Harlan Reservoir

Fisheries Update - Spring 2023

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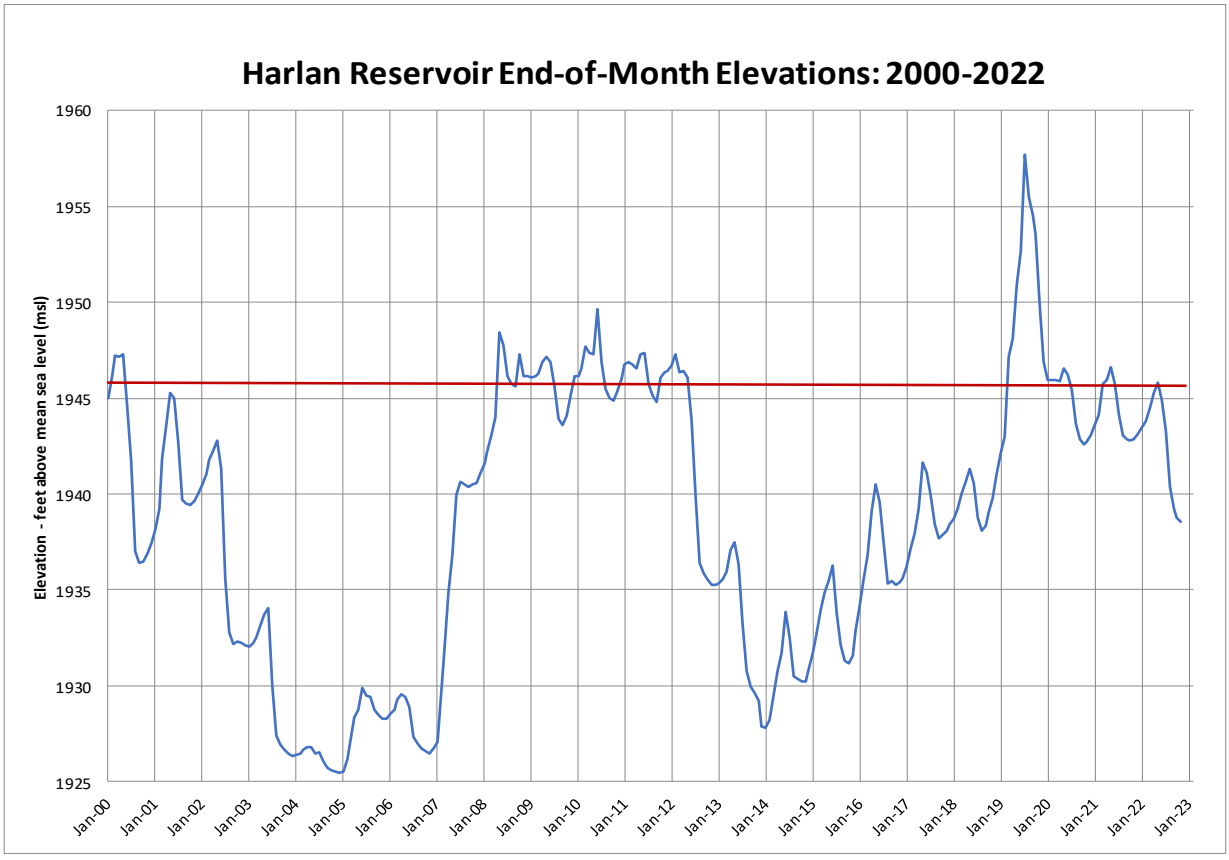
Nebraska Game and Parks Commission uses standard sampling methods to determine the status of fish populations in Nebraska waters. At Harlan Reservoir, gill nets are used to sample open-water fish species such as walleye and white bass, while trap nets are used for shoreline-oriented fish such as crappie. Annual netting surveys are completed at approximately the same dates and locations to reduce variability and allow for trend comparisons of species abundance and size distribution.

The following pages contain graphs and text that summarize netting surveys completed at Harlan Reservoir. Graphs show the total number of fish caught per net and the relative abundance of fish within several length categories. The text provides brief explanations of the information contained in the graphs. In most cases, results are included from the last 10 years.

Water Levels

The following graph shows water elevations at Harlan Reservoir from 2000 through 2022 and the red line shows the conservation pool elevation of 1945.6 msl.

