

**Division of Fisheries
Streams Program
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March 2022**



**Fish Assemblages and Stream
Conditions in the Upper
Mississippi River Basin 2021**



Upper Mississippi River 2021 Basin Survey

Summary

Introduction

The Upper Mississippi River Basin was sampled in the summer of 2021 by the Illinois Department of Natural Resources (IDNR) Division of Fisheries. The purpose was to collect comprehensive fisheries data on selected stream stations in this area. The data collected from these surveys has been very valuable in assessing the health of our streams, and has been used to upgrade the IDNR's strategic plan. It has also proved valuable in helping target stream specific management activities, and to provide the basis for making decisions regarding potential impacts on streams from construction activities, and point and non-point discharges.

The Upper Mississippi River Basin extends from the East Dubuque area in northwestern Illinois south to Savanna and east to about Stockton, IL. Included are all of Jo Daviess County, and the northern part of Carroll County. This area of Illinois, along with portions of Wisconsin, Minnesota, and Iowa, is known as the "Driftless Area", an island that escaped the continental glaciers of the Pleistocene Epoch. The Driftless Area has a typical continental climate with cold winters, hot summers, and abundant rainfall. The soils are composed mostly of windblown loess and gravel, with flood deposited alluvium in the valley floors. This area is one of the most unique areas in the state, harboring rare plant species found nowhere else in Illinois. It also has the highest geographical point in Illinois - the exposed bedrock surface at Charles Mound in Jo Daviess County. The topography of the area includes dozens of ridges and valleys of varying heights and widths, covered with pastures and forests. Ravines and valleys crisscross the land in every direction, and their slopes form the dominant feature of the landscape. Agriculture is the leading industry of the area, followed by manufacturing and tourism. Of the region's total farm cash receipts, almost three-fourths are from livestock.

There are approximately 1,632 miles of rivers and streams in this area. The headwaters of the Apple, Galena, Sinsinawa, and Menominee Rivers are in Wisconsin, and all of these streams flow south by south-west into the Mississippi River. The channel slopes are relatively steep, averaging from 13 to 20 feet per mile. The smaller tributaries are often steeper, often exceeding 40 feet per mile! The steep channel slopes and hilly topography result in excessive erosion in many areas, exacerbated by livestock grazing on the slopes, and by poor farming practices. Seven stream segments in this area are recognized as Biologically Significant Streams because they support threatened or endangered species or have high fish and mussel diversity. These segments, which cover more than 22 stream miles, include the Apple River from Wolf Creek southeast to Mill Creek, West Fork Apple River, Plum River from East Plum River to Carroll Creek, Carroll Creek, Menominee River, Sinsinawa River, and river miles 545-550 of the Mississippi River.

Methods

A total of 19 locations were sampled within the Upper Mississippi River Basin during the summer of 2021 (Table 1). Six samples were collected from the main stem of the Apple River, along with two samples from tributary of the South Fork of the Apple River. Two samples were collected from the Plum River main stem, along with two samples from Carroll Creek, a tributary of the Plum River. Two samples were collected from the Galena River, one from the East Fork Galena River, and one sample was collected from each of the following: Menominee River, Sinsinnawa River, Rush Creek, and Smallpox Creek. All sites were sampled using a small DC electro-fishing boat equipped with a 5.0 GPP Smith Root box and generator. One person was usually netting stunned fish from the front of the boat, while additional people collected stunned fish by walking alongside the boat in the water as depths permitted. Most of the larger fish were enumerated in the field with lengths (total length) recorded to the nearest mm, and weights measured to the nearest gram. Smaller fish,

primarily minnows, were preserved for later identification. These fish were then similarly enumerated. An Index of Biotic Integrity (IBI) for the collection of these fish species was also calculated for each station. The historical IBI for surveys from 2000, 2005, 2010 and 2015 is also shown with the 2021 survey. (Table 2).

A number of biological, chemical, and physical measurements or observations were made by IDNR personnel at each sampling location. These included water depth, water width, temperature, transparency, color, odor, water stage, pH, conductivity, channel modifications, bank stability, substrate type, percent shading, instream cover, weather, riparian cover, adjacent land use, and the presence of pollution sources. This report will only describe and summarize the data collected by the Illinois Dept. of Natural Resources which includes the fishes collected, stream conditions, and the station information.

IEPA Code	Stream	Location	County	Latitude	Longitude
MJ-01	Plum River	Savanna	Carroll	42.09832	-90.12643
MJ-02	Plum River	Pleasant Valley	Jo Daviess	42.24381	-90.04005
MJB-02	Carroll Creek	Scenic Palisades Rd.	Carroll	42.10782	-90.05547
MJB-03	Carroll Creek	Mt. Carroll	Carroll	42.10318	-89.98205
ML-02	Rush Creek	AIRHART RD	Carroll	42.18093	-90.19393
MN-04	Apple River	E. Shapeville	Jo Daviess	42.40122	-90.13225
MN-05	Apple River	Elizabeth So. Goodfellow	Jo Daviess	42.34082	-90.20477
MN-07	Apple River	State Park	Jo Daviess	42.44841	-90.0552
MN-17	Apple River	Hanover above dam	Jo Daviess	42.26573	-90.2755
MN-18	Apple River	N. Scout Camp Road	Jo Daviess	42.47859	-90.1042
MN-22	Apple River	Hanover below dam	Jo Daviess	42.25734	-90.28685
MNI-11	S Fk Apple River	State Park	Jo Daviess	42.44786	-90.05222
MNI-12	S Fk Apple River	Kuppersmith Rd. Br.	Jo Daviess	42.42453	-90.02321
MPA-02	Smallpox Creek	GLEN HOLLOW RD	Jo Daviess	42.38911	-90.36381
MQ-01	Galena River	Galena	Jo Daviess	42.41061	-90.43081
MQ-02	Galena River	Council Hill Road	Jo Daviess	42.47639	-90.40653
MQB-01	E Fk Galena River	Council Hill Station	Jo Daviess	42.4675	-90.33875
MS-03	Sinsinawa River	RT 20 BRIDGE	Jo Daviess	42.45643	-90.49412
MU-01	Menominee	Tranel Road	Jo Daviess	42.5046	-90.5914

Table 1. Stream station locations sampled in 2021 in the Upper Mississippi River Stream Basin.

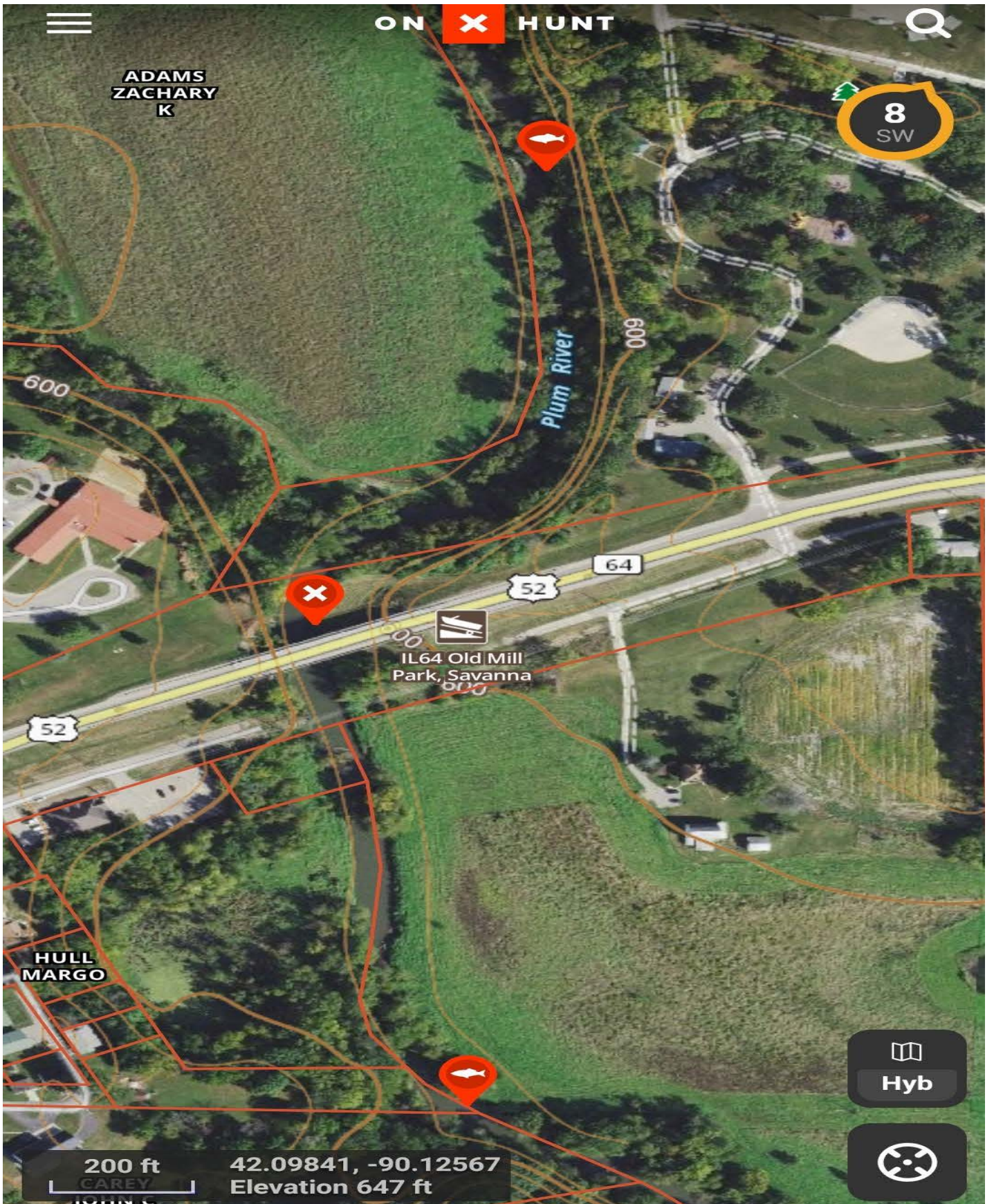
Summary of Individual Station Results

Plum River – MJ-01: The Plum River was sampled in two locations. Station MJ-01 was located on the east side of the city of Savanna at the Route 64 Bridge crossing. The DC electrofishing boat was used to sample upstream and downstream of the bridge for a total distance of about 2148 feet x 45 feet wide. The total sample time of electrofishing was 39 minutes. The water level was normal and the water was turbid with a clarity of 8 inches. This station was located toward the lower end of the Plum River. The channel was fairly straight and “U” shaped with steep banks. The bottom sediments were 60% silt/mud, 10% sand, 10% gravel, 10% boulder/rip-rap, and 10% woody habitat. The heavy silt load covered much of the hard substrates and woody debris, root wads and log jams were the main instream habitat.

A total of 18 native and 1 non-native fish species were collected at this site. The larger fish species included largemouth bass, smallmouth bass, walleye, channel catfish, freshwater drum, common carp, gizzard shad, and 4 native sucker species. The smaller fish included bluegill, yellow perch, grass pickerel and 5 minnow species. The IBI rating was a 34 in 2021. This is much higher than the 2015 survey value of a 19, but consistent with the value of 38 in 2010 and 2005. It was noted that the 2015 value could have been affected by high water and very turbid conditions at the sampling time. Regardless, this site on the Plum River is rated a C class, Moderate Aquatic Resource. The slow flow and high sediment load negatively impact the stream in this area. Fish flesh contaminate samples were taken on 2 size groups of common carp and 1 size group of largemouth bass for IEPA analysis.



MJ-01 Plum River, Downstream view 8/11/2021.



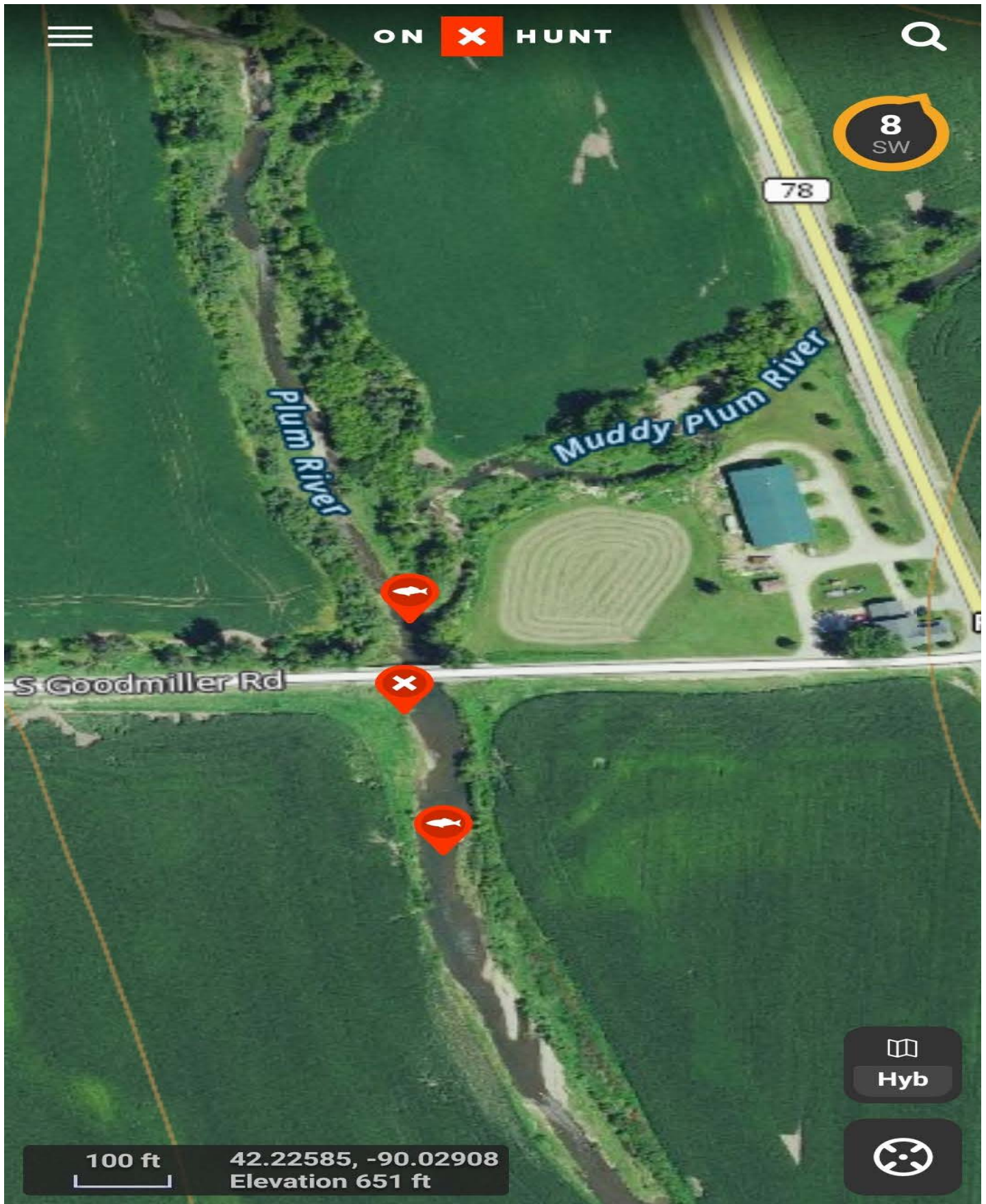
MJ-01 Plum River, IDNR sampling station on 8/11/2021.

Plum River – MJ-02: This station was located north of Mt. Carroll at the Goodmiller Road Bridge crossing. The DC electrofishing boat was used to sample a 369 feet x 40 feet wide stretch upstream and downstream of the bridge for a total sample time of 15 minutes. Two riffles, one pool, and one long run were sampled. The stream in this area was bordered by agricultural fields, with only a narrow riparian buffer of weeds. The bottom was firm and was composed of 20% silt/mud, 20% sand, 20% gravel, 20% cobble, 10% boulder/rip-rap and 10% submerged aquatic vegetation. The aquatic vegetation was elodea and filamentous algae. Habitat diversity was present in spite of the channelization of the stream corridor.

