Pioneer Trails Recreation Area

Fisheries Management Plan

Prepared By

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Nebraska Game and Parks Commission
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Introduction

Pioneer Trails Recreation Area is located in Hamilton County, Nebraska, approximately one mile north and 1.5 miles east of Aurora. The property encompasses approximately 114 acres and is owned and maintained by the Upper Big Blue Natural Resources District (UBBNRD). The reservoir at its current level is approximately 23 surface acres and fisheries management is the responsibility of the Nebraska Game and Parks Commission (NGPC). The UBBNRD has spent a considerable amount of money and resources on the area the past five years to enhance recreational opportunities. Major projects include sealing the bottom of the reservoir, installing a high capacity groundwater well, constructing a new modern campground, adding improved restroom facilities, constructing an outdoor amphitheater, and improving picnic and day use opportunities. This document will look at the past history of the reservoir, provide a summary of recent fisheries activities, and will highlight future fishery management strategies.

Past History

The reservoir was constructed in 1986 on a tributary of Lincoln Creek for the purpose of flood control, ground water recharge, and recreation. The dam was completed in December 1986 and the reservoir first filled in March 1987. It became apparent soon after construction that the watershed yielded less inflow than projected and the lake bed had higher infiltration rates than expected. These two factors resulted in large fluctuations of lake levels and most of the time water levels were too low to maintain a fishery. Recreational opportunities were limited and the reservoir provided only flood control and ground water recharge for the first 27 years of its existence. In 2003, the UBBNRD hired an engineering firm to explore alternatives to seal the reservoir and enhance inflows with groundwater pumping. Funding issues and lack interest from the majority of UBBNRD board members kept this plan on the shelf for many years.

In the spring of 2013, the UBBNRD board awarded a contract to seal approximately 17 acres of the lake bed by mixing soda ash with existing soil and re-compacting. Calculations following the addition of soda ash indicated that infiltration rates were reduced by 92%, down to approximately ¼ inch per day. During that same summer, the NRD also installed a 650 gallon per minute well to provide supplemental water throughout the year.

Following these improvements, the UBBNRD contacted NGPC inquiring about making improvements to the fishery. It was determined that the recently made enhancements would now allow for the reservoir to maintain suitable water levels to maintain a healthy fishery.

Renovation

Following the resealing of the reservoir bottom and prior to re-filling, the lake was treated with the fish toxicant rotenone to eliminate the existing fishery. The date of application was November 4, 2013. The lake was estimated to be eleven surface acres and the volume was approximately 60 acre-feet. Sixty gallons of 5% Prenfish liquid rotenone was applied. The chemical was purchased by the UBBNRD and was applied by NGPC fisheries staff. Cost of the chemical was $61.90 per gallon, plus a $239.12 shipping and handling charge. Application was completed with a boat and pump system on the lower end of the reservoir where depths reached over 20 feet in a couple small areas, although most of the depths were

less than six feet. The upper end of the reservoir consisted primarily of a shallow channel of water and was treated with an atv and tank sprayer. Common carp and fathead minnows were the most numerous species of fish killed. Other species included young-of-the-year channel catfish and black bullheads.

Stocking History

The reservoir was restocked with largemouth bass and bluegill fingerlings in April 2014. Channel catfish and saugeye (walleye x saugeye hybrid) were stocked in subsequent years. The table below shows all fish stocked at Pioneer Trails Reservoir since the 2013 chemical renovation.

Date	Species	Size (inches)	Number
4/17/2014	Largemouth Bass	2.2	1800
4/17/2014	Bluegill	4.5	865
4/24/2014	Bluegill	3	1650
7/3/2014	Largemouth Bass	1.5	1870
9/9/2014	Channel Catfish	10.5	540
6/7/2016	Saugeye	2	5250
8/25/2016	Channel Catfish	10	600
6/15/2017	Saugeye	2	10032

Fish Survey Results

There have been two fish population surveys conducted at Pioneer Trails Reservoir since the 2013 chemical renovation. Day time electroshocking was completed on June 9, 2015 to evaluate renovation and stocking success. Two ten-minute shocking stations were completed and all largemouth bass and a sub-sample of bluegill were dipped. All other miscellaneous species observed were also collected. The shocking survey collected three fish species: largemouth bass, bluegill and white crappie. No common carp or bullheads were observed. Largemouth bass and bluegill were both sampled in good abundance and growth rates were comparable to other new reservoirs. Both year-classes of bass that were stocked were collected in the survey. It also appeared that the bluegill spawned during 2014 and produced a very large year class. The lack of common carp indicated that the chemical removal was successful. The presence of white crappie was unexpected, as they were not stocked by NGPC. They were likely illegally introduced into the reservoir from anglers. Their presence should not be detrimental to the fishery and in fact could prove beneficial as white crappie are more tolerant of turbid water than black crappie. The table below provides additional details on the fish collected during the 2015 survey.