Harlan Reservoir water levels have been at or above conservation pool for the past three years, but there was a significant decline during 2022. A hot and dry summer resulted in reservoir levels dropping approximately seven feet during the 2022 irrigation season. Current lake elevation information can be found on this website: [Current Data for Harlan County Dam, NE (usbr.gov)]

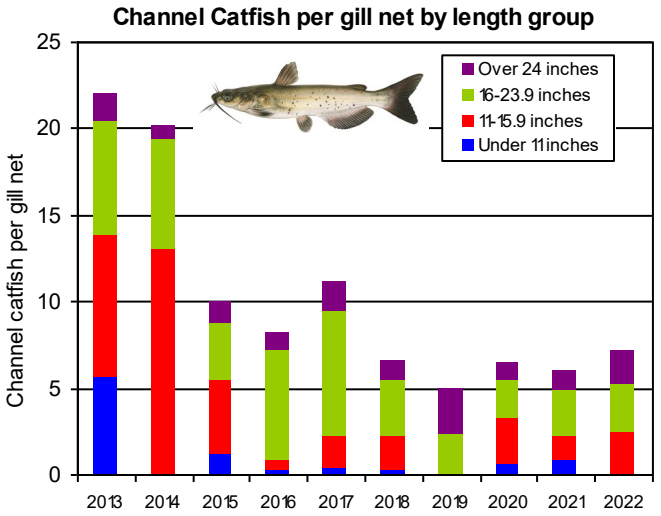


Channel Catfish

Gill net catch of channel catfish has remained stable the past five years, but overall the catch remains lower than results seen during the 2013-17 time period. The ten year average catch is 10.3 catfish/net.

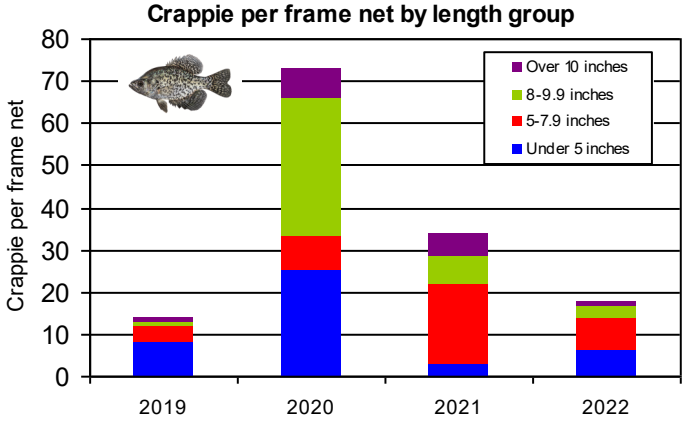
In 2022, most catfish ranged from 16 to 26 inches and the average catfish length was 19.3 inches. Catfish fingerlings were stocked in 2019 and 2021 to improve abundance. The catfish population will continue to be monitored to determine if future stocking is warranted.

Current fishing regulations for channel catfish include a daily bag limit of five in the reservoir and a daily bag limit of ten in the Republican River west of the Highway 89 Bridge.



Crappie

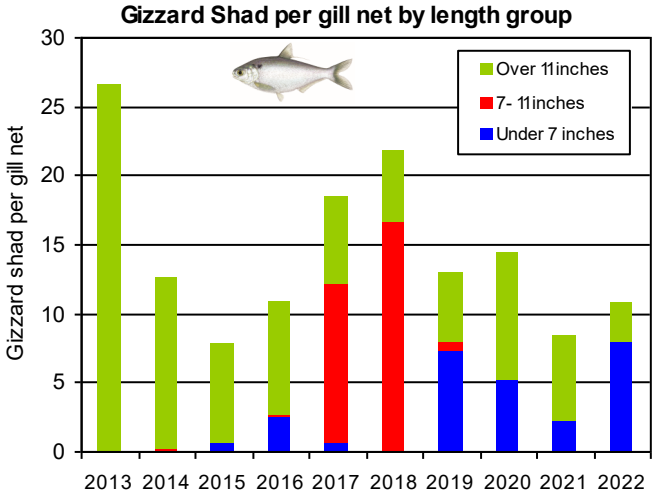
Trap nets are used to sample crappie populations when reservoir levels are high enough to use standard net locations in the major coves. Netting completed the last four years has documented good crappie recruitment. During 2022 sampling efforts, crappie of all size classes were sampled, but the abundance of crappie larger than ten inches was slightly lower. Successful crappie recruitment and growth is highly dependent on high reservoir levels and may be negatively impacted if reservoir levels continue to decline.



