

February 2001

## **The wet world where we work**

**Mike Staggs**

Fifteen thousand lakes and 44,000 miles of streams provide fishing in Wisconsin. © DNR Photo

**A**re you one of the nearly 2 million people who enjoy fishing in Wisconsin? Do you live along or play on one of our 15,000 lakes or 44,000 miles of streams? Do you own or live near any of our nearly 5.3 million acres of wetlands? Have you enjoyed the scenic vistas and vast recreational opportunities available along our 860 miles of Great Lakes' shoreline? Do you, or your business, benefit from Wisconsin's popular fishing or water-related tourism industry?

If you answered yes to any of these questions, then in some way the Department of Natural Resources Fisheries Management and Habitat Protection program affects your life.

The Wisconsin DNR is the only agency in the country with a comprehensive waters program that unifies regulatory, environmental quality and resource management functions to provide for a fishery that supports 161 fish species.

Our Fisheries Management and Habitat Protection program is responsible for all "in-the-water" regulatory, monitoring and management activities affecting Wisconsin's Great Lakes, inland lakes, streams, rivers and wetlands; and the aquatic plants, amphibians and reptiles, non-game fish, panfish and larger game fish that live in these systems. We work to protect, restore and enhance these resources through lakes and wetlands management, surface water monitoring, fish contaminant monitoring and water regulations relating to navigable waters and wetlands.

### **Table of Contents**

[The wet world where we work](#)

[Fishing for fun and the future](#)

[The water's edge is a busy place](#)

[A steady stream of support](#)

[Beefing up the catch](#)

[Visit a hatchery](#)

[Finding value in wet places](#)

[Assessing aquatic health through monitoring](#)



**DNR fish toxicologist and disease specialist Sue Marcquenski at work.**  
© Robert Queen

We employ about 270 staff across the state including fisheries biologists and technicians, fish hatchery supervisors and technicians, disease specialists, aquatic habitat experts, water management specialists and water resources specialists.

We have an annual budget of about \$23 million. About 73 percent comes from fishing license sales and federal Sport Fish Restoration funds. The rest comes from state General Purpose Revenues, permit fees or federal water quality grants.

Managing the state's fisheries isn't the only thing we do, but it is one of the most important – and understanding how we do that will give you a good idea of how our program operates.

We have over 1.4 million licensed sport anglers. Fishing also is big business. In 1996, sport anglers spent over 17 million days fishing in Wisconsin – almost 4 million by non-residents. That level of angling accounted for \$1.1 billion dollars in direct expenditures, \$2.1 billion in economic activity, 30,410 jobs, and \$75 million in state income and sales taxes.

Commercial fisheries exist - primarily in the Great Lakes, but also in the Mississippi River and several other larger inland waters. The largest remaining industry is on Lake Michigan where about 100 commercial licenses annually sell around \$10 million worth of fish. Native American treaty fisheries annually harvest about 25-30,000 walleyes and 200-300 muskellunge by spring spearfishing. And there are commercial bait fisheries and other "non-fish" fisheries such as freshwater mussels, frogs and turtles – for which little is known about the number of users or amount of harvest.

The single most important element in a quality fishery – and a healthy ecosystem - is habitat.

Effective habitat protection and restoration is the most cost-effective fisheries management that we can do. After years of experimenting with management strategies, we have yet to find one that improves on a self-sustaining natural system existing in good habitat. Fisheries flourish at no cost to anglers; surface waters are drinkable, swimmable, and boatable; we get free groundwater recharge and storm water retention; natural scenic beauty is enhanced; and aquatic biodiversity is protected.

Effective habitat management requires an integrated approach including regulation, education and restoration. We involve our constituents in our management activities - no regulatory program is ultimately successful without significant acceptance among those being regulated and that acceptance is best gained through educational programs and making open participatory decisions.

Yet society continues to voluntarily and involuntarily trade off aquatic habitat and self-sustaining ecosystems for things deemed of higher value – lakeshore and watershed development, industrial and nonpoint discharges, surface and diversions, river damming, exotic species introductions and overharvest.

In this imperfect reality we need regulatory, stocking, and restoration programs. We believe we have some of the finest such programs in the nation – but we hope that you will not lose sight of the fact that these activities are Band-Aids to cover basic habitat problems.

We also have tools for what is usually termed enhancement. We use put-and-take stocking (stocking fish when they are young and allowing them to grow to a catchable size), aeration system installation in naturally winterkilling ponds (those that freeze through in the winter), construction of "new" wetlands as mitigation for lost natural wetlands, reservoir construction, and nonnative species introduction such as rainbow trout. But these are costly activities reserved for special situations where there are pressing local needs, extended funding sources, or as a last resort in situations to address political realities.

Finally, we have access, educational and urban fishing programs, which promote involvement and an understanding of aquatic systems. These programs are important because the aquatic resources need a constituency. Users who enjoy these resources will be willing to fight for them when they are threatened.

A few years ago we began efforts to work more closely with our user groups - one of the things we did was ask some focus groups what they knew about fisheries management. The answers shocked us – generally, people said they didn't know anything about what we did, and those that did know something about our program assumed all we did was stock fish. Read on and you'll learn about some of the important fisheries management tools that we use -- habitat protection, restoration and enhancement, harvest regulation, fish stocking, and education – and how they are all tools necessary to make sure Wisconsin continues to have quality fishery.

