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Gary C. Matlock  
*Texas Parks and Wildlife Department*

Hal R. Osburn  
*Texas Parks and Wildlife Department*

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## DEMISE OF THE SNOOK FISHERY IN TEXAS

Snook (*Centropomus undecimalis*) is a euryhaline species that ranges from Delaware to Florida (McClane 1972) and from Texas to Brazil (Rivas 1962). The species is very sensitive to cold with a minimum temperature tolerance of about 15.6 C (Marshall 1958, Shafland and Foote 1983). In south Florida snook is one of the most sought game fish (Shafland and Koehl 1979); its sale was prohibited throughout the state in 1957 (Marshall 1958). Snook are also caught in south Texas at about the same latitude (26°) as in Florida, but represent less than 0.1% of the present Texas sport landings (McEachron *et al.* 1981). However, snook have provided a winter sport fishery near Port Isabel, Texas before 1970 (Breuer 1972). Bryan (1970) found juveniles (30-125 mm total length) and adults (275-375 mm total length) in the Arroyo Colorado (lower Laguna Madre) in 1968 and 1969. Jordan and Evermann (1896) reported that snook were common on the Texas coast in the late nineteenth century.

The objectives of this manuscript are to document the range and magnitude of the historical fishery for snook in Texas and to examine possible reasons for its demise.

### MATERIALS AND METHODS

Reported commercial landings were obtained from "Fishery Statistics of the United States" and "Texas Landings" published by the U.S. National Marine Fisheries Service and their predecessors; Texas Parks and Wildlife Department (TPWD) annual reports; Hamilton (1981, 1982, 1983); and Hamilton and Saul (1984). The number and size (total length to the nearest mm) of snook landed by

sport anglers (principally private boat fishermen) during May 1974 through March 1985 were determined by on-site interviews at the completion of each angler's trip according to procedures described in Green *et al.* (1978) and Osburn and Ferguson (1985).

Documented accounts (including photographs and catch data) of snook landings by anglers prior to 1974 were obtained from newspapers (e.g., "Port Aransas South Jetty", "San Antonio Light" and "Corpus Christi Caller") and magazines (e.g., "The Southern Sportsman", "Saltwater Sportsman" and "Texas Fisherman"). The state record was obtained from Anonymous (1985).

TPWD fishery-independent collections of snook in Texas marine waters since November 1975 were obtained from a variety of gear (including bag seine, gill net, rotenone, trammel net, rod and reel, trotline and trawl) according to procedures described in Matlock *et al.* (1978), Matlock and Weaver (1979), McEachron *et al.* (1980), Benefield (1982), Matlock *et al.* (1982), Anonymous (1983), Matthews *et al.* (1984) and McEachron and Green (1985).

Documented accounts of freeze-related snook mortalities in 1940, 1947 and 1983-84 were obtained from Gunter (1941), Anonymous (1947) and unpublished TPWD data.

### RESULTS

Snook once supported both sport and commercial fisheries in Texas, but are only rarely landed by most sport fishermen today. Reported commercial landings peaked in 1928 at 104,451 kg, but steadily declined thereafter (Table 1). No commercially landed snook have been reported since 1961. Sport catches were reported to have declined greatly from the 1940's through the 1960's, but

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**Table 1.** Reported commercial landings (kg) of snook in Texas. Data were not collected in unlisted years before 1961, and no landings were reported after 1961.

Year	Weight
1887	9,752
1888	9,571
1890	14,719
1897	10,310
1902	25,991
1918	0
1923	0
1927	52,914
1928	104,451
1929	51,346
1930	17,892
1931	15,617
1932	9,477
1934	2,948
1936	3,175
1937	1,160
1938	12,957
1939	17,010
1940	3,221
1941	2,355
1942	1,063
1943	0
1944	134
1945	220
1946	49
1947	28
1948	0
1949	194
1950	904
1951	493
1952	5
1953	547
1954	3,052
1955	17
1956	25
1957	15
1958	64
1959	68
1960	445
1961	113

the documentation to support this does not exist. Daily catches of 17 to 25 snook (about 800 mm total length) were reported in 1939 at Port Isabel and 1945 at Port Aransas. Occasional catches were reported in newspaper accounts during 1954-1960 from Port Aransas, Corpus Christi Bay, upper Laguna Madre and the Brownsville Ship Channel. There appears to be little doubt, however, that

snook catches have declined greatly since the 1930's. Very few fishermen land these fish today, and the state record of 26.1 kg caught in 1937 off Padre Island still stands. From May 1974 to March 1985 only 14 snook were seen by TPWD (Table 2) in over 100,000 sport angler interviews. These fish were 318-761 mm total length and were landed mainly from the lower Laguna Madre. Eleven of the 14 were caught in 1983 and 9 of the 11 were caught in the lower Laguna Madre. Newspaper and magazine accounts also indicate that the current snook fishery is almost completely restricted to the lower Laguna Madre.