12 native fish species were collected at this site. The larger fish species were dominated by an impressive smallmouth bass population. Other species included bluegill, pumpkinseed sunfish, green sunfish, 4 minnow species, 3 native sucker species and Johnny darters. The IBI value in 2021 was a 41. This was consistent with the 46 in 2015 and the 42 in 2005. In 2000, this site had a high value of 53.



MJ-02 Plum River. Downstream view with Blake Bushman and smallmouth bass on 8/11/2021.



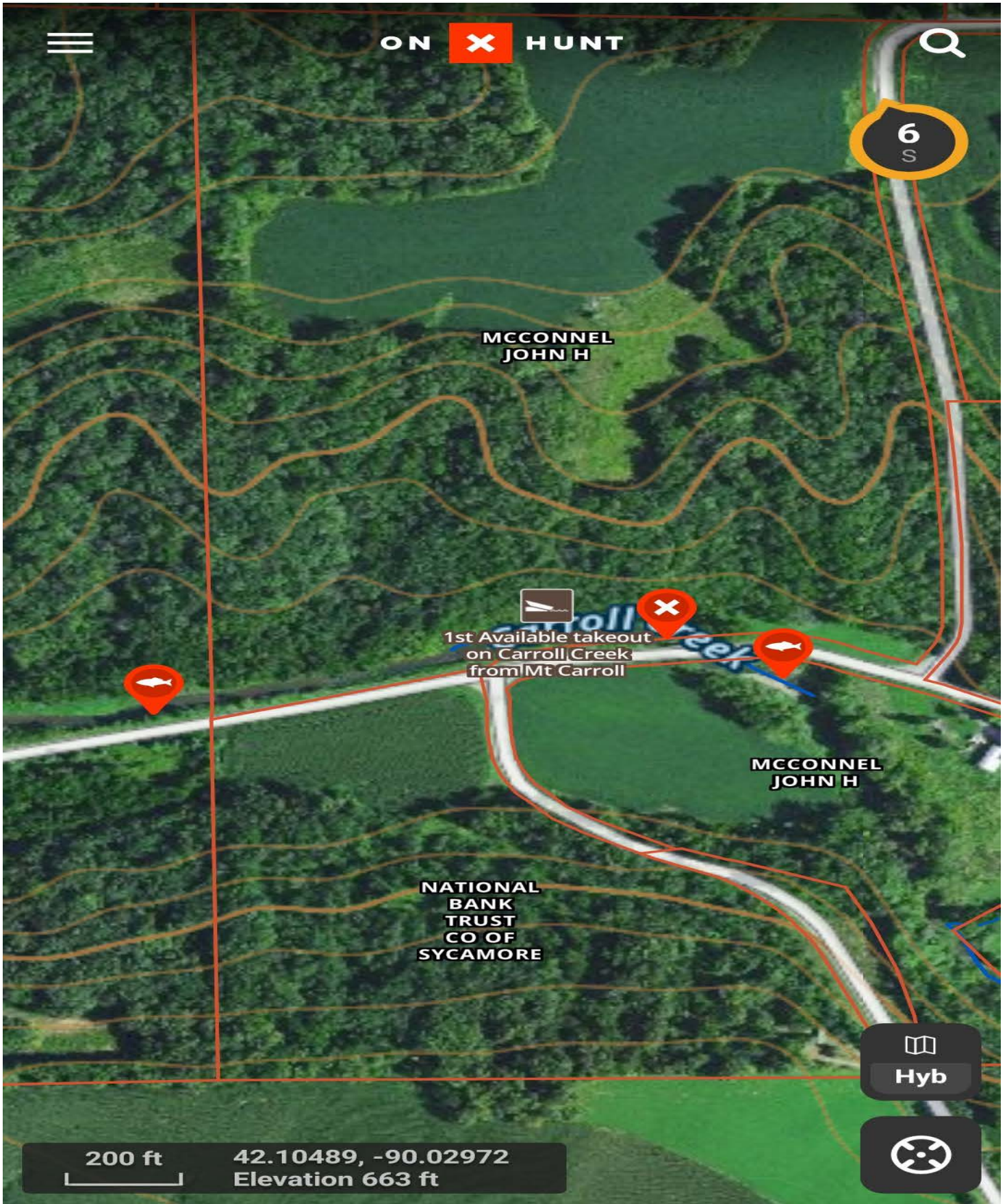
MJ-02 Plum River, IDNR Sampling station on 8/11/2021.

Carroll Creek – MJB-02: This station was located west of the town of Mt. Carroll at the bridge crossing on Ivy Road, just upstream of the Scenic Palisades Road intersection. The DC electrofishing boat was used to sample 1050 feet x 25 feet section of stream for a total sample time of 30 minutes. The station started just upstream of the bridge and went up through the bridge, encompassing 3 riffles, 2 runs and 2 pools. The flow was fast and the bottom sediments consisted of 10% silt/mud, 10% sand, 20% gravel, 20% cobble, 20% boulder and 20% submerged aquatic vegetation. The aquatic vegetation was composed of curly leaf pondweed, elodea, chara and leafy pondweed. Riparian zone border the roadway on one side, and a steep, timbered bluff on the other.

A total of 16 native fish species were collected at this site. The large fish species included smallmouth bass, largemouth bass, yellow bullhead, bluegill, green sunfish, northern hogsucker and white suckers. The small fish included 7 minnow species, stonecats, and fantail darters. The collection of longnose dace was part of this fish group. The IBI value in 2021 was a 43. This was slightly higher than the 35 value in 2015 and the 37 value in 2005. This site was not sampled in 2000 or 2010.



MJB-02 Carroll Creek upstream view on 8/10/2021.



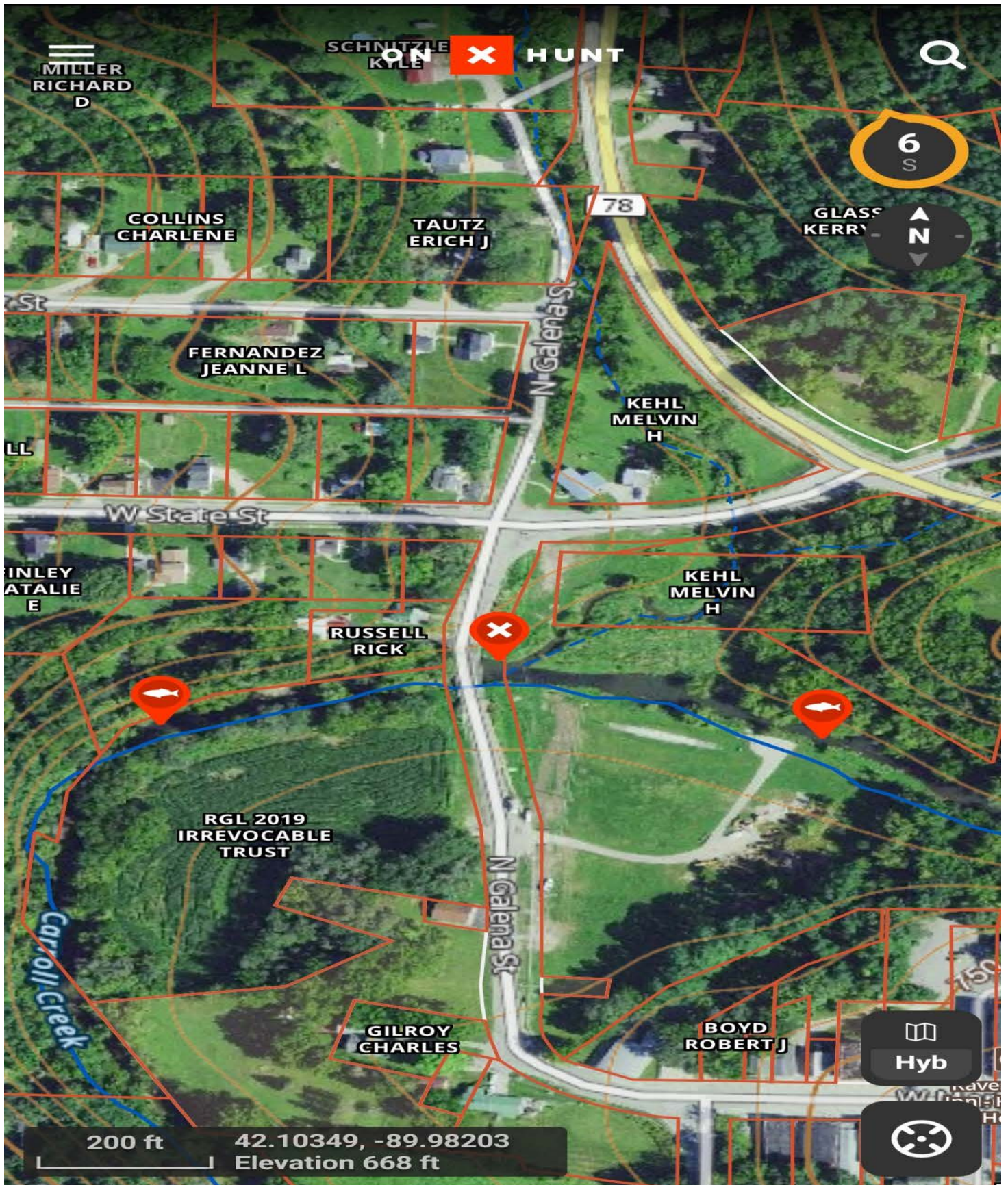
MJB-02 Carroll Creek, IDNR Sampling station on 8/10/2021.

Carroll Creek – MJB-03: Carroll Creek was also sampled at the North Galena Street Bridge crossing on the west side of Mt. Carroll using the DC electrofishing boat. Three riffles, 2 runs and 2 pools run were sampled for a total sample time of 20 minutes and a total distance of 741 feet x 36 feet wide. The stream in this area flowed through a small park, with mowed grass and a few scattered trees representing the riparian corridor. The bottom was firm and the sediments consisted of 10% silt/mud, 20% sand, 20% gravel, 20% cobble, 10% boulders and 20% submerged aquatic vegetation. The aquatic vegetation was composed of elodea, coontail and leafy pondweed. This site had large beds of submerged aquatic plants along shorelines, and solid embedded riffles with fast flow

A total of 18 native species were collected at this site. The larger species included smallmouth bass, largemouth bass, black bullhead, bluegill, grass pickerel, yellow perch, northern hogsucker, white sucker, and golden redhorse. The small fish included fantail darters and 6 minnow species with one being the longnose dace. The IBI was calculated at a 44 in 2021. This was up from the 39 in 2015 and 35 in 2010. And substantially higher than the 24 value in 2000. No sample was completed at this station in 2005.



MJB-03 Carroll Creek, Upstream view on 8/10/2021.



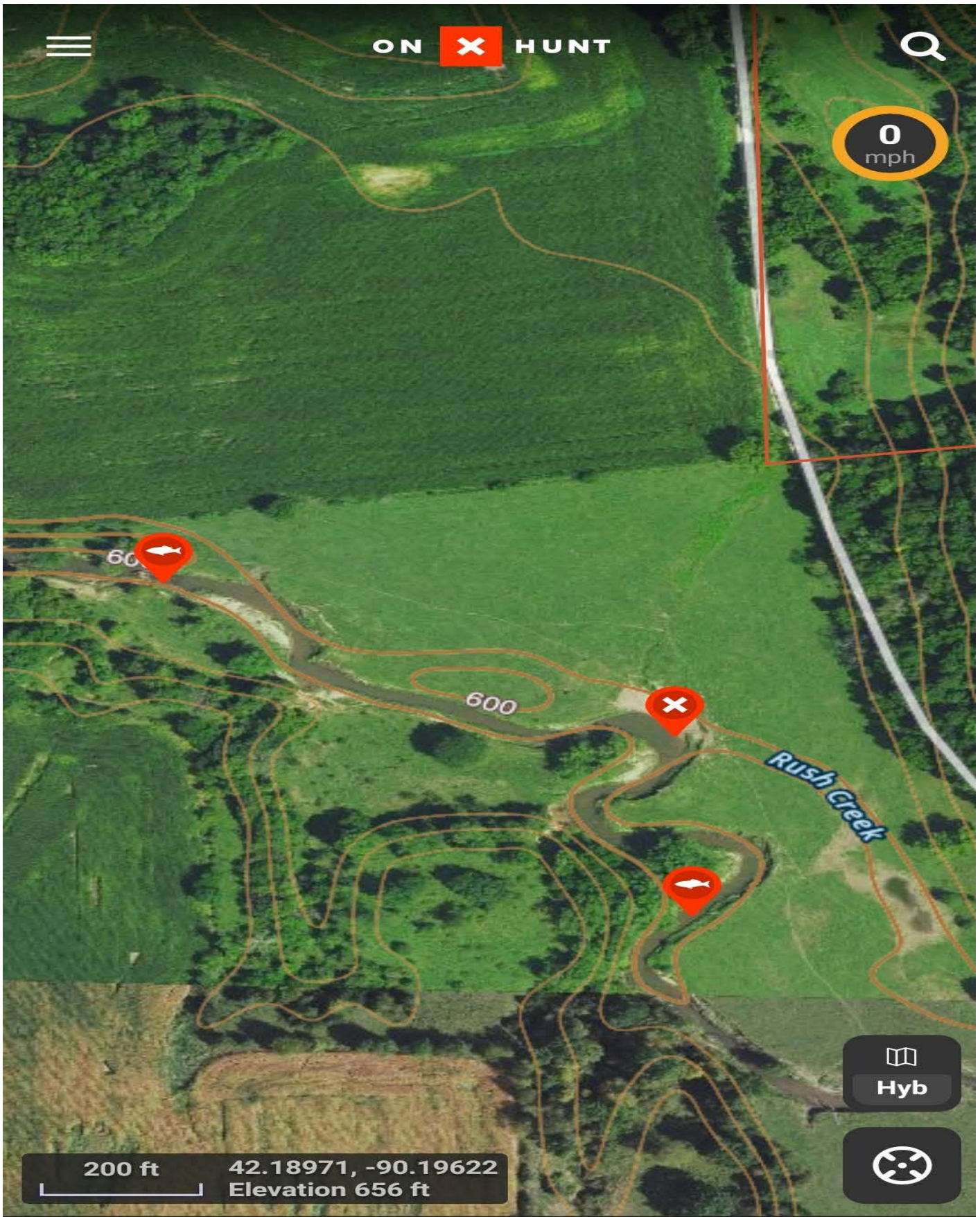
MJB-03 Carroll Creek, IDNR Sampling station on 8/10/2021.

Rush Creek – ML-02: Rush Creek was sampled on private property north of Mississippi Palisades State Park off of Airhart Road in a cow pasture. The DC electrofishing boat was used to sample a stretch of stream 1302 feet x 24 feet wide for a total sample time of 33 minutes. The stream in this area was incised with poor habitat that consisted of 50% silt/mud, 30% sand, 10% claypan and 10% woody debris. The banks were badly eroding in some areas and cows were impacting the stream. Approximately 60 head of cattle were present and the water was very turbid from their actions. Despite the poor habitat at this site on the stream, the immediate upstream and downstream sections of the stream had stable riparian zones without cattle.

A total of 18 native fish species and 1 non-native fish species were collected. The larger fish species included walleye, yellow perch, smallmouth bass, bluegill, channel catfish, freshwater drum, gizzard shad, common carp, and 6 native sucker species. Small fish species included 6 minnow species, Johnny darter and log perch. The IBI value was calculated at a 43 in 2021. This is an increase from the 35 from the 2015 survey results.



ML-02 Rush Creek, Upstream view on 8/12/2021.



