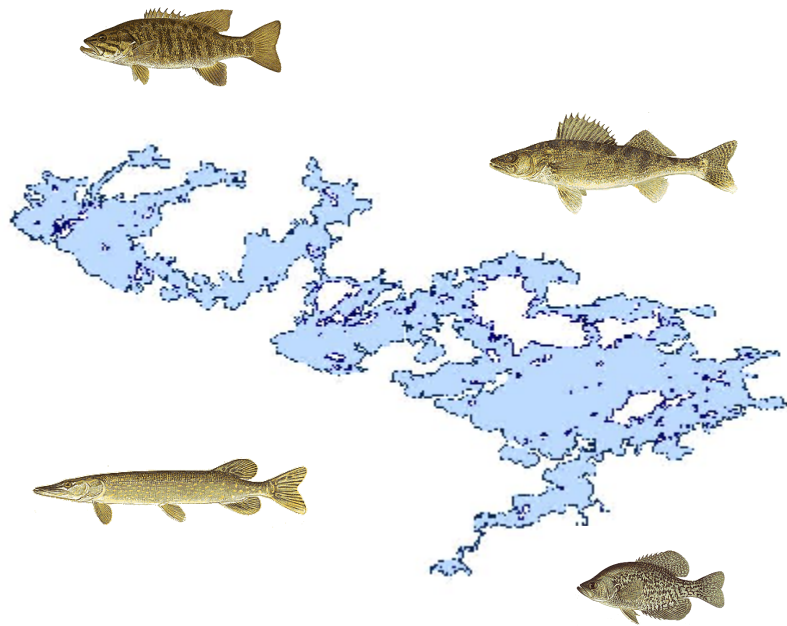


Fisheries Management On Lake Vermilion In 2010



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 2010 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.

Duane Williams, Large Lake Specialist

Phone: 218-753-2580, ext. 224

e-mail: duane.williams@state.mn.us

Jeff Eibler, Acting Area Fisheries Supervisor

Phone: 218-753-2580, ext. 223

email: jeff.eibler@state.mn.us



MN Dept. of Natural Resources
Division of Fish and Wildlife
Section of Fisheries
650 Highway 169
Tower, MN 55790
Phone: 218-753-2580

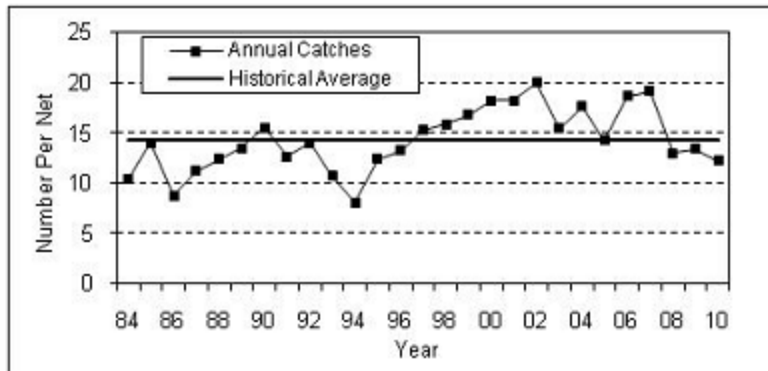
Walleye

The walleye gill net catch in the fall of 2010 was 12.2 fish/net, slightly below the historical average (Figure 1). Relatively low walleye catches in recent years were due primarily to poor reproduction in 2004, 2005, and 2008. High walleye gill net catches in 2006 and 2007 were due to strong year classes produced in 2002 and 2003, however the influence of those year classes has diminished in recent years.

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 for the two lake basins. The 2010 walleye gill net catch on East Vermilion was higher than the catch on West Vermilion, which is typical. Historically, walleye gill net catches are usually higher on East Vermilion, while the average size of walleye 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 usually enough 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.