**Mike Staggs** is bureau director of the DNR's Fisheries Management and Habitat Protection Program.



Exploring aquatic insects on a visit to a school stream. © Robert Queen photo

February 2001

## Fishing for fun and the future

Aquatic educators reach young people in fun and educational ways

Natasha Kassulke

Wisconsin's fisheries biologists got a wake-up call about 12 years when the state fishing license sales had reached a plateau despite the fact the population was growing. Given Wisconsin's array of fishing opportunities, we sensed that if we started losing anglers, we also might lose a group of people who care about protecting streams, lakes, rivers and the Great Lakes, as well as a source of funding to manage and protect those resources.

"The angler education program was started to reaffirm and revitalize fishing as worthwhile leisure for family and friends," notes Theresa Stabo, the state's aquatic resources education director. "Fishing can be a solitary pursuit but also can be very social. People who are connected to the resource usually have a stronger commitment to protecting it. Fishing is one way to make that connection."

Also, fishing is a lifetime sport.

*While DNR programs aim to introduce all ages to the joys of fishing and the wonders in lakes and streams, a priority is encouraging young people to become lifelong anglers and resource stewards.*

One challenge fishing faces, though, is intense competition for children's time.

"Fishing competes with Nintendo, piano lessons, soccer and lots of other interests," Stabo notes.

So we need to make sure that the Angler Education Program is fun as well as educational. The goal is to introduce kids not only to fishing, but to get them outside again.

Adults who take youth fishing learn that angling provides time to talk about school, social issues and family matters as well as the environment. Fishing reconnects people not only with aquatic resources, but with each other.

### Table of Contents

[The wet world where we work](#)

[Fishing for fun and the future](#)

[The water's edge is a busy place](#)

[A steady stream of support](#)

[Beefing up the catch](#)

[Visit a hatchery](#)

[Finding value in wet places](#)

[Assessing aquatic health through monitoring](#)



DNR loans fishing equipment for free at 30 offices, state parks and other facilities. © Robert Queen

To reach young people in a variety of ways, we turn to teachers interested in ways to bring the environment into the classroom. Youth leaders such as boys and girls clubs, summer camp staff, fishing club members, and alcohol and drug abuse counselors also teach fishing skills to help build youth self-esteem.

After attending a training workshop, it's up to volunteers to implement the program in their school or community or camp. The DNR provides access to equipment, supplies and literature. See the [DNR website](#) for a list of workshops.

Angler education teaching materials are available to trained instructors for preschool and kindergarten through 12th grade.

Aquatic education can add three new "Rs" to the classroom -- relaxation, regulations, and responsibility for resources.

"We can use fishing days or expos as launch pads to establish long-term program and educational goals," Stabo says.

Social studies classes might learn how fishing is an important business and source of commerce in Wisconsin communities. Language arts classes might write essays and poetry about fishing experiences. Art classes can teach students to craft lures and jigs or make fish prints of their catch. Family resource classes can learn to prepare fish for the table. And all learn to appreciate fishing as a healthy choice for spending free time.

Kal Larson, a science teacher at Nathan Hale High School in West Allis, uses the Angler Education Program as a basis for the spring Outdoor Education class he teaches with a physical education instructor at the school. Larson teaches the basics of fishing including how to catch and how to clean fish, plus he builds fishing related topics such as the food pyramid and environmental concerns into the course.

"For many of these students," Larson says, "their last experience fishing was with a cane pole or a Snoopy rod and reel when they were kids."

Fishing clinics provide hands-on experience. The Learn to Fish Program gives novice anglers a one-time chance to fish without a license. Fishing Coaches (for those over 18) and Youth Fishing Buddies (for those under 18) provide instruction at fishing clinics.

Hamilton Middle School in Madison sponsors an after-school fishing club. Students learn about tackle, casting skills, fish identification and more.



Angling education programs help kids and adults experience the joy of fishing.  
© Robert Queen

On Free Fishing Weekend people fish for free the first Saturday and Sunday in June. Many state parks offer special fishing programs that weekend so anglers are encouraged to invite their non-angling friends out for a fishing picnic, Stabo notes.

The DNR Tackle Loaner Program provides fishing equipment at 30 sites in Wisconsin. There is no charge to borrow the equipment. Groups may borrow equipment for up to one week from regional DNR offices. Parks have their own arrangements. Call (608) 266-2272 or see the [DNR website](#) to learn about the tackle loaner site closest to you.

The Hooked on Wisconsin Anglers Club acknowledges diverse angling opportunities and recognizes outstanding sportfishing catches and releases in Wisconsin.

In 1985, the state launched an urban fishing program by stocking Milwaukee County park lagoons and other urban waters in southeast Wisconsin. The DNR's urban fishing coordinator visits schools and other groups to discuss the program. The goal is to help urban residents appreciate the aquatic resources in their backyards.

In 1997, staff in the DNR Alma office started The Reel Kid's Klub for kids ages 10–17. Chapter members hold monthly meetings, fish and take field trips. Guest speakers share fishing skills and talk about fishing safety, aquatic plants, ancient fishes of Wisconsin. The Angler Education Program complements other programs offered by DNR, University of Wisconsin-Extension and national organizations.

Many DNR staff statewide also enjoy giving presentations to share how their jobs fit into the big picture. Randy Larson, fish propagation supervisor for the Wild Rose Fish Hatchery, gives many presentations each year.

"I enjoy doing this very much and get really excited when I see all those eager and excited looks in the eyes of the young boys and girls," Larson says.

For more information about the state's aquatic education program contact Theresa Stabo at (608) 266-2272 or e-mail [stabot@dnr.state.wi.us](mailto:stabot@dnr.state.wi.us).