2015 Electroshocking Survey Results

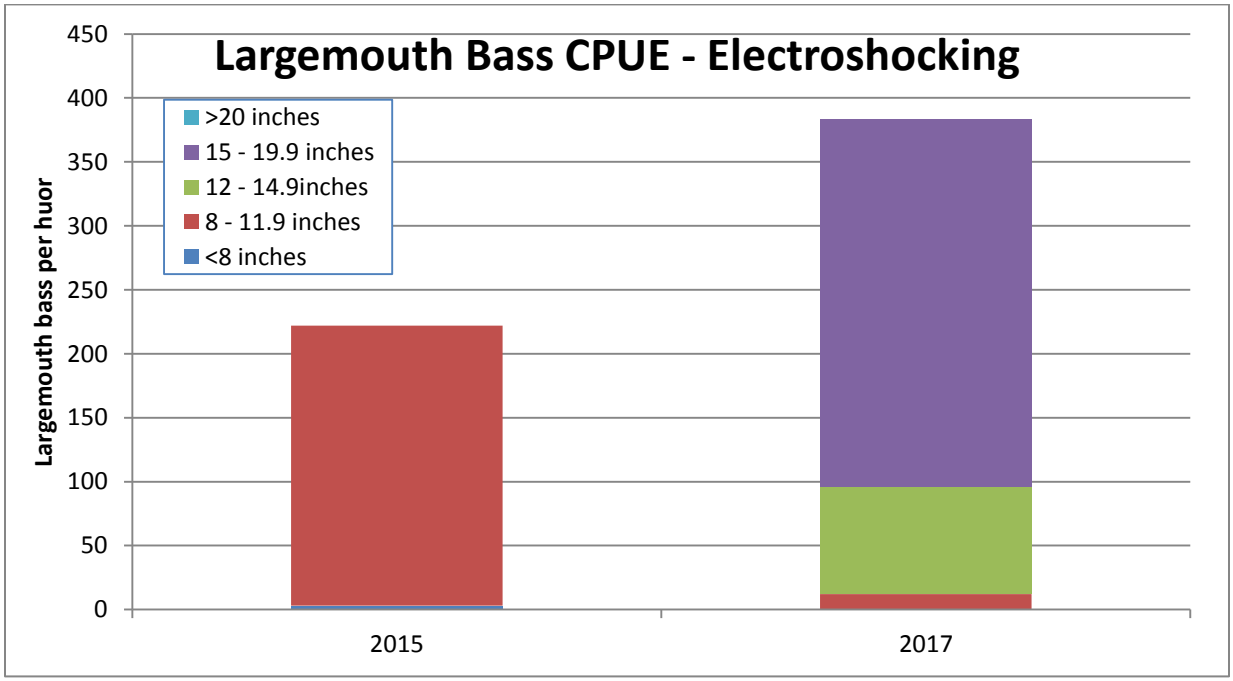
Species	# Sampled	CPUE (fish / hour)	Size Range (inches)	Average Length (inches)
Largemouth bass	74	222	7.1 – 11.4	9.6
Bluegill	48	144	1.1 – 8.7	4.5
White crappie	3	9	9.1 – 10.2	9.7

The reservoir was also surveyed on June 1, 2017. Sampling effort consisted of three frame nets and two ten-minute daytime electroshocking stations. This survey collected largemouth bass, bluegill, channel catfish, white crappie and black bullheads. All species collected in the survey were identified and measured, but no weight or age data was collected. Results from the 2017 survey can be found in the table, graph, and text below.

