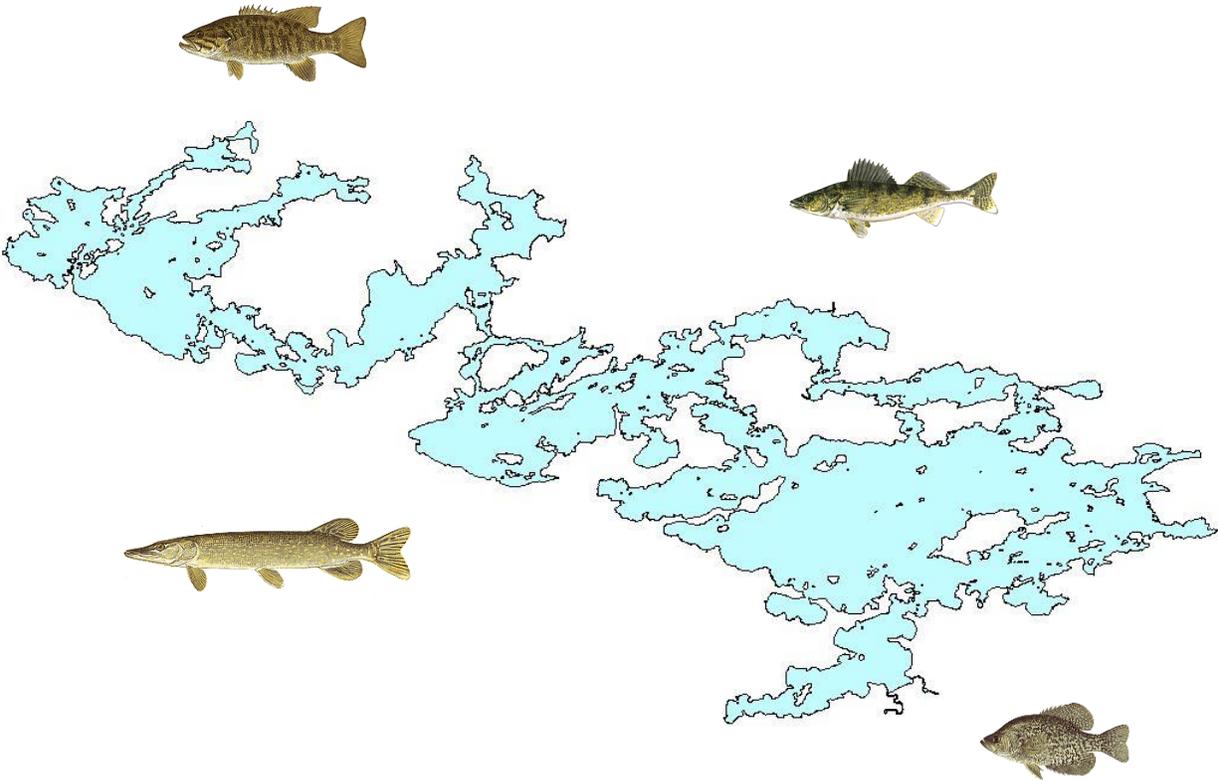


# Fisheries Management on Lake Vermilion in 2013



MN Dept. of Natural Resources  
Division of Fish and Wildlife  
Section of Fisheries  
650 Highway 169  
Tower, MN 55790

## Introduction

Lake Vermilion is part of the statewide Large Lake Program, an intensive fisheries management program on the 10 largest lakes in Minnesota. The Large Lake Program was started in 1984 when it became apparent that more detailed biological information was needed to properly manage these important lakes. A Large Lake Specialist was assigned to each lake to manage the program at the area level. The Large Lake Program includes annual fish population assessments, annual water quality monitoring, and regularly scheduled creel surveys.

A variety of sampling gear is used during population assessments to collect the various fish species and life stages; including gill nets, trap nets, beach seines, and an electrofishing boat. Sampling for each gear type is conducted at the same time and place each year in order to determine population trends for the major species. Data is also collected on length, weight, age, and growth for each of the major species.

Creel surveys are scheduled on Lake Vermilion for two consecutive years out of every six years. Creel survey is a scientific method of estimating fishing pressure and fish harvest from a series of boat counts and angler interviews. The last creel surveys were done in 2008 and 2009 with the next cycle of creel surveys scheduled for 2014 and 2015.

