THE MANAGEMENT OF PONDS WITH STUNTED FISH POPULATIONS

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ABSTRACT

The principal causes of stunted populations in impounded waters in the Southeast are: Overstocking, absence of sufficient carnivorous fish, and heavy weed growth in ponds. Recommended management practices for the correction of these conditions are: (1) weed control, (2) stocking with largemouth black bass, (3) fertilization to increase the food supply, and (4) heavy fishing to reduce the number of fish.

These measures were applied experimentally to a 3-acre pond containing a stunted population of bluegills which had been unable to produce legal-sized fish over a 10-year period. Within 6 months the pond was producing good fishing, and after 18 months, seining samples indicated that 1-year-old bluegills weighed as much as 5-year-old bluegills had at the beginning of the experiment.

The occurrence of ponds with stunted fish populations is apparently common throughout the United States. The fishing in such ponds is extremely poor as most of the fish are under legal size, or are so starved that they furnish very poor sport and are practically inedible. Fish-culturists are being called upon for advice concerning the correction of such conditions in both public and private fishing waters. One phase of the work on pond management at the Alabama Agricultural Experiment Station has dealt with methods of improving fishing in old ponds, many of which have stunted populations of fish.

There are various degrees of stunting, but for the purpose of this article stunted populations will be defined as occurring when only few of the fish present in the pond have been able to reach a legal size. The principal causes of such a condition are as follows: (1) overstocking, (2) absence of sufficient carnivorous fish, and (3) heavy weed growth in ponds. Each of these causes will be discussed briefly.

Overstocking, or the addition of more fish than a pond can support, is a very common cause of stunted populations in impounded waters. This has been due largely to lack of knowledge of how many fish a pond can support and to the widespread belief that heavy stocking can be relied upon to produce good fishing. Where a suitable carnivorous species was included in the original stocking, the overcrowded condition usually has been corrected within a period of from 3 to 6 or more years.

In ponds containing no carnivorous fish, an overcrowded and stunted condition may be expected to continue indefinitely. The most common cause of stunted populations in impounded waters in Alabama

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is the failure to stock properly such areas with a suitable species of carnivorous fish (Swingle and Smith, 1941). In the Southeast, a suitable species appears to be the largemouth black bass (*Huro salmoides* Lacépède). This species should be placed in all ponds in this section in which good fishing is desired. In the past, fish-culturists have often recommended that, in newly impounded waters, black basses should not be added until several years after the bluegills and other forage fish have been introduced. After 1 year the pond consequently is heavily overstocked and stunting begins. When the small black bass finally are added they are usually too small to begin feeding upon the stunted fish and for a considerable period must compete with them for food. Growth usually is slow and mortality high during this period. If a sufficient number of largemouth black bass has been added, the pond may eventually be balanced. However, when an insufficient number of small largemouth black bass or only a few adults have been used in stocking, results have been very unsatisfactory because the fish have always failed to reproduce successfully in ponds crowded with bluegills and other forage fishes.

A 12-acre pond was stocked in 1932 with 70 adult bluegill bream (*Lepomis macrochirus* Raf.), and 200 golden shiner minnows (*Notemigonus crysoleucas* Raf.); 1 year later 8 adult largemouth bass and 250 fingerlings were added. Fishing records were kept on the pond for a 5-year period and during which the largemouth black bass failed to reproduce successfully and did not prevent stunting in the bluegill population. During this 5-year period only four bass, weighing 3 to 5 pounds, were caught on hook and line. The dam broke in 1938 and 50 largemouth black bass weighing between 3 and 8 pounds were recovered from pools in the bottom.

In a 2-acre pond, containing a stunted population of bluegills, white crappies (*Pomoxis annularis* Raf.) and bullheads (*Ameiurus natalis* LeS.), 10 adult largemouth black bass produced only three young in 3 years, although the adults grew rapidly, gaining from 1½ pounds to 2 pounds yearly. Each year one or more females were removed, cut open, and found to be producing eggs. Similar results were secured when large fingerling largemouth black bass were added to a pond containing only a stunted bluegill population. It would appear that the eggs or newly-hatched largemouth bass were devoured by the stunted forage fish. Analyses of stomach contents of bluegills from stunted populations revealed that starving individuals will eat fish eggs of both their own and other species. This fact renders the correction of severe overcrowding more difficult.

