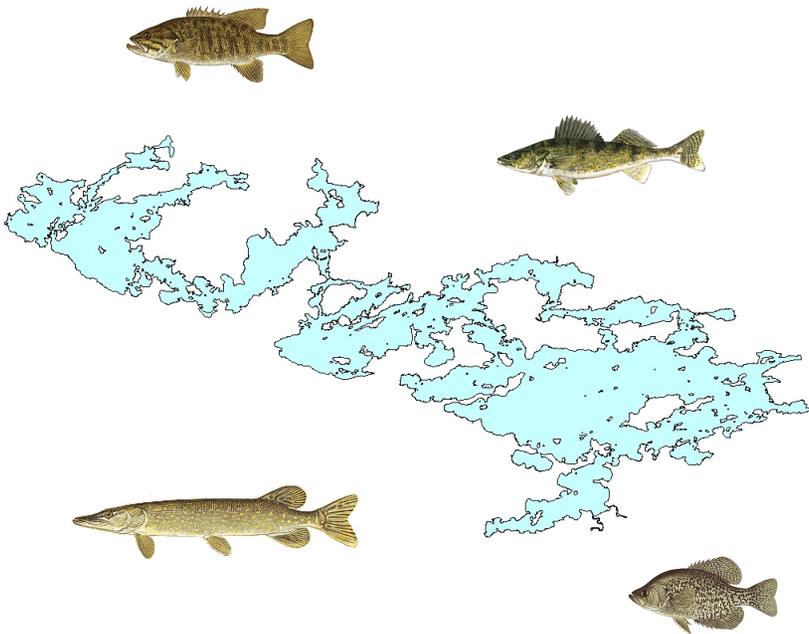


# Fisheries Management On Lake Vermilion In 2011

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Division of Fish and Wildlife  
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## 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 2011 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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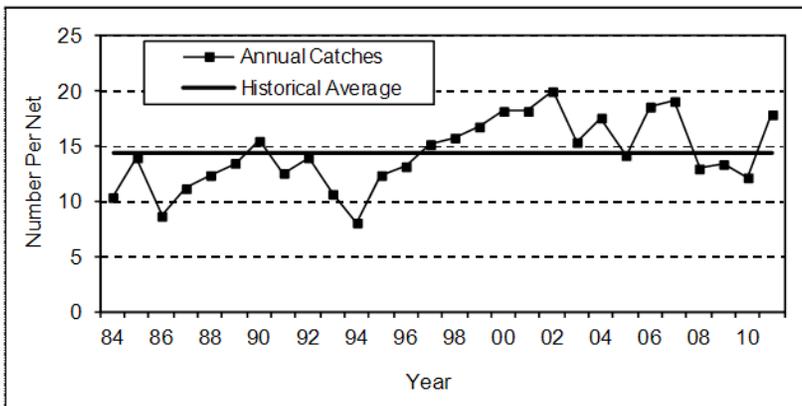
## Walleye

The walleye gill net catch in 2011 was 17.9 fish/net, which was well above the historic average for Lake Vermilion and the highest walleye catch since 2007. Walleye gill net catches were slightly below average from 2008 to 2010 due to poor reproduction in 2004, 2005, and 2008. The improved catch in 2011 was due to good reproduction in 2010 and unusually high catches of older year classes.

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 2011 walleye gill net catch on East Vermilion was higher than the catch on West Vermilion, which is typical. Walleye gill net 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.

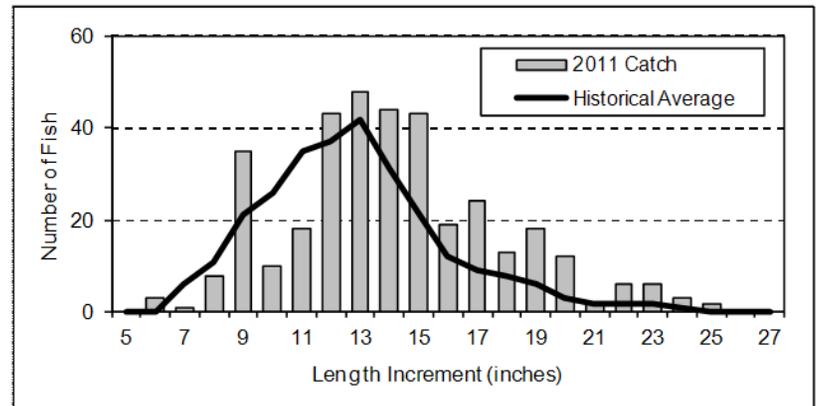
Figure 1. Walleye Gill Net Catches, 1984-2011