The results of the 2013 fish population assessment are presented in the balance of this report. We encourage anyone with questions or comments to contact the Tower Fisheries office or stop by our office for a visit. We are located just west of Tower on Highway 169.

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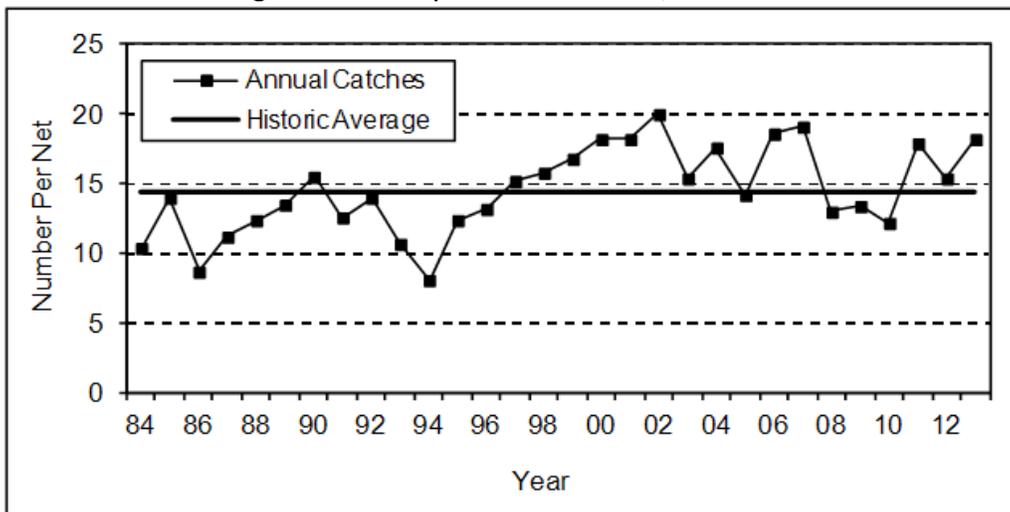
## Walleye

The walleye gillnet catch in 2013 was 18.2 fish/net, well above the long-term average for Lake Vermilion (Figure 1). It was the third consecutive year walleye catches were higher than average. Walleye gillnet catches were slightly below average from 2008 to 2010. Improved walleye catches in recent years were due to good reproduction in 2007, 2010, and 2011.

There are often differences in fish populations between the two major lake basins, East Vermilion and West Vermilion, and some of the assessment data is analyzed separately. The 2013 walleye gillnet catch on East Vermilion was 22.1 fish/net, while the walleye catch on West Vermilion was 12.4 fish/net. Walleye gillnet catches are usually higher on East Vermilion, while the average size is larger on West Vermilion.

Walleye populations in large natural walleye lakes often fluctuate in response to strong and weak year classes. Generally, strong year classes are produced every few years, which is sufficient to maintain a good population. Because fish production is limited by lake productivity, it would be impossible for lakes to sustain strong year classes every year. Lakes with excessive walleye harvest tend to have highly variable reproduction and walleye abundance. Lakes with low walleye harvest tend to have more stable populations.

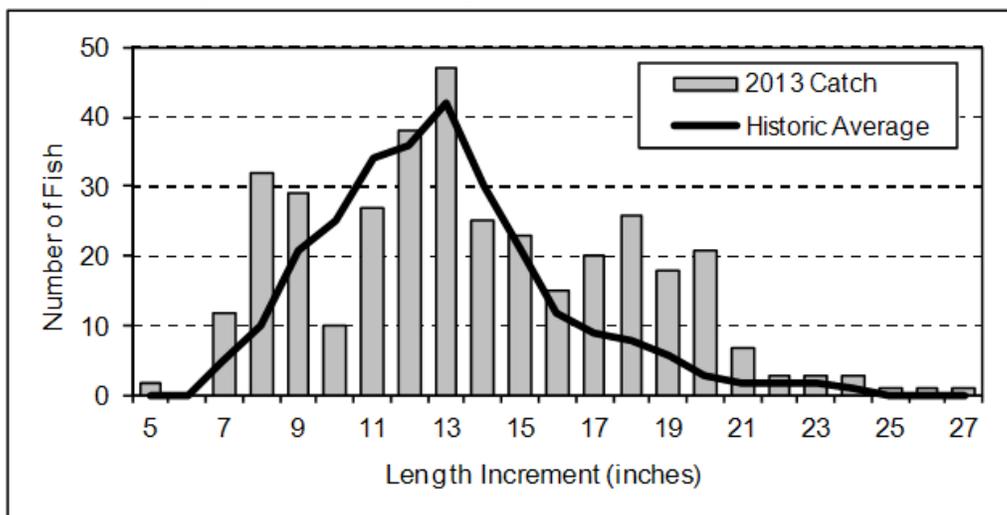
Figure 1. Walleye Gillnet Catches, 1984-2013



