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Aquatic and Terrestrial Invasive Species Study Report

Northern States Power Company
Gile Flowage Storage Project
Montreal, Wisconsin
GAI Project Number: R220323.01
| FERC No. 15055
September 2022

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Prepared on behalf of:
Mead & Hunt
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1.0 Project Overview

The Gile Flowage Storage Project (Project), Federal Energy Regulatory Commission (FERC) No. 15055, is located in the Towns of Pence and Carey, and the City of Montreal, in Iron County, Wisconsin (Figure 1). The Project is owned, operated, and maintained by Northern States Power Company, a Wisconsin corporation (NSPW or Applicant). The Applicant is seeking an original license for the Project and must submit a Final License Application (FLA) by August 18, 2023. The FLA will include an evaluation of botanical resources, including invasive species, and the potential impacts to these resources associated with Project operations. The Friends of the Gile Flowage, River Alliance of Wisconsin, and Wisconsin Department of Natural Resources (WDNR) requested the Applicant complete an invasive species study as part of the licensing process. On the behalf of Mead & Hunt, GAI is pleased to submit the results of an Aquatic and Terrestrial Invasive Species Study (Study) conducted June 13-14, 17, and 22-23; and July 26-28, 2022 to fulfill this request. This Study report provides baseline data on native species and aquatic and terrestrial invasive species and includes the following:

- Aquatic plant surveys – two sampling events conducted in June and late-July,
- Water tow samples – collected during the late-July survey,
- Sediment samples – collected during the June survey, and
- Terrestrial upland survey – conducted during the late-July survey.

2.0 Introduction

The Gile Flowage (Gile or Flowage) is a 3,138-acre flowage in the Montreal River Watershed with a maximum depth of 25 feet. Land cover within the watershed is primarily comprised of northern hardwood forest and wetland. The Gile is a headwater storage reservoir that empties into the West Fork of the Montreal River and is essential to the operation of NSPW's two downstream hydropower plants. Water quality is considered good, and all three reaches of the Montreal River include trout waters.

Invasive species pose one of the primary threats to aquatic ecosystems. They are defined as non-native species that, when introduced cause, or are likely to cause, harm to the environment, human health, or the economy. Invasive plant species can displace native plant populations, restrict boating, reduce wildlife habitat, and cause nutrient imbalance in a waterbody. Once established invasive species can be transferred downstream by recreationists and migrating wildlife.

This Study was conducted to assess the presence of known aquatic and terrestrial invasive species and identify any new invasive species in the Project area. The Study encompassed the Gile Flowage within the Project's existing and proposed boundaries and included aquatic and terrestrial plants and select aquatic invertebrates. The study area also included the reservoir shoreline as well as the shoreline of the islands. This report summarizes the results of the 2022 aquatic and terrestrial plant surveys, water samples, and sediment samples.

3.0 Methodology

Prior to performing the field work, GAI reviewed the known and historic status of invasive species at the Project. Prior to this Study, only limited information was available regarding invasive species within the Project boundary. The WDNR indicated that banded mystery snails (*Vivaparus georgianus*), Chinese mystery snails (*Cipangopaludina chinensis*), reed canary grass (*Phalaris arundinacea*), spiny water flea (*Bythotrephes longimanus*), and purple loosestrife (*Lythrum salicaria*) have been observed at Gile Flowage.

3.1 Upstream and Downstream Inundated Areas

3.1.1 Aquatic Plant Survey

Aquatic plants were sampled by approximating the WDNR's Point-Intercept protocols as listed in *Recommended Baseline Monitoring of Aquatic Plants in Wisconsin* (WDNR 2019). Two sampling surveys were completed: one on June 13-14, 17, and 22-23; and one on July 26-28, 2022. The WDNR provided a grid of sample points for Gile Flowage to implement during the study (Figure 2). The grid was comprised of 957 sample points distributed evenly throughout the flowage. Each sampling point was located using a boat and a Trimble R1 GNSS Receiver and GPS device and was assessed for sample feasibility.

Points that could not be sampled were categorized as follows:

- Non-navigable (due to thick emergent plant growth, shallow water, or safety),
- Terrestrial (point located in an upland area),
- Obstacle (e.g., dock, rocks, fallen trees, etc.), or
- Too Deep (i.e., over 15 feet deep in June; over greatest depth of plant growth in July)

Points were sampled using a double-sided rake mounted on a pole. The rake was lowered until is rested gently on the lake bottom, twisted twice, then raised straight up out of the water. At each sampled point, aquatic plant species' presence and density were collected (Figures 3 and 4, Attachments A and B). Plant density was measured by rake fullness (Figure 5). Areas not captured by the point-intercept grid were monitored for the species listed in the WDNR aquatic invasive rapid response species list (WDNR 2016). No permanent vouchers were collected. Photos taken during the Study are included in Attachment C.

Additional information on bed substrates and depths were collected at points with water depths less than 15 feet in June in order to categorize depth and substrate. Substrate was categorized using nine substrate types: clay, silt, sand, gravel, cobble, boulder, bedrock, wood, or organic. In July, the maximum depth of colonization (MDC) was determined by three empty rake retrievals in different areas at the same depth. Once the MDC was determined, points where water depth was greater than the MDC were not sampled.

3.1.2 Water Samples

To monitor for the presence of zebra mussels (*Dreissena polymorpha*), two water samples, one in the reservoir and one in the tailwater, were collected during the late-July survey by approximating WDNR monitoring protocol for zebra mussels (Figure 1, WDNR 2020). A 64-micron mesh zooplankton net was used to collect the zebra mussel veliger sample. For the reservoir sample, a horizontal tow was conducted by lowering the net into the water so that the top of the net was fully submerged, and the bottom of the net was not touching the bottom or hypolimnion. With the net in this position, the boat was driven backwards slowly (about 2 miles per hour) for two minutes.

Shallow water and fast flows at the tailwater locations prevented the use of a boat, therefore, the sampling method was adjusted accordingly. The pool below the dam was accessed on foot. The plankton net was positioned in the current, such that the top of the net was submerged while the bottom of the net remained above the bottom substrate. The net was held in this position with water flowing through for two minutes to collect the water sample.

While raising the zooplankton net from the water, the net was rinsed from the outside so that the entire sample would be washed into the collection cup. For each sample, as much water as possible was decanted from the collection cup. The final sample was poured into a quart-sized sample bottle and preserved with 95% ethanol at a 4:1 ethanol to sample ratio. The preserved water samples were delivered to the Wisconsin State Laboratory of Hygiene in Madison, Wisconsin on August 11, 2022, as requested by the WDNR invasive species coordinator, to be analyzed for zebra mussel veligers.

Spiny water fleas (*Bythotrephes longimanus*) are already known to be present in Flowage waters, therefore, no additional water samples were collected for this species. However, it should be noted that spiny water fleas, which can be seen without magnification, were observed within the reservoir water sample collected for zebra mussels.

3.1.3 Sediment Samples

To monitor for invasive macroinvertebrates, sediment samples were collected at five public access sites: Sucker Hole Boat Landing, the 4-H landing off of Spring Camp Rd., Gile Park Landing, County Hwy C Landing, and the access on the east side of the road opposite from the County C Landing (Figure 1). A shovel was used to scoop approximately six inches of sediment into a 10-inch Tetra Pond Planter Basket, with a 1/32nd inch mesh (Figure 6). Fine sediment was flushed out of the basket and the remaining materials were examined for Asian clam (*Corbicula fluminea*), faucet snail (*Bithynia tentaculate*), New Zealand mud snail (*Potamopyrgus antipodarum*), Malaysian trumpet snail (*Melanoides tuberculata*), rusty crayfish (*Orconectes rusticus*), and other invasive macroinvertebrates. The areas around these access sites were also visually examined for live snails, crayfish, and shells.

3.2 Terrestrial Upland Areas

The upland shoreline adjacent to the reservoir (including the islands) and upland areas owned by NSPW that included Project facilities and/or NSPW-owned formal recreation sites, were surveyed in late-July using two methods described below.

3.2.1 Upland Shorelines

Upland shoreline areas, including islands, were studied by GAI on July 25, 26, and 27, 2022 (Attachment D). The upland shoreline was surveyed by boat or on foot where the use of a boat was not feasible. While the boat motored slowly along the shoreline, an overall characterization of the terrestrial plant composition was made using the *Wisconsin Natural Heritage Inventory (NHI) Recognized Natural Communities Working Document* (Epstein et al. 2007). Shoreline plant composition was studied within a 10-meter riparian zone visible from open water.

The reservoir shoreline survey, including 26 islands, was divided into 17 segments (Figure 7) based on changes in land use or vegetative communities. When plants included in the NR 40 list were observed, the species type, location, and length of infested shoreline were identified and mapped using a Trimble R1 GNSS Receiver and GPS device. Relative abundance of each observed species within each segment was determined using the Daubenmire Classification Scheme Cover Ranking System. This system provides an estimate of the percent foliage cover as would be observed from above the vegetation. This ranking system was used to estimate relative abundance because it reduces the influence of individual bias in estimating foliage cover and can be applied to the relative size and length of a given segment of study (Daubenmire 1959). See Table 1 below for an overview of the Daubenmire Classification Scheme Cover Ranking System.

Table 1

Daubenmire Classification Scheme Cover Ranking System

Foliage Percent Cover	Rank
5-25	2
25-50	3
50-75	4
75-95	5
95-100	6

3.2.2 Upland Terrestrial Areas

One upland area owned by the Applicant within the Project boundary was studied using a meander survey on July 27, 2022. The route traveled during the meander survey was recorded using a Garmin Forerunner 55 Watch. An overall characterization of the terrestrial plant community was recorded. Whenever plants included in the NR 40 list were observed, the species and location were recorded using a Trimble R1 GNSS Receiver and GPS device. An estimate of relative abundance, using the Daubenmire System, and the extent to which the species was present (areal coverage), were recorded, as was the route of travel during the meander. No meander surveys were conducted on the islands; all sampling for terrestrial invasive species on islands was conducted according to the protocol discussed in section 3.2.1.

4.0 Results and Discussion

4.1 Aquatic Plant Survey

4.1.1 June Survey

A total of 679 points were sampled during the point-intercept survey completed over five days in June of 2022 (Figure 3, Attachment A). The majority of the points not sampled were the result of water depths exceeding 15 feet. In addition, four of the points could not be sampled because of navigability issues due to dense aquatic vegetation and two points were terrestrial. Among the points sampled, 154 were shallower than the maximum depth of rooting plants (7.6 feet) and 38 (25% of the littoral points; littoral frequency of occurrence) exhibited vegetation. Twenty-four species (all native) were found during the survey (Table 2), six of which were observed visually, but not present on the rake/at a sample point. Those six species include: spatterdock (*Nuphar variegata*), northern blue flag (*Iris versicolor*), water smartweed (*Persicaria amphibia*), hardstem bulrush (*Schoenoplectus acutus*), common water-starwort (*Callitriche palustris*), and a liverwort: slender riccia (*Riccia fluitans*). Because riccia is a bryophyte (non-vascular), it does not get calculated into the overall relative frequency of plant occurrence and is therefore excluded from the species table below. Overall, predominant species were variable-leaf pondweed (*Potamogeton gramineus)*, alternate-flowered water milfoil (*Myriophyllum alterniflorum*), and narrow-leaf bur-reed (*Sparganium angustifolium*). Figure 8 depicts the species most dominant on each rake sample. The average total rake fullness during the study where plants were present (does not include points with no vegetation) was 1.05 (Figure 3). No aquatic invasive plant species were identified on the rake during the point-intercept survey.

