Prepared for
Michigan Conservation

Original--Fish Division
cc: Education-Game
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DIVISION OF FISHERIES
MICHIGAN DEPARTMENT OF CONSERVATION
COOPERATING WITH THE
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July 25, 1940

REPORT NO. 609

WATER WEEDS--THEIR VALUE AND CONTROL

by

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Not all plants found in Michigan lakes and streams have leaves, stems and roots. More than half of the different kinds are too small to even be seen by the unaided eye. These are the algae or one-celled plants. They are best known to the layman as water slime or pond scum because of the nature of the masses resulting from the congregation of large numbers of individuals and colonies. Almost no natural water is without some representatives of this group and they extend from the surface down into rather deep water in most Michigan lakes. It is only under extremely favorable conditions however that they become numerous enough to be noticed, much less a serious nuisance.

In fish production the algae are not only beneficial but absolutely essential. While they are seldom used directly, they are fundamental in the process of fish food production because of their ability to transform the elements into useful substances. They are the food of the fish food organisms and thus occupy an important link in the food chain.

Occasionally algae may be present in such large masses as to completely blanket or choke small lakes and ponds. Under these conditions they impart a very disagreeable odor and may pollute the water with poisonous substances

when they decay. Fish and even livestock have been known to die from this poison.

(Algae photo)

The control of algae is no simple matter and requires the skillful use of chemicals. Copper sulphate is the best known of those chemicals used for this purpose. A concentration of 0.3 - 0.5 parts of copper sulphate to a million [redacted] is safe to use under most circumstances. However, a careful study should be made of each water before treatment is applied. It is a known fact that a concentration sufficient to kill algae in hard water is dangerous to use in the treatment of soft waters because it will also kill the fish. Copper sulphate added in sufficient quantities to kill the rooted vegetation will destroy fish and fish food organisms as well.

The law prohibits the use of chemicals except as they are applied under competent supervision and with the permission of the Conservation Department. The layman should under no circumstances attempt algae control by this means where the water in question is of a public nature or involves public rights.

The higher aquatic plants (water weeds) are even a greater problem than the algae to the users of public waters. There are at least a hundred different kinds common in the lakes and ponds throughout Michigan. They have been divided into three groups according to their habit of growth. The cattails and bulrushes are examples of the emergent type because they are always found in shallow water and stand erect above the water surface. Out beyond the emergent plant zone the yellow and white water lilies are found, usually in water between 3 and 12 feet in depth. They are called

floating species because they float most of their foliage on the surface of the water. The submerged weed beds include such examples as the common pond weed, eel grass and water milfoil. Plants of this type seldom reach the water surface and are capable of growing down to about 20 feet in depth. These three groups make up the plant community of each lake. Sometimes one or all are missing, depending upon the presence or absence of suitable conditions for their growth.

(Photo showing plant zones)

All plants, whether they grow in the water or on the land, are dependent directly or indirectly upon soil fertility. Good soil not only supplies food to the plant through its roots but also adds to the fertility of the water which may in turn supply many needed substances directly through plant stems and leaves. Such plants as coontail and water milfoil are seldom rooted in the bottom and depend almost entirely upon food materials in solution in the water. Lakes and streams rich in the required plant foods almost invariably lie in the better agricultural districts or drainage areas where fertile top soil is abundant.

Only the shallower waters are suitable for plants because sunlight is needed to carry on their life processes. In ordinary lakes about 20 feet is the lower limit of plant growth. This varies, however, depending on the turbidity or color of the water. In very clear water plants may inhabit the bottom down to 40 or 50 feet. On the other hand, very turbid waters often exclude all vegetation. In average natural waters, the most abundant plant beds occur at depths between 2 and 12 feet.

Sand bottom, although capable of supporting a certain limited vegetation, often prevents the growth of plants because of its movement during wave action. The young plants, as they protrude from the bottom, are destroyed by the cutting effect of the moving sand. This explains the almost complete lack of vegetation along the shoals of our larger Michigan lakes.

An abundance of vegetation over an entire lake is indicative of shallow water and a muddy bottom. Such lakes are generally old and are passing through the last stages of their existence. Deposits of large quantities of organic soil furnishes food for the dense growth of plants which in turn add to these deposits when they sink and decay at the end of each growing season. These plant deposits eventually completely fill the lake basin. Many hundreds of these extinct lakes can be seen as marshes or bogs from the highways over the state.

(Photo of extinct lake)

Aquatic Plants and Fish

No observing fisherman can deny that most of the pan fish reside in or near the weed patches of our lakes. The fish are there because these plant beds offer cover and more abundant food. Studies on certain small Michigan lakes show that food organisms are many hundred times more numerous in submerged weed beds than in equal areas without weeds. Some fishes use aquatic vegetation as spawning beds as well and lay their eggs on the plant leaves and stems.