The mean length of walleye sampled by gill nets was 14.2 inches, well above the historic average. Most size classes were well represented in the gillnet catch (Figure 2). The catch of “keeper size” walleye (13-17 inches) was slightly above average. Many of these fish came from strong year classes produced in 2007, 2010 and 2011. The gillnet catch of 17-21 inch walleye was well above average, with many of these larger fish coming from West Vermilion. Prior to 2013, gillnet catches of walleye less than 12 inches had been below average for several years. However the catch of these smaller fish improved in 2013, reflecting good reproduction in 2011 and 2012.

Small walleye are nearly always more abundant than medium and large fish although this is not reflected in the gillnet catch. The experimental gill nets used for population assessments do not sample small fish very well so small fish are under-represented in the gillnet catch. Walleye are not sampled at maximum efficiency until they are about 13 inches long. The decline in the gillnet catch of fish larger than 13 inches represents the effects of mortality and declining abundance. Healthy walleye populations will have good numbers of fish across a wide range of size classes. Heavily exploited walleye populations tend to have high numbers of small fish and few large fish.

Figure 2. Walleye Length Frequency From Gillnets, 2013



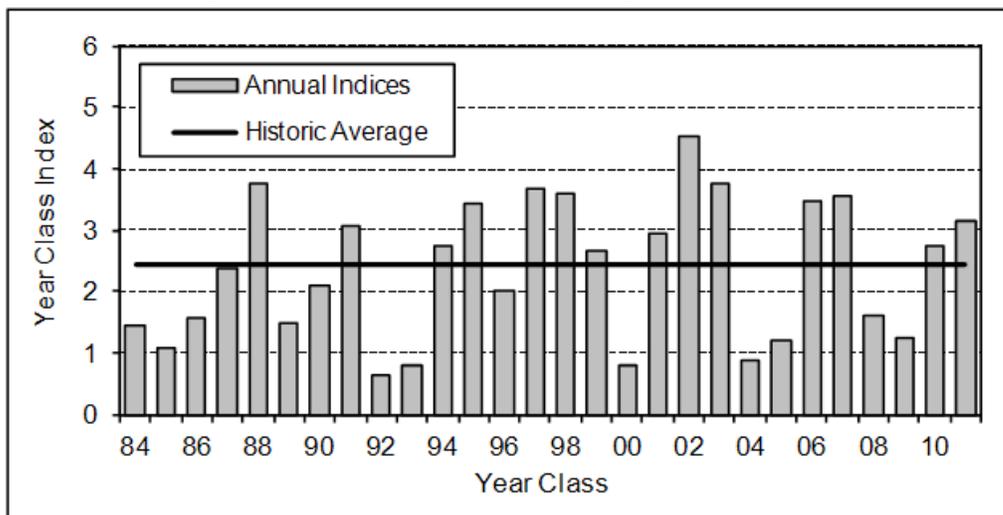
Walleye reproductive success can vary considerably from year to year. Year class strength can be represented by indices that are calculated from gillnet catches of each year class for several years of netting (Figure 3). High values indicate strong year classes, while low values represent weak year classes. In recent years, strong year classes of walleye were produced in 2006, 2007, 2010, and 2011. Weak year classes were produced 2004, 2005, 2008, and 2009.

Year class strength sometimes varies considerably between East Vermilion and West Vermilion. The 2010 year class is much stronger on East Vermilion than it is on West Vermilion, while the 2007 year class is especially strong on West Vermilion. It appears the 2011 year class is about equally strong across both lake basins.