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4.1.2 Late-July Survey

The late-season survey on Gile Flowage was completed on July 26-28, 2022. All sample points that were within the plant rooting depth range established in June were re-sampled in July. Additional points were sampled to confirm the maximum depth of plant growth. A total of 165 points were visited during the July survey (Figure 4, Attachment B). The maximum depth of plant growth in July decreased to 6.1 feet. It should be noted that water levels on the Flowage were approximately 1.5 feet lower compared to the June survey. Points sampled were adjusted to account for this change in water depth; however, plant growth coverage did not appear to have expanded.

For the July survey, 133 of the visited points were found to be within the littoral zone. Forty-nine (37% littoral frequency of occurrence) of these sample sites contained vegetation. Twenty-three species were found on the rake during the late-season survey (Table 2). The predominant species were variable-leaf pondweed, various-leaved watermilfoil (*Myriophyllum heterophyllum*), and slender and common waterweeds (*Elodea nuttallii and E. canadensis*). Figure 9 depicts the predominant species for each rake sample. The average total rake fullness where plants were present was 1.27.

Table 2

Aquatic Plant Species Abundance in Gile Flowage

Scientific Name	Common Name	Littoral Frequency of Occurrence[a]		Relative Frequency of Occurrence[b]	
		June	Late-July	June	Late-July
Callitriche palustris	Common water-starwort	Visual	2.26	Visual	3.1
Ceratophyllum echinatum	Spiny hornwort	1.3	0.75	4.0	1.0
Elatine minima	Waterwort	0.65	*not observed*	2.0	*not observed*
Elodea canadensis	Common waterweed	0.65	3.76	2.0	5.2
Elodea nuttallii	Slender waterweed	1.95	7.52	6.0	10.4
Iris versicolor	Northern blue flag	Visual	Visual	Visual	Visual
Myriophyllum alterniflorum	Alternate-flowered watermilfoil	5.19	0.75	16.0	1.0
Myriophyllum heterophyllum	Various-leaved watermilfoil	0.65	9.02	2.0	12.5
Myriophyllum verticillatum	Whorled watermilfoil	1.95	3.76	6.0	5.2
Najas flexilis	Slender naiad	*not observed*	1.5	*not observed*	2.1
Nitella sp.	Stoneworts	0.65	7.52	2.0	10.4
Nuphar variegata	Spatterdock	Visual	Visual	Visual	Visual

Scientific Name	Common Name	Littoral Frequency of Occurrence[a]		Relative Frequency of Occurrence[b]	
		June	Late-July	June	Late-July
Persicaria amphibia	Water smartweed	Visual	0.75	Visual	1.0
Potamogeton amplifolius	Large-leaf pondweed	0.65	Visual	2.0	Visual
Potamogeton epihydrus	Ribbon-leaf pondweed	0.65	1.5	2.0	2.1
Potamogeton gramineus	Variable-leaf pondweed	7.79	13.53	24.0	18.8
Potamogeton nodosus	Long-leaf pondweed	0.65	0.75	2.0	1.0
Potamogeton praelongus	White-stem pondweed	*not observed*	0.75	Visual	1.0
Potamogeton pusillus	Small pondweed	0.65	4.51	2.0	6.3
Potamogeton spirillus	Spiral-fruited pondweed	*not observed*	2.26	*not observed*	3.1
Ranunculus flammula	Creeping spearwort	2.6	1.5	8.0	2.1
Sagittaria sp.	Arrowhead sp.	0.65	*not observed*	2.0	*not observed*
Schoenoplectus acutus	Hardstem bulrush	Visual	Visual	Visual	Visual
Schoenoplectus subterminalis	Water bulrush	0.65	2.26	2.0	3.1
Sparganium angustifolium	Narrow-leaf bur-reed	4.55	3.01	14.0	4.2
Utricularia minor	Small bladderwort	*not observed*	2.26	*not observed*	3.1
Utricularia vulgaris	Common bladderwort	*not observed*	0.75	*not observed*	1.0
Vallisneria americana	Wild celery	*not observed*	0.75	*not observed*	1.0
Zizania sp.	Wild rice[c]	0.65	0.75	2.0	1.0

[a]The littoral frequency of occurrence refers to the number of times the species was found divided by the total number of sample locations shallower than the MDC.

[b]The relative frequency of occurrence refers to the frequency at which one species was found in comparison to all species found (percentage).

[c]Wild rice was observed at or near sample locations 212, 337, 470, 499, 500, 501, 503, 845, 925, 949, and 956. A map of the sample locations is shown in Figure 2.

4.1.3 Overall Aquatic Plant Survey Analysis and Observations

The aquatic plant community in Gile Flowage is unique. While plant abundance is low, the quality of species is high with several uncommon species observed. In June, species richness (on rake only; excludes visual-only occurrences) was 18 and the mean conservatism value was 7.76, resulting in a Floristic Quality Index (FQI) of 32.0. In July, species richness was 23 and the mean conservatism value was 7.5, calculating to a 36.9 FQI (Table 3). Higher species conservatism values indicate the presence of plants which are sensitive to environmental degradation. The incidence of plant species with higher conservatism values indicates high-quality conditions present on Gile Flowage.

The low plant density can be explained by the size and depth of the waterbody. Plants were primarily found growing in shallow, near-shore areas and in protected bays. The depth of much of the flowage, combined with tannin-stained water and wind fetch, make only the shallow, protected areas conducive for submergent aquatic plant growth. Substrate type also directly affects the species type and abundance of plants that can be supported in a waterbody. The majority of the Flowage has a firm bottom dominated by organic detritus comprised of wood debris over sand and rock. The majority of substrate samples collected in June (~81%), at points having depths of less than 15 feet, were classified as organic; however, this category is often used to describe a soft bottom of unconsolidated organic matter. The organic matter on the Gile is comprised of a firm mixture of muck, sand, detritus (small sticks and bark), and in some cases, clay (Figure 10). Areas that were less protected (i.e., where wind fetch likely scours the bottom more often) had a substrate dominated by cobble (6.9% of the points sampled) and gravel (4.6% of the points). Smaller percentages of sand, wood, boulder, and silt were present at the remaining locations. The firm substrate, in conjunction with the factors listed above, likely plays a significant role in the low density of aquatic plants in the Flowage.

The number of aquatic invasive plant species observed on the Flowage was minimal. Only one location (two plants) of purple loosestrife was observed. It was in bloom but had not gone to seed; therefore, the flower heads were removed. An observation of suspected narrow-leaf cattail (possibly hybrid) was made but was not confirmed. Since the seed heads are required for positive identification, and the population had not gone to seed at the time of the survey, the identification could not be confirmed. We theorize this may be the result of delayed plant growth due to the late spring.

The majority of the Gile Flowage is too deep to support aquatic vegetation, even near shore where many areas exceeded the max depth of plant growth. Figure 11 shows a bathymetric map which illustrates the depths recorded during the June 2022 point-intercept survey.

Table 3

Overall Gile Flowage Submergent Plants Summary

Statistic	June 2022	Late-July 2022
Littoral Frequency of Occurrence	24.9	36.8
Maximum Depth of Plants	7.6 feet	6.1 feet
Species Richness	18	23
FQI	32.0	36.9

4.2 Water Samples

The samples for zebra mussel veligers will be analyzed by the Wisconsin State Lab of Hygiene. Samples were dropped off at the Lab on August 11, 2022. Results are expected to be available within approximately 60 days from the drop-off date.

4.3 Sediment Samples

Boat launches are an ideal location to sample for aquatic invasive species because of the high traffic associated with boat anglers, recreational watercraft and people shore-fishing. Public access locations can be a conduit for the introduction of aquatic invasive species through the emptying of bait buckets, boat bilges, live wells, or hulls which may be holding water from other infested waterbodies. Sediment samples collected at the public access sites did not detect any invasive macroinvertebrates. There were no additional invasive species observed from the visual inspections of the public access sites, except for the Chinese and banded mystery snails, which were already known to occur in the Flowage. Native snails, mussels (adults and juveniles), and northern clearwater crayfish (*Orconectes propinquus*) were visually observed at some of the boat launch areas while collecting sediment samples.

4.4 Terrestrial Upland Areas

Terrestrial invasive species surveys were conducted along the shoreline and upland areas included within the study area. The shoreline was primarily undeveloped and wooded, with scattered homes and cabins. The shoreline was inspected by boat where possible, or by walking where navigability was limited. Upland areas were generally rocky and wooded, with occasional roadways, emergent wetland and scrub/shrub areas, and residential properties with maintained lawns. A terrestrial invasive meander survey was conducted at Gile Park, which is primarily comprised of manicured turf grass, trees, shrubs, and herbaceous vegetation. This area contained sizeable populations of invasive species.

4.4.1 Upland Shoreline Survey – Gile Shoreline and Islands

The upland survey, which included 26 islands, was separated into 17 segments based on changes in land use or vegetative communities (Figure 7). The Flowage shoreline is extremely rugged, with bedrock and large boulders comprising much of the terrestrial substrate. The shoreline is largely undeveloped and is characterized by Talus, Northern Mesic, and Northern Wet-Mesic mixed conifer-deciduous forests, Emergent Wetland, and Scrub-shrub community types, with roadways, residential homes, and cabins thinly interspersed (Table 4).

