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THE VALUE OF STOCKING AND OF ENVIRONMENTAL
IMPROVEMENT IN FISH MANAGEMENT

By

Albert S. Hazzard

Blue initial
topic

The subject of ~~discussion~~ today "Stocking vs. Environmental Improvement for Wildlife" is stimulating, but perhaps a bit misleading. Both stocking and habitat improvement are sound management methods and each has its proper place in creating better fishing. The important question is the relative value of the two methods and their rightful places in the program.

The spectacular results following the introduction of new species-- the European brown trout in many waters, the striped bass in California, and more recently the ^{KAMLOOPS} ~~Kamloops~~ rainbow in Lake Pend Oreille, Idaho, have over-emphasized the importance of stocking. The public has become convinced that fish planting whether of salmon, trout, bass, bluegills, or channel catfish is essential and must be continued year after year in order to maintain good fishing. A farmer must plant corn every season to get a crop. If we stop stocking, where will our fishing be in the future? Of course this is not a proper comparison, but it is often made and apparently widely credited.

6 pgs

A paper presented during the 1948 convention of the Izaak Walton League of America.

Fish are a three or four year crop at least in the northern states and the majority taken by the angler have spawned once and probably several times before capture. Only recently has it been recognized the hook and line is a very inefficient method of harvesting a fish crop. Southern workers have found that even with heavy fishing and with no closed seasons, size or creel limits only about half of the adult bass and bluegills can be removed by angling. Investigations currently under way in Indiana, Ohio, and Michigan indicate the same results for the mid-west. There seems to be no danger of sportsmen depleting the breeding stock of any of the warm-water fishes. With trout or salmon it may be another matter, although population counts with the electric shocker in some of the heavily-fished streams in northern Michigan reveal surprising numbers of adult wild fish left after the fishing season. Such studies also show many young of the year and sub-legal trout--the results of previous spawnings.

Perhaps another reason why the public and many conservation officials feel that annual planting is necessary has been the lack of information as to the success of natural spawning. Recently completed studies of the breeding habits and fecundity of some of our principal game fish have shown them to be enormously productive. The average bluegill spawns more than 16,000 young each year! The largemouth bass produces about 6,000 fry and a sizeable walleye may deposit as many as half a million eggs! The spawning season of some species such as the bluegill extends over several months and it is suspected that the same female may produce several batches of young in a single year. Although certain kinds of bottom and other habitat are preferred, reproduction will occur successfully for most species in most waters under a variety of conditions. Since it takes several years to reach

catchable size, spawning need not be successful every year in order to maintain a maximum population. Indeed it appears that in the majority of waters more failures in natural reproduction, at least of panfish, would be desirable. We are now convinced that in many streams and lakes there are too many small fish rather than too few, and that better fishing would result if effective population control could be developed. Every fish that dies a natural death (unless eaten by a game fish) represents a waste so far as the angler is concerned and the food it ate and the space it used until it died interfered with the growth and production of fish which did come into the catch. If we could reduce our fish population to the capacity of each particular water just as the gardener thins his carrots, fishing would be better. This is a promising field for the fish manager of the future.

If it is conceded that systematic re-stocking of fish is not necessary in waters where the habitat is suitable and where the proper species are present, where does planting fit into the modern concept of fish management?

Although fewer in number because of better access and widespread plantings in the past, there are still isolated lakes as in the high mountains of the west where the introduction of trout would create new fishing. Also there are doubtless many lakes in various parts of the country where adding a new species would improve angling, but experience has convinced most administrators that such introductions should be preceded by careful investigation of each lake or stream having due regard for connecting waters. Planting northern pike in a lake containing only stunted perch or sunfish might balance the fishing there, but might ruin trout fishing in waters above or below.

Restoration of salmon runs by planting fingerlings in streams formerly blocked by natural or artificial barriers offers promise.

