Establishment of a Hybrid Morone Fishery in the Apalachicola River, Florida

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Abstract: Hybrids produced by crossing female striped bass (*Morone saxatilis*) with male white bass (*M. chrysops*) have been stocked annually in Lake Seminole, Georgia and Florida, since 1975. Fish migrating from this reservoir and subsequent stockings directly into the Apalachicola River in Florida have resulted in a very popular hybrid *Morone* fishery. Spring creel surveys conducted from 1979 to 1983 documented improved angler success and major increases in fishing effort. More than 15,500 hybrids weighing 28,800 kg were harvested. The monetary value of this additional fishery was more than $339,000.

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Historically, very little or no emphasis has been placed on evaluating *Morone* hybrids introduced into a river system. Past introductions and evaluations have occurred primarily in natural lakes or reservoirs (Ware 1974, Stevens 1974, Crandall 1978).

Morone hybrids produced by crossing female striped bass (*Morone saxatilis*) with male white bass (*M. chrysops*) were first introduced into Lake Seminole in spring 1975. The initial and later annual stockings represented a cooperative venture between the Florida Game and Fresh Water Fish Commission and the Game and Fish Division of the Georgia Department of Natural Resources. Between 1975 and 1982, >3.4 million fingerlings were stocked in Lake Seminole and downstream in the Apalachicola River. During the first 3 years, hybrids were stocked only in Lake Seminole. Many of the originally stocked fish migrated from the reservoir through the Jim Woodruff Lock and Dam and became established throughout the Apalachicola River. Reports from various fish camps and individual anglers indicated *Morone* hybrids were being taken up to 162 km downstream near the delta. These reports stimulated a study designed to monitor angler utilization and harvest.

Methods

The Apalachicola River is formed by flow from Lake Seminole and travels southward 171 km through the Florida panhandle to the Gulf of Mexico. Most of Lake Seminole is located in Georgia; however, the southwestern portion of this 15,176-ha reservoir and the majority of the Jim Woodruff Lock and Dam are located in Florida. The reservoir is fed by 2 major river systems flowing through Georgia and Alabama: the Flint and Chattahoochee.

Angler utilization and harvest assessments discussed in this paper were taken on the Apalachicola River immediately below the Jim Woodruff Lock and Dam to a point 7.25 km downstream. During normal water levels, the study area encompassed 840 ha.

A roving creel survey was conducted each spring (February through May) from 1979 through 1983. Design followed North Carolina State University format utilizing a stratified survey employing nonuniform probability sampling. Advantages of this type survey program are discussed by Pfieffer (1966), Ware et al. (1972), and Malvestuto et al. (1978).

Creel census data were summarized, keypunched, and sent to North Carolina State University for analysis and statistical evaluation. Results obtained included expanded harvest, effort, and success estimates for all major sportfish although only information pertaining to *Morone* hybrids is presented in this paper.

Length frequency and average weight per length group were obtained during routine censuses. These data were expanded using the formula:

$$N = A\left(\frac{X}{Y}\right)$$

where N = expanded number caught for each length group, A = number of fish censused in each group, X = estimated total number caught, and Y = actual number censused.

Economic values for *Morone* hybrids were calculated by substituting striped bass values as adopted in 1982 by the pollution committee of the southern division, American Fisheries Society.

Results and Discussion

Five years of spring creel census data revealed a hybrid *Morone* fishery has developed in the Apalachicola River below Jim Woodruff Lock and Dam. Numbers harvested and fishing effort expended toward this species increased steadily during the course of this study. Numbers of hybrids harvested during the spring quarter increased 273% from 1,346 to 5,015 fish between 1979 and 1983 (Table 1). For the first 3 census years, hybrids accounted for 3% of the

Table 1. Harvest, effort, and success estimates for *Morone* hybrids taken during spring creel surveys conducted on the Apalachicola River below the Jim Woodruff Lock and Dam.