Fishery-independent collections verify that snook are presently relatively scarce in Texas bays. Only 110 snook were caught during 8 years in over 20,000 collections with bag seines, gill nets, rotenone, trammel nets, rods and reels, trotlines and trawls (Table 3). Eighty-one of these fish were caught in the lower Laguna Madre, and at least one fish was caught each year in only this system.

Snook have been observed as killed by freezes in Texas bays, particularly on the lower coast. Gunter (1941) reported an estimated 6,800 kg of [snook] and drum were killed at the southern tip of Texas in the 1940 freeze. In the 1947 freeze, great numbers of [snook] were reported killed in the Brownsville Ship Channel (Anonymous 1947). Snook were also killed in the 1983-84 freeze in the Galveston Bay, Matagorda Bay and lower Laguna Madre systems (TPWD unpublished data).

## DISCUSSION

Reasons for the demise of the snook fishery in Texas are unknown. Possible explanations include climatic or environmental degradation, disease and overfishing. Breuer (1972) concluded that

**Table 2.** Sport angler landings of snook observed during Texas Parks and Wildlife Department on-site interviews during May 1974-March 1985.

Bay system	Date (Mo-day-yr)	Catch (No.)	Total length range (mm)
San Antonio	09-28-78	1	
	11-11-83	1	416
Corpus Christi	09-29-83	1	380
Lower Laguna Madre	08-26-81	1	761
	10-04-81	1	
	05-25-83	1	600
	07-22-83	2	551-563
	08-13-83	6	318-565
Coastwide		14	318-761

the species' susceptibility to cold would preclude the development of a major fishery in Texas because Texas is near the margin of its normal range. Severe cold spells, however, have occurred on the Texas coast at average intervals of

14 years (Gunter 1945). Despite major freezes recorded in 1856, 1868, 1899, 1917, 1924, 1930 and 1940 (Gunter 1941, 1945), the snook commercial fishery remained viable for at least 50 years. After the late 1920's when commercial lan-

**Table 3.** Number and length (mm) of snook caught in Texas Parks and Wildlife Department bag seine, rotenone, gill net, trammel net, rod and reel, trotline and trawl collections during November 1975-November 1983.

Bay system	Year	Catch (No.)	Total length range (mm)
Aransas	1979	1	700
	1982	2	323-362
	1983	1	106
Corpus Christi	1976	14	177-568
	1981	2	379-403
	1982	5	315-395
	1983	1	376
Upper Laguna Madre	1976	1	256
	1980	1	27
	1982	1	319
Lower Laguna Madre	1975	1	460
	1976	12	375-590
	1977	20	373-646
	1978	2	466-537
	1979	1	
	1980	2	64-583
	1981	11	305-598
	1982	22	450-872
1983	10	250-775	
Coastwide	1975-1983	110	27-872

dings peaked, temperatures in south Texas during the primary snook spawning period of June to August (Marshall 1958, Volpe 1959) have generally been well above the minimum lethal temperature for snook juveniles and adults (Anonymous 1939, 1984).

The presence of DDT in the marine ecosystem may have kept the snook population at a reduced level during the last several decades. Butler *et al.* (1972) concluded that this pesticide was responsible for reducing the spotted seatrout (*Cynoscion nebulosus*) population in the lower Laguna Madre during the 1960's. However, the necessary data do not exist to determine if snook were also adversely affected. Neither do data exist to examine the influence of disease on the snook population.

If marine waters in south Texas represent the northern limit of the snook's range, then any increase in natural mortality (M) coupled with fishing mortality (F) would tend to reduce the population in Texas. The same result could be expected even if M remained relatively constant but F increased dramatically. It is likely that commercial exploitation did increase substantially between 1890 and 1940 since snook was considered a highly prized food fish (Higgins and Lord 1927).

The Texas snook fishery could probably be revitalized through stocking. If the fishery's demise was due to recruitment failure, then fingerlings stocked into at least the lower Laguna Madre may increase the snook population. These stockings should be coupled with strict harvest restrictions for a minimum of 3 years to provide adequate time for the fish to obtain sexual maturity. This conclusion is based on the demonstrated stocking success for red drum (*Sciaenops ocellatus*) (Matlock *et al.* 1985) which has a life history very similar

to snook (Marshall 1958, Volpe 1959, Matlock 1985). Spawning and fry rearing techniques have been developed for snook (Ager *et al.* 1976, Shafland and Koehl 1979, Chapman 1982), but mass production of fingerlings needs additional research (Chapman 1982).

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- Gary C. Matlock and Hal R. Osburn, *Texas Parks and Wildlife Department, Coastal Fisheries Branch, 4200 Smith School Road, Austin, Texas 78744.*