Weak year classes of walleye on Lake Vermilion are sometimes related to cool spring and summer weather, which can negatively affect first-year growth and survival. Nearly all of the major fish species experienced poor reproduction in 2004 and 2009, due to the cool spring and summer weather in those years.

It takes at least two years to calculate a year class strength index for any individual year class, therefore indices have not yet been calculated for the 2012 and 2013 year classes. One year of netting indicates the 2012 year may be stronger than average.

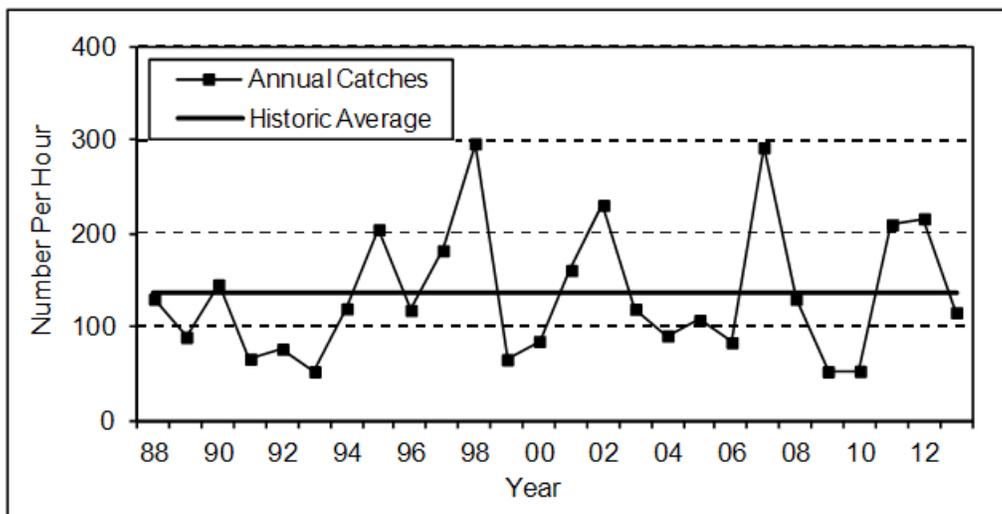
Figure 3. Walleye Year Class Strength Indices, 1984-2011



Fall electrofishing is used to sample young-of-the-year walleye and help determine reproductive success for the year. The 2013 fall electrofishing catch of young-of-the-year walleye was 116 fish/hour, slightly below the historic average (Figure 4). The walleye catch declined after relatively high catches in 2011 and 2012. East Vermilion had a higher electrofishing catch than West Vermilion, which is consistent with past sampling.

The mean length of young-of-the-year walleye sampled by electrofishing in 2013 was 5.1 inches, which is near the historic average. Data from our sampling program indicates growth of young-of-the-year walleye is an important factor in future survival, with large fast growing young-of-the-year walleye producing strong year classes and small slow growing fish producing weak year classes. An example of this occurred in 2010. Although the electrofishing catch was unusually low, the walleye were much larger than average, resulting in good survival and producing a good year class. The mean length of young-of-the-year walleye and the total number caught can be used in a predictive model that will give a good indication of how strong a year class will be. The mean length and total catch indicate the 2013 year class will likely be near average on East Vermilion, and below average on West Vermilion.

Figure 4. Electrofishing Catches of Young-Of-The-Year Walleye, 1988-2013.



Angling prospects for walleye look favorable in 2014. There are good numbers of 13-17 inch walleye in the population, especially on East Vermilion. Most of these fish are from strong year classes produced in 2007, 2010, and 2011. Anglers may catch more small walleye than usual due to strong 2011 and 2012 year classes. Prospects for catching quality sized fish (over 18 inches) are also favorable, especially on West Vermilion where there are still good numbers of fish in the population from strong year classes produced in 2007, 2002 and 2003. However, most of these fish are over 18 inches and must be released in order to comply with the special regulation on Lake Vermilion.