**Natasha Kassulke** is associate editor of Wisconsin Natural Resources.



February 2001

## The water's edge is a busy place

Shoreland and habitat protection work to keep pace with development

Natasha Kassulke

From 1991 to 1998, PWC registrations in Wisconsin rose from 6,500 to 33,000.  
© UW Extension Photo

Every "improvement" on a lakeshore, even small ones, changes the water and the land. Each homeowner, business and town reworking a beach, a lawn or a pier alters the shore in ways that add up.

In their natural state, Wisconsin waters are protected by thick and diverse shoreline vegetation. Development often changes the face of that shoreland buffer. In fact, the pace of change on Wisconsin's waterfront over the last 30 years has skyrocketed. At the same time, scientists have learned ways to minimize some of those impacts by protecting a 50-foot swath of land nearest the water as well as the first 20-30 feet of the nearshore water and lakebed.

Paul Cunningham, a DNR fish ecologist, says research in Wisconsin and elsewhere reveals the cumulative effects of individual lake and stream projects harm water quality and diminish the waterway's natural beauty.

Why are lakeshore properties so popular? Dr. Pat Shifferd of Northland College asked citizens why they own lakefront property. The top three reasons: a peaceful and tranquil view, watching wildlife, and fishing.

Today, nearly 80 percent of the land bordering Wisconsin lakes and rivers is privately owned and each year, thousands of shoreland parcels are developed. Since the 1960s, the number of homes on northern Wisconsin lakes has increased an average of 216 percent. Homes are larger and the number of people seeking permits has tripled since 1990 to alter waterways by dredging to create a sandy beach, building a seawall or installing a large pier.

To protect lakeshore habitats from these activities, Wisconsin relies on regulation, voluntary conservation efforts, grants, public investments, and education.

As early as the 1960s, Wisconsin developed statewide standards to guide development near lakes and streams to protect water quality, fish and wildlife habitat, recreation, and natural beauty by setting minimum lot sizes, minimum setback for building near the water's edge, restrictions on clear-cutting close to the water, and limits on filling, grading and vegetation removal.

Counties can adopt the statewide rules (called NR 115) or develop their own ordinances as long as they are more protective than the state standards.

Chapter 30 of Wisconsin's statutes is another tool to balance public and private rights to navigate and use shorelands, explains Mary Ellen Vollbrecht, the DNR chief of rivers and habitat protection section. Chapter 30 requires permits to ensure that alterations such as bridges, piers and bank grading are done in ways that avoid harm to lakes and streams.

The State of Wisconsin is making substantial financial investments in its public waters as well. To date, 170 Lake Protection Grants totaling more than \$12 million have been used to buy or lease sensitive lands surrounding lakes.

### Table of Contents

[The wet world where we work](#)

[Fishing for fun and the future](#)

[The water's edge is a busy place](#)

[A steady stream of support](#)

[Beefing up the catch](#)

[Visit a hatchery](#)

[Finding value in wet places](#)

[Assessing aquatic health through monitoring](#)

The Knowles-Nelson Stewardship Program buys, protects and restores wildlife habitat; preserves high quality natural areas; and protects water quality and fish habitat. The legislature and governor renewed the Stewardship Program as part of the 1999-2001 state budget bill, increasing Stewardship funding from \$23.1 million to \$46 million each year, for another 10 years.

The Northern Initiative – a collaboration of government, nonprofit groups and citizens – also promotes education, voluntary conservation, technical assistance and land acquisition to safeguard northern lakes and shoreland.

On-water recreation also stresses shorelines and shorelands. The number of registered boats in Wisconsin, for example, has nearly doubled since the 1960s from 303,000 in 1969 to 564,000 in 1999. Increased boating traffic and bigger boats can harm the nearshore area as propellers stir the water, disturb fish habitat, and uproot aquatic plants. Boat wakes can disrupt wildlife and cause shoreline erosion. To minimize these impacts, boaters must observe "no-wake" rules.

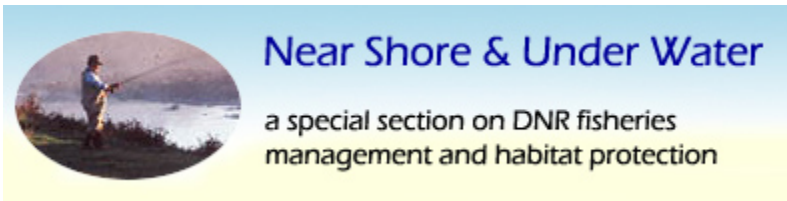
Explosive growth in personal watercraft (PWCs or jet ski-like products) poses another concern. From 1991-1998, in-state PWC registrations rose from 6,500 to 33,000 vehicles.

The newest toy to hit Wisconsin waterways, the water trampoline, also has spurred complaints that the devices are eyesores, navigation hazards, and may harm fish habitat.

Education is a critical tool in programs to protect aquatic habitat. People need to be introduced and reminded of building and recreational regulations such as slow-no-wake rules. DNR water managers also work with UW-Extension and private groups to provide educational materials to landscapers, contractors and landowners on ways to minimize shoreline habitat damage.

Just as cumulative actions can harm the water's edge, cumulative action can restore the shoreland and shoreline as well. Preserving or planting shoreland buffers, careful siting of essential boat mooring, reasonable recreation and knowledgeable users can protect the fragile zone where land meets water.

**Natasha Kassulke** is the associate editor of *Wisconsin Natural Resources* magazine.



February 2001

## A steady stream of support

Habitat restoration nurses damaged streams back to health

**Natasha Kassulke**

Each year 130,000 trout stamps are sold to anglers. © Robert Queen

**T**rut streams were shaped by nature. No amount of management can make one out of a stream that wasn't meant to provide fast, cold, clean water, but management can restore damaged streams.