Year	1979	1980	1981	1982	1983
Harvest[a]	1,346	2,471	2,814	3,928	5,015
Effort[b]	2,108	4,608	6,258	6,653	10,847
Success[c]	0.52	0.54	0.36	0.47	0.46

[a] Number.
[b] Man-hours.
[c] Catch/man-hour effort.

total harvest. In 1982, hybrids represented 4% of total numbers harvested, and, in 1983, this figure increased to 10%.

Fishing effort for hybrids significantly increased during the course of this study. During the first year, 2,108 man-hours were spent fishing for hybrids; 5 years later, effort had increased 415% to 10,847 man-hours. During the first 4 years, anglers seeking hybrids accounted for 10% to 13% of the total fishing effort. In the fifth census year, 28% of the total fishing effort was oriented solely toward this species. *Morone* hybrids now represent the major predator species sought by anglers in the Apalachicola River below the Jim Woodruff Lock and Dam.

Angler satisfaction is measured not only by size and numbers of fish caught, but also catch per unit of effort. The lowest overall success rate was 0.36 fish/man-hour of effort recorded during the 1981 census. Low flow conditions were considered to be responsible since success rates were down for all species during that year. Similar findings were reported by Hanson (1977) for tailwater fisheries below Lake of the Ozarks and Pomme de Terre reservoirs, Missouri. During the other 4 census years, overall success rates ranged from 0.46 to 0.54 fish/man-hour of effort. Although success rates for 2-week periods are not illustrated in this paper, the highest was 1.11 fish/man-hour of effort. Documentation of similar high catch rates could not be found in available literature. Ware (1975) reported overall success rates of 0.21 *Morone* hybrids/man-hour of effort for a winter creel census conducted in Lake Gibson, Florida.

Length frequency data (Fig. 1) indicated >50% of the *Morone* hybrids taken in 1979 and 1980 were in groups with a mean total length of ⩾483 mm. In 1979, most fish caught were in the 483 mm group; in 1980, they were in the 559 mm group. A decrease in average size occurred in 1981 with 62% of the yield between the 305 mm group and the 406 mm group. Modal peak for the 1981 catch was 381 mm. Average size of fish harvested increased during the last 2 census years. In 1982, 62% of hybrids harvested were in groups ⩾483 mm, with a modal length of 508 mm. Data collected in 1983 indicated 66% of fish harvested were in groups ⩾483 mm and the most frequently caught had a mean total length of 559 mm. Expansion of length frequency

