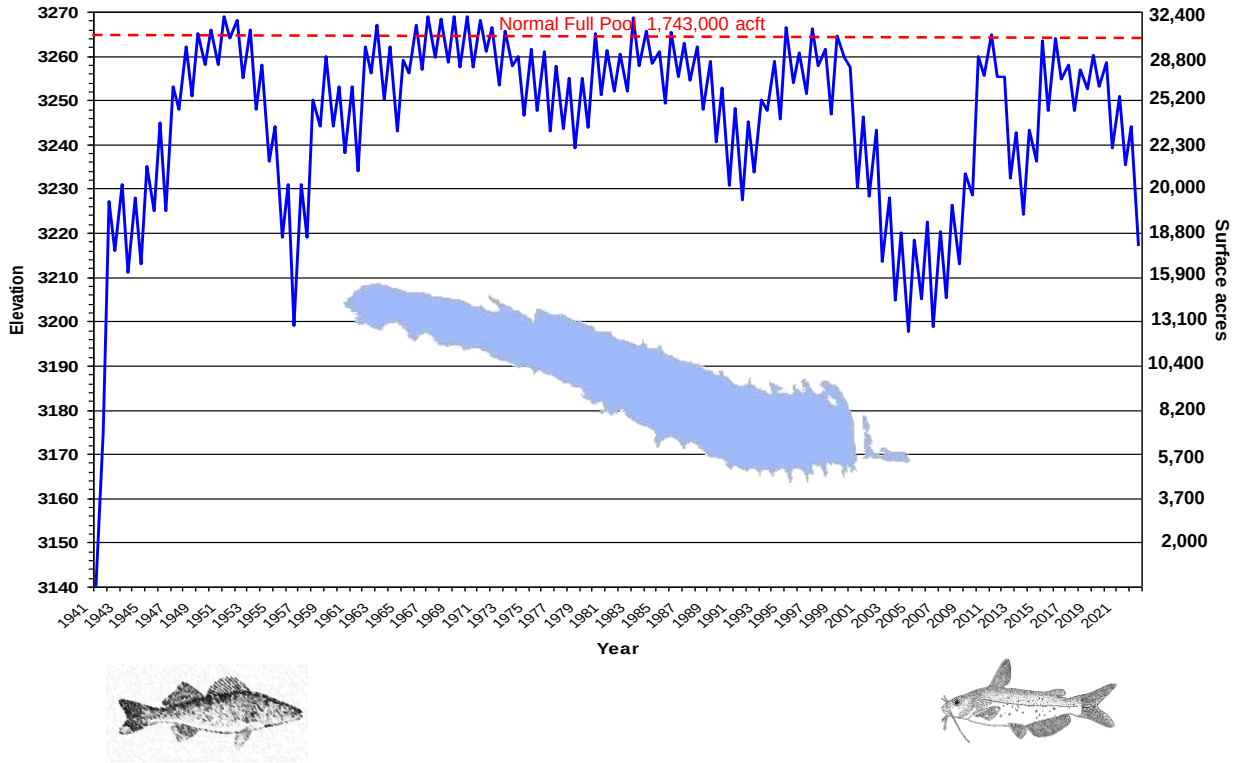
Lake McConaughy
2023 Fall Survey Summary

