An underwater photograph of a lake showing a dense thicket of Eurasian water-milfoil plants. The plants have thin, yellowish-brown stems and feathery green leaves. The water is clear and blue, with light filtering through from the surface, creating a dappled effect on the plants.

A tangled

DNR scientists

begin to unravel the

secrets of Eurasian

water-milfoil and

its effect on

Wisconsin lakes.



A key to containing Eurasian water-milfoil is slowing its spread by people from boats and trailers. Continuing research shows that Eurasian water-milfoil does not become invasive in every type of lake.

DNR FILE PHOTO

question

Julia Solomon

At first glance Eurasian water-milfoil looks like a typical aquatic plant. Its long, slender branches are covered with tiny green leaflets. It anchors to lake bottoms and grows toward the surface, sometimes reaching heights of 10 feet. A casual observer would not pick out this innocent-looking plant as a contender for Public Enemy Number One.

Lake users in Wisconsin could tell you otherwise. Eurasian water-milfoil is not native to Wisconsin's waters, and in the four decades since it arrived in the state it has spread to more than 400 of Wisconsin's 15,000 lakes. Eurasian water-milfoil is a tough, aggressive plant that can alter lake ecosystems and crowd out native plants. In certain situations it can become so thick that recreational activities like boating, fishing and swimming become difficult. Agencies and citizens across the state are working hard to slow the spread of this invader and minimize the problems it causes.

ENGBRETSON UNDERWATER PHOTOGRAPHY, ERIC ENGBRETSON

In recent years Eurasian water-milfoil has achieved a certain amount of notoriety. The worst-case-scenarios — green, choked, unusable lakes — have captured headlines and imaginations. But does Eurasian water-milfoil take over every lake that it invades? Or does it behave differently in different locations, or in different types of lakes? Is it possible to predict where it will become a nuisance? And what can citizens do to keep lakes healthy — with or without invasive plants? These are the questions that motivate Department of Natural Resources researcher Dr. Jennifer Hauxwell and her team of scientists. In the summers of 2005 and 2006 they set out to get to know the enemy.

The research

Researchers Alison Mikulyuk and Kelly Wagner laugh when asked to describe how they spend their summers. “We practically live out of our boat,” says Wagner. “We spend so much time on the water that sometimes in the evening — after hours on dry land — you can still feel the rocking of the boat.” Over the past two summers, Mikulyuk and Wagner have spent over 500 hours taking plant samples in 100 lakes with known populations of Eurasian water-milfoil. Armed with lake maps, a standardized sampling protocol, a GPS unit, a couple of big rakes, and a 14-foot jon boat, they set out across the state to document the places where this nasty invader is and isn’t. In each lake they sampled an average of 200 separate points — more in big lakes, fewer in small ones.

Floating around on lakes all summer sounds like a pretty nice job, until you realize that sampling means scraping the lake bottom with the rakes and hauling dripping loads of aquatic plants out of the water. Each rakeful is sorted out and every plant is identified. “Pulling in over 19,500 rakefuls of plants is tiring work,” says Mikulyuk. “I certainly love working outdoors, but by the end of the summer, you really can’t stand to look at another bottle of sunscreen or dig through another rakeful of plants.”

Their goal was to collect enough

data to be able to map where and how much Eurasian water-milfoil occurs in each lake. With this information, they can compare conditions in different lakes.

Dr. Susan Knight, a project partner and aquatic plant specialist with the DNR and the University of Wisconsin, explains some of the reasons why it is important to collect this type of information. “Good data are the foundation of strategic lake management,” she says. “The information we are collecting now provides a baseline for the future. Knowing where Eurasian water-milfoil is in a lake and how much there is helps people choose the most appropriate management options.”

The results

After their summers on the water, Mikulyuk and Wagner traded their rakes for computers and dug into the task of analyzing the data. What they found was surprising.

“A lot of people assume that Eurasian water-milfoil becomes very abundant in every lake and always dominates the aquatic plant community,” says Mikulyuk. “But that’s not what we found at all.”

In fact, in most of the lakes they sampled, Eurasian water-milfoil showed up on their rakes in less than 10 percent of sites shallow enough to support plant growth. For deep lakes, this meant Eurasian water-milfoil was found in even fewer than 10 percent of the sites they sampled, because deep lakes have many areas where plants are unable to grow. While these measurements don’t translate to an exact acreage of Eurasian water-milfoil in a lake, they provide a good estimate of its distribution and abundance for each waterbody. And they tell researchers that the story is a lot more complicated than they first



Researcher Kelly Wagner was part of a research team that collected and analyzed aquatic plant samples from more than 100 lakes during the last two summers. On each lake, the team collected an average of 200 samples to determine the frequency, density and spread of Eurasian water-milfoil in lakes where it occurs.

might have thought.

“It turns out that lakes with sparse or patchy Eurasian water-milfoil are actually a lot more common than lakes where it takes over the vegetation,” says Hauxwell. “In most of the lakes we sampled, the amount of Eurasian water-milfoil we found was well below the level where most people would consider it a nuisance.”

Which is not to say that they didn’t find any Eurasian water-milfoil nightmares: In a few lakes, they pulled up Eurasian water-milfoil nearly every time they stuck a rake in the water. But this scenario was a lot less common than expected, and a lot less common than people are led to believe.

