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Vegetation Matters

By Mike Pehanich
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While sustaining native species of aquatic habitat, scientists are also attempting to find ways to control exotic species like Eurasian water milfoil. Photo courtesy of John Madsen, Mississippi State University

To kill or not to kill? That is the question fisheries managers ask every year about the surface mats of Eurasian water milfoil that choke fisheries, impede navigation and, ultimately, stunt fish growth rates on prime bass waters across the nation.

Indeed, it had been the question for a number of years at Spring Lake, a fishery located in Tazewell County south of Pekin, Ill.

Fed by cold spring waters, the fishery hosts a strong bass population. North Spring Lake also has provided brood stock for a successful muskellunge stocking program, despite having an average depth of only 2.9 feet.

Prior to 1916, Spring Lake was a natural backwater marsh created by the Illinois River. But that year, levees impounded the lake and stabilized water levels as part of a 12,000-acre drainage district project. In 1978, the lake was divided into north and south sections.

The lake seemed to win a battle with rough fish after rotenone treatment in 1981. Seventeen species of aquatic vegetation rebounded at the 1,200-acre lake, and gamefish populations rebounded, too.

Once Eurasian water milfoil (Myriophyllum spicatum) entered the mix, however, things began to change. The milfoil spread quickly and choked out many native plants. This plant coverage, in turn, severely restricted access to fishermen, resulting in a short window of weedless fishing opportunities between mid-March and mid-May.

National nuisance

A combination of federal dollars and state matching funds derived from the Aquatic Nuisance Species fund brought the $10,000 needed to take on the milfoil in 2004. The Illinois Department of Natural Resources saw an opportunity to test the effectiveness of two different chemicals on the northern and southern portions of the lake.

"Spring Lake was the guinea pig," admitted Wayne Herndon, a district biologist with the Illinois Department of Natural Resources (DNR). "We studied the literature. We worked with biologists in Minnesota and Wisconsin to determine the best methods of treatment. Everyone is interested in getting an answer to this problem."

Spring Lake became the ideal laboratory for the fisheries biologist. With distinctly defined north and south sections, the DNR could compare results of side-by-side treatment within relatively equivalent aquatic environments.

Herndon and colleagues rejected biological and mechanical options (see related story on facing page) and opted for chemical treatments. They used 2, 4-D L.V. 6 Ester (commonly called 2-4D) in the south lake and Fluridone (also referred to as Sonar) in North Spring.

"We wanted to see which chemical delivered the best control and economics," explained Herndon.

Hardiness and resistance to cold gives Eurasian milfoil an advantage over other aquatic plants. Stolons, roots and lower stems will grow even under the ice. Only a total freeze out of a lake or a drawdown under freezing conditions will kill it.

Although it starts small, Eurasian milfoil grows and spreads quickly. Photo by Robert L. Johnson, Cornell University

Moreover, milfoil's ability to store carbohydrates gives the plant a head start over other vegetation in spring. It photosynthesizes and grows rapidly, spreading a thick canopy that prevents sunlight from reaching other plants.

Chemical treatment is most effective shortly after ice-out when new shoots are beginning to grow.

Defining the plant

For the sake of clarity, some species of milfoil are native to the U.S. and live harmoniously with other native aquatic plants. On the other hand, Eurasian water milfoil is a hardy exotic endemic to Europe, Asia and north Africa.

Bass and other sportfish thrive amid healthy vegetative growth. But too much milfoil can open up Pandora's Box.

"First, it interferes with human use: swimming, boating and most forms of fishing," explained John Madsen, assistant professor of research and extension at Mississippi State University and an acknowledged milfoil authority.

"Ecologically, it reduces the transfer of oxygen, which reduces the natural re-aeration of the water. Oxygen levels under the milfoil canopies are very low. It also interferes with light penetration and shades out the native plants, reducing the diversity of plant and animal life."

Anglers often spread milfoil inadvertently via boats, motors, trailers, bait buckets and livewells. It also spreads by natural downstream transmission.

But the biggest problem with Eurasian milfoil is that it doesn't know when to stop. Once it takes root, it spreads like wildfire, driving anglers and waterfront owners nuts.

Bass grow to hate it, too. Or don't grow at all. And therein lies the problem.

"Milfoil alters the predator-prey balance that can be maintained more readily with native plants," said Madsen.

"Bass need edges to be really effective predators," added Herndon. "The prior year [at Spring Lake], we could see the thick milfoil was hurting the bass. They were thin, not the rotund fish they should have

been. The heads were too big for the bodies."

