2019 Fisheries Survey Summary

Irrigation Reservoirs in the Nebraska Panhandle

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NEBRASKA GAME PARKS

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Several reservoirs located in the panhandle of Nebraska were built and managed for the primary purpose of water storage for irrigation. Water levels in these reservoirs can change drastically throughout a year and may make access difficult or impossible. The Bureau of Reclamation owns Box Butte Reservoir, Lake Minatare, Lake Winters Creek, and Big Lake Alice. Water levels in these reservoirs are controlled by their associated irrigation district. Whitney Reservoir is owned and managed by the Whitney Irrigation District. Oliver Reservoir was constructed by the Kimball Irrigation District, but is currently owned and managed by the South Platte Natural Resource District as a Recreation Area. Nebraska Game and Parks Commission Fisheries Management Section manages the fish populations. A map of lake locations can be found at https://maps.outdoornebraska.gov/fishing/.

This report will provide survey results for each reservoir for the targeted species. Not all species are sampled in every reservoir annually. Different sampling techniques are used throughout the year to collect targeted species. These techniques are standardized in Nebraska to allow comparisons across waterbodies and identify trends in populations from year to year. Largemouth bass are surveyed at night by electrofishing while shoreline oriented species (bluegill, crappie, yellow perch, and northern pike) are sampled using frame nets. Off-shore species such as white bass, channel catfish, and walleye get sampled by gillnets in the fall. Species collected during a survey are counted, measured, weighed, and some scales removed for aging before releasing them back. Biologists use this information to monitor the health and size structures of each fish population. Anglers are reminded they should not rely solely on what the surveys indicate as patterns of weather and timing of the surveys could have effects on catch rates for certain species. For example yellow perch and northern pike are sampled in late March or early April when they are moving into the shallows to spawn; this can happen relatively quickly even within a few days making sampling of these species in several waterbodies relatively difficult.

The table below lists the fish surveys completed in 2019 and the species that were targeted. Although other species are collected during these surveys and may be mentioned in this report the results should not be compared to other surveys.

Lake	Target Species	Survey Type
Box Butte Reservoir	Walleye, Channel Catfish	Fall Gillnet
Minatare	Walleye, White Bass, Catfish	Fall Gillnet
Lake Winters Creek	Walleye, Channel Catfish	Fall Gillnet
Oliver Reservoir	Walleye, Channel Catfish	Fall Gillnet
Whitney	Crappie	Spring Frame net
Whitney	Saugeye, White Bass, Catfish	Fall Gillnet

Fish are measured and weighed to get a length frequency distribution and body condition index for the population. This information helps compare growth rates and the health of the fishery. Poor body condition may indicate the loss of prey species such as shad in the fishery.

Box Butte Reservoir

Box Butte Reservoir is located approximately 9 miles north of Hemingford, south of the Pine Ridge escarpment, in the Nebraska panhandle. The reservoir was constructed in the early 1940's and impounds the Niobrara River which originates about 60 miles upstream. Box Butte Reservoir was designed for irrigation, flood control, and recreation.

Box Butte Reservoir is owned by the Bureau of Reclamation (BOR) and encompasses 2,212 acres while the reservoir itself impounds approximately 1,600 of those acres at conservation pool (Elevation 4007ft) . A State Recreation Area (SRA) encompasses the northeast end of the reservoir while the rest of the property is managed as a Wildlife Management Area (WMA). These areas are all managed by the Nebraska Game and Parks Commission. The SRA offers electrical and primitive camping, water, boat ramp, fish cleaning station, swimming, picnic tables and shelters, and primitive restrooms.

