Land and Water

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Invasive Eurasian Watermilfoil Can Be Controlled Naturally

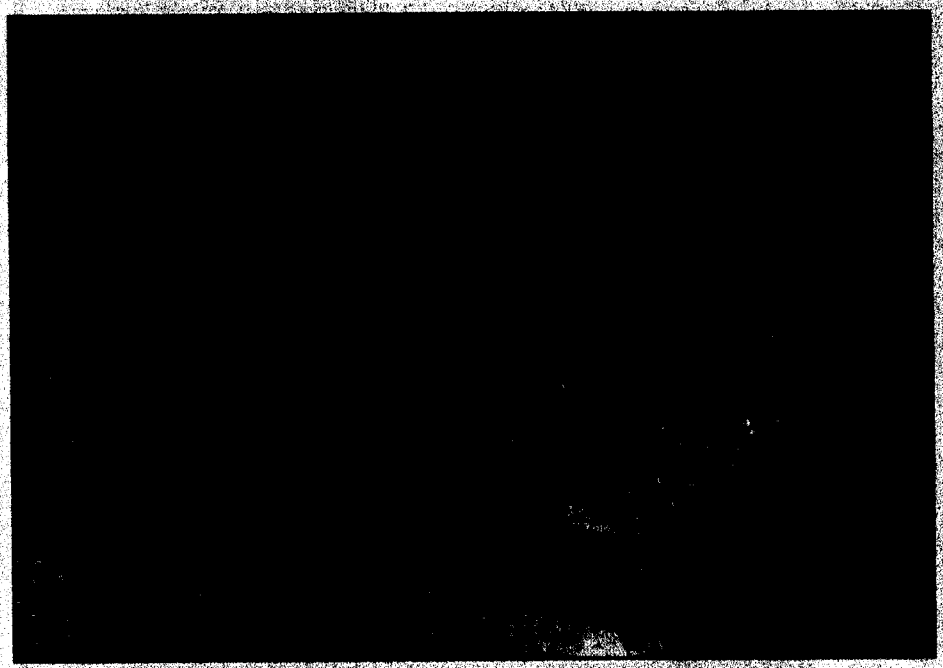
Introduction

BOATING across much of Van Etten Lake, a 1,400 acre reservoir located in Oscoda, Michigan, was often a difficult task before the deliberate introduction of the aquatic milfoil weevil Euhrychiopsis lecontei. Dense mats of the exotic and invasive aquatic weed Eurasian watermilfoil (EWM) made this once pleasurable experience nearly impossible. The health of the lake was diminishing as the exotic invader began to take control. Native plant species were unable to compete for light and nutrients and were beginning to disappear. The Van Etten Lake Association and Oscoda Township decided that something needed to be done.

The Culprit

Eurasian watermilfoil is thought to have been accidentally introduced by the aquarium trade to U.S. waterways in the 1930's. The Washington D.C. area had the first documented case. EWM has now spread to more than 45 states; as far west as Washington state and north into at least half of the Canadian provinces. The plant is most often spread when boaters carelessly leave EWM stems on trailers and boats. It has also been deliberately spread by fishermen who want to make beds for fish reproduction. Once established, this rapidly spreading weed out-competes most native plants and interferes with recreational activities, wildlife habitat, and facilities with water uptake systems. The U.S. Army Corps of Engineers considers EWM to be the most pervasive aquatic nuisance plant in the United States.

Eurasian watermilfoil resembles an elongated bottle brush with long stems and feather-like leaves arranged in whorls. Its flowering spike protrudes from the water in late summer and when the flowers are pollinate, they set seed. More commonly, this plant propagates by auto fragmentation (self-breaking). Even pieces which appear dried out or are quite small can begin new colonies. It is capable of growing in water from two to more than twenty feet in depth, and tolerates a wide range of pH and turbidity.



Eurasian watermilfoil fragment.

Conventional Control

Current methods of EWM control such as mechanical control and herbicides often prove to be inadequate and temporary solutions. The use of mechanical harvesters actually helps to spread this invasive plant due to its ability to reproduce from small fragments. During harvesting, milfoil fragments often escape the harvester and float to other parts of the lake where they can root and grow. The newly established plants eventually produce seeds and further colonize via fragmentation. This process repeats until the entire lake is infested. Hand pulling or raking can be physically demanding and is therefore suitable for only small areas. Hand control methods may also lead to fragments being spread to uninfested parts of the lake.

This process uses a native beetle about the size of a sesame seed to control this exotic nuisance plant.

Chemical treatments, although usually relatively rapid, at best produce a year or two of relief, and can be potentially harmful to lake users and the environment. Herbicide misuse can have devastating effects on a water body.

