

STATUS OF THE COMMON SNOOK
(*CENTROPOMUS UNDECIMALIS*)
IN TEXAS

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Abstract.—Catch data are summarized for common snook, (*Centropomus undecimalis*) from 1975 through 2004 from the lower Laguna Madre, the only area along the Texas coast where common snook are routinely captured. Catch rates of common snook were low (<1 common snook per gill net set) and varied among years, as did size structure. Based on the catch rate and size structure data, the adult common snook population is characterized by low abundance and erratic recruitment (i.e., missing or extremely weak year-classes are common). Additional comments on the status of common snook in Texas are provided.

The common snook, *Centropomus undecimalis*, is a tropical fish whose range extends into sub-tropical waters. In the western Atlantic Ocean, common snook occur from $\approx 34^{\circ}\text{N}$ to $\approx 25^{\circ}\text{S}$ latitude (North Carolina to Rio de Janeiro, Brazil), with common snook frequently captured in waters off Galveston and the southern tip of Texas (Robins & Ray 1986; Rivas 1986). Although common snook reproduction is limited to salt water, juvenile habitat is usually characterized by low salinity waters whereas adult habitat includes rivers, estuaries, coastal lagoons, and outer shores of barrier islands (Marshall 1958; McMichael et al. 1989; Shafland & Koehl 1979). Common snook distribution is restricted primarily by cold weather and freeze events (Storey & Gudger 1936). These fish have been observed as far north as New York (Shaefer 1972), but their sensitivity to cold weather prevents establishment of a permanent population further north than the 14°C isotherm. The lower Laguna

Madre and its associated estuaries appear to be the northern-most range of the Texas-Mexico population.

The common snook is valued recreationally in Texas and commercially in Mexico. During the early part of the 20th century, common snook populations supported commercial fisheries in Florida, Texas, and the Caribbean (Marshall 1958; Alvarez-Lajonchere et al. 1982; Matlock & Osburn 1987). Annual commercial landings in Texas were greater than 45,360 kg in the 1930s. These landings declined through the 1940s and 1950s until 1961, after which no landings were reported (Matlock & Osburn 1987). The sale of common snook in Texas was prohibited in 1987. From 1978 to 1983, very few common snook were recorded in either Texas Parks and Wildlife Department fishery independent sampling or sport angler surveys; as a result, stocking was recommended as a means to revitalize the fishery (Matlock & Osburn 1987). Efforts to collect brood fish eligible for strip-spawning and attempts to mature snook in ponds and cages were unsuccessful (Colura & Matlock 1989). This study summarizes catch data for common snook from 1975 through 2004 from the lower Laguna Madre, which is the only area along the Texas coast where common snook are routinely captured, and comment on the status of common snook in Texas.

METHODS

Total length (mm) was measured on common snook collected coastwide between 1975 and 2004 by Texas Parks and Wildlife Department personnel during routine gill-net sampling. Forty-five gill nets were set at random locations during 10-wk periods in the fall and spring of each year in each of eight bay systems. Gill nets were 183 m long and 1.2 m deep with 45.7-m sections of 76-, 102-, 127- and 152-mm stretched monofilament meshes. Gill nets were set perpendicular to the shoreline with the smallest mesh size adjacent to the shore. The nets were set within 1 hr of sunset and picked up within 4 hr after sunrise. Due to lower catch rates in the spring and to minimize difficulties with assessment of seasonal

catches (Pope & Willis 1996), this study restricted the assessment to fall (September through November) catch data. Spectral analysis (Chatfield 1989) was used to determine whether cyclical patterns were evident in the catch of adult common snook.

From 1992-97, juvenile fish were collected using otter trawls and bag seines in the Rio Grande from its confluence with the Gulf of Mexico to 48.3 river-km upstream. Ten trawls and six bag seines were collected monthly at randomly selected sampling stations. Otter trawls were 5.7 m wide at the headrope with 38-mm stretched nylon multifilament mesh. Trawl tows were made in alternating directions (upstream and downstream) in the center of the channel. Bag seines were 9.1 m long with 19-mm stretched mesh in wings and 13-mm stretched mesh in bag. Bag seines were pulled parallel to the riverbank. To minimize seasonal biases in catches (Pope & Willis 1996) and ensure that age 0+ common snook had recruited to these gears, this study restricted assessment to winter (December through January) catch data.

