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2001 Report to



Minnesota Anglers

**How the DNR works
to improve fishing
in Minnesota**

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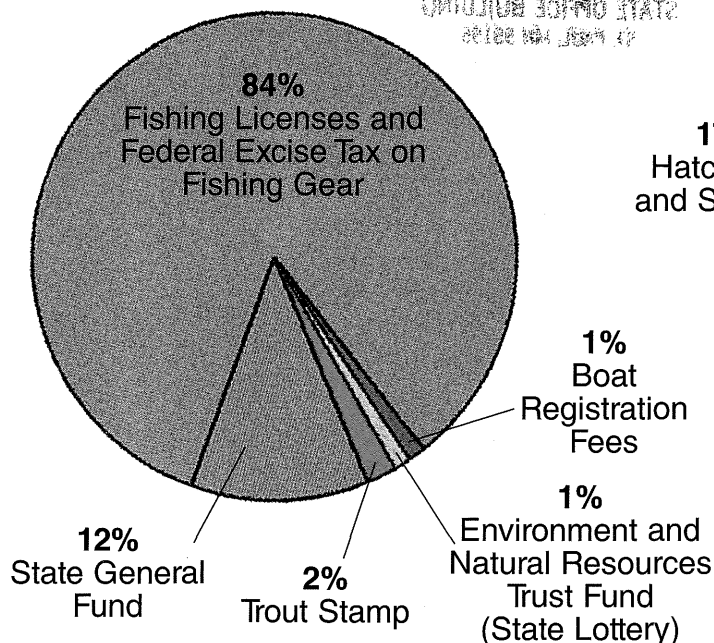


DNR Fisheries Budget

\$22.4 Million

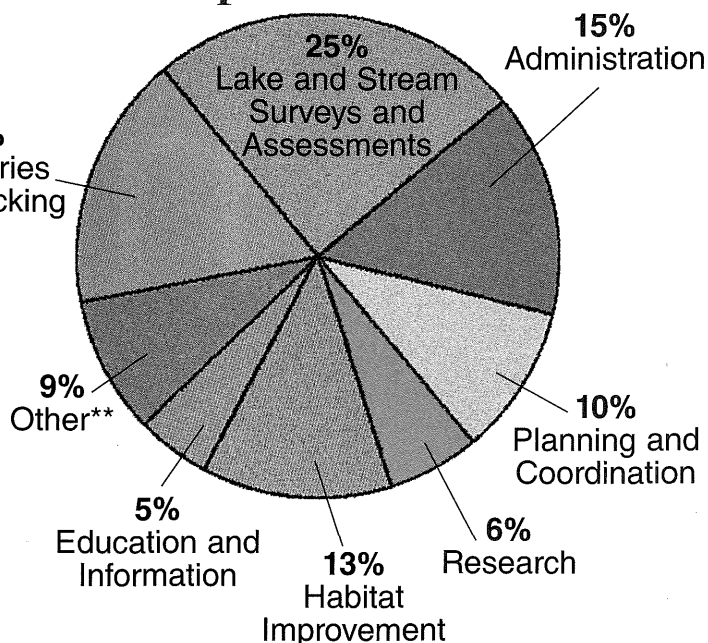
(Fiscal Year 2000: July 1-June 30)

Funding Source



*What DNR Fisheries gets from the Minnesota Legislature

Expenditures



**Equipment, facilities, supplies, etc.

DNR Fisheries Achievements for 2000

Miles of stream easements acquired	.6
Acres of lakeshore aquatic management areas acquired	.56
Trout stream miles improved or maintained	.510
Warm-water stream miles improved or maintained	.30
Lakes and ponds rehabilitated	.8
Aeration systems installed	.12
Fishing piers installed	.14
Walleye rearing ponds operated	.239
Walleye spawn-taking sites maintained	.10
Muskie rearing ponds maintained	.30
Northern pike spawning areas maintained	.4
Lake surveys completed	.139
Lake population assessments	.258
Stream surveys completed	.12
Stream population assessments	.52
Specialized fish assessments	.344
Ongoing research projects	.31
Public aquatic plant restoration (shoreline feet)	.5,240
Private aquatic plant restoration (shoreline feet)	.2,670

Accelerated Walleye Management Program:

increase in pond acreage for fingerling production	.5,000
lake plans for which public input was solicited	.141

Fish stocked:

walleye fry	.230,000,000
walleye fingerlings	.905,000
walleye yearlings	.94,000
northern pike (all sizes)	.712,000
muskellunge (fingerlings)	.23,000
largemouth bass (all sizes)	.5,000
smallmouth bass (all sizes)	.38,000
channel catfish (all sizes)	.237,000
tiger muskies (fingerlings)	.724
rainbow trout	.852,000
Chinook salmon	.359,000
lake trout	.399,000
brook trout	.177,000
brown trout	.525,000
splake	.77,000

Introduction

Our job in DNR Fisheries is to manage your fisheries, using your money. We have a responsibility to tell you how we spend that money and to explain clearly what we mean by "managing Minnesota's fisheries."

This new booklet is intended to do just that. The heart of this publication is an explanation of what we do to improve your fishing. When you've finished reading, you should have a good idea of what those activities are, why they are necessary, and how they lead to better fishing.

You'll also get a sense of the other things that affect your fishing—how weather, angling pressure, and lake ecology can often play as big a role as we do.

In addition, you'll find information on major issues, such as bag limits and walleye stocking. And there's a special section where anglers can learn the truth about many common Minnesota fishing and fish management myths.

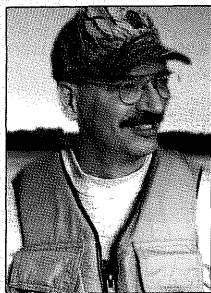
This is our report on what we do with your money. We hope you find it interesting, enlightening, and proof that the \$17 you paid for a fishing license this year was money well spent.

I'd like to hear what you think of this publication and the job we do managing your fisheries. I encourage you to contact me at the mailing or e-mail address listed below, and to fill out and mail me the enclosed reader survey card.

Good fishing,

Ronald D. Payer

Ron Payer
Director, DNR Fisheries Division
500 Lafayette Road
St. Paul, MN 55155
ron.payer@dnr.state.mn.us



Some basic statistics

Resident and nonresident anglers 1.5 million
Number including kids 2.3 million
Resident individual fishing license fee \$17

Game fish lakes 5,400
Miles of streams and rivers 15,000
Miles of trout streams 3,600
Public water access sites 3,000
Fishing piers and shore fishing sites 200

DNR Fisheries staff 320
Area offices 28
Hatcheries 18
Annual budget \$22 million*

* For FY 2000. Budget ranges from \$22-\$30 million depending on various funding sources, such as bonding, LCMR, lottery-in-lieu, etc.



Contents

Minnesota DNR

How we improve your fishing

Gather Information 4

Improve and
Protect Habitat 6

Stock Fish 10

Special Section

Big Issues 12

- Experimental regulations • Bag limits
- Angling pressure • Exotic species
- Accelerated walleye program

Adjust Regulations 14

Inform and Educate 16

Increase Access 17

Conduct Research 18

Special Section

Reality Check 19

- The reality of fishing in Minnesota
- The reality about DNR fisheries management
- The reality about lakes and fisheries

Minnesota Fishing Information. 23

How we improve your fishing

Gather INFORMATION

If two anglers go out and catch their limit, does that mean the lake is packed with fish—and that it doesn't need stocking or experimental regulations? Of course not—no more than getting blanked would mean the lake was empty of fish.

Just as the world isn't flat despite the horizon appearing to be straight, a single observation by a few people isn't an accurate indication of a fish population's status. Their good fishing may be due to a hot bite, extraordinary skill, or just good luck rather than an abundance of game fish.

The shortcomings of anecdotal evidence and casual observations are the main reasons we invest so much time and money gathering information using scientific, comprehensive lake and stream surveys.

That's not to say firsthand accounts aren't valuable. But such information must be balanced with methodical, consistent surveys of fish populations, fish habitat, and fishing activity.

Information from lake and stream surveys forms the foundation of every DNR fisheries management activity we do to improve fishing—from stocking fish to restoring aquatic plant habitat. Fisheries managers conduct these surveys by netting, seining, trawling, electrofishing, and analyzing water. This gives us long-term information on fish population size structure, fish reproductive success, species abundance, fish growth and movement, and habitat conditions. Added to this is information about angling success and preferences we get from creel surveys (interviews with anglers).

Along with public input, survey information helps us decide

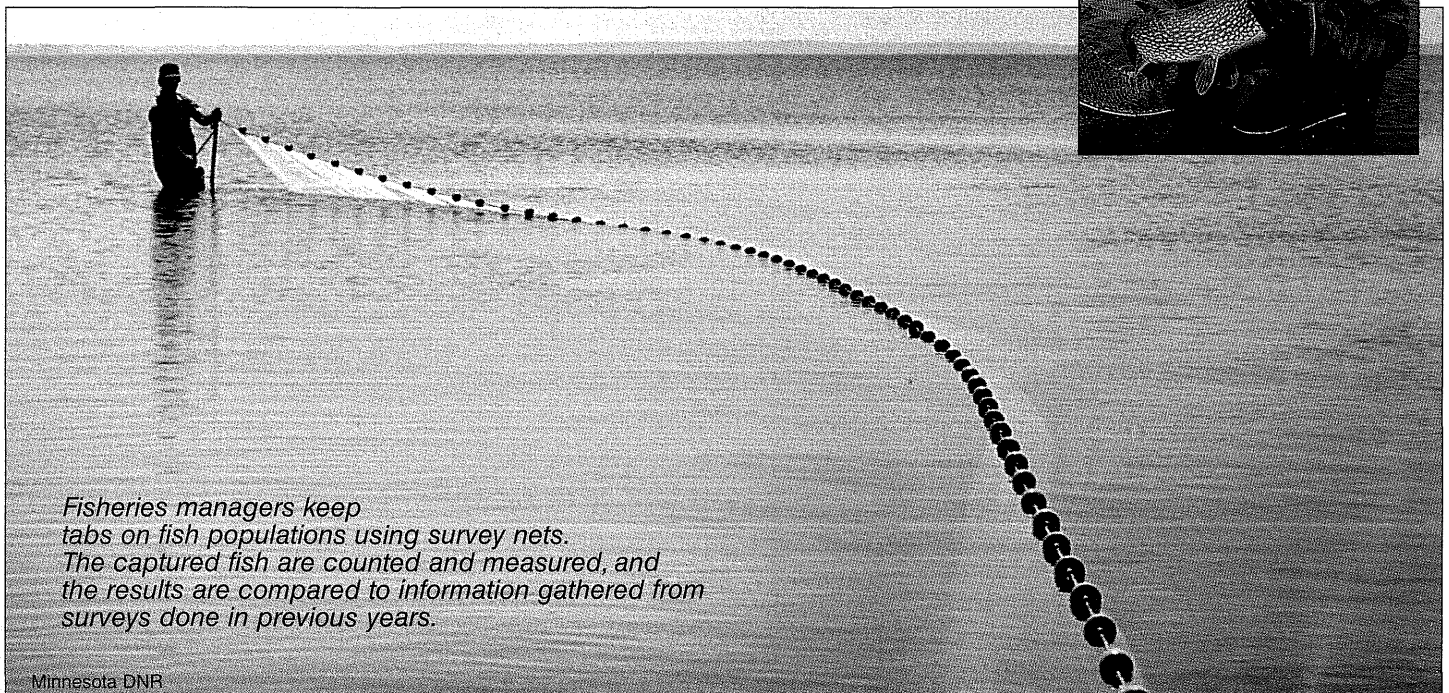
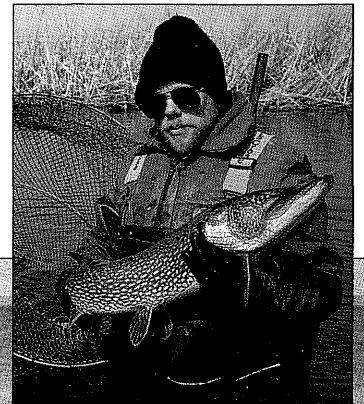
when stocking is needed, whether experimental regulations are necessary, and how environmental conditions affect fish populations. Follow-up sampling and angler surveys determine if specific management techniques such as fingerling stocking or a slot limit are having the desired effect on a particular lake.

As one fisheries manager puts it: "Without the lake and stream surveys, everything we did would be guesswork."