Fern fish ponds and newly made reservoirs may require planting for the first year or so in order to establish the proper balance of fish life. This is true in the latter only if suitable game fish are not present in the river to be impounded, or if they are greatly outnumbered by carp or other rough fish.

In the northern states there are a number of shallow, muddy-bottomed lakes where winterkill may deplete the bass and bluegill population. Since these lakes are highly productive and since kills usually come only once or twice in a decade, re-introduction of such species is justified.

But all of the above are examples of the need for stocking to introduce or to re-establish fish. Is there a place for annual restocking? That has been the major job of state and federal agencies in recent years. Our present knowledge and current experience suggest that stocking for maintenance of warm-water species such as bass, bluegills, perch, walleyes, etc., is unnecessary or actually harmful. Trout present a different picture. There are many lakes with water ideal for trout except for a lack of spawning grounds. Such lakes are usually unproductive of warm-water fish because of low temperatures and limited food supply. Smaller lakes must first be poisoned if they contain stunted warm-water species. Annual stocking with fingerling brook, rainbow, and possibly brown trout (and cutthroat trout in the West) will provide very satisfactory angling. Some mortality occurs from hooking and no doubt there is some cannibalism as larger fish develop, but these fingerlings grow up in the lake utilizing the natural food supply and are "wild" in every respect when they begin to come into

the catch usually about two years later. The program is economical and effective.

Also there is a proper place for planting larger trout (6-8-inch) in certain lakes where warm-water fish only partially use the water. Routine lake surveys have revealed sizeable areas of cold, well-oxygenated water in a number of deeper lakes even in the southern part of Michigan. Such water is little used by bass, bluegills, and most of the other fish present. Only suckers, ciscoes, and less commonly whitefish and smelt are found there. These are "vacant rooms" which the planting of trout can fill to make the entire lake productive. Rainbow, brown, and lake trout supplement the rather mediocre fishing for bass and other warm-water species which such lakes generally afford. Trout up to six and eight pounds have been taken a few years after such plantings and the return is estimated as at least 25 percent of the number stocked. Most of the fish caught are from plantings of the preceding fall (except for lake trout which first show up in numbers two years after stocking) but about a third of the total are older and larger fish. Such plantings take advantage of food and space not utilized by the other fish and so far no adverse effect on the catch of the warm-water species is evident.

Another good use for continued trout plantings was developed in Michigan during war-time restrictions on travel. A number of spring-fed ponds no longer needed for bass and bluegill rearing were found to be suitable for trout. Stocked in the fall with fingerling or larger fish, some growth occurs over winter and the trout are "wild" in appearance and action by the following spring. Fishing is restricted to daylight hours, no boats or rafts are permitted, artificial flies only may

be used and the daily limit is two trout. Heavy use has been made of these ponds which are mostly near the larger cities and their popularity is growing. Three new ones have recently been constructed and more are planned. Records have shown that many anglers fish entirely for sport, rarely keeping a single fish. New converts to fly fishing have been made and many anglers have found pleasure in slipping away from work late in a spring afternoon for an hour or so of trout fishing. The single planting lasts throughout the season, thanks to the special restrictions, and there is a sizeable carryover to the following year to provide some larger fish.

Legal-sized trout plantings in streams may yield even higher returns than in lakes, but the results leave much to be desired. Stocked just before and during the season to avoid the heavy loss incurred in fall planting, these trout are readily taken by the first fishermen to reach the stream after the planting has been made. Color, eating, and fighting quality are inferior to that of wild trout and little skill is necessary to catch them. Within a few days the bulk of the planting has been caught and very few are ever recovered after the third or fourth week. The results from such plantings are temporary, highly artificial and spoil the sport for those who feel that the taking of trout should involve skill and persistence rather than proper timing with the arrival of the hatchery truck. But resort operators and other businessmen in the north country as well as a large number of fishermen demand more and more of these plantings and the major share of the anglers' license funds in trout states now goes into producing "put and take" fishing. For a state lacking natural trout streams, such a program may be justified as the only means for providing any type of

trout fishing, but when good trout waters are available it would seem that restoring and improving the environment should receive the major emphasis.