2017 Electroshocking Survey Results

Species	# Sampled	CPUE (fish / hour)	Size Range (inches)	Average Length (inches)
Black bullhead	1	3	8.7	8.7
Channel catfish	1	3	20.1	20.1
Largemouth bass	124	384	8.3 – 16.9	15.0
White crappie	1	3	12.6	12.6

The largemouth bass sample was exceptional, as the catch per unit effort (CPUE) was 384 bass per hour of electroshocking. Seventy five percent of the bass sample were larger than fifteen inches and are assumed to be from the original bass stocking. The second stocking of bass does not appear to have contributed as many fish to the population, as that size group was less abundant in the survey. Overall, largemouth bass ranged from 8.3 to 16.9 inches, with an average of 15 inches.



Four frame nets were set to sample shoreline orientated species such as bluegill and crappie. One of the nets was tampered with and was partially collasped so that data was not used. The frame nets captured five species of fish, with bluegill being the most abundant. Additional information regarding the survey can be seen in the tables, graphs, and text below.

2017 Frame Netting Survey Results

Species	# Sampled	CPUE (fish / net)	Size Range (inches)	Average Length (inches)
Black bullhead	9	3	8.3 – 10.6	9.5
Bluegill	98	32.7	2.4 – 8.3	5.8
Channel catfish	19	6.3	11.0 – 25.2	17.9
Largemouth bass	16	5.3	11.4 – 16.1	14.8
White crappie	26	8.7	4.7 – 11.4	9.8

Bluegill were the most abundant fish species sampled in the frame nets with a catch rate of 32.7 fish per net. Size distribution was fairly good with most fish ranging from 6 to 7.5 inches and five percent of the sample was larger than eight inches. There were fish of all size groups caught and the average length was 5.8 inches.

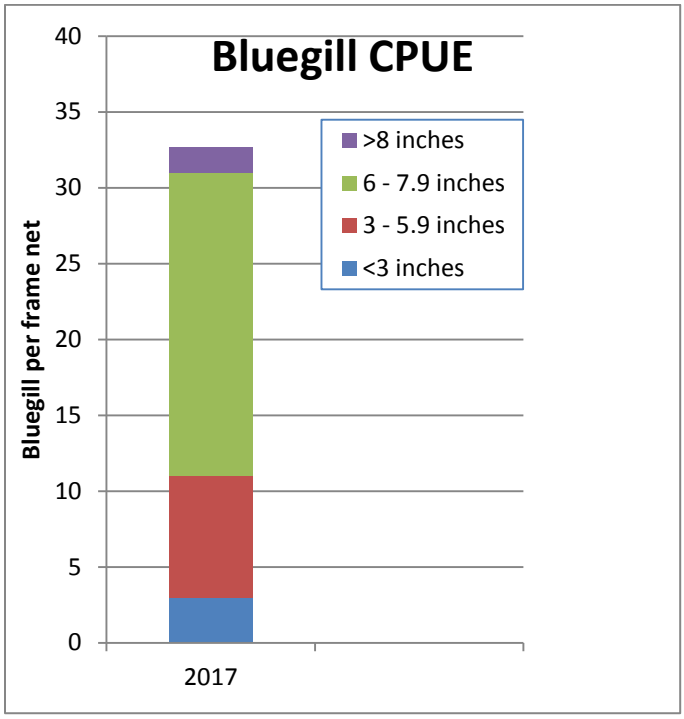
White crappie were the second most abundant fish sampled in the frame nets and had a catch rate of 8.7 fish per net. The majority (73%) of the crappie sampled were larger than ten inches, but a few smaller fish were captured indicating that they are reproducing in the reservoir. The average length was 9.8 inches.