Gizzard Shad

Gizzard shad are the primary prey species found in Harlan Reservoir and serve as the food source for all major game fish populations. Ideal shad populations consist of a few breeding adults and an abundant population of small young-of-the-year shad. High abundance of intermediate-sized shad (7 to 11 inches) can result in competition for food resources with juvenile gamefish and tends to reduce survival of young-of-the-year walleye and white bass.

Current gizzard shad abundance and size distribution is in good balance and the population contains adequate numbers of small individuals to maintain healthy predator populations.



Walleye

The following four graphs depict the walleye catch from the fall of 2022.

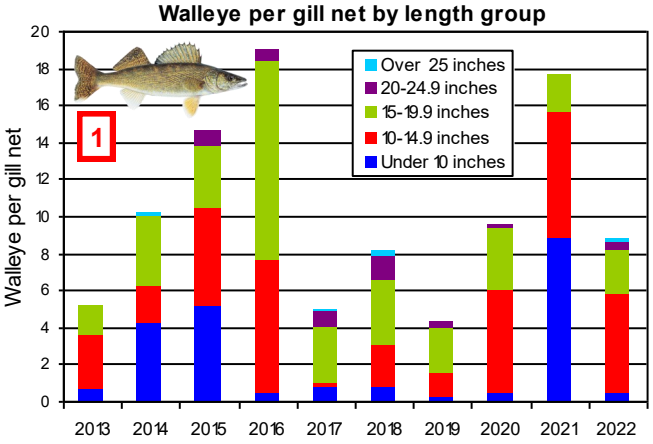
GRAPH 1: The 2022 catch of 8.8 walleye/net was slightly below the ten year average of 10.2 walleye/net. The majority of the catch was comprised of fish from the large 2021 year-class, which range from 10 to 16 inches. Due to the high catch of young fish, the average length of a walleye collected during the 2022 survey was only 14.9 inches. Fish of legal harvest size (>15 inches) comprised about 34% of the total number of walleye sampled last fall.

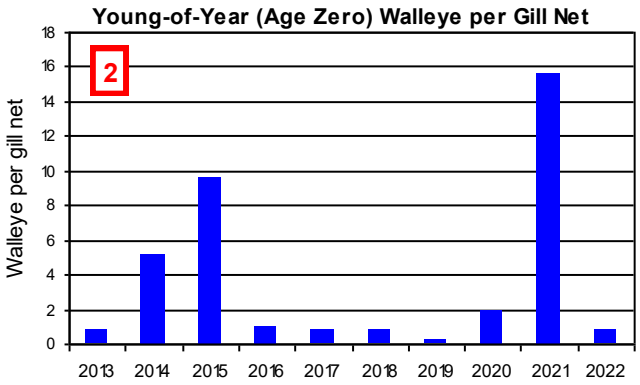
GRAPH 2: After coming off a year that saw the largest catch of young-of-the-year walleye in recent history, the 2022 catch of age-0 walleye was near the long term average. Walleye fry stockings have been completed every year since 2009 (except 2020) with about 10-14 million fish stocked each year. Although we do see some limited natural reproduction of walleye at Harlan, studies have indicated that stocked fish typically contribute up to 90% of the walleye in the reservoir. The large 2021 year-class should contribute to excellent fishing opportunities during the next several years.

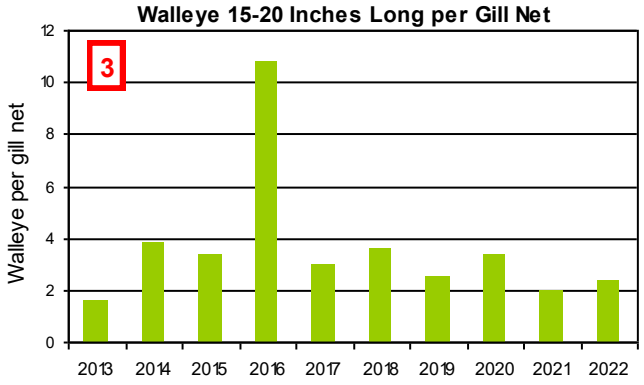
GRAPH 3: Numbers of walleye between 15 and 20 inches long are presented in graph 3. The 2022 catch of fish in this size group was slightly lower than the ten year average of 3.7 fish/net. Walleye in this size range are 2 to 4 years old and generally provide the bulk of the walleye harvest at Harlan each year. It is expected that we will see a lot of fish recruit into this size group during 2023, as fish from the large 2021 year-class currently range from 13 to 15 inches.