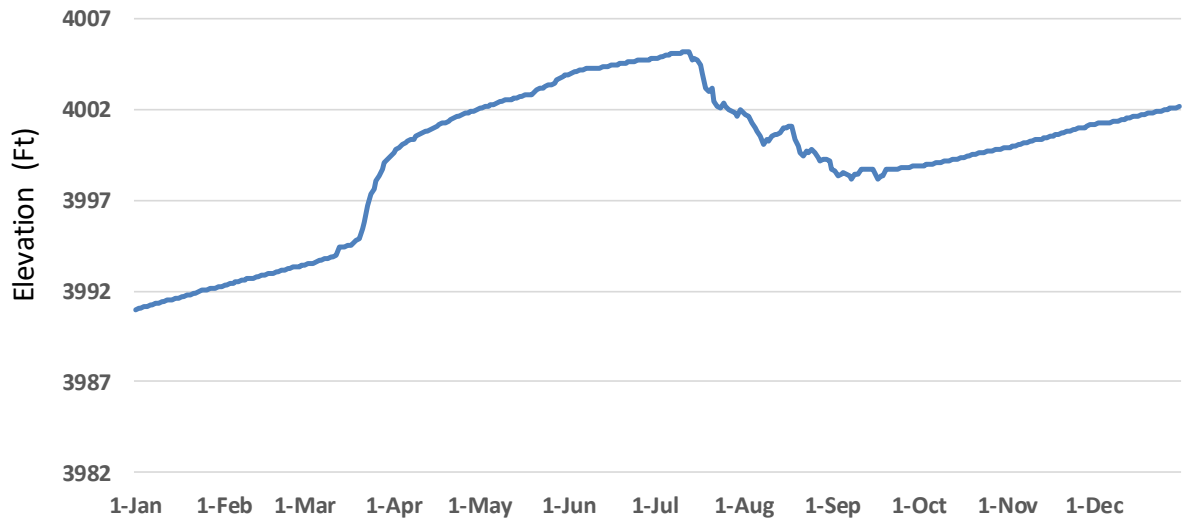
Game fish species present in Box Butte Reservoir include: walleye, northern pike, channel catfish, blue catfish, yellow perch, bluegill, black crappie, rock bass, largemouth bass, smallmouth bass, and pumpkinseed sunfish. It is an excellent open water fishery for all game fish species as well as a top ice fishing destination for pike, bluegill, and yellow perch. Box Butte is also known for its water clarity, making it desirable for bow fishing, underwater powered spear gunning, and surface spear action.

After the BOR completed a major repair to the toe drain system on the dam in 2018, Mirage Flatts Irrigation district chose not to draw water from Box Butte during 2018. This left more water in the reservoir for the start of 2019. Spring of 2019 was exceptionally wet as the reservoir filled quickly and peaked at elevation 4005.22 ft. Moisture continued throughout the irrigation season and the reservoir did not drop as much as most years finishing the season at elevation 3998.14 ft. This will give the 2020 season a high starting elevation and it is expected that Box Butte Reservoir to fill to full pool elevation (4007 ft.) for the first time since the 1940's.

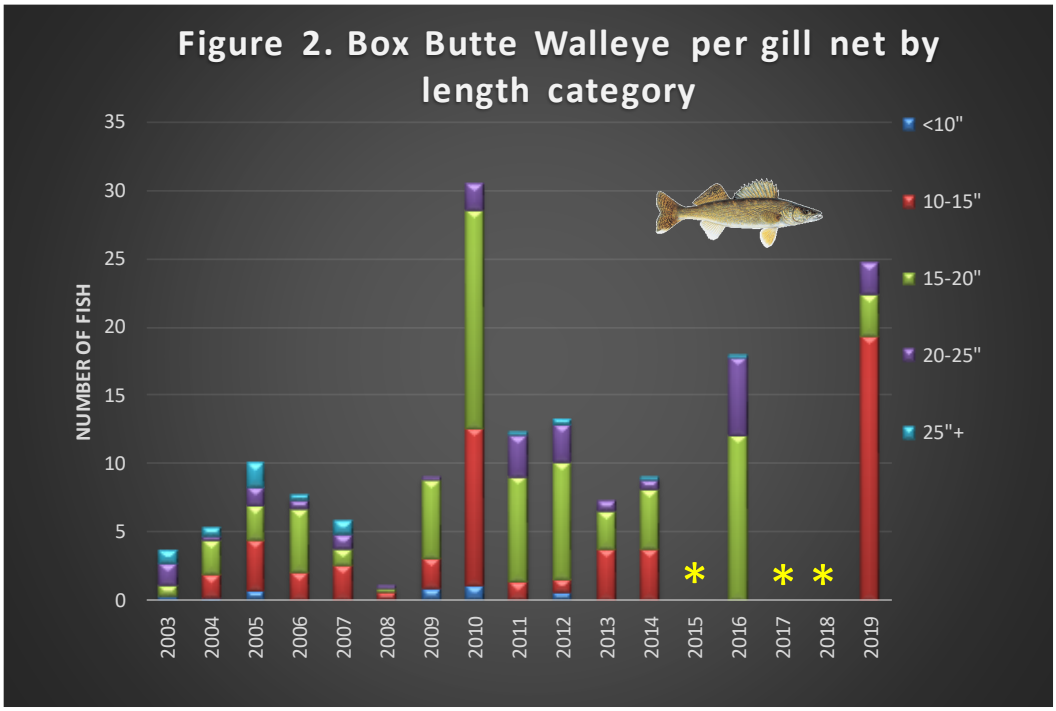
A spring frame net survey was scheduled for March of 2019 to evaluate the northern pike population. However, ice did not come off the lake until April and the survey was canceled. 2019 angler reports suggested northern pike abundance was lower than previous years.

