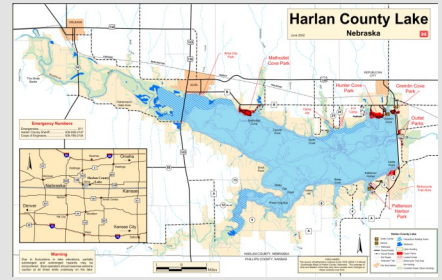


Harlan Reservoir

2010 Fall Survey Summary

Nebraska Game and Parks Commission
Brad Newcomb, District Manager



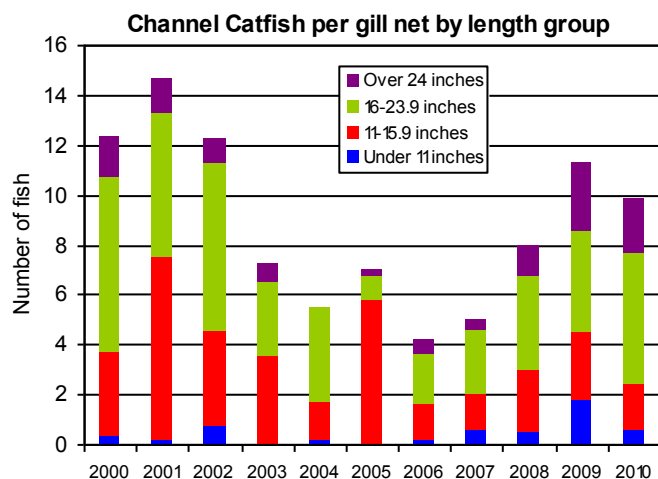
The following text and graphs are summaries of netting surveys completed during October 2010 at Harlan Reservoir. For comparative purposes, results from previous years are also included. Fish populations are sampled each fall at Harlan using gill and frame nets. Gill nets are used to sample fish species found primarily in open water, such as walleye, while frame nets are used to sample shoreline oriented fish, such as crappie. The nets are set each year at approximately the same locations and dates as previous years, which reduces variability and allows for trend comparisons of species abundance and size distribution.

The following graphs show the total number of fish caught per net and the relative abundance of fish within several length categories. The text provides a brief explanation of the information contained in the graphs.

Channel Catfish

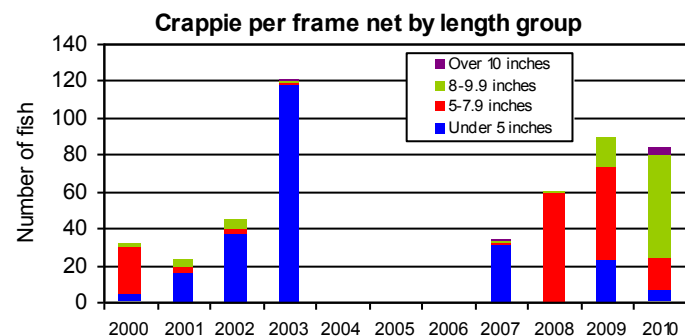
Channel catfish numbers have been much higher the last three years than the long-term low in 2006, and are near the peak years of 2000-2002. Catfish are present in all size groups, including good representation of catfish over 24 inches.

Recruitment of catfish under 11 inches has been present from 2007 through 2010. Recruitment has improved with 2007 and 2009 stocking and improved water levels and habitat. A new channel catfish regulation was approved for 2009 which reduces the daily bag limit to five fish. Harlan anglers should expect good catfishing in 2011 with a good variety of sizes available.



Crappie

The 2010 survey showed very good numbers of crappie from 8 to 10 inches long. Good year-classes of crappie have resulted from higher water levels and abundant shoreline and cove habitats. The 2007, 2008, and 2009 year-classes of crappie are all well represented in the 2010 survey. The crappie from the 2007 year-class were about 9-10 inches long. Recent strong recruitment and continued high water levels should provide very good crappie fishing at Harlan Reservoir.