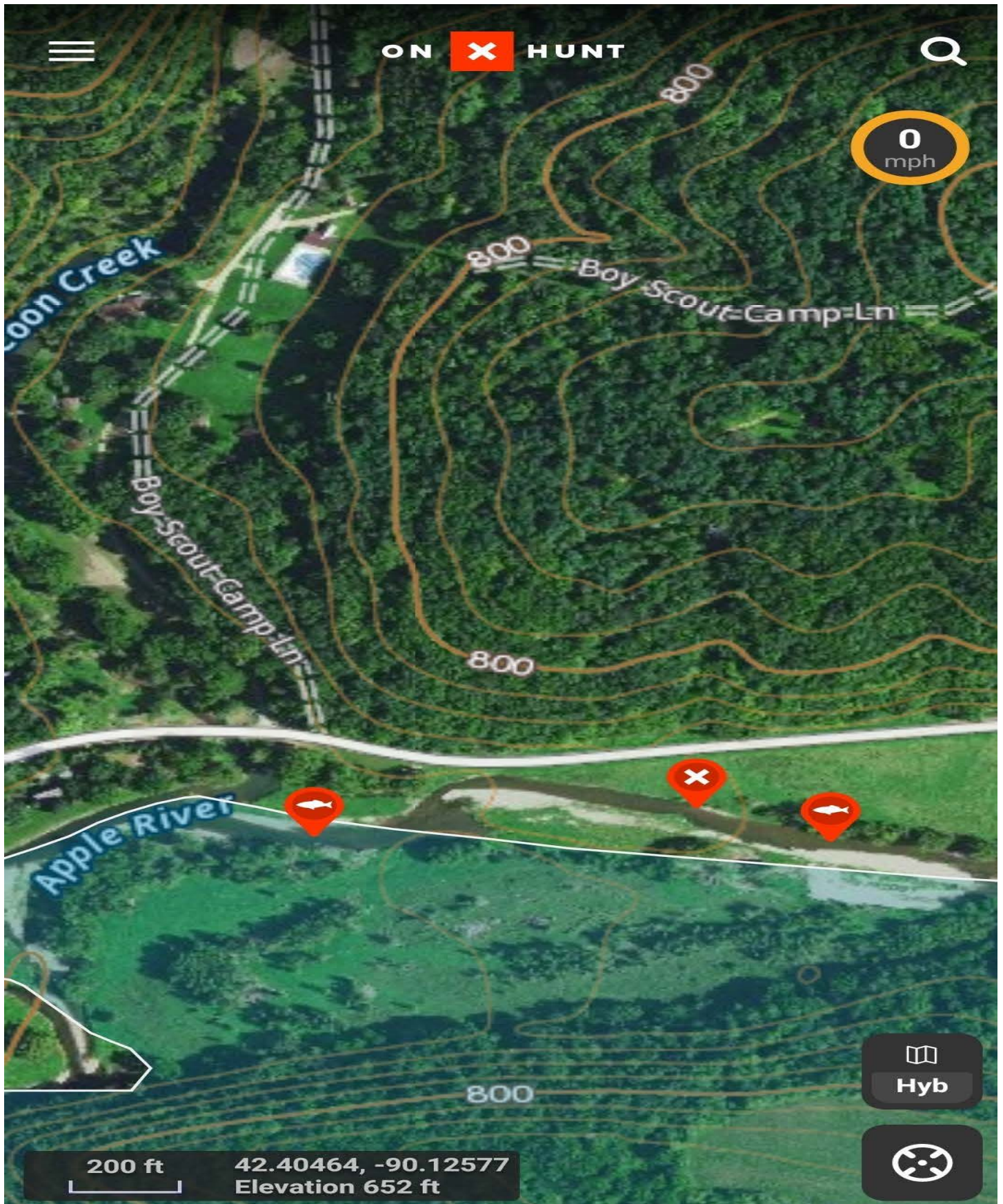
ML-02 Rush Creek, IDNR Sampling station on 8/12/2021.

Apple River – MN-04: The main channel of the Apple River was sampled at 6 locations. Station MN-04 was located about 6 miles northwest of Stockton downstream of the Townsend Road Bridge. The DC electrofishing boat was used to sample a section of the stream that was approximately 1005 feet x 45 feet wide for a total sample time of 25 minutes. The section contained 2 riffles, 2 runs and a large pool. The bottom sediments were firm and consisted of 5% silt/mud, 20% sand, 40% gravel, 15% cobble, 15% boulders and 5% woody habitat. The water flow was fast and instream cover was provided by the boulders, rocky ledges, undercut banks, and a few submerged logs. Submerged aquatic vegetation includes elodea and curly leaf pondweed. The area sampled was an old cow pasture that was recently acquired by the Illinois Dept. of Natural Resources pre-2015, the riparian corridor vegetation included mostly pasture grasses, weeds and limited trees. This section was experiencing bank erosion and appeared to be in the widening stage of channel evolution.

A total of 15 native fish species were collected from this station. The large species included an impressive smallmouth bass population, young of the year largemouth bass, green sunfish, and 4 native sucker species. The small fish included stonecats, fantail darters and 5 minnow species. The State Threatened Ozark Minnow was part of this minnow group. The IBI was calculated at a value of 48 in 2021. This is slightly higher than the 44 in 2015, the 46 in 2010, the 44 in 2005, and the 40 in 2000.



MN-04 Apple River, downstream view on 8/17/2021.



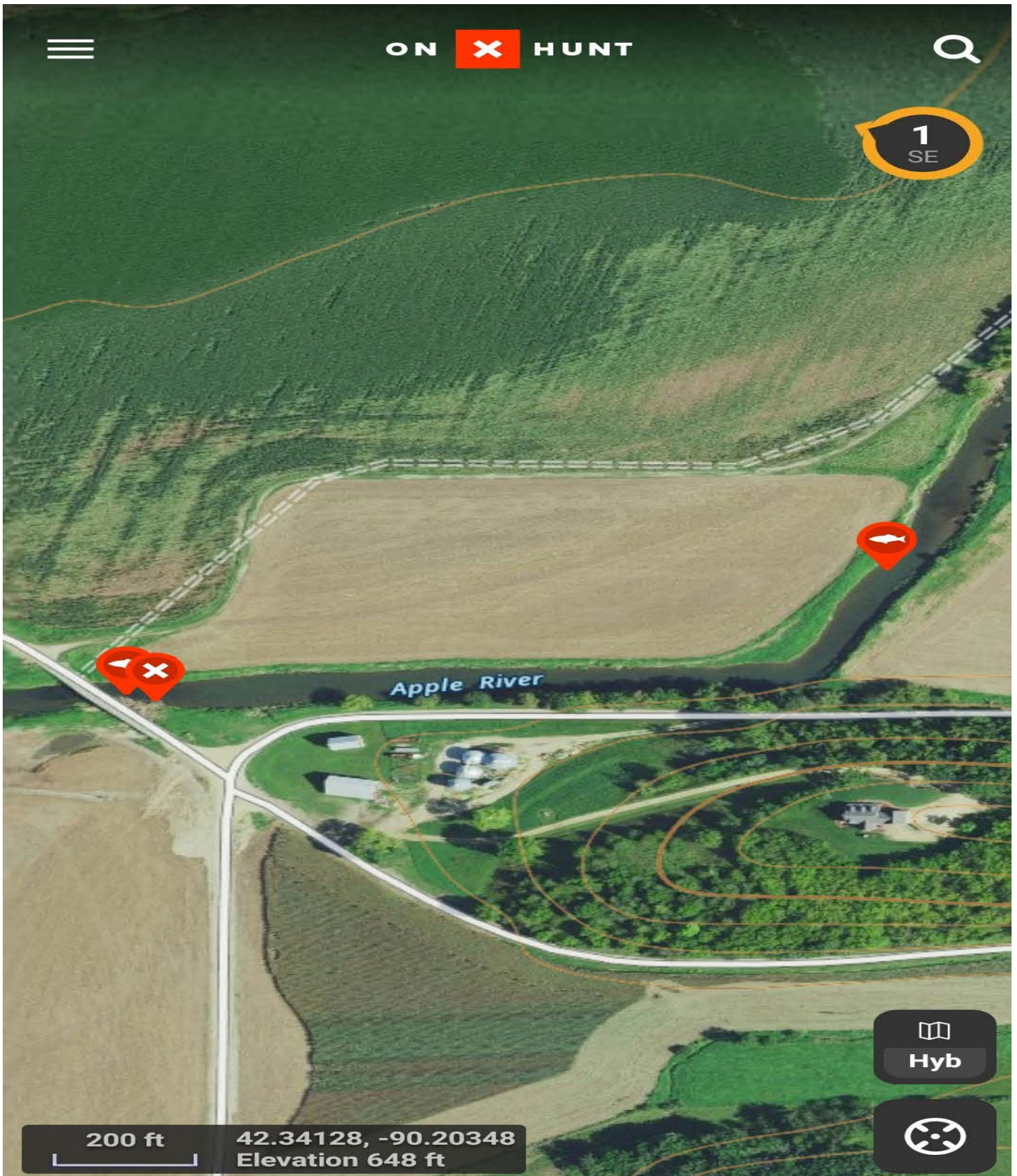
MN-04 Apple River, IDNR Sampling station on 8/17/2021.

Apple River – MN-05: This station was located upstream of the bridge on private property north of the town of Elizabeth at the junction of South Apple River Road and Goosehollow Road. At this location the stream was somewhat channelized and ran through an agricultural field. The banks were steep and the stream was incising with minor erosion occurring. The DC electrofishing boat was used to sample a stretch 1212 feet x 69 feet wide for a total of 26 minutes. The flow in this area was fast and clear, with a firm substrate of 30% sand, 30% gravel, 30% cobble, and 10% boulders. One pool, 2 runs and 2 riffles were sampled. Instream cover was provided by boulders, undercut banks, a few brush jams, and submerged roots. A former dam site for a mill provided grade stabilization immediately upstream of the road bridge.

A total of 16 native fish species were collected. The larger fish included smallmouth bass, bluegill, green sunfish, yellow bullhead and 5 species of native suckers. Small fish included stonecats, fantail darters, Johnny darters and 4 minnow species. The IBI was calculated at a value of 45 in 2021. This is very consistent with the value of 44 from the surveys in 2015, 2010 and 2005. This station was not sampled in the 2000 basin survey of the Apple River.



MN-05 Apple River, upstream view on 8/16/2021.



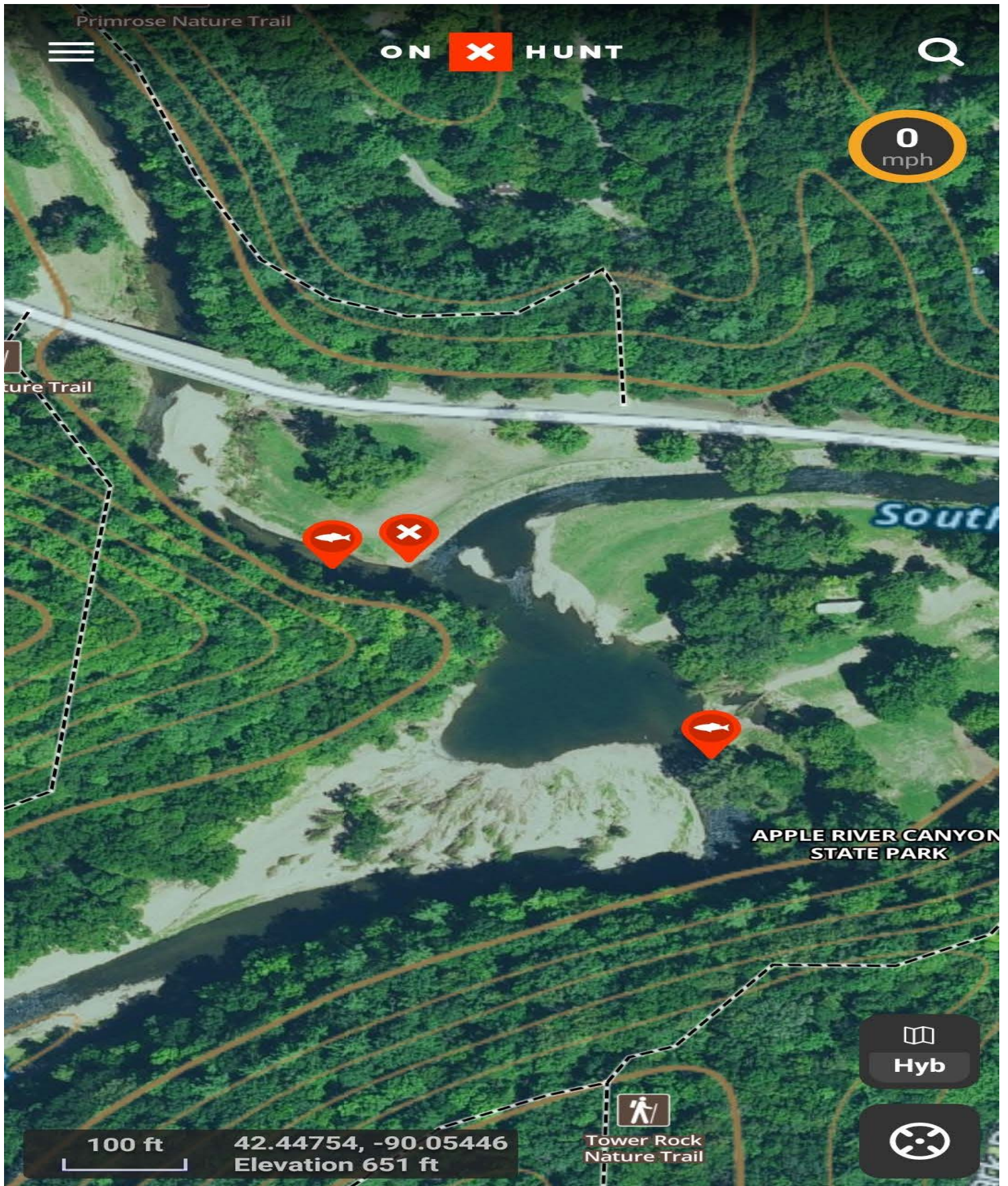
MN-05 Apple River, IDNR Sampling station on 8/16/2021.

Apple River – MN-07: This station was located in Apple River Canyon State Park just downstream of the East Canyon Road Bridge. The DC electrofishing boat was used to sample a stretch of stream 396 feet x 100 feet wide for a total sample time of 27 minutes. This site is immediately below the junction with the South Fork of the Apple River and included 3 riffles, 1 run and 1 large, deep pool. The water averaged 2 feet deep with a maximum depth of 8 feet. The bottom was firm with a composition of 10% silt/mud, 20% sand, 25% gravel, 25% cobble, 10% boulders and 10% bedrock. Instream cover was provided by the boulders, undercut banks, a limestone outcropping, submerged woody habitat and a small amount of submerged aquatic vegetation. The aquatic vegetation was composed of elodea and small pondweed.

A total of 20 native fish species were collected at this site. Large fish included smallmouth bass, largemouth bass, black crappie, bluegill, and 4 native sucker species. Small fish included stonecats, Johnny darter, fantail darter, brook silversides, and 8 minnow species. The minnow group included largescale stonerollers and the State Threatened Ozark Minnows. The IBI was calculated at a value of 49 in 2021. This is slightly above the IBI value of 46 in 2015, 45 in 2010, 40 in 2005, and 44 in the 2000 Apple Basin survey. Fish flesh samples were taken on 1 size group of white sucker and 1 size group of smallmouth bass for IEPA analysis at this site. This location is a popular fishing site for anglers in the State Park.



MN-07 Apple River, downstream view on 8/18/2021.