Fisheries Division

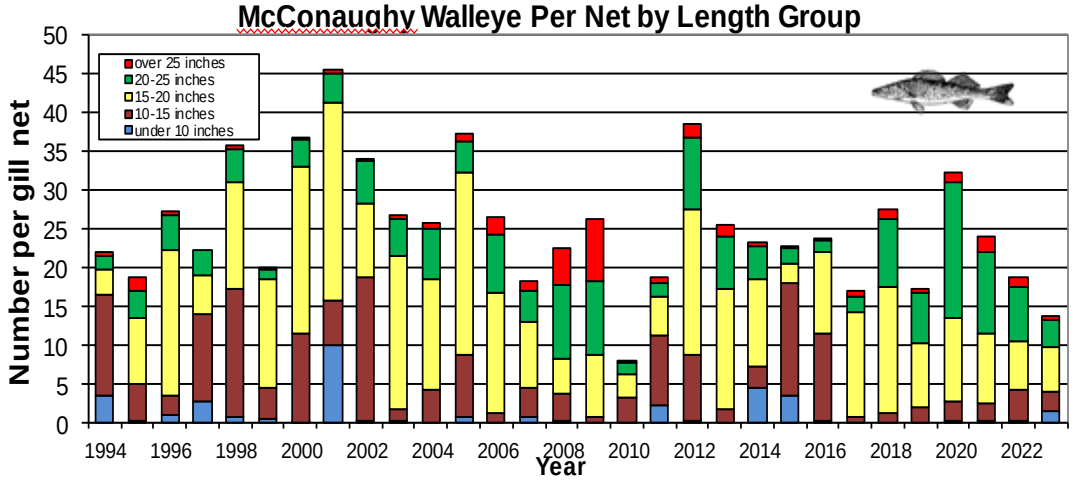
Nebraska Game and Parks Commission Darrol Eichner, Fisheries Biologist

The following text and graphics is an effort to provide anglers with recent background on lake water levels and historical fall fish sampling efforts conducted by the Nebraska Game and Parks Commission. Lake McConaughy is Nebraska's largest reservoir and has a long history of being a very high quality sport fishery. Since completed construction of Kingsley Dam in 1941 it also has a history of dramatic water level fluctuation as a result of drought related low inflows and significant releases of stored water for downstream surface water irrigation. An additional negative factor is the reduced river and stream inflow related to increased upstream groundwater pumping. Central Nebraska Public Power Irrigation District (CNPPID) estimates this to be a loss of 160,000 acre feet of historical annual inflow.

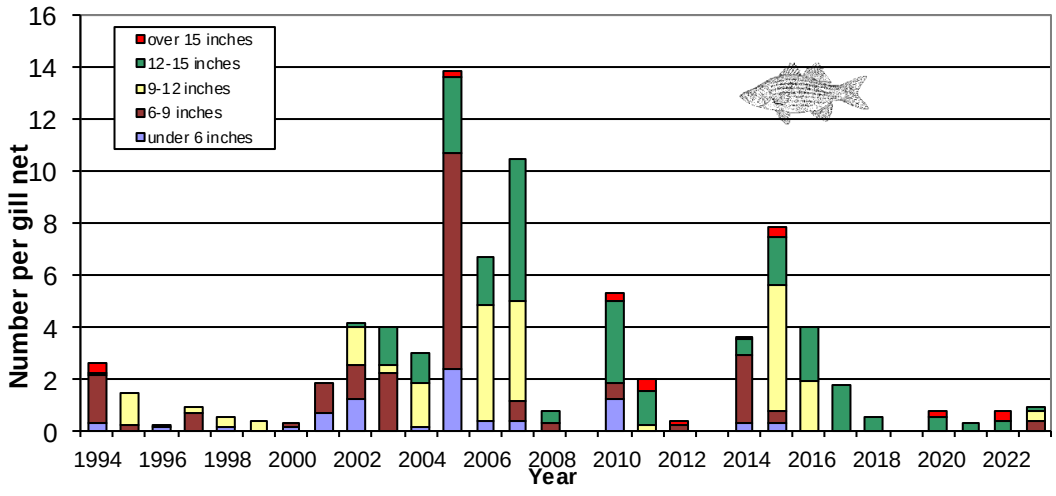
Lake McConaughy Annual High-Low Elevations, 1941-2022