A fall gillnet survey was conducted in 2019 to monitor the walleye and channel catfish populations. Walleye abundance was up with a gillnet catch of 24.7 fish per net (Figure 2). The catch was dominated by a 2018 year class that averaged 13.1 inches and should reach 15 inches by the end of the 2020 growing season. Consistent year classes of walleye up to 24.4 inches and seven years old were also captured but at low abundance.

Figure 1. 2019 Box Butte Water Operation



Box Butte Reservoir (continued)



Walleye have not been stocked in Box Butte from 2003 to 2017. Natural recruitment maintained a healthy walleye population with some big year-classes. With the lake held low in 2018, walleye were stocked to maintain a year-class as the water elevation eliminated the typical spawning habitat. With the lake higher than usual and a decline in northern pike abundance, walleye were stocked in 2019 and will again be stocked in 2020.

Channel catfish catch remained low in 2019 with a rate of 4.7 fish per net. The average size catfish sampled was 21.5 inches. Box Butte Reservoir remains a top destination for anglers looking for master angler quality catfish.

Bass and panfish were not sampled in 2019, however some nice crappie were collected during the fall gillnet survey. Gillnets are not the preferred method for sampling crappie, but a gillnet catch of 14 crappie per gillnet suggests that there is a good abundance of crappie in Box Butte. These crappie ranged from 4 to 12 inches with most of them around 11 inches.

A few nice perch in the 10 to 12 inch range were also collected in the fall gillnet survey. Although this survey cannot indicate abundance, it does suggest that there are some harvestable perch in the population.

Bluegill were not surveyed in 2019, but angler reports suggested an excellent catch of 8 inch plus bluegill in 2019.

Water quality profiles were taken at Box Butte in 2019 during the heat of the summer. At high water levels, water remained cool enough to support a trout fishery. With northern pike abundance low, rainbow trout will be stocked in 2020 to try and establish another fishing opportunity at Box Butte. The last stocking of trout occurred in 1984.

18 and 21 pound catfish sampled in Box Butte in 2019.