A special walleye regulation was implemented on Lake Vermilion in 2006; a 17-24 inch protected slot, with one fish allowed over 26 inches, and a 4-fish bag limit. The special regulation was adopted because of increased fishing pressure and walleye harvest. Creel surveys in 2002 and 2003 documented the highest walleye harvest ever observed on Lake Vermilion, well above the safe harvest level established for the lake. Consistent harvest above the safe harvest target could negatively affect the walleye population. Creel surveys in 2008 and 2009 indicated the regulation did help keep harvest at a safe level.

The special walleye regulation was modified in 2012 to an 18-26 inch protected slot, with one fish allowed over 26 inches, and a four-fish bag limit. The regulation change was prompted by angler concerns over catching keeper-sized walleye on West Vermilion. Due to several years of poor to fair reproduction, the walleye population in that lake basin had become dominated by larger fish and anglers had difficulty catching walleye less than 17 inches long. The modified regulation will allow some additional harvest while keeping harvest at a safe level. Walleye harvest will be documented again during the next cycle of creel surveys in 2014 and 2015.

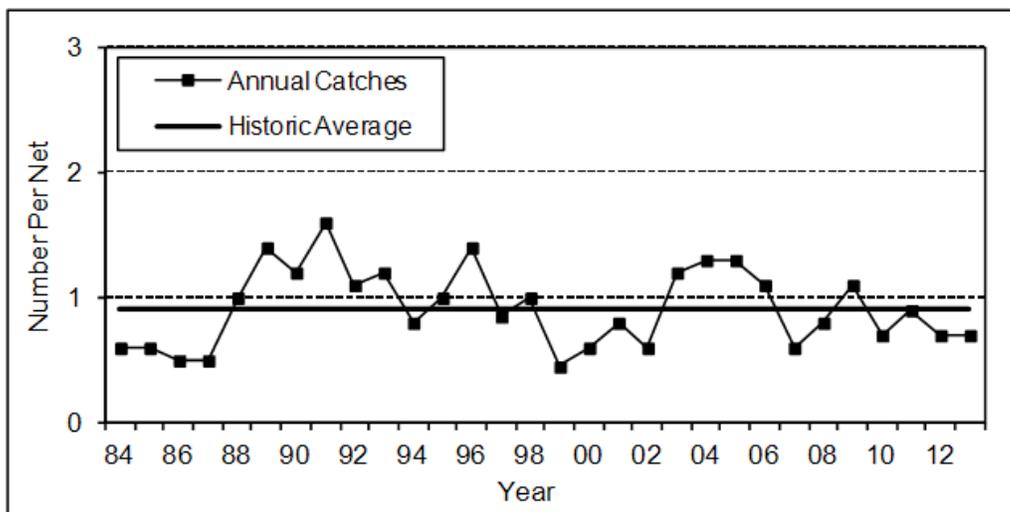
## Northern pike

The 2013 gillnet catch of northern pike was 0.7 fish/net, slightly below the historic average (Figure 5). Gillnet catches of northern pike have historically been fairly stable at a relatively low level. West Vermilion usually has higher gillnet catches of northern pike than East Vermilion, reflecting higher abundance in that lake basin. Northern pike are more abundant in some of the shallow weedy bays, however those areas are not sampled during standard gillnet assessments.

The mean length of northern pike in the gillnet catch was 27.6 inches, well above the historic average. Northern pike reproduction is usually fairly consistent from year to year, without exceptionally strong or weak year classes. Angling prospects for large northern pike have improved in recent years, as gillnet catches of large pike have been above average for several years.

A special regulation for northern pike has been in effect since 2003: a 24-36 inch protected slot, with one fish allowed over 36 inches. The bag limit remains at three fish. The regulation is part of a statewide initiative to improve the size structure of pike populations in a number of lakes across the state. Lake Vermilion was chosen for this special regulation because of its potential to produce quality sized fish. An ice-out trap net assessment will be conducted in 2014 and 2015 to evaluate the regulation.