The mean length of gillnetted walleye was 14.6 inches, which was well above the historic average. Good numbers of large and medium sized walleye were sampled during the survey (Figure 2). Many of the larger walleye were sampled on West Vermilion and came from strong year classes produced in 2002 and 2003. The gill net catch of 13-17 inch walleye was well above average, reflecting good reproduction in 2006 and 2007, especially on East Vermilion. The gill net catch of 9 inch walleye was also above average, indicating the 2010 year class may be stronger than average. The gill net catch of 10-11 inch walleye was below average, reflecting only fair reproduction in 2009.

Small walleye are nearly always more abundant than medium and large fish although this is not reflected in the gill net catch. The experimental gill nets used for population assessments do not sample small fish very well so small fish are under-represented in the gill net catch. Walleye are not sampled at maximum efficiency until they are about 13 inches long. The decline in the gill net 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 Gill Nets, 2011



Walleye year class strength can be represented by indices that are calculated from gill net catches of each year class for several years of netting (Figure 3). The strongest year classes produced in recent years were the 2006 and 2007 year classes. Both year classes are stronger on East Vermilion than on West Vermilion. Strong year classes were also produced in 2002 and 2003.

Year classes produced in 2004, 2005, 2008, and 2009 were all weaker than average. Unusually cool weather in 2004 and 2009 probably affected walleye reproduction in those years. Weak year classes of walleye on Lake Vermilion are often 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. Most species probably had poor reproduction in 2009 as well, due to the cool spring and summer weather that year.

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 2010 and 2011 year classes. One year of netting indicates the 2010 year may be stronger than average, especially on East Vermilion.

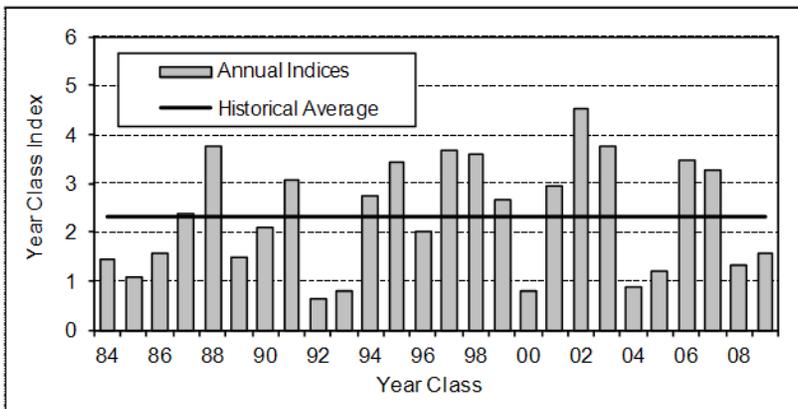


Figure 3. Walleye Year Class Strength Indices, 1984-2009.

Fall electrofishing is used to sample young-of-the-year walleye and help determine reproductive success for the year. The 2011 fall electrofishing catch of young-of-the-year walleye was 210 fish/hour, well above the historic average (Figure 4). The electrofishing catch improved after unusually low catches in 2009 and 2010. East Vermilion had a much higher electrofishing catch than West Vermilion. Electrofishing catches are usually higher on East Vermilion.

The mean length of young-of-the-year walleye sampled by electrofishing in 2011 was 5.1 inches, slightly below 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. It is believed large young-of-the-year walleye have better over-winter survival than small fish. 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 2011 year class will likely be stronger than average on East Vermilion, and slightly below average on West Vermilion.