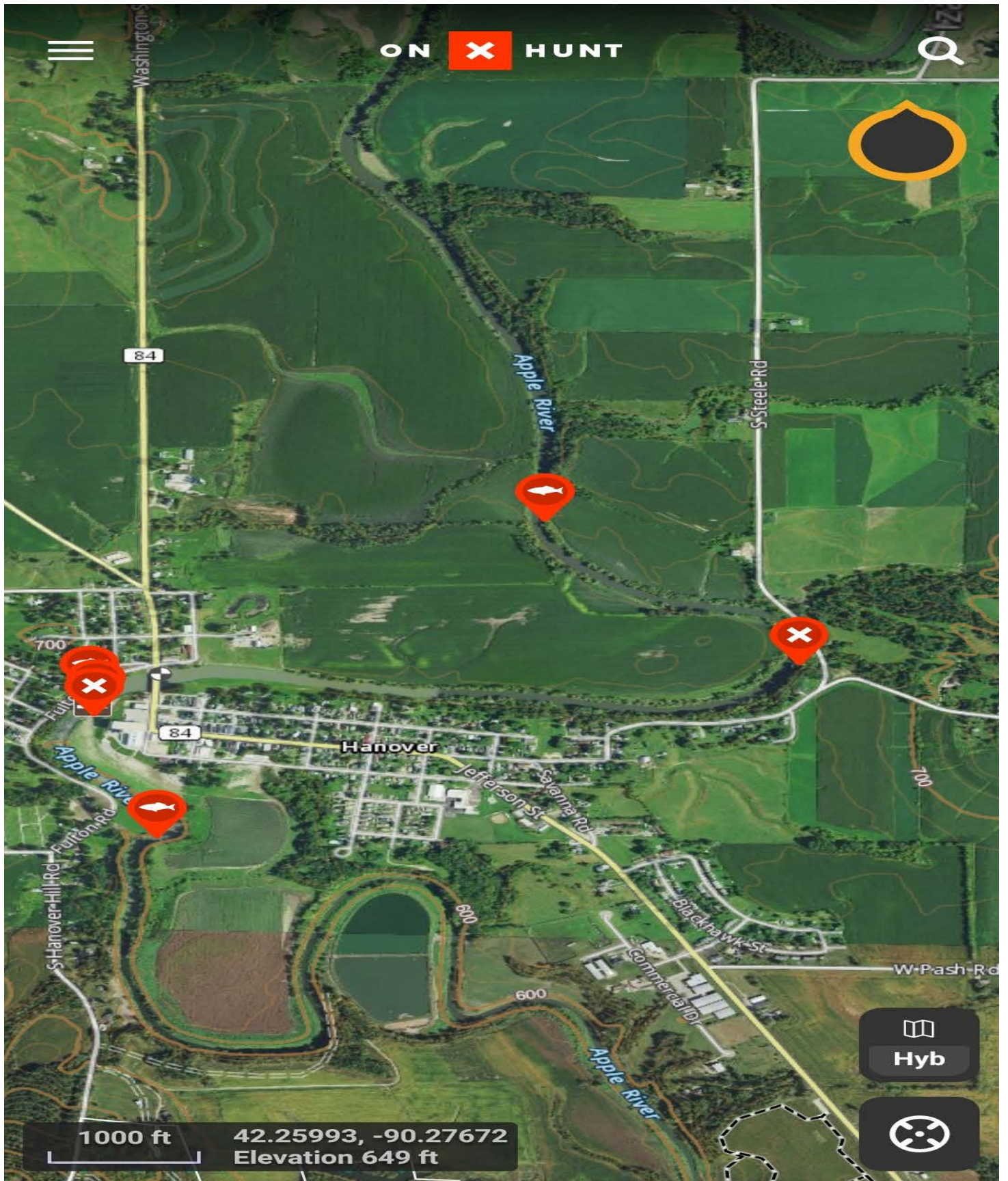
MN-07 Apple River, IDNR Sampling station on 8/18/2021.

Apple River – MN-17: This station on the Apple River is located near the town of Hanover and is above the Crescent Falls Dam on the Apple River. Two DC electrofishing boats were used to sample a shoreline length of approximately 1 mile in this section with a total sample time of 60 minutes. This included about 1120 feet of the pool immediately upstream of the Hanover Dam and then another .8 miles of shoreline along South Steele Road near the access point. The station consisted of one long pool approximately 100 feet wide, with 40% mud/silt, 40% sand, 10% boulder/rip-rap and 10% woody habitat. Instream cover was provided by undercut banks, debris/brush jams, submerged logs and roots. Very little flow was present with the poor stream channel features.

A total of 15 native fish species were collected at this site. The large fish included largemouth bass, smallmouth bass, bluegill, green sunfish, black crappie, and 5 native sucker species. Small fish included brook silversides and 4 minnow species. The IBI value was calculated at a 41 in 2021. This is a substantial increase from the IBI value of 29 in 2015, and the 32 in 2010. The IBI values of 37 in 2005 and 2000 were more similar.



MN-17 Apple Rive, downstream view on 8/25/2021.



IDNR Sampling stations on MN-17 Apple River above the Crescent Falls Dam on 8/25/2021, and MN-22 Apple River below the Crescent Falls Dam on 8/20/2021.

Apple River – MN-18: Station MN-18 was located at the bridge on North Scout Camp Road about 1.5 miles southwest of Apple River. A stretch of stream approximately 546 feet x 30 feet wide was sampled upstream and downstream of the bridge using the DC electrofishing boat. The total electrofishing sample time was 25 minutes. The sampled section included 2 riffles, 2 runs and 1 pool. The bottom sediments were primarily firm and consisted of 20% silt/mud, 20% sand, 20% gravel, 20% cobble, and 20% boulders. Instream habitat was provided by boulders, undercut banks, and rocky ledges. The riparian corridor was a cattle pasture with grass and scattered trees.

A total of 16 native fish species were collected. The large fish included smallmouth bass, bluegill, green sunfish, and 4 native sucker species. The white sucker population was the dominate population at this site. Small fish included Johnny darters, fantail darters and 7 minnow species. The minnow group included largescale stonerollers and the State Threatened Ozark Minnow. The IBI was calculated at a value of 43 in 2021. This was slightly below the IBI value of 45 in 2015, and the value of 49 recorded in 2010, 2005 and 2000.



MN-18 Apple River, upstream view on 8/23/2021.



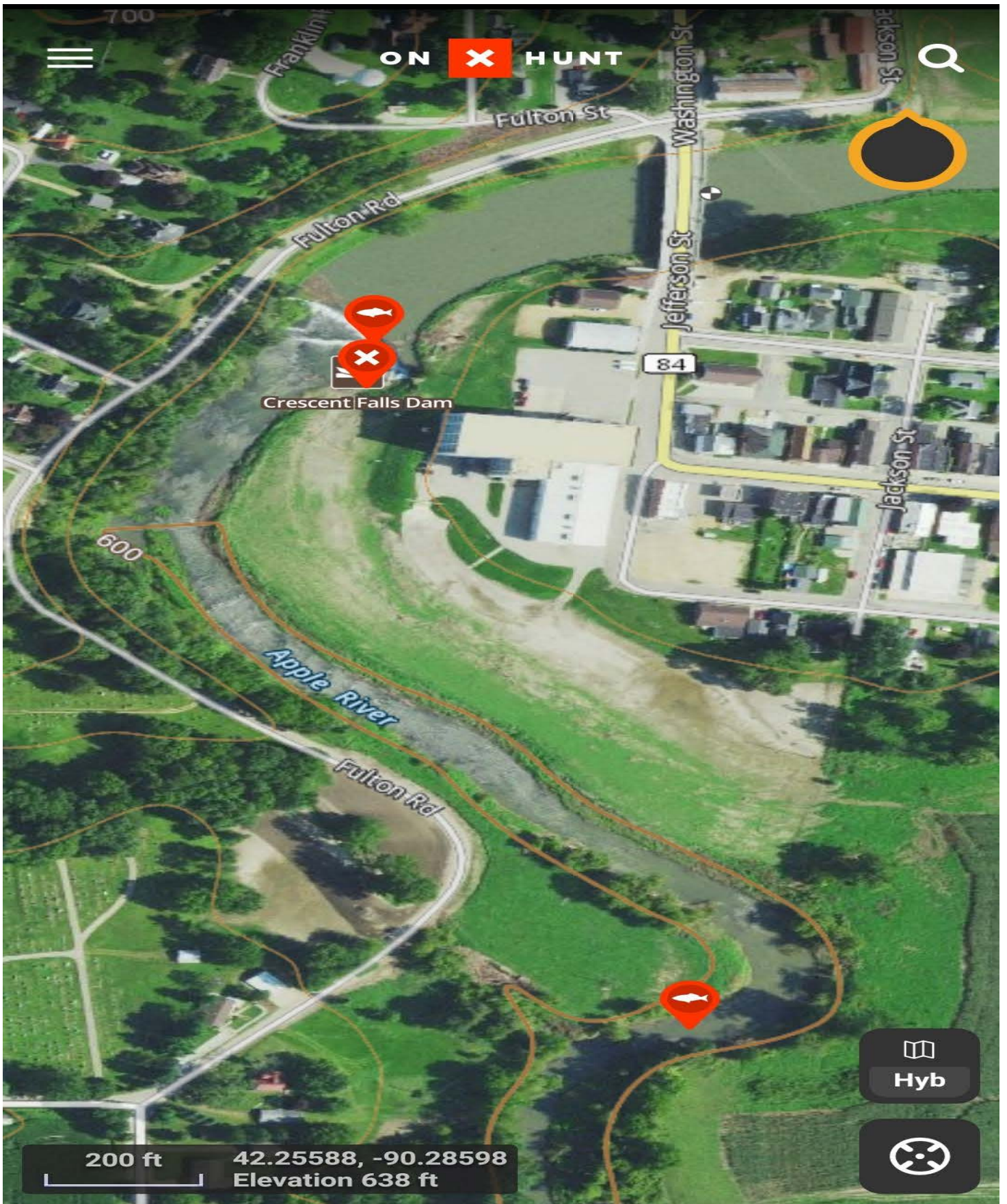
MN-18 Apple River, IDNR Sampling station on 8/23/2021.

Apple River – MN-22: The most downstream station sampled on the Apple River Basin survey was located downstream of the Crescent Falls Dam in Hanover. A stretch of stream, 1860 feet x 75 feet wide was sampled using the DC electrofishing boat. The upstream limit was the immediate tailwater of the dam and a total sample time of 34 minutes. The water flow was fast and conditions very rocky. Two pools were the book ends for a long series of 9 riffles and runs. Bottom sediments consisted of 20% sand, 20% gravel, 20% cobble, 20% boulders and 20% bedrock. Instream habitat was also provided by undercut banks, submerged roots, debris/brush jams, and submerged logs. The riparian corridor was very steep banks.

A total of 40 native fish species and 1 non-native fish species were collected. The overall fish density was also very high at this site with shorthead redhorse and northern hog suckers being subsampled. The large fish included smallmouth bass, largemouth bass, bowfin, walleye, sauger, bluegill, green sunfish, orange spotted sunfish, pumpkinseed sunfish, yellow perch, channel catfish, flathead catfish, freshwater drum, gizzard shad, shortnose gar, common carp and 7 native sucker species. The small fish group included stonecats, brook silversides, 10 minnow species and 4 darter species. A variety of species were collected that have never been found above the dam. These included walleye, sauger, shorthead redhorse, Northern Pike, 7 species of minnows, and Freshwater Drum. This finding emphasizes the need for the dam to either be removed, or to have some type of fish passage structure built to allow fish to pass over or around the dam. The IBI was calculated at a value of 58 in 2021. This is very high and even above the IBI value of 51 from 2015. This site was not sampled in the Apple Basin surveys of 2010, 2005 and 2000. In 2021, fish flesh samples were taken from 1 size group of bluegill, 2 size groups of smallmouth bass, 2 size groups of common carp and 3 size groups of channel catfish to be analyzed by IEPA.



MN-22 Apple River, below the Crescent Falls Dam on 8/20/2021.



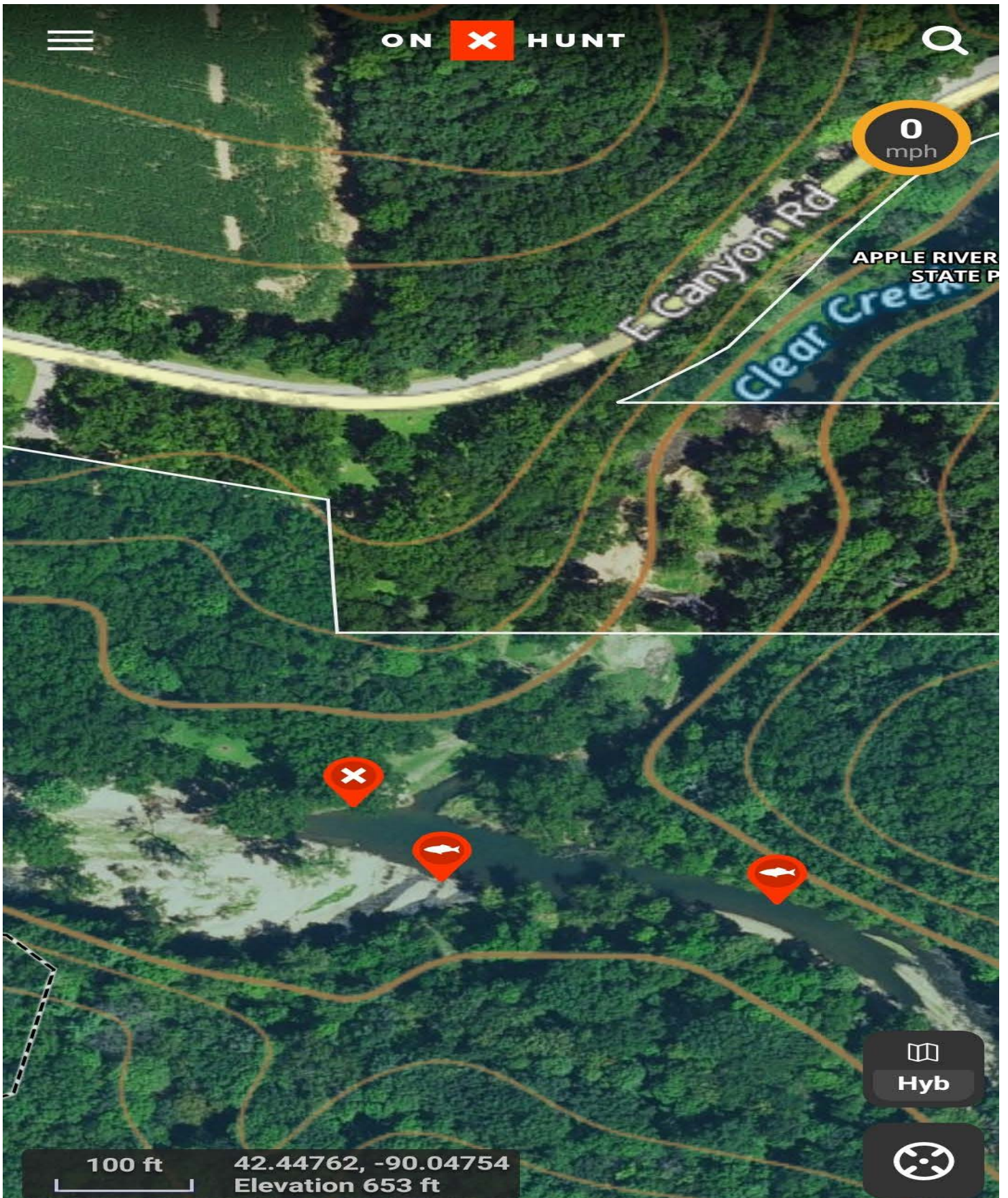
MN-22 Apple River, IDNR Sampling station on 8/20/2021.

South Fork Apple River – MNI-11: This station was located on the east side of Apple River Canyon State Park at the group camping area at the junction of the South Fork of the Apple River and Clear Creek (MNIA-11). A stretch of stream 351 feet x 45 feet wide was sampled using the DC electrofishing boat for a total sample time of 17 minutes. The stream site consisted of 3 riffles, 2 runs and 1 large pool at the stream junction. The bottom sediments consisted of 10% silt/mud, 10% sand, 25% gravel, 25% cobble, 10% boulders, 10% bedrock and 10% woody habitat. Small pondweed was also present. Instream habitat was provided by the lunkers, boulders, rocky ledges, and debris/brush jams. Three sets of “Lunker” structures had been installed in Clear Creek immediately above this stream junction in late 2007 to enhance the habitat and to correct the stream bank erosion that was occurring.

