CHANGES IN THE SPORT FISHERY AND FISH POPULATION OF WEST POINT LAKE, SINCE IMPOUNDMENT

Leslie M. Ager

AUTHOR: Georgia Department of Natural Resources, Game and Fish Division, Route 3, Box 75, Fort Valley, Georgia 31303.
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INTRODUCTION

The early years of West Point Reservoir were marked by a rapidly expanding fish population and heavy use and harvest by anglers. During the late 1970's and early 1980's, the sport fishing harvest was dominated by black crappie and crappie anglers made up the majority of the fishing use. Gizzard shad were the most abundant species in the lake and were limiting the production of sportfish both directly and indirectly. The minimum harvest limit on largemouth bass was increased in 1983 from 305 to 406 mm in an effort to increase predation on, and reproduction by, gizzard shad. By 1985, the bass population had significantly increased and the abundance of large gizzard shad had decreased. Since that time this more desirable fish population balance has persisted. The sport fishery is now dominated by anglers seeking largemouth bass but crappie remain the most abundant species in the harvest.

The reservoir is a 10,481-hectare mainstream impoundment on the Chattahoochee River near LaGrange, Georgia. It was impounded in the fall of 1974 by the U.S. Army, Corps of Engineers to provide flood control, hydroelectric power, and recreational facilities.

Water Quality Background

Even before impoundment, Schneider et al. (1972) cited the potential for accelerated eutrophication that could spoil the recreational potential of the reservoir because of degraded water quality in the river below Atlanta. In 1975, water-quality analyses by Georgia DNR-EPD (1976) led them to conclude that: 1) nuisance algal conditions were not observed; 2) low dissolved oxygen concentrations and anaerobic condition in the hypolimnion caused serious violations immediately below West Point dam during the thermal stratification period; 3) the headwater area of the reservoir was of poor quality and was not acceptable for whole-body contact recreational activities; 4) water quality was better in the downstream part of the reservoir; and 5) overall, the lake was classified as highly eutrophic. Cherry et al. (1978) reported that point and nonpoint sources from the metropolitan Atlanta area contributed most of the dissolved and suspended loads to the river and, subsequently, to West Point reservoir. Bayne et al.(1980) indicated that primary productivity was declining on West Point reservoir by 1980 and that this decline was associated with the aging process. But by 1982, Davies et al.(1984) reported that primary productivity had drastically increased and indicated that the natural aging processes had apparently been abated by increases in nitrification from upstream sources. Urbanization, therefore, had created large demands on West Point reservoir not only as the major source of water for downstream populations, but also as a major transporter of wastes from points upstream. In this paper, the development of the fish populations and sport fishery of the reservoir will be discussed.

DISCUSSION

Fish Population Changes

The sport fishery and fish population of the reservoir was studied intensively by researchers from Auburn University from 1973 through 1984 (Bayne et al., 1980, Shelton et al., 1981, Lawrence et al., 1982, Bayne et al., 1983, and Bayne et al., 1986). Fish populations were categorized as typical of southeastern impoundments. Lawrence et al. (1982) reported that changes in species abundance accompanied the first 6 years of impoundment. In 1975, of the 48 species collected in the reservoir, only seven species (bowfin (Amia calva), gizzard shad (Dorosoma cepedianum), carp (Cyprinus carpio), brown bullhead (Ictalurus nebulosus), bluegill (Lepomis macrochirus), largemouth bass (Micropterus salmoides), and black crappie (Promoxis nigromaculatus) each represented more than 5% of the total standing stock, yet only two of these (gizzard shad and black crappie) composed more than 10% of the standing stock. By 1980,

only 34 species were collected and four species (gizzard shad, threadfin shad (Dorosoma petenese), bluegill, and carp) composed more than 5% of the standing stock. Of these, gizzard shad, bluegill, and carp represented 32%, 27%, and 20% respectively, of the total standing stock.

Gill net catch reported by Ager (1982, 1983, 1984) found that five species (striped bass hybrids (Morone saxatilis X Morone chrysops), carp, channel catfish (Ictalurus punctatus), gizzard shad, and black crappie) commonly were captured in weights exceeding 5% of the total catch in gillnets. The relative lack of overlap of the abundant species in the two sampling methods probably reflects gear selectivity. Yet clearly, gizzard shad and carp may have been the most significant in the early life of the reservoir in terms of biomass.

The shift in community structure over this time frame was from a relatively diverse and dynamic initial population composed of species representing a number of guilds, to a less diverse and more stable community dominated by a few species relatively low in the food chain. This is a population development or characteristic pattern of new reservoirs.

Lawrence et al. (1982) reported that largemouth bass were the most abundant predator shortly after impoundment. However, as early as 1977, Shelton et al. (1979) noted that largemouth bass recruitment in West Point was probably being limited by prey availability. Correspondingly, largemouth bass abundance declined through 1977 and Lawrence et al. (1982) reported that the abundance of harvestable-sized largemouth bass were stable in terms of numbers and biomass. Electrofishing results reported by Ager (1989) generally supported this with only 3.6 fish per hour greater than 369 mm in length during fall samples and 4.9 during the spring. Across all sizes, largemouth bass were captured at 38 and 16 fish per hour during the spring and fall respectively (Table 1).

Table 1. Catch of Largemouth Bass (Number per Hour) Collected by Electrofishing on West Point Reservoir during the Period 1982-1989.