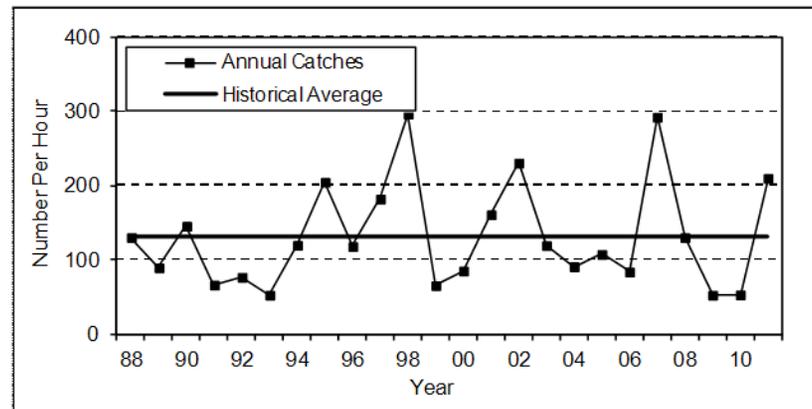


Figure 4. Electrofishing Catches of Young-Of-The-Year Walleye, 1988-2011.

Angling prospects for walleye look favorable in 2012. 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 2006 and 2007. The number of keeper-sized walleye has also improved in the Niles Bay area of West Vermilion. Prospects for catching quality sized fish (over 18 inches) are also favorable, especially on West Vermilion. There are high numbers of walleye over 18 inches in the population from the strong year classes produced in 2002 and 2003, however these larger fish must be released in order to comply with the special regulation on Lake Vermilion.

The special walleye regulation on Lake Vermilion 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 takes effect May 12, 2012. The previous special regulation was implemented in 2006 and had a protected slot of 17-26 inches. The regulation change was prompted by angler concerns over catching keeper-sized walleye on West Vermilion. Due to strong reproduction in 2002 and 2003 and several years of poor to fair reproduction since then, the walleye population in that lake basin has been dominated by larger fish and anglers have had difficulty catching walleye less than 17 inches to harvest. The DNR agreed to review the regulation and see if the protected slot could be modified to allow harvest of larger fish while still meeting management goals for the lake.

A number of protected slot regulations were considered during the review process. Public input was also solicited and a public input meeting was held Sept. 29, 2011. Of the comments received: 25% favored keeping the slot, 70% favored modifying the slot, and 5% favored dropping the slot entirely. Of those offering specific recommendations: 41% favored a 20-26 inch protected slot and 28% favored an 18-26 inch protected slot. After considering all the biological data and public input, it was decided the 18-26 inch protected slot was the best choice to allow some additional harvest while keeping harvest at a safe level.

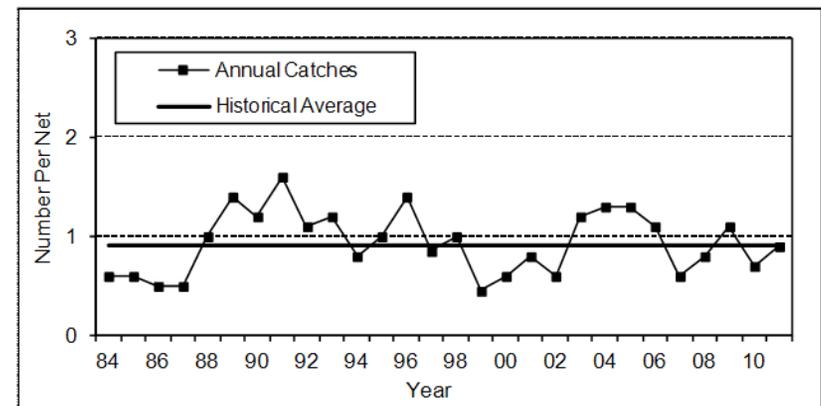
### Northern pike

The 2011 gill net catch of northern pike was 0.9 fish/net, which is near the historic average (Figure 5). Gill net catches of northern pike have historically been fairly stable at a relatively low level. West Vermilion usually has higher gill net catches of northern pike than East Vermilion, reflecting higher abundance in that lake basin.