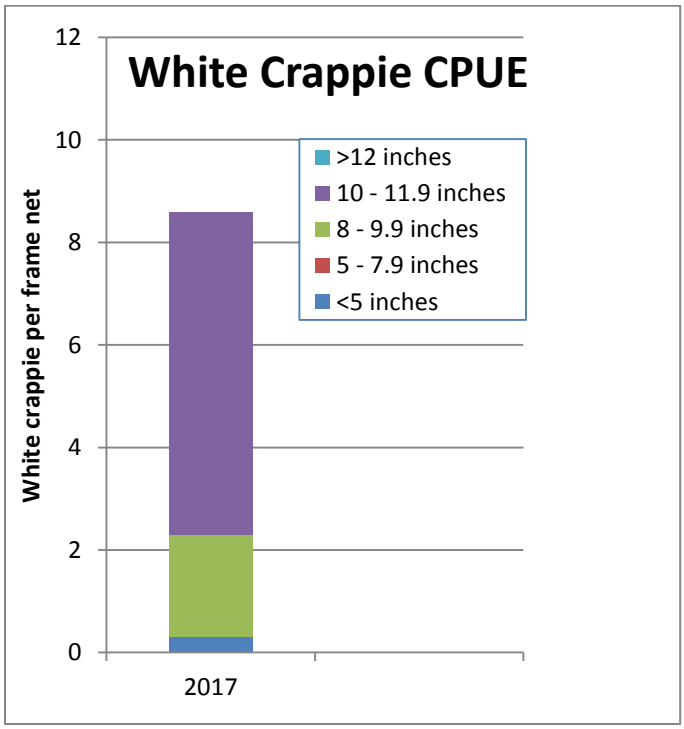
Channel catfish are not normally targeted with frame nets, but a fair number were captured during the survey, possibly because of the more turbid water conditions. The catch rate was 6.3 per net and all fish fell into two distinctive size groups, 11 to 13 inches and 21 to 25 inches, which correlates to the two stocking years of 2014 and 2016. While catfish sometimes exhibit poor natural reproduction in lakes with high densities of largemouth bass, the turbidity of Pioneer Trails may allow more small catfish to survive. Future stocking rates will be adjusted if natural survival is detected. At this time, 10-inch channel catfish are scheduled to be stocked on alternate years at a rate of 30 fish per acre.

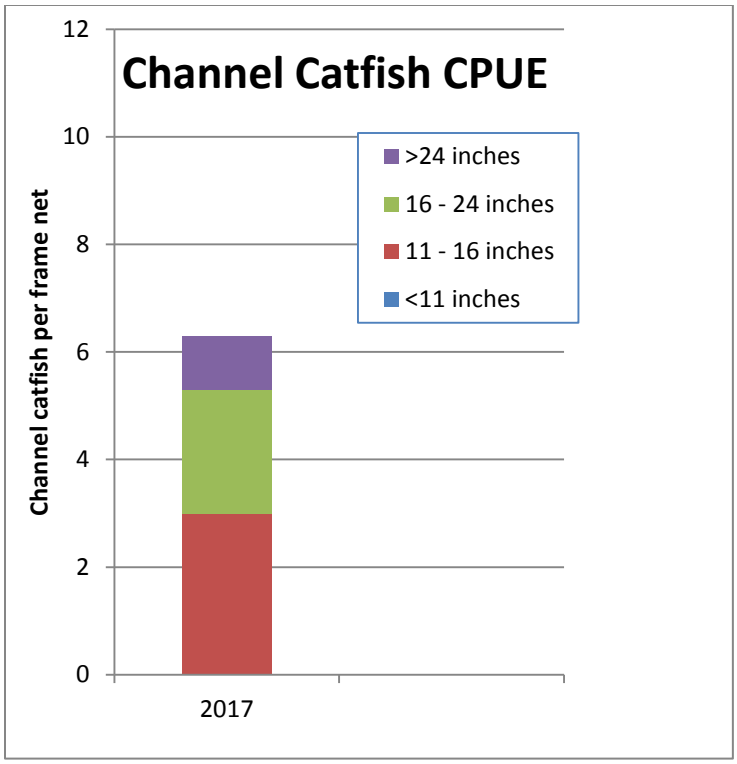
Black bullheads were sampled in low densities during the survey. These fish likely survived the chemical renovation or originated from the watershed. Densities appear to be relatively low at the catch rate was 3.0 fish per net. Lengths ranged from 8.1 to 10.6 inches and the average length was 9.5 inches. Based on current black bass populations, black bullheads will probably not pose much of a threat to the fishery, but could become a detriment if predator levels become too low to control their abundance.

