

Water samples collected from Carlos Lake were analyzed for veliger and zooplankton densities and showed an increase in veligers, suggesting increasing reproduction in the lake.

Many boaters report no zebra mussels or very few on their watercraft in the Lake Pepin area. This die-off is similar to those seen in the past in the Mississippi River as well as Lake Zumbro. Such die-offs seem to coincide with times of extremely low water coupled with high summer temperatures. It is important to note that despite massive population declines, the zebra mussel populations rebound in subsequent years--thus, this has not in the past been the "end" of zebra mussel infestations and it is very likely that the populations will rebound in future seasons

DNR scuba divers from the Aitkin Area Fisheries office and Ecological and Water Resources counted zebra mussels along 15 established transects in August. These 600-foot transects have been surveyed yearly since 2005 when zebra mussels were first reported in Mille Lacs Lake.

Brainerd DNR Area Fisheries and Invasive Species Program staff met with the Gull Lake Association board in the fall to report on the 2012 zebra mussel monitoring results. Zebra mussel populations appear to be increasing throughout the lake.

**Zebra Mussel Research**  
Recent work and progress in the potential for bacterial control of zebra mussels has raised the possibility of use of such a method in Minnesota lakes. Marrone Bio-Innovations has been testing and refining the use of a strain of *Pseudomonas fluorescens*, a common

soil bacteria, for zebra mussel control. This bacterial strain was shown to kill zebra mussels when high enough doses were consumed. Future research directions for this material include more non-target toxicity data, as well as micro- and mesocosm trials in natural lake conditions. Questions remain on the potential use, as initial trials have shown high-dose rates and long exposure times are necessary to obtain zebra mussel mortality.

**Management of Invasive Aquatic Plants**

In 2011, the DNR initiated an effort to engage stakeholders to help the Department improve its role in management of existing infestations of invasive aquatic plants. These meetings resulted in several recommendations to improve management:

- Streamline permitting by making organizational and operational changes,
- Increase efficiency by use of a standardized, short-form Lake Vegetation Management Plan,
- Improve the DNR's grant program by simplifying the application, expanding the eligibility of projects, and increasing the level of funding,
- Continue to conduct and support research on management, and
- Improve communications and public education related to management.

In 2012, the DNR implemented these changes. Streamlining the process of the Invasive Species Aquatic Plant Management permits was successful and went smoothly. More than 210 permits were issued along with 150 management grants totaling over \$900,000.

**Enforcement**

From January 1, through the end of the year, DNR conservation officers provided 18,857 hours of invasive species enforcement resulting in 36,685 contacts for AIS education and enforcement.

During the year, officers performed 17,700 law compliance checks resulting in 998 citations and 1,550 written warnings, resulting in a 14.4% violation rate.

This was the fourth full year that included nine officers who dedicated a significant portion of their work toward invasive species enforcement. This change was implemented as part of an increased focus on enforcement of invasive species laws and the need to have coordinated efforts. Conservation officer hourly goals also were increased to manage the added work load.

**Lake Service Provider Training**

In 2011, the Legislature passed a law requiring lake service providers (LSP) to take aquatic invasive species (AIS) training and obtain a permit prior to working in waters of the state. Additionally, the employees of lake service providers are required to obtain a certificate showing that they have completed AIS training. In 2012, DNR began training and issuing these permits and certificates.

To date, 41 LSP trainings have been offered: 768 permits have been issued, and 2,142 employees have been certified. A list of permitted lake service providers is available at the DNR website. This list is updated frequently as applications, course attendance, test scores, and payments are processed. The training courses and permit applications are ongoing.