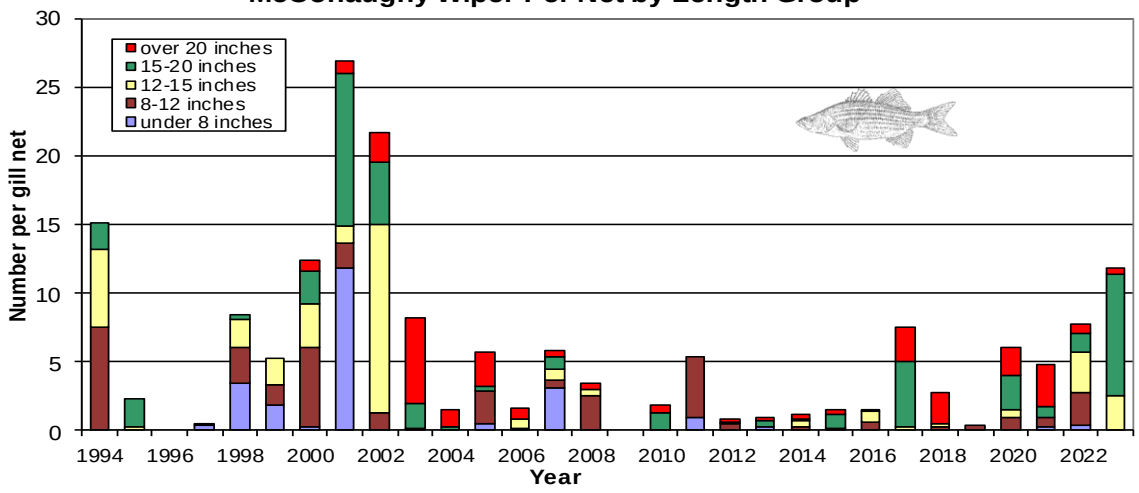
At normal full pool elevation 3265.0 Lake McConaughy has a surface area of 30,000 surface acres and storage volume of 1,743,000 acre feet (ac/ft) of water. The average annual summer irrigation drawdown since construction is 13.7 feet. As recently as 2004 McConaughy reached a new record low elevation of 3197.6, a loss of 67.4 feet of vertical water column over a four year period. The respective surface area was reduced to 12,400 acres with 340,000 ac/ft of storage. This put the reservoir at 41% of it's normal full pool surface area and 20% of normal full pool storage volume which can have a dramatic negative impact on both sport and prey fish populations. Increased natural mortality and fish escapement undoubtedly were factors but are not accurately measurable. After 2004 the reservoir never recovered above elevation 3233.5 until June of 2010 when it reached elevation 3260.0 which put it at 90% of normal full pool surface area. This was a one year gain of approximately 8,000 surface acres which covered vast areas of terrestrial vegetation that had established on the exposed lake bed over a period of nearly nine years. An additional 2,000 surface acres of water was added in 2011 when the lake elevation reached normal full pool 3265.0. From a fish management perspective it was hoped that the reservoir would maintain some resemblance of a full reservoir that would keep most of the established terrestrial brush inundated for a period of years. However in 2012, starting the year at a high elevation of 3255.3, the lake level declined 23.0 feet to elevation 3232.3 with an additional loss in 2013 of 18.5 feet to elevation 3224.1 and resulting surface area of less than 19,000 surface acres. More recently the high spring elevation in 2022 was 3244.1 with a dramatic summer drawdown of 27.0 feet. The high spring elevation in 2023 was 3235.7 (21,230 surface acres) with a more modest summer drawdown of 7.3 feet to elevation 3228.4 (19,680 surface acres). For the water 2024 water year CNPPID intends to make a full seasonal irrigation delivery.