Table 4

Terrestrial Shoreline Community Types Summary

Terrestrial Shoreline Community	Mileage of Meander	Percentage of Meander
Boulder	0.39	1.11%
Emergent Wetland/Tag Alder	0.82	2.35%
Northern Mesic Forest	9.94	28.42%
Northern Mesic Forest/Boulder	1.031	2.95%
Northern Mesic/Talus Forest	4.86	13.88%
Northern Mesic/Wet Mesic Forest	11.24	32.12%
Northern Wet Mesic Forest	1.07	3.06%
Roadside	0.80	2.29%
Tag Alder/Northern Wet Mesic Forest	0.51	1.46%
Talus Forest	3.89	11.11%
Mowed/Maintained	0.44	1.26%
Total	34.99	100%

The following list summarizes the most commonly encountered herbaceous and woody vegetation species observed within each terrestrial shoreline community:

- Emergent Wetland
  - Narrow-leaf bur-reed (*Sparganium angustifolium*), reed canary grass (*Phalaris arundinacea*), sweet flag (*Acorus calamus*), and sedge species (*Carex* spp.)
- Tag Alder
  - Overstory: tag alder (*Alnus incana*), willow species (*Salix* spp.), dogwood species (*Cornus* spp.)
  - Understory: reed canary grass
- Northern Mesic Forest
  - Overstory: sugar maple (*Acer saccharum*), eastern white pine (*Pinus strobus*), balsam fir (*Abies balsamea*), basswood (*Tilia americana*), paper birch (*Betula papyrifera*), white spruce (*Picea glauca*), eastern hemlock (*Tsuga canadensis*), northern pin oak (*Quercus ellipsoidalis*)
  - Understory: fern species (polypodiophytes)
- Northern Wet Mesic Forest
  - Overstory: black ash (*Fraxinus nigra*), balsam fir, black spruce (*Picea m*ariana), northern white cedar (*Thuja occidentalis*), trembling aspen (*Populus tremuloides*)
  - Understory: reed canary grass, sedge species, fern species, sphagnum, and mosses
- Talus Forest
  - Overstory: eastern white pine, red pine (*Pinus resinosa*), paper birch, northern white cedar
  - Understory: fern species, moss and lichen species, boulders
- Boulder:
  - Smooth serviceberry (*Amelanchier laevis*), Beaked hazelnut (*Corylus cornuta*), Lichen species
- Roadside:
  - Spotted knapweed, Tansy, Canada goldenrod (*Solidago canadensis*), Birdsfoot trefoil (*Lotus corniculatus*), Queen Anne's Lace (*Daucus carota*)
- Mowed/Maintained
  - Mowed turfgrass, cultivated plants

Invasive species comprised 2.2 miles of shoreline during the terrestrial survey and were limited to glossy buckthorn (*Frangula alnus*), Eurasian bush honeysuckle (*Lonicera spp.*), spotted knapweed (*Centaurea stoebe*), tansy (*Tanacetum vulgare*), purple loosestrife (*Lythrum salicaria*), and suspected narrowleaf/hybrid cattail (*Typha angustifolia and T. x glauca*; Table 5). Honeysuckle was the most predominant species observed and was present on the majority of islands. Buckthorn was also present across the islands, but at lower densities. Spotted knapweed and tansy were limited to higher traffic areas such as roadsides. Only one location of purple loosestrife was noted and was comprised of two small plants. The suspected narrow-leaf cattail was scattered throughout the project at low densities, and at one higher concentration near the north end of the flowage.

Table 5

Shoreline and Terrestrial Invasive Species Summary

Species	Common Name	Mileage of Meander	Percentage of Meander
Centaurea stoebe	Spotted knapweed	1.168	3.34%
Lythrum salicaria	Purple loosestrife	0.002	0.01%
Typha spp.	Cattail spp. (suspected to be invasive or hybrid)	0.352	1.01%
Tanacetum vulgare	Tansy	0.329	0.94%
Frangula alnus	Glossy buckthorn	0.009	0.03%
Lonicera spp.	Eurasian bush honeysuckle	0.295	0.84%

4.4.2 Upland Terrestrial Area – Meander Survey of Gile Park

Gile Park, and the adjacent public access areas owned by the Applicant near the dam, features an open green space with manicured turf grass and planted trees and an undeveloped wooded area dominated by trees, shrubs, and herbaceous vegetation. The area also includes NSPW's canoe portage take-out and put-in sites. The meander survey area contained populations of Eurasian honeysuckle, suspected narrow-leaf cattail, tansy, and spotted knapweed.

4.5 Conclusion

Overall, few invasive species were observed throughout the Project and those that were documented occurred at low densities. Species such as tansy and spotted knapweed were primarily limited to areas of high traffic such as road shoulders and Gile Park. Honeysuckle was found sporadically throughout the Project and was the most common species found on the islands, frequently as individual plants, or small populations. The other widely spread species was cattail. While some of the cattail populations appeared to be native, having broader and shorter leaves, many infestations of suspected invasive cattail (narrowleaf or hybrid) were observed and documented. These plants were suspected to be of the invasive variety based on having more narrow leaves and growing in a mat-like monoculture, typical of the invasive cattails. A positive identification was not confirmed due to the lack of seed heads during the Study. This year's late spring, followed by cool weather, may explain the late blooming.

The Gile Flowage appears to have a healthy terrestrial and aquatic plant community with low populations of invasive species and high FQI's. This is further supported by the presence of high-quality indicator species such as Spiny hornwort and Alternate-flowered watermilfoil. Additionally, residential development along the shoreline is light, which historically has been correlated with higher quality systems (Sass et al. 2010). Increased public education and monitoring would help ensure that the populations of native plant species found on the Flowage remain healthy.

5.0 References

Daubenmire, Rexford. 1959. A Canopy-coverage method of vegetational analysis. Northwest Science 33:43-64.

Epstein, E.J., Judziewicz, E.J., Spence, E. 2007. Madison: Wisconsin Department of Natural Resources, Natural Heritage Inventory Program. *Wisconsin Natural Heritage Inventory (NHI) Recognized Natural Communities – Working Document.* (updated online 2022 at https://dnr.wi.gov/topic/endangeredresources/communities.asp)

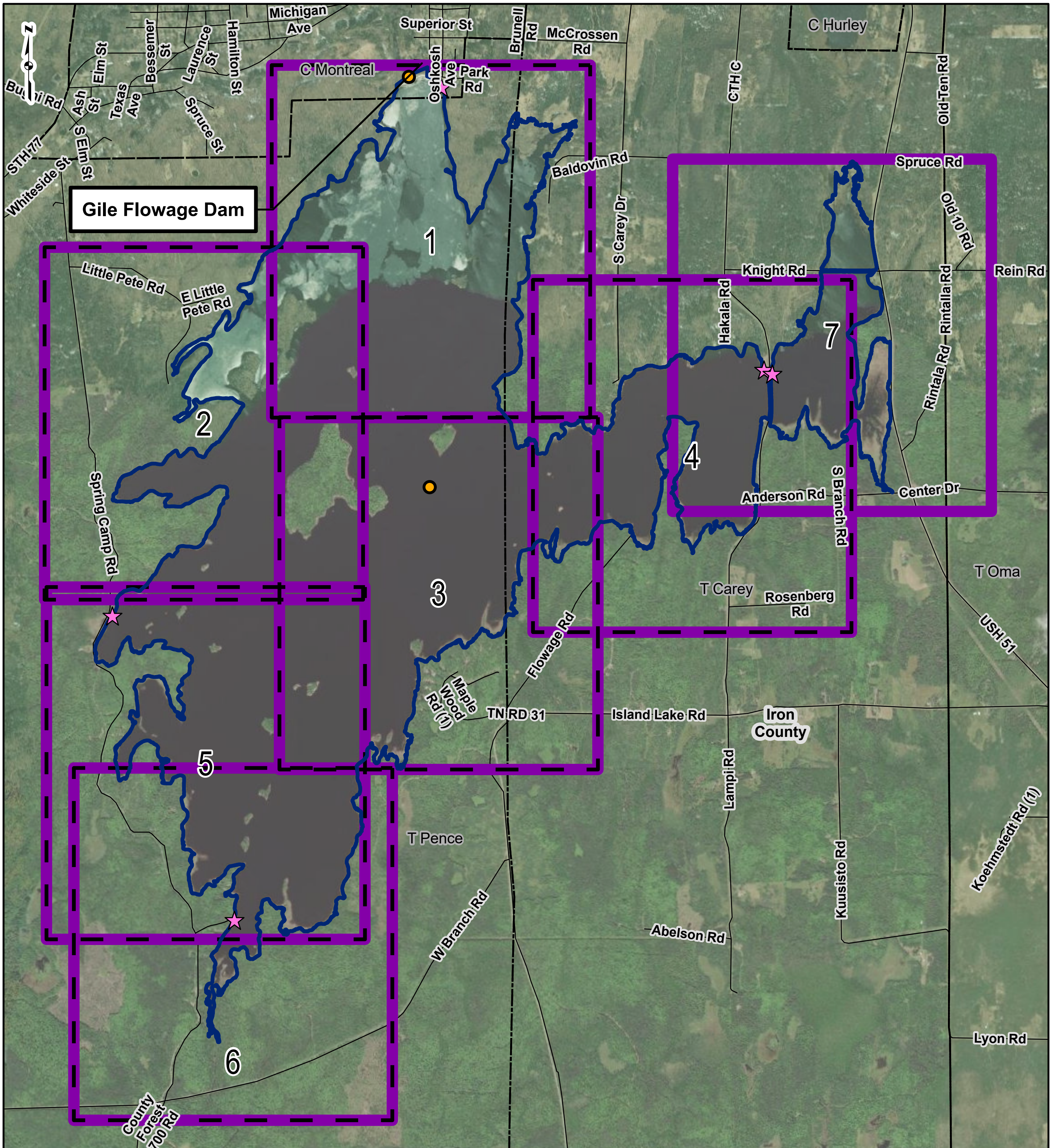
Sass, L.S., M.A. Bozek, J.A. Hauxwell, K. Wagner, S. Knight. 2010. Response of aquatic macrophytes to human land use perturbations in the watersheds of Wisconsin lakes, USA. Aquatic Botany 93 (1), 1-8

Wisconsin Department of Natural Resources. 2020. *Veliger Sampling Protocol; Standard Operating Procedures.* 16 pp.

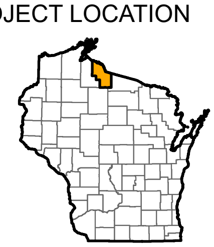
Wisconsin Department of Natural Resources. 2019. *Recommended Baseline Monitoring of Aquatic Plants in Wisconsin: sampling design, field and laboratory procedures, data entry and analysis,* and applications. PUB-SS-1068.

Wisconsin Department of Natural Resources. 2016. *Aquatic Invasive Rapid Response Species List*. PUB-SS-1162.

FIGURE 1
Project Location and Overview Map



PROJECT LOCATION



IRON COUNTY, WISCONSIN

LEGEND

- Water Tow Location
- Sediment Sample Location
- Project Boundary
- Point Intercept Map Index
- Terrestrial Meander Map Index
- Road Centerline
- Community Boundary
- County Boundary

0 1,625 3,250 6,500 Feet

FIGURE 1
PROJECT LOCATION AND OVERVIEW MAP

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

gai consultants

Mead & Hunt

DRAWN BY: EMW | DATE: 9/22/2022

CHECKED: TDB | APPROVED: LLS

REFERENCE: ESRI WORLD IMAGERY 2021, Accessed 9/22/2022. WDNR Counties, 2011. WISLR Community Boundary 2021. WISDOT Road Centerlines, 2021.