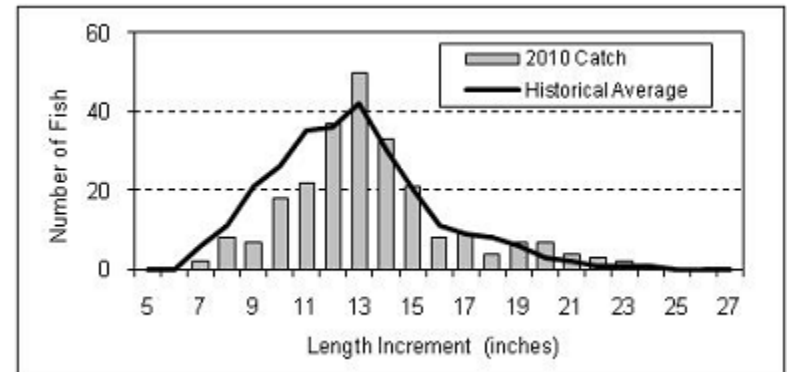
Figure 1. Walleye Gill Net Catches, 1984-2010.



Walleye sampled by gill nets had a mean length of 14.0 inches, well above the historical average. The large average size was due primarily to low numbers of small walleye in the gill net catch (Figure 2). The low catch of walleye under 12 inches long was related to poor reproduction in 2008 and 2009. The gill net catch of walleye 12-16 inches long was slightly above average, reflecting the presence of moderately strong year classes produced in 2006 and 2007. The catch of larger walleye was also slightly above average, due to strong year classes produced in 2002 and 2003. Most of the larger walleye were sampled on West Vermilion.

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 and they 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 much lower numbers of large fish.

Figure 2. Walleye Length Frequency From Gill Nets, 2010.

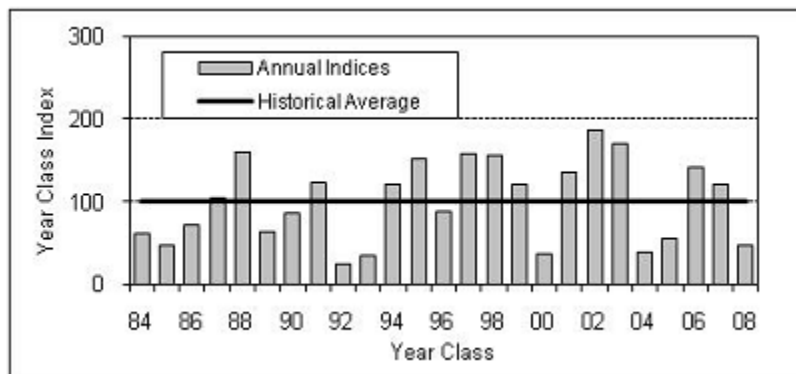


Walleye year class strength can be represented by indices that are calculated from gill net catches of each year class for each year of netting (Figure 3). An index of 100 would be considered average. The strongest year classes produced in recent years were the 2006 and 2007 year classes. The 2006 year class is especially strong on East Vermilion, while the 2007 year class is stronger on West Vermilion. Strong year classes were also produced in 2002 and 2003. Most of the larger walleye sampled on West Vermilion were from the 2002 and 2003 year classes.

Weak year classes of walleye were produced in 2004, 2005, and 2008. Poor reproduction in 2004 was probably related to unusually cool spring weather. Weak year classes of walleye on Lake Vermilion are often related to cool spring and summer weather, which can negatively affect egg survival and first-year growth. 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 2009 and 2010 year classes. One year of netting indicates the 2009 year will likely be weaker than average.