A total of 13 native fish species and 1 non-native fish species were collected from this site. The large fish included a nice population of smallmouth bass, 3 native sucker species and 1 rainbow trout from the annual IDNR stocking program. The small fish included stonecats, fantail darters, Johnny darters and 6 minnow species. The minnow group included largescale stonerollers and the State Threatened Ozark Minnow. The IBI was calculated at a value of 35 in 2021. This station has not been sampled in the past Apple River Basin surveys. The station immediately upstream on Clear Creek had higher IBI values of 43 in 2015 and 2010, a value of 45 in 2005, and a value of 42 in 2000.



MNI-11 South Fork of the Apple River, upstream view on 8/18/2021.



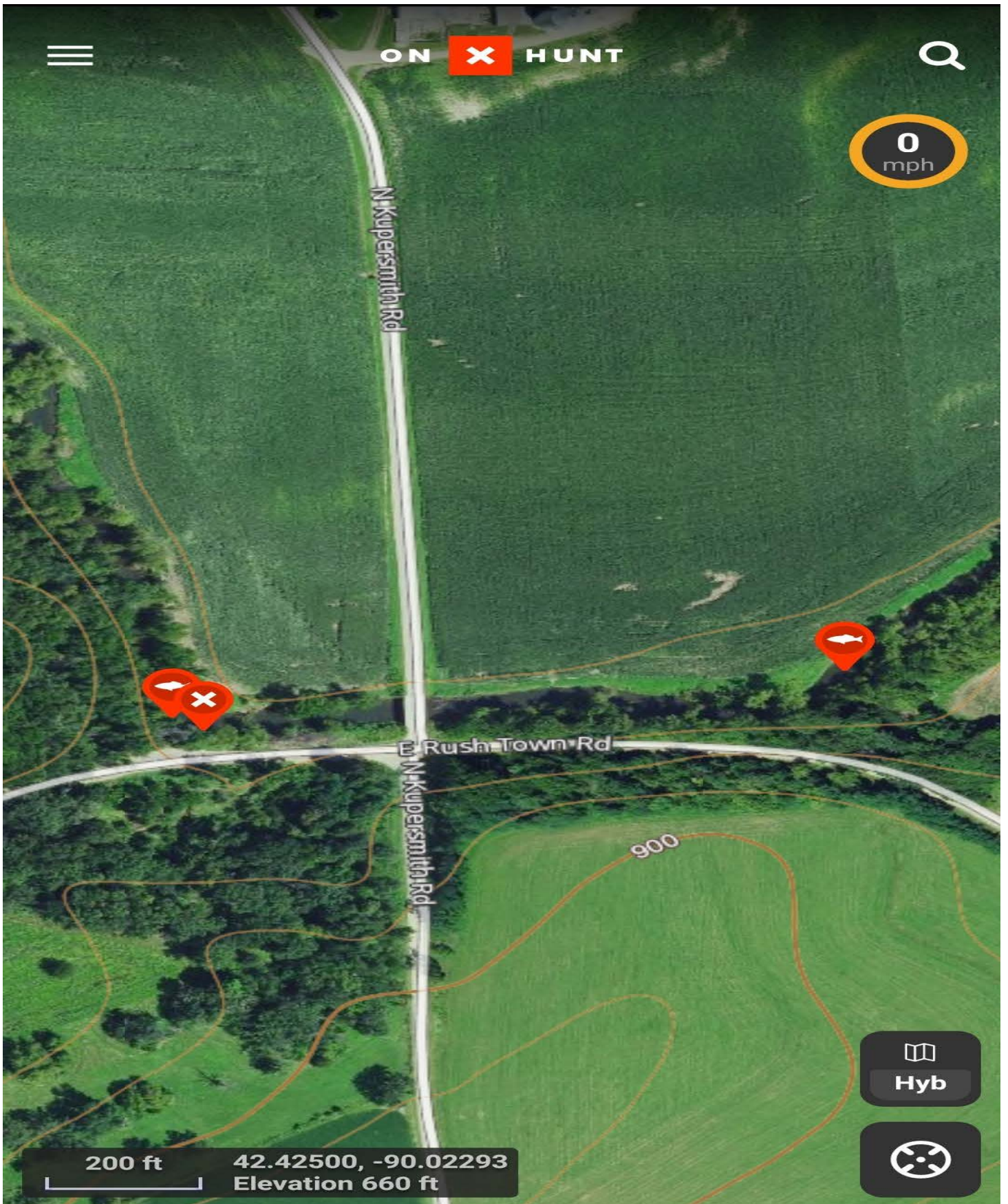
MNI-11 South Fork of the Apple River, IDNR Sampling station on 8/18/2021.

South Fork Apple River – MNI-12: This station was located at the junction of North Koppersmith Road and East Rushtown Road at the bridge. The DC electrofishing boat was used to sample a stretch 900 feet x 45 feet wide downstream to upstream of the bridge for a total sample time of 27 minutes. Bottom substrates consisted of 30% silt/mud, 20% sand, 30% gravel, 10% cobble, 5% boulders and 5% woody habitat. Instream habitat was provided by boulders, undercut banks, submerged roots, logs, and debris/brush jams. Two riffles, 2 runs and 1 pool were sampled. The riparian corridor was mostly agricultural fields with a narrow buffer of trees and brush. The banks were steep with some active erosion.

A total of 15 native species were collected from this station. The large fish included smallmouth bass, largemouth bass, green sunfish, bluegill, golden redhorse and a large percentage of white suckers. The small fish included stonecats, Johnny darters, and 7 minnow species. The minnow group include the State Threatened Ozark Minnow. The IBI was calculated at a value of 33 in 2021. This is a significant decline from the 43 value in 2015, the 38 in 2010, 48 in 2005 and the value of 41 in 2000.



MNI-12 South Fork of the Apple River, upstream view on 8/17/2021.



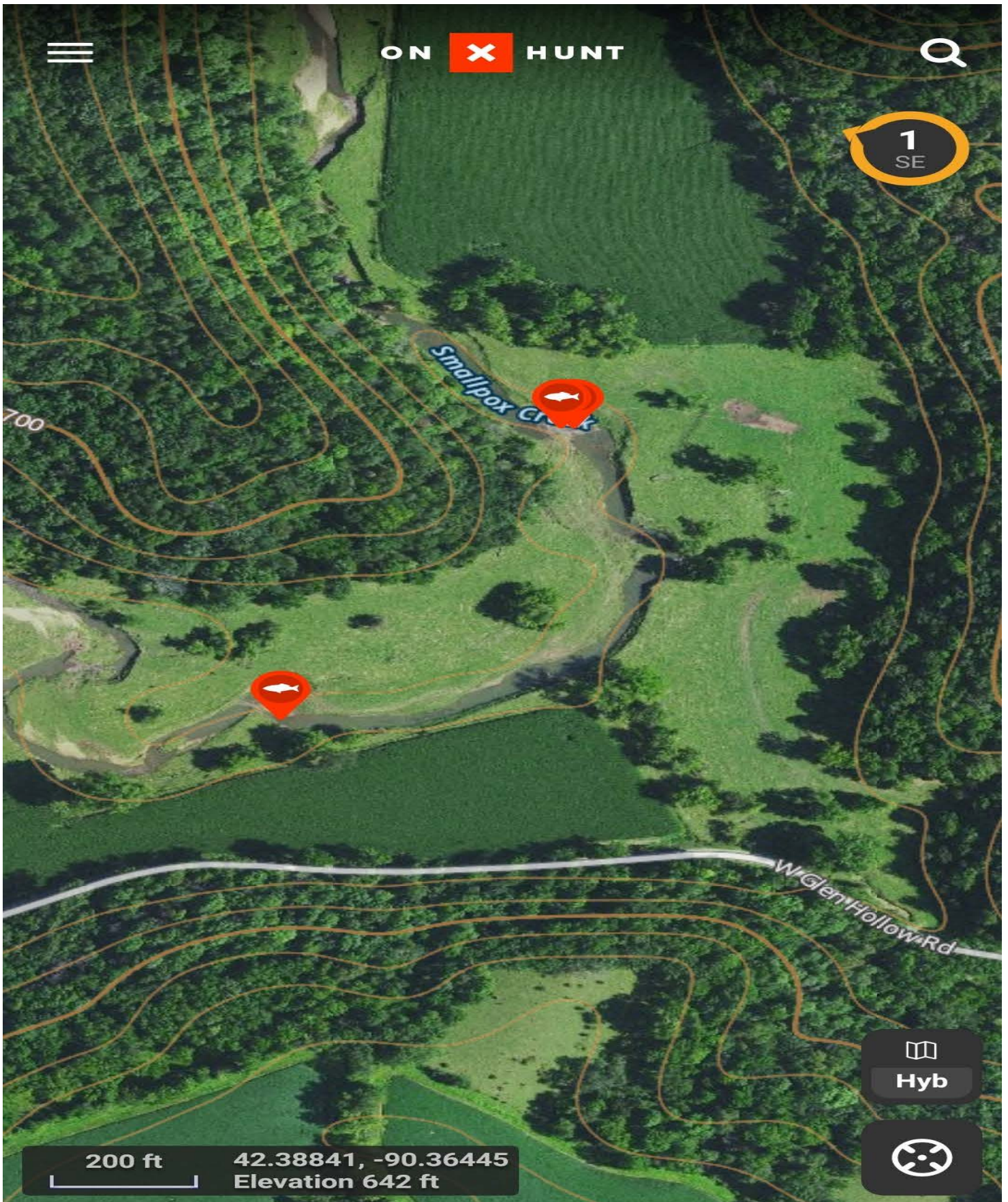
MNI-12 South Fork of the Apple River, IDNR Sampling station on 8/17/2021.

Smallpox Creek – MPA-02: Smallpox Creek was sampled south of Galena along Glen Hollow Road on private property approximately 1 mile east of the Route 20 junction. The DC electrofishing boat was to sample a stretch 1035 feet x 36 feet wide for a total sample time of 19 minutes. Bottom sediments consisted of 35% silt/mud, 10% sand, 10% gravel, 20% boulders/rip-rap, and 25% vegetation. Instream cover was provided by abundant boulders from a stream bank restoration site, undercut banks, submerged roots, a few brush jams, and large amounts of coontail, waterstar grass, curlyleaf pondweed and elodea. The shoreline also had a nice emergent band of sagittaria and rushes. Two pools, 2 runs and 2 riffles were sampled. The riparian corridor was pasture with cows present. Bank erosion was occurring due to the damage caused by the cows, but this was not severe.

A total of 17 native fish species were collected at this site. The large fish included smallmouth bass, largemouth bass, walleye, bluegill, green sunfish, rock bass, pumpkinseed sunfish, black crappie, yellow perch, yellow bullhead, and 2 sucker species. Small fish included 5 species of minnows. Lake Galena, a large organizational lake is upstream of this station, which is most likely why Yellow Perch, Bluegill, and young Largemouth Bass were present in the sample as these species are not common in the streams of this area. The IBI was calculated at a value of 35 in 2021, and at a 37 in 2015. This site was not sampled in 2010, 2005 or 2000.



MPA-02 Smallpox Creek, upstream view of 8/16/2021.



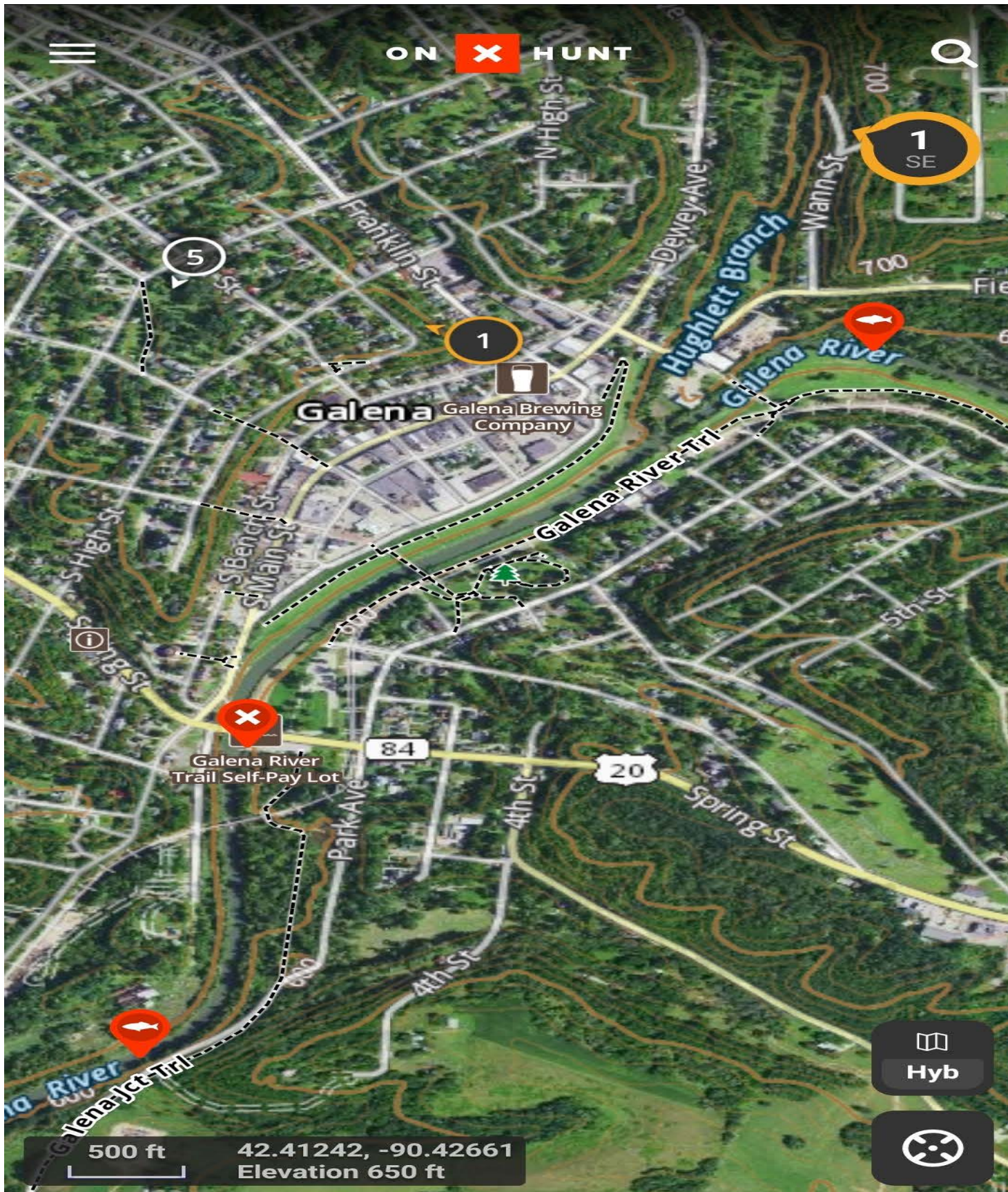
MPA-02 Smallpox Creek, IDNR Sampling station on 8/16/2021.

Galena River – MQ-01: The Galena River was sampled at two locations. This station was located within the city limits of Galena using the public boat launch to access the stream. The DC electrofishing boat was used to sample a stretch of approximately 1.2 miles in length for a total sample time of 57 minutes, both upstream and downstream of the ramp. The Galena River from the city of Galena to the Mississippi River has been channelized, with bank erosion common and muddy bottom substrates. Habitat is provided by downed trees, brush piles and aquatic vegetation. However, just upstream of the city the gradient is steeper and the stream bottom is sandy with better habitat for fishes. The area upstream has not been channelized and is more of a natural pool/riffle/run which probably attracts the fish and likely results in the increased diversity seen downstream. The substrate composition in the sampled area was 30% silt/mud, 30% sand, 10% gravel, 10% cobble, 10% boulder and 10% woody habitat. Waterstar grass clumps and duckweed was present.