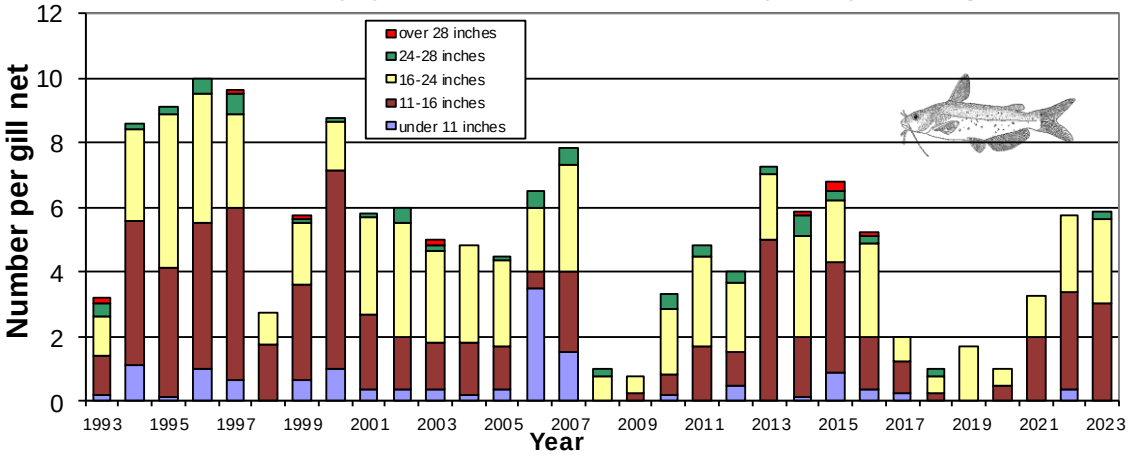
Standardized fall fish sampling methods involve the use of experimental mesh gill nets placed at historical stations. It needs to be noted that dramatic changes in lake elevation, as have been experienced, can add some variability when comparing yearly catch numbers for all species. The 30 year average walleye catch is 25.2 per net. Walleye in the 15-20 inch length group were the most strongly represented length category in 2023. A calculated relative weight (Wr) index based on a length-to-weight ratio is used to measure the degree of 'plumpness,' or lack of, for an individual or group of fish. Applying that calculation to the walleye catch indicates older fish in the 21 inch and larger length ranges had elevated Wr values up to 120, higher than the theoretical optimum standard value of 100. Walleye in the other length groups are generally slightly under the 100 Wr value.



White bass fall survey catch rates at Lake McConaughy can be quite variable for a schooling fish in a large fluctuating reservoir and have remained generally low since the introduction of alewife in the early 90's. A number of factors can affect natural recruitment and establishment of strong annual year-classes of white bass. These include weather related cold fronts during the spawning run and egg incubation, declining change in reservoir elevation, lack of high river inflow, predation and food availability for larval/juvenile fish. The 12-15 size range of McConaughy fish are generally in the 3-6 year old age brackets. With consideration for the small number in the sample all white bass length categories sampled in 2017 had Wr values in the 108 range. **Anglers are reminded of a statewide regulation: no more than one wiper/white bass/striped bass 16 inches or longer in the daily bag limit.**



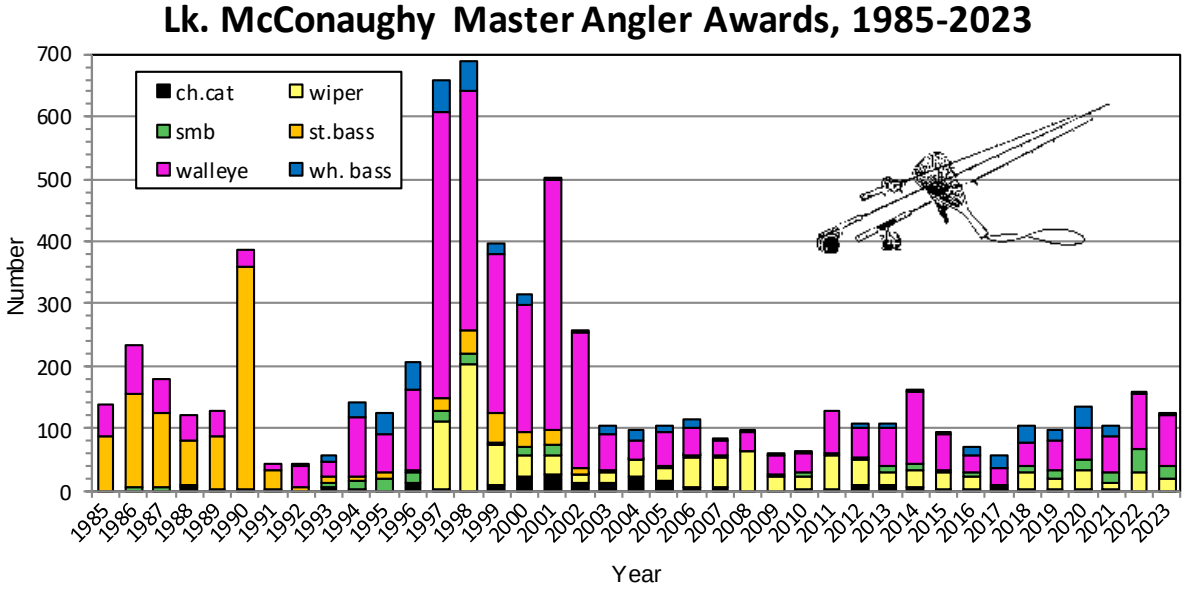
The historical wiper survey data also shows variable survey catch rates over time, not unlike that of white bass. The zero catch in 2009 can also be attributed to a later than normal survey sampling date. The lower catch rates of larger wiper are not indicative of what is available in the reservoir based on recent angler catch success. McConaughy wiper generally reach a length of 20 inches at age 4 or 5. The Wr values for the length categories over 12 inches have remained well above the theoretical optimum 100 value over a period of years. **Anglers are reminded of a statewide regulation: no more than one wiper/white bass/striped bass 16 inches or longer in the daily bag limit.**