Heavy weed growth in ponds has also been found to cause stunted fish populations. Dense weed growths hide young fish from the carnivorous species with the result that the pond soon becomes so overcrowded with small fish that satisfactory growth is impossible. Properly balanced ponds can be maintained only if the waters are sufficiently open so that the carnivorous species can find and devour most

of the small fish produced in the pond. The problem of weed control in ponds is so complex that it will be dealt with in other papers by the authors.

The simplest treatment for ponds with stunted fish populations is to drain the pond, or poison the entire fish population, and restock with the correct numbers and species of fish. These methods have been used by the authors and others (for example by Eschmeyer, 1937; Thompson and Bennett, 1939), and may be rendered necessary by the presence of obnoxious species in the pond. However, removal and destruction of the stunted population is not always possible or desirable. With an understanding of the causes of overcrowding, and the application of the proper management practices, it has been found possible to correct this condition and provide excellent fishing in such ponds within less than one year.

The following four management practices are recommended for correcting conditions that produce stunted populations in impounded waters: (1) control of dense weed growth; (2) stocking with largemouth bass if they are not already present; (3) fertilization of the pond to increase the food supply for forage fish and carnivorous fish; (4) heavy fishing to further reduce the number of small fish.

A 3-acre pond with a stunted fish population was selected to test the above practices. This pond was 10 years old and originally was stocked with bluegill bream only. It rapidly became overcrowded and the fish never reached legal size. Eight years after the original stocking, adult largemouth bass and speckled catfish were added. The largemouth bass failed to spawn successfully and failed to correct the overcrowded condition. The catfish produced some young and added to the congestion in the pond. During the 10-year period after the pond was constructed it had failed to produce legal-sized fish with the exception of one or two large largemouth black bass. Samples of the bluegills were removed and their ages and weights determined in February, 1939, at the start of the experiment. The average weights for the various ages were as follows: 4 years old, 1.3 oz.; 5 years old, 1.2 oz.; and 6 years old, 1.4 oz. No small largemouth bass could be found, but one 3-pound individual had been caught previously.

Since largemouth black bass were already present, it was decided that no more would be added, and that the only management practices needed were fertilization and heavy fishing.

The pond was fertilized during 1939 as recommended in a previous publication (Swingle and Smith, 1939). The first application was made in February, and further applications followed at approximately monthly intervals until October. By the latter part of April, the bluegills were noticeably heavier, and by June many of them had reached a weight of 4 ounces. Due to the increased food in the pond, the bluegills did not bother either the largemouth bass eggs or young with the result that large schools of young largemouth black bass were to be found in the pond for the first time. Heavy hatches of bluegills

were produced throughout the summer and were promptly consumed by the young largemouth black bass.

Fishing was begun in the pond in February, 1939, and any fish caught which was large enough to be eaten was removed from the pond. Bluegills caught during the early spring were small, averaging less than 2 ounces. By the middle of the summer, the average weight was between 3 and 4 ounces, and by fall many were caught which weighed 4 to 5 ounces. Samples were again taken in August, 1940, 18 months after the beginning of the experiment.

The average weights were as follows: 1 year old, 1.1 oz.; 2 years old, 1.6 oz.; 3 years old, 3.7 oz.; and 4 years old, 6.6 oz.

These results indicate that after 1 year of fertilization and heavy fishing, bluegills 1 year old weighed practically as much as 5-year-old bluegills at the start of the experiment. During the year, 270 pounds of bluegills, 400 pounds of speckled catfish, and 30 pounds of largemouth black bass were removed by fishing. By the application of the correct management practices a worthless pond had been changed into an excellent fish pond in less than 1 year.

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