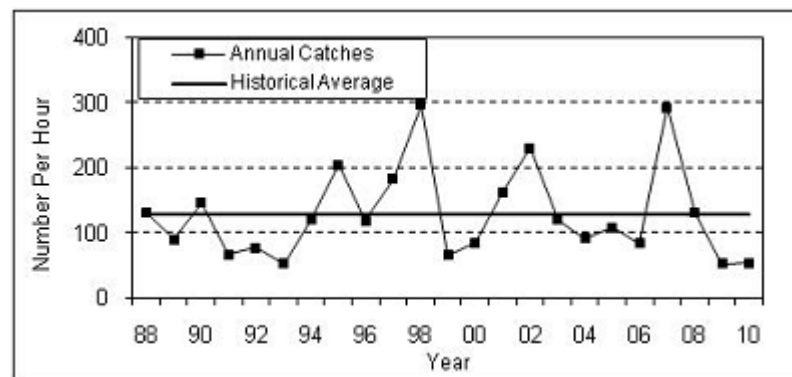
Figure 3. Walleye Year Class Strength Indices, 1984-2008.



Fall electrofishing is used to sample young-of-the-year walleye and help determine reproductive success for the year. The 2010 fall electrofishing catch of young-of-the-year walleye was 53 fish/hour, well below the historical average (Figure 4). It was the second consecutive year of low walleye electrofishing catches. Poor reproduction in 2009 may have been related to cool weather that spring and summer.

The average length of young-of-the-year walleye sampled by electrofishing in 2010 was 5.5 inches, slightly above the historical average. Data from our sampling program indicates growth of young-of-the-year walleye is an important factor in eventual year class strength, 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, along with 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 2010 year class will likely be near average. Most species experienced favorable conditions for spawning in 2010, due to an early spring and warm summer weather.

Figure 4. Historical Electrofishing Catches of Young-Of-The-Year Walleye, 1988-2010.



Angling prospects for walleye are fairly good in 2011. There are good numbers of 13-15 inch walleye in the population, especially on East Vermilion. Most of these fish are from moderately strong year classes produced in 2006 and 2007. Fishing should also improve in the Niles Bay area of West Vermilion. Good numbers of 11-13 inch walleye were sampled in that area. Anglers can expect to catch fewer small walleye than normal, due to poor reproduction in 2008 and 2009. Prospects for catching quality sized fish (over 17 inches) are good, especially on West Vermilion. There are high numbers of walleye over 17 inches in the population from 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.

In an effort to maintain fishing quality, the DNR implemented a special regulation for walleye on Lake Vermilion in 2006. The regulation is a 17-26 inch protected slot with one fish allowed over 26 inches, and includes a four fish bag limit. Anglers must immediately return to the lake all walleye 17-26 inches long, inclusive. One walleye over 26 inches long is allowed in the daily and possession bag limit. Anglers fishing Lake Vermilion may only have 4 walleye in their daily and possession limit.

A more restrictive walleye 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 level could have negative consequences for the walleye population. The slot limit will help keep harvest at a safe level, while allowing anglers to keep eating sized fish. Adding the 4-fish bag limit will also help keep harvest at a safe level and will be consistent with regulations recently adopted on other large walleye lakes in Minnesota. Creel surveys in 2008 and 2009 indicated the regulation did help to keep the walleye harvest at a safe level.

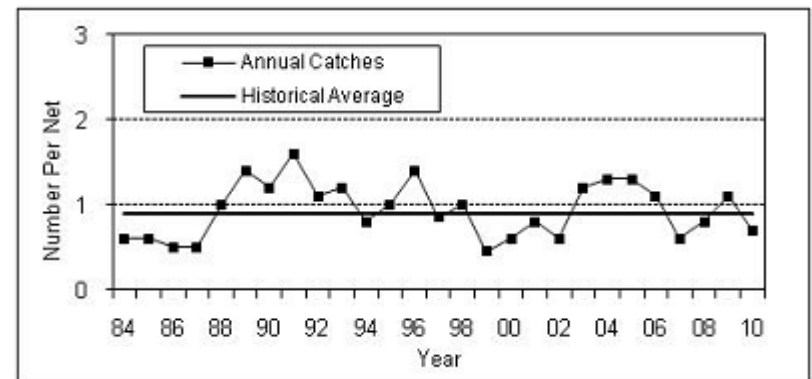
Northern pike

The 2010 gill net catch of northern pike was 0.7 fish/net, slightly below the historical 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 sampled by gill nets was 29.8 inches, well above the historical average. A wide size range of northern pike were sampled, although the total sample size was only 14 fish. Northern pike reproduction is usually fairly consistent from year to year, without exceptionally strong or weak year classes in most years. Angling prospects for northern pike in 2011 should be similar to recent years.