Lake and stream surveys

So important are lake and stream surveys that one-fourth of our \$22 million yearly budget goes towards this work. Each year, field crews around the state survey several hundred lakes and several dozen streams or rivers. Most lakes are surveyed every three to five years, although Rainy Lake, Lake Mille Lacs, and other large lakes are monitored yearly. We now have a database of survey information for 4,500 lakes and streams—more than any other state—and biologists are adding new information each year.

In the short term, surveys show the relative proportion of big and small fish, and whether each year's new generation of fish, called a *year class*, is relatively weak or strong. By accumulating many years of this information, we can see long-term trends and patterns, such as how quickly fish grow in various lakes or the gradual loss of important spawning habitat.



Fisheries managers keep tabs on fish populations using survey nets. The captured fish are counted and measured, and the results are compared to information gathered from surveys done in previous years.

Minnesota DNR

Success Story

Managing the Large Walleye Lakes

Information from ongoing lake surveys on Minnesota's largest lakes tells us how much harvest these waters can withstand and the level of angling pressure they receive. These big waters—which include Leech, Lake of the Woods, Winnibigoshish, Rainy, and Mille Lacs—account for half the state's yearly walleye harvest. With so much at stake, these lakes get special scrutiny.

How do lake surveys help increase fishing opportunities on these lakes? On Mille Lacs, precise survey information allows us to provide more recreational angling opportunities than we could if the data were “fuzzy” and we had to further tighten harvest restrictions to protect the walleye population from overharvest.

And on Rainy Lake, survey information is telling us that portions of the lake's booming walleye fishery are in danger of overharvest and will require stricter harvest regulations to keep the good times rolling.

Lake survey information helps us keep a close watch on the state's top walleye waters and ensure that anglers get the most recreation possible without overharvesting walleye populations.

In-Fisherman, Inc.

Survey techniques

Fisheries managers and their crews use various survey techniques appropriate for various fish species or sizes.

Gills nets: Usually 250 feet long, these nets are used to capture walleyes, northern pike, and yellow perch. Live fish are released after workers take measurements and samples of scales (to be analyzed later to determine fish age). Dead fish are further analyzed for sex, stomach contents, and parasites.

Trap nets: These smaller nets capture bluegills and other small fish.

Trawls and shoreline seines: These small-meshed nets are used to capture young fish.

Electrofishing equipment: Used in streams and rivers, this equipment uses an electrical charge to temporarily stun fish so they can be measured and weighed. It also is used in lakes to survey bass, crappies, and young walleyes.

Trotlines and angling: These methods are used to survey catfish and other species that often can't be captured efficiently any other way.

Water analysis: This is used to determine the percentage of dissolved oxygen in water as well as water fertility and clarity.

Creel surveys

Creel surveys help assess the effectiveness of fisheries management techniques by measuring angler success. “Creel” is an old term describing a basket, often made of wicker, that anglers once used to hold their catch.

Throughout the summer on lakes across the state, DNR creel clerks ask anglers what time they started and stopped fishing, the number of people in their party, the species of fish they sought, and the weight, length, and number of fish they either kept or released. Sometimes anglers are asked what type of equipment they use, which is how we learned that the percentage of boats with depth finders has more than tripled since the 1970s.

All this creel survey information helps fisheries managers determine fishing pressure, the size and number of fish harvested on a particular lake, and angler catch rates. That information, in turn, helps us determine how best to manage fish populations.

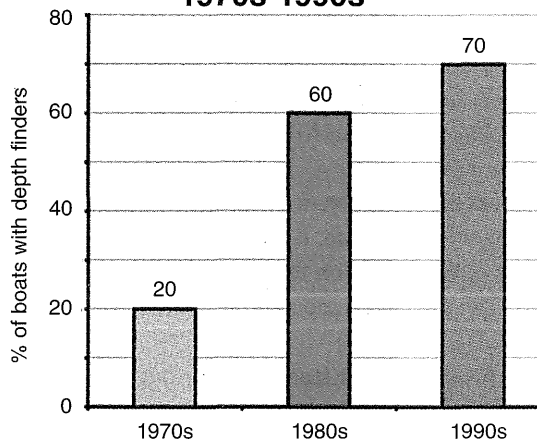
Value of surveys

Ongoing creel, lake, and stream surveys are used to evaluate the effectiveness of management work. For example, if the number of big brown trout found in a stream increases after

underwater hiding areas are built there, then that habitat improvement was likely a success and may work elsewhere. Or, if walleye size on a lake increases after a particular experimental regulation is put in place, then that regulation may work on other, similar lakes.

Surveys also show if water chemistry or habitat conditions are changing. And they are an essential part of the DNR's Accelerated Walleye Program for helping us evaluate which lakes need additional stocking and whether that stocking boost is working to improve fishing.

**Increasing use of depth finders
1970s-1990s**



How we improve your fishing

Improve and Protect HABITAT

Years ago hunters woke up and saw the link between healthy habitat and abundant wildlife. Now anglers are making the connection, noticing that lakes and streams with the best fishing usually have the healthiest fish habitat.

Unfortunately, that realization has come too late in many areas where habitat degradation has harmed fish populations. Pesticides, fertilizers, and soil from farm fields drain into lakes and rivers, killing aquatic insects, depleting dissolved oxygen, and smothering fish eggs. Leaves, grass, and fertilizer wash off urban and suburban lawns into sewers, then into lakes, where these excessive nutrients fuel massive algae blooms.

Even northern waters are losing fish habitat. The housing boom on fishing lakes is turning native lakeshore and shallow water vegetation into lawns, rocky riprap, and sand beaches. Few lakeshore owners realize that the native plants (the so-called “weeds”) they remove help sustain healthy fish populations. Within a few years, the water gets murkier from fertilizer runoff, and, lacking bulrushes and other emergent plants in shallows, fish have fewer places to hide and grow. The great fishing that drew people to the lake in the first place inevitably deteriorates.

Summing up the irony, one fisheries manager notes: “Lakeshore owners who don’t see the connection between lakeshore habitat and fish populations too often end up wrecking the very thing they value.”

But there is good news to report, too. Each year, we team up with a growing number of fishing clubs and lake associations to improve and protect fish habitat on dozens of lakes and streams statewide.

Success Story

Aquatic Plant Restoration

Since 1991, we have been reestablishing emergent aquatic plants on Knife and Pokegema lakes in east-central Minnesota. High water, overabundant carp, and relentless waves had uprooted existing plants, which are important fish and wildlife habitat.

“The plants are taking hold,” reports Jack Lauer, assistant fisheries supervisor at Hinckley, “but it’s slow going.”

Lauer and student workers have been transplanting hardstem bulrush, river bulrush, and giant bur reed from nearby lakes to Pokegema and Knife. After obtaining a required DNR permit, the workers uproot the plants, transport them to the new lakes, and plant them in one- by three-meter plots. The plants are anchored with river stones and protected with windbreaks.

The emergent vegetation provides habitat for underwater insects that fish eat, nesting areas for crappies, sunfish, and bass, and spawning habitat for northern pike. They also protect windswept shorelines from wave erosion.

HABITAT IMPROVEMENT

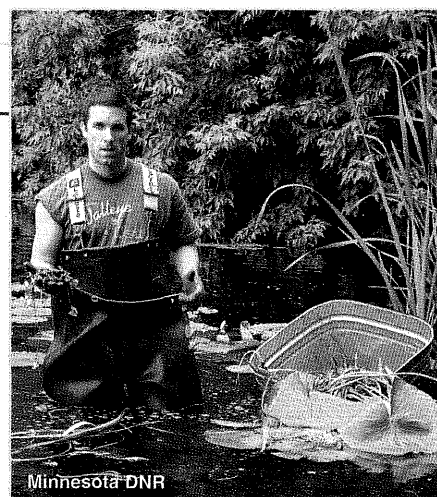
Aquatic plant restoration

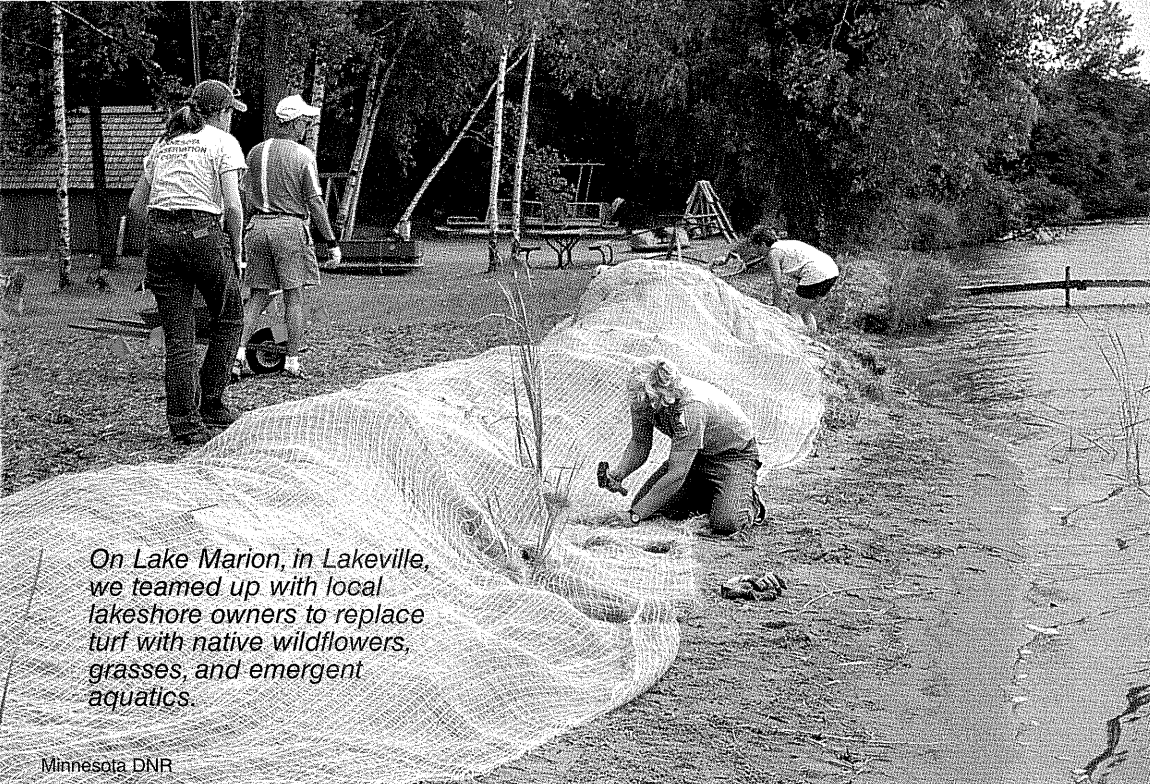
To restore the natural features of lakeshores that provide fish habitat, fisheries managers work with local lakeshore owners on landscaping that’s friendly to lakes. This new approach replaces some or all lakeside lawns and beaches with native wildflowers, shrubs, grasses, and aquatic plants. A growing number of lakeshore owners are learning that restoring natural vegetation can cut maintenance costs, prevent unwanted pests such as Canada geese, attract butterflies and songbirds, and improve fish habitat in shallow water.

In 1998, we established an Aquatic Plant Restoration Program. Working with local communities, program staff members have set up more than a dozen clearly marked demonstration sites near boat ramps and lakeside parks throughout the state. Here, lakeshore owners can see how their property might look with native vegetation. And they can learn where to get more information on habitat restoration. The program has also produced a “Save Your Shoreline” video available for loan to citizens and lake associations.

Spawning area improvement

Fisheries managers work to prevent eroding shorelines from sending sediment into the water, where it smothers fish eggs and the underwater insects that fish eat. They show willing





On Lake Marion, in Lakeville, we teamed up with local lakeshore owners to replace turf with native wildflowers, grasses, and emergent aquatics.

Minnesota DNR

landowners how state or federal conservation programs make it cost-effective to convert plowed land along the lake edge into grassy strips that filter runoff and stabilize banks. On some lakes, fisheries managers use backhoes to slope back steep banks and create a gentle contour less easily eroded. Then they restore the sloping bank with native grasses and trees that anchor the soil.

On some large reservoirs, such as Lake Winnibigoshish and Lake Lac qui Parle, fluctuating water levels can eat away at shorelines. Here fisheries managers install large boulders to shore up eroding banks. On Winni, more than 4.5 miles of the lakeshore has been reinforced since 1989. Walleyes are now spawning in the improved habitat.

Fisheries crews also alter water levels in marshy areas used by northern pike for spawning to create more favorable conditions for reproduction.