RESULTS AND DISCUSSION

Most (83 percent) common snook caught in gill nets came from the lower Laguna Madre and no common snook were caught north of Matagorda Bay. A total of 209 common snook was captured in the lower Laguna Madre during fall sampling. Annual variation in the catch rate of these common snook was evident (Fig. 1). Spectral analysis revealed statistically significant 3-, 5- and 10-year cycles in the catch rate of common snook (Fisher-Kappa test, $P = 0.019$), with the 10-year cycle as the strongest. Although there is no linear trend in the 30-year time series of catch rates, there is a significant recurring pattern of years with higher and lower catches of common snook. In all years, catch rates were low (<1 common snook per gill net set). There were ten years in which enough common snook ($n \geq 10$) were captured to examine size structure, which also varied among years (Fig. 2). Based on the catch rate and size structure data, the adult common snook population is

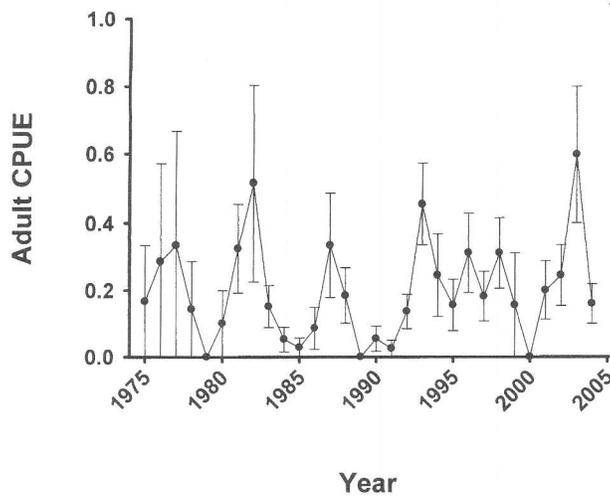


Figure 1. Mean \pm SE catch per unit effort (CPUE; number per gill net set) for adult common snook captured in the Lower Laguna Madre, Texas from 1975 to 2004.

characterized by low abundance and erratic recruitment (to 300-mm TL); namely, missing or extremely weak year-classes are common.

The common snook is a protrandric hermaphrodite (Peters et al. 1998; Taylor et al. 2000). In Florida populations of common snook, 50 percent of the young males are believed to transform into females by the age of 5-7 years (Taylor et al. 2000). Thus, adequate growth and some protection of younger males are necessary for the production of females. The current recreational harvest regulation (a reverse slot, which allows the harvest of fish between a minimum and maximum length and requires the release of fish shorter than the minimum length or longer than the maximum length) is designed to provide protection to males, while allowing some harvest. Given the low numbers of common snook captured during routine monitoring, it is unlikely that density-dependent mechanisms are hindering growth rates of these fish. Even so, very few large (>750 mm) common snook were captured during fall gill-net sets. It is possible that production of common snook year classes in Texas is egg-limited because few mature females exist. This may be an important key for future conservation efforts with common snook in Texas.