A special regulation for northern pike went into effect on Lake Vermilion in 2003. The regulation is a 24-36 inch protected slot, with one fish allowed over 36 inches. All northern pike 24-36 inches long must immediately be returned to the lake. 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.

Figure 5. Northern Pike Gill Net Catches, 1984-2010.



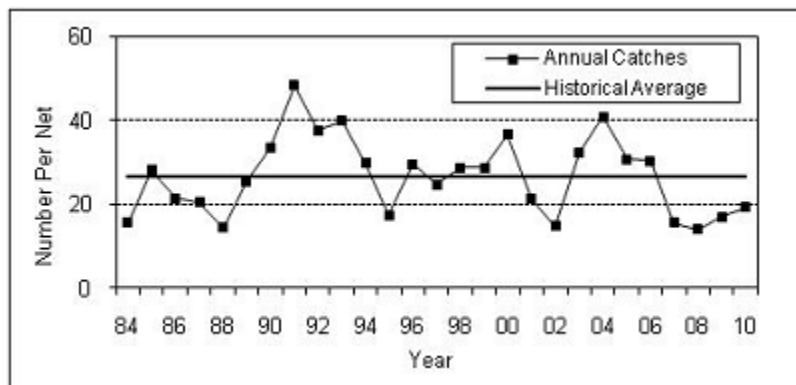
Yellow perch

The 2010 gill net catch of yellow perch was 19.3 fish/net, well below the historical average (Figure 6). It was the fourth consecutive year of low perch gill net catches. Low perch catches in recent years were due in part to poor reproduction in 2004 and 2005. The perch catch on East Vermilion was much lower than the West Vermilion catch. Usually perch catches are similar between the two lake basins.

The average length of perch sampled by gill nets was 7.3 inches, slightly below the historical average. The catch of 5-6 inch perch was near average, while the catch of larger perch was below average. Poor year classes of perch were produced in 2004 and 2005. Moderately strong year classes were produced in 2003 and 2008.

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, 1984-2010



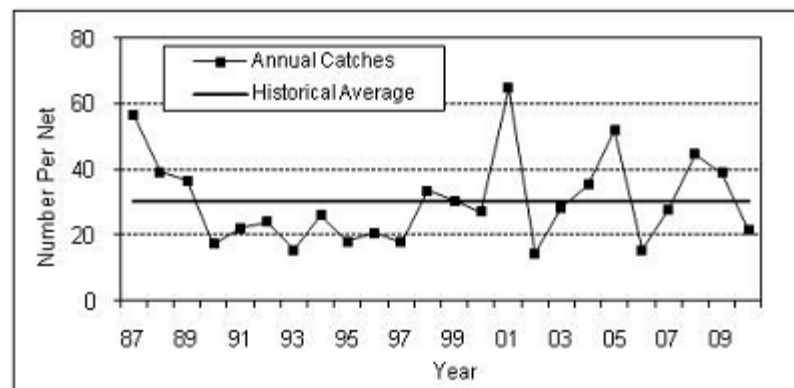
Bluegill

The 2010 trap net catch of bluegill was 21.6 fish/net, slightly below the historical average (Figure 7). The low bluegill catch was due primarily to poor reproduction in 2004 and 2007. Trap net catches of bluegill have been highly variable in recent years, reflecting large differences in year class strength. Bluegill are much more abundant in West Vermilion and trap net catches there are always much higher than catches on East Vermilion.