DNR teams have the know-how for that work.

"We're a model for the nation in acquiring lands along trout streams, protecting waters and restoring wild fish populations," says Larry Claggett, a DNR coldwater fisheries ecologist. Wisconsin focuses on protecting stream channels and modifying their banks to create favorable conditions for fish. It's the cornerstone of DNR's trout management program, Claggett notes.

During the past 150 years, people made our streams and waterways work hard to carry logs and produce power. Beaver dams, cattle grazing, construction, pollution and floods also took their toll on trout streams. The damage was measured in higher water temperatures, eroded streambanks, turbid water and declining numbers of trout, Claggett explains, but in the past 30 years a lot of streams and habitat have been restored to more natural forms.

The incentive to restore trout streams came from Wisconsin conservationists through their legislators who supported a fee structure for Wisconsin's trout stamp in 1977. Proceeds are strictly designated for improving and maintaining inland trout streams by working on stream channels and their immediate surroundings. The consistent stream of money pays for long-term habitat improvements rather than relying on stocking that would only temporarily improve fishing. About 130,000 stamps have been sold annually in Wisconsin over the past 10 years.

Using trout stamp money and some funding from fishing license sales and federal funds, more than 550 miles of 400 different coldwater streams have been improved.

### Table of Contents

[The wet world where we work](#)

[Fishing for fun and the future](#)

[The water's edge is a busy place](#)

[A steady stream of support](#)

[Beefing up the catch](#)

[Visit a hatchery](#)

[Finding value in wet places](#)

[Assessing aquatic health through monitoring](#)

State fisheries restoration crews draw on techniques they have developed to work with the unique characteristics – and remedy the historic woes – of regional streams.

In southwestern Wisconsin, crews stabilize steep streambanks and scour away sediment that washed down from hillsides in the late 1800s and early 1900s as a result of grazing and row cropping. In northern Wisconsin, crews narrow and return the meanders in wide streams that were straightened and damaged by log drives, logging dams and beaver dams. In northeastern Wisconsin, crews reverse the effects of erosion from farm fields and historic sedimentation from logging.

Traditional bank work included building undercut banks and adding rocks to provide fish cover. Now, fish biologists also are adding wood to the streams and their bank to provide shade, cover, erosion control and a nursery for buglife.

Historically, many Wisconsin streams were strewn with fallen trees that naturally provided such cover. The Brule River, for example, was once a tangled mass of wood. But during the log drives, loggers cleared the river of wood and rocks so that they could more easily float rafts of logs down river. It changed the stream, and the fish population suffered from a lack of food and shelter that dead wood had provided.

The Tomorrow River project in Waupaca and Portage counties shows how trout habitat can bounce back along a stretch of the river that was shallow, lacked cover and damaged by cows pasturing in the area. DNR and Trout Unlimited (TU) designed a restoration plan, in consultation with landowners.

DNR crews placed LUNKERS -- which are pre-fabricated bank structures that are placed on the outside bends of streams, jut into the water and are covered with rock and soil to look natural. LUNKERS were developed by Dave Vetrano, a DNR fisheries biologist in La Crosse and provide cover that fish can hide under. The stream narrows, water flows faster through the channel and scours sediment from the bottom. Gravel and cobble revealed on the streambed provide areas for food and trout reproduction. TU installed 100 half logs to create more cover and put up a fence to keep livestock out of the water.

Dam removal also is an important management tool for restoring fish habitat by returning streams to their natural free-flowing condition. The River Alliance of Wisconsin notes that about 60 dams have been removed from Wisconsin streams in three decades -- the largest number of dam removals in the nation.

The 1998 removal of the Waterworks Dam in Baraboo shows dam removal can be a proven river restoration tool. Dams transformed the Baraboo Rapids segment of the Baraboo River from a fast-moving stream with healthy fish populations to a series of sluggish impoundments. What once supported a spawning lake sturgeon population in pre-settlement days became known for its carp.

By removing the dam, three-quarters of a mile of high-quality riffle habitat, rare in southern Wisconsin rivers, was restored to its free-flowing condition. Only 18 months after removal, the DNR found 24 species of fish in the newly free-flowing stretch of the river, the dominant species was smallmouth bass.

Another sign that habitat restoration efforts coupled with other management tools like regulations and catch-and-release fishing is working is the return of brook trout, the state's only native stream trout. Waters such as tributaries to the West fork of the Kickapoo River are seeing remarkably healthy brook trout populations.

Today, Wisconsin leads the nation in miles of high quality (Class I) trout streams – 3,500 miles with naturally self-sustaining trout populations.

"Experienced trout anglers are telling me again and again it's the best fishing in recent memory," Claggett says.

For a copy of a report describing other inland trout habitat improvement projects in Wisconsin, call Larry Claggett at (608) 267-9658 or e-mail to [claggl@dnr.state.wi.us](mailto:claggl@dnr.state.wi.us).

**Natasha Kassulke** is the associate editor of *Wisconsin Natural Resources* magazine.



February 2001

## Beefing up the catch

Wisconsin fish hatcheries provide for future angling opportunity

Natasha Kassulke

Stocking adult trout to increase angling opportunities. © Robert Queen

[Visit a hatchery for an egg-strordinary experience](#)  
[Wisconsin's fish hatcheries](#)

Given a clean place to live, protection from enemies, plentiful food and good company, almost any population could sustain itself. Fish are no different. And fisheries experts increasingly aim to create the right conditions so fish will naturally reproduce and keep their population growing.

