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Report No. 1306

AQUATIC PLANT CONTROL AT HESS LAKE, NEWAIDU COUNTY

By

Norman O. Levaridsen

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Abstract

Experiments on control of aquatic vegetation were carried on at Hess Lake, an extremely weedy body of water, for three successive summers, beginning in 1948.

The large-leaf pond weed (Potamogeton amplifolius) is one of the more common plants of the lake, and it also is one of the most difficult species to control. While plant growth is abundant over much of the entire area, a 10-acre section out from the mouth of Wheeler Drain is especially affected.

Experimental procedures are described. Results with 2,4-D pellets were not effective. Various balanced mixtures containing benzene compounds were effective on some plants, especially musk grass (Chara), but were found toxic to fish at rates of application required to kill vegetation. Sodium arsenite held promise for achieving control but there was hesitancy in encouraging extensive use of this chemical because a concentrated solution in inexperienced hands involves some danger to animal life and humans. Weed cutters were not considered practicable.

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The lake and the problem

Since property owners on Hess Lake had for some time been considerably concerned about marked abundance of aquatic vegetation here, it was decided in 1948 that this would be one of the waters used in experiments on means of control. Work was carried on at Hess Lake during the summers of 1948, 1949 and 1950. While control methods tested and results obtained are included in my doctoral thesis¹ supplementary comments on conditions and problems at Hess Lake are given in this report.

Because I was interested in the evaluation of different methods of weed control and experimentation with new chemicals, my work did not include complete mapping of the weed beds in the lake. However, Hess Lake, which has an area of about 1,125 acres, is the weediest I have seen. A few remarks will be given relative to the especially troublesome areas.

Probably the part of the lake most taken over by weeds is that area just outside the mouth of the Wheeler Drain. Here the water is fairly

¹"Studies on Chemical Methods of Aquatic Plant Control in Fresh-water
Lakes and Ponds."

shallow and Myriophyllum is very abundant. During the summer of 1950 there was an area of at least 10 acres through which rowing was difficult. Cottages situated near this inlet are in a bad way.

Another area of the lake on which I made detailed observations is the west end. Here, in the summer of 1949, plants of Ceratophyllum were loosened from the bottom apparently by natural causes and floated on the surface. This drifting mass of decaying plant material, with subsequent disagreeable odors, caused more than one cottager to pack up and go back to the city. Putrefaction of the mass was perhaps indirectly responsible for a small fish kill. It is highly unlikely that chemicals, which I used in weed control research, caused the fish kill. I do not believe a similar condition occurred in the summer of 1950.

Over much of the lake Potamogeton amplifolius is really bad. By late June or early July the flowers and fruits of these plants are conspicuously extended above the surface, and they persist to some extent throughout the summer. Attempts to run a motor through such areas are futile. If a trip were made around the lake by boat with an outboard, the motor would be fouled at least a dozen times. A trip around the lake by car does not afford a reliable picture of the weed situation.

Most of the weed control experimental applications were made in the western and northwestern parts of the lake. A boat was always available here, and the proximity to large stands of weeds made the area suitable for experimental work. Some applications of herbicides were made to the dense stand of water lilies in the cove just east of the mouth of the Wheeler Drain. Anchored mats of Polygonum were numerous in the more open water north of the inlet.

In the spring of 1948, a meeting held in Mr. Westerman's office was attended by several members of the Hess Lake Improvement Association. It was decided that some experimental work would be done at Hess Lake beginning the summer of 1948. Dr. B. H. Grigsby and I went up to Hess Lake on August 7, 1948, and sat in on a meeting with a dozen or more property owners. Later that summer several applications of herbicides were made. In the summers of 1949 and 1950 whenever I went to Hess Lake to make applications, the young son of the Association's president was always willing to give me a hand with my equipment and always had a boat available.

Experimental procedures

The boundaries of experimental areas were laid out with the aid of a nylon clothesline equipped with fish net floats. Corners were identified with poles. After treatment, the poles were generally removed and square blocks with an identifying number were anchored at the spot, suspended about 18 inches below the surface. These boundary markers were thus much less conspicuous than the poles which had previously been left as markers. Fishermen often tied their boats to the corner poles and occasionally displaced them.

