobia 24 to 36 hours old have been collected 52 miles southeast of Charleston by a South Carolina Department of Natural Resources (SCDNR) research cruise and in the Gulf Stream off North Carolina (Hassler and Rainville 1975) indicating that some cobia are open ocean spawners. Burns et al. (1998) reported that gonadal evaluations from cobia collected from Beaufort County, South Carolina (primarily Port Royal Sound but also in Calibogue and St. Helena Sounds) indicated that the fish probably undertook an offshore movement prior to spawning and then returned to inshore waters. Smith (1995) reported that mature cobia enter the larger high salinity inlets of North Carolina (Beaufort, Ocracoke and Hatteras) each spring starting in May, peaking in early June and sharply declining after early July. During this time, plankton samples taken inside North Carolina inlets have included cobia larvae and eggs, which indicates that spawning probably occurs just outside of the inlets with some possibly occurring in the sounds (J. Smith, NMFS, pers. comm.). This spawning scenario could likely describe what is happening with the fish in Port Royal Sound. Joseph et al. (1964) described a similar spawning of cobia in the Chesapeake Bay. This reproduction concept is supported by the unaided spawning of a pair of cobias within twelve hours of capture from Port Royal Sound in May 2001 at the Waddell Mariculture Facility (T. Smith, SCDNR, pers. comm.).

Juvenile cobias are known to utilize estuaries in South Carolina during their early life. In 1973, 77 juvenile cobias were collected between 24 July and 31 August. The collections were made in the boat slip of the Marine Resources Center located on the James Island on the southern shore of Charleston Harbor. The fish ranged in size from 42 to 129 mm (1.7 to 5 inches) total length (TL) and averaged 82 mm (3.2 inches) TL; 27 fish were measured at capture. The surface salinity where the juveniles were captured ranged from 12.0 to 19.1 parts per thousand (ppt) and averaged 15.6 ppt. Surface water temperature averaged 29.4 °C while ranging from 27.5 °C to 32.2 °C. The juvenile cobia appearance in the boat slip was closely linked to the tidal stage with over 83 percent (64 individuals) of the fish collected between the two-thirds ebb stage and the one-third flood stage. Juveniles ranging in size from 260 to over 400 mm (10 to 157.5 inches) TL have been captured in South Carolina estuaries as late as September and October (Hammond 2001).

CHALLENGES

While there have been no immediate direct challenges to the South Carolina cobia population, water quality and habitat are recognized as especially important in the early life stage of marine fish found in estuaries. Any degradation to the Port Royal Sound water quality or ecosystem could impact the survival, growth and later life of cobia that utilize this estuary as a nursery ground. The impact that many pollutants have on marine fish life cycles are just now being discovered. Thomas (1990) found that four known mammalian reproductive toxins also altered the reproductive endocrine function in female Atlantic croaker, *Micropogonias undulatus*, impairing reproduction. These toxins could have a similar impact on cobia, especially those found in Port Royal Sound.

CONSERVATION ACCOMPLISHMENTS

Cobia found off the southeastern coast of the US are designated a coastal migratory pelagic species and are under the management authority of the South Atlantic Fisheries Management Council (SAFMC). This council has the authority to regulate the harvest of marine organisms that occur within the Exclusive Economic Zone (EEZ), which lies from three to two hundred miles off the United States shores. The SAFMC closely monitors cobia stocks.

Harvest of cobia is regulated in the EEZ under the Coastal Migratory Pelagic Resources Management Plan and in state waters by a law that states that South Carolina automatically adopts federal laws regulating fisheries except when noted otherwise. Currently, regulations require cobia to be a minimum of 84 cm (33 inches) fork length to be retained; each angler is restricted to a possession limit of two fish per day or trip which ever is longer. This applies to recreational as well as commercial fishermen.

Enactment of the Fisheries Management Plan for the Coastal Migratory Pelagic Resources by the Department of Commerce combined with the adoption of the federal regulations by the state of South Carolina for state controlled waters has effectively addressed the current management needs. The SAFMC will monitor the annual landings and will take the necessary actions to prevent overfishing in federal waters.

CONSERVATION RECOMMENDATIONS

- Expand creel sampling in Beaufort County in order to better capture cobia catch, effort and size distribution data on the cobia fishery. Collection of sagittal otoliths for aging would be extremely valuable for future stock assessments.
- Investigate water temperature selections and examine vertical movement in the water column to determine if there are diel, lunar or tidal patterns that may relate to spawning activity of cobia.
- Conduct a study to determine if individual cobia undergo regular or repeated movements in and out of Port Royal Sound during the spring estuarine incursion.
- Define temporal and spatial cobia spawning activity in Port Royal Sound and evaluate and define the role Port Royal Sound plays in cobia's life history.
- Monitor Port Royal Sound waters for the appearance of toxic chemicals. The affluence from any proposed industrial development within the watershed of this estuary should be very closely assessed qualitatively as well as quantitatively for its potential impact on marine life before construction permits are issued.
- Establish a catch and release ethics program for the Beaufort County cobia fishery. Area fishing clubs and conservation groups pushing for stronger conservation ethics can help guide and direct the future of this localized fishery through community avocation and awareness.

MEASURES OF SUCCESS

Once an assessment has been completed and cobia populations are monitored over time, a measurement of success will be stable population trends, most importantly in Beaufort County.

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