The mean length of bluegill sampled by trap nets was 5.5 inches, well below the historical average. Above average numbers of small bluegill were sampled from strong year classes produced in 2005 and 2006. The catch of larger bluegill was below the historical average. Strong year classes of bluegill were produced in 2002, 2005, and 2006. Poor year classes were produced in 2004 and 2007.

Anglers can expect good bluegill fishing in 2011, with the best fishing being on West Vermilion. Anglers may catch more small fish than usual from the strong year classes produced in 2005 and 2006. There are larger fish available to anglers from older year classes in the population, however small fish and medium sized fish are much more abundant than large fish.

Figure 7. Bluegill Trap Net Catches, 1987-2010.



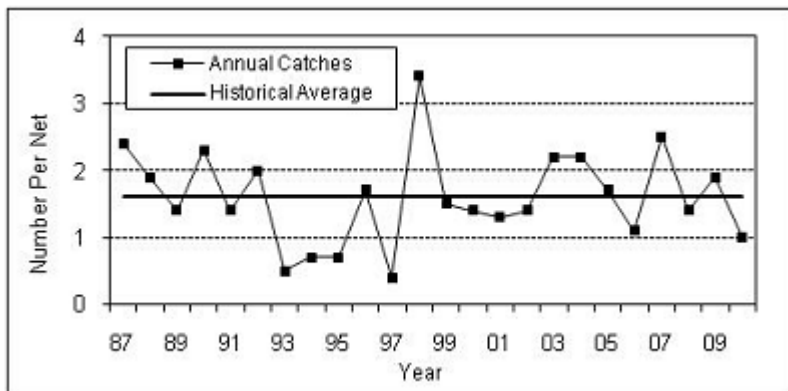
Black crappie

The 2010 black crappie trap net catch was 1.0 fish/net, slightly below the historical average (Figure 8). Crappie numbers have historically been relatively low on Lake Vermilion, although some areas of West Vermilion have higher numbers of fish. Crappie trap net catches are usually higher on West Vermilion than East Vermilion.

The mean length of black crappie sampled by trap nets was 9.6 inches, well above the historical average. The large average size was due to above average numbers of 10-11 inch crappies in the catch. These larger fish were from strong year classes produced in 2005 and 2006. The trap net catch of small crappie was below average, reflecting poor reproduction in 2007 and 2008. A poor year class of crappie was also produced in 2004.

Angling prospects for crappie in 2011 are good, with above average numbers of 10-11 inch crappie available to anglers from the strong 2005 and 2006 year classes. Anglers will likely catch fewer small crappie than normal, due to poor reproduction in 2007 and 2008. As usual, the best crappie fishing will likely be on West Vermilion.

Figure 8. Black Crappie Trap Net Catches, 1987-2010.



Smallmouth bass

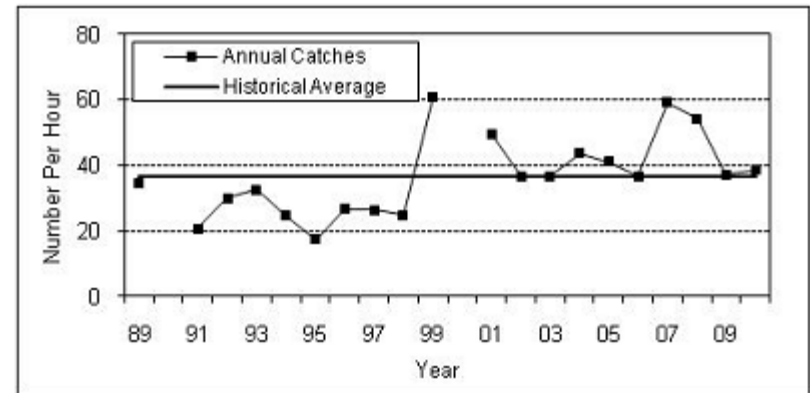
An electrofishing boat is used as the standard sampling gear for smallmouth bass because they are not often caught in standard assessment nets. The 2010 smallmouth bass catch was 38.6 fish/hour of electrofishing, which is near the historical average (Figure 9). The smallmouth bass catch was higher on West Vermilion than East Vermilion, which is typical for the lake.