**Revenue and Expenditures**

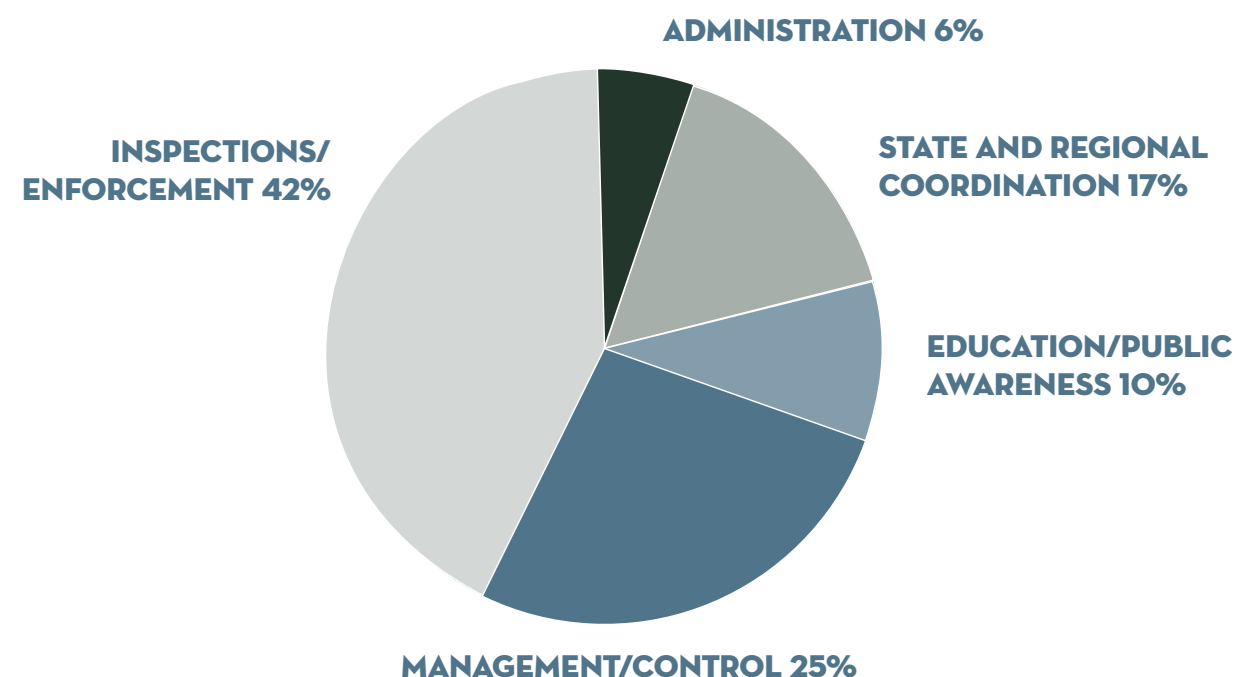
Funding for the Invasive Species Program includes a \$5 surcharge on watercraft registered in Minnesota and a \$2 surcharge on non-resident fishing licenses (which makes up the Invasive Species Account), appropriations from the General Fund account, Heritage Enhancement Fund Account, Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission

on Minnesota Resources, and local contributions. These funding sources generated \$7,237,000 for all invasive species prevention and management activities for the 2012 fiscal year.

The distribution of aquatic invasive species spending (\$7,237,000) for fiscal year 2012 is shown in Figure 1. The Management/Control and Inspections/Enforcement categories account for 67% of aquatic invasive species spending. These two spending

categories along with expenditures for Education/Public Awareness activities reflect the importance the DNR places on efforts to prevent the spread of invasive species and to help manage the problems those species cause once they become established.

In addition, the Invasive Species Program received federal funds from the U.S. Fish and Wildlife Service for aquatic invasive species prevention and management.