River and stream habitat improvement

On large rivers, fisheries managers work with the staff of the DNR Ecological Services Division to improve fish access to spawning habitat. On the Red River of the North, for example, several lowhead dams have been replaced with a series of rapids that allow fish to reach upstream spawning tributaries. On the Mississippi River near Lake City, fisheries managers have worked with the U.S. Army Corps of Engineers to alter water levels above and below lock and dams to improve habitat for northern pike and bluegills.

Working with other agencies and local units of government, we restore natural curves in river and stream stretches that have been straightened by artificial channels.

We also team up with anglers to make streams better places for trout by installing 20- to 40-foot-long box frames, called *lunker structures*, where fish can hide from predators and grow larger. We

also put boulders along eroding streambanks and add underwater rocks that force the current to deepen and scour streambeds.

Most stream habitat improvement occurs on private land stream easements. In exchange for a onetime payment, landowners allow us access to streams to do improvements and allow anglers access for fishing.

In southeastern Minnesota, we have secured stream easements on more than 40 percent of the trout stream miles flowing through private land.

Lake aeration

Every few winters, most or all fish in many shallow lakes die for lack of oxygen. Called *winterkill*, this occurs when thick ice and snow block sunlight from reaching underwater plants. When the plants die, they decompose and use up dissolved oxygen needed by fish. Usually it takes three to four years for the lake's fish population to recover.

The solution to this problem is remarkably simple: Add oxygen to the lake using an aeration system. One system uses a pump and baffle to draw water from the lake up onto shore, where it collects oxygen by cascading over boulders before returning to the lake. Another keeps an open area in ice where air can mix with water.

Success Story

Sleepy Eye Lake

Before Sleepy Eye Lake near New Ulm was rehabilitated, its water in midsummer resembled pea soup. Biologists who lowered a black-and-white saucer-sized plate, called a secchi disc, into the lake watched it disappear from view just 2 feet below the surface. Anglers rarely caught anything but carp and bullheads. Swimming was not even considered.

Then, in 1993, we used rotenone to kill all the fish in Sleepy Eye and then restocked it with panfish, yellow perch, catfish, northern pike, and largemouth bass. With fewer carp and bullheads to stir up bottom sediment, the water has cleared. Today a secchi disc lowered 8 feet down is still visible. As a result of the clearer water, underwater plants are thriving and the fish population is booming. Northerns over 20 inches, bass and catfish up to 5 pounds, and good numbers of bluegills, bass, and crappies are caught regularly. Local kids say the swimming is awesome.

How we improve your fishing

These and other aeration systems add enough oxygen to prevent winterkill. As a result, they provide fishing opportunities that otherwise wouldn't exist. Many southwestern Minnesota lakes that often lacked fish three years out of four now offer good angling year after year.

Most aeration systems are purchased by the DNR and installed and run by local conservation clubs and units of government in consultation with local fisheries managers. We help decide what types of systems would work best and where they should go, and we check them periodically to make sure the devices are working.

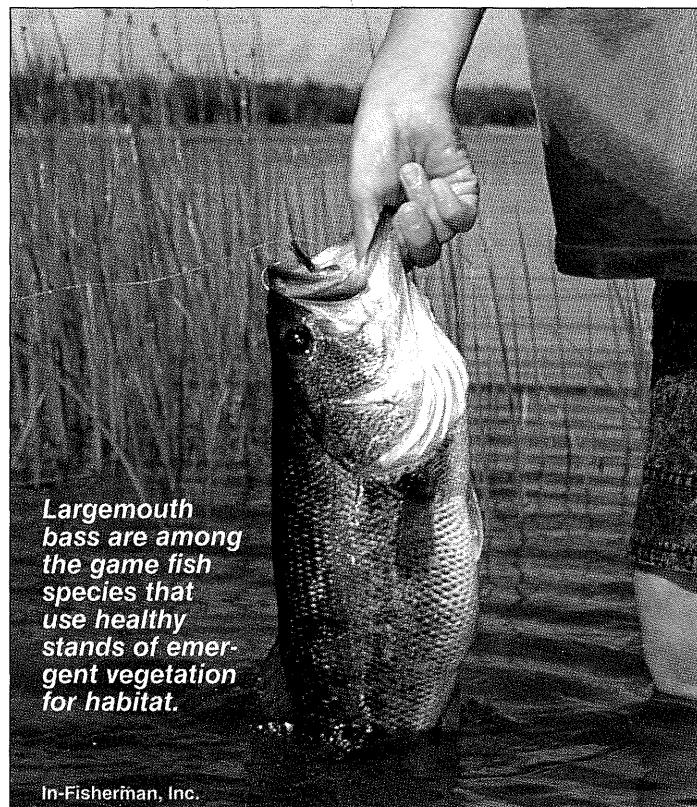
The first lake aeration systems were installed in the early 1960s. Today, roughly 270 of the systems are aerating shallow lakes. We approve approximately 12 new aerator permits each year, mostly in the Twin Cities Metro Region and southwestern Minnesota.

Lake rehabilitation

Fish habitat in many shallow lakes has been destroyed by carp and black bullheads. These fish root in the silty lake bottoms and stir up nutrient-laden sediment. The murky water blocks sunlight from reaching aquatic plants that stabilize the lake bottom and provide oxygen and habitat for game fish and water insects. Bluegills and bass numbers drop, while the seemingly indestructible bullheads and carp thrive in the gray-green soup.

The only way to begin restoring the ecological balance in these damaged lakes is to first remove all the offending fish. And the only proven method of doing that is to kill the entire fish population and restock the lake with game fish. This process is called *lake rehabilitation*.

The fish are killed by applying rotenone, a natural chemical derived from a South American tree. Rotenone kills gilled animals by preventing them from using dissolved oxygen. In the concentrations used by the DNR, it is harmless to humans or any wildlife that eat fish killed by the substance. Rotenone breaks down into carbon dioxide and water within a few weeks, rendering it completely harmless.



Lake rehabilitations aren't long-term solutions, however. Because the carp and bullheads eventually return to lakes through connected waters, many rehabilitated lakes return to their sorry state within 10 years.

The sediment that carp and bullheads stir up is loaded with nutrients from surrounding farm fields. And nutrients and other contaminated runoff flow into lakes from distant farms, parking lots, streets, and lawns. The nutrients fuel blooms of algae, which, when they die, consume oxygen needed by fish and underwater insects.

That's why fisheries managers increasingly focus on reducing the influx of this *non-point-source pollution* as part of a long-term solution to improving fishing in these lakes.

Lura Lake Before and After



A. Before 1997, Lura Lake in Blue Earth County was farmed to its edge, causing the steep banks to erode and send silt into the water. **B.** With permission from local landowners, we used backhoes to slope back the banks and create a contour that is less easily eroded by waves. **C.** Finally, we placed boulders along the water's edge and planted switchgrass and trees along the shoreline.

HABITAT PROTECTION

Land acquisition

In 1992, the Minnesota Legislature created a new public land classification called aquatic management areas (AMAs). Modeled after wildlife management areas, AMAs are purchased from willing sellers to protect the environmentally vital shoreline and littoral (shallow water) edge of lakes, streams, and rivers.

The focus of AMA acquisitions is critical shoreline habitat, muskellunge spawning areas, and walleye nurseries. Once purchased, the areas are protected from development, pollution, and other damage.

Each year, we buy roughly 15 AMAs using money from the Environment and Natural Resources Trust Fund (state lottery), the Reinvest in Minnesota Critical Habitat Match Program, and the Legislative Commission on Minnesota Resources. So far more than 100 AMAs have been purchased throughout the state.

Before the AMA acquisition program began, we had purchased more than 150 wetland fish spawning sites next to lakes and acquired more than 210 miles of easements along trout streams. In addition to providing access for angling and stream improvements, the brushy and grassy easements shade the water to keep it cold and filter out sediments flowing in from surrounding farmland.

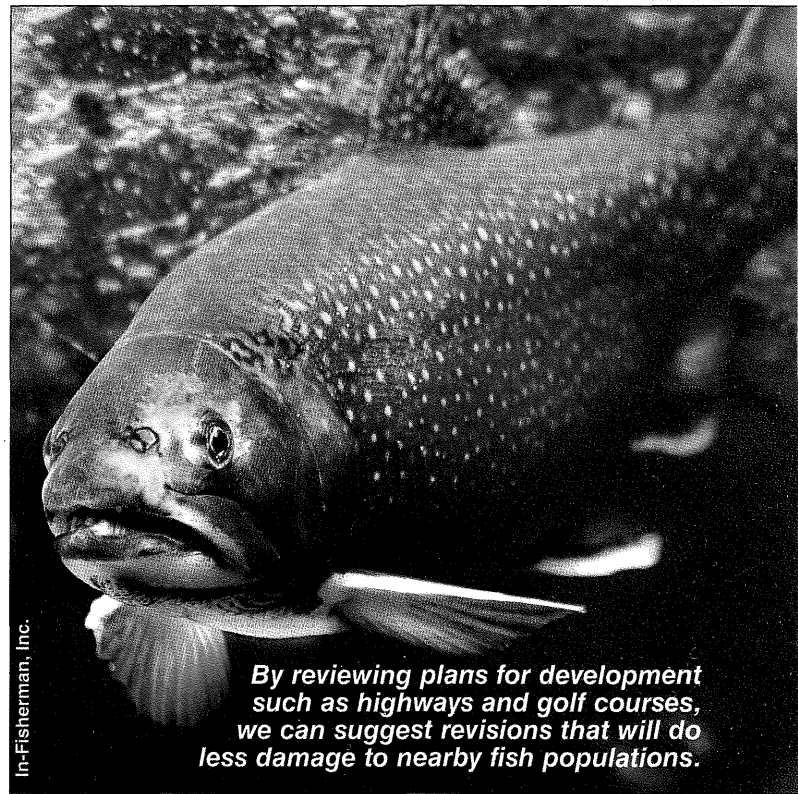
Environmental review and watershed coordination

It's far less expensive to protect fish habitat from harm beforehand than it is to repair the damage afterwards. That's the idea behind environmental review and watershed coordination. Fisheries managers and other DNR staff members scrutinize plans by developers, other agencies, and local governments to see if the proposed developments might damage nearby fisheries.

For example, a proposed golf course irrigation system might suck away vital water from a trout stream, or a proposed resort expansion could irreparably damage a lake shoreline.

Each year, we review hundreds of development projects. By conducting these environmental reviews, we can head off potential disasters and offer suggestions to developers and others on how the plans might be revised to lessen harm to fish habitat and populations.

This "ounce-of-prevention" philosophy is also behind our decision to fund several DNR watershed coordinators, who work with citizens and local governments to protect water quality and fish habitat throughout Minnesota.



In-Fisherman, Inc.

By reviewing plans for development such as highways and golf courses, we can suggest revisions that will do less damage to nearby fish populations.

Success Story

Moody and Gladstone Lakes AMA

In March 2000, we acquired a 195-acre parcel of land in Crow Wing County containing 3,700 feet of undeveloped shoreline on Gladstone Lake and an entire 40-acre pristine lake named Moody. The Moody and Gladstone Lakes AMA, says Brainerd area fisheries manager Tim Brastrup, "contains perhaps the last high-quality undeveloped shoreline of significant length in Crow Wing County." In addition to providing fish habitat, the aquatic management area provides bald eagle roosts, shore fishing access, "and a place to observe some of the most beautiful sunsets you've ever seen," says Brastrup.

The property was owned by Marie Malskeit, a lifelong landowner whose mother had been deeded most of the property from the Theodore Roosevelt administration in 1907. The elder Malskeit had instructed her daughter to eventually put the land into state ownership. Brastrup says Marie Malskeit, who had been a careful steward of the property, accepted less than the appraised value for the land, donating the \$43,600 difference to the Reinvest in Minnesota (RIM) Critical Habitat Match Program, which was used to buy the property. Most RIM funds are generated by conservation license plates, which the state sells to buy important habitat for fish, wildlife, and native plants.

How we improve your fishing

Stock FISH

When done well, stocking can work wonders. Hundreds of Minnesota walleye lakes would today offer little or no walleye fishing were it not for regular stocking. Stocking is responsible for the tiger muskies hooked each year in Twin Cities Metro Region lakes. Stocking has helped restore the native lake trout population on Lake Superior. Stocking has created new trout fishing opportunities on Arrowhead Region lakes. And stocking has been used to repopulate dozens of lakes in which all the previous fish were deemed undesirable and removed (see "Lake rehabilitation," page 8).

Walleye stocking

We stock walleyes in roughly 900 lakes throughout the state, adjusting stocking levels up and down as necessary. The goal of these manipulations is to find appropriate stocking levels that increase or maintain healthy walleye populations.