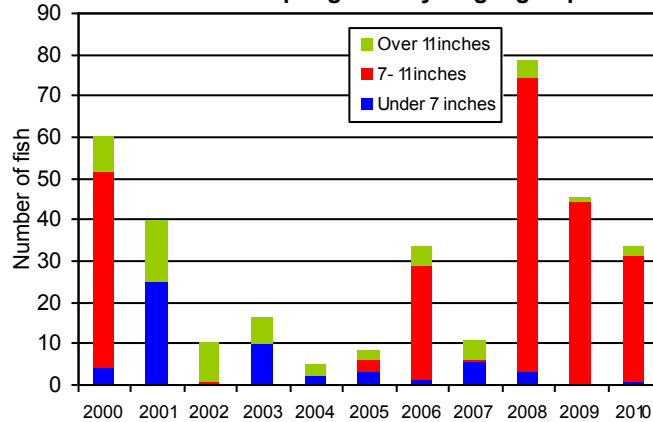


Gizzard Shad

Gizzard shad numbers continued to decline from the peak in 2008. Most shad sampled ranged from 9 to 11 inches long. Large numbers of intermediate-sized shad result in more competition for food resources with juvenile gamefish, and may reduce survival of young-of-the-year walleye and white bass.

Very few small shad have been collected the last two years during the fall survey. Gizzard shad are the most important prey species in Harlan Reservoir and serve as food for all the major game fish populations. Poor production of young shad may lead to lower annual recruitment and growth of predator fish species such as walleye and white bass.

Gizzard Shad per gill net by length group



Walleye

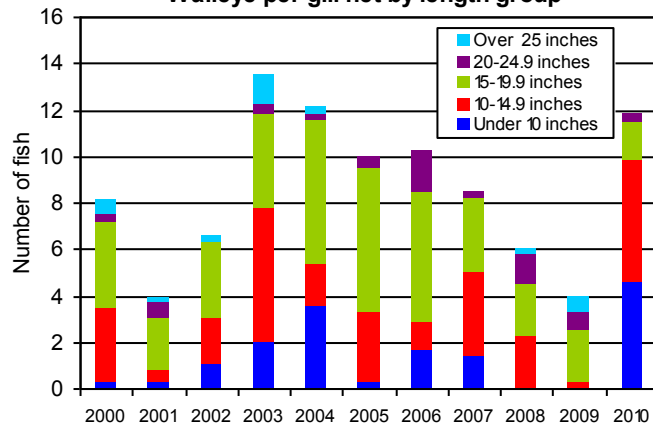
After a long period of declining walleye numbers, an impressive increase in walleye abundance was observed in 2010. Although no young-of-the-year (YOY) walleye were sampled in 2008 or 2009, a **record number** of YOY walleye were sampled in 2010. The total of 8.2 YOY walleye per net was the highest at Harlan since survey records started in the 1970's (refer to second graph).

There were also good numbers of 10 to 15 inch walleye that were mostly age one, but also included some fast-growing YOY walleye.

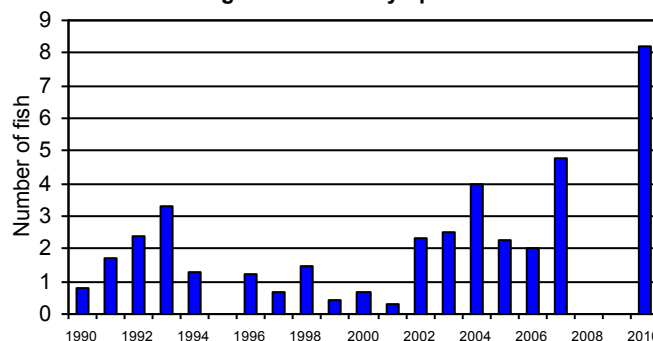
After seeing an increase in walleye over 25 inches the last two years, none were sampled in 2010. Distribution in flooded habitat may still be impacting sampling efficiency for certain sizes for fish.