Figure 5. Northern Pike Gillnet Catches, 1984-2013



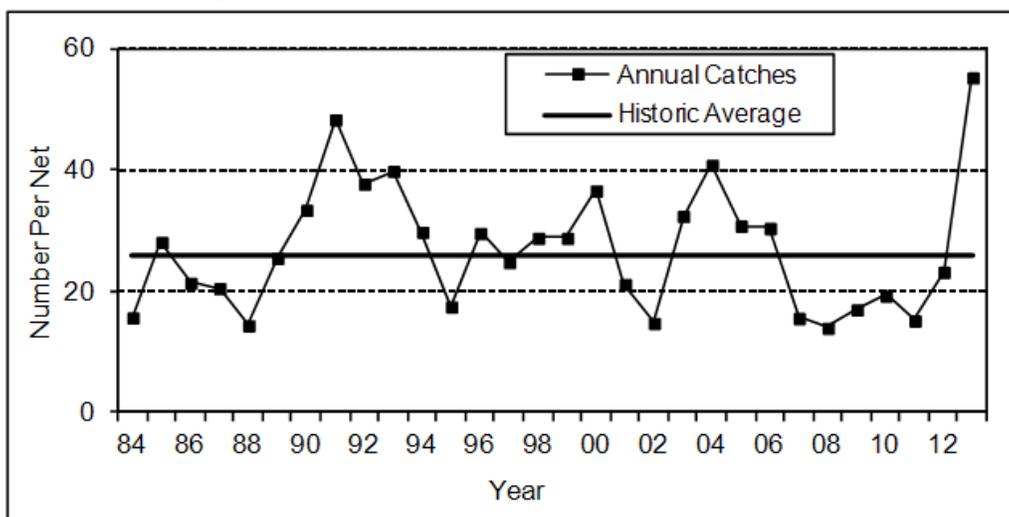
## Yellow perch

The 2013 gillnet catch of yellow perch was 55.3 fish/net, the highest perch catch ever documented on Lake Vermilion (Figure 6). Prior to 2013, perch catches had been well below average since 2007, especially on East Vermilion. Low perch catches in recent years may have been related to an expanding cormorant population on the lake. A control program to reduce cormorant predation was initiated in the spring of 2013. The cormorant issue is discussed in detail later in this report.

The mean length of gillnetted perch was 7.0 inches, well below the historic average. The low average size was due to very high numbers of 5-6 inch perch in the gillnet catch. Most of these smaller fish came from strong 2010 and 2011 year classes. One year of netting indicates the 2012 year class may also be stronger than average. Prior to 2010, perch reproduction and survival had been poor for a number of years.

Perch fishing is relatively insignificant on Lake Vermilion, with most of the harvest coming from anglers fishing for other species. There are more large perch in East Vermilion and most of the harvest comes from that lake basin. Perch are also an important prey item for several species of gamefish, including walleye and northern pike.

Figure 6. Yellow Perch Gillnet Catches, 1984-2013



### Smallmouth bass

An electrofishing boat is used as the standard sampling gear for smallmouth bass because they are not often caught in standard assessment nets. Sampling in 2013 was affected by issues with a new electrofishing boat that resulted in an unusually low catch. The low catch probably does not reflect actual abundance. Previous electrofishing assessments indicate the smallmouth bass population is doing well, with good numbers of fish across a broad range of sizes. Smallmouth bass catches are usually higher on West Vermilion while the average size is larger on East Vermilion.

### Muskie

It is unclear if muskie are native to Lake Vermilion. They were never sampled in the lake until after they were first stocked in 1968, although there are some old accounts of muskie being caught prior to 1950. Leech Lake strain muskie have been stocked regularly since 1987. The current stocking rate is 4,000 fingerlings every other year. Stocked muskie have been fin-clipped since 1993 to differentiate stocked fish from natural reproduction. Substantial numbers of un-clipped fish have been observed in recent assessments, indicating natural reproduction is occurring.

Muskie population assessments are done every 4-6 years on Lake Vermilion. Due to the large size of the lake, East Vermilion and West Vermilion are done in different years. The last assessments were done in 2011 and 2012. Muskie trapnet assessments target spawning fish in the spring shortly after ice-out.

Muskie trapnet catches have been gradually increasing since they were introduced as more year classes recruit to the spawning stock. To date, muskie catches have been higher on East Vermilion, while the average size has been larger on West Vermilion. In 2011 and 2012, over 19% of the muskie sampled were over 50 inches long. The largest muskie caught to date in assessment nets was 55.6 inches long.