Our prudent, scientific approach appears to be working (see chart on the following page). Overall walleye populations have continued to increase on stocked lakes since 1977, even though we stock fewer walleyes now than in the 1980s.

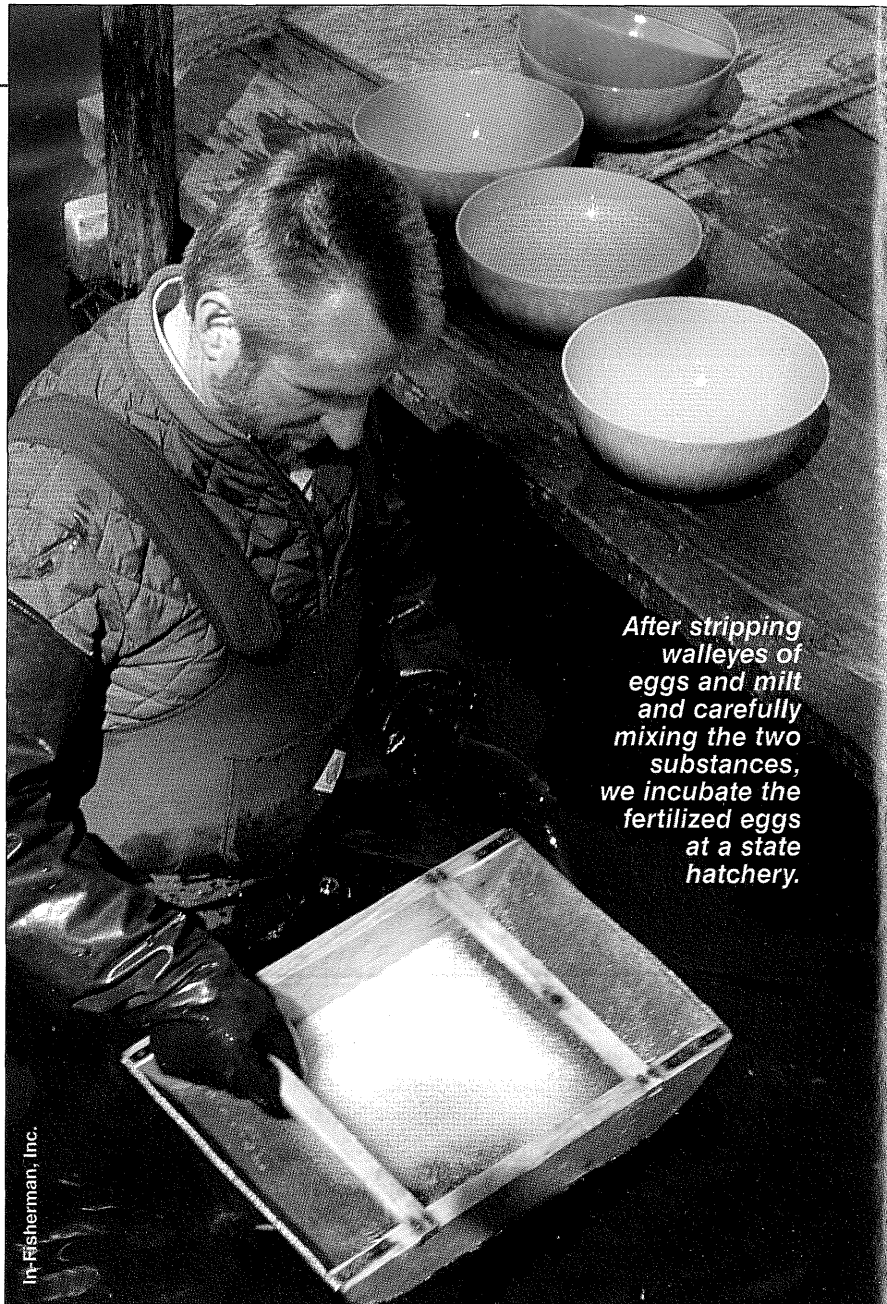
Not every lake is stocked with walleyes. Many large, windswept northern lakes are natural walleye factories that don't need a visit from the hatchery truck. To stock these lakes would be like planting corn in a field already sown with seed.

And some lakes aren't stocked with walleyes because they are better suited for natural bass and panfish populations. On some bass and panfish lakes where angler harvest pressure justifies the cost, such as Lake Minnetonka, we stock walleyes to compensate for limited natural walleye reproduction.

On each lake, fisheries managers must consider the cost versus the benefits of walleye stocking, the likely effects on other fish populations, and how well previous stockings worked. Only then do they recommend whether a lake should be stocked or not.

As one manager puts it: "Not all waters can be fishing waters, and not all fishing waters can be walleye fishing waters."

Minnesota leads the nation in the pounds of walleyes reared and stocked.



After stripping walleyes of eggs and milt and carefully mixing the two substances, we incubate the fertilized eggs at a state hatchery.

In-Fisherman, Inc.

Rearing and stocking fish

Though walleyes get most of the attention, we also stock several other important fish species. We rear walleyes, catfish, muskellunge, and smallmouth bass in 12 warmwater hatcheries, and we rear stream trout, lake trout, and salmon in five cold-water hatcheries spread throughout the state.

The main warm-water hatchery work begins in April, when DNR workers net spawning walleyes, strip the eggs and milt (sperm), and mix the two together. The fertilized eggs are then taken to the hatcheries, incubated, and hatched. About two-thirds of the tiny fry are stocked a few days after hatching. The rest are reared over the summer to fingerling size (4-6 inches) in more than 200 rearing ponds (winterkill wetlands and lakes). In fall they are netted and taken to lakes for stocking.



In-Fisherman, Inc.

Coldwater hatchery work goes on year-round. Spawn taking occurs in the fall, when eggs and milt are taken from brown trout, brook trout, and lake trout. The fertilized eggs are incubated through the winter and then the young fish are stocked in the spring or the following fall.

Common walleye stocking questions

Q: What's the difference between stocking walleye fry and stocking walleye fingerlings?

A: It's more cost effective to stock fry (mosquito-sized walleyes) than fingerlings (4- to 6-inch walleyes), so we stock fry most often. Sometimes a fisheries manager will stock fry in the spring and then check back in the fall to see what proportion survived to reach fingerling size. If not enough did, then supplemental fingerlings may be stocked that fall.

Another difference is that fry stocking is more variable—some years are booms; some are busts. Fingerling stocking results tend to be more consistent.

Q: How long does it take a stocked fish to reach catchable size?

A: It takes several years for the tiny walleyes stocked each spring or fall to reach 1 pound, or about 14 inches. Warmer, southern lakes have longer growing seasons, so walleyes grow more quickly there than in the north.

LAKE REGION TIME TO REACH 1 LB.

South	3-4 years
North	4-5 years
Northern border	5-6 years

Q: How many fish get stocked in a lake?

A: Most lakes that are stocked receive an average of 1,000 fry or 1 pound of fingerlings per *littoral acre* (a surface area less than 15 feet deep). To come up with specific stocking levels and rates, local fisheries managers consider a wide range of factors. These include walleye growth rate, survival, and mortality; lake type, forage base, and amount of natural reproduction; and public requests for stocking.

Q: Why are some lakes stocked with more walleyes than other lakes?

A: Bigger stocked lakes generally get more fish than smaller lakes. Stocking levels can vary however, depending on factors such as the amount of prey available and lake productivity. For example, lakes that have lots of yellow perch generally can support more walleye stocking than lakes that don't.

Q: Why does the DNR stock lakes every other year rather than yearly?

A: A generation of walleyes stocked or hatched one year (called a *year class*) will eat much of the food needed by the next year class. This phenomenon is called *year class suppression*. To prevent this from happening to stocked walleyes, fisheries managers usually stock every other year.

Success Story

Walleye Stocking

During the 1980s, we evaluated our stocking policy to see where it might be improved. In the 1990s, as a result of

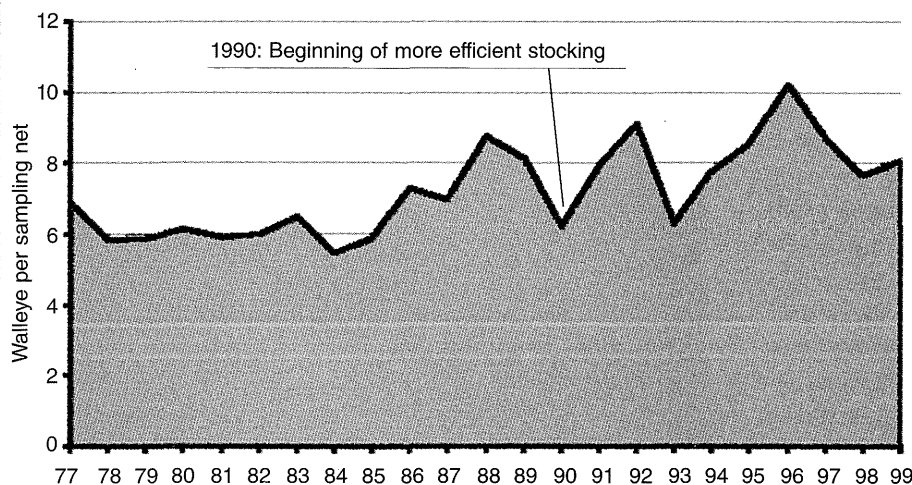
that analysis, we decreased the amount of walleyes we stocked in Minnesota lakes while increasing the overall effectiveness of stocking. The result has been a continual increase in walleye abundance in stocked lakes while we have saved time and money by not stocking lakes that hadn't been benefiting from the practice.

A new Accelerated Walleye Program aims to further increase walleye abundance on stocked lakes by boosting stocking rates on lakes where it appears to do the most good.

The chart at left shows that walleye abundance has steadily grown over the past two decades, even after 1990, when we began stocking fewer walleyes but stocking "smarter" (targeting lakes where stocking worked best and discontinuing stocking where it was not benefiting anglers).

Increasing Walleye Abundance 1977-1999

All 878 Currently Stocked Walleye Lakes



Big Issues

In a state where angling has near-religion status, fisheries management has always fostered lively debate. Here are five major issues being discussed by anglers and DNR fisheries managers.

1. Experimental regulations

These harvest regulations are tailored to individual lakes and streams and different fish species. On Kandiyohi County's Long Lake, for instance, all walleyes between 16 and 20 inches must be immediately released.

Biologists believe that limiting harvest of some sizes of fish is the most effective way to improve the average size of fish that anglers catch. Under the direction of the Fishing Roundtable, a group representing fishing interests, the DNR has placed experimental regulations on 90 lakes and 25 streams and rivers.

Issues: Some anglers don't want to release keeper-sized fish. Other anglers say it's worth releasing those fish in order to catch bigger ones in the future. Some resort owners believe the regulations drive away customers. Other resort owners see the regulations as the best way to increase fish size and attract future customers.

Meanwhile, we continue to learn which regulations work best for various waters and species.

2. Bag limits

We want to be able to explain why Minnesota's bag limits are what they are. Right now, that's difficult. Many bag limits were set more than 50 years ago. No one can recall why, for example, the crappie limit was set at 15.

We are currently examining the biological and social ramifications of existing and proposed bag limits. And we are gathering input from anglers and others.

Issues: Because only a small fraction of anglers ever catches a bag limit or even near a limit on a given day, lowering limits by just one or two fish usually does little to reduce harvest (though there are some exceptions). Still, many anglers support moderately decreasing bag limits to promote conservation.

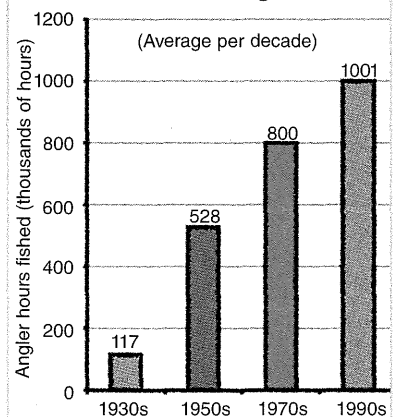
3. More pressure, better gear

Fishing pressure has continued to increase since the 1950s. Though the number of anglers is up only 15 percent since then, there appears to be a dramatic increase in the average number of days each angler fishes. On Lake Winnibigoshish, for example, the number of angler hours fished per year nearly doubled from the 1950s to the 1990s.

Meanwhile, continual improvements in fishing gear have made anglers more effective at finding and catching fish. Anglers have graduated from rowboats to comfortable fishing rigs, from steel poles to graphite rods, from braided Dacron to monofilament, and from using a rock on a string for finding lake depths to using sophisticated depth finders and fish locators.