A total of 26 native fish species and 1 non-native fish species were collected at this site. The large fish included smallmouth bass, largemouth bass, white bass, walleye, sauger, bluegill, rock bass, pumpkinseed sunfish, northern pike, channel catfish, flathead catfish, longnose gar, gizzard shad, freshwater drum, common carp and 5 native sucker species. Small fish included 7 minnow species. The IBI was calculated at a value of 43 in 2021. This was very similar to the 44 value in 2015, and higher than the 34 value in 2010, the 40 value in 2005 and the 34 value in 2000. Fish flesh samples were collected for 1 size group of bluegill, channel catfish, walleye and 3 size groups for common carp for IEPA analysis.



MQ-01 Galena River, upstream view on 8/12/2021.



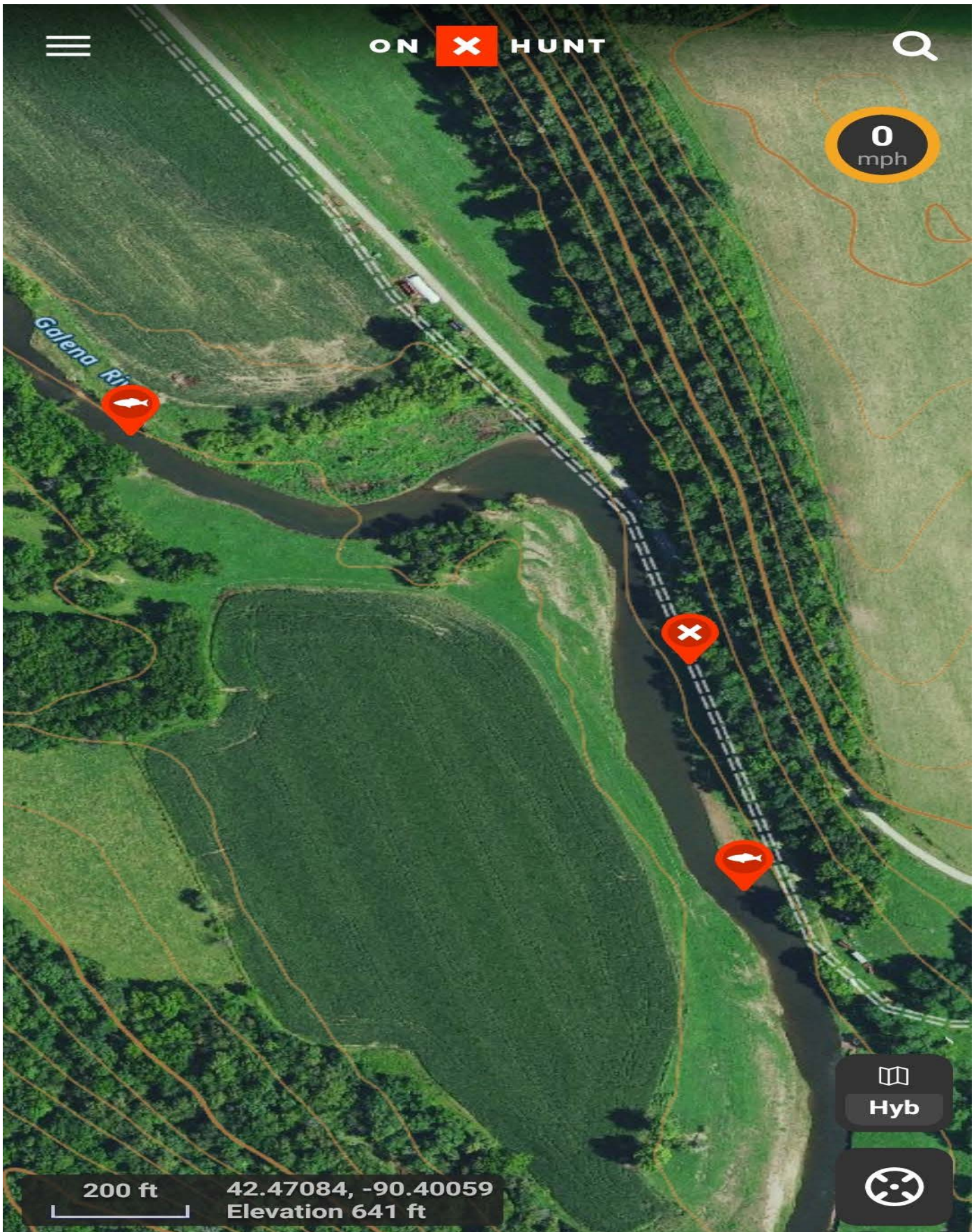
MQ-01 Galena River, IDNR Sampling station on 8/12/2021.

Galena River – MQ-02: This station was located on the upper end of the Galena River, 7-8 miles north of Galena just downstream of the North Council Hill Road Bridge. A 1800 feet x 75 feet stretch of stream was sampled using the DC electrofishing boat for a total sample time of 27 minutes. One pool, 1 riffle and 3 runs were sampled. The stream in this area was flowing through a cow pasture so the riparian corridor was mostly grass and weeds with few trees. Bottom sediments consisted of 20% silt/mud, 20% sand, 20% gravel, 20% cobble, 10% boulders, 5% vegetation and 5% woody habitat. Instream cover was provided by boulders, undercut banks, a few log jams and brushy debris, and small amounts of curlyleaf pondweed and water stargrass.

A total of 19 native fish species were collected at this site. The large fish included smallmouth bass, rock bass, pumpkinseed sunfish, flathead catfish, freshwater drum, gizzard shad and 5 species of native suckers. Small fish included 3 minnow species and 2 darter species. The IBI was calculated at a value of 46 in 2021. This has been a steady increase from a 44 value in 2015, a 38 value in 2010, a 36 value in 2005 and a 30 value in the 2000 basin survey.



MQ-02 Galena River, upstream view on 8/23/2021.



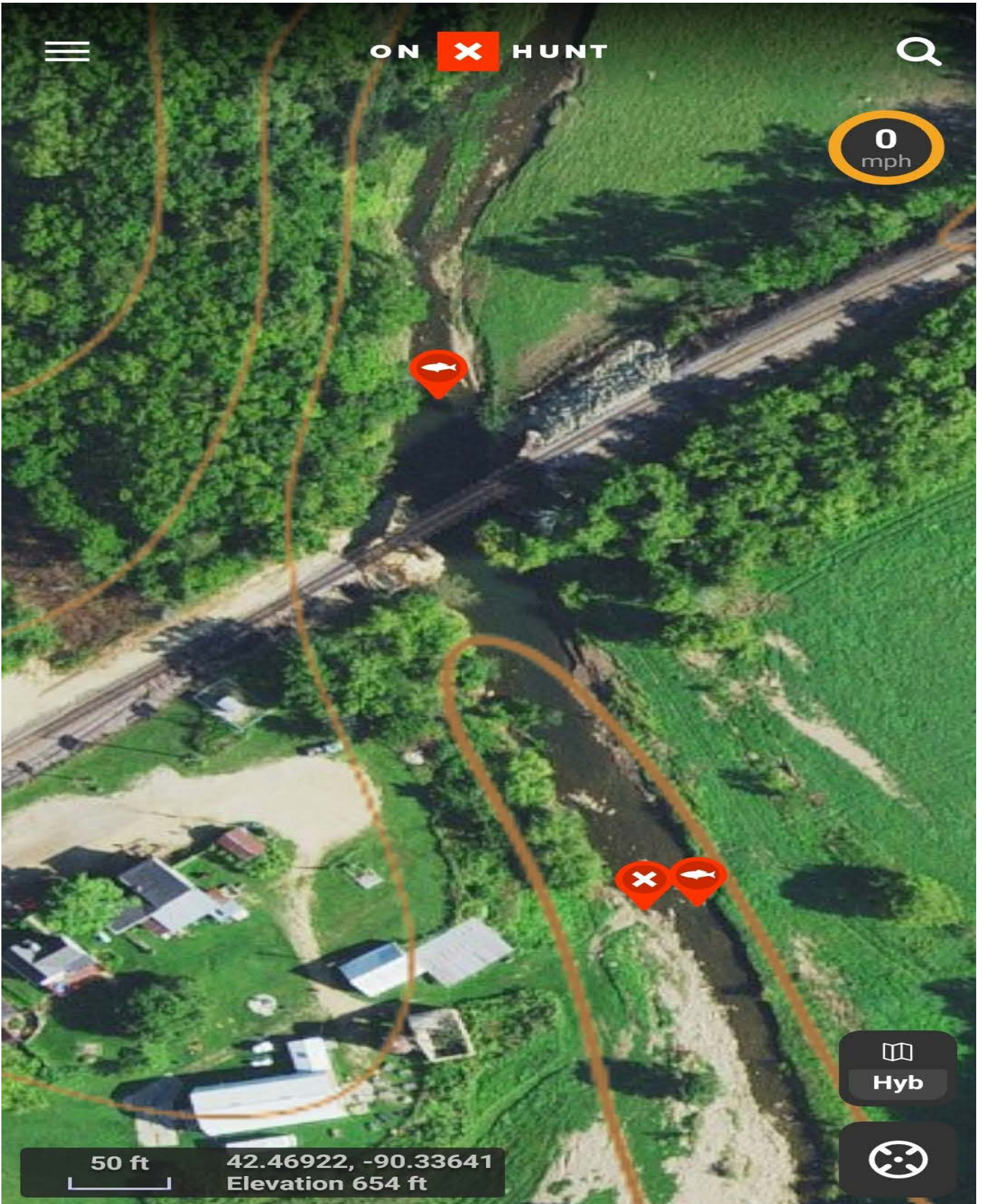
MQ-02 Galena River, IDNR Sampling station on 8/23/2021.

East Fork Galena River – MQB-01: The East Fork of the Galena River was sampled on private property in the tiny town of Council Hills Station, behind the old general store. A 402 feet x 30 feet wide section of stream was sampled using the DC electrofishing boat for a total sample time of 20 minutes. One pool, two riffles and 2 runs were sampled. Bottom sediments consisted of 20% silt/mud, 20% sand, 20% gravel, 20% cobble, and 20% boulders. Instream cover was provided by the boulders, undercut banks, submerged roots, and curly leaf pondweed.

A total of 9 native fish species were collected at this site. The large fish included a dense population of smallmouth bass and white suckers. For a small stream, the collection of 175 smallmouth bass of 5 year classes was impressive. The small fish included green sunfish, fantail darters and 5 minnow species. Longnose dace were included in the minnow group. The IBI was calculated at a value of 34 in 2021. This was consistent with the past IBI values of 31 in 2015, a 39 value in 2010, a 42 value in 2005, and a value of 39 with the 2000 basin survey.



MQB-01 East Fork of the Galena River, upstream view on 8/23/2021.



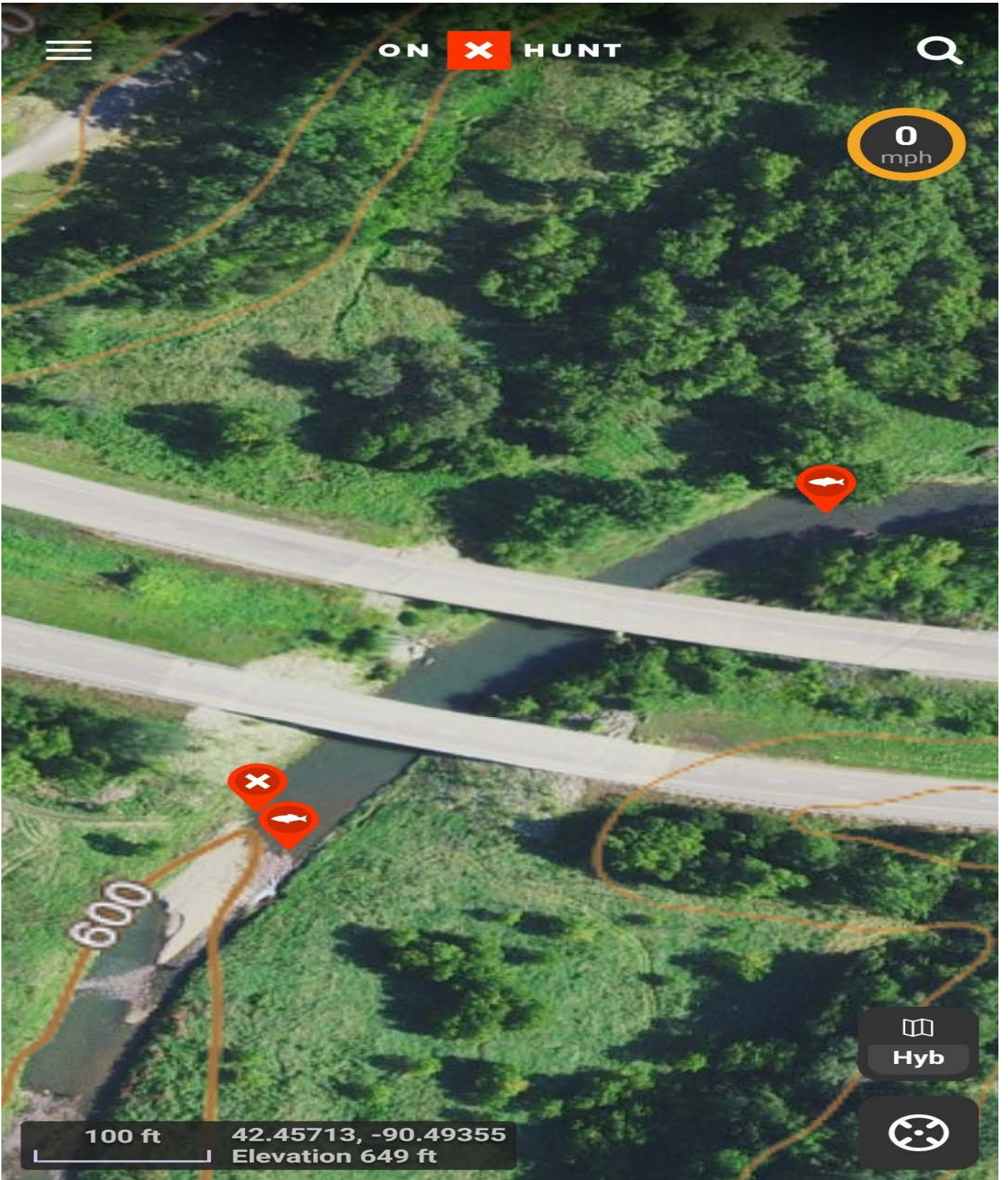
MQB-01 East Fork of the Galena River, IDNR Sampling station on 8/23/2021.

Sinsinnawa River – MS-03: The Sinsinnawa River was sampled immediately downstream and upstream of the Route 20 Bridge northwest of Galena. The DC electrofishing boat was used to sample a stretch of stream approximately 450 feet in length x 60 feet wide for a total sample time of 22 minutes. The stream in this area was rocky, with good, firm substrates composed of 10% silt/mud, 20% sand, 20% gravel, 20% cobble, 20% boulders, and 10% aquatic vegetation. This vegetation was curlyleaf pondweed and elodea. The site contained a large pool under the bridge with large riffles upstream and downstream.

A total of 21 native fish species and 1 non-native fish species were collected at this site. The large fish included smallmouth bass, largemouth bass, rock bass, bluegill, pumpkinseed sunfish, green sunfish, common carp and 3 native sucker species. Small fish included stonecats, 8 minnow species and 3 darter species. The longnose dace was part of the minnow group. The IBI was calculated at a value of 41 in 2021. This is slightly below the 46 value from the 2015 basin survey at this site. This site was not sampled in the previous basin surveys in 2010, 2005 or 2000.



MS-03 Sinsinnawa River, upstream view on 8/24/2021.