	1982	1983	1984	1985	1986	1987	1988	1989
Spring	38	51	52	67	74	63	113	73
Fall	16	32	29	91	49	42	53	58
Spring	15	19	26	26	37	46	77	48
Fall	NE	18	14	55	27	22	24	38

The population of gizzard shad, while abundant, was not in a desirable condition. The population was characterized by relatively large individual size, 180 - 220 millimeters (mm), and slow growth (Ager 1989). The development of this large gizzard shad population had two important consequences for West Point Reservoir. First, the large average size of gizzard shad reduced their availability to all but the largest predators in the reservoir. Second, because large populations of gizzard shad reduce bluegill recruitment (Stiefvater and Malvestuto 1985) by reducing the abundance and altering the size structure of the zooplankton forage base (Drenner et al. 1982), young of the year (YOY) largemouth bass were likely subject to reduced availability of forage during the critical period of dietary change.

In an effort to channel the gizzard shad biomass into sport fish production and reduce competition between gizzard shad and bluegill, in 1983 the states of Alabama and Georgia restricted harvest of largemouth bass to fish of 406 mm minimum length on the lake. The purpose of the regulation change was to shift the length distribution of the largemouth bass population upward, thereby increasing predation on large gizzard shad, resulting in more YOY production by gizzard shad and bluegill. Ultimately, it was hoped that such changes in the forage base would stimulate both recruitment of largemouth bass to a harvestable size and the capacity of the lake to support other predators.

Catch rates of largemouth bass in electrofishing samples in both the spring and fall collections increased significantly following the change in length limit (Table 1). The samples collected in the spring in 1982-1983 averaged 45 fish per hour and 17 kg per hour, while the average from 1984-1989 was 74 and 43. Fall samples averaged 25 fish per hour and 18 kg per hour while the average from 1984-1989 was 54 and 30.

Ager (1989) also reported a significant shift towards larger size classes in spring and fall largemouth bass length frequency distributions after 1983 and that by 1985 the length distribution had stabilized. Evans (1989), analyzing electrofishing results from 1989, concluded that the length frequency and abunance of the bass population had not changed since 1985.

Along with the significant increase in largemouth bass abundance and size distribution, the gizzard shad population also changed (Ager 1989). While the overall abundance in terms of weight and the absolute abundance of larger shad did not change, the size frequency of the population clearly shifted towards shorter fish. That trend has persisted through 1989 (Evans 1989).

Sport Fishery Changes

Total fishing effort has remained relatively stable with the exception of 1983 and 1984. The sport fishery of West Point Reservoir was dominated during the first full year of impoundment (1986) by largemouth bass fishermen (Bayne et al. 1980). However, by 1977, the emphasis had shifted to black crappie, which comprised about 46% of the total effort. This trend continued until about 1983 when largemouth bass fishermen composed about 45% of

the total effort. Although total effort had declined between 1981 and 1983, effort directed at bass had increased substantially, to over 62 hours/ha or about 60% of the total. Evans (personal communication) recorded qualitative creel information from a springtime survey during 1989 and found that the proportion of effort directed at the various species was unchanged since 1985.

Trends in fishing effort are reflected in total harvest (Table 2). When crappie dominated the fishery from 1977 through 1981, their increased contribution kept total harvest at a higher level than has occurred subsequently. Largemouth bass harvest dropped precipitously in 1983 and 1984 because of the change in length limit and a subsequent decline occurred in total harvest. But by 1985, harvest had returned to a level equal to that observed prior to the change in regulation and the level of largemouth bass harvest, over 10 kg/ha, was the highest ever recorded. The decline in harvest in 1984 was almost entirely due to a decrease in the crappie harvest. Despite this continued low crappie harvest in 1985 however, increased catches of largemouth bass caused the overall harvest to return to a level similar to that prior to the regulation change.

SUMMARY

The overall fish population has apparently remained relatively stable in terms of total biomass probably because of the increased nutrification of the reservoir from upstream sources. The population was dominated shortly after impoundment by relatively few species and, while the size distribution of these species may have changed, their overall relative abundance has not. A large sport fishery developed shortly following impoundment and has persisted and become increasingly dominated by fishermen seeking largemouth bass. A more restrictive length limit restriction imposed in 1983 did impact the length frequency of gizzard shad and increased the abundance and size frequency of largmouth bass. Harvest of this important species increased after this change. Negative impacts of the accelerated eutrophication of the reservoir have not been observed in the fish populations or in the fishery.

Table 2. A Comparison of Creel Estimates on West Point Reservoir, Georgia During the Period 1977-1985.
(Data from Shelton et al., 1981, Bayne et al., 1986, and Ager 1989)

	1976	1977	1978	1979	1980	1981	1983	1984	1985
Pressure (HR/HA/YR)									
Largemouth Bass	NE	NE	16.02	22.39	27.14	17.71	26.09	23.79	62.39
Crappie	NE	NE	27.06	50.23	63.12	60.59	32.32	16.76	21.54
Total	86.28	80.28	71.62	91.53	118.49	96.28	66.31	54.83	107.14
Harvest (KG/HA/YR)									
Largemouth Bass	5.63	2.69	4.00	5.78	6.55	2.28	.74	2.81	10.02
Crappie	1.59	8.43	4.23	17.79	13.47	6.31	2.00	3.14	3.87
Total	12.88	18.13	13.31	25.78	26.83	12.47	3.16	7.01	17.54
Success (KG/HR)									
Largemouth Bass	NE	NE	.21	.26	.22	.10	.07	.19	.16
Crappie	NE	NE	.16	.35	.21	.10	.09	.15	.18

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