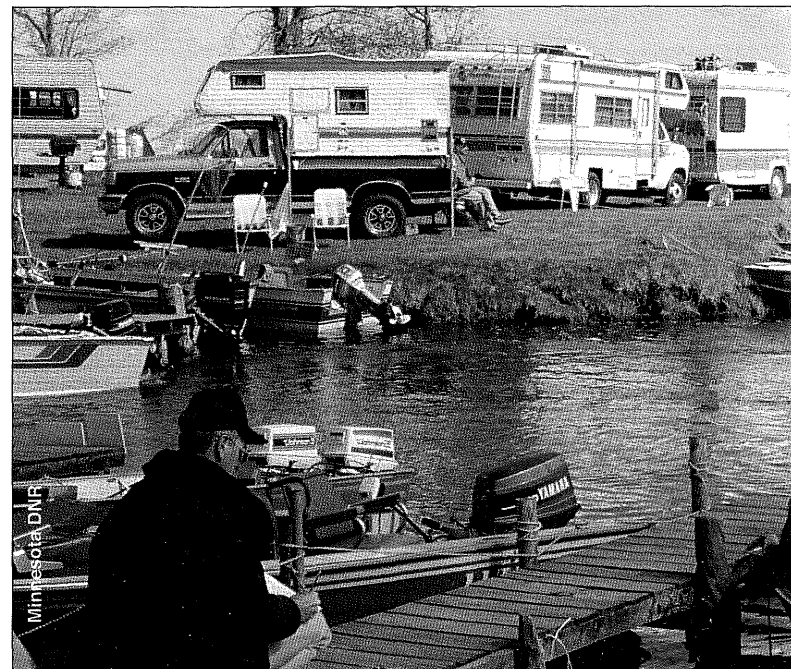
As fishing pressure and technological advances increase, the number of fishing waters remains constant. Something has

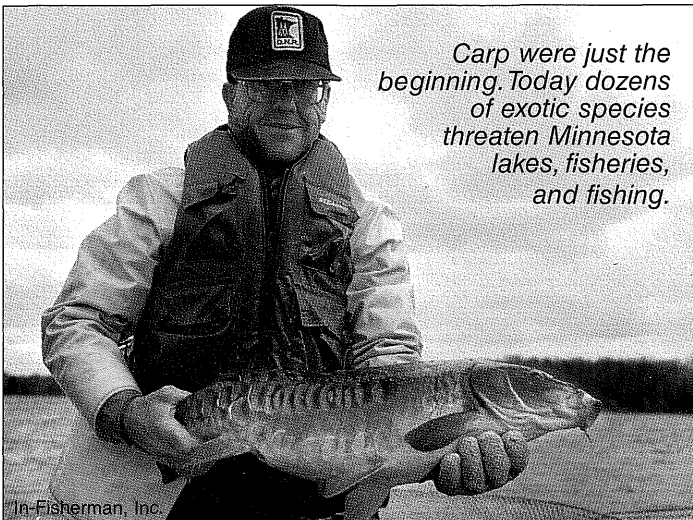
Growing Fishing Pressure on Lake Winnibigoshish



In-Fisherman, Inc.

Is the gain of making fish bigger worth the pain of letting them go?





Carp were just the beginning. Today dozens of exotic species threaten Minnesota lakes, fisheries, and fishing.

to give. On many lakes, it now takes longer to catch fish—and the average fish caught is smaller—than was true 50 years ago. In other words, the size of the pie hasn't changed, but each slice is getting smaller.

Issue: Should we impose limits on technology to protect fish from overharvest? Should such limits be voluntary, and, if so, would enough anglers comply to make a difference? Or is the sacrifice not worth the benefit for most anglers?

4. Exotic species

Harmful aquatic animal and plant species such as the zebra mussel, round goby, spiny water flea, and ruffe increasingly threaten to permanently harm Minnesota's fish populations and fishing. Zebra mussels, which consume food at the base of the food chain, recently invaded one of Minnesota's inland waters, Lake Zumbro, for the first time. Spiny water fleas are now clogging fishing tackle on Lake Superior charters. And several new species of destructive Asian carp are poised to enter Minnesota

from southern states via the Mississippi River. These and other species could displace native fish species and alter the food chain that supports game fish.

Issue: If anglers and boaters don't do more to prevent the spread of exotics—like removing plants from boats and draining livewells before leaving a lake—then Minnesota's fish populations and fishing are bound to suffer.

5. Accelerated Walleye Program

In the 1990s, in an effort to stock more efficiently, we scaled back on our walleye fingerling stocking. These reductions convinced some anglers that walleye populations in Minnesota's stocked lakes were declining.

On average, walleye populations in stocked lakes have actually been increasing (see chart, page 11). But walleye numbers on some lakes did drop, raising public concern. In 1999, using additional funding from the state legislature, we began the Accelerated Walleye Program. Over the past two years, local fisheries managers have carried out the program to:

1. increase acreage for natural ponds used to produce fingerlings by roughly 5,000 acres
2. increase by 23 percent (88,000 lbs in 1999 to 108,500 lbs in 2000) the pounds of fingerlings produced from state rearing ponds, despite poor rearing conditions caused by mild winters
3. increase walleye fingerling stocking quotas on 90 lakes
4. increase walleye population abundance goals on 58 lakes
5. solicit public input on 141 lake management plans
6. purchase walleyes from commercial growers to supplement our production.

The main thrust of the sped-up walleye program is to add more walleye fingerlings on lakes where stocking will have the best chance of improving fishing.

Issue: We are committed to finding lakes that will benefit from increased stocking and to stock more walleyes there. However, years of evaluations and research have proven that increased stocking won't improve fishing on every lake. That's why a main component of the accelerated program is to evaluate the stocking we do.

Fisheries managers will continue to review historical lake survey information and meet with local anglers to determine which lakes have the best potential to produce more walleyes. And fisheries managers will evaluate how well increased stocking works on those lakes to see if it's worth continuing to stock at higher levels.



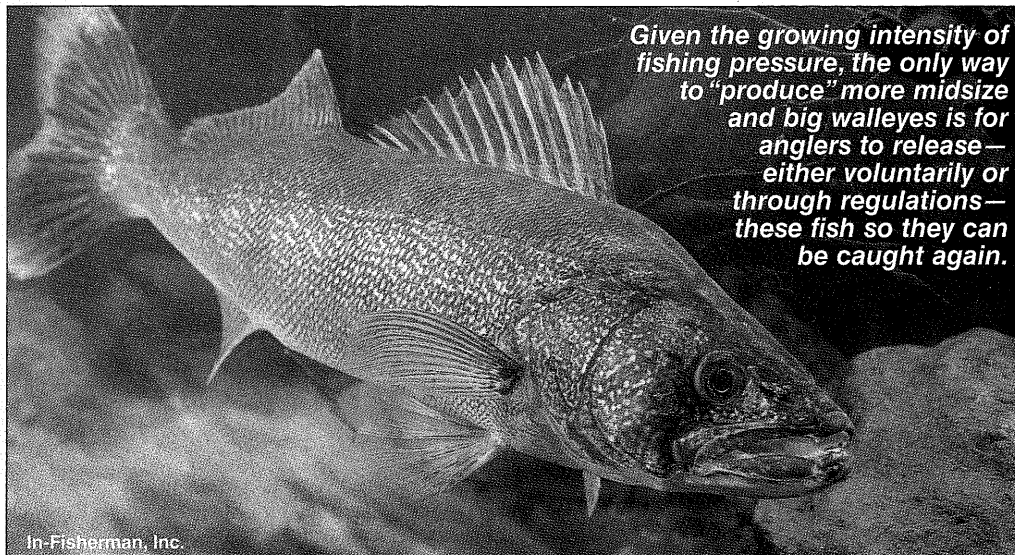
In-Fisherman, Inc.



Opening day on Lake Mille Lacs: More anglers are fishing more often, putting increasing pressure on Minnesota's limited fish populations.

How we improve your fishing

Adjust Harvest REGULATIONS



Given the growing intensity of fishing pressure, the only way to "produce" more midsize and big walleyes is for anglers to release—either voluntarily or through regulations—these fish so they can be caught again.

In-Fisherman, Inc.

No pain, no gain. That sums up why experimental fishing regulations are needed and how they work.

Fishing regulations are like a diet. If they don't require giving up something, they won't help improve fishing. And yet, like pudgy dieters hoping to shed pounds while eating glazed doughnuts, most anglers want to catch bigger fish but have traditionally opposed regulations that would restrict their catch.

That's changing. Anglers increasingly understand that releasing certain sizes of fish (called *selective harvest*) can help increase the number and size of fish they catch in the future. There's pain, sure. But the gains are worth it.

Yet even if people increasingly agree that selective harvest is worthwhile, exactly what sizes of fish need to be released? How many? Which species benefit from this management approach? And on what lakes will it work best?

We are trying to find out. On 90 lakes and 25 streams and rivers, we have established experimental fishing regulations to protect certain sizes of various fish species. Anglers generally support the new regulations, and many are calling for experimental regulations to be placed on additional lakes, streams, and rivers.

The regulations are called *experimental* because research scientists are studying their effects on fish populations and angler harvest. In time, the researchers will be able to tell us which regulations will work best on certain lakes to improve fishing for certain species.

The need for customized fishing regulations grew from the observation by anglers and fisheries managers in the 1980s that fish size was declining. Anglers had become so effective at catching fish, and fishing pressure had grown so intense, that fish were being caught as soon as they reached "keeper" size.

Because a lake can produce only so many pounds of fish—whether as many small ones or a few big ones—the intense pressure tipped the balance toward many small ones, as anglers took home most of the keepers.

The solution? Protect the keepers, so they could grow into the big fish that anglers enjoy hooking.

This flew in the face of traditional wisdom, which was to throw back the small fish so they'll grow up to be keepers. But on many lakes, releasing small fish doesn't help. These lakes usually have more than enough small fish.

Because relatively few small fish ever survive predation and disease to reach catchable size, what's most needed are more midsize fish. And the only way to "produce" more of these is to harvest fewer.

On many walleye lakes, the best way to increase the number of big walleyes (over 20 inches) that anglers can catch is to limit the number of midsize fish (such as 16- to 20-inchers) they can kill. Back in the water, those midsize walleyes can then grow for a few more years before being caught again.

Another common misconception is that a released fish is a stocked fish. Actually, a released fish is much more than that.

Success Story

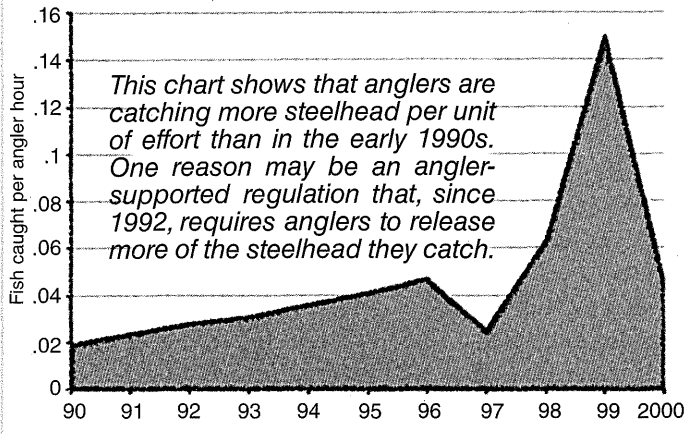
Rainy Lake

In 1994 we established a slot limit on this sprawling Canadian border lake. Anglers had to release all walleyes 17 to 25 inches long and could keep only one longer than 25 inches. The regulations were designed to protect the walleye population, which was recovering from years of overharvest by commercial and sport anglers.

The slot limit appears to be helping protect several strong year classes of walleyes that are now prime harvest size. Rainy's catch rate has tripled from an average of one walleye caught per 4.5 hours of fishing in the 1980s to one per 1.5 hours today. Bookings at resorts have skyrocketed, and on some weeks guides actually have to turn away customers.

In fact, so good is the fishing at Rainy that Minnesota's side is in danger of being overharvested—even with the slot limit. Kevin

Increasing North Shore Steelhead Catch Rate 1990-2000



Because so many stocked fish don't survive, a released 20-inch walleye is more like 1,000 stocked fingerlings.

Which regulations work best? It depends on the lake or stream and the fish species. That's why we have so many different experimental regulations. Minimum size limits work well for slow-maturing species such as muskies. Protected slot limits work well for bass and walleyes. And what works on a relatively sterile northern Minnesota lake likely won't do the same on a fertile southwestern Minnesota lake.