Unfortunately, a lot can go awry in the watery world. Pollution seeps in, nutrients cause plants to grow too quickly and exotic organisms that eat eggs or uproot habitat can invade. Hungry predators cruise the waters, and human anglers have a taste for fish. Small wonder that in many cases natural reproduction of fish can't keep pace with "consumer demand."

To give anglers a greater chance of catching fish, Wisconsin has stocked state waters for more than 100 years. Walleye have been stocked since 1876, when the Nevin Hatchery was established in the Madison countryside that became Fitchburg.

Then and now, we primarily stock fish to provide angling opportunities for the public, explains Al Kaas, the statewide fish propagation coordinator. We raise fish in hatcheries to protect them during their most vulnerable life stages, then we release them to grow to adulthood back in wild waters.

Fish stocking quotas fluctuate somewhat annually and today, DNR operates 14 state hatcheries and three spawning facilities.

Fish may be stocked when they are fry (newly hatched), fingerlings (up to one year old), yearlings (12 to 23 months old) and as adults. Wisconsin annually stocks around 11 million fingerlings and yearling fish, but much larger quantities of the smaller fry are released. Twenty to 40 million fry are stocked – trout and salmon fry, fingerlings and yearlings in the Great Lakes; trout, walleye, muskellunge, northern pike and largemouth bass fry, fingerlings and yearlings on inland lakes, rivers and streams.

While that sounds like a lot of fish, stocking actually is not necessary in most Wisconsin waters.

"Most state waters support excellent fish populations and do not require stocking," Kaas says. "Introducing fish to lakes that already support excellent fish populations could upset the genetic balance in those waters and go beyond the biological carrying capacity of the lake.

Frank Pratt, a fisheries manager in Hayward, says stocking can be a valuable tool when a lake or stream has a smaller fish population than it should support because spawning habitat has been destroyed, cover for young fish is weak, food supplies have dropped off or there's a problem with predation.

### Table of Contents

[The wet world where we work](#)

[Fishing for fun and the future](#)

[The water's edge is a busy place](#)

[A steady stream of support](#)

[Beefing up the catch](#)

[Visit a hatchery](#)

[Finding value in wet places](#)

[Assessing aquatic health through monitoring](#)

Lake surveys and past experience determine if a lake should be stocked, what species should be stocked and what size the fish need to be to survive in the water, Pratt says. Fisheries biologists consider harvest regulations, catch records and demand in figuring how many fish should be stocked and which waters would most benefit from supplemental fish.

It's a balancing act.

Take the muskellunge, Wisconsin's most sought trophy game fish, as an example. Every year, small musky are transferred from hatchery rearing ponds and stocked in more than 200 musky waters statewide. Musky populations are low in some waters due in part to competition with northern pike, and declines in habitat and spawning grounds.

The bulk of musky fingerlings are wild stock reared at the Gov. Tommy G. Thompson Hatchery at Spooner, the newest and most modern coolwater hatchery, and at the recently renovated Art Oehmcke Hatchery at Woodruff and West Central Region rearing ponds. Mature fish are captured during spring spawning. Their abdomens are then rubbed to expel roe (eggs) and milt (sperm). In the wild, less than 0.1 percent of the eggs deposited would hatch and survive, in the hatchery, 60 to 95 percent of the incubated eggs make it.

Stocking is the culmination of weeks, sometimes months or years of care, says Rod Patrick, the South Central Region operations manager who oversees the Lake Mills and Nevin hatcheries.

Last year, the Nevin Hatchery provided wild fish for 169 trout streams. The hatchery leads the state in raising wild trout that remain wary after stocking. The wild trout program started five years ago when state fisheries biologists found that domesticated trout strains didn't fare as well as wild trout raised with less human interaction.

While all the hatcheries raise fish, not all hatcheries hatch eggs. Some, called "rearing stations," raise fish that are hatched and transferred from other facilities. In true hatcheries, after eggs are mixed with milt and left to firm up or "water harden" for a while, the fertilized eggs are collected and placed in hatching jars supplied with oxygen rich water at a specific temperature. Newly hatched fish (fry) are raised indoors in tanks. As they grow, they are transferred to outdoor raceways and ponds.

Some hatcheries also are taking part in research projects such as tracking conditions that cause hatchery-raised chinook salmon to contract Bacterial Kidney Disease as adults.

Aside from special projects and the day-to-day intricate art of raising fish, the state hatchery/stocking program faces longer-term challenges. One of the most significant is keeping the facilities in working order. Some hatcheries are 50 years old or more and need upgrading to meet compliance standards for water supply issues.

At some hatcheries old windows need to be replaced, black topping is needed, buildings need to be insulated, and raceways need upgrading.

Stan Johannes, a Northern Region operations manager in Spooner, says more environmentally friendly chemicals are being explored and used in state fish hatcheries and new technologies are being explored to prevent fish diseases. Over the past few years there also has been a shift from manual hands-on control of feeding, water volume and temperature to automated (computer-controlled) systems.

Ultimately, Johannes says, the greatest shift has been a shift from producing numbers of fish to producing quality fish that survive better in the wild.

"Fish culture has changed a lot over the past 100 years," Kaas says. "But we are working throughout the state to ensure that the fish we are stocking will continue to grow to legal size and in coming years provide a healthy fishery and good fishing opportunities."

**Natasha Kassulke** is the associate editor of *Wisconsin Natural Resources* magazine.



These salmon eggs will be mixed with milt. Fertilized eggs form fry that are stocked or raised in hatcheries. © Robert Queen

February 2001

## Visit a hatchery

**Ready for an egg-strordinary experience?**

Theresa Stabo

[Wisconsin's fish hatcheries](#)

**M**ore and more, teachers and after-school fishing clubs are learning that a trip to a hatchery can be a fun part of their aquatic studies. Moreover, we're making the hatcheries more fun to visit.