Walleye ages ranged from one through four. The most abundant walleye were age zero or YOY (69% of all walleye sampled) and age one (17% of the sample). Both year-classes correspond to walleye fry stockings of about 14 million fish each year.

Walleye per gill net by length group



Young-of-Year Walleye per Gill Net



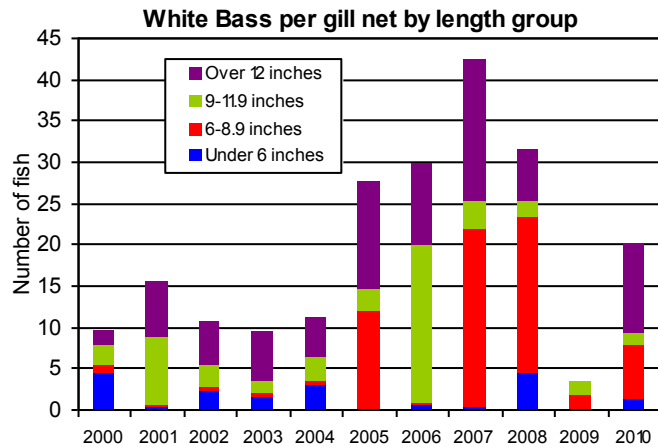
Overall, there is increased and record-level recruitment of young walleye and much improved total numbers. Together with high water levels, improved aquatic habitat conditions, and stocking programs, future walleye fishing should improve considerably.

White Bass

White bass numbers increased in 2010 from the unexpected drop observed in 2009. The low numbers in 2009 may have been explained by poor sampling efficiency caused by flooded vegetation and uneven fish distribution with high reservoir water levels.

The most abundant white bass were 12-13 inches long, with good numbers also in the 6 to 9 inch range. White bass ranged from age zero to four. There was good recruitment, with age zero contributing 39% of the total numbers. Ages 2 and 3 (2007-2008 year-classes) were also well represented, contributing 59% of the total numbers sampled.

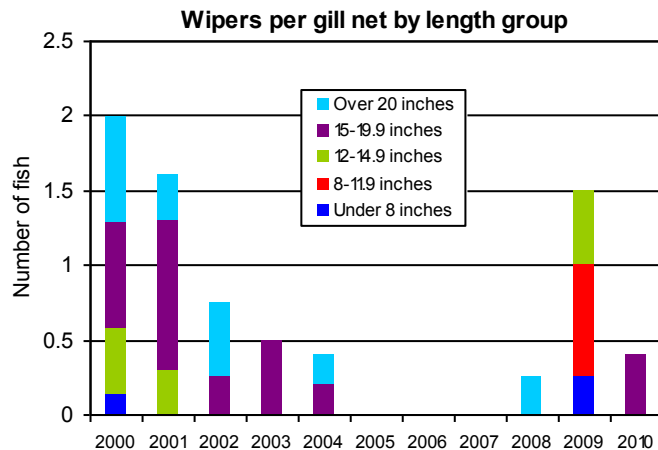
The 2010 white bass survey was more indicative of the excellent white bass population observed from 2005-2008. As with previous survey results, the potential exists for very good white bass fishing in the next few years.



Wipers

Wiper numbers remain low at Harlan Reservoir. A total of two wipers were sampled in 2010, which were 16-17 inches long and age two. That corresponds to the last stocking and the 2008 year-class. Wipers are scheduled for stocking again in 2011, and every three years following.

Results from a 2002-2003 food habit study at Harlan involving major predator fish species indicated very little competition between wipers and walleye. Based on those results, wiper stocking was reinstated in 2005, with stockings planned every three years. The current stocking program should improve the population to provide a sustainable sport fishery.