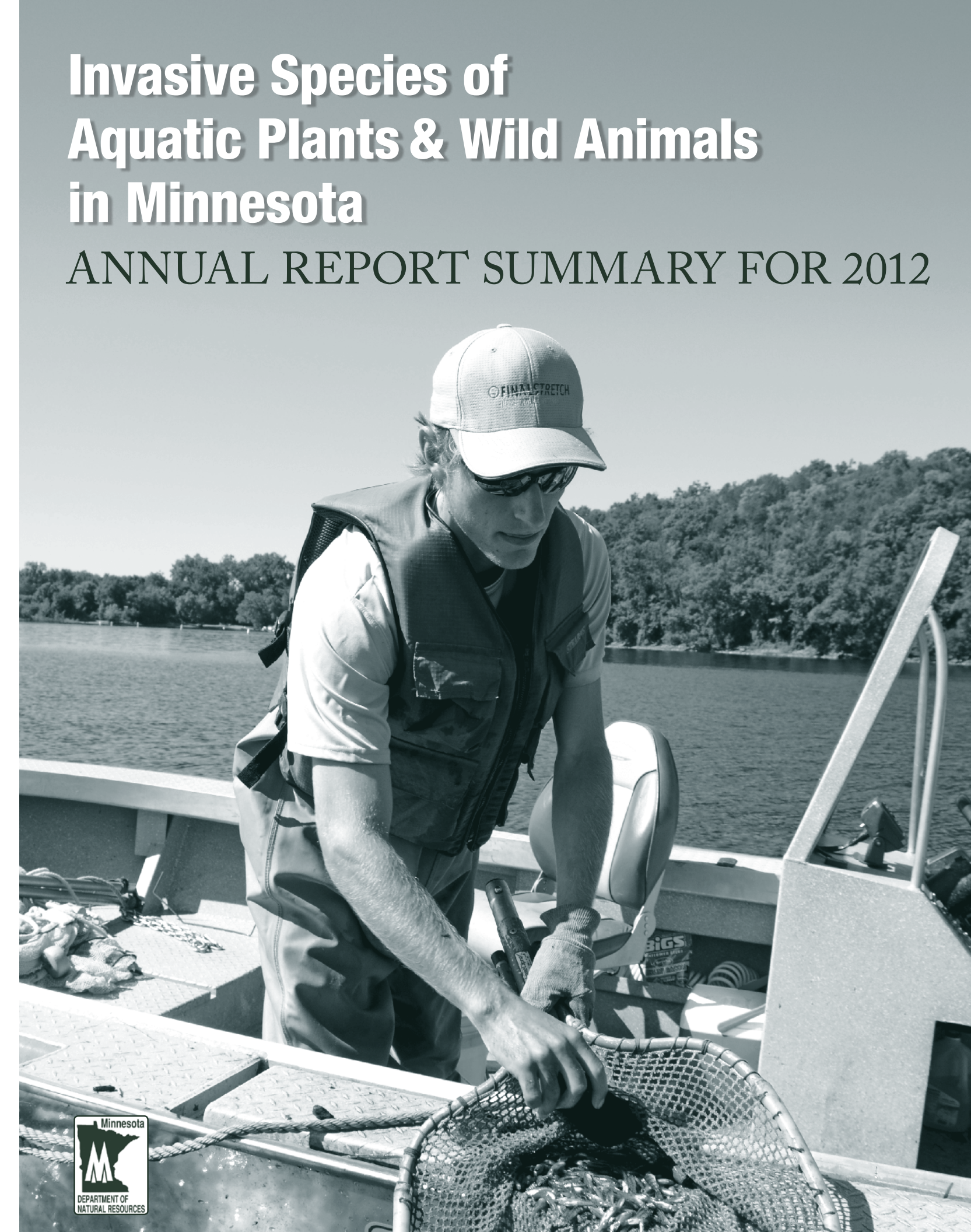


*Figure 1. Aquatic Invasive Species Program spending (Invasive Species Account, General Fund, Heritage Enhancement Fund, and the Environment and Natural Resources Trust Fund only) in FY12 by major categories.*

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# Invasive Species of Aquatic Plants & Wild Animals in Minnesota

## ANNUAL REPORT SUMMARY FOR 2012



Invasive species are non-native species that are a threat to the state's natural resources and local economies that depend on natural resources. To address the problems caused by invasive species, the 1991 Minnesota Legislature directed the Department of Natural Resources (DNR) to establish the Invasive Species Program and to implement actions to monitor and manage invasive species of aquatic plants and wild animals. This is a summary of the 2012 annual report. The full report is available at [www.mndnr.gov/invasives](http://www.mndnr.gov/invasives).

## Status of Invasive Species in Minnesota: 2012

### Aquatic Plants

**Eurasian watermilfoil** was discovered in 16 additional water bodies during 2012. The total number of milfoil-infested water bodies is 273.



EURASIAN MILFOIL

**Purple loosestrife** is known to infest 2,412 locations in Minnesota. In 2012, purple loosestrife was found in four new sites, bringing the total number of known infestations to 2,412.