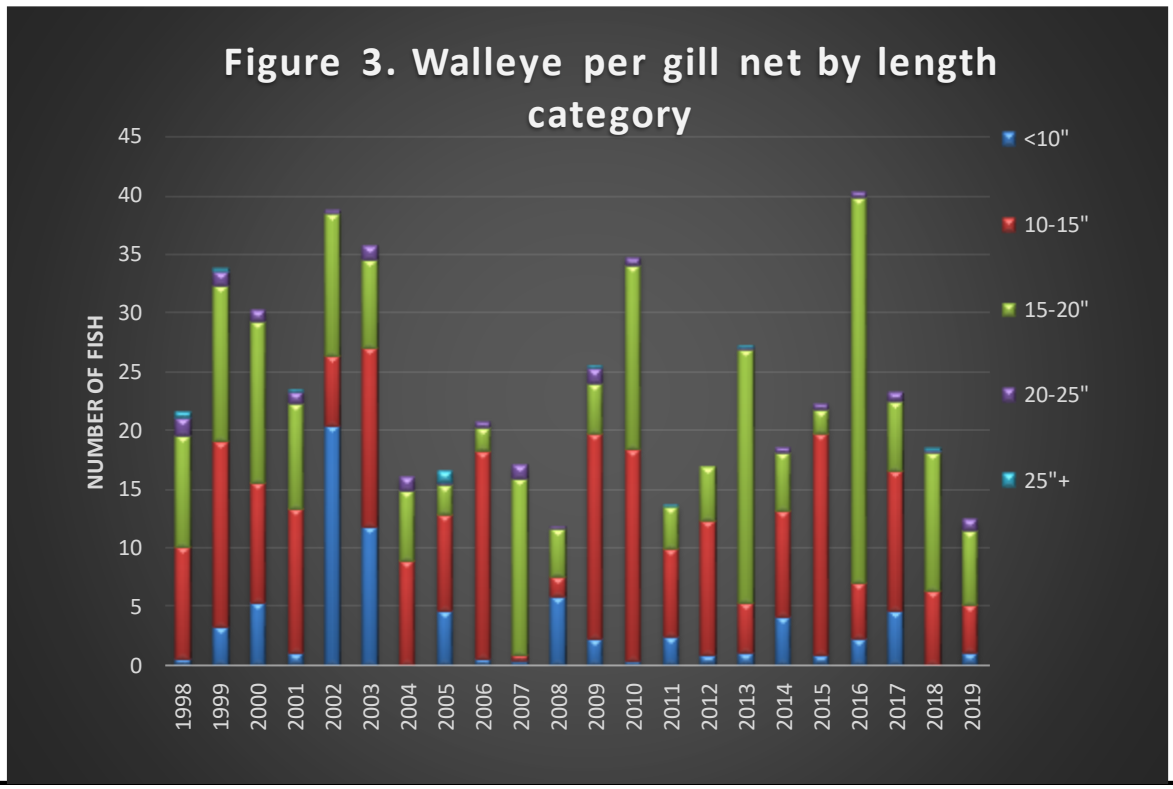
Lake Minatare

Lake Minatare State Recreation Area is located 6 miles east and 8 miles north of Scottsbluff, NE in the North Platte River Valley. The area encompasses 2,873 acres, including a 2,147 acre reservoir when full. The reservoir was built in 1915 by the U.S. Bureau of Reclamation primarily for irrigation purposes. In 1986, jurisdiction of the area was granted to the U.S. Fish and Wildlife Service as part of the North Platte Wildlife Refuge. The lake and land adjacent to the reservoir is managed by the Nebraska Game and Parks Commission through a lease agreement for recreational activities while the Pathfinder Irrigation District controls water levels for irrigation.

Fishing is available at Lake Minatare for a variety of fish species which include walleye, northern pike, white bass, wiper, channel catfish, blue catfish, smallmouth bass, largemouth bass, and yellow perch.

A fall gillnet survey was conducted in 2019 to evaluate the catfish, white bass, and walleye populations. Although both blue and channel catfish are present in Lake Minatare, only channel catfish were collected in 2019 at a rate of 4.33 fish per gillnet (Figure 4). The average size channel cat was 18.3 inches but ranged from 14 inches up to 24 inches. White bass abundance was low in 2019 at less than 1 per gillnet. White bass typically travel in schools and can be difficult to sample. Although the catch rate was low, good white bass fishing can be found in the spring in the inlet ditches as the lake fills. No wipers were collected in 2019, but a few likely still persist in the fishery. Wiper stockings were discontinued in 2011 to try and improve the white bass population.

Lake Minatare was down to 12.3 walleye per net which is the lowest catch rate since 2008. Although the abundance is low, the 2016 and 2017 year-classes are still persisting in the population offering some better than usual fish in Lake Minatare. The average size walleye was 15.4 inches with 56.7 percent of the population over 15 inches and some over 20 inches.