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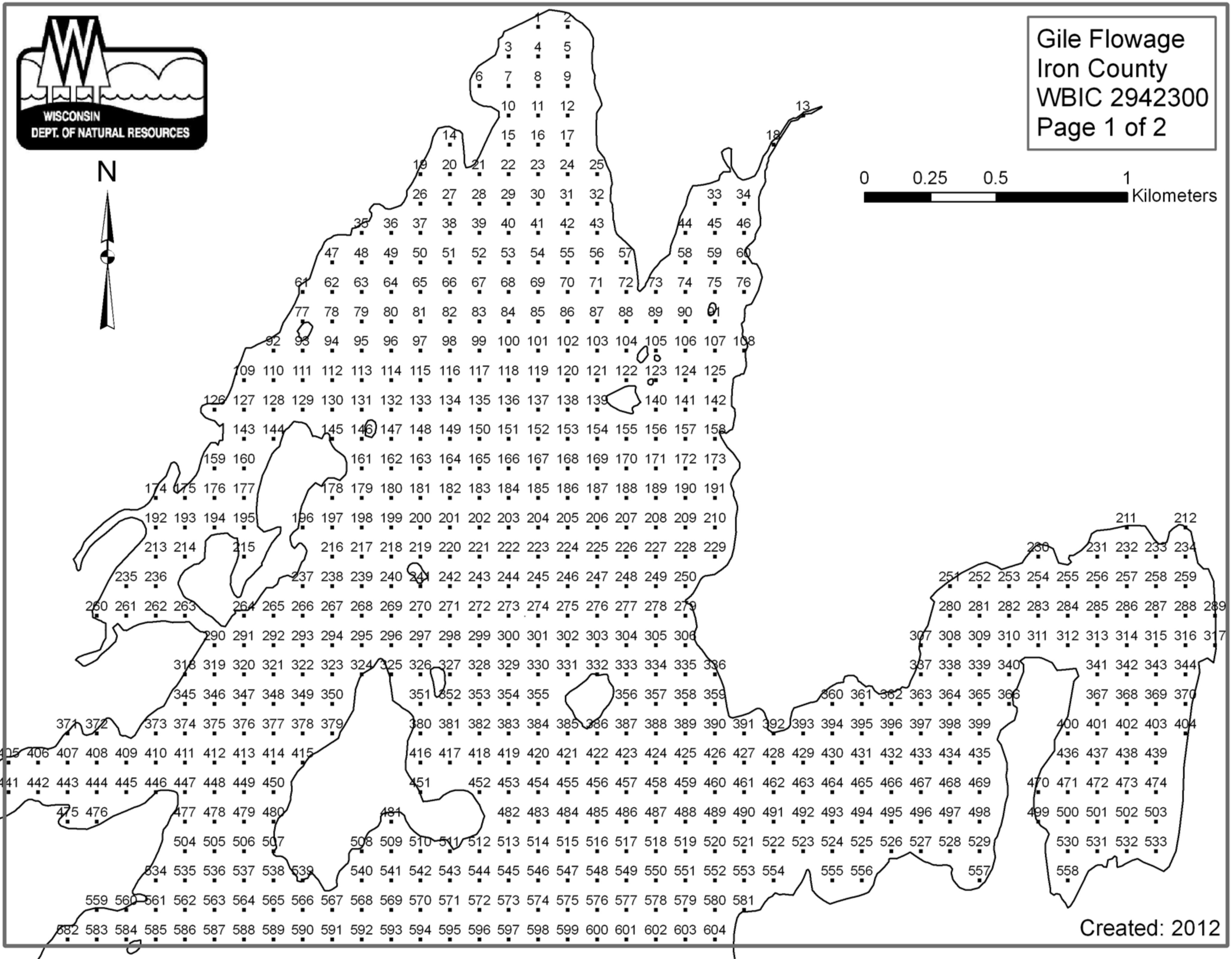
FIGURE 2
Point-Intercept Grid Provided by the WDNR


WISCONSIN
DEPT. OF NATURAL RESOURCES
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Gile Flowage
Iron County
WBIC 2942300
Page 1 of 2
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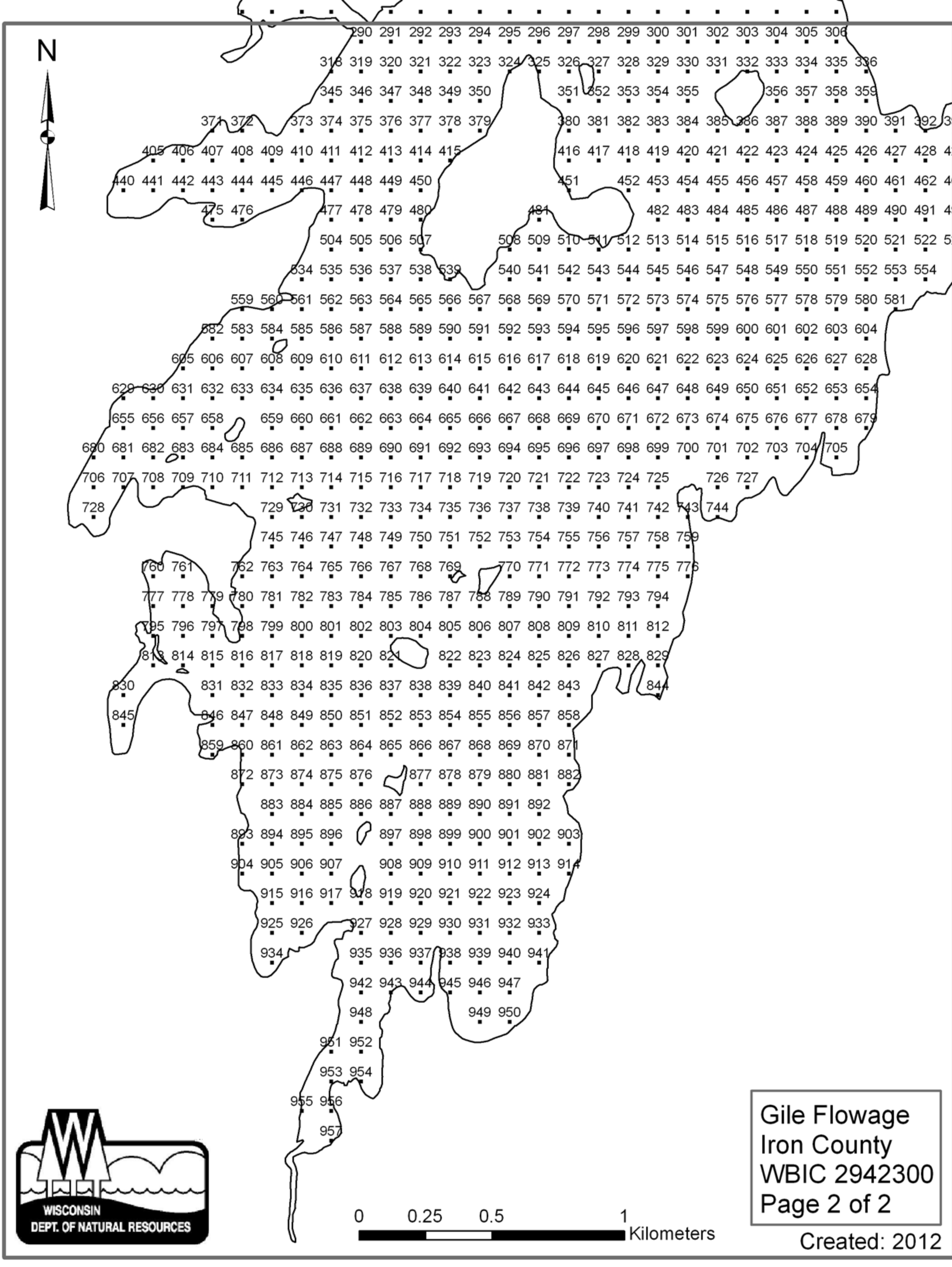
Kilometers
Created: 2012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345 346 347 348 349 350 351 352 353 354 355 356 357 358 359
371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393
405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429
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680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705
706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727
728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744
745 746 747 748 749 750 751 752 753 754 755 756 757 758 759
760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776
777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794
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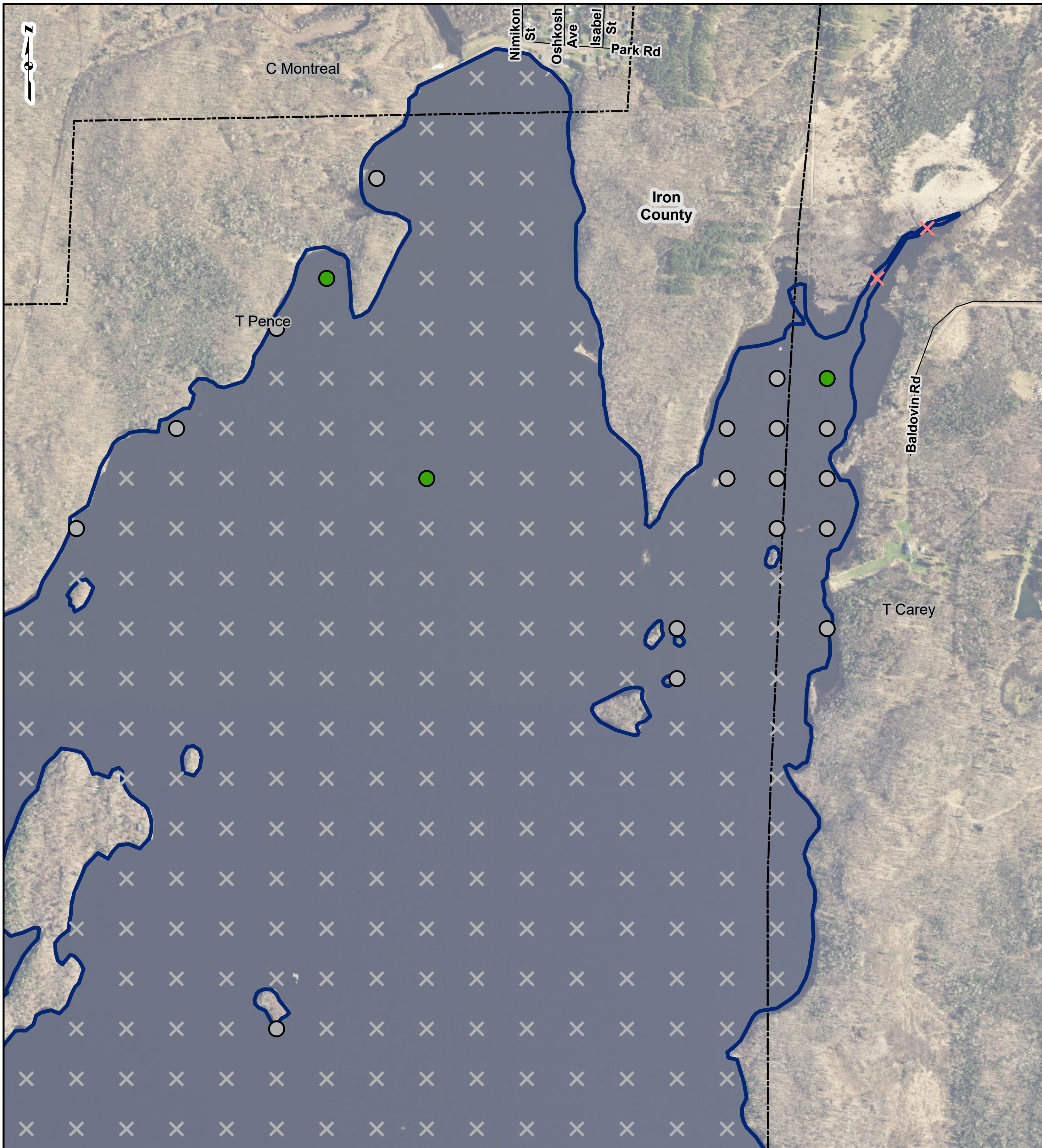
904 905 906 907 908 909 910 911 912 913 914
915 916 917 918 919 920 921 922 923 924
925 926 927 928 929 930 931 932 933
934 935 936 937 938 939 940 941
942 943 944 945 946 947
948 949 950
951 952
953 954
955 956
957
WISCONSIN
DEPT. OF NATURAL RESOURCES
0 0.25 0.5 1
Kilometers
Gile Flowage
Iron County
WBIC 2942300
Page 2 of 2
Created: 2012

FIGURE 3
June Point-Intercept Survey



PROJECT LOCATION

IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Rake Fullness
- 0
- 1
- 2
- 3 (None)

- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 3
June Point
Intercept Survey
Sheet 1 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

DRAWN BY: EMW
DATE: 8/18/2022
CHECKED: TDB
APPROVED: LLS

REFERENCE: ESRI WORLD IMAGERY 2021, Accessed 8/18/2022. WDNR Counties, 2011. WISLR Community Boundary 2021. WISDOT Road Centerlines, 2021.