**Curly-leaf pondweed** is known to occur in 759 lakes in 70 Minnesota counties.

**Flowering rush** is known to occur in 27 water bodies in 10 counties. No new infestations were reported in 2012.

### Wild Animals

During 2012, 14 new lakes were designated as being infested with **zebra mussels**: Pelican, Gilbert, and Buck lakes (Becker County); Lake Minnewaska and Lake Emily (Pope County); Lake Miltona (Douglas County); Orwell Reservoir, Dayton Hollow Reservoir, and Paul, Rusch, Little McDonald, and Kerbs lakes (Otter Tail County); Ida Lake (Douglas County); and Breckenridge Lake (Wilkin County).

Three species of **Asian carp** were caught in Minnesota in 2012. One adult bighead carp was caught in the St. Croix River in April 2012; and a grass, bighead, and silver carp were caught in Mississippi River Pool 6 near Winona in March 2012.

One new **spiny waterflea** infested water was discovered in Trout Lake (Cook County) in 2012. With the interconnections between many infested lakes in northern Minnesota, more infestations are likely to be discovered in future seasons.



SPINY WATERFLEA

**Chinese and banded mystery snails** are being reported in Minnesota waters—more than 90 occurrences of the Chinese mystery snail and 60 occurrences of the banded mystery snail have been reported.

**Faucet snails.** By the end of the 2012 open water season, 41 potential leech ponds across four counties in northwest Minnesota had been searched for the presence of faucet snails—only eight were confirmed to have faucet snails.



FAUCET SNAIL

R.T. Dillon, fwgma.org

During 2012, the DNR recorded reports of wild or escaped **mute swans** at multiple locations in the state. A total of 23 birds were reported in the wild in 14 counties.

## Hot Topics

### Asian Carp

In April, an adult bighead carp was caught in the St. Croix River, and a grass, bighead, and silver carp were caught by commercial fishermen in Mississippi River Pool 6 near Winona in March. While individual collections of Asian carp are increasing in Minnesota, there is no evidence that they are naturally reproducing in the state. The closest known reproducing populations are in Iowa waters of the Mississippi River near Pool 17.

Environmental DNA, or eDNA, testing was completed for the first time in Minnesota waters in 2011. This technology was developed out of Notre Dame University to determine if DNA from Asian carp is present in water samples. Positive eDNA results alone do not confirm the presence of live silver carp. To test for false positives, additional water samples were collected in spring 2012 from a lake in the Twin Cities metropolitan area where Asian carp were very unlikely to be present. Twenty samples analyzed by the U.S. Army Corps of Engineers tested negative, while one sample out of 20 analyzed by the DNR contractor tested positive for silver carp. This one sample is most likely a false positive. To improve confidence in eDNA results, the University of Minnesota, National Park Service, U.S. Geological Survey, and DNR are working together to complete additional eDNA testing. Funding from the Legislative-Citizens



ASIAN CARP

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Commission on Minnesota Resources is being provided through the University of Minnesota to the U.S. Geological Survey to conduct analysis following federal protocols.

Approximately 500 samples were collected in September from a variety of locations including negative controls (i.e., well water), positive controls (i.e., tanks containing live Asian carp), and from many of the same locations where positive samples were reported on the Mississippi and St. Croix rivers in 2011. Results will improve confidence in eDNA testing and help determine future sampling strategies.

The Legislature provided \$7.5 million from the Outdoor Heritage Fund during 2012 to complete Asian carp barrier work, as well as \$3.8 million to establish a new Aquatic Invasive Species Research Center at the University of Minnesota to accelerate research on long-term controls for Asian carp.

During 2011, Governor Mark Dayton hosted a series of three Asian Carp Summits which included representation from the congressional delegation, state and federal partners, and non-governmental organizations. Governor Dayton presented an Action Plan that included many of the actions recommended by the Asian Carp Task Force. The DNR and other partners are currently in the process of implementing the Action Plan. For more information, visit [www.dnr.state.mn.us/asian-carp](http://www.dnr.state.mn.us/asian-carp).

## New Legislation in 2012

Legislation aimed at strengthening Minnesota's ability to prevent the spread of aquatic invasive species was signed into law. Among the results is the requirement that boat lifts and docks cannot be placed into another water body within 21 days of removal.