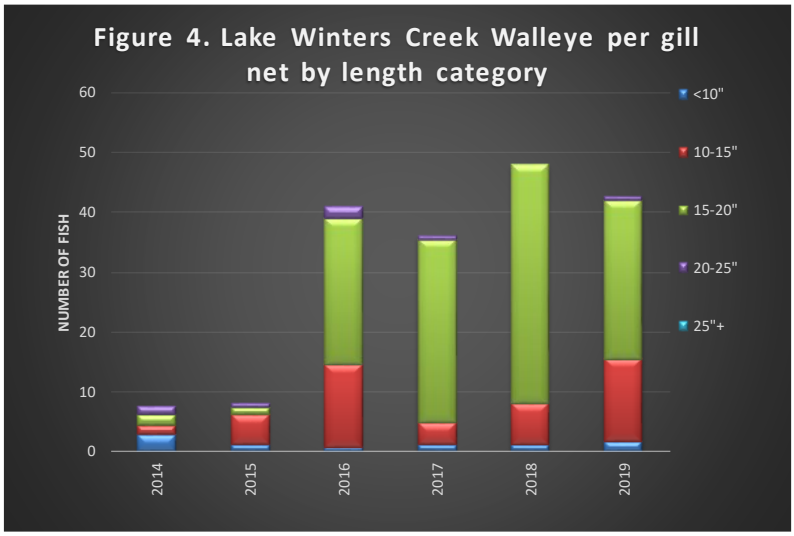


Big Lake Alice and Lake Winters Creek

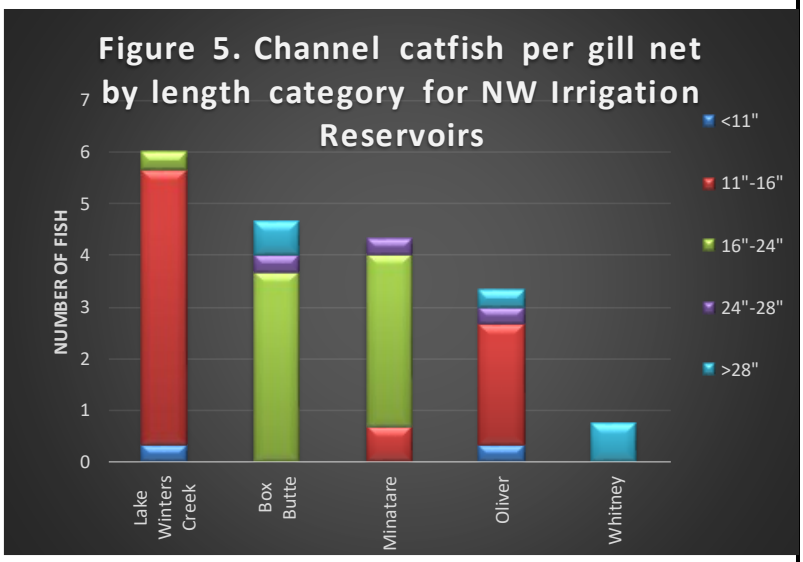
Big Lake Alice and Lake Winters Creek are both part of the North Platte Wildlife Refuge located above Lake Minatare and supplied by water from the Lake Minatare supply canal. Due to irrigation, Big Lake Alice is lowered to an elevation every year which results in very few fish surviving the winter months. Therefore Big Lake Alice is utilized as a rearing lake for shad, walleye, and perch to be sent down the supply canal and into Lake Minatare. These species typically exhibit better growth in Big Lake Alice due to the "new lake affect" each year. When water is transferred during the fall, some of these get drained into Lake Minatare providing some advanced fish that have a better chance of surviving the winter. However, in 2019, no fish were stocked into Big Lake Alice to reduce demand on the state hatchery system while some major renovations are occurring across the state to remove carp.

As part of the North Platte National Wildlife Refuge, Lake Winters Creek has a few special fishing regulations. The lake is only open during daylight hours and anglers are restricted to non-gas motors. Anglers may find a variety of species at Lake Winters Creek including yellow perch, black and white crappie, bluegill, walleye, largemouth bass, and northern pike. To provide a refuge for migrating waterfowl, Lake Minatare, Lake Winters Creek, and Big Lake Alice are closed to public use from October 15th through January 14th each year.

Lake Winters Creek was sampled in the fall of 2019 using gillnets to evaluate the walleye and channel catfish populations. With a walleye catch of 42.7 fish per net, Lake Winters Creek will be the top walleye destination in the panhandle in 2020. The average size walleye was 15.2 inches with 64 percent of the population over the minimum length of 15 inches (Figure 4).