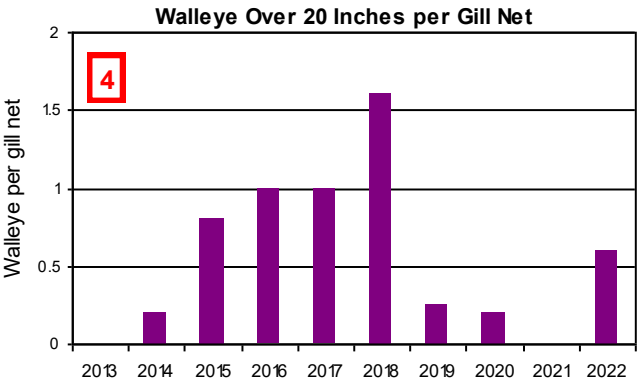
GRAPH 4: Walleye over 20 inches long are displayed in the fourth graph. After seeing lower than average catch of these larger fish the past three years, there was a modest increase last fall. Most walleye in this size range are age five or older. These large fish can be more difficult to sample in standard survey gear as they are less abundant and sometimes occupy different habitats within the reservoir.

The walleye regulation for Harlan allows the harvest of one fish from 15-18 inches and three longer than 18 inches; or four longer than 18 inches. Only one fish larger than 22 inches is allowed.







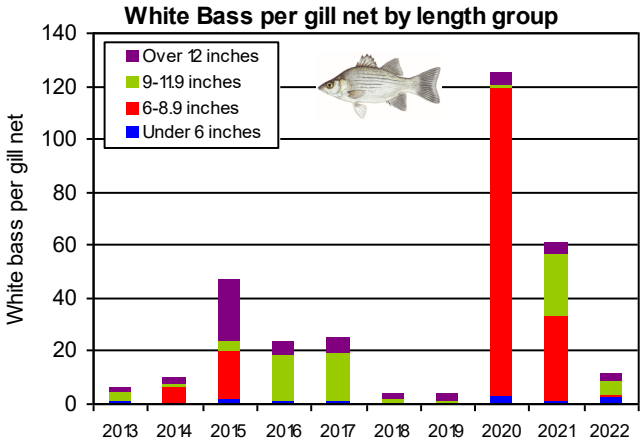


White Bass

After two years of extremely high net catches of white bass, abundance was lower during the 2022 survey. The ten year average gill net catch is 31.0 white bass/net.

White bass of all sizes were sampled, but most ranged from 10 to 13.5 inches. The average length of a white bass collected was 10.3 inches and the largest individuals were 15 inches. The 2020 and 2021 year-classes were the most common age groups captured.

With two very strong year-classes of white bass present in the reservoir, anglers should see excellent angling opportunities during 2023 and beyond.

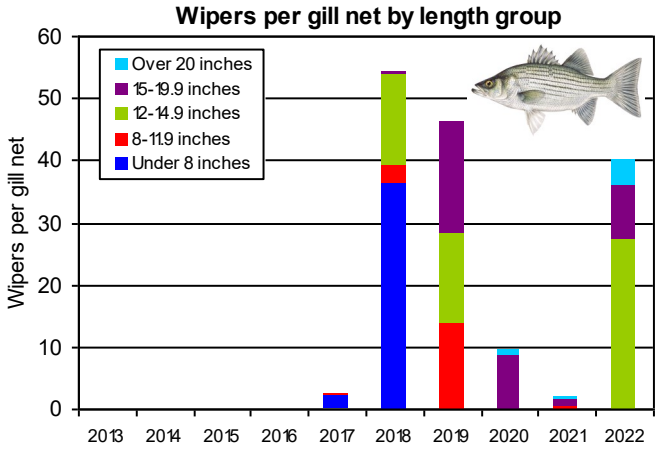


The statewide daily bag limit for white bass is 15 fish per day, with only one fish greater than 16 inches.