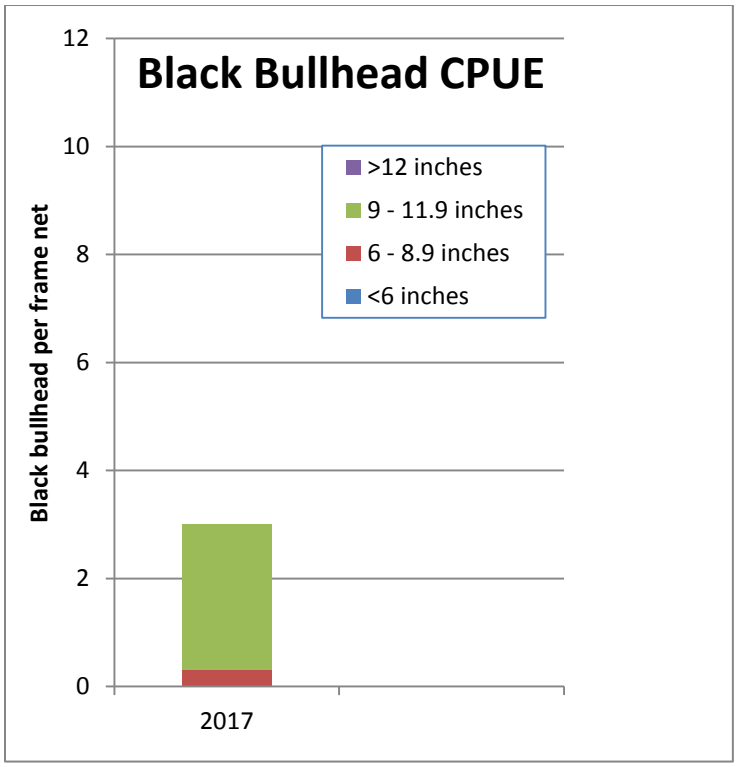
The only other species captured in the frame nets were largemouth bass. Bass are rarely captured in frame nets, but above average numbers of bass were captured during this survey, likely due to their current high population in the reservoir. Bass lengths in the nets were similar to what was observed while electroshocking, with bass ranging from 11 to 16 inches and averaging 14.8 inches.

Overall, the status of the current fishery at Pioneer Trails looks very good. All species that had been stocked, with the exception of saugeye were collected in high abundance and all exhibited good growth rates and size structure. Saugeye had only been stocked once prior to the survey and were likely too small to be effectively captured by the gear used. Their population status will be monitored in the future with gill nets. Two species, (white crappie, black bullhead) that were not stocked by NGPC were also sampled, but are not expected to be detrimental to the fishery in their current abundance.


Bluegill CPUE
Bluegill per frame net
40
35
30
25
20
15
10
5
0
2017
>8 inches
6 - 7.9 inches
3 - 5.9 inches
<3 inches


White Crappie CPUE
White crappie per frame net
12
10
8
6
4
2
0
2017
>12 inches
10 - 11.9 inches
8 - 9.9 inches
5 - 7.9 inches
<5 inches


Channel Catfish CPUE
Channel catfish per frame net
12
10
8
6
4
2
0
2017
>24 inches
16 - 24 inches
11 - 16 inches
<11 inches


Black Bullhead CPUE
Black bullhead per frame net
12
10
8
6
4
2
0
2017
>12 inches
9 - 11.9 inches
6 - 8.9 inches
<6 inches

Physical and Environmental Characteristics of the Reservoir

Pioneer Trails was originally constructed as a 43 acre reservoir with a storage capacity of 277 acre-feet, but high infiltration rates (2.4 inches per day) and lower than expected inflows resulted in a reservoir that was much smaller and often mostly dry. A project to seal 17 acres of the lake bed with soda ash and additional compaction was completed in the spring of 2013. In addition, a 650 gallon per minute groundwater well was added to supplement water levels. Water levels are currently kept approximately one foot below the top of the spillway, which results in a 23 acre reservoir and an estimated 134 acre-feet of volume. Maximum depths approach 25 feet when full, but engineering estimates from a 2003 UBBNRD study indicated that only 15% of the reservoir has depths greater than 10 feet and that the average depth is estimated at five feet. The lake has a watershed area of 5,200 acres, which makes the watershed ratio approximately 226:1, much greater than what is preferred for small impoundments. Almost the entire watershed consists of intensive row crop agriculture. Fortunately, most of the slopes in the watershed are gradual which reduces sedimentation, but it was still estimated by UBBNRD officials that based on normal precipitation events, an estimated 559 tons of sediment will enter the reservoir each year. The county road on the north end of the reservoir serves as a de facto sedimentation dike, as it creates a small area above the reservoir where sediment can settle out before flowing under the road and into the main reservoir. While not 100% effective as a sediment trap, it has shown to reduce sediment and nutrient loading into the main reservoir.