We are learning more about harvest regulations with an experiment that began in 1994. We started with 25 lakes and have continued to expand—now to 90 lakes—while learning more about the effects of various regulations on different species and water along the way.

The long-term plan is not to have a different regulation for every single Minnesota fishing lake. That would be too complicated, like having a different speed limit on every single road. But we eventually will come up with a range of regulations that local fisheries managers could offer to local anglers looking for ways to improve fishing on their lakes and streams.



Peterson, DNR area fisheries manager at International Falls, says that record harvests in recent years have exceeded what biologists believe is the maximum sustainable level on the U.S. side.

In response, we recently tightened regulations further to protect the walleye population. Beginning March 1, 2001, anglers must immediately release any walleyes from 17 to 28 inches long and may keep only one longer than 28 inches. In 2002 the bag limit is scheduled to go from six to four.

The rule change has the support of the Rainy Lake Sportfishing Club, a local angling group and advocate of walleye conservation.

"We want to make sure this fish population stays as healthy as it is," Peterson says. "These new regulations should help do that."

Terminology of limits

Bag, or possession limit: This is the total number of a certain species that an angler may possess, in one day or over several days, both on the water or off. For example, you may not have in your possession more than six walleyes, and that includes what's in the livewell and in the cabin freezer.

Use: This general, statewide limit prevents the commercialization of sportfishing and distributes the catch among anglers. But because so few anglers ever catch a limit (roughly 1 percent of anglers on any give day harvests a walleye limit), current bag limits generally do little to protect fish populations from overharvest.

Protected slot limit: This is a size range, or slot, in which fish must be released. For example, a 12- to 16-inch slot limit for bass means that all bass from 12 to 16 inches long must be released.

Use: Protected slot limits protect medium-sized fish so they can grow to be the large fish anglers most enjoy catching. They also preserve fish that are at their most prolific spawning age.

Harvest slot limit: This is a size range in which fish may be kept. For example, a 14- to 18-inch harvest slot means that only fish between 14 and 18 inches may be kept. All others must be released.

Use: Harvest slot limits protect larger, spawning-aged fish while limiting the overall harvest.

Minimum size limit: This limit requires that all fish below a set length must be released. For example, the statewide minimum size limit for muskellunge is 40 inches, meaning that you may not keep a muskie less than 40 inches long.

Use: This protects slow-maturing fish such as muskies, steelhead, and lake sturgeon until they can spawn at least once.

Maximum size limit: This means that all fish above a set length must be released. A 24-inch maximum size limit for northern pike means you may not keep a northern that's longer than 24 inches.

Use: This works much like a protected slot limit to increase the number of medium and large-sized fish.

One-over limit: This means you may only keep one fish over a set length. For example, in 2001 on Lake Mille Lacs you may only keep one walleye that is more than 28 inches long.

Use: This limit allows the harvest of a true trophy fish that an angler might catch once in a lifetime.

Inform and EDUCATE

Which lakes have the best walleye fishing? Which streams contain native brook trout? Is a slot limit the best way to increase fish size? What's the link between farming practices and fish populations?

Such are the questions answered regularly by DNR fisheries managers throughout the state. Providing this information and educating interested anglers, lakeshore owners, and kids is among the most important work we do.

Anglers in particular are ravenous for DNR Fisheries information. Each day the DNR web site gets more than 60,000 "page hits," mostly from people looking up lake survey reports. In spring the DNR Information Center gets hundreds of phone calls and e-mail requests each day, mostly from anglers.

Local fisheries managers meet regularly with many of the more than 300 fishing groups and 600 lake associations throughout the state. The managers listen to the concerns of anglers and lakeshore owners, present lake survey information, propose experimental regulations, and discuss the state of local lakes and streams. Fisheries managers also give presentations to school groups and civic groups, talk regularly on radio shows, provide information to reporters, and field questions from visiting anglers and real estate agents.

To reach an even broader audience, fisheries managers appear at fairs and other events. The DNR building at the Minnesota State Fair is one of the biggest, attracting 700,000 fairgoers each year. For many families, no trip to the State Fair is complete without a stroll past the aquariums inside the DNR building and a stop at the outdoor fish pond to marvel at the large muskies, gar, paddlefish, bass, and other species.



In-Fisherman, Inc.

MinnAqua

According to the 2000 U.S. Census, most rural counties in Minnesota lost populations, while urban counties gained. One result of this growing urbanization of Minnesota's populace is that fewer kids are growing up near lakes and streams.

To increase public—particularly urban public—knowledge about lakes, streams, and fisheries, we developed the MinnAqua aquatic education program. MinnAqua's main goal is to teach kids to fish while providing basic instruction on lake and stream ecology, fisheries conservation, and angling ethics.

Over the past 10 years, MinnAqua has reached more than 250,000 kids throughout Minnesota, mainly in the urban areas of Minneapolis/St. Paul, Rochester, and Duluth.

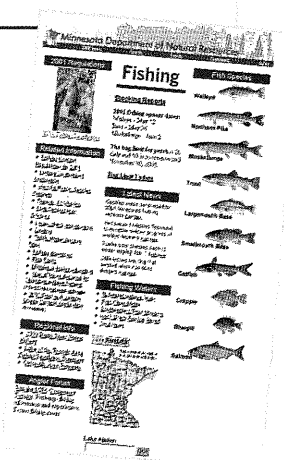
MinnAqua staff work with schools, resorts, and sport shows to get profishing, proenvironment messages out to kids. MinnAqua is also a part of UnderWater World at the Mall of America and has teamed up with the Minnesota Fishing Museum in Little Falls to promote aquatic education there.

Success Story DNR Web Site

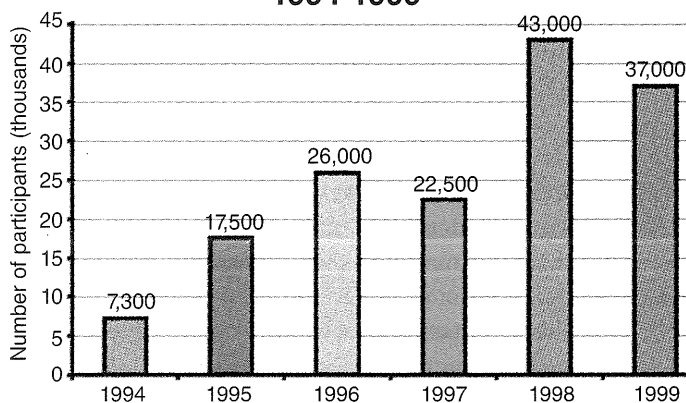
"We continue to be amazed," says one fisheries manager of the phenomenal public interest in fisheries information on the DNR web site (located at www.dnr.state.mn.us). Currently, the site receives more than 60,000 page hits per day and the number increases yearly. Most visitors look up survey information, available for more than 4,500 lakes and streams. Here they can learn:

- what species live in the lake
- relative abundance of fish species compared to other lakes
- lake characteristics such as size and average depth
- latest stocking reports
- current status of the fishery.

Also on the DNR web site is the heavily visited fishing page. Here anglers can learn about the management and regulations of all game fish species, as well as additional angling information.



Steady Growth of the MinnAqua Program 1994-1999



Increase ACCESS

It doesn't matter how good the fishing is if anglers can't get to the water. To provide angler access to Minnesota's lakes and rivers, which are all public waters, the DNR installs and maintains fishing piers and boat ramps. To provide access to trout streams, which are also public waters, fisheries managers buy easements from willing sellers.

Boat ramps

Half of the 3,000 public boat ramps on Minnesota lakes and streams were built and are maintained by the DNR. The rest are administered by counties or local units of government.

Boat accesses have concrete ramps where boats can be



launched. They also have parking areas. Nearby road signs indicate their location. Larger access sites provide toilet facilities. Most accesses are open 24 hours a day

and are regularly patrolled by DNR conservation officers.

Boaters pay for access construction and maintenance through their boat license fees and a federal tax on boat motor oil and fuel. The DNR provides free maps of boat ramp locations for most counties (see page 23).

Fishing piers and shorefishing sites

Anglers can fish from hundreds of fishing piers and shorefishing sites throughout Minnesota. And the DNR installs new piers each year. These fishing facilities are cooperative projects among DNR Fisheries, DNR Trails and Waterways, local units of government, and local conservation clubs.

New piers and shorefishing sites are designed to meet the needs of anglers with disabilities. They are generally within 300 feet, via a hard wheelchair-accessible surface, of a paved parking area. To order a free pier map, see page 23.

Trout stream easements

Most trout streams run through private land. To give anglers easier access to those public waters, we buy easements along trout streams from willing landowners. The landowners get a onetime payment and retain ownership of the property and all rights except the right to prevent fishing. The easements are per-



manent; they remain even if the land ownership changes hands.

Most stream easements, which are strips of land along a stream that generally run 66 feet from the stream center in either direction, have been marked with small tan signs. We provide maps of all stream easements in southeastern Minnesota in a free booklet called *Trout Fishing Access in Southeastern Minnesota* (see sidebar below).

Each year we spend roughly \$200,000 to \$400,000 buying approximately five to 10 new stream easements. Fisheries managers put easements on stretches with the best fishing, especially those close to roads. Where a streamside easement is far from a road, we work with the landowner to buy a walk-in easement that provides access to the stream.

Almost all stream easements are located in southeastern Minnesota, which contains most of the state's trout streams that run through private land. We have purchased easements on more than 250 of the 600 miles of southeastern trout streams running through private property. Most money for easement purchases comes from the Environment and Natural Resources Trust Fund (state lottery).

Success Story

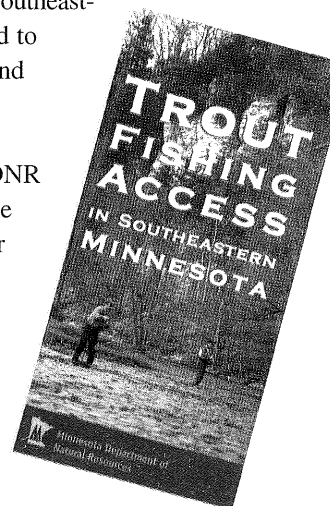
Trout Fishing Access Guide

First published in 1998, *Trout Fishing Access in Southeastern Minnesota* is a free, 100-page color booklet stuffed with maps showing every designated trout stream in southeastern Minnesota. Each stream is color coded to show streamside easements and public land (such as state parks).

The maps also show where we have improved habitat. The easements allow DNR fisheries managers to get equipment to the stream to, for example, install underwater structures that provide hiding places for trout to grow larger.

Savvy anglers know that areas with habitat improvements often provide some of the best trout fishing.

To order a free booklet, see page 23.



How we improve your fishing

Conduct RESEARCH

The DNR's 23 fisheries research scientists spend their days figuring out how to make fisheries management more effective and efficient. They're like guides, assisting fisheries managers through the obstacles of scientific unknowns.

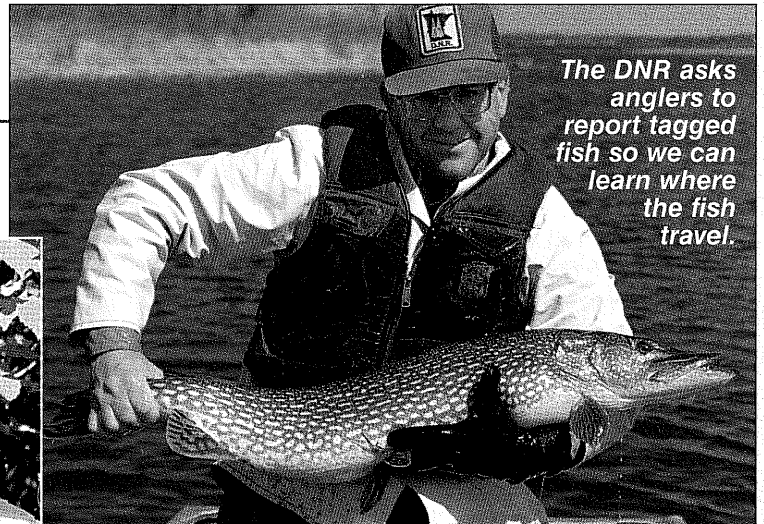
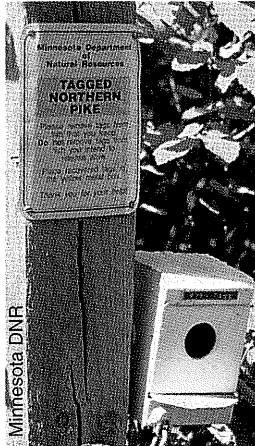
Researchers conduct experiments that answer specific questions posed by managers and anglers, such as:

1. How would lowering bag limits affect fish populations?
2. What customized regulations would work best to increase walleye size?
3. Why don't Minnesota lakes have more big bluegills?

