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THE USE OF COPPER SULPHATE IN CONTROLLING ALGAE IN SYLVAN
POND (WATERLOO PROJECT—NATIONAL PARK SERVICE),
WASHTENAW COUNTY

by

A. S. Hazzard

In 1938 the National Park Service constructed a small pond in Section 6, T. 2 S., R. 3 E., Sylvan Twp. The purpose was to beautify this part of the recreational area and to provide a limited amount of trout fishing. Shortly after the pond filled, a heavy blanket of filamentous green algae appeared which ruined the pond's appearance and prevented most fishing. The Institute was asked to advise how the algae might be controlled and to assist the Park Service in accomplishing it. Mr. O. H. Clark and the writer worked on this problem with the following results.

The pond, about $3/4$ acre in size, was formed by restoring an old dam built by an early settler. The structure was located about two hundred feet from the spring in which the stream originates. As the spring emerges in a natural basin the construction of a short earth fill impounded the water to a depth of about six feet in this hollow. To increase the average depth and to create two small islands the Service had a crew of workmen excavate a considerable amount of marl and peat which presumably were deposited in the early stages of impoundment. (Park Service workmen uncovered the skull of a beaver while excavating for the dam so that it seems likely the original dam at this point was made by these animals.) The digging exposed much of this presumably rich soil to leaching action by the water causing the rich growth of algae referred to above.

The first treatment with copper sulphate was made on June 14, 1939 by spraying the pond surface with a concentrated solution of the salt. Two and one half ($2\frac{1}{2}$) pounds of crystalline copper sulphate were partly dissolved in a forest fire back spray can and the solution distributed in a coarse spray concentrating it over the densest algae. Water was added to the can at intervals until all of the copper sulphate had disappeared.

The amount used was calculated to produce a concentration of approximately 0.5 parts per million when mixed with the pond water. This was based on a volume of 4,952,880 pounds of water as calculated by Mr. Philip Olin, engineer of the Waterloo Project. The flow over the spillway at the time of treatment was estimated at 10 gallons per minute. It was calculated that it would require about 43 days for a complete change of water in the pond.

An analysis of the water made July 8, 1939 showed a temperature of 74° F. at the surface over the main spring; 73° F. at the spillway; 64° F. at a depth of 3 feet over the main spring; and 50° F. at a depth of 5 feet over the main spring. In the approximate center of the pond the temperature was 60° F. at a depth of 5 feet. At the time of first treatment, June 16, the surface was 66° F. with an air temperature of 72° F. at 4 p.m. Bottom temperatures on this date were probably not very much different than when taken July 8.

Water analysis on July 8 at a depth of 5½ feet over the main spring showed 9.3 p.p.m. of oxygen; 11 p.p.m. of CO₂; a methyl orange alkalinity of 195 p.p.m. and a pH of 7.4. The water in Sylvan Pond is therefore well oxygenated, very hard and quite alkaline.

Fish present at the time of treatment were sticklebacks, mud minnows and about seventy brook trout from seven to eleven inches in length, planted there from the Wolf Lake Hatchery about one month previously.

Results of Treatment

It was noted that the algae turned brown where the solution hit it within about thirty minutes.

On June 16 and again on June 20 Mr. Clark examined the pond and reported the algae was loosening and floating down over the spillway. Algae had disappeared completely in the deeper water and the pond was generally quite clear of the plants. No loss of fish was noted.

On June 27 the pond was found to be almost completely covered again with algae. On June 28, Mr. Clark treated the pond for the second time by towing from a boat a burlap sack containing 2½ pounds of copper sulphate until all of the crystals had dissolved.

By July 2 the algae had again completely disappeared except along the immediate shore line and much of this algae was brown.

A visit by Mr. Clark on July 6 showed the water to be fairly free of algae but he believed it was starting to come back.

On July 25 algae was becoming abundant again but there were still some areas of open water. The shallow water was pretty well choked. Mr. Clark left another dose of 2½ pounds of copper sulphate with Mr. Olin who promised to treat the pond but for some reason did not do so.

No trouble from algae was reported in the season of 1940 or during the past two summers.

Summary and Conclusions

1. Sylvan Pond showed a dense growth of filamentous green algae the first year it was filled. The algae was so dense that it was impossible to fish the pond. This condition has not re-occurred in subsequent years and it is believed that it was due to the leaching of highly nutrient materials from the freshly flooded, fertile soil.

2. Treatment with 0.5 p.p.m. of copper sulphate destroyed the algae almost completely but within two weeks time it had re-appeared. Following a second treatment the algae did not become abundant again until about four weeks had elapsed.

3. A concentration of .5 p.p.m. of copper sulphate temporarily controlled filamentous green algae in the hard, cool waters of Sylvan Pond without any mortality of adult brook trout, sticklebacks or mud minnows.

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