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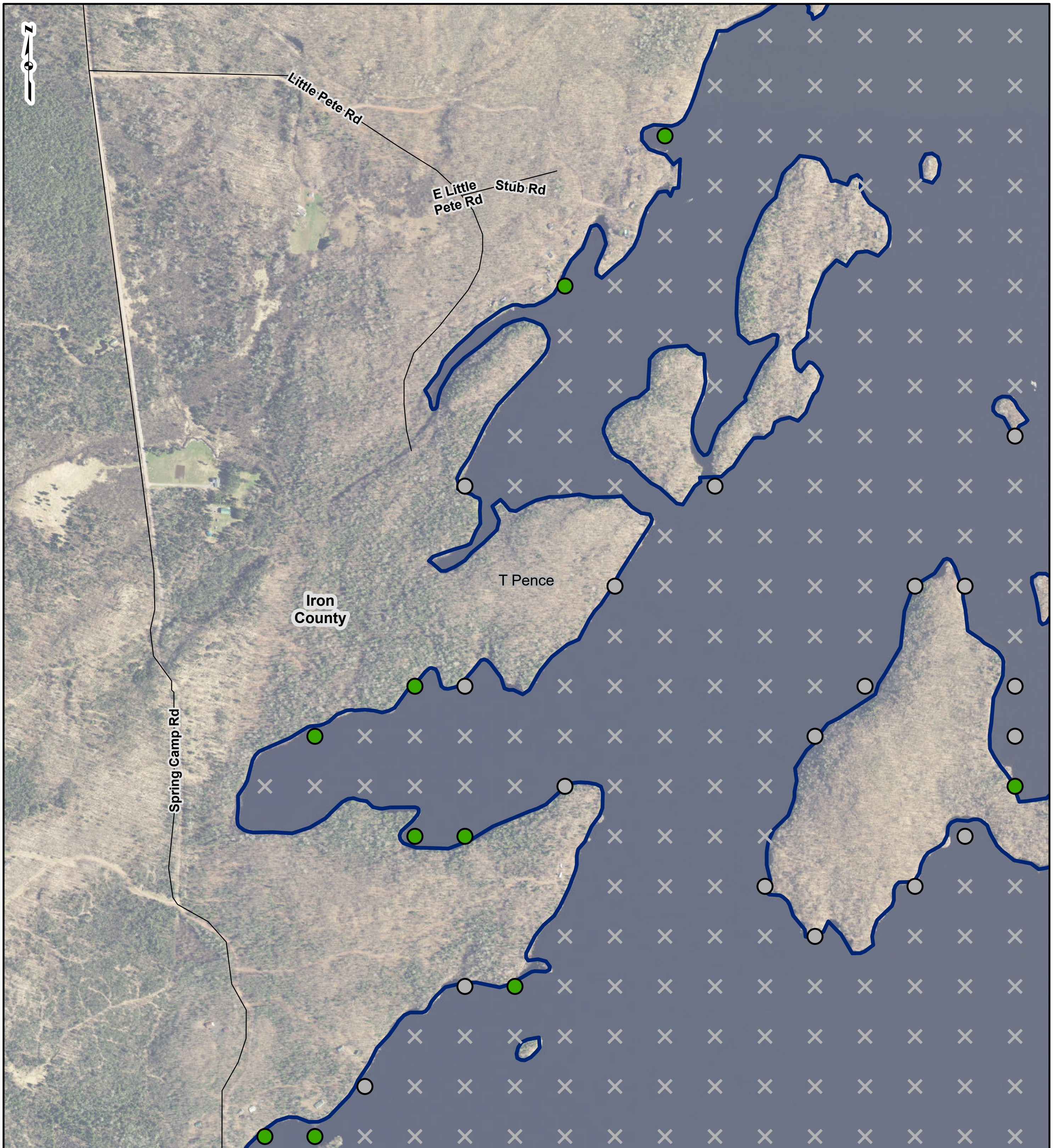
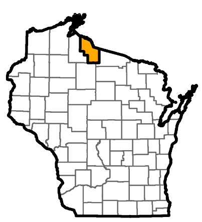


PROJECT LOCATION



IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Rake Fullness
- 0
- 1
- 2
- 3 (None)

- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 3
June Point
Intercept Survey
Sheet 2 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

gai consultants

Mead & Hunt

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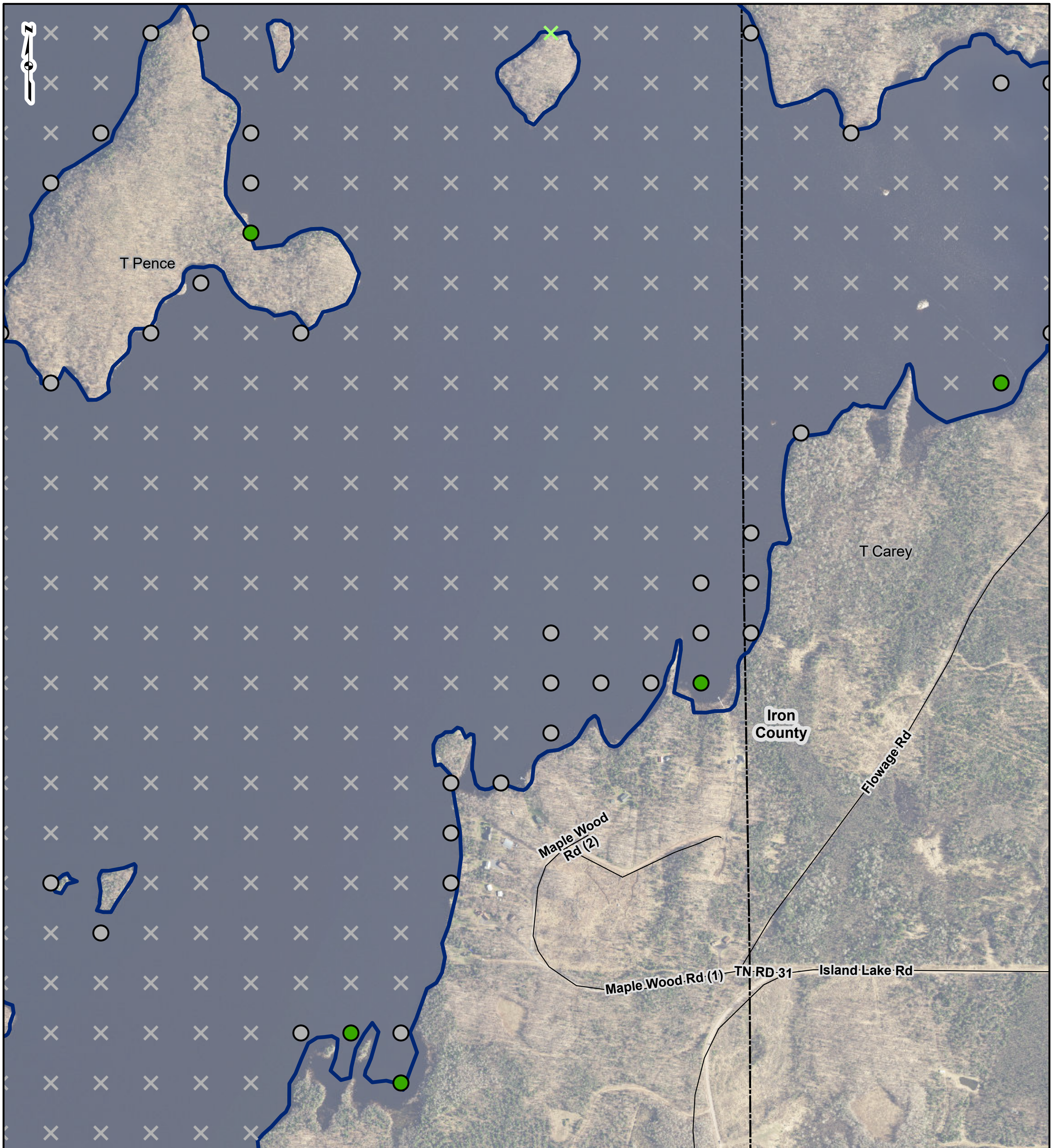

PROJECT LOCATION

IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Rake Fullness

- 0
- 1
- 2
- 3 (None)

- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 3
June Point
Intercept Survey
Sheet 3 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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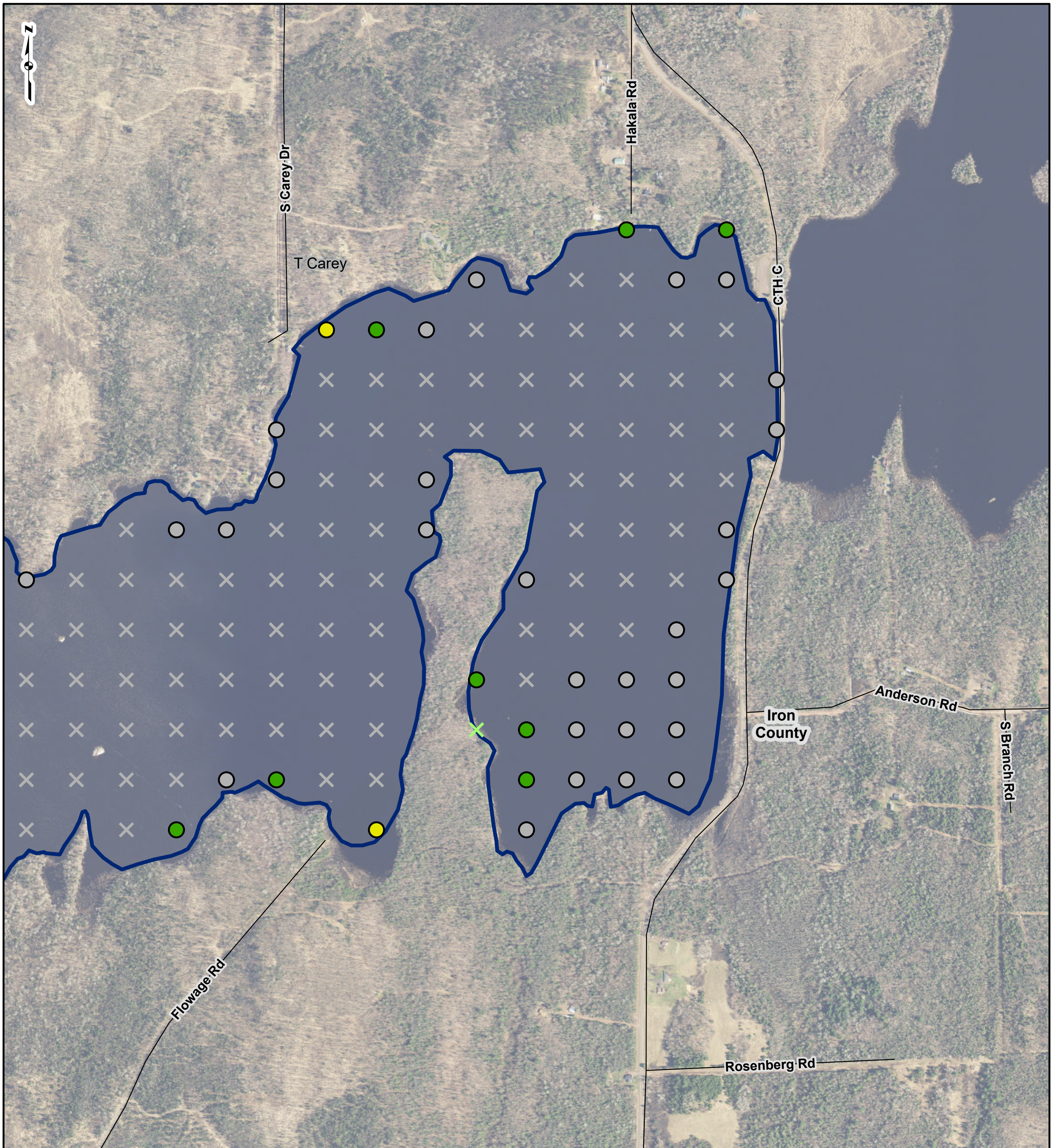

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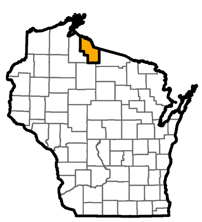

IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Rake Fullness

- 0
- 1
- 2
- 3 (None)

- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 3
June Point
Intercept Survey
Sheet 4 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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Mead & Hunt

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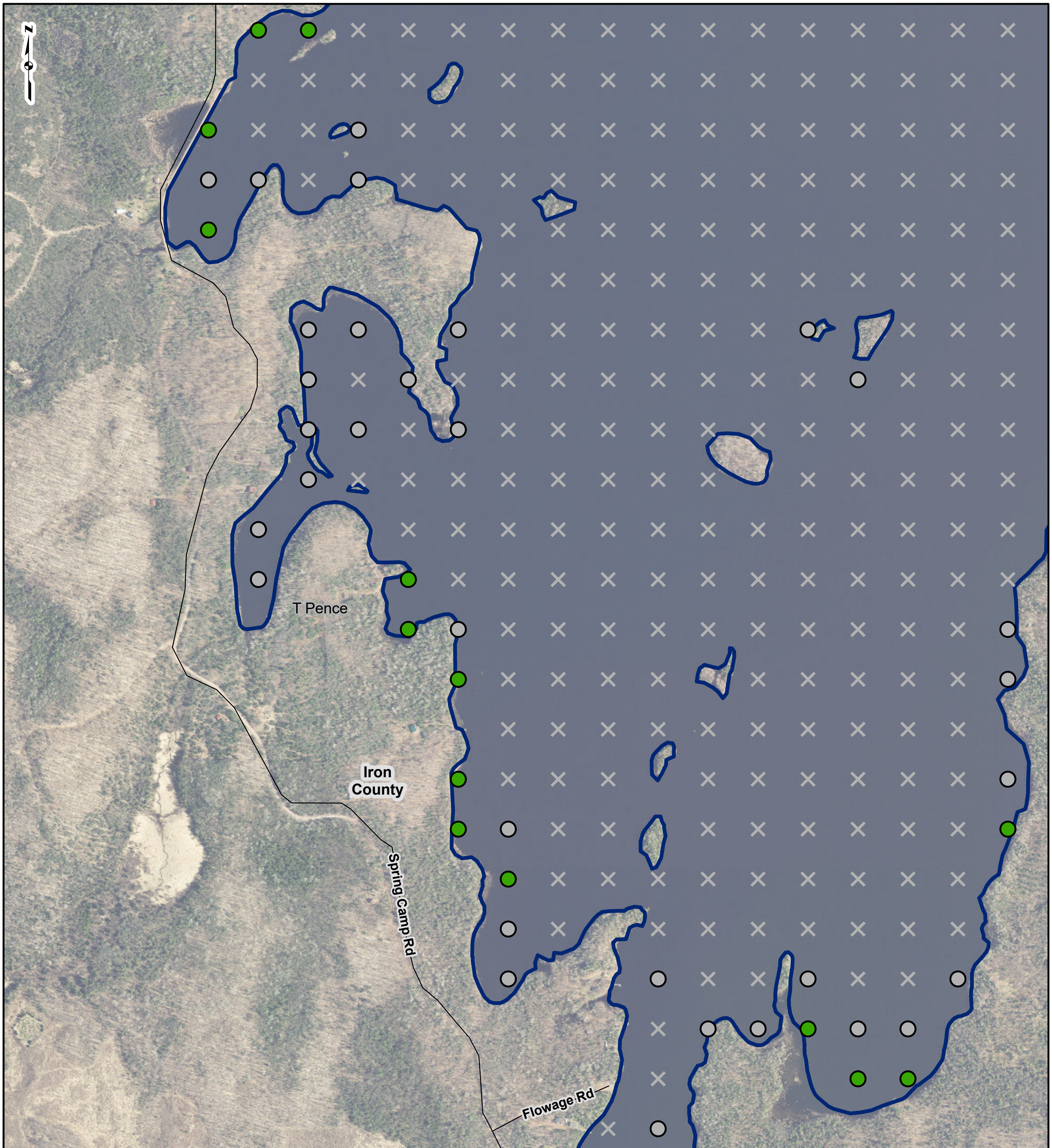

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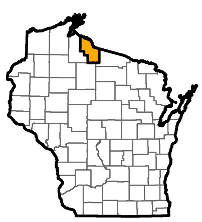

IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Rake Fullness
- 0
- 1
- 2
- 3 (None)

- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 3
June Point
Intercept Survey
Sheet 5 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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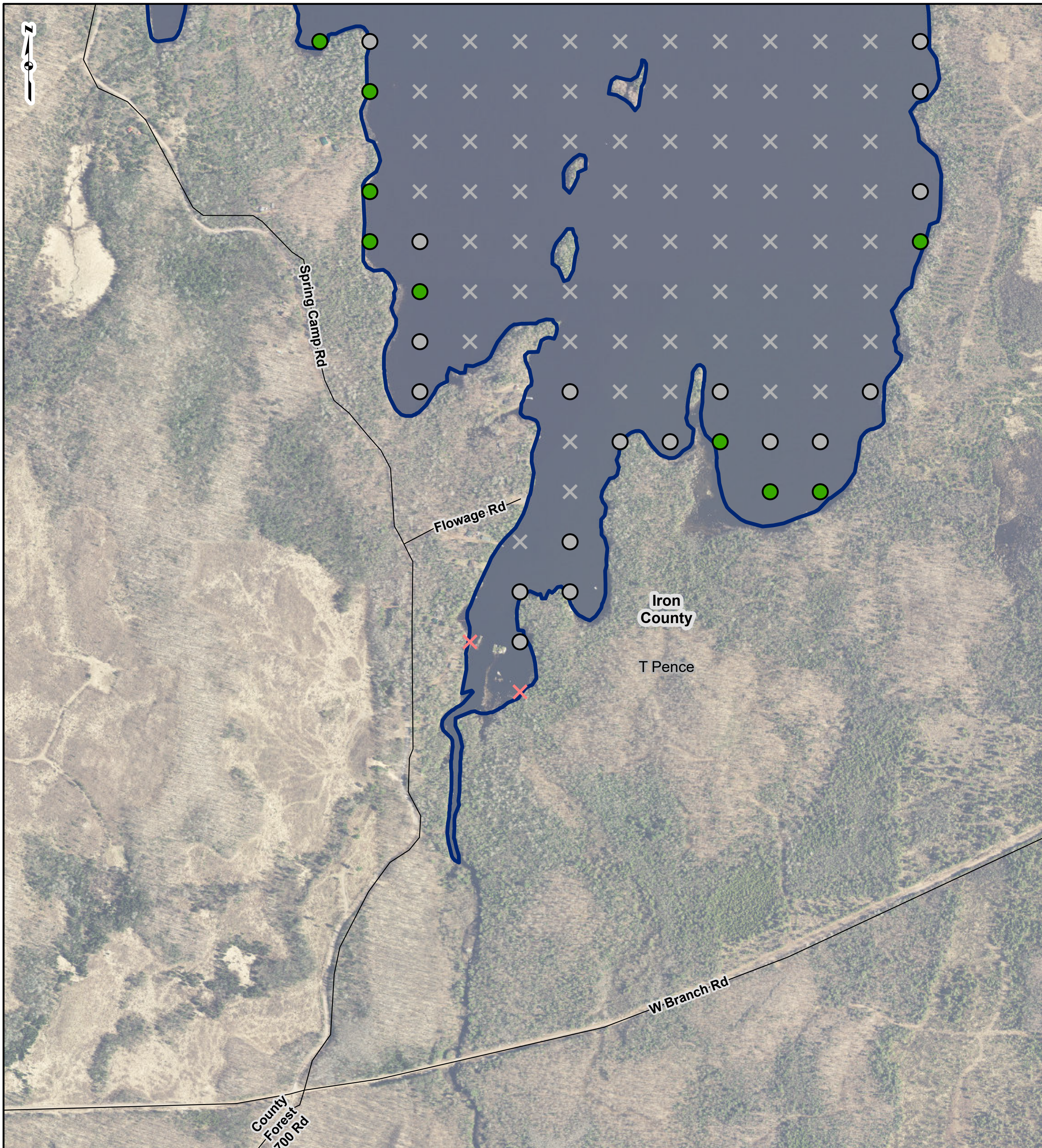

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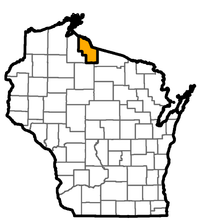

IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Rake Fullness
- 0
- 1
- 2
- 3 (None)

- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 3
June Point
Intercept Survey
Sheet 6 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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REFERENCE: ESRI WORLD IMAGERY 2021, Accessed 8/18/2022. WDNR Counties, 2011. WISLR Community Boundary 2021.
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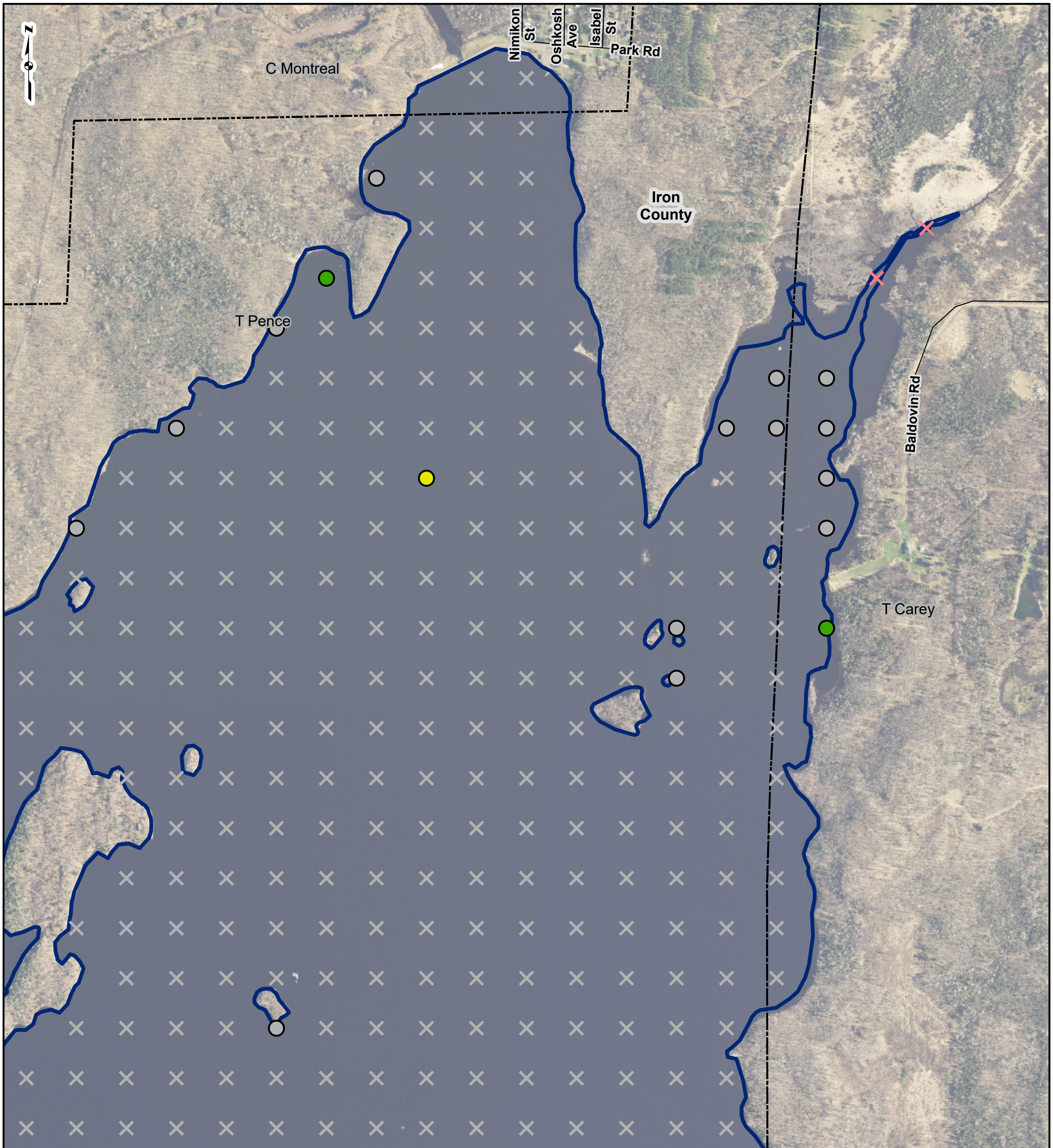
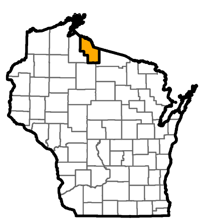
FIGURE 4
Late-July Point-Intercept Survey



PROJECT LOCATION



IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Rake Fullness

- 0
- 1
- 2
- 3

- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 4
Late July Point Intercept Survey
Sheet 1 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

DRAWN BY: EMW
DATE: 8/18/2022
CHECKED: TDB
APPROVED: LLS

REFERENCE: ESRI WORLD IMAGERY 2021, Accessed 8/18/2022. WDNR Counties, 2011. WISLR Community Boundary 2021. WISDOT Road Centerlines, 2021.

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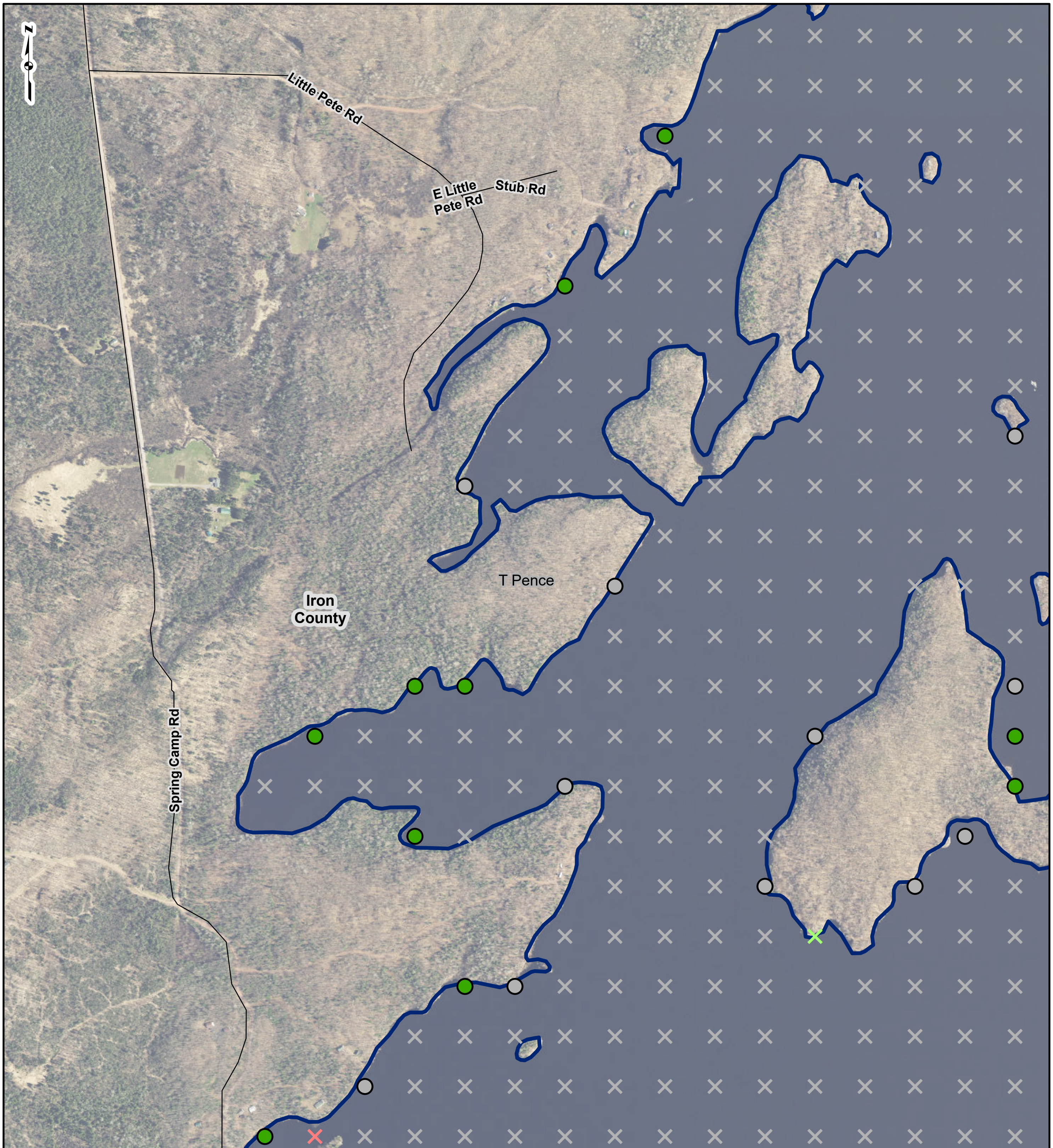

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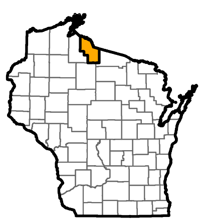

IRON COUNTY, WISCONSIN

LEGEND

Deeper than Plant Growth
Non-Navigable Vegetation
Non-Navigable Terrestrial

Rake Fullness
0
1
2
3

Project Boundary
Road Centerline
Community Boundary
County Boundary

0 500 1,000 2,000 Feet

Figure 4
Late July Point Intercept Survey
Sheet 2 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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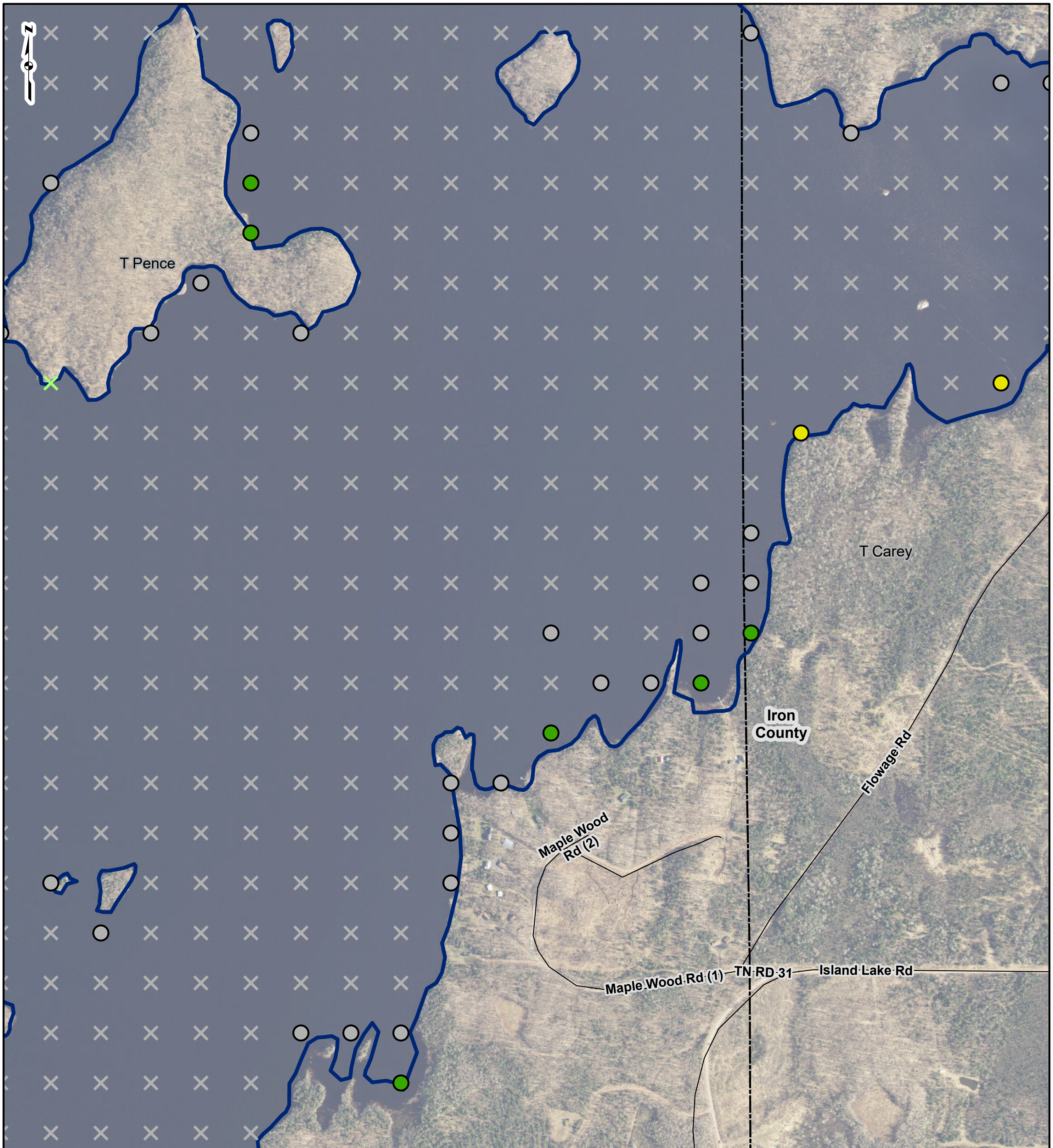