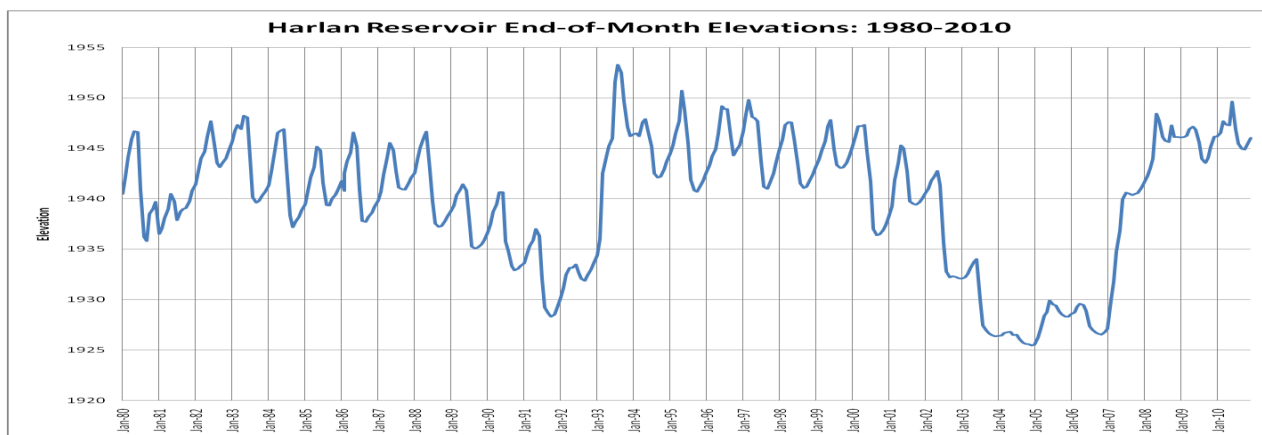
Additional Information about Harlan Reservoir

Water Levels

Harlan Reservoir water levels remained high through 2010. The reservoir was at or above conservation pool for much of the year, and only dropped a few feet for irrigation releases. Excellent aquatic habitat conditions continued through 2010 with many acres of flooded terrestrial vegetation such as willows and cottonwoods.

High water levels and increased aquatic habitat have resulted in good recruitment of several fish species. Although 2009 recruitment was not well-documented, several species had good recruitment in 2007 and 2008.

Water elevations at Harlan Reservoir Since 1980 Conservation Pool is 1946msl



Fish Stocking

Due to declining population trends and low recruitment, Harlan Reservoir received a stocking of **channel catfish** in 2007 and 2009. Each catfish stocking consist of 10 fish per acre that were 5 to 7 inches long. Based on survey results, the catfish population has recovered well enough to discontinue future stockings.

Based on results of several years of research into wiper interactions in Harlan Reservoir, **wiper** stockings started again in 2005 and are scheduled for every three years. The most recent stocking was about 70,000 wiper fingerlings in 2008, and these fish were represented in the 2010 survey.

Recent walleye fry stockings included about 11 million in 2007, 14 million in 2009, and 15 million in 2010. Stocking survival in 2010 likely contributed to record levels of young-of-year walleye in the fall. Based on recent recruitment success, walleye fry are requested for future stockings at a rate of 1,000 per surface acre of water.

To take advantage of shoreline habitat associated with higher lake levels, stocking of largemouth bass and northern pike were completed from 2008 to 2010. Future stocking of these species will be dependent on the availability of shoreline habitat.

Walleye Egg Collections

Walleye eggs were collected at Harlan Reservoir from 2003 through 2006, with most used for walleye fry stockings in Nebraska. No walleye eggs have been collected from Harlan since 2006, and none are planned for 2010.

Additional Information Continued...

Aquatic Habitat Project at Harlan Reservoir

Harlan Reservoir was included on the initial list of sites as part of Nebraska's Aquatic Habitat Program. This program is designed to rehabilitate aquatic habitat in aging reservoirs to provide enhanced fishing opportunities. The Aquatic Habitat Program utilizes funding generated from Nebraska's Aquatic Habitat Stamp and various matching sources.