Channel catfish survey catch rates show that two length groups, representing fish from 11-24 inches, make up a majority of the catch. McConaughy channel catfish historically have been a slow growing long lived population with fewer fish found in the two larger length categories. Long term fall survey age and growth analysis indicates that a length of 16 inches is generally not reached until age 6-7 with fish 20 inches or larger at age 9 and older. The population is maintained by natural recruitment from both the reservoir and North Platte River.

Lake McConaughy Smallmouth And Largemouth Bass

Although fall survey catch results have historically shown low numbers smallmouth bass are important to an increasing number of catch and release anglers at Lake McConaughy. The rock face dam and areas of natural rocky shoreline provide a large area of their preferred habitat. Most angler caught smallmouth range in size from 8-16 inches in length with some fish each year recorded as qualified Master Angler Awards. Age and growth analysis shows most McConaughy smallmouth bass reach the statewide 15 inch minimum size limit at age 5 which is comparable to growth rates in several other states. Largemouth bass numbers at Lake McConaughy improved slightly as a result of increased flooded timber areas which developed in the low water years in the mid-2000's. One largemouth bass Master Angler Award was recorded in 2023 to confirm their presence.



A total of 84 Master Angler walleye were recorded from Lake McConaughy in 2023 representing 62% of the entire statewide listing for that species. Fifty-three of the 68 largest walleye recorded by weight in the state came from McConaughy with a 32 inch 12 pound 15 ounce fish being the largest. Lake McConaughy has averaged 60 master angler walleye per year in the previous 10 years. A total of 18 striped bass hybrid (wiper) were recorded with the largest being a 32 inch, 11 pound 6 ounce fish. A new state record wiper was recorded in June of 2020 weighing 21 pounds 9 ounces. Twenty smallmouth bass awards were issued in 2023 with more angler interest in that species. The largest smallmouth recorded was a 20 inch fish weighing 4 pounds 3 ounces. Five northern pike were recorded with the largest a 41 inch 18 pound fish.

Lake McConaughy Fish Stockings 2014-2023

Year	Walleye Fingerling	Walleye Fry	Striped Bass Hybrid (wiper) Fingerling	White Bass Fingerling
2014	1,140,241	--	--	305,725
2015	1,670,670	--	28,750	401,000
2016	1,584,717	--	--	28,750
2017	1,730,985	--	86,634	360,226
2018	1,808,025	--	185,492	115,815
2019	1,839,652	--	38,556	400,128
2020	1,558,722	--	91,448	--
2021	1,733,314	--	33,570	239,736
2022	1,610,308	26,022,507	--	--
2023	1,042,010	20,990,175	--	--
	Fingerling Requested	Fry Requested		
2024	1,000,000	20,000,000	--	--