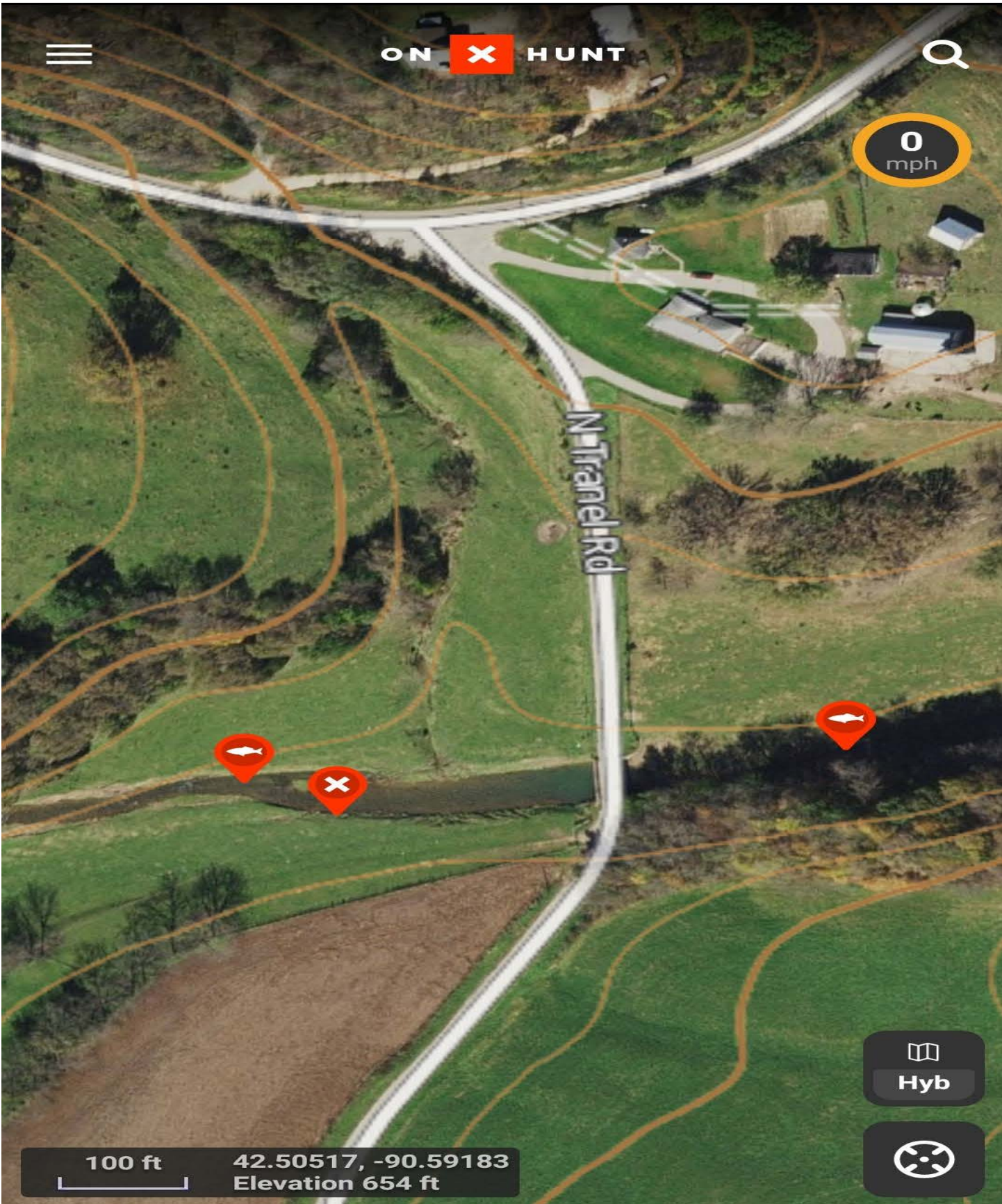
MS-03 Sinsinnawa River, IDNR Sampling station on 8/24/2021.

Menominee River – MU-01: The Menominee River was sampled on private property about 5 miles northeast of East Dubuque just downstream of the bridge on Tranel Road. The DC electrofishing boat was used to sample a stretch 498 feet x 40 feet wide for a total sample time of 16 minutes. Two riffles, 2 runs and a deep pool under the bridge was sampled. Bottom sediments were firm and consisted of 5% sand, 20% gravel, 30% cobble, 20% boulders, and 25% bedrock. Instream cover was provided by boulders, undercut banks, rocky ledges, submerged logs and a small amount of Elodea and Sago Pondweed. Bottom sediments were firm and consisted of 10% silt/mud, 20% sand, 20% gravel, 20% cobble, 20% boulders, and 10% aquatic vegetation. The vegetation was composed of elodea, curlyleaf pondweed, and the emergent water willow. The riparian corridor was mostly pasture grass with scattered trees. Cows were present in the pasture, and the greater watershed had a large percentage of land in pasture for dairy cows.

A total of 13 native fish species and 1 non-native fish species were collected at this site. The large fish included a nice population of smallmouth bass and an extremely dense population of white suckers. The non-native fish was a brown trout at almost 15 inches in length. This fish would be from an illegal stocking in Illinois or perhaps from a stocking across the state line in Wisconsin. Small fish included 9 minnow species and 2 darter species. Largescale stonerollers were included in this minnow group. The IBI was calculated at a value of 27 in 2021. This is a steep decline from the value of 41 in 2015, the value of 44 in 2010, and the value of 40 in 2005. This site was not sampled in the 2000 basin survey.



MU-01 Menominee River, downstream view on 8/24/2021.



MU-01 Menominee River, IDNR Sampling station on 8/24/2021.

Summary of Basin Wide Results

A total of 58 native fish species and 3 non-native fish species were collected from the 19 sites. The most numerous species collected during the 2021 basin survey was the white sucker, followed by the smallmouth bass, common shiner and bluntnose minnow. The most commonly occurring species were the smallmouth bass and the white sucker which were both collected at all of the stations sampled.

The Upper Mississippi Basin can be divided into 2 distinct groups of streams; 1 group contains all of those streams that are a part of the Apple River Basin, and the 2nd group contains those streams that are outside the Apple River Basin. These two groups are very different in the diversity of species that they harbor. This distinction occurs because the Apple River is closed to fish migration due to the presence of a large dam at Hanover which was first built in 1829. The dam is close to the mouth of the river, being located only about 10 miles from the confluence with the Mississippi River. This dam effectively blocks fish migration for a variety of species that occur in other streams in the basin. In 2021 one sample was collected immediately downstream of the Hanover Dam. This sample contained 14 species that were not collected anywhere above the dam, and many that have not been collected above the dam since collections started in 1995. Historically these species included Spotfin Shiners, Mimic Shiners, Mississippi Silvery Minnows, River Shiners, Shorthead Redhorse, Pallid Shiners, Channel Catfish, Golden Shiners, Northern Pike, Yellow Bullhead, Walleye, Brassy Minnows, Slenderhead Darters, Freshwater Drum, Pumpkinseed, Banded Darters, and Flathead Catfish.

Other species that have been collected in the Upper Mississippi River Basin but that have not been found in the Apple River Basin above the Hanover Dam include: Yellow Perch, Gizzard Shad, Channel Shiner, Pugnose Minnow, Bullhead Minnow, Bowfin, Quillback, River Carpsucker, Tadpole Madtom, White Bass, Spotted Sucker, Warmouth, Orangespotted Sunfish, River Darter, Rock Bass, Sand Shiner, Brook Silverside, Highfin Carpsucker, and Black Bullhead. This represents a total of 38 species.

There are a few species that occur in the Apple River Basin that have not been found in the other streams of the Upper Mississippi Basin, or they have been found only in small numbers outside the Apple Basin. The species that occur only in the Apple Basin include the Rainbow Trout, Redfin Shiners, Black Redhorse, and Brook Stickleback. Only a few Northern Hogsuckers have been found outside the Apple River Basin since the collections began in 1995; and prior to 2010, only one Largemouth Stoneroller was found outside the Apple River Basin. In 2021, they were found at 1 station outside of the basin and in 2015, they were found at 2 stations outside the Apple River Basin. Removing the Hanover Dam, or building a fish structure that would allow passage over the Hanover Dam, while allowing more species to migrate into the Apple River Basin, could cause unwanted changes to the populations of these species, however the overall benefits may far outweigh the negatives. The challenge of upstream migration by common carp, and the now expanding silver carp and grass carp in the Mississippi River, may require serious debate if the option is explored further.

While the presence of the dam may be protecting some populations, it may be harming other populations. Several species that commonly occur in other areas of the basin, also once occurred in the Apple River Basin, but apparently died out. A review of historic data found 9 species that fit this description: Spotfin Shiners, Emerald Shiners, Blacknose Shiners, Channel Shiners, Sand Shiners, Bigmouth Buffalo, White Crappie, Black Crappie, and Rock Bass have all been collected above the dam prior to 1990 but since 1990 these species have either not been found or have been found only in very small numbers. More recent data comparisons reveal that changes are still occurring. A comparison of the fish species that were collected in the Apple River Basin for the collecting years 1995 – 2007, compared to more recent surveys using an Independent 2- tailed t test, with a 0.05 level of significance found that the populations of 2 species have changed significantly ($t = 2.145$ 14df). These 2 species are the Stonecat, which has increased slightly in total numbers, and the Northern Hogsucker, which showed a slight, but significant, population decline. The reasons for the decline of the Northern Hogsucker are not known. The populations of all other species in the Apple River Basin have not changed significantly since 1995.

Conclusions

Index of Biotic Integrity

The Upper Mississippi River Basin appears to be in good condition overall, with 12 of the stations scoring IBI's in the 40's, and 1 station in the 50's (B or A ratings respectively). Most of the stations also showed similar results to past surveys indicating overall stable conditions in the watershed. MN-17 Apple River above the dam showed the biggest improvement from a D to a B rating. While the MU-01 Menominee River showed the biggest decline from a B rating to a D rating. And the 2 South Fork of the Apple River sites slid into the lower end of the IBI C level. The negative influences of channel modification and agriculture production in the watershed may have compounding effects on this stream.

Table 2 lists the IBI rating for each station and for each of the years where data is available. Tables 3, 4, and 5 contain a list of all of the fishes collected during this survey and sorted by the stations where they were collected. Below is an explanation of the IBI ratings system.

IBI Scores	Integrity Class	Attributes
51-60	Unique Aquatic Resource (A)	Comparable to the best situations without human disturbances, all regionally expected species for the habitat and stream size, including the most tolerant forms, are present with a full array of age classes, balanced trophic structure.
41-50	Highly Valued Aquatic Resource (B)	Species richness somewhat below expectations, especially due to the loss of the most intolerant forms, some species are present with less than optimal abundance of size distributions; trophic structure shows some signs of stress.
31-40	Moderate Aquatic Resource (C)	Signs of additional deterioration include loss of intolerant forms, fewer species, and highly skewed trophic structure, older age classes of top predators may be rare.
21-30	Limited Aquatic Resource (D)	Dominated by omnivores, tolerant forms, and habitat generalists, few top carnivores, growth rates and condition factors commonly depressed; hybrids and diseased fish are often present.
< 21	Restricted Aquatic Resource (E)	Few fish present, mostly introduced or tolerant forms; hybrids common; disease, parasites, fin damage and other anomalies regular.

Sportfish

The most common collected sport fish in the Upper Mississippi River Basin Survey in 2021 was the smallmouth bass. A total of 1,248 smallmouth bass were collected over the 19 sites (Tables 6, 7 and 8). Naturally reproducing populations were found in all of the stream sites with recruitment maintaining stable smallmouth bass levels. The size structure of the smallmouth bass from the 6 Apple River stations was also good with 23% over 14 inches in length, and 2% over 17 inches in length. The 2 South Fork of the Apple River sites had 23% over 14 inches. The size structure of the smallmouth bass from the 2 Plum River sites was also good with 23% over 14 inches in length, and 3% over 17 inches in length. The 2 Carroll Creek sites had 14% over 14 inches. East Fork of the Galena had 16% over 14 inches. The 2 Galena River sites had 5% over 14 inches. The Menominee River site had 20% over 14 inches. The Rush Creek site had 33% over 14 inches. The Sinsinawa site had 33% over 14 inches.

Bluegill was the second most common collected sport fish, found at 14 stations, for a total of 315 fish collected. Channel Catfish were locally common outside of the upper Apple River with a total collection of 69 fish from 5 of the stations.

Walleye and sauger were also only locally common in the stream stations closer to the Mississippi River with 23 walleye collected from 6 of the stations.

Other notable sportfish populations included the collection of 125 largemouth bass from 11 of the stations, and 17 Rock Bass from 4 stations.



Smallmouth bass from MN-07 Apple River on 8/18/2021.

Discussion

The Upper Mississippi River Basin consists of high gradient, rocky bottom streams supporting unique fish assemblages. The Largescale Stoneroller and the State Threatened Ozark Minnow are found commonly in these streams but are rare or non-existent elsewhere in Illinois. The Longnose Dace has been found in several locations in the Driftless area streams, but elsewhere in Illinois it has only been found along the shallow shores of Lake Michigan. Brook Sticklebacks were found in a few locations but are sporadic throughout Illinois due to their unique habitat requirements, and the largest populations of Black Redhorse are found in this area of Illinois. Most of the stations sampled had cool water with a high oxygen content and good flow, and only a few stations in the lower reaches were moving sluggish and showing muddy sediments. These Upper Mississippi River tributary streams should be protected due to the unique fish assemblages they harbor. The Driftless areas streams are also notable for the high quality of the Smallmouth Bass fishery. People travel from all over to take advantage of the excellent fishing available at Apple River Canyon State Park. Protection of the water quality of this area should be a priority when making any decisions for development in the region.



Ozark Minnows from MN-04 Apple River on 8/17/2021.

Stream Name	Station	2000	2005	2010	2015	2021	IBI
							Rating
Plum River	MJ-01	23	38	38	19	34	C
Plum River	MJ-02	53	42	---	46	41	B
Carroll Creek	MJB-02	---	37	---	35	43	B
Carroll Creek	MJB-03	24	---	35	39	44	B
Rush Creek	ML-02	---	---	---	35	43	B
Apple River	MN-04	40	44	46	44	48	B
Apple River	MN-05	---	44	44	44	45	B
Apple River	MN-07	44	40	45	46	49	B
Apple River	MN-17	37	37	32	29	41	B
Apple River	MN-18	49	49	49	45	43	B
Apple River	MN-22	---	---	---	51	58	A
S Fk Apple River	MNI-11					35	C
S Fk Apple River	MNI-12	41	48	38	43	33	C
Smallpox Creek	MPA-02	---	---	---	37	35	C
Galena River	MQ-01	34	40	34	44	43	B
Galena River	MQ-02	30	36	38	44	46	B
E Fk Galena River	MQB-01	39	42	39	31	34	C
Sinsinawa River	MS-03	---	---	---	46	41	B
Menominee	MU-01	---	40	44	41	27	D

Table 2: Index of Biotic Integrity ratings for stations sampled on the Upper Mississippi River Basin in 2000, 2005, 2010, 2015 and 2021. (50-60 = A rating, 40-49 = B rating, 30-39 = C rating, 20-29 = D rating).