The mean length of northern pike in the gill net catch was 27.4 inches, well above the historic average. Northern pike lengths ranged from 16.4 inches to 39.1 inches. Northern pike reproduction is usually fairly consistent from year to year, without exceptionally strong or weak year classes. Several age 1 fish were sampled suggesting the 2010 year class could be stronger than average. Angling prospects for large northern pike are better than average in 2012. Anglers may also catch more small fish than normal because of the 2010 year class.

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. Historical fishing records indicate the number of medium and large pike has declined dramatically in Minnesota lakes over the past 50 years. Lake Vermilion was chosen for this special regulation because of its potential to produce quality sized fish.

Figure 5. Northern Pike Gill Net Catches, 1984-2011



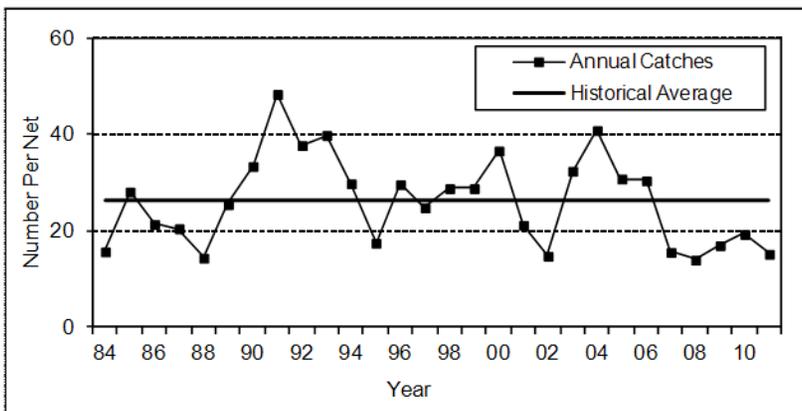
## Yellow perch

The 2011 gill net catch of yellow perch was 15.2 fish/net, well below average (Figure 6). It was the fifth consecutive year of low perch gill net catches. Low perch catches have been due to a series of poor year classes from 2004 to 2008. The perch catch on West Vermilion was slightly higher than the East Vermilion catch, which is typically the case.

The mean length of gillnetted perch was 7.3 inches, which is near the historic average. All sizes of perch were poorly represented in the gill net catch. Perch reproduction has generally been poor in recent years, although moderately strong year classes were produced in 2003 and 2009. One year of netting suggests the 2010 year class may also be stronger than average.

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 in East Vermilion grow faster than West Vermilion perch, probably because they feed extensively on juvenile rusty crayfish that are abundant in that area of the lake. Perch growth is likely to improve in West Vermilion as rusty crayfish become more abundant in that lake basin. Perch are also an important prey item for several species of gamefish, including walleye and northern pike.

Figure 6. Yellow Perch Gill Net Catches, 1984-2011



## Smallmouth bass

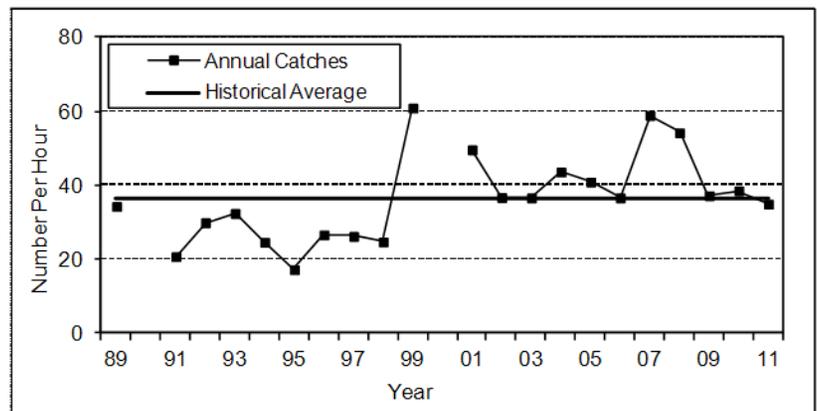
An electrofishing boat is used as the standard sampling gear for smallmouth bass because they are not often caught in standard assessment nets. The 2011 smallmouth bass catch was 35.0 fish/hour of electrofishing, which is near the historic average (Figure 7). The smallmouth bass catch on West Vermilion was considerably higher than the catch on East Vermilion. Smallmouth bass catches are usually higher on West Vermilion while the average size is larger on East Vermilion..