Smallmouth bass sampled by electrofishing had a mean length of 10.6 inches, well above the historical average. The large average size was due to high numbers of 14-16 inch bass in the catch from strong year classes produced in 2002 and 2003. Good numbers of 8-12 inch bass were also sampled from strong year classes produced in 2005 and 2006. Weak year classes of smallmouth bass were produced in 2004 and 2007.

Angling prospects for smallmouth bass are good in 2011. There will be good numbers of 14-16 inch fish available to anglers from moderately strong year classes produced in 2002 and 2003. Anglers can also expect to catch more small fish than usual, from strong year classes produced in 2005 and 2006.

There is not a sampling program in place that targets largemouth bass. Angler reports indicate the largemouth bass population is probably increasing, especially on West Vermilion.

Figure 9. Smallmouth Bass Electrofishing Catches, 1989-2010.



Muskie

Muskie population assessments are done every 4-6 years, with East Vermilion and West Vermilion being done in different years due to the large size of the lake. The last assessments were done in 2005 and 2006, with the next assessments scheduled for 2011 and 2012. Trap net catches of muskie have been gradually increasing since the first set of assessments was done in 1993 and 1994. The number of large fish has also been increasing. Over 15% of the muskie sampled in 2005 and 2006 were over 50 inches long. The largest muskie sampled during the 2005-2006 assessments was 54.7 inches long. The current muskie stocking quota is 4,000 fingerlings every other year. Natural reproduction of muskie has also been documented in recent assessments.

Invasive Species

Several invasive species have become established in Lake Vermilion; including rusty crayfish, purple loosestrife, curly-leaf pondweed, and heterosporis (a microsporidean fish parasite). These species were probably inadvertently 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, infested water, and 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.

The Sportsmen's Club of Lake Vermilion (SCLV) has also been working 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.

Cormorants

There has been concern in recent years about increasing numbers of cormorants on Lake Vermilion. Many anglers and lake residents are concerned that high 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. Cormorants are protected by the Migratory Bird Act, which makes indiscriminate killing of these birds illegal. Some limited control of cormorants is allowed through a deprecation 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 six fishing tournaments scheduled so far on Lake Vermilion in 2011. 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 21: City Auto Glass Walleye Classic, 100 boats.
- May 22-23: Super Slam Bass Tour, 50 boats.
- July 9: Team Great Outdoors (Bass), 50 boats.
- August 6: Lake Vermilion Musky Challenge, 50 boats.
- August 13: Denny's Super 30 (Bass), 50 boats.
- August 28-29: Super Slam Bass Tour, 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 each year, although it is not known how much these stocked fry contribute to the walleye population.

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, which leaves a permanent mark on the fish's bony structures that can be identified at later stages of life. The goal of the project is to determine how many walleye fry are produced naturally in these lakes and what level of stocking would maximize return of walleye to anglers. Similar marking projects have been done on Red Lake and Leech Lake, which contributed greatly to the understanding of walleye reproduction in those lakes.

Based on the ratio of marked and unmarked young-of-the-year walleye sampled by fall electrofishing, an estimated 2,350 wild fry/littoral acre were produced in 2009. The littoral area is the portion of the lake less than 15 feet deep, which is the most productive area of a lake. In 2010, an estimated 670 wild fry/littoral acre were produced. Strong year classes of walleye were produced on Red Lake and Leech Lake at total fry densities of 300-600 fry/littoral acre, less than the production of wild fry on Lake Vermilion. Growth and survival of walleye fry may be a more limiting factor on Lake Vermilion than the number of fry produced naturally or stocked.

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, primarily 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. For more information on properly managing lakeshore and other DNR programs, go to the DNR website at www.mndnr.gov.