State fish hatcheries provide unique opportunities to see lots of fish at all stages in their life cycles, to learn where the fish are going, and to appreciate the limited role stocking plays in keeping fish populations healthy and productive.

The Root River Steelhead Facility in Racine and the C.D. "Buzz" Besadny Anadromous Fisheries Facility in Kewaunee are egg collection facilities. Windows into streams allow visitors to watch fish spawning runs. At the Besadny Facility, naturalist Julie Hein-Frank developed a study guide so teachers can prepare students for their field trip. Hein-Frank meets the group at the facility, gives them a tour to explain how egg collection works, then takes them to the adjacent stream to scoop up invertebrates. Students get their hands wet conducting water quality tests. After the field experience, teachers get follow-up lessons back in the classroom.

Education was part of the renovation plan at the Spooner Hatchery, and when it reopened as the Gov. Tommy G. Thompson Hatchery in 1996, visitors were dazzled by a 24-foot mural created by artist Ruth King, a DNR nonpoint source pollution specialist. Other exhibits offer fishing tips, provide lessons on fish anatomy, and explain the hatchery workings. The Yellow River Flowage, which is a short walk from the front door, is part of a shoreline demonstration project. Shell Lake Elementary, Spooner Elementary and others in the community helped plant native shrubs and grasses.

As Madison bulges at its boundaries, the grounds at the Nevin Hatchery in Fitchburg will be increasingly important as an educational site and as urban green space.

All of our state hatcheries and egg collection sites are open for visitations. Visiting hours vary, but most are open at least weekdays from 9 a.m. to 3 p.m. for visits. Hatchery visits are more interesting during certain times of the year. Call ahead to plan your visit during a peak season and reserve time when a staff member can meet your group.

**Theresa Stabo** is the state's aquatic resources education director.

## Wisconsin's fish hatcheries

Broodstock are adult fish that are kept at a hatchery so that their eggs (roe) and sperm (milt) can be collected to produce fertilized eggs for production needs.

At a spawning facility you can see eggs collected from fish.

At a fish hatchery you can see eggs hatch and fish of various stages of their life cycle at the right time of year.

At a rearing station you can see fish being raised, which were transferred to them from other hatcheries.

All state fish hatcheries are open for visitation. Call ahead to be sure that the hatchery you are interested in is at a point in its stocking schedule that there is something interesting to see.

### Art Oehmcke Hatchery

- Species: muskellunge, walleye, lake trout and suckers
- Operations: hatching and rearing
- Located at 8770 Hwy. H., two miles east of Woodruff, Oneida Co.
- Telephone: (715) 358-9215

### Bayfield Hatchery

- Species: brook trout, brown trout, lake trout, steelhead (rainbow) , splake (brook trout/lake trout cross); coho and chinook salmon
- Operations: broodstock, hatching and rearing
- Located at 141 S. Third St., between Washburn and Bayfield, Bayfield Co.
- Telephone: (715) 779-4021

## Table of Contents

[The wet world where we work](#)

[Fishing for fun and the future](#)

[The water's edge is a busy place](#)

[A steady stream of support](#)

[Beefing up the catch](#)

[Visit a hatchery](#)

[Finding value in wet places](#)

[Assessing aquatic health through monitoring](#)

### Brule Rearing Station

- Species: brook, brown and rainbow trout; and steelhead
- Operations: rearing and spawning
- Located at 13847 E. Hatchery Rd., south of Brule, Douglas Co.
- Telephone: (715) 372-4820

### Governor Tommy G. Thompson Hatchery

- Species: muskellunge, walleye, northern pike and suckers
- Operations: hatching and rearing
- Located at 951 W. Maple St., on the west side of Spooner, Washburn Co.
- Telephone: (715) 635-4147

### Kettle Moraine Springs Hatchery

- Species: steelhead (rainbow) trout and coho salmon
- Operations: hatching and rearing
- Located at N1929 Trout Spring Rd., in Adell near Cascade, Sheboygan Co.
- Telephone: (920) 528-8825

### Lake Mills Hatchery

- Species: coho salmon; northern pike and walleye
- Operations: hatching and rearing
- Located at 302 S. Main St. in Lake Mills, Jefferson Co.
- Telephone: (920) 648-8012

### Lakewood Rearing Station

- Species: brook and rainbow trout
- Operations: rearing
- Located at 14865 Hatchery Lane in Lakewood, Oconto Co.
- Telephone: (715) 276-6066

### Langlade Rearing Station

- Species: brown trout
- Operations: rearing
- Located at Q1269 Fish Hatchery Rd., in White Lake east of the Wolf River, Langlade Co.
- Telephone: (715) 882-8757

### Nevin Hatchery

- Species: brook, brown and rainbow trout
- Operations: broodstock, hatching and rearing
- Located at 3911 Fish Hatchery Rd., in Fitchburg, Dane Co.
- Telephone: (608) 275-3246

### Osceola Hatchery

- Species: rainbow trout
- Operation: broodstock, hatching and rearing
- Located at 2517 90<sup>th</sup> Ave., in Osceola, Polk Co.
- Telephone: (715) 294-2525

### St. Croix Falls Hatchery

- Species: brook and brown trout
- Operations: broodstock, hatching and rearing
- Located at 230 River St., in St. Croix Falls, Polk Co.
- Telephone: (715) 483-3535