Habitat improvement is a relatively new approach in fish management based on the theory that if living conditions can be made better there will be a larger survival of young and more or larger fish will reach the anglers' creel. A farmer improves his land by fertilization, drainage or irrigation to increase the yield. He knows that simply planting twice the usual amount of seed will not give him more corn or wheat-- in fact the crop will be poorer because of too many plants for the food and space available.

First and foremost should be the control of pollution where, as too often is the case, fish production is being destroyed or impaired by the filth and poisons being dumped into our streams and lakes. But I do not need to go further on this subject before an Isaak Walton League audience.

Watershed control starting at the headwaters is the logical approach, but so far as I know no fish and game department has adopted this method of stream and lake restoration. It does little good to install deflectors and dams if upstream erosion on the watershed fills the pools and chokes the riffles with sand and silt. Soil conservation ties in directly with better fishing. Contour-plowing, strip-cropping, and any other feasible method to keep the top soil in place will benefit both farmers and fishermen. I sincerely believe that the time will come when fishermen will insist that part of their license money shall be spent in working with landowners to check soil erosion.

Better control of stock grazing along stream banks is badly needed in all parts of the country. Stream bottom fencing with sufficient protected access to water is essential wherever there is grazing of sheep or cattle. Stock concentrate along streams, especially in hot weather, and browse off most of the reproduction of trees and shrubs, thereby affecting game as well as fish. Banks are caved in and stream beds are widened by cattle. It is hopeless to attempt any tree or shrub planting or bank erosion control along a heavily pastured stream.

Restoration and preservation of forest cover on watersheds is vital. Even in rich agricultural areas a strip of ungrazed woodland bordering all streams may one day be recognized as sound land use. Game managers realize the importance of proper cover and food close to water for most birds and other animals. Fish and game technicians should work with soil conservation agencies and landowners to achieve the goal of all-- better stream-side protection--but I know this goal will not be achieved if we must continue to work separately, each driven on by the demands for bigger cash crops for the farmer, more pen-raised pheasants for the hunter and more hatchery trout for the angler--"now"!

Having protected our watersheds and the stream banks and having controlled pollution, what can be done in streams and lakes themselves to increase fish production? Unfortunately most stream improvement to date has been done in the channels rather than on the watersheds. In many cases if the watershed including the stream banks is properly managed, little or no work will be needed in the water--pools and riffles will develop naturally. There are still many miles of fine trout streams where it would be a sacrilege to attempt any improvement. But there are many others where floods, log driving, or grazing have widened stream channels, destroyed shelter for fish life, and have smothered out pools

and riffles. Research has now proven that the trout yield can be greatly increased by the use of deflectors and shelters to narrow the channels, to create new pools, and to expose gravel bottom for spawning and food production. There is little doubt that the same can be done for bass, catfish, and other stream fish. But these studies have also shown that well-built structures are expensive. The cost of producing additional trout by stream improvement may be as great as the cost of the extra fish added to the anglers' catch through legal-size planting. The advantages of stream improvement are additional pools and the increased yield of wild trout.

Lake improvement methods are not so well developed, but experiments are under way testing the value of fertilization, weed reduction, liberalized fishing, population control, and other methods which seem to offer promise. At present the use of shelters of brush or stone on barren lake shoals appears to be of value in concentrating fish for the angler. Since fishermen could take a larger crop of warm-water fish without endangering the future supply this appears to be a sound management method.

Stocking and habitat improvement are both valuable tools for the fish manager, but they should be used only where needed and only where the results are in keeping with sound conservation principles. It is our duty as sportsmen to insist on a proper balance between what is done for the present--pheasants for the gun; trout for the creel--and what in the long run will best insure clean, clear waters and naturally productive fish and game habitat.

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