Short Term Effects of Selective Control of Shad in Alabama Public Fishing Lakes

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Abstract: Analysis of catch records at state- owned and managed public fishing lakes indicated that significant increases in permit sales and harvest of fish occurred the year after treatment with rotenone to thin or eliminate threadfin shad and/or gizzard shad. No significant change in the harvest of trophy largemouth bass was observed following treatment.

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Alabama's state- owned and -managed public fishing lakes were originally developed as fisheries containing largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and redear sunfish (*L. microlophus*) (Byrd and Moss 1957, Byrd and Crance 1965). However, in recent years stockings of additional species of predator and forage species have been made at these lakes. Threadfin shad (*Dorosoma petenense*) were first stocked into 1 of Alabama's public fishing lakes in 1970 (Powell 1975). Stockings of threadfin shad were undertaken to provide additional forage for largemouth bass. These stockings were made at other lakes and by 1975, 10 of Alabama's public fishing lakes had received threadfin shad.

Threadfin shad were also believed to be desirable as forage fish for striped bass (*Morone saxatilis*) and hybrid striped bass (*M. saxatilis* × *M. chrysops*), which were frequently stocked in these state-owned lakes during the 1970s. However, threadfin shad and gizzard shad (*D. cepedianum*) populations became so abundant in some lakes that it was believed their presence was reducing bluegill growth and reproduction and largemouth bass recruitment (Davies et al. 1982). Efforts were made to thin or eliminate the shad with rotenone (5% emulsifiable). Treatments were made to all or to portions of the lakes using rates up to 0.20 ppm rotenone.

The selective rotenone treatments to thin shad generally did not significantly affect other fish populations (Powell 1975). However, harvest of trophy

largemouth bass (2.3 kg and larger) fell following treatment at both Lee and Dallas County public lakes. The number of trophy bass harvested declined from 64 to 23 the year prior to treatment to 6 and 2 the year after treatment at Lee and Dallas County lakes, respectively. The reduction in harvest of trophy bass from these lakes caused concern that selective shad treatments might be adversely affecting harvest of trophy bass from other treated lakes.

Concessionaires at these public lakes occasionally expressed concern that a treatment which would kill fish at their lakes would reduce permit sales and fishermen's harvest. The purpose of this project was to determine if selective shad treatments at Alabama's public fishing lakes reduced harvest of trophy largemouth bass or affected permit sales and fishermen harvest the year following treatment.

Methods

Concessionaires at Alabama's public fishing lakes maintain creel records. Fish are counted and weighed and total number and weight of each species harvested is recorded daily. The number of trophy largemouth bass is also recorded. The total harvest for the fiscal year (1 October through 30 September) is summarized by species along with permit sales for each lake. Data for 1978–1979, 1979–1980, 1980–1981, and 1981–1982 from 15 public fishing lakes were used to evaluate the effect of selective shad treatments with rotenone.

The 3 categories that were evaluated were permit sales 0.405 ha of lake, weight of fish harvested/permit sold at each lake, and number of trophy largemouth bass harvested/0.405 ha at each lake. Values for each of these categories at each lake were paired with the succeeding year. Therefore, each lake had 3 paired values for the 4-year period for each of the 3 categories.

A total of 13 treatments with rotenone were applied to 10 of the 15 lakes during the 4-year period. Lakes which received repeat treatments within a year were considered to have 1 treatment that year. In 10 of the treatments, the total water volume of the lake was treated with from 0.1 ppm to 0.2 ppm rotenone to eliminate populations of shad. The other 3 treatments were applied to only a portion of the lake surface and were designed to thin shad populations. These treatments occurred in the fall or winter.

The 45 paired values for each of the categories were separated into 2 groups (Fig. 1). The first group of 13 paired values represented lakes where a treatment was applied near the start of the second year of the pair. The second group of 32 paired values represented lakes where treatments were not applied near the start of the second year of the pair.

Each of the 6 groups of paired values (permit sales/0.405 ha, treatment; permit sales/0.405 ha, no treatment; harvest/permit sold, treatment; harvest/permit sold, no treatment; trophy bass/0.405 ha, treatment; and trophy bass/

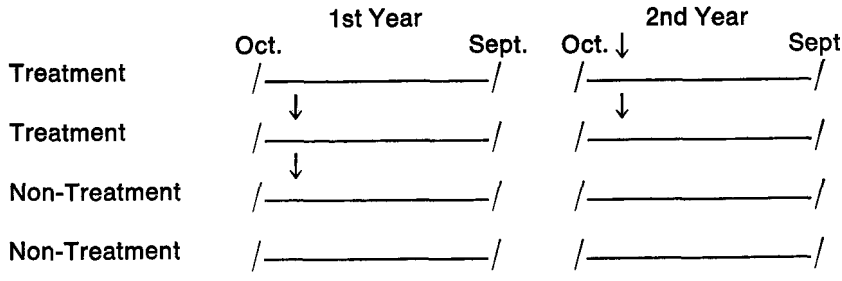

Figure 1. Paired values for treatment and non-treatment lakes.

0.405 ha, no treatment) was evaluated over time by simple linear regression. The result of the trend in permit sales was converted to a per-hectare basis for simplicity.

Results and Discussion

No significant trends ($P > 0.05$) were observed from the 3 categories with no treatment (Table 1). For the categories with treatment, 2 significant trends were observed. Permit sales showed a trend toward an increase of 6 sold/ha of lake ($P < 0.05$) after shad were treated. Harvest of fish showed a trend toward an increased harvest of 0.01 kg of fish/permit sold ($P < 0.05$) after shad were treated. No significant trend ($P > 0.05$) was observed for harvest of trophy largemouth bass after treatment of shad.

The high number of variables which apparently affect permit sales, fisherman's harvest, and harvest of trophy largemouth bass prevented any significant trends in these categories from being observed from lakes which did not receive shad treatments. The effect of removing large numbers of shad from the treated lakes was strong enough that the trends of increased permit sales and increased harvest were apparent. It is probable that increases in the average size of bluegills in the fishermen's catch at the treated lakes was responsible for these trends.

The effect of selective shad treatments on harvest of trophy largemouth

Table 1. Trend analysis of creel data from Alabama's public fishing lakes for lakes which did and lakes which did not receive selective shad treatments with rotenone.

	Treatment	No treatment
Permit sales/ha	+6.00	no trend
Kg of fish harvested/permit	+0.01	no trend
Harvest of trophy largemouth bass	no trend	no trend

bass appears to be similar to the results reported by Phillippy (1967) for selective shad treatments at 6 Florida lakes. He reported significant loss of quality size (1.36 to 5.45 kg) largemouth bass from only 1 of the 6 lakes which were treated. At Alabama's public fishing lakes, no trend was observed in harvest of trophy largemouth bass following 13 shad treatments, although 2 individual lakes had marked decreases in harvest of trophy largemouth bass the year following treatment.

In general, fears of concessionaires that selective shad treatments will hurt permit sales, fishermen harvest, or harvest of trophy largemouth bass appear unfounded.

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