Thin and long, the muskies had been working too hard for their supper as well.

"The vegetation was tying up too much forage," explained Herndon. "Now the individual condition of the fish is much better. They are thick bodied. Reproduction is better too."

Sweet success

Both Fluridone and 2-4D treatments proved effective at Spring Lake in 2004, but the 2-4D was significantly less expensive.

Herndon noted another advantage to 2-4D: "Native plants began to rebound faster with the 2-4D," he said. "Within 90 days — by July — native coontail had made a comeback."

The successful milfoil control effort bodes well for other Illinois lakes strangled with milfoil, particularly other Illinois River backwaters experiencing a renaissance of late. (See the February 2005 issue of BASS Times.)

Already this year, Herndon, DNR microbiologist Steve Shults, and Gary Sullivan, a biologist for The Wetlands Initiative, replicated the Spring Lake 2-4D treatment on another pair of backwater fisheries — Hennepin and Hopper lakes. Both had experienced a similarly rapid Eurasian milfoil invasion over the last two years.

As for Spring Lake, a local bass tournament held there earlier this year found 68 anglers entering 425 pounds of legal bass, including 16 limits and a "big fish" winner of 6.75 pounds.

"And the muskie have benefited too," concluded Herndon.

"Like the bass, they are in super condition & thick-bodied and beautiful."

Weed control options

John Madsen, assistant professor of research and extension at Mississippi State University, calls Eurasian water milfoil "possibly the most widespread non-native aquatic plant in North America."

Eurasian water milfoil is a pesky plant that — once out of hand — is difficult to exterminate. Photo by Alison Fox, University of Florida

An acknowledged expert in the field, he evaluates the most common methods of Eurasian milfoil control as follows:

Systemic herbicides

These chemicals are spread over large expanses of water at low concentrations, killing the stems and shoots of undesirable plants like Eurasian water milfoil.

The most common chemical in this category is 2-4D, which has a long track record and offers several distinct advantages over other systemic herbicides: 1.) At $20 to $30 per gallon and effective at low concentrations, it's both reliable and economical; 2.) It works selectively on broadleaf vegetation like

milfoil and will control native and Eurasian milfoil, and at higher concentrations, it can also affect coontail; and 3.) Used at recommended concentrations, it is safe for fish, invertebrates and other plants. Safety warnings suggest, however, a minimum 21-day waiting period before using water treated with 2-4D for swimming, drinking, fish consumption or irrigation. Native plant regeneration may commence within 90 days of treatment.

Fluridone usage entails none of the restrictions of 2-4D and can be just as effective. However, it is far more expensive at $600 per quart versus the $20- to $30-per-gallon cost of 2-4D. Furthermore, it is more difficult to fine-tune effective dosages. Fluridone must maintain contact with the plant for 60 to 90 days to be effective and, in some cases, may require repeated application. A rapid water exchange rate or extensive deep water acreage may compromise its effectiveness.

Triclopyr acts similarly to 2-4D and has fewer usage restrictions; however, it is also more expensive.

Contact herbicides

Contact herbicides are used to treat small areas of milfoil growth. Two of the most popular chemicals are Endothall and Diquat. Both may work effectively even at small dosage levels, but several applications per growing season may be required.

Mechanical

This simple and direct method is of dubious value as a milfoil control measure. Though the effects of mechanical cutting equipment are immediate, milfoil grows back quickly and will likely spread more rapidly with the migration of severed stems.

Drawdowns

Eurasian milfoil remains remarkably hardy in cold water, but portions of the plant will die after being entrapped in winter ice for extended periods. Fisheries managers may draw down water levels, in combination with using chemical treatment, to freeze exposed and shallow milfoil.

Biological

Chinese grass carp are plant eaters. They were introduced to North America to control excessive aquatic weed growth. One big problem associated with this control measure, according to Madsen: Grass carp don't like to eat Eurasian water milfoil. They are much more effective with hydrilla infestations.

Three types of non-native insects — species of aquatic caterpillar, midge and weevil — can help control milfoil growth and are gaining favorable attention in some parts of the country. But they are effective only under very narrow sets of circumstances. However, high concentrations of weevils may reduce milfoil density in lakes with low sunfish populations.

The naturalized fungus known as MT (Mycoleptodiscus terrestris) has shown some ability to reduce milfoil density, but further study seems necessary.