## Invasive Species

There are several invasive species known to be present in Lake Vermilion. Rusty crayfish are very abundant in East Vermilion and are now expanding into West Vermilion. Curly-leaf pondweed is present in Everett's Bay and Stuntz Bay in East Vermilion. Chinese mystery snails were discovered in 2011 in Spring Bay at the far west end of the lake. These invasive species were probably introduced by careless anglers or boaters.

The DNR has taken several steps to prevent the spread of invasive species. It is illegal to transport water, plants, or animals from lake to lake. The DNR also established a program to inspect boats at some public accesses. Enforcement and education efforts have been increased. Guidelines were adopted to ensure DNR hatcheries and private aquaculture operations do not harbor or spread invasive species. There is now mandatory training on invasive species for lake service providers, including businesses that install or move docks and boat lifts. Legislation passed in 2011 increased funding for invasive species programs and increased penalties for violating laws related to invasive species.

The Sportsmen's Club of Lake Vermilion (SCLV) also has a monitoring program to keep invasive species out of Lake Vermilion. SCLV volunteers conduct voluntary boat inspections at public accesses several times a year. In June 2013, the SCLV sponsored a chemical treatment of curly-leaf pondweed in Everett's Bay, with a goal of reducing its abundance and slowing its spread to other areas of the lake. The SCLV has also used a variety of educational methods including billboards, brochures, and restaurant place mats to inform anglers and boaters about invasive species.

Anglers and boaters should always take preventative measures to avoid moving water, plants, or animals to other lakes. Boats and trailers should be thoroughly cleaned or dried before moving to other bodies of water. All bilges and live wells must be drained. All drain plugs must be removed and left out for transport. For more information on invasive species and new regulations, go to the DNR website at [mndnr.gov](http://mndnr.gov).

## Cormorants

In recent years there has been a large increase in the number of cormorants on Lake Vermilion. A nesting colony on Potato Is. grew from 32 nests in 2004 to 434 nests in 2012. Potato Is. is located in Big Bay in the eastern part of the lake. Many anglers and lake residents became concerned that high cormorant numbers might harm gamefish populations, especially walleye. Cormorants usually exist at population levels that do not significantly affect fish populations, however there have been cases where cormorants were linked to fish population declines. Cormorants are protected by the Migratory Bird Act, which makes unregulated killing of these birds illegal. Some limited control of cormorants is allowed in Minnesota through a depredation order managed by the U.S. Fish and Wildlife Service. However, there must be evidence of damage before control would be approved.

There has been increasing evidence that cormorant predation may be affecting yellow perch abundance in East Vermilion. Perch gillnet catches were persistently low in that lake basin from 2007 to 2012, the same time period the cormorant population has been expanding. The Fisheries Research unit examined data from Lake Vermilion and concluded that cormorant predation was the most likely factor contributing to low perch abundance, although evidence of this link was not conclusive. Based on the decline in the perch population, the DNR worked with the U.S. Fish & Wildlife Service to develop a cormorant control program for Lake Vermilion. The goal of the control program is to reduce cormorant numbers to a level that allows the perch population to recover, while still maintaining a viable cormorant nesting colony on Potato Island.

For 2013, the plan called for killing 10% of the adults on Potato Is. and oiling all the eggs. Egg oiling consists of spraying the eggs with vegetable oil, which suffocates and kills the eggs. On May 28, DNR staff conducted a pre-control nest count on Potato Is. There were 349 nests on the island, down considerably from the 434 nests counted in 2012. On May 29, staff from the Animal and Plant Inspection Service (APHIS), an agency of the USDA, began the control program. They shot 70 adult birds (10%) and oiled all the eggs on the island. Eggs were oiled again on June 11 and July 2.

DNR staff conducted a post-control nest count on June 20 and found 201 nests, many of which had been abandoned. It was estimated there were 1/3 the number of cormorants on the island as there was on May 28 when the first nest count was done.

After experiencing nesting failure, many cormorants apparently left the lake. Anecdotal observations by DNR staff and other lake users suggest cormorant numbers were much lower than recent years. The Sportsmen's Club of Lake Vermilion has counted cormorants during their annual loon count since 2010. They counted 281 cormorants during their loon count on July 15, much less than any previous count. DNR Fisheries staff estimated there were only 50-70 DCCO on Potato Is. during several informal counts from a boat in July and August.