Smallmouth bass sampled by electrofishing had a mean length of 11.1 inches, well above the historic average. Good numbers of 12-17 inch bass were sampled from strong year classes produced in 2002, 2003, 2005, and 2006. Weak year classes of smallmouth bass were produced in 2004 and 2008. A low catch of age 2 fish suggests the 2009 year class may also be weaker than average.

Angling prospects for smallmouth bass look favorable in 2012. There are good numbers of medium sized and large fish in the population from strong 2002, 2003, 2005, and 2006 year classes. Anglers may catch fewer small fish than normal due to poor reproduction in 2008.

There is not a sampling program in place that targets largemouth bass. Recent creel surveys and angler reports indicate the largemouth bass population has increased, especially on West Vermilion.

Figure 7. Smallmouth Bass Electrofishing Catches, 1989-2011



## Muskie

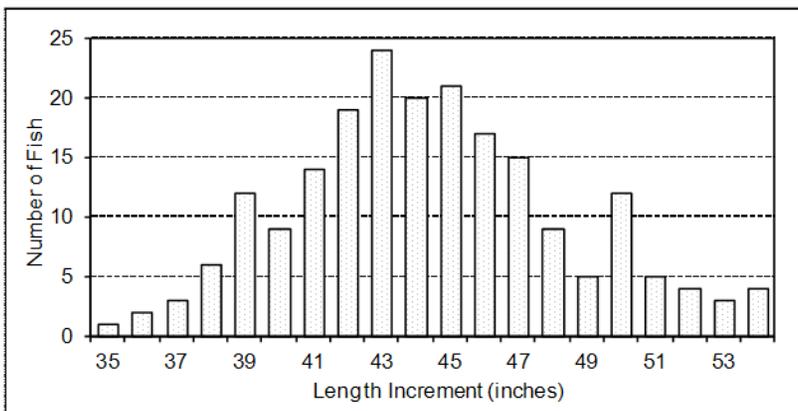
Muskellunge were not known to be native to Lake Vermilion, although there are some unverified accounts of muskie being caught prior to 1960. The first muskie stocking occurred in 1968. Leech Lake strain muskie have been stocked regularly since 1987.

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. An assessment was done on East Vermilion in 2011 and an assessment is scheduled for West Vermilion in 2012. Muskie trap net assessments target spawning fish in the spring shortly after ice-out.

The muskie trap net catch on East Vermilion in 2011 was 2.8 fish/net, slightly higher than the last catch in 2005. Muskie trap net 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 than West Vermilion.

A wide size range of muskie were sampled during the assessment (Figure 8). The mean length of trapnetted muskie was 44.9 inches. Male muskie had a mean length of 42.9 inches, while females had a mean length of 48.5 inches. Nearly 14% of the muskie sampled were over 50 inches long. The largest muskie sampled was 54.6 inches long.