Lake Winters Creek channel catfish sample was low with a catch rate of 6.0 fish per net. Although still a low catch, this was the highest abundance sampled in 2019 (Figure 5). The average size catfish collected was 13.1 inches and in great condition with a mean relative weight of 103.8.

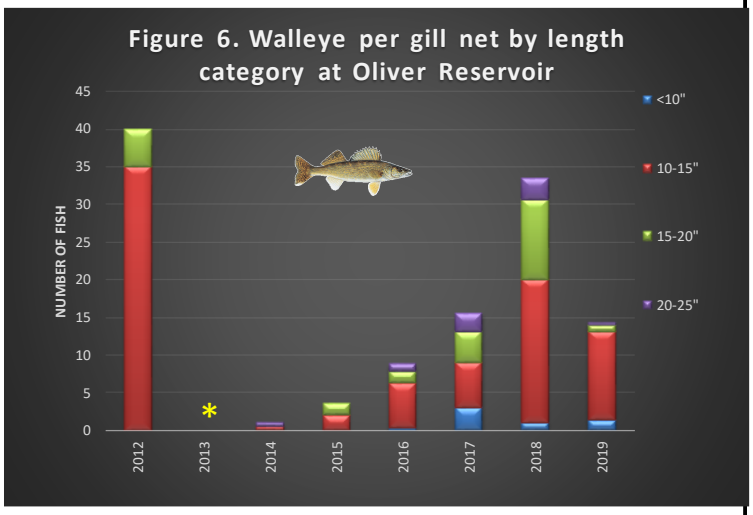


Although northern pike were not surveyed in Lake Winters Creek, it is a popular destination for pike fisherman around the Scottsbluff area. The fall gillnet survey collected a few pike that averaged 20.7 inches. Northern pike are an aggressive predator fish that provide excellent fishing action for both bank and boat anglers. Although they require a little more care cleaning, they are also excellent table fare. The statewide northern pike daily bag limit was changed in 2019 to allow 3 fish with only one exceeding 34 inches.

Oliver Reservoir

Oliver reservoir (Kimball Reservoir) is located 8 miles west of Kimball, Nebraska off highway 30. It is a 270-acre reservoir when full, located on a 917-acre recreation area. South Platte NRD owns and manages the area with the help from Nebraska Game and Parks to sustain a fishery. The combination of drought and over appropriation of groundwater use has contributed to the loss of water inflows to the lake. Occasional strong storms produce flash flood events that has extended the life of Oliver Reservoir. 2019 was an exceptionally wet year, and Oliver gained a few feet in elevation. If the water levels in Oliver Reservoir continue to drop, the reservoir may disappear over time. Game fish in Oliver Reservoir include walleye, white crappie, bluegill, largemouth bass, yellow perch, channel catfish, northern pike, and muskellunge.

Oliver Reservoir was surveyed in the fall of 2019 targeting walleye and channel catfish. Walleye numbers were down in Oliver with a catch of 14.3 fish per gillnet compaired to 34 fish per gillnet in 2018 (Figure 6). Age and growth analysis suggests consistent year-classes with slightly slower growth rates than other irrigation reservoirs taking 4 years to reach 15 inches. The average size walleye surveyed was 12.2 inches with very few fish over 15 inches.



Catfish abundance was also lower in 2019 compared to 2018 (8.5 fish per net) at 3.3 fish per net (Figure 5). The average size catfish sampled was 15.6 inches with the largest fish over 29 inches.

Although northern pike are found in most of the irrigation reservoirs, Oliver is the only one with a history of a muskellunge fishery. Oliver Reservoir was stocked with tiger muskie from 1986 until 2003. In 2004 the stocking was switched to pure strain muskie which continued for a couple years with the final stocking in 2006. Even after 11 years and periods of extremely low water a few muskie still persist in Oliver. Although no muskie were collected in 2019, in 2016, one muskie was collected during the spring crappie survey and three more were found during the fall gillnet survey. These fish ranged from 30 to 43 inches. The ages of these muskie (determined by looking at scales) ranged from 12 years old down to only 3 years old suggesting some natural recruitment occurring.