The project proposal document for the aquatic habitat project at Harlan Reservoir was completed in the spring of 2008. The project proposal identifies possible locations and techniques for habitat improvements. The overall goal will be to restore and protect selected shoreline, point, and cove habitats at Harlan Reservoir in order to improve or sustain recreational fisheries.

The next step for Harlan's project will be a Request for Proposal document to obtain engineering services for final design, construction specifications, and oversight for the project. This step is scheduled for completion in 2011.

Uncertain water levels at Harlan Reservoir will present a special challenge for the design and construction work. The project proposal includes sites for both low and high water conditions, and individual sites will be completed contingent on future water levels in the lake. Most probable locations for work at Harlan will be Gremlin Cove and Patterson Harbor, and proposed activities are included in the following diagrams.

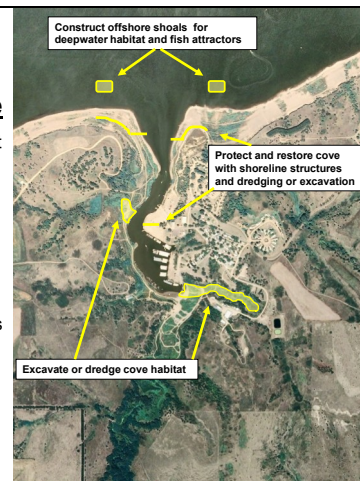
Gremlin Cove Site

- Increase height of existing jetties to protect cove habitat, boat access, and marina operation, < 1944
- Protect dike north of Gremlin boat ramp, < 1938
- Excavation behind jetties and north end of cove, < 1934
- Dredging behind jetties and north end of cove, > 1938
- Construct offshore shoals for deepwater fish habitat and fish attractors (placement dependent on detailed depth profile map)



Patterson Harbor Site

- Protect and restore cove habitat
- Shoreline jetties or breakwaters (1927-1940 depending on length of jetty)
- Excavate (<1929) or dredge (>1935) cove habitat
- Construct offshore shoals for deepwater habitat - fish attractors (any elevation)



Public Information

Paper copies of this summary are supplied to the US Army Corps of Engineers Office in Republican City. Also, the Game and Parks fisheries staff presents an update of Harlan fisheries management at the annual Harlan Walleye Anglers Group meeting in Holdrege.

Zebra & Quagga Mussels

Anglers and boaters need to be aware of zebra and quagga mussels while using Nebraska Lakes. While no mussels have been identified at Harlan Reservoir, zebra mussels have been confirmed at Zorinsky Lake in Omaha and are present in several reservoirs in Kansas and Colorado. Monitoring was completed at several Nebraska reservoirs during 2010 and no evidence of mussels were found. Unfortunately, adult mussels were found during the fall of 2010 at Zorinsky Lake by a private citizen. This lake is currently closed to public access and efforts are being made to eradicate the mussel population. Statewide monitoring efforts will be expanded in 2011 to determine if mussels are present in other water bodies.

Invasive mussels will attach to almost any surface and have detrimental impacts on industry (power plants, water intakes, irrigation, etc), native fish and mussels, and recreational users (fouling boat motors, impacting beaches, etc). Invasive mussels cause an estimated \$5 billion per year in economic impacts in the United States for monitoring and control efforts. Inadvertent transfer by humans is the major source of new infestation for zebra and quagga mussels; primarily by boats, boat trailers, and fishing gear. Boaters and anglers are reminded that it is important to **clean, drain and dry** their equipment and boats before moving to different bodies of water. Anglers and boaters are encouraged to educate themselves on these and other aquatic invasive species. An excellent source of information regarding invasive species can be found on the University of Nebraska's Invasive Species Project website: <http://snr.unl.edu/invasives/>.



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For additional information about fisheries management at Harlan Reservoir, please contact the NGPC Kearney office at 308-865-5310, or by email at the addresses listed below.

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