As is the case with environmental and biological factors having an influence on natural reproduction and recruitment of larval/juvenile game fish, supplemental fish stockings can have similar degrees of success or failure. Walleye fingerlings have been stocked annually at McConaughy beginning in 1996 with a maximum request most years of 1,500,000 fish based on a 50 per acre stocking rate at an expected 30,000 normal full pool surface acres. Stocking requests for 400,000 fingerling white bass have been on an annual basis and 90,000 fingerling wiper on an alternating year schedule through 2021. All wiper recruitment into the reservoir population is supported by stockings. Hatchery fish production can some years occasionally not meet expected yield goals but as can be seen in the numbers listed in the above table for the last ten years Lake McConaughy has also benefited most years from surplus hatchery production numbers for walleye and wiper. The 2024 fish stocking request will be 1,000,000 walleye fingerlings and 20,000,000 fry based on projected spring reservoir surface acres. In the last five years all fish lake stockings have been made by boat in open water when wind and wave action allows in an effort to reduce shoreline predation on the small walleye.

Angler Survey Results

The University of Nebraska Cooperative Fish and Wildlife Research Unit, in cooperation with Nebraska Game and Parks Commission fisheries staff, conducted an night creel along Kingsley dam in 2023 during the April walleye spawning run for the second consecutive year. Data was recorded from angler interviews to provide estimates on angling effort measured in hours and days, species sought, species catch to include size and the numbers of fish caught, harvested or released. Information was also collected on angler demographics encompassing residency and frequency of angling trips to Lake McConaughy. No daytime April to October angler survey was conducted in 2023.

Kingsley Dam April Walleye Spawning Run Nighttime Angler Survey

Year	Bank Anglers	Boat Anglers	Total Hrs Fished
2022	5,729	5,177	10,905
2023	5,479	2,808	8,287

Walleye Catch and Harvest

Year	Bank Angler Catch	Boat Angler Catch	Total Catch	Bank Angler Harvest	Boat Angler Harvest	Total Harvest
2022	2,855	1,505	4,360	1,163	1,119	2,282
2023	3,075	1,088	4,164	1,248	747	1,995

Fisheries Research

Ongoing fisheries research projects at Lake McConaughy conducted by graduate students from the University of Nebraska at Kearney (UNK) continue with the gathering of information on adult sportfish populations to include protecting the high quality walleye fishery along with emphasis on improved white bass recruitment into the reservoir fishery. These students work under the guidance and project planning of Dr. Keith Koupal at the NGPC Kearney office and Dr. Melissa Wuellner at the UNK campus. This involved series of studies will also look at zooplankton densities and water quality parameters related to lake level fluctuations along with possible alewife predation on walleye fry or fingerlings. Fish distribution patterns for both predator and prey species have been monitored along with identifying preferred stocking locations. Adult sex ratios related to calculated age and growth data will be determined and mortality estimates applied to the assumed short-lived nature of white bass.

To evaluate contribution of walleye fry, fingerling and fingerling+ size stockings the fish were given differentiating marks for each size group at the hatchery using an oxytetracycline bath to make a chemical imprint on the otolith for later extraction and analysis. In late summer the UNK graduate students used an electrofishing boat to collect young-of-the-fish (yoy) for laboratory examination. The result of that two years effort and respective stock contribution findings are listed in the table below. Because of some variability in percent contribution of fish origin for the two years a third year of identical study is planned for 2024.

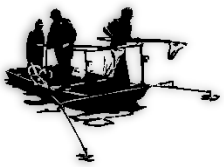
McConaughy yoy Walleye Origin

2022 Lake McConaughy Walleye Stocking

Origing	# Stocked	Contribution (%)
Fry	26,022,507	**49 (27.5)**
Fingerling	1,330,934	**60 (33.7)**
Fingerling +	279,374	**47 (26.4)**
Wild		**22 (12.3)**
Total	27,632,815	**178**