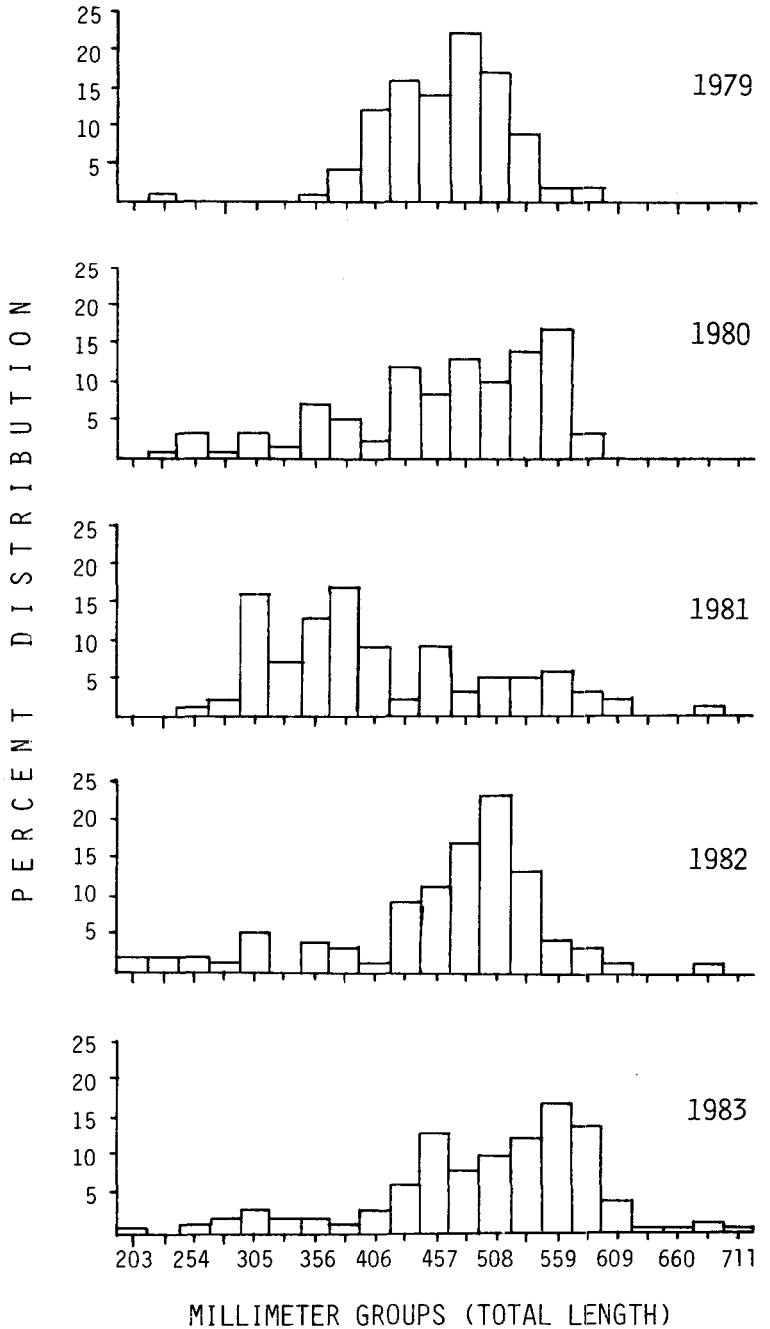

Figure 1. Length frequency histograms for *Morone* hybrids harvested from Apalachicola River.

and average weight data revealed 28,808 kg of *Morone* hybrids were harvested during the 5 spring creel surveys.

Justification of fishery improvement programs requires an economic evaluation as well as documentation of improved angler utilization and harvest. Monetary value for the total estimated number of *Morone* hybrids harvested from the Apalachicola River during the 1979 to 1983 spring creel surveys was $339,384.40. It should be emphasized this value represents only hybrids harvested from a 7.25-km section of the river immediately downstream from Jim Woodruff Lock and Dam. This value would be much greater if it were expanded to encompass all *Morone* hybrids harvested throughout the year from the entire river system and Lake Seminole.

In summary, this study documents the successful establishment of a hybrid *Morone* fishery in a river system. This fishery resulted from stocking programs initially implemented in an upstream reservoir. *Morone* hybrids now represent the primary predator fish sought by anglers and significantly contribute to the overall fishery harvest.

Literature Cited

Crandall, Paul S. 1978. Evaluation of striped bass x white bass hybrids in a heated Texas reservoir. Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies. 32:588–598.

Hanson, W. D. 1977. Tailwater fisheries of Lake of the Ozarks and Pomme de Terre Lake, Missouri. Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies. 31:505–513.

Malvestuto, S. P., W. D. Davies, and W. L. Shelton. 1978. An evaluation of the roving creel survey with nonuniform probability sampling. Trans. Am. Fish. Soc. 107:255–262.

Pfieffer, P. W. 1966. The results of a non-uniform creel survey on a small state-owned lake. Proc. Annu. Conf. Southeast. Assoc. Game and Fish Comm. 20:409–412.

Stevens, R. E. 1974. Current and future considerations concerning striped bass culture and management. Proc. Annu. Conf. Southeast. Assoc. Game and Fish Comm. 28:69–73.

Ware, F. J., W. V. Fish, and L. Prevatt. 1972. Five-year creel survey of two Florida lakes. Q. J. Fla. Acad. Sci., Vol. 35, No. 1. 17pp.

———. 1974. Progress with *Morone* hybrids in fresh water. Proc. Annu. Conf. Southeast. Assoc. Game and Fish Comm. 28:48–54.

———. 1975. Investigations of striped bass and *Morone* hybrids. D-J Annual Progress Report F-32-1. Fla. Game and Fresh Water Fish Comm. Tallahassee. 58pp.