Crappie were not surveyed in Oliver in 2019 but the reservoir typically has some quality white crappie fishing. May is a good time to target crappie as they move shallow to spawn. In the turbid waters, anglers should fish live bait, or baits and lures that give a flash or vibration.

Blue or Channel?

1. Blue catfish have a long straight anal fin while a channel catfish's anal fin is rounded.
2. Small channel catfish will have spots across its body while blue catfish will not.

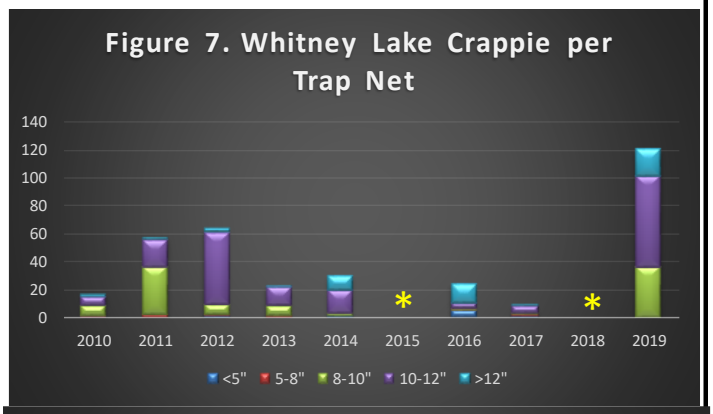
Whitney Reservoir

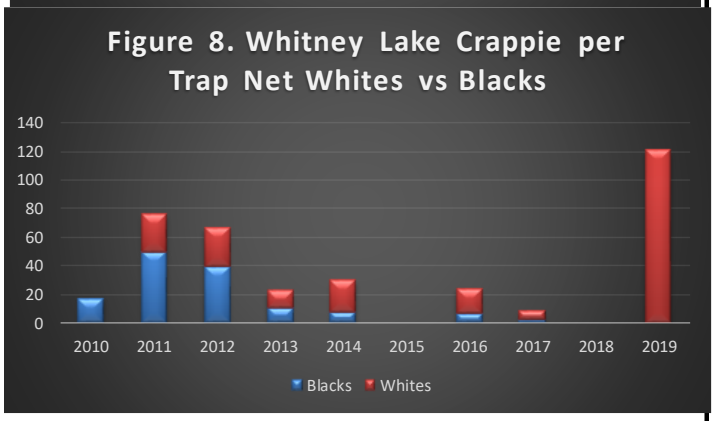
Whitney Reservoir is a 900-acre lake located about 1 mile west of Whitney, Nebraska owned and operated by the Whitney Irrigation District. A Wildlife Management Area located on the NE corner of the lake provides angler access with a new boat ramp and a pit toilet. The lake has a drastic summer drawdown making access nearly impossible by late summer. Game fish species present in Whitney Reservoir include: yellow perch, bluegill, black crappie, white crappie, northern pike, largemouth bass, channel catfish, white bass, and walleye.

A frame net survey was conducted in the spring of 2019 to monitor the crappie population. A gillnet survey was conducted in the fall to evaluate the walleye, and saugeye populations.

Crappie in Whitney Lake are doing exceptional with a catch rate of 120.25 fish per frame net with 69.6 percent of the population over 10 inches total length (Figure 7). The Whitney crappie population contains both white and black crappie. White crappie appear to be doing better than blacks since 2012 and only white crappie were sampled in 2019 (Figure 8). Body condition of crappie was still excellent with a Wr of 108 for stock size and larger fish, however, body condition did diminished as fish got larger.

Walleye stockings were replaced with saugeye in Whitney in 2015. Although walleye do persist and some natural recruitment may occur, the majority of the younger fish are saugeye. In 2019, saugeye catch was low at 3.7 fish per gillnet. The average size saugeye captured 12.7 inches with 36 percent of the catch over 15 inches. Although no walleye were collected in the fall survey, several walleye ranging from 20 to 29 inches were captured in frame nets during the crappie survey. During the spring survey, walleye were in terrible condition with an average Wr of 73.5 for stock size and larger. Saugeye in the fall were in better shape with an average Wr of 100.3.