Limited water quality information exists for the reservoir. Water clarity is generally poor and is impacted by several factors, including a watershed dominated by row crops and shallow reservoir depths. Secchi disc readings recorded during the surveys in 2015 and 2017 ranged from 18 to 24 inches. Reduced water transparency is primarily attributed to suspended sediments from runoff and from being redistributed from wave action. Algae blooms are also a contributor as they have also been observed on several occasions during the summer months resulting in extremely green water conditions. Submersed aquatic vegetation is relatively sparse due to poor water transparency. Filamentous algae is fairly abundant throughout the reservoir. Emergent vegetation has become more common in the upper areas of the reservoir, consisting primarily of smartweed, sedges, and annual weeds.

Public Facilities and Access

The area is owned and maintained by the UBBNRD. The entire property is approximately 114 acres; with the lake encompassing 23 acres and the developed park land consisting of approximately 12 acres. The remainder of the property is upland habitat, which is either hayed or left for wildlife habitat. The UBBNRD has spent considerable resources on recreational development at Pioneer Trails the past four years. A new campground was constructed that has ten concrete pads with electrical hookups. There has also been a new amphitheater and restrooms built. Primitive camping areas and improved day use facilities are present. A concrete boat ramp is available to launch boats. Trails are available for hiking and horseback riding. There is no entry fee to access the area, but nominal fees are charged for camping. Shoreline access for anglers is located primarily along the east side of the reservoir and along the dam. Angler access is fair and needs improvement, especially in the area near the campground and day use area.

Future Fisheries Management

The following management strategies will be utilized to maintain a healthy fishery at Pioneer Trails Reservoir.

- NGPC will survey the fish populations utilizing electroshocking, frame netting, and gill netting every five years. The next survey is scheduled for the spring of 2022. Partial surveys may occur more frequently to sample individual species, i.e saugeye and largemouth bass.
- The following management objectives will be used to assess status of the priority gamefish species.
    - Maintain a largemouth bass population with a CPUE of at least 125 eight inch or larger bass per hour of daytime electrofishing. CPUE of bass larger than 15 inches should be at least 50 per hour.
    - Maintain a bluegill population with a CPUE of 30 to 50 fish per frame net with 20% of them eight inches or larger.
    - Maintain a white crappie population with a CPUE of at least 15 fish per net with 20% of them ten inches or larger.
    - Maintain a channel catfish population with a catch of at least 5 fish per frame net or 10 fish per experimental gill net.
    - Develop and maintain a saugeye population that has a fall gill net catch of three to five fish per experimental gill net.
- Stock 10-inch channel catfish on alternate years at rate of 30 fish per acre to maintain a fishable population. Channel catfish population status will be monitored in the future with frame nets and/or gill nets and stocking rates will be adjusted accordingly.
- Stock 8-inch saugeye annually at a rate of 10 fish per acre to establish and maintain a fishable population. Saugeye are also being used as an additional predator to assist with bluegill and white crappie control. The status of the saugeye population will be assessed with fall gill netting and stocking rates will be adjusted accordingly.
- Investigate future aquatic habitat improvement and / or angler access projects.
- Work with the UBBNRD to improve shoreline angler access.
- Communicate annually with the UBBNRD regarding fish management, water level issues, access improvements, etc.

Future Fish Stocking Schedule

Date	Species	Size (inches)	Number Requested
September 2018	Saugeye	8	230
September 2019	Saugeye	8	230
September 2019	Channel Catfish	10	690
September 2020	Saugeye	8	230
September 2021	Saugeye	8	230
September 2021	Channel Catfish	10	690

Fishing and Boating Regulations

The fishery at Pioneer Trails is currently managed under statewide regulations and no special regulations are in effect at this reservoir. Current length limits include a 15-inch minimum for largemouth bass and saugeye. The daily bag limit for bass is four fish, with only one larger than 21 inches. The daily bag limit for saugeye is four fish with only one larger than 22 inches. There are no length limits on panfish (bluegill, crappie) or channel catfish and the daily bag limits are 15 and 5, respectively. The reservoir is open to all types of boats, but speed is restricted to five mph or no-wake. While no special regulations are currently being considered for the reservoir, drastic changes in the status of the fishery could trigger more restrictive regulations in the future.