Chemicals, harvesting, and hand pulling and raking rarely provide long term control.

These treatments are often necessary several times during the summer season for adequate control. Grass carp, another common EWM treatment, are not EWM-specific. In fact, milfoil is one of this herbivore's least favorite foods, meaning that they tend to consume everything else first, and may eliminate all desirable native plants from the water column, prior to attacking the milfoil. For this reason, Grass carp are banned in some states.

Milfoil mat.

spent the past five years working with Sheldon and MIddlebury College to bring the weevils out of the laboratory environment and making them commercially available to resource managers and lake associations.

Sixty-eight thousand weevils were stocked in eight Eurasian watermilfoil beds. Two monitoring sites were established to monitor the movement of weevil populations throughout the lake. At the start of the project, qualitative observations were made regarding lake condition, and quantitative data was collected on plant community composition, plant health, and weevil density. The EWM was very healthy and found flowering in the monitoring sites during the initial survey in June, 2000. The monitoring (control) sites also consisted of healthy EWM, and were flowering.

The results of the first follow-up survey in August of 2000 were very encouraging, revealing that weevils were found in abundance at all of the stocking sites, except for one where the milfoil was found to have totally disappeared. The remaining seven stocking sites were found to contain very unhealthy EWM that had mostly fallen to the lake bottom. All plants were brown and hardened, with very few leaves or meristems, and no flowers were present on any of the stems. These were all clear indications that the EWM was responding as expected to the severe damage being inflicted by the weevils at the time of the August survey. Weevil densities increased in most of the stocking sites and significant damage caused by both weevil larvae and adults was observed in all of the sites.

By the time of the second follow-up survey in June of 2001, EWM in most of the previous year's stocking and control sites had virtually disappeared. The stocking and monitoring sites which still had some EWM had very high numbers of weevil adults and larvae. These results indicated that the weevils had overwintered successfully and had returned to the lake in large, healthy numbers.

Euhrychiopsis lecontei - the milfoil weevil.

An additional 62,000 weevils were stocked in June of 2001. The follow-up survey conducted in August of 2001 indicated that the weevils had severely damaged EWM throughout the lake. Twelve of the fourteen stocking sites from 2000 and 2001 had virtually disappeared. The remaining

stocking sites had patches of EWM (heavily damaged by weevils), but most of the observed EWM was in poor condition, had fallen out of the water column, and was covered in algae. The 2001 monitoring sites were the only remaining sites where EWM was still abundant. Even here, most of the EWM was algae covered and heavily damaged by weevils.

One very promising sign of recovery noted at the time of the August 2001 follow-up survey was an overall increase in number of species and abundance of the native aquatic plants. This is a positive indicator that desirable native aquatic plants are rapidly filling the areas where the EWM once dominated.

Due to the rapid and dramatic success of the weevils in reducing EWM throughout the lake after only two seasons, a decision was made to discontinue stocking in the third year of the program. Not enough milfoil remained to justify further stocking.

Final Conclusions

The introduction of weevils into Van Etten Lake in 2000 and 2001 resulted in severe damage to EWM beds throughout the lake, providing lake-wide control after only two years. During the first year of the project, weevils successfully overwintered, returned to the lake in large numbers, and established a thriving population throughout the lake. Stocking of the milfoil weevils has produced a devastating impact on an invasive Eurasian watermilfoil population over a relatively short time period, so much so that a projected third year of stocking was eliminated. The weevil population in Van Etten Lake is thriving and stabilizing, indicating that the introduction has been a complete success. Native plants are becoming more abundant and it is expected that over the course of the next few years, vegetation in the lake will return to conditions similar to that which existed prior to the milfoil invasion.

Eurasian watermilfoil is considered one of the most invasive exotic aquatic plant species in North America. Old methods of treatment- harvesting, herbicides and hand methods- are merely a cosmetic, short-term fix. Biological controls may offer cost-effective, long-term, environmentally sound methods to treat nuisance aquatic vegetation problems. Although a relatively new treatment option, use of milfoil weevils has proved to be extremely effective in the fight against EWM. Success similar to that seen in Van Etten Lake has occurred in over ninety percent of the lakes where the milfoil weevils have been introduced using the MiddFoil® process applied by EnviroScience.

This process has been applied to lakes ranging from 20 to 20,000 acres across the East and Midwest with similar degrees of success. Permit approvals for weevil introduction are pending in several states and Canadian provinces including Colorado, Washington, and Quebec. In cooperation with resource managers and private lake associations, the milfoil weevil can reverse the damaging effects of Eurasian watermilfoil in North American lakes and rivers.

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