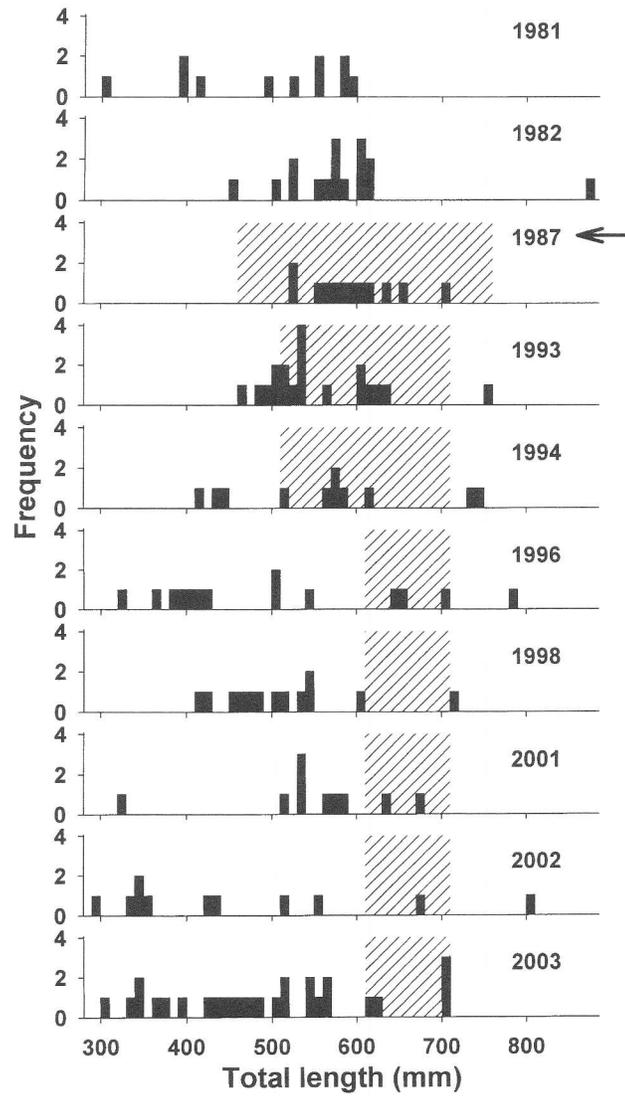


Figure 2. Size structure for adult common snook captured with gill nets in the Lower Laguna Madre, Texas from 1981 to 2004. The arrow indicates when the sale of common snook was prohibited and size limits were approved for recreational harvest of common snook. The legal harvestable size range for common snook is represented by the hatched region.

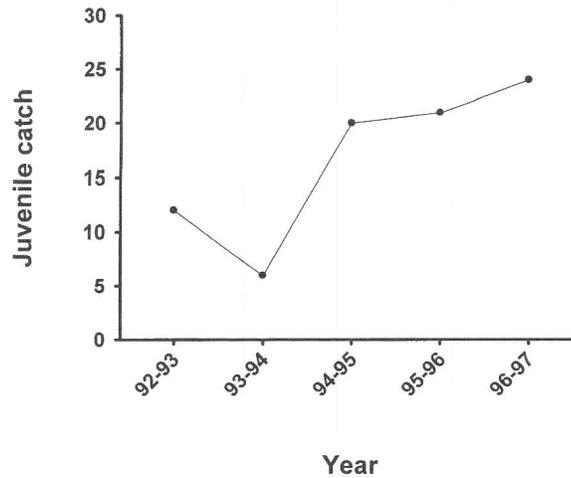


Figure 3. Number of age 0+ common snook caught during winter (December-January; fish arbitrarily became age 1 on January 1) using bag seines and otter trawls in the lower 48.3 river-km of the Rio Grande, Texas from 1992 to 1997.

During the years assessed in this study, juvenile common snook were captured each year in the Rio Grande (Fig. 3), although catches and size structure varied among years (Fig. 4). Thus, it appears that common snook successfully spawn most years in south Texas. Given the size structure of the adult population, these young fish may not successfully recruit each year to the adult population, a common trait of longer-lived fishes. While this trait may not be a concern for common snook, research on the factors that influence recruitment of common snook may provide the knowledge necessary for rebuilding the populations.

At present, the common snook population in Texas is small in size and appears to persist at a relatively steady state. Several factors may limit the growth of this population including over fishing, sudden winter freezes, and loss or degradation of habitat including environmental contamination. For example, the blockage of the mouth of the Rio Grande that occurred in 2001 and 2002 prevented larval common snook from reaching their nursery habitat upriver, at least during the period of blockage. The difficulty of

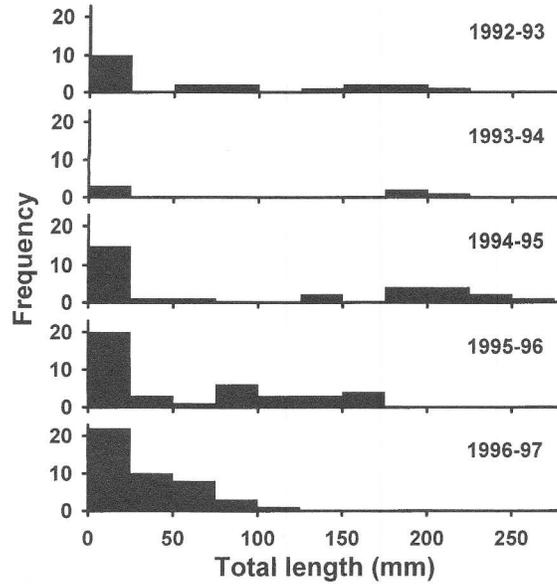


Figure 4. Size structure for age 0+ common snook during winter (December-January; fish arbitrarily became age 1 on January 1) that were captured in the lower 48.3 river-km of the Rio Grande, Texas from 1992 to 1997.

managing these factors and their interactions constrain the return of the common snook population in Texas to historic levels.

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