The work of fisheries researchers is closely related to that done by corporate research scientists. Companies rely on research to produce the most effective products for the lowest possible cost. Graphite rods, trolling motors, GPS units, and four-stroke engines all came from the research and development departments of fishing and boating equipment companies. Research is just as essential to the business of fisheries management.

Some research is long-term, such as studies now examining how eight to 10 years of experimental angling regulations affect fish populations and fishing. Other research, such as creel surveys and sturgeon telemetry projects, try to determine in two years or less something specific about a specific species.

Among the important DNR fisheries research findings:



The DNR asks anglers to report tagged fish so we can learn where the fish travel.

- **Fish genetics:** Fish come in different genetic strains, which are subtle variations of the same species. Some strains do better than others in Minnesota waters, so researchers have studied which are best to stock. A study in the Arrowhead Region found that lake trout native to waters where they are stocked survive better than strains from other waters.

- **Habitat improvement techniques:** Among the findings by researchers is that trout numbers per mile of stream rise dramatically if channels are narrowed, banks are stabilized, riffles are kept free of silt, and brush is allowed to grow along streambanks.

- **Walleyes:** Researchers have studied conditions in walleye rearing ponds and refined hatchery techniques to increase the rate of egg fertilization to produce more walleyes for less cost.

We publish the results of research studies in a series of investigational reports. Since 1938, when the first report on the sex ratio of fish caught by ice anglers was written, we have produced more than 460 investigational reports. Currently, we are in the process of providing access to the past 20 years of reports on our web site.



Success Story

Muskie Management

Thanks to research conducted over the past 25 years—and the help of conservation groups such as Muskies, Inc.—muskie anglers have twice as many waters to fish as they did two decades ago, and they have a far greater chance of catching a trophy-sized muskie.

In the late 1970s, researchers followed electronically tagged muskies to learn where they spawned in Leech Lake and how shoreline alterations affected spawning habitat. Other studies showed that muskies thrive in large lakes that contain relatively few northern pike, lots of forage fish such as tullibees, and suitable spawning habitat.

In the 1980s, researchers learned that the Leech Lake strain of muskie survived better and grew larger than other strains. Fisheries managers used this information to direct new stockings of the Leech Lake strain to waters where muskies had the best chance of thriving.

Over the past two decades, muskie research has helped us double the number of lakes containing muskies from 40 to 80, and to provide anglers—especially those fishing Twin Cities Metro Region muskie waters—with more opportunities to catch trophy muskies.

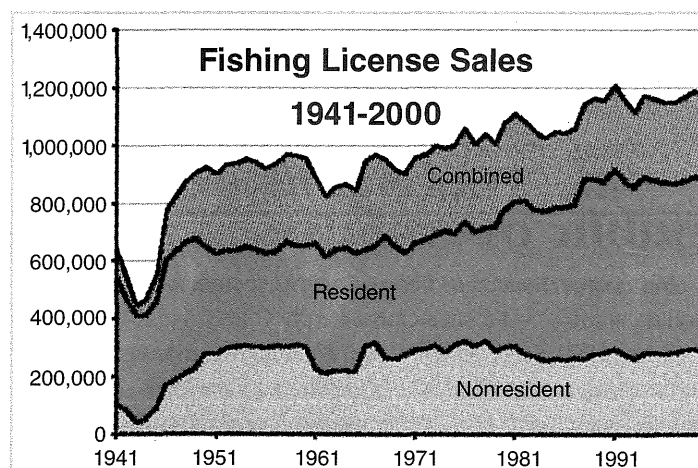
Reality Check

Dispelling some common myths and misconceptions about Minnesota fishing, fisheries management, and fish populations.

The reality of fishing in Minnesota

1. Fishing is thriving

There's a rumor that people just aren't fishing anymore. That may be true in New York City or wherever this myth began, but fishing is definitely doing well in Minnesota. Just check the graph below. Fishing license sales have remained steady in recent years. Though the number of anglers as a percent of population has dropped slightly, there are today 200,000 more licensed anglers than 30 years ago. Obviously, plenty of people still fish in Minnesota each year.



2. Fishing is big money in Minnesota

Another common misconception, especially among those who don't fish, is that angling is a rinky-dink affair, far less important than, say, professional sports.

Yet each year anglers spend more than \$1.8 billion in Minnesota on fishing-related recreation. That's *billion*, with a *B*. The big money goes to boats, gas, and lodging. But the little items add up too. For example, each year anglers in Minnesota spend

- \$50 million on bait
- \$34 million on lures, line, and tackle
- \$8 million on ice.

The figures come from a federal government study on 1996 spending.

On average, an angler spends \$1,086 on fishing in Minnesota



In-Fisherman, Inc.

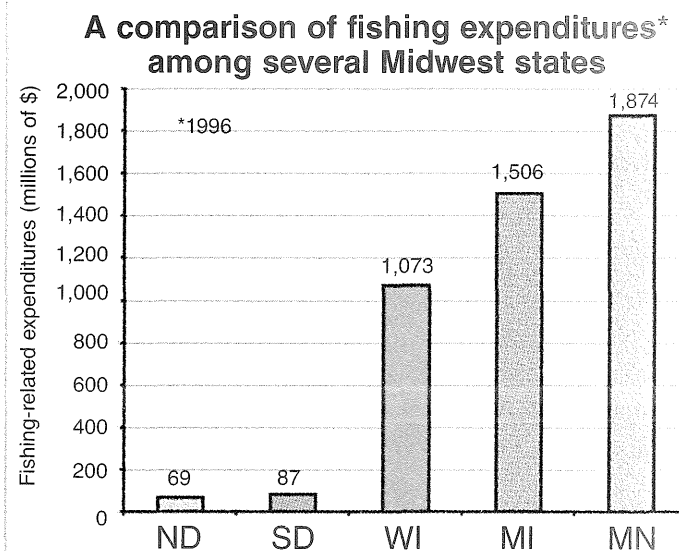
each year. Benefiting from this outlay of cash are gas stations, cafes, bait shops, motels, and resorts—mostly in rural Minnesota.

Big companies thrive off fishing, too. Among the top national names based in Minnesota are Alumacraft, Crestliner, Inc., Johnson Fishing, Inc., Lund, Northland Tackle, Stearns Manufacturing, Inc., and Water Gremlin.

Cabela's is a fishing retail powerhouse thriving in Minnesota. The Nebraska-based company's 150,000-square-foot Owatonna store is second only to the Mall of America as the most visited retail attraction in Minnesota.

3. Minnesota is doing well compared to the so-called "better" fishing states

A common myth is that "everyone" is fishing in other states such as Wisconsin and Michigan because the fishing in Minnesota has gotten so poor. Statistics show otherwise.



Though it's not possible to determine if fishing is "better" in one state or another, there are ways to compare the popularity and extent of fishing in various states.

Minnesota has more total anglers, receives more income from fishing, and attracts more angling tourists than any surrounding state. For example, anglers spend \$360 million more in Minnesota each year than they do in Michigan, which has more people and is surrounded by the Great Lakes and their lucrative charter boat industry.

These figures indicate that Minnesota remains one of the top fishing states in the country.

The reality about DNR fisheries management

1. The DNR works cooperatively with many local groups

One rumor has it that the DNR doesn't work with anglers. Yet Minnesota's 28 fisheries managers and their staff regularly work with hundreds of local fishing clubs, lake associations, individuals, and conservation groups. Such *coordination*, as this work is called, is essential because it brings fisheries workers face to face with anglers, resort owners, and other citizens who care about the state of fishing. And these daily conversations between managers and citizens in turn drive fisheries management programs on Minnesota's lakes and streams.

Take Lee Sundmark, for example. At his area fisheries office in Hutchinson, he and his small crew are responsible for 40 lakes in five central Minnesota counties. Sundmark says that one of his most important jobs is working with more than two dozen local groups to improve water quality and fish habitat. He encourages the clubs and lake associations to participate in the various pro-

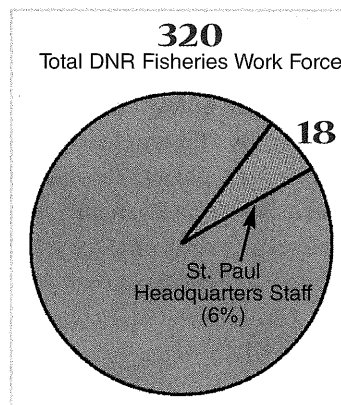
grams run by the Minnesota Pollution Control Agency that show interested citizens how to monitor the health of their local lakes.

Sundmark also sits down with local groups to hear their concerns and to discuss various ways to improve fishing, such as installing aeration systems, planting buffer strips along lakeshores, stabilizing shorelines, and transplanting aquatic plants to reduce erosive wave action.

"The anglers I talk to each day are increasingly interested in lake ecology and how it affects fish habitat and populations," Sundmark says.

2. Few DNR Fisheries staff work in St. Paul

A common belief among anglers is that DNR Fisheries is bloated with bureaucrats. That's not true. Of our 320 staff members, just 18, or less than 6 percent, work in the St. Paul headquarters. The rest are in regional or area field stations statewide.



3. There is lots of public oversight

Many anglers want to know if we are spending their license dollars wisely. "Who's watching the pot?" they ask.

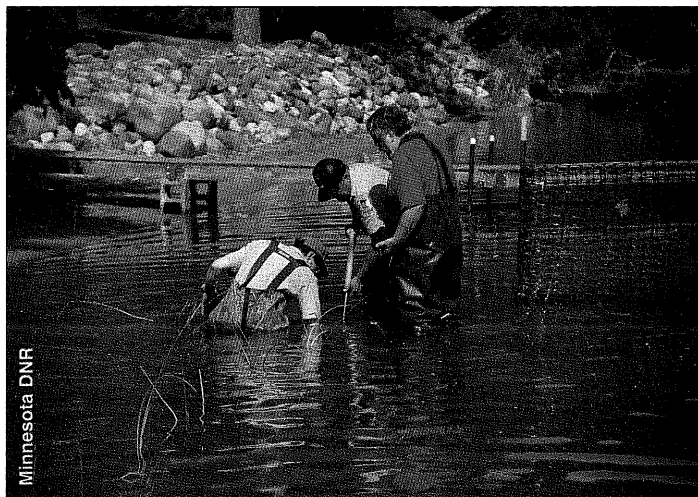
Since 1994, three different citizen committees have been scrutinizing our budget and the Game and Fish Fund. The committees were formed by the Minnesota Legislature to review DNR reports on how we spend money from a range of special accounts. The DNR commissioner appointed citizen leaders to review the:

- Game and Fish Fund
- DNR Fisheries budget
- Trout and Salmon Stamp Fund.

Committee members, who mainly represent major fishing organizations, are charged with reviewing various reports and making recommendations to the Legislature.

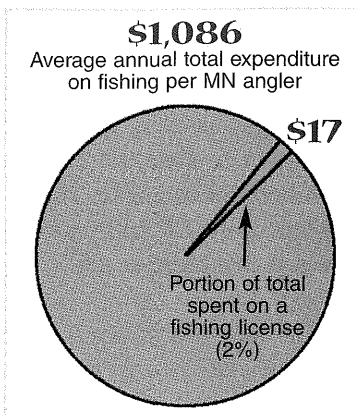
This oversight is in addition to regular legislative audits of our budget, which is open to public review, and biennial review by state lawmakers.

Even more oversight takes place each January when the Fishing Roundtable convenes. Representing angling groups and other fishing interests, roundtable members spend two days discussing DNR fisheries management proposals and offering suggestions for new ways to improve fishing and management.



Minnesota DNR

4. Fishing licenses are a tiny fraction of overall angler spending



One persistent myth is that the cost of a fishing license is a financial burden for anglers. Maybe it is for some people, but not most. On average, an angler spends \$1,086 on fishing (gas, gear, bait, lodging, food, etc.) in Minnesota each year. The \$17 individual fishing license represents less than 2 percent of that total.

The reality about lakes and fisheries

1. Lakes can only hold so much fish biomass

Some anglers urge us to “make” lakes produce more fish. But a lake can only support a certain amount of fish over the long haul. Referred to as a lake’s *carrying capacity*, this biological limit is based on a lake’s size, fertility, amount of available habitat, and length of growing season. There’s no way to force a lake to hold more fish than it can, any more than a field can be forced to grow more corn than its soil can support.