Wipers

The 2022 wiper catch consisted of 40 fish per net, most of which were fish from the 2021 stocking. Fish from the 2018 stocking made up 25% of the catch, while only 6% were from 2017. Wipers ranged from 12 to 22 inches.

Prior to 2017, most wiper stockings at Harlan consisted of fingerling fish (1-2 inches). While these stockings created some fair year-classes, in many years survival was low. In an effort to increase survival and overall abundance, stockings were switched to fry in 2017 (3.4 million) and 2018 (2.6 million). These two stockings were extremely successful and have contributed to an abundant wiper population at Harlan. Wiper stocking was temporarily suspended during 2019 and 2020 to help bring wiper numbers to more normal population levels. Fry stockings resumed in 2021, although at a much lower rate (850,000) than what was stocked in 2017 and 2018. The 2021 stocking has produced another strong year-class, most of which are currently ranging from 12 to 15 inches.



The current management strategy for wiper stocking at Harlan calls for stocking fry every three years, with the next stocking scheduled for 2024. Future stocking rates will be determined based on the survival success of the 2021 stocking. The wiper management goal is to maintain a sustainable population that provides a viable sport fishery with opportunity for trophy fish and also to maintain angler tolerance for those who prefer to fish for other species. Previous food habit studies at Harlan Reservoir have shown that there is minimal competition between wipers, walleyes, and white bass for available food resources. Gizzard shad abundance is currently high and can support all the predator species present in Harlan without compromise.

Anglers should continue to have excellent angling opportunities for wipers at Harlan in the upcoming years.

The daily bag limit for wipers at Harlan is 15 fish per day, with only one fish greater than 16 inches.

Additional Information about Harlan Reservoir

Walleye Stocking

Walleye fry have been stocked at Harlan annually since 2009, with about 10 to 14 million stocked each year. Walleye recruitment has been documented in each of these years, including a record number of young-of-year walleye in 2021. Special research sampling of young-of-year walleye from 2011 though 2018 has shown that over 90% of sampled young walleye were stocked fish. Based on overall recruitment success with walleye fry stockings, this stocking strategy will continue at a rate of 1,000 fry per surface acre of water each year. Due to COVID-19 travel restrictions in 2020, no walleye fry stockings were completed in Nebraska. During 2022, the hatchery system produced surplus walleye which allowed for an additional 5 million fry to be stocked into Harlan. There were a total of 18 million fry stocked into Harlan during 2022. Due to anticipated lower reservoir levels, we are scheduled to stock approximately 12.5 million fry in 2023.

Channel Catfish Stocking

Due to declining catfish numbers since 2014, catfish stocking was completed in 2019 and 2021. In 2019 the stocking consisted of 9,500 10-inch fish and the 2021 stocking consisted of 82,618 3.5 inch fish. Channel catfish populations will be annually monitored to determine if future stocking is necessary. No channel catfish are scheduled to be stocked during 2023.

Wiper Stocking

Based on results of several years of research into predator fish interactions in Harlan Reservoir, wiper stockings resumed in 2005. Fingerling stockings during the 2005-2016 time frame were not very successful. Wiper fry were stocked in 2017 and 2018 with excellent success. Wiper fry were again stocked in 2021 at a reduced rate. The wiper management plan calls for wiper fry to be stocked every three years with the next stocking scheduled for 2024.

Crappie, Largemouth bass, and Northern pike stocking

These shoreline oriented fish species are typically stocked when reservoir water levels are near conservation pool. With high water levels, crappie, largemouth bass, and tiger musky were stocked in 2019 and 2020. Tiger musky replaced northern pike stockings due to hatchery availability. The success of the tiger musky stockings appears to have been poor, as few of these fish have been observed in netting surveys and anglers have reported minimal success on them. The stocking of crappie, largemouth bass and northern pike/tiger musky will be suspended for the immediate future due to declining reservoir levels and loss of suitable habitat and will be considered again when reservoir levels rise and preferred habitat conditions return.

Regulation Changes for 2023

In order to simplify regulations for law enforcement purposes, the line that separates the reservoir from the Republican River has been re-designated as the Highway 89 Bridge west of Orleans. Previously, the separation point was the Highway 183 bridge. Additional information can be found in the current Nebraska fishing guide: http://digital.outdoornebraska.gov/i/1489243-fishing-guide-2023-web/0?