County	Carroll	Jo Daviess	Carroll	Carroll	Carroll
Stream name	Plum River	Plum River	Carroll Creek	Carroll Creek	Rush Creek
Station	MJ-01	MJ-02	MJB-02	MJB-03	ML-02
Date	2021-08-11	2021-08-11	2021-08-10	2021-08-10	2021-08-12
Minutes	39	15	30	20	33
Common name					
Shortnose Gar	0	0	0	0	0
Longnose Gar	0	0	0	0	0
Bowfin	0	0	0	0	0
Gizzard Shad	35	0	0	0	7
Brown Trout	0	0	0	0	0
Rainbow Trout	0	0	0	0	0
Grass Pickerel	1	0	0	1	0
Northern Pike	0	0	0	0	0
Common Carp	10	0	0	0	8
Golden Shiner	5	0	0	0	4
Creek Chub	1	2	4	2	0
Hornyhead Chub	0	0	5	16	0
Central Stoneroller	0	1	52	17	0
Largescale Stoneroller	0	0	0	0	0
Suckermouth Minnow	0	0	0	0	1
Longnose Dace	0	0	16	2	0
Mississippi Silvery Minnow	0	0	0	0	0
Common Shiner	0	16	62	51	0
Spotfin Shiner	20	0	0	0	69
Fathead Minnow	0	0	0	0	1
Bluntnose Minnow	0	0	2	7	80
Emerald Shiner	188	0	0	0	113
Rosyface Shiner	0	7	8	5	0
River Shiner	0	0	0	0	0
Ozark Minnow	0	0	0	0	0
Bigmouth Shiner	0	0	0	0	0
Sand Shiner	0	0	0	0	0
Spottail Shiner	2	0	0	0	0
Quillback	0	0	0	0	4
River Carpsucker	0	0	0	0	0
White Sucker	2	16	94	62	25
Spotted Sucker	0	0	0	0	0
Northern Hog Sucker	0	27	3	8	4
Shorthead Redhorse	5	0	0	0	15
Black Redhorse	0	0	0	0	0
Golden Redhorse	4	3	0	5	1
Silver Redhorse	1	0	0	0	3
Channel Catfish	1	0	0	0	13

Yellow Bullhead	0	0	1	1	0
Black Bullhead	0	0	0	1	0
Flathead Catfish	0	0	0	0	0
Stonecat	0	0	42	0	0
Brook Silverside	0	0	0	0	0
White Bass	0	0	0	0	0
Black Crappie	0	0	0	0	0
White Crappie	0	0	0	0	0
Rock Bass	0	0	0	0	0
Largemouth Bass	13	0	5	5	0
Smallmouth Bass	7	123	96	23	19
Green Sunfish	0	4	1	0	0
Bluegill	2	1	37	4	3
Pumpkinseed	0	1	0	0	0
Orangespotted Sunfish	0	0	0	0	0
Walleye	1	0	0	0	2
Sauger	0	0	0	0	0
Yellow Perch	1	0	0	1	1
Slenderhead Darter	0	0	0	0	0
Logperch	0	0	0	0	1
Johnny Darter	0	1	0	0	1
Banded Darter	0	0	0	0	0
Fantail Darter	0	0	8	1	0
Freshwater Drum	2	0	0	0	1
Total Number	301	202	436	212	376
Native Species Number	18	12	16	18	21
Non-Native Species No.	1	0	0	0	0

Table 3. Fishes collected from the Plum River, Carroll Creek and Rush Creek in 2021.

County	Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess
Stream name	Apple River	Apple River	Apple River	Apple River	Apple River	Apple River	S Fk Apple River	S Fk Apple River
Station	MN-04	MN-05	MN-07	MN-17	MN-18	MN-22	MNI-11	MNI-12
Date	2021-08-17	2021-08-16	2021-08-18	2021-08-25	2021-08-23	2021-08-20	2021-08-18	2021-08-17
Minutes	25	26	27	60	25	34	17	27
Common name								
Shortnose Gar	0	0	0	0	0	2	0	0
Longnose Gar	0	0	0	0	0	0	0	0
Bowfin	0	0	0	0	0	1	0	0
Gizzard Shad	0	0	0	0	0	45	0	0
Brown Trout	0	0	0	0	0	0	0	0
Rainbow Trout	0	0	0	0	0	0	1	0
Grass Pickerel	0	0	0	0	0	0	0	0
Northern Pike	0	0	0	0	0	0	0	0
Common Carp	0	0	0	0	0	8	0	0
Golden Shiner	0	0	0	0	0	0	0	0
Creek Chub	1	0	3	2	22	0	0	15
Hornyhead Chub	4	0	7	0	39	0	5	4
Central Stoneroller	0	2	9	0	0	8	0	1
Largescale Stoneroller	45	0	22	0	69	19	3	0
Suckermouth Minnow	0	0	0	0	0	1	0	0
Longnose Dace	0	0	0	0	0	0	0	0
Mississippi Silvery Minnow	0	0	0	0	0	2	0	0
Common Shiner	24	8	62	4	84	0	32	93
Spotfin Shiner	0	0	0	0	0	37	0	0
Fathead Minnow	0	0	0	0	0	0	0	0
Bluntnose Minnow	0	4	18	11	71	0	8	301
Emerald Shiner	0	0	0	7	0	147	0	0
Rosyface Shiner	98	27	88	0	27	1	41	81
River Shiner	0	0	0	0	0	85	0	0
Ozark Minnow	3	0	26	0	58	0	17	38
Bigmouth Shiner	0	0	0	0	0	1	0	0
Sand Shiner	0	0	0	0	0	0	0	0
Spottail Shiner	0	0	0	0	0	1	0	0
Quillback	0	0	0	0	0	11	0	0
River Carpsucker	0	0	0	0	0	1	0	0
White Sucker	71	177	52	85	420	11	374	756
Spotted Sucker	0	0	0	0	0	0	0	0
Northern Hog Sucker	23	26	12	2	6	91	0	0

Shorthead Redhorse	0	0	0	0	0	584	0	0
Black Redhorse	14	38	28	15	10	6	5	0
Golden Redhorse	7	29	16	25	1	6	2	3
Silver Redhorse	0	1	0	3	0	11	0	0
Channel Catfish	0	0	0	0	0	46	0	0
Yellow Bullhead	0	1	0	0	0	0	0	0
Black Bullhead	0	0	0	0	0	0	0	0
Flathead Catfish	0	0	0	0	0	3	0	0
Stonecat	5	2	2	0	0	6	1	2
Brook Silverside	0	0	1	6	0	1	0	0
White Bass	0	0	0	0	0	0	0	0
Black Crappie	0	0	1	1	0	0	0	0
White Crappie	0	0	0	0	0	7	0	0
Rock Bass	0	0	0	0	0	0	0	0
Largemouth Bass	1	0	1	51	0	8	0	8
Smallmouth Bass	92	116	30	42	51	128	68	22
Green Sunfish	1	4	0	23	20	5	0	3
Bluegill	0	5	2	87	2	54	0	3
Pumpkinseed	0	0	0	0	0	9	0	0
Orangespotted Sunfish	0	0	0	0	0	11	0	0
Walleye	0	0	0	0	0	15	0	0
Sauger	0	0	0	0	0	2	0	0
Yellow Perch	0	0	0	0	0	1	0	0
Slenderhead Darter	0	0	0	0	0	1	0	0
Logperch	0	0	0	0	0	1	0	0
Johnny Darter	0	1	1	0	2	0	5	55
Banded Darter	0	0	0	0	0	2	0	0
Fantail Darter	3	2	5	0	2	4	4	0
Freshwater Drum	0	0	0	0	0	3	0	0
Total Fish	392	443	386	364	884	1386	566	1385
Native fish No.	15	16	20	15	16	40	13	15
Non-Native fish number	0	0	0	0	0	0	0	0
Hybrid fish no.	0	0	0	0	0	0	0	0

Table 4. Fishes of the Apple River and the South Fork of the Apple River in 2021.

County	Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess
Stream name	Smallpox Creek	Galena River	Galena River	E Fk Galena River	Sinsinawa River	Menominee
Station	MPA-02	MQ-01	MQ-02	MQB-01	MS-03	MU-01
Date	2021-08-16	2021-08-12	2021-08-23	2021-08-23	2021-08-24	2021-08-24
Minutes	19	52	27	20	22	16
Common name						
Shortnose Gar	0	0	0	0	0	0
Longnose Gar	0	4	0	0	0	0
Bowfin	0	0	0	0	0	0
Gizzard Shad	0	17	3	0	0	0
Brown Trout	0	0	0	0	0	1
Rainbow Trout	0	0	0	0	0	0
Grass Pickerel	0	0	0	0	0	0
Northern Pike	0	1	0	0	0	0
Common Carp	0	13	0	0	1	0
Golden Shiner	2	3	0	0	0	0
Creek Chub	0	0	0	0	0	6
Hornyhead Chub	101	0	0	14	29	63
Central Stoneroller	5	0	0	0	1	28
Largescale Stoneroller	0	0	0	0	0	11
Suckermouth Minnow	0	0	0	0	0	0
Longnose Dace	0	0	0	1	1	0
Mississippi Silvery Minnow	0	0	0	0	5	0
Common Shiner	82	0	0	41	10	288
Spotfin Shiner	0	61	2	0	54	0
Fathead Minnow	0	0	0	0	0	1
Bluntnose Minnow	12	9	5	87	41	95
Emerald Shiner	0	24	0	0	19	0
Rosyface Shiner	0	0	0	65	0	24
River Shiner	0	10	0	0	0	0
Ozark Minnow	0	0	0	0	0	0
Bigmouth Shiner	0	0	0	0	0	0
Sand Shiner	0	2	36	0	0	1
Spottail Shiner	0	12	0	0	0	0
Quillback	0	0	0	0	0	0
River Carpsucker	0	0	0	0	0	0
White Sucker	365	9	73	43	123	880
Spotted Sucker	1	15	0	0	0	0
Northern Hog Sucker	0	0	2	0	0	0
Shorthead Redhorse	0	9	63	0	6	0
Black Redhorse	0	0	9	0	0	0
Golden Redhorse	0	1	7	0	0	0
Silver Redhorse	0	4	2	0	2	0

Channel Catfish	0	7	2	0	0	0
Yellow Bullhead	10	0	0	0	0	0
Black Bullhead	0	0	0	0	0	0
Flathead Catfish	0	1	1	0	0	0
Stonecat	0	0	0	0	1	0
Brook Silverside	0	0	0	0	0	0
White Bass	0	1	0	0	0	0
Black Crappie	6	0	0	0	0	0
White Crappie	0	0	0	0	0	0
Rock Bass	9	3	1	0	4	0
Largemouth Bass	20	8	0	0	5	0
Smallmouth Bass	78	26	89	175	27	36
Green Sunfish	1	0	0	5	2	0
Bluegill	66	38	0	0	11	0
Pumpkinseed	15	3	1	0	10	0
Orangespotted Sunfish	0	0	0	0	0	0
Walleye	1	3	1	0	0	0
Sauger	0	2	0	0	0	0
Yellow Perch	7	0	0	0	0	0
Slenderhead Darter	0	0	1	0	0	0
Logperch	0	0	3	0	1	0
Johnny Darter	0	0	0	0	7	1
Banded Darter	0	0	0	0	0	0
Fantail Darter	0	0	0	4	14	2
Freshwater Drum	0	2	1	0	0	0
Total Number of fish	781	288	302	435	374	1437
Number of Native species	17	26	19	9	21	13
Number of Non-native species	0	0	0	0	0	0
Number of Hybrid species	0	0	0	0	0	0

Table 5. Fish collection from Smallpox Creek, Galena River, East Fork of the Galena River, Sinsinawa River and the Menominee River in 2021.

County		Carroll	Jo Daviess	Carroll	Carroll	Carroll
Stream name		Plum River	Plum River	Carroll Creek	Carroll Creek	Rush Creek
Station		MJ-01	MJ-02	MJB-02	MJB-03	ML-02
Date		2021-08-11	2021-08-11	2021-08-10	2021-08-10	2021-08-12
Minutes		39	15	30	20	33
Common name	Total					
Brown Trout	1	0	0	0	0	0
Rainbow Trout	1	0	0	0	0	0
Grass Pickerel	2	1	0	0	1	0
Northern Pike	1	0	0	0	0	0
Channel Catfish	69	1	0	0	0	13
Yellow Bullhead	13	0	0	1	1	0
Black Bullhead	1	0	0	0	1	0
Flathead Catfish	5	0	0	0	0	0
White Bass	1	0	0	0	0	0
Black Crappie	8	0	0	0	0	0
White Crappie	7	0	0	0	0	0
Rock Bass	17	0	0	0	0	0
Largemouth Bass	125	13	0	5	5	0
Smallmouth Bass	1248	7	123	96	23	19
Green Sunfish	69	0	4	1	0	0
Bluegill	315	2	1	37	4	3
Pumpkinseed	39	0	1	0	0	0
Walleye	23	1	0	0	0	2
Sauger	4	0	0	0	0	0
Yellow Perch	11	1	0	0	1	1
Freshwater Drum	9	2	0	0	0	1

Table 6. Sportfish collected from the Plum River, Carroll Creek and Rush Creek 2021.

County		Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess
Stream name		Apple River (MN)	Apple River (MN)	Apple River (MN)	Apple River (MN)	Apple River (MN)	Apple River (MN)	S Fk Apple River (MNI)	S Fk Apple River (MNI)
Station		MN-04	MN-05	MN-07	MN-17	MN-18	MN-22	MNI-11	MNI-12
Date		2021-08-17	2021-08-16	2021-08-18	2021-08-25	2021-08-23	2021-08-20	2021-08-18	2021-08-17
Minutes		25	26	27	60	25	34	17	27
Common name	Total								
Brown Trout	1	0	0	0	0	0	0	0	0
Rainbow Trout	1	0	0	0	0	0	0	1	0
Northern Pike	1	0	0	0	0	0	0	0	0
Channel Catfish	69	0	0	0	0	0	46	0	0
Yellow Bullhead	13	0	1	0	0	0	0	0	0
Black Bullhead	1	0	0	0	0	0	0	0	0
Flathead Catfish	5	0	0	0	0	0	3	0	0
White Bass	1	0	0	0	0	0	0	0	0
Black Crappie	8	0	0	1	1	0	0	0	0
White Crappie	7	0	0	0	0	0	7	0	0
Rock Bass	17	0	0	0	0	0	0	0	0
Largemouth Bass	125	1	0	1	51	0	8	0	8
Smallmouth Bass	1248	92	116	30	42	51	128	68	22
Green Sunfish	69	1	4	0	23	20	5	0	3
Bluegill	315	0	5	2	87	2	54	0	3
Pumpkinseed	39	0	0	0	0	0	9	0	0
Walleye	23	0	0	0	0	0	15	0	0
Sauger	4	0	0	0	0	0	2	0	0
Yellow Perch	11	0	0	0	0	0	1	0	0
Freshwater Drum	9	0	0	0	0	0	3	0	0

Table 7. Sportfish collected from the Apple River and the South Fork of the Apple River in 2021.

County		Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess	Jo Daviess
Stream name		Smallpox Creek	Galena River	Galena River	E Fk Galena River	Sinsinawa River	Menominee
Station		MPA-02	MQ-01	MQ-02	MQB-01	MS-03	MU-01
Date		2021-08-16	2021-08-12	2021-08-23	2021-08-23	2021-08-24	2021-08-24
Minutes		19	52	27	20	22	16
Common name	Total #						
Brown Trout	1	0	0	0	0	0	1
Rainbow Trout	1	0	0	0	0	0	0
Grass Pickerel	2	0	0	0	0	0	0
Northern Pike	1	0	1	0	0	0	0
Channel Catfish	69	0	7	2	0	0	0
Yellow Bullhead	13	10	0	0	0	0	0
Black Bullhead	1	0	0	0	0	0	0
Flathead Catfish	5	0	1	1	0	0	0
White Bass	1	0	1	0	0	0	0
Black Crappie	8	6	0	0	0	0	0
White Crappie	7	0	0	0	0	0	0
Rock Bass	17	9	3	1	0	4	0
Largemouth Bass	125	20	8	0	0	5	0
Smallmouth Bass	1248	78	26	89	175	27	36
Green Sunfish	69	1	0	0	5	2	0
Bluegill	315	66	38	0	0	11	0
Pumpkinseed	39	15	3	1	0	10	0
Walleye	23	1	3	1	0	0	0
Sauger	4	0	2	0	0	0	0
Yellow Perch	11	7	0	0	0	0	0
Freshwater Drum	9	0	2	1	0	0	0

Table 8. Sportfish collection from Smallpox Creek, Galena River, East Fork Galena River, Sinsinawa River and Menominee River 2021.