In lakes with good spawning habitat, new additions to the fish population come each spring from natural reproduction. They replace fish lost by predation, starvation, old age, angling, and disease. To stock additional fish into a “full” lake won’t work because it creates overpopulation. There isn’t enough habitat (food and shelter) for the new fish, so they either displace existing fish or die off.

2. Lake fertility determines fish abundance and species

Many anglers still believe that northern lakes—cool, deep, clear, clean—are the ones packed with fish. But actually, it’s southwestern lakes that contain and produce the most fish per acre. A northern Minnesota lake simply can’t produce as much fish as a similar sized southwestern lake, any more than an acre of land in St. Louis County can grow as much corn as an acre in Le Sueur County. A northern Minnesota lake such as Vermilion in St. Louis County produces about 8 pounds of game fish per acre, while a southern Minnesota lake such as Tetonka in Le Sueur County produces about 40 pounds of game fish per acre.

Why the difference? Because lake fertility is one of the most important factors limiting the number and size of fish in a lake. The more fertile the lake—up to a limit—the more fish per acre it can produce. That’s because fertile lakes support more plant life, and plant life supports the entire food chain.

Minnesota’s lakes range from the relatively infertile *oligotrophic* (“scantily nourished”) northern Minnesota lakes, which have steep, rocky shores and contain few nutrients, and are so deep that sun can penetrate only a small amount of water, to the extremely fertile *eutrophic* (“richly nourished”) southwestern Minnesota lakes, which are surrounded by rich farmland and are so shallow that sunlight can reach—and thus stimulate plant growth in—a relatively large percentage of the water mass.

Between two regions are the central Minnesota lakes, called *mesotrophic* (“moderately nourished”).

One qualifier: Lakes can actually have too many nutrients and grow too fertile to support game fish. That’s because the same plants that provide food and oxygen to the lake also consume oxygen when they die and decompose. Every few winters, thick ice and snow on shallow lakes block adequate sunlight from reaching plants, which then die. As the vegetation decomposes, it uses up dissolved oxygen needed by fish to survive. When fish die in large numbers in late winter from lack of oxygen, it is called *winterkill*. This commonly occurs on overly fertile southwestern lakes and ponds.



3. Much depends on year classes

Anglers on Lake Mille Lacs and Rainy Lake now understand the importance of year classes. Anglers on other lakes are catching on too.

The single most important factor affecting whether or not anglers catch walleyes is *year class variability*. A year class is a generation of walleyes born the same year. Each spring a new year class is born. Depending on spawning conditions and survival—determined largely by water temperatures from April to June—some year classes have lots of fish, and some have few.

In any given decade, a lake usually has two or three abundant (“strong”) year classes, two or three sparse (“weak”) year classes, and four or five medium year classes.

When, after four or five years, a strong year class reaches catchable size (14 inches), anglers start hooking more fish. When two or three strong year classes are in the main catchable size range (14 to 24 inches), the fishing can be fantastic. That’s been the case on Rainy Lake in recent years.

But the converse is also true. When several weak year classes in a row reach catchable size, the fishing can get difficult. The lake just didn’t have the right biological conditions those years to produce more fish. Usually the cause was a cold spring that killed young walleye fry as they hatched.

Fortunately for anglers, lakes that have strong natural reproduction usually have enough strong year classes to provide plenty of catchable fish to offset the effects of a few consecutive weak year classes.

4. Limits of fishing success

Didn’t catch a lot of walleyes last Saturday? The fact is, most anglers don’t catch even one keeper-sized game fish on a typical day of fishing. That’s not because the fishing is poor; it’s just the nature of fishing.

On any given day, 95 percent of walleye anglers harvest two or fewer walleyes. This generally holds true on every walleye lake in Minnesota and across the U.S. For example, 1992 was considered the best year in modern history for fishing on Mille Lacs, one of the top walleye lakes in the United States. Yet even during that banner year, 76 percent of anglers there on any given day did not catch a fish.

It’s not such a bad thing that anglers don’t always or even regularly catch their limit. There simply aren’t enough fish. For example, we estimate that Minnesota has roughly 18 million walleyes over 14 inches long (general keeper size). Approximately 27 million angler days are spent fishing each year. If every angler caught and kept just one walleye on average per outing, the state’s entire keeper-sized walleye population would be wiped out before the year was over.

As fishing pressure increases while the number of fishing waters stays the same, anglers crop off the keeper-sized fish as soon as the fish reach keeper size. Soon, more and more small fish dominate the fish populations. Decent-sized fish become rare.

The only solution, say biologists and a growing number of anglers, is to limit the number of medium-sized and large fish that are harvested. In time, that would result in an increase in the average size of fish that anglers catch.



It's not realistic for anglers to expect to always catch a limit because there aren't enough keeper-sized fish to support everyone catching a limit. That's just a plain fact of nature.

Minnesota Fishing INFORMATION



Why do some anglers always seem to know what's going on—where the fish are biting, what the DNR is up to, and such? It's often because they found fishing information available from the DNR and many media sources.

However, this isn't exclusive insider information. Using the Internet, anyone can get access to tons of data from the DNR web site. And by entering "Fishing" or "Minnesota Fishing" on any web browser, you can reach dozens of sites ranging from resorts and guides to angling chat lines.

Prefer print publications? Fishing information is served regularly in the outdoors or sports sections of most Minnesota daily and weekly newspapers and in newsstand publications such as *Minnesota Sportsman*, *In-Fisherman*, *Outdoor News*, and *Outdoorsman's Weekly*.

In addition, we have dozens of free fishing-related recreation maps, brochures, and flyers, listed below. And you can call area fisheries offices, also below, for local information on the lakes and streams you fish.

Fishing maps and listings

- Statewide Fishing Pier Locations
- Twin Cities Water Recreation Map
- Trout Fishing Access in Southeastern Minnesota
- North Shore Trout Streams
- Listings of Designated Trout Streams
- Lakes Managed for Stream Trout

(2 segments), Big Fork, Cannon, Crow Wing, Crow/NorthFork, Des Moines, Kettle, Little Fork, Pine, Red Lake, Root, Rum, St. Louis, Snake, Straight, Vermilion, and Zumbro/Whitewater.

To order these maps, guides, or brochures, call the DNR Information Center at (651) 296-6157 (Twin Cities) or (888) 646-6367 (statewide) or visit or write to the center at the DNR headquarters, 500 Lafayette Road, St. Paul, MN 55155-4040.

Water access maps (limit 5 maps)

These identify more than 3,000 access locations operated by city, county, state, and federal agencies.

Canoe and boating routes (limit 5 maps)

These maps show access points, campsites, rest areas, and portages. Hazards such as dams and waterfalls are marked, as are rapids. Rivers: Mississippi (14 segments from headwaters to Iowa border), Minnesota (6 segments), St. Croix (5 segments), Cloquet

DNR web site

The DNR web site offers lake and stream survey reports, fishing management information, an interactive state fishing lake map, and more. On the Minnesota DNR home page at www.dnr.state.mn.us, click the topic "Fishing."

Get the latest fisheries management news by subscribing to our free webzine, *Fish & Wildlife Today*. Go to www.dnr.state.mn.us/fwt and click "Subscribe for Free."

DNR area fisheries offices

Northwest Region

Baudette
(218) 634-2522
Bemidji
(218) 755-2974
Detroit Lakes
(218) 847-1579
Fergus Falls
(218) 739-7576
Glenwood
(320) 634-4573
Park Rapids
(218) 732-4153
Walker
(218) 547-1683

Northeast Region

Duluth and
Lake Superior
(218) 723-4785
Ely
(218) 365-7280
Finland
(218) 353-7591
Grand Marais
(218) 387-3056
Grand Rapids
(218) 327-4430
International Falls
(218) 286-5220

Central Region

Aitkin
(218) 927-3751
Brainerd
(218) 828-2550
Hinckley
(320) 384-7721
Little Falls
(320) 616-2450
Montrose
(763) 675-3301

Southwest Region

Hutchinson
(320) 234-2550
Ortonville
(320) 839-2656
Spicer
(320) 796-2161
Waterville
(507) 362-4223
Windom
(507) 831-2919

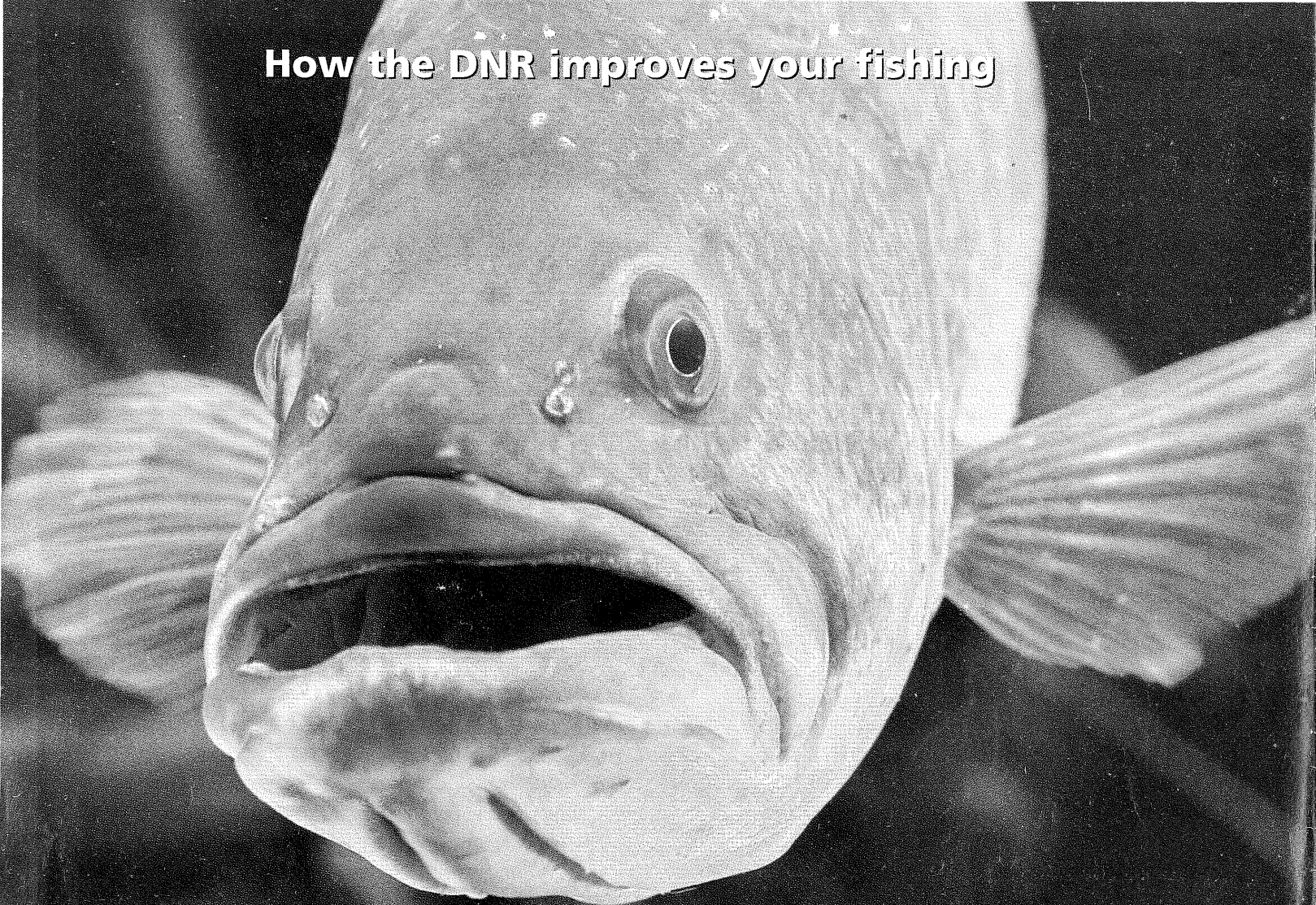
Southeast Region

Lake City
(651) 345-3365
Lanesboro
(507) 467-2442

Metro Region

Metro East
(651) 772-7950
Metro West
(952) 826-6771

How the DNR improves your fishing



This publication was produced by the Minnesota Department of Natural Resources.

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Department of Natural Resources

500 Lafayette Road

St. Paul, MN 55155-4040

(651) 296-6157 (Metro Area)

1-888-MINNDNR (646-6367) (MN Toll Free)

www.dnr.state.mn.us

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Printed on recycled paper containing
a minimum of 10% post-consumer
waste with soy-based ink

Graphic Design by Redpine, Inc.
70,000 printed at a cost of 16¢ each

Produced by Minnesota DNR Fisheries
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Department of Natural Resources