### Thunder River Rearing Station

- Species: spring/summer - brown trout; fall/winter - coho salmon
- Operations: rearing
- Located at W13562 Hatchery Rd., west of Crivitz, Marinette Co.
- Telephone: (715) 757-3541

### Westfield Hatchery

- Species: chinook and coho salmon
- Operations: Hatching and rearing
- Located at 220 W. Pioneer Park Rd., in Westfield, Marquette County
- Telephone: (608) 296-2343

### Wild Rose Hatchery

- Species: brown trout and chinook salmon; muskellunge, hybrid muskellunge, suckers, northern pike, walleye and lake sturgeon
- Operations: broodstock, hatching and rearing
- Located on Hwy. 22 N., in Wild Rose, Waushara Co.
- Telephone: (920) 622-3527

### Wisconsin's egg-taking sites:

#### Strawberry Creek Spawning Facility

- Species: chinook salmon
- Located on Strawberry Lane off Hwy. U in Sturgeon Bay, Door Co.
- Telephone: (920) 746-2860

#### C.D. Besadny Anadromous Fisheries Facility

- Species: steelhead and brown trout, coho and chinook salmon
- Located at 3884 Ransom Moore Lane, in Kewaunee, Kewaunee Co.
- Telephone: (920) 388-1025

#### Root River Steelhead Facility

- Species: steelhead (rainbow) trout, coho and chinook salmon
- Located at 2399 Dominick Dr., in Racine, Racine Co.
- Telephone: (262) 884-2300



February 2001

## Finding value in wet places

Helping individuals sustain small wetlands is where it's at.

**Lisa Gaumnitz**

Wetlands provide critical habitat and food sources for fisheries. © DNR Photo

Sue Schumacher can be forgiven for viewing southeastern Wisconsin's shallow cattail marshes, sedge meadows and forested wetlands with all the pride of a doting mother.

"I get a good feeling when I see a wetland that at one time was slated to be filled but wasn't because we either denied the project or altered it in a way to avoid or minimize damage," Schumacher says. "I can look at that wetland and know I had a hand in protecting it."

She and colleagues in DNR's habitat protection program are the keepers of Wisconsin's nationally renowned wetland protection program. They are charged with casting the deciding vote when individuals, companies and governments need permits to build ponds, buildings, roads, or some other project that potentially alters wetlands.

In the last decade, they've succeeded in cutting permitted wetland losses by 330 percent while still allowing 86 percent of applicants to complete the projects they want. Often as not, the projects get done more quickly and inexpensively with less harm to the environment.

Schumacher and the 51 other water management specialists covering Wisconsin's 72 counties work with 10,000 landowners every year. In the past decade, they've seen a four-fold increase in applications to build ponds in wetlands, and similar growth in requests to start waterfront projects. "People realize they need permits and they are trying to comply," she says.

That change in public attitude has been a long time coming. For much of the state's first 150 years, wetlands were considered wastelands and mosquito breeding grounds. Laws and policies encouraged swamp reclamation. Settlers received subsidies and tax breaks to drain and fill wetlands for farm fields, ports and cities. New drainage technology in the 1940s spurred destruction of an additional 3 million acres of wetlands; only 5.3 million of the 10 million acres of wetlands present before statehood remained by 1980.

By that time, dramatic declines in waterfowl populations, combined with a growing body of scientific literature, wakened the state and nation to wetland values. Wetlands provide crucial habitat for native fish, plant and wildlife species; store water to prevent flooding; buffer runoff; protect water quality; provide natural beauty and sustain recreational opportunities for boaters, canoeists, hunters and birdwatchers.

"We've come a long way in reducing wetland losses and that's directly associated with gains in knowledge and the science of wetlands' true values," says Dale Simon, chief biologist in the habitat protection program.

### Table of Contents

[The wet world where we work](#)

[Fishing for fun and the future](#)

[The water's edge is a busy place](#)

[A steady stream of support](#)

[Beefing up the catch](#)

[Visit a hatchery](#)

[Finding value in wet places](#)

[Assessing aquatic health through monitoring](#)

Federal laws in the late 1970s started requiring people to seek permits from the U.S. Army Corps of Engineers for projects potentially affecting wetlands. To further reduce acreage lost through this permit process, Wisconsin sought greater say in federal decisions. In 1991, Wisconsin became the first state to require decisions on federal wetland permits to meet state wetland water quality standards. Today, applicants for a federal wetland permit must demonstrate to DNR habitat protection staff that they've tried to avoid harming wetlands. If an applicant shows that wetlands will be minimally affected, then their Corps wetland permit may be certified.

The requirement has helped cut wetland losses in permitted projects to an average of 300 acres a year. It has also brought applicants in early. Now, developers and others are willing to attend workshops to learn what they need to do to protect the environment and get their permit.

We've spent 20 years building protection programs, says Scott Hausmann, who leads the DNR's wetland team that recently developed a new strategic plan. Those will continue to be the backbone of our wetland efforts, but we recognize that 75 percent of wetlands are in private hands, and we need to provide those owners with the tools and the means to manage those wetlands.

That education starts with teaching people that wetlands are much more diverse than a marsh with ducks, says Pat Trochlell, a DNR wetland ecologist. "Wetlands include floodplain forest, bogs, sedge meadows and other areas people don't readily recognize as wetlands. Further, they provide other benefits than waterfowl habitat."

A low spot in a backyard that collects spring rain could be an ephemeral wetland that provides critical habitat for salamander reproduction, she says.

To encourage people to protect, restore and manage such wetlands, DNR strategists propose education and grants to help share the costs of wetland restoration, and reducing taxes on wetland property and other conservation lands.