DNR Fisheries began the annual gillnet assessment on August 28, several months after the control effort. The yellow perch gillnet catch on East Vermilion was the second highest ever observed on that lake basin and well above perch catches in recent years. It is believed cormorant control improved survival of small fish and contributed to the higher perch catch. However, it is unclear if the rebound in the perch gillnet catch can be attributed entirely to the control program. Additional analysis and more years of experience will improve knowledge of cormorant/perch population dynamics on Lake Vermilion.

Future cormorant control will be based on the management plan developed in 2013. At this time, control plans for 2014 have not been finalized.

## Walleye Stocking

The Minnesota DNR operates a major walleye egg-take station and hatchery at the mouth of the Pike River on Lake Vermilion. Walleye produced at the hatchery are used for stocking programs in northeastern Minnesota and other areas of the state. A portion of the fry produced each year is stocked back into Lake Vermilion to mitigate egg removal from the lake. In recent years, 5-20 million walleye fry have been stocked into Lake Vermilion annually.

A research project began in 2008 to evaluate walleye fry stocking on several lakes with egg-take stations, including Lake Vermilion. The project involves marking all walleye fry stocked back into the research lakes by immersion in an oxytetracycline bath. This leaves a permanent mark on bony structures that can be identified at later stages of life. The goals of the project are to determine how many walleye fry are produced naturally in these lakes and the optimal stocking rates to produce strong year classes.

Population estimates of wild fry on Lake Vermilion have ranged from 474 fry/littoral acre in 2012 to 666 fry/littoral acre in 2010. The littoral area is the portion of the lake less than 15 feet deep and the most productive area of a lake. These fry densities are more than sufficient to produce good year classes. Total fry densities (wild + stocked) were over 1,000 fry/littoral acre each year. While it is important to have sufficient walleye fry for producing good year classes, excessive stocking beyond that level is probably not productive and may actually be counter-productive by slowing growth and reducing survival.

## Habitat and Water Quality

Preserving fish habitat and water quality continues to be a management priority on Lake Vermilion. The DNR has several programs that protect fish habitat and water quality by regulating shoreline alterations and the removal of aquatic plants. Aquatic vegetation and shallow near-shore areas both provide critical habitat for a number of fish species. Individual property owners can also take steps to manage their shoreline in an environmentally sound manner. Information can be found at the DNR website: [mndnr.gov](http://mndnr.gov).

## Fishing Tournaments

To date, there are five fishing tournaments scheduled on Lake Vermilion in 2014. Permits from the DNR are needed for most fishing tournaments, and permits have been issued or applications received for the tournaments listed below. The DNR is responsible for regulating fishing tournaments and manages them in a manner that will protect fish populations and minimize conflict with other lake users. All of the tournaments in 2014 will be based at the Fortune Bay Resort and Casino.

- May 17: City Auto Glass Walleye Classic, 125 boats.
- June 1: MN Pro Team Bass Trail, 30 boats.
- June 22: Super Slam Bass Tour, 50 boats.
- August 22-23: Cabelas North American Bass Circuit, 90 boats
- Sept. 4: MN Bass Nation Tournament, 100 boats.

## Creel Survey

The Minnesota Dept. of Natural Resources, Section of Fisheries, will be conducting creel surveys on Lake Vermilion during the summers of 2014 and 2015. Creel survey is a scientific method of estimating fishing pressure and fish harvest from boat counts and angler interviews. The surveys are a valuable tool for managing fish populations. Creel surveys are conducted on Lake Vermilion as part of the statewide Large Lake Program and are scheduled two consecutive years out of every six years. The last surveys were done in 2008 and 2009. A DNR aircraft will be used to count boats at scheduled times throughout the summer. Two DNR creel survey clerks will be interviewing anglers by boat to gather information on the numbers and sizes of fish caught, time spent fishing, and other pertinent information. They will ask a series of questions and may measure fish the angler has caught. I would like to take this opportunity to thank Lake Vermilion anglers for their cooperation during the survey. The interview process may be a little inconvenient, however the information gained is very valuable. Creel survey clerks that worked during previous surveys were very impressed with how cooperative and friendly Lake Vermilion anglers were. That cooperation is much appreciated!