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## BRACKISH WATER CULTURE OF STRIPED BASS IN LOUISIANA

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### ABSTRACT

Striped bass (*Morone saxatilis*) have been cultured in brackish water ponds since 1972 as part of Louisiana's Anadromous fisheries project. Over the past five years, 648,872 fingerlings have been reared to stocking size in ponds with salinities ranging up to 10.8 ppt. Annual percent survival from fry to fingerling ranged from .03% in 1972 to 34.0% in 1976. Increased survival is attributed to improvements in nursery and pond rearing techniques.

A bioassay in 1976 indicated two-day old fry were dead at 30 hours in 24.5 ppt salinity. Fry in 10, 15 and 20 ppt survived two weeks with no apparent harmful effect.

### INTRODUCTION

Stocking of striped bass (*Morone saxatilis*) fingerlings in Louisiana reservoirs for control of gizzard shad (*Dorosoma cepedianum*) was initiated by Louisiana Wildlife and Fisheries Commission in 1965. This stocking and subsequent stockings were possible by virtue of South Carolina's Wildlife Resources Department furnishing fry to states in the southeast United States in exchange for culture data (Steven, 1965).

With congressional passage of the Anadromous Fish Act in 1967, Louisiana became eligible for funds under this program because of a historical run of striped bass in streams tributary to Lake Pontchartrain. Chipman (1956) presented data on occurrence of striped bass in these streams, but no records since 1956 document the presence of these fish.

The initial objective under the Anadromous Fish Program was to reestablish the striped bass fishery to historical levels. In 1967, the first project under this program inventoried the anadromous fishery in coastal Louisiana east of the Mississippi River (Davis et al., 1970). This study indicated that the previous striped bass fishery formerly present in fishable numbers was extinct. However, a reproducing population of Atlantic sturgeon (*Acipenser oxyrinchus*) was found. Davis et al. (1970) were unable to explain the striped bass depletion, but theorized intense coastal stream channelization in the late 1940's and early 1950's resulted in habitat alteration and destroyed most of the traditional spawning areas. They concluded that water quality had improved during the past 10 years and a plentiful supply of forage organisms existed to support an introduced striped bass fishery. Recommendations were given that attempts to reestablish an anadromous striped bass population commence in the fishes' historical range.

Fisheries biologists in Louisiana concluded the best approach to reestablishing the striped bass was to obtain fry from truly anadromous fish. Striped bass from Chesapeake Bay was the best source for these fish and arrangements were made with Maryland Fish and Wildlife personnel to obtain fry. The first year of hatchery operations in Maryland produced 800,000 fry that were shipped to Huey P. Long Fish Hatchery at LaCombe, Louisiana. No striped bass fingerlings were recovered from the ponds. Failure was attributed to the poor condition of the hatchery (Williams, 1971).

During the striped bass hatching operations in Maryland, it was observed that salinity in the river during spawning ranged from 0.5 to 2.0 ppt. Based on this, we decided it would be desirable to culture fry in brackish water. Ponds located on Rockefeller Refuge offered this possibility, thus the beginning of brackish water culture of striped bass in Louisiana.

#### MATERIALS AND METHODS

Striped bass have been cultured since 1972 in coastal ponds at Rockefeller Wildlife Refuge. This state-owned area is located in southwest Louisiana between the Grand Chenier-Pecan Island beach ridge complex and the Gulf of Mexico.

#### Fry Nursery

The fry nursery in 1973 consisted of four 284-liter asphaltum coated

galvanized stock tanks and one 454-liter fiberglass rectangular tank. In addition to tank units, a 1 m<sup>3</sup> saran cage was submerged in a 0.12 ha pond. Brackish well water was circulated through each tank unit at approximately 1.9 liters per minute. Water temperature remained constant at 19.5 C, salinity 1.2 ppt and dissolved oxygen ranged from 4.0 to 8.0 ppm in the tanks. Drains consisted of 2.5 cm standpipes with saran filters attached. Aeration was supplied to each tank. An aquarium pump supplied air and turbulence to the cage.

The fry nursery was altered in 1974 to include six 265-liter round fiberglass tanks, five 265-liter rectangular fiberglass tanks and the 454-liter fiberglass tank. Water used in 1974, 1975 and 1976 was taken from a canal complex connecting with the Gulf of Mexico. Salinities ranged from 1.8 to 4.0 ppt. Canal water pumped with a 3.8 cm electric pump and filtered through a 5 micron Afco filter was stored in two 2,727-liter reservoir tanks for settling. An electric 2.5 cm jet type pump supplied water at 4.5 liters per minute to each of the small fry tanks and 5.3 liters per minute to the 454-liter tank. Aeration was supplied by a 3/4 hp compressor to maintain a small degree of turbulence in each tank. Standby pumps, compressors and generators were maintained in case of equipment failure.

The ponds used for striped bass culture were constructed in 1966 and ranged in size from 0.04 ha to 0.6 ha. Water for the ponds was obtained by mixing brackish deep well water (1.4 ppt) with water obtained from a canal complex connecting to the Gulf of Mexico. The canal received runoff from a 32 ha goose pasture periodically holding 2,500-3,000 Canada geese. Fertilization was not added to the ponds because of nutrient enrichment from the goose droppings.

Nursery techniques varied tremendously over the five-year period. Initially in 1972, 145,000 striped bass were obtained from Vienna, Maryland, and shipped to Rockefeller Refuge. After 14 hours in transit, the fry were acclimated for approximately 45 minutes. Shipping mortality for the 3-6 day old fry was estimated at 60%. Water temperature in the shipping boxes was 20.5 C and 24 C in the ponds. Three 0.12 ha ponds were stocked at a rate of 143,000 per ha.

In 1973, fry were again shipped from Vienna, Maryland to the refuge. Upon arrival, 950,000 3-day old fry were placed in previously described metal nursery tanks at a density of 597 per liter and 250,000 placed in a 1 m<sup>3</sup> saran cage. Water temperature was 18 C in the shipping boxes, 19.5 C in the tanks and 27.0 C in the pond containing the cage. Shipping mortality was approximately 5%. Twenty-four hours after the fry were received, an extensive die-off occurred in the tanks.

Fry were periodically offered brine shrimp (*Artemia* sp.) until active feeding was noted on the fifth day (120 hrs. old). Thereafter, brine shrimp were offered every 4 hours until the fry were stocked when approximately 190 hours old. One 0.12 ha pond was stocked with approximately 40,400 fry and the 0.12 ha pond in which the cage was placed was stocked with approximately 14,000 fry. Approximately 71,000 fry from the tanks were stocked in a 0.6 ha pond. Water temperature and salinity in the small ponds and tanks were identical (22.0 C, 1.4 ppt). Salinity