The big question, of course, is why. What makes one lake develop a carpet of Eurasian water-milfoil while in another it is present but hardly noticeable? The complete answer has yet to be found, but here are some things researchers now know:

- Southern lakes have higher levels of



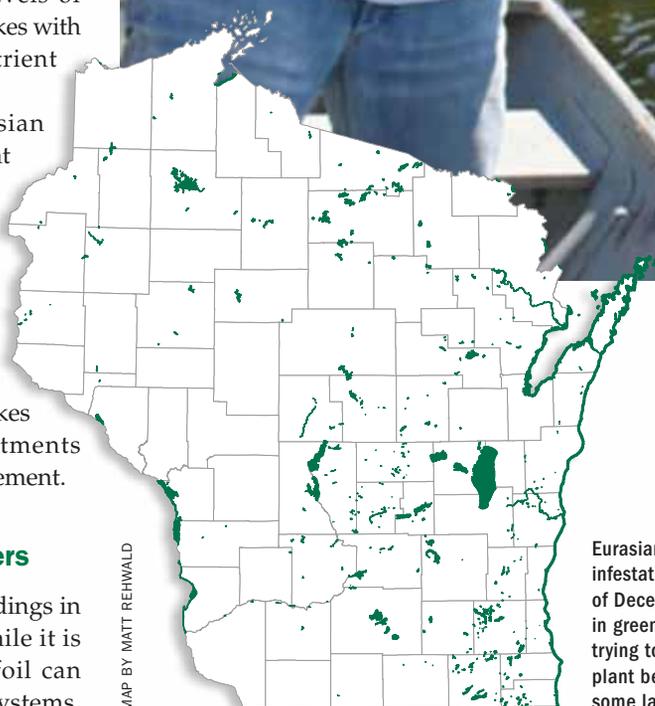
PHOTO COURTESY OF JENNIFER HAUXWELL



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Eurasian water-milfoil than northern lakes.

- Lakes with moderate-to-high amounts of nutrients have higher levels of Eurasian water-milfoil than lakes with very low or very high nutrient loads.
- The length of time Eurasian water-milfoil has been present in a lake may explain some of the variation in abundance, but it doesn't explain all of it.
- Some lakes that have had Eurasian water-milfoil for decades still have very low levels. This is true both for lakes with annual chemical treatments and for lakes with no management.



MAP BY MATT REHWALD

What it means for lake-lovers

Dr. Hauxwell sums up their findings in two words: "Don't panic." While it is true that Eurasian water-milfoil can cause major havoc in lake ecosystems,

People assume that Eurasian water-milfoil becomes abundant and dominates the aquatic plant community in every lake where it is found. But that is not what we found at all, notes researcher Alison Mikulyuk.

Eurasian water-milfoil infestations documented as of December 2006 are shown in green. Researchers are trying to unravel why the plant becomes invasive in some lakes but not in others.



FRANK J. KOSHERE

In some lakes, Eurasian water-milfoil just interspersed in small clusters among a host of other lake plants.



FRANK J. KOSHERE

In other places, Eurasian water-milfoil takes over and fills the lake bottom in dense mats of vegetation that are difficult for boats and fish to penetrate. Researchers want to understand why.

don't assume that finding a few Eurasian water-milfoil plants automatically means a lake is destined to be overrun.

"Prevention is always the best option," says Hauxwell. "It's vital for lake users to do everything they can to keep Eurasian water-milfoil out of a lake."

This means taking steps like cleaning plants and mud off of boats every time you leave the water and draining water from your bilge, motor and live well before you leave the landing. Eurasian water-milfoil can spread from small stem fragments, so thorough cleaning is critical. Promoting healthy lake ecosystems by reducing nutrient runoff to lakes and preserving native plant communities in lakes is also important.

But if Eurasian water-milfoil does make its way into a lake you care about,

don't give up hope. Your lake may very well be one of those where Eurasian water-milfoil coexists with the native plant community without becoming a nuisance. And while no one in the world has ever truly eradicated a milfoil population from a lake, there are steps you can take to help keep Eurasian water-milfoil in check and promote a healthy native plant community.

Dr. Hauxwell emphasizes that early detection of new populations of Eurasian water-milfoil is important for effective control. She also says some treatments, such as early-season chemical application and hand-pulling by divers, show promise for keeping populations low, though more research is needed to be sure.

One of the best ways to protect a

lake is to develop a long-term management plan. If you're thinking about developing a plan for your lake, getting access to good baseline data — like that collected by Hauxwell's team — is a great place to start. Knowing how much Eurasian water-milfoil is in a lake, when it got there, and what other types of plants are present helps scientists develop a strategic plan for control.

"It is important to tailor the lake plan based on how much Eurasian water-milfoil is in a lake and where the populations are located," says Hauxwell. "It is also important to set reasonable expectations about what various management options can accomplish. For newer populations of milfoil, the goal may be to reduce the abundance of Eurasian water-milfoil over time, not just to offer single-year relief. For more established populations, the goal may be to run an efficient nuisance relief program through harvesting. It really all depends on the data."

Strategic lake management with the help of data is something that Dr. Hauxwell discusses a lot. She hopes her research will help the Department of Natural Resources, lake associations and others make better management decisions as they work to keep lakes healthy. Eventually, they hope to be able to predict in which lakes Eurasian water-milfoil will and won't become problematic. They also hope to learn more about the management strategies that are most effective at keeping it under control.

Untangling the mysteries of Eurasian water-milfoil is a long-term project, and there are still a lot of unanswered questions. Dr. Hauxwell and her team are still combing through their data from last summer in hopes of teasing out new secrets, and they're gearing up to head out again this year.

If you're out on a lake this summer and happen to spot a crew of people pulling up rakefuls of plants, head on over to say hello. The research they are doing now may provide the answers to keep your lake healthy in the future. ❧

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