2023 Lake McConaughy Walleye Stocking

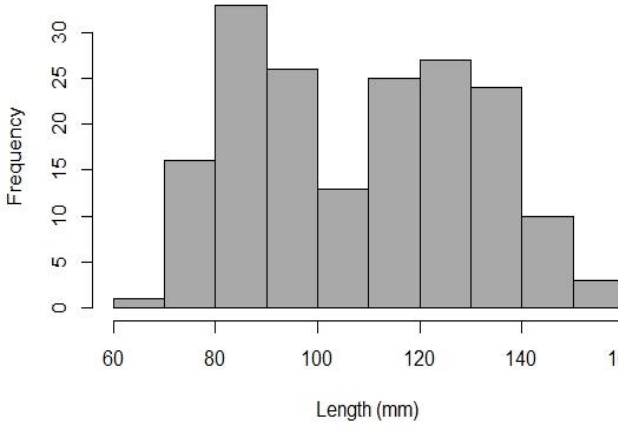
Origin	# Stocked	Contribution (%)
Fry	20,990,175	**52 (19.8)**
Fingerling	841,029	**118 (44.8)**
Fingerling +	200,981	**34 (13.0)**
Wild		**59 (22.4)**
Total	22,032,185	**263**



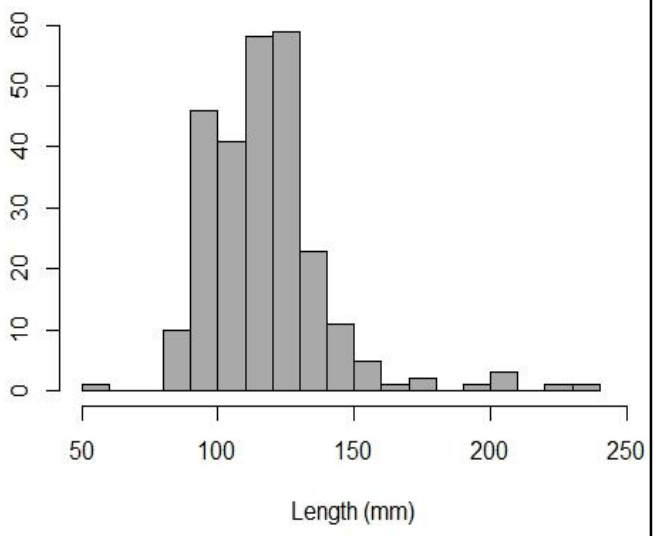
(continued)

Length frequency data collected on the late summer collected yoy walleye in 2022 and 2023 was plotted on graphs to present the size range of fish collected. As in 2022 concern with the significant number of fish less than 100 mm (~4 inches) resulted In a joint decision by fisheries management and research staff to not stock any possible surplus hatchery walleye for 2022 and 2023 and proceed with stocking numbers based only on the predicted reservoir surface acres at stocking time. It is possible these smaller walleye were unable to find a food source necessary for better growth. Fisheries literature review indicates that dramatically small walleye at the end of their first year will have a poor chance of survival to age one and beyond.

2022 McConaughy yoy walleye length frequency



2023 McConaughy yoy walleye length frequency



For further information contact Darrol Eichner, Fisheries Biologist, Nebraska Game & Parks Commission
308-284-8803

Aquatic Invasive Species

Because of Lake McConaughy's status as a popular destination for anglers and recreational boaters it draws visitors from a large geographic area making it very vulnerable to introduction of a number of threatening aquatic invasive species. Most attention to date at Lake McConaughy has been on the potential introduction risk of zebra and quagga mussels. To protect this very valuable resource it is important to adhere to recommended **'Clean-Drain-Dry'** protocol for all boats and watercraft. With emphasis on cleaning and drying livewells, bilge water areas and motor cooling systems. **A new regulation placed in effect starting in 2013 states that any conveyance (vessel) that has been on a waterbody must drain all water from their compartments, equipment or containers before leaving the launch area. In addition it is unlawful for any vessel to arrive at a water body with any water other than a domestic water source. Felt sole boots or waders are not allowed on Nebraska waters.**

Aquatic invasive species fees collected from boaters fund the Nebraska Aquatic Invasive Species Program. This fee for resident boaters is included in the vessel registration payment. Motorized vessels registered outside of Nebraska are required to purchase and permanently display an $18 Aquatic Invasive Species Stamp before launching on any Nebraska waters.

Zebra and Quagga Mussels

PROTECT OUR WATERS
from invasive species