Plans also envision investigating new methods to map wetlands onto distortion-free photographs and to increase their availability to the public. Wisconsin Wetland Inventory maps show wetlands statewide. They are being used by county zoning planners, realtors and prospective property owners who want to know if they're buying a wetland, according to Lois Simon, inventory coordinator.

The strategic plan also challenges DNR to work smarter in its own restoration efforts. Scientists know how to get water back on the land, but they don't know if it's possible to create a complex series of wetlands like those the glaciers left behind 10,000 years ago.

"There's no way we can go back to pre-European settlement times," Trochlell says. "But we want to protect the wetlands we have, and to restore high-quality wetlands to areas where they once existed and where it makes sense."

**Lisa Gaumnitz** writes for DNR's water management programs in Madison.

February 2001



Measuring a stream's width, depth, flow rate, temperature, pH, dissolved oxygen and nutrient levels. © Mike Miller

## Assessing aquatic health through monitoring

Monitoring helps in the diagnosis.

Mike Miller

[The pulse of aquatic health: A result of land and water activities.](#)

Like a doctor making a diagnosis, we can monitor the health of streams and lakes by collecting and analyzing physical, chemical and biological data.

Monitoring documents how environmental changes affect fish and other aquatic organisms. The data also improves our understanding of how human actions affect ecosystem health.

Monitoring can be targeted to provide information on specific resources and projects, or can be broad to measure statewide trends to maintain quality resources. We monitor some waters by setting up stations that continuously measure water quality and automatically transmit results to computers. In other cases, we select sites and bring in portable equipment to do seasonal, temporary or one-time sampling to answer a specific question.

Historically, aquatic monitoring in Wisconsin focused on commercial and sport fish. We also collected water chemistry data on major industrial rivers. Increasingly, we monitor aquatic ecosystems and evaluate how activities on land affect the waters.

To monitor aquatic health, DNR biologists consider the following:

- physical characteristics of waterway, size and water temperature, and shoreline and aquatic habitat.
- watershed land use activities.
- chemical characteristics of water such as pH, dissolved oxygen and nutrient concentrations
- the types, numbers, size and health of fish found in lakes or streams
- the types, and numbers of invertebrates like aquatic insects and mussels found.

Fish species are not equally sensitive to environmental degradation. The ones that are more sensitive make good indicators of healthy waters much like a canary in a coal mine. If these species are found in large numbers, we sense that the lake or stream is in pretty good shape.

Fisheries staff also evaluates if a lake or stream is as productive as it might be. We take steps to help a water body reach that potential and monitor for subsequent changes. As habitat and species change, we modify management practices accordingly.

### Table of Contents

[The wet world where we work](#)

[Fishing for fun and the future](#)

[The water's edge is a busy place](#)

[A steady stream of support](#)

[Beefing up the catch](#)

[Visit a hatchery](#)

[Finding value in wet places](#)

[Assessing aquatic health through monitoring](#)

DNR also monitors fish populations to assess how stocking fish changes natural reproduction rates, determine if changing fish regulations are effective, and note if habitat management activities work.

Measuring what anglers catch in creel surveys helps document angler satisfaction and expectations and the influence of angling pressure on game fish.

We especially enjoy hands-on work with fish. Game fish such as walleye, catfish and trout, as well as nongame fish, are captured with electrofishing equipment or nets. Species, numbers, lengths, weights, ages and other information are recorded; fish are released unharmed.

Aquatic insects and other stream invertebrates also are good indicators of stream health. Like fish, aquatic invertebrates vary in sensitivity to pollution and habitat degradation.

We enlist help to monitor Wisconsin's vast aquatic resources. The Self-Help Lake Monitoring program is a core of 900 volunteers who measure water clarity and water chemistry. Their collective reports alert scientists to potential problems and provide a general picture of the lake's overall health.

Volunteers also note the presence or location of exotic animals and plants by watching for Eurasian water milfoil and zebra mussels.

The DNR also works with institutional partners such as Native American tribes, the U.S. Environmental Protection Agency, U.S. Geological Survey, universities and the State Lab of Hygiene to sample waters and interpret readings. One recent partnership with the University of Wisconsin's Environmental Remote Sensing Center attempted to measure lake water clarity using satellite images.

We believe – and the public expects – that Wisconsin's aquatic resources will be managed with the best scientific information available to ensure that we can enjoy and sustain these resources into the future. Monitoring is a key tool to make that happen.

### The pulse of aquatic health: A result of land and water activities.

Clean water is not enough to ensure that lakes and streams are fit for aquatic organisms. Pollution from rural and urban land uses add sediment, nutrients, toxics and pathogens to the water. Phosphorus from manure and commercial fertilizers, may cause excess nutrient concentrations (eutrophication) in lakes and streams and lead to algal blooms.

Sediment, by volume, is the greatest pollutant in Wisconsin's surface waters. Sediment that runs off the land and into the water blankets stream and lake bottom habitat with excess nutrients, making water cloudy reducing the productivity of aquatic ecosystems and blocking sunlight.

Water quantity also changes a lake or stream's health. Flooding can wash vegetation and soil along waterways. Concrete and pavement carry pollutants, increasing runoff and decreasing spring flow to lakes and streams. The water that enters the stream is warmer and lower in oxygen capacity.

Food chains in lakes and streams also factor into an aquatic ecosystem's health. Organic matter such as leaves and other vegetation wash into streams providing food for aquatic insects, which in turn, are food for other aquatic organisms that live there.

**Mike Miller** is a DNR monitoring specialist.