The new law, which received bipartisan support in the Legislature, is the product of a year-long effort in 2011 by the DNR to gather input from stakeholders, including lake associations, cabin owners, angler groups, conservation organizations, counties, and local units of government. That input was the key to developing legislative support, according to DNR Commissioner Tom Landwehr.

One of the key components of the legislation includes increased civil penalties that became effective on July 1. Also a new requirement for an AIS trailer decal replaced the 2011 AIS rules decal. A person must complete training to obtain an AIS trailer decal and this requirement becomes effective July 1, 2015.

Other aspects of the 2012 legislation enhance the DNR's ability to work in partnership with local units of government. DNR can enter into delegation agreements with tribal and local governments to authorize mandatory inspection programs at public water access sites or in locations that allow for servicing multiple water bodies (approved plan required).

In 2012, an expedited emergency rule was adopted that designates several additional non-native species into invasive species classifications:

**Prohibited Invasive Species**—faucet snail, large-scale silver carp, quagga mussel, red swamp crayfish, and western mosquito fish

**Regulated Invasive Species**—banded mystery snail

### Watercraft Inspections

Early in 2011, the DNR made significant changes to the way that it allocated hours of watercraft inspection within the state, in response to the growing number of infested waters. These adjustments emphasized containment at zebra mussel-infested waters, with the goal to become more effective with available staff time. The tiered system developed for this effort

was very successful and helped the Watercraft Inspection Program increase the number of inspections from 66,000 in 2010 to 76,000 in 2011; this increase occurred even though DNR hours of inspection were reduced by 5,500 in 2011 from 2010.

The biggest challenge the Watercraft Inspection Program faced in 2012 was the inability to meet its original goals of hiring 100 Level 1 watercraft inspectors and 46 Level 2 watercraft inspectors. This lack of staff reduced the total number of hours of inspection and decontamination that the DNR was able to do around the state. The DNR responded to this issue by hiring an additional 30 staff through the emergency hiring process at the end of the season.

The Watercraft Inspection Program underwent several changes in the 2012 season. The Program was regionalized, which meant the addition of four regional watercraft inspection supervisors, who will be supervised at the regional level. The DNR purchased an additional 20 decontamination units and used them at high-use, zebra mussel-infested waters.

### Planning for the 2013 Watercraft Inspection Season

The Watercraft Inspection Program's goal for 2013 is to complete 60,000 hours of watercraft inspection with the equivalent of 2,400 days of Level 2 watercraft inspection at watercraft



MN DNR

accesses around the state. The Program will continue to operate regionally and grow in that new structure. As a part of the regional structure, each regional supervisor will receive some discretionary hours in addition to those designated by the tier system in order to assign work based on regional issues and feedback.

### Zebra Mussel Early Detection and Rapid Response in Rose Lake and Lake Irene

In response to new zebra mussel infestations, local partners were informed about the discoveries, signs were installed at public accesses, and press releases were issued. Increased watercraft inspections and enforcement also occurred.

Due to the possibility of boats moving upstream into Buck Lake in Becker County from zebra

mussel-infested-waters (Pelican and Little Pelican lakes, Otter Tail County), Buck Lake was designated as infested with zebra mussels in summer 2012.

Zebra mussels continued to expand their range in the Northwest Region. Dramatic increases in zebra mussel reproduction and settlement were seen in several lakes in the region. Lake Darling in Douglas County and Prairie Lake in Otter Tail County were found to have their highest production of zebra mussels since the discovery of these infestations in 2009.

Pelican Lake in Crow Wing County was listed as infested following the discovery of two zebra mussels on the lake bed by DNR scuba divers in July. Gilbert Lake, also called Lake Ore-Be-Gone (St. Louis County), was listed as infested after recreational divers discovered zebra mussels near the public access.

In October, a lakeshore owner on Lake Miltona was removing lake equipment when the owner noticed several small zebra mussels attached to the base of one of the docks. As a result of this find, Lake Miltona was designated as infested with zebra mussels. Lake Ida, less than one and a half miles downstream of Lake Miltona, also was designated as infested with zebra mussels due to the high likelihood of zebra mussel veligers traveling downstream into the lake.

Zebra mussel densities continue to increase in Mille Lacs Lake. Divers noted that zebra mussels were beginning to create a layer on softer sediments by attaching to scattered solid objects and other zebra mussels. CONTINUED →