Figure 8. Muskie Length Frequency From Trap Nets, 2011



## Invasive Species

There are several invasive species known to be present in Lake Vermilion. Rusty crayfish are very abundant in East Vermilion and have recently become established in West Vermilion. Curly-leaf pondweed is now 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 invasive species, water, or aquatic vegetation from lake to lake. The DNR also established a program to educate the public about invasive species and inspect boats at some public accesses. A new invasive species plan was recently announced that will include increased enforcement and education efforts. New guidelines have been adopted to ensure DNR hatcheries and private aquaculture operations do not harbor or spread invasive species. New regulations have been adopted that limit the use of smelt and cisco for bait. These species are known carriers of VHS, a virus that is lethal to many species of fish. There is now mandatory training on invasive species for lake service providers, including businesses that install or move docks and boat lifts. Recent legislation 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. 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 invasive species to other lakes. Boats and trailers should be 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 338 nests in 2011. Potato Is. is located in Big Bay in the eastern part of the lake. Many anglers and lake residents are concerned that increased cormorant numbers might harm gamefish populations, especially walleye. Documented cases where cormorants have impacted fish populations are rare. Cormorants generally exist at population levels that do not significantly impact fish populations. On Lake Vermilion, there has not been a major impact on the walleye population. The walleye gill net catch was above average in 2011 and it appears strong year classes were produced in 2010 and 2011. Cormorants are protected by the Migratory Bird Act, which makes unregulated killing of these birds illegal. Some limited control of cormorants is allowed 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. Cormorant numbers and fish populations will be monitored closely, and cormorant control will be proposed should evidence develop that gamefish populations are being impacted.

## **Fishing Tournaments**

There are four fishing tournaments scheduled so far on Lake Vermilion in 2012. 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 considers fishing tournaments to be a legitimate activity on Minnesota lakes, and manages them in a manner that will protect fish populations and minimize conflict with other lake users.

- May 19: City Auto Glass Walleye Classic, 125 boats.
- May 20: Excell Bass Tournament, 40 boats.
- June 23: Minnesota Super 30 (Bass), 50 boats.
- August 4: Lake Vermilion Musky Challenge, 50 boats.

## **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 are stocked back into Lake Vermilion. 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 for five years. Walleye fry are marked by immersion in an oxytetracycline bath. This leaves a permanent mark on bony structures in the head 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. Similar marking projects have been done on Red Lake and Leech Lake, which contributed greatly to the understanding of walleye reproduction in those lakes.

Because of water chemistry issues, marking was unsuccessful in 2008 and 2009. Adjustments were made in the methodology and good marks were attained in 2010 and 2011. Based on the ratio of marked and unmarked young-of-the-year walleye sampled by fall electrofishing, an estimated 670 wild fry/littoral acre were produced in 2010. The littoral area is the portion of the lake less than 15 feet deep and the most productive area of a lake. In 2011, an estimated 660 wild fry/littoral acre were produced. This is in addition to the fry that were stocked into the lake. Total fry density (wild + stocked) was estimated to be 1,070 fry/littoral acre in 2010 and 1,660 fry/littoral acre in 2011. Strong year classes of walleye were produced on Red Lake and Leech Lake at total fry densities of 300-600 fry/littoral acre, much less than total fry densities on Lake Vermilion in 2010 and 2011. While it is important to have sufficient walleye fry for producing good year classes, excessive stocking beyond that level is probably not productive.

### **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).

### **License Fee Initiative**

Minnesota's Game and Fish fund is in dire condition. It is projected to "go negative" by as early as July 2013. This means the DNR will need to make significant cuts that affect the quantity and quality hunting and fishing unless the State Legislature approves license fee increases during the 2012 session. The primary reason for the poor condition of the Game and Fish Fund is that hunting and fishing license fees have not increased since 2001. This is the longest period of time without a fee increase in more than 40 years.

The Division of Fish and Wildlife is highly dependent on funds from the Game and Fish fund. For the Section of Fisheries, 94% of the operating budget come out of the Game and Fish Fund. The Section of Wildlife receives 96% of its operating budget from the Game and Fish Fund. Other funding sources like the Legacy Amendment and State Lottery cannot be used for core DNR functions. These funds are used for special projects and were never intended to supplement traditional DNR funding sources.

Under the license fee initiative proposed by the DNR, the cost of a resident individual angling license would increase from \$17 to \$24. Fees for other types of licenses would go up as well. The license initiative would also create several new license types based on preferences expressed by anglers and hunters. If the Legislature approves the DNR proposal, the Game and Fish fund should remain solvent through 2019. For additional information on the license fee initiative, go to the DNR website at [mndnr.gov](http://mndnr.gov) and click on "The Bottom Line." Your opinion matters. Please voice it to your state legislators.