Small plots, used for making pellet applications, were laid out in shallow water by means of a yardstick, and the corners identified with stakes, the tops of which were brightly colored. One set of plots was laid out thusly, and the stakes were not molested. Another set of plots where pellets were used was laid out in deeper water with submerged markers. These plots were in the vicinity of the public fishing site on the northeast shore, and were not molested.

The plots were not laid out on a permanent basis; therefore, locating

all of them now would be difficult. Chemicals used are listed in the thesis, except for sodium arsenite which is discussed later in this report.

The "Spartan Sprayer" was utilized in spraying submerged weeds with balanced mixtures and in making sodium arsenite applications. A "Champion" knapsack sprayer was utilized in making foliage applications of 2,4-D.

Results

In general, the work with 2,4-D pellets was discouraging. They did not prove effective even at rates of application which were considered high. Pellets containing 2,4-D-PCP were effective but had to be applied at too high a rate to be considered practical.

The balanced mixtures did not prove effective on Potamogeton amplifolius, at least with concentrations considered reasonable. Other species are more sensitive to the mixtures, especially Chara. Unfortunately, fish will not survive applications of the mixtures at the strengths required to control aquatic vegetation.

Applications of sodium arsenite have been made by me on several occasions at Hess Lake. The first was on August 3, 1949, with 5 gallons of 4-pound material purchased from the Wheaton Chemical Company. Plots were laid out, volume of water was calculated, and the material was put in at the rate of 10 ppm. Results from this preliminary trial were discouraging but, when certain precautions learned from experience were followed, results were better. Following are some guides on the use of sodium arsenite afforded by experience:

1. Late spring and early summer applications gave better results than did late summer applications.

2. Treatment of isolated small plots gave poorer results than treatment of large areas, even though the rate of application was the same.
3. Better coverage can be attained when the solution is diluted with water than when sprayed straight. It is essential not only to have a concentration sufficiently high to kill weeds, but uniform distribution is required to obtain uniform kill.
4. Less material can be used when ponds are sprayed than when lakes are treated.

On the basis of the experimental applications with sodium arsenite made as a part of this study, one factor appears to stand out as being especially important, and this is the success of the treatment largely depends upon the experience of the operator. Due attention must be paid to calculation of dosage, to the matter of timing, and to application. In experimental plots, especially in lakes, although the volume of water was calculated as closely as possible and the application made as carefully as possible, satisfactory control was not always obtained. In several experimental plots, apparently good control early in the summer gave way to regrowth by the end of the summer.

As a result of my experiences with sodium arsenite, I would agree that the material should not be used by just anyone, but should be handled by a skilled operator using equipment especially designed for the purpose. The sprayer for sodium arsenite should be of large volume and low pressure.

Recommendations to local Association

At a meeting on May 15, 1951, when Dr. Grigsby and I discussed the weed problem with the Hess Lake Improvement Association, the members did not seem very much interested in chemical weed control. We did not press the

issue since Dr. Grigsby is against sodium arsenite, and since the other chemicals which I had tried would not effect a satisfactory control of Potamogeton amplifolius, or else were highly toxic to fish. I think that the Association members could be convinced on treating scattered areas of a quarter acre or so to produce fishing "holes." Large scale treatments are out.

I believe the Association members recognize that the cost of cleaning up the whole lake would be prohibitive. Many of them have expressed the feeling that they could endure rowing through weeds to their favorite fishing spots if their children could go swimming, or at least wade, in the water in front of their cottages. It was suggested that they investigate the possibility of lowering the level of Hess Lake for a brief period to enable persons with cottages bordering the lake to clean up the exposed beach. There is a chance that such might be possible, and it should be worthy of some consideration.

What action will be taken on reducing erosion in the Wheeler Drain remains to be seen. The suggestion was made that they get to work to stop further erosion. Periodic cleaning out of the lower section of the drain appears necessary if nothing is done about correction.

The Association was seriously considering some mechanical means of controlling vegetation. Dr. Grigsby expressed the opinion that they would have more to show for their money if they put it into the proposed sand sucker or pump than if they put it into operation of the weed cutter or into chemicals. There is enough work to keep a sand sucker just about the year around.

INSTITUTE FOR FISHERIES RESEARCH

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