There is no doubt that aquatic plants are important to good fish production but there is some question as to just how thick vegetation should be to make conditions ideal for fish life. It is quite possible

that some of the small, shallow lakes have too abundant vegetation for good fish growth. The effect of very dense weed beds seems to be a matter of actual crowding, in that there is less space left for the needed activities of the fish and also because plants often reduce the available oxygen to a danger point during long periods of darkness or cloudy weather. It isn't a matter of food production because food organisms increase in almost direct proportion to the vegetation density. Small weed-choked ponds or lakes are literally teeming with the favorite food items of fish. There is another problem which should not be ignored and that is the difficulty of angling for fish in lakes choked with weeds. Weeds may become so dense that angling is no longer possible and the legal fish present cannot be harvested.

The question arises then: Can the removal or destruction of vegetation be justified on the grounds of improving conditions for fish? Our conclusion is that water plant eradication can only be justified, in a fisheries program, on ponds or small lakes which are known to produce fish and which are filled with weeds early in the season. Of course weed eradication is desirable in hatchery ponds where large concentrations of fish are held and where cleaning is necessary to safeguard the stock. The removal of weeds from the bays of lakes having large areas of open water is a questionable procedure from the point of view of fish production.

There are many other interests which must be considered, however, when contemplating plant control. Often a lake is of greater importance for swimming and boating than for fishing. The complete removal of vegetation from such a lake may be entirely justifiable. It is possible, however, to restrict vegetation control to swimming beaches and boat paths. This will probably have no serious effect on fish production. Each project involving the removal of plants should be considered in the light of the greatest public interest and not the desires of a few.

Methods for Water Weed Control

A great many different chemical and mechanical methods of plant control have been tried. None of these have proven satisfactory for all situations but certain ones seem practical in controlling the common "water weeds" over limited areas. The method to be employed depends upon the kind of weed to be eradicated, the extent of the bed and the value of such an eradication, i.e., just how much of an expenditure can be justified.

Plant control by means of chemicals is at best very hazardous and should not be used by anyone except the experienced. It should be remembered that chemicals which are toxic enough to kill plants are also toxic enough to kill fish and other organisms. As stated above, the use of chemicals is not permitted by law in Michigan except as this may be carried out under the direction of the Conservation Department. Private ponds, lakes or streams are naturally open for treatment at the discretion of the owner. The treatment of streams crossing private property should never be attempted by the private owner, however, as the poison will be readily washed downstream to other private or state property. Such treatments have been known to kill all the vegetation as well as fish a mile or so below the section treated.

Sodium arsenite is a common weed poison and has been used with some success by a few workers in controlling the common pondweed, coontail and waterstar grass. A solution equal to one part per million of arsenous oxide, made by mixing one gallon of concentrate to 64,082 gallons of water, is recommended by one author.* It is usually applied by a pressure sprayer, taking care not to exceed the safe concentration for fish.

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* Eugene Surber, "Controlling vegetation in fish ponds with sodium arsenite," U. S. Bur. Fisheries Invest. Rept. 11, 39 pp.

Other workers have used this method with varying degrees of success and some added greater concentrations accompanied by thorough and immediate mixing of the water, claiming no harm to the fish.

Besides being toxic to fish, sodium arsenite is also a dangerous poison if taken internally by man, game or livestock and it is likely to make any emergent soil sterile for a long time.

There are many factors affecting a successful treatment. The presence of other substances in the water, such as minerals and organic matter, make those chemicals added either more or less effective depending upon the case in question. This explains why a certain prescribed concentration is effective in weed eradication with no damage to the fish life for one lake and very toxic to fish when applied to another. Even the expert doesn't know exactly what the results will be. Each time he applies his treatment to a new water the outcome is more or less uncertain. The whole thing is in an experimental stage and no good safe procedure has as yet been worked out for all the different kinds of waters and weeds. We do not recommend that chemicals be used until further studies have been made.

Almost everyone interested in the eradication of water weeds has witnessed the use of one mechanical device or another developed for this purpose. A weed saw operated from either bank has been used on small ponds, lakes and streams. This consists of a long, thin blade with a serrated edge which when pulled a short distance back and forth severs the plant stems and releases the upper portion which can then be dragged to and forked upon the shore. This device has been described as very effective by some users and as being of little use by others. Its effectiveness most probably depends upon the kind and density of plants to be removed.

Another more elaborate device, similar to a hay mower but adapted for attachment to or built on a boat or raft for underwater cutting, has been used rather extensively where the purchase of such equipment could be justified. Inquiries sent to a number of organizations using such equipment show also two different opinions. Some claim great success, while others credited their cutting operations with actually spreading the weeds.

Here again, the results probably depend upon the kind and density of the weeds as well as the frequency with which cuttings are made.

(Two pictures of underwater mowers)

Dredging as a means of eradicating plants is very effective when the water is deepened sufficiently to prevent future plant growth. This is about the only solution for lakes well filled with organic deposits. It is very expensive however, and would only be practical on waters with very high recreational value.

The use of hand tools such as scythes and rakes, while not very appealing to the average cottage owner, can be used effectively in controlling weeds around private docks and on limited beaches. It is necessary to be persistent in this effort however, since water weeds grow much the same as those on land, requiring several cuttings each growing season.

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