Additional Information about Harlan Reservoir

Artificial Fish Attractors

Over the past several years, staff from the Corps of Engineers (COE) and Nebraska Game and Parks have worked together to construct artificial fish attractors commonly referred to as “Georgia Cubes”. Recently the COE have utilized volunteer labor to assist with construction of these structures, which has saved a significant amount of money and has allowed for many more cubes to be constructed. During 2022, staff from the COE and NGPC teamed up to add approximately 50 more cubes to three locations in the reservoir. Below is a table of the gps points for the locations where cubes have been added in recent years.

Location	Latitude	Longitude	# of Cubes
Cedar Point	40.05445	-99.21189	31
Patterson	40.04707	-99.23727	25
Indian Hill	40.04443	-99.27525	17
Hunter Cove	40.07369	-99.22858	20

Aquatic Habitat Project— Methodist Cove Section 1135 Project

The Game and Parks Commission and the U.S. Army Corps of Engineers (COE) are partnering on a largescale aquatic habitat restoration project at Methodist Cove. Currently in the design phase, this project is intended to restore and protect aquatic habitat that has been negatively impacted by sedimentation and shoreline erosion. A major component of the project will involve removing accumulated sediment from Methodist Cove and reconnecting the cove to the main reservoir. Breakwaters will be constructed to prevent the newly deepened cove from future erosion, as well as providing improved angling access. Improved spawning habitat will be added to the deepened areas of the cove to benefit species such as crappie, while deep water fish attractors will be placed in the main reservoir near the mouth of the cove to provide overwintering habitat. Design is scheduled to be finalized during late 2023 and construction is tentatively scheduled for 2024.

Most of the funding for this project is being provided by a Section 1135 grant administered by the COE to restore and enhance degraded aquatic ecosystems on projects that are owned by the COE. NGPC will provide matching funds through the Aquatic Habitat Fund, which is funded by the sale of Nebraska fishing permits.

Aquatic Invasive Species – Zebra Mussels

Anglers and recreational boaters should be aware of the threat of zebra and quagga mussels while using Nebraska waters. Boaters using Nebraska waters need to be aware of **current regulations** dealing with aquatic invasive species. The following regulations are in effect to help prevent the spread or introduction of unwanted species in Nebraska waters.

- **It is unlawful to arrive at or leave any waterbody in Nebraska with water other than from a domestic source (such as a water supply system, well, or bottled), except for fire-fighting purposes. This applies especially to boats, their compartments, equipment or containers that may hold water.**
- **Any watercraft that has been on a Nebraska waterbody must drain the lake water from their compartments, equipment or containers before leaving the launch area. It is illegal to dump baitfish into a Nebraska waterbody.**
- **Livewells need to be drained prior to leaving a launch area: plan ahead and bring a cooler for harvested fish.**
- **All aquatic vegetation from that waterbody attached to the watercraft and/or trailer must be removed before leaving the launch area**.

A good source of information about invasive species can be found on the Nebraska Game and Parks Commission website: **http://outdoornebraska.gov/aquaticinvasivespecies/**

Technicians have been hired the past few years to conduct interviews of boaters and help provide more information about aquatic invasive species. During 2022, the AIS technician completed 668 inspections and interviews at the three major boating access sites at Harlan. Inspections included a visual examination of the boat and trailer, as well as questions to boat owners to determine their residence, last water body visited, when boat was last used, and determination of boat type. Of all the boats sampled, a significant number (92%) of them had only visited Harlan during the prior three weeks. Conversely, there were eight boaters interviewed that said that they had visited a zebra mussel infested lake within three weeks prior of visiting Harlan. This illustrates that the risk of mussels being introduced into Harlan by an irresponsible boater is a real possibility.

The following tables list residency of Harlan boaters and the types of boats used to recreate on the lake.

State of Residence	Frequency
Nebraska	94%
Kansas	3%
Colorado	2%
Other	1%

Boat Type	Frequency
Fishing	36%
Pontoon	26%
Pleasure	20%
Ski / wakeboard	14%
PWC	5%

Harlan Reservoir remains a priority location for AIS work and efforts will continue during 2023 to inspect boats, educate boaters, and to conduct sampling for veliger's, adult mussels, and other types of aquatic invasive species.

For additional information about fisheries management at Harlan Reservoir, please contact the Nebraska Game and Parks Commission office in Kearney at 308-865-5310, or by email at the addresses listed below.

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