Contact Information

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York, NE 68467
Phone: 402-362-6601
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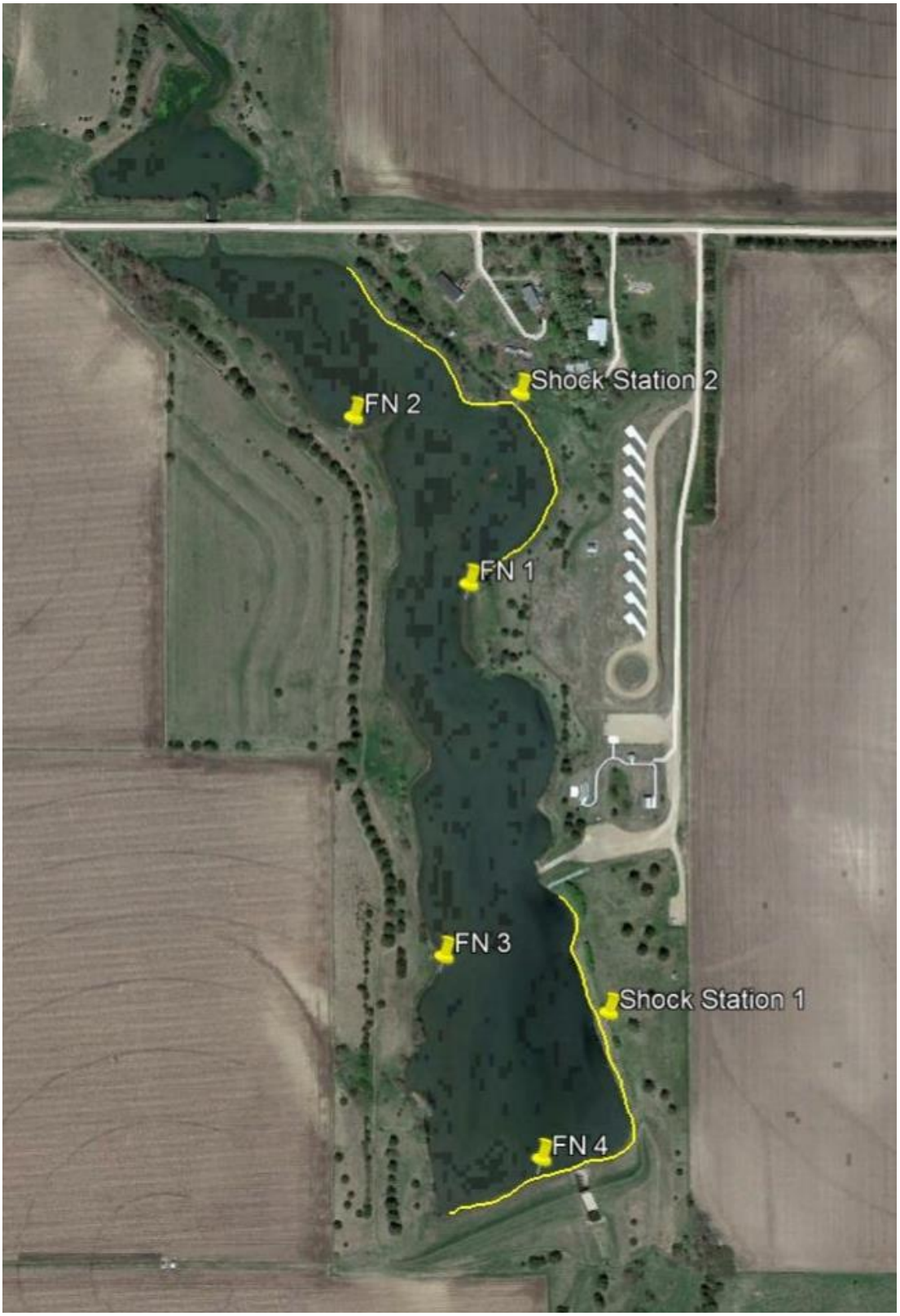
Sampling Station Map



Miscellaneous Photos of Pioneer Trails Recreation Area (taken 7/21/2015)

Upper End of Reservoir

Rest Room

Boat Ramp

Picnic Shelter

Lower End of Reservoir

Campground