Several anglers reports in the fall of 2018 suggested fish were in very poor condition in Whitney Lake. This lake has experienced shad die offs during cold winters before, and it appears we may have lost the majority of adult shad during the 2017 winter. No survey was conducted in 2018 which missed the data to indicate the poor body condition of game fish. Prior to spawn, several adult gizzard shad were collected from Oliver Reservoir, and Calamus Reservoir to boost the shad population. By fall, body condition of all game species improved. To prevent the possibility of loosing the adult shad population, adults will be stocked on an annual basis each spring.

2019 Fish Stockings

Several species within the irrigation reservoirs have self sustaining populations such as bass, bluegill, northern pike, white bass, crappie, and yellow perch. Walleye do get some natural recruitment in irrigation reservoirs, however, the natural recruitment in most irrigation reservoirs is not good enough to keep up with fishing pressure or to maintain consistent year-classes. Channel catfish are also stocked annually in irrigation reservoirs. Catfish are highly preyed upon by predator species at small sizes. By stocking advanced size fish (10 inch plus) survival to catchable size is improved. The following table is a list of fish stocked in the panhandle irrigation reservoirs in 2019.

Lake	Species	Size	Number
Box Butte Reservoir	Walleye	Fingerling (1.25 inch)	54,700
Box Butte Reservoir	Channel Catfish	10 inches	3,200
Lake Minatare	Walleye	Fingerling (1.25 inch)	110,000
Lake Minatare	Channel Catfish	10 inch	1,000
Lake Minatare	Channel Catfish	9.75 inch	4,860
Lake Winters Creek	Walleye	Fingerling (1.25 inch)	12,000
Lake Winters Creek	Channel Catfish	10 inch	1,200
Oliver Reservoir	Walleye	Fingerling (1.25 inch)	12,000
Oliver Reservoir	Channel Catfish	10 inch	1,000
Whtiney Reservoir	Saugeye	Fingerling (1.25 inch)	45,000
Whitney Reservoir	Channel Catfish	10 inch	3,600
Whitney Reservoir	Gizzard Shad	10 inch	226

Invasive Species

Over the past several years invasive species have become a rising concern in Nebraska. In 2015, a new regulation was established to help prevent the spread of invasive species via boats and trailers. The new regulation states: It is illegal to either arrive or leave any water body in Nebraska with water other than from a domestic source (water supply system, well or bottled) except for firefighting purposes.

Zebra mussels (pictured right) were first documented in Nebraska in 2006 at Offutt Airforce Base Lake and have since been discovered at Zorinsky Lake (2010) (mussels eliminated via a winter drawdown that froze them out but has had a positive veliger sample since leaving it a suspect lake), Lewis and Clark Lake (2015), Lake Yankton (2017), Glen Cunningham Lake (2018) and below Gavins Point Dam in the Missouri River. Carter Lake is also a suspect lake where veligers were sampled. Zebra mussels and quagga mussels are small fingernail-sized mussels and adults are usually ¼ to ½ inches long with alternating yellow and brownish colored stripes on their shell. These mussels can spread in their immature form known as veligers by being transported in bilge, ballast, or live-well water or as adults attached to boat hulls, engines, aquatic vegetation, or other surfaces. Sampling for these veligers occurs statewide from the months of May through September. No evidence of these mussels has been discovered in any other lakes sampled.

Aquatic vegetation such as curly-leaf pondweed and Eurasian water milfoil are also invasive species present in Nebraska. Both of these plants form dense mats of vegetation near the water's surface which make recreational fishing, boating, and swimming difficult. Spread of these plants can happen through stem fragmentation. A single segment of plant material can be transferred to another water body and form a new colony therefore removing any visible plant material from boats and trailers is a must and remember to **CLEAN, DRAIN, and DRY**!

CLEAN- Remove plants, animals, mud and thoroughly wash equipment that came into contact with the water.
DRAIN- Drain all water before leaving, including wells, bilge, ballast, and any parts or equipment that can hold water.
DRY-Allow all equipment to dry completely before launching into another body of water.
For more information on invasive species in Nebraska visit neinvasives.com.

Pictured below: Photo of curly leaf pond weed at Smith Lake Wildlife Management Area