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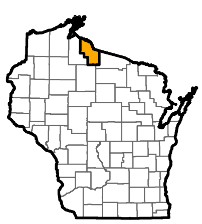

IRON COUNTY, WISCONSIN

LEGEND

Deeper than Plant Growth
Non-Navigable Vegetation
Non-Navigable Terrestrial

Rake Fullness
0
1
2
3

Project Boundary
Road Centerline
Community Boundary
County Boundary

0 500 1,000 2,000 Feet

Figure 4
Late July Point Intercept Survey
Sheet 3 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

gai consultants

Mead & Hunt

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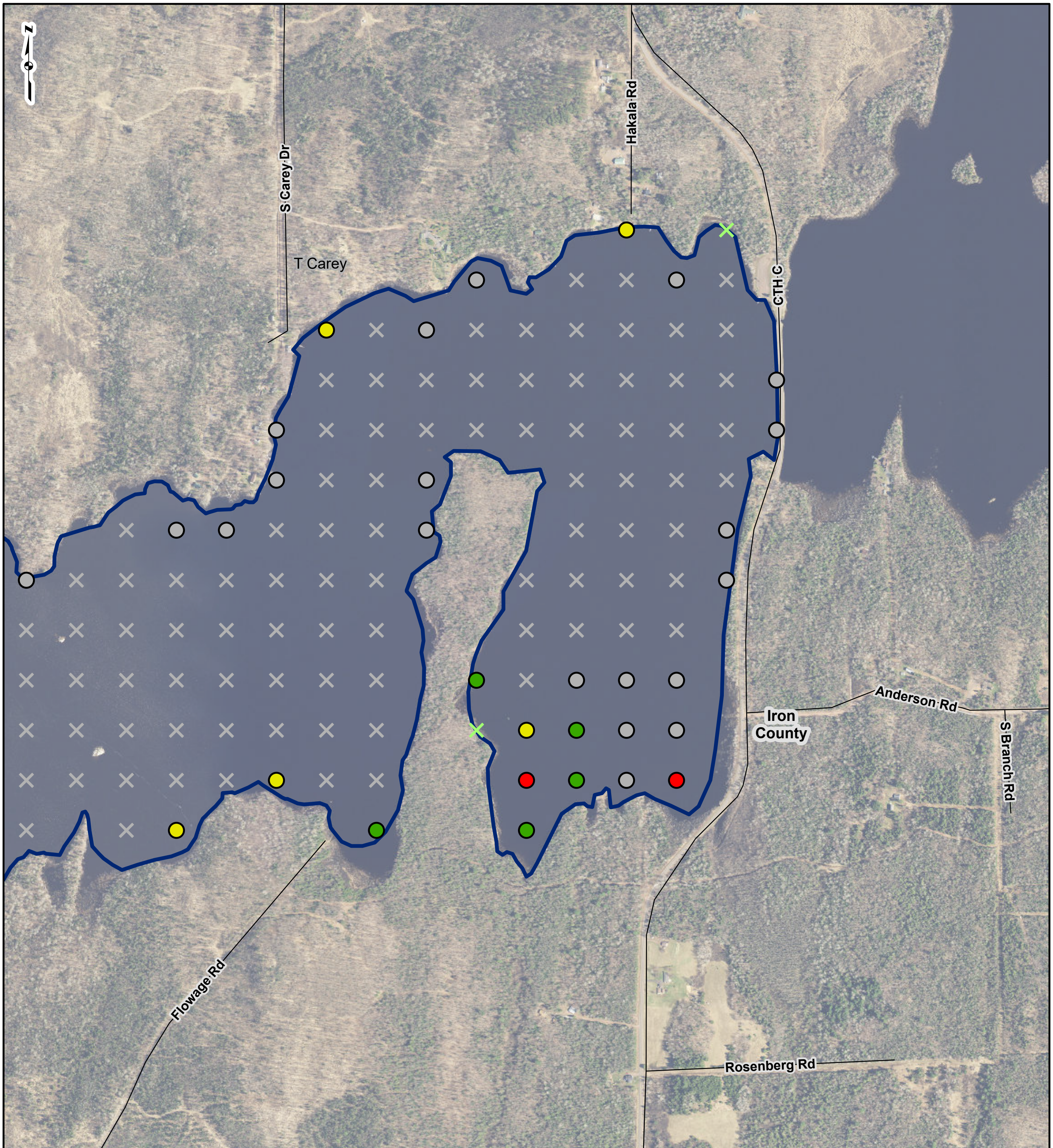

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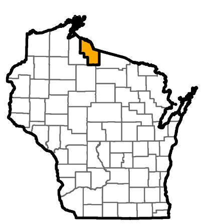

IRON COUNTY, WISCONSIN

LEGEND

Deeper than Plant Growth
Non-Navigable Vegetation
Non-Navigable Terrestrial

Rake Fullness
0
1
2
3

Project Boundary
Road Centerline
Community Boundary
County Boundary

0 500 1,000 2,000 Feet

Figure 4
Late July Point Intercept Survey
Sheet 4 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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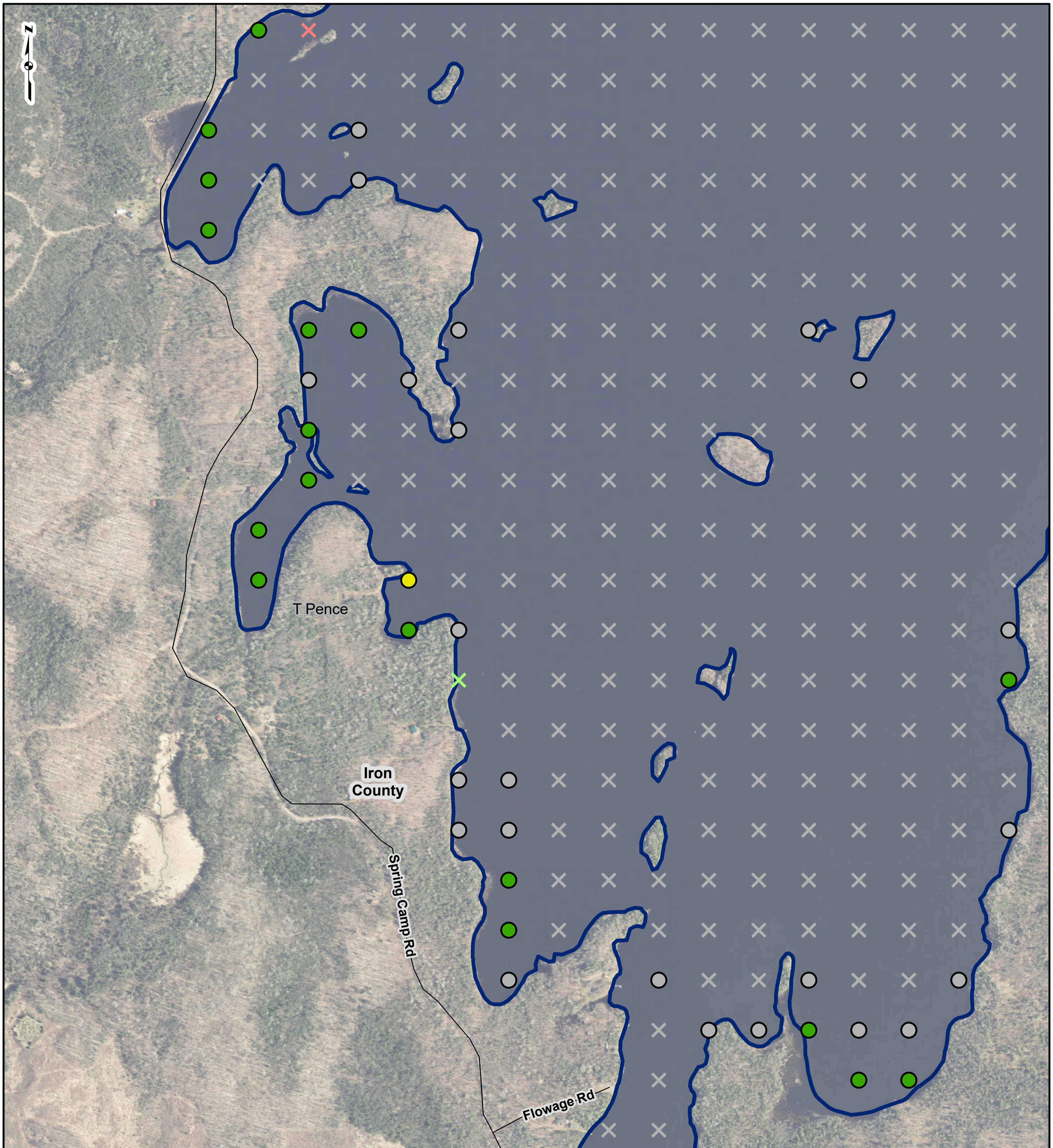

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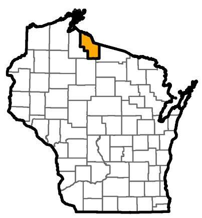

IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Rake Fullness
- 0
- 1
- 2
- 3

- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 4
Late July Point Intercept Survey
Sheet 5 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

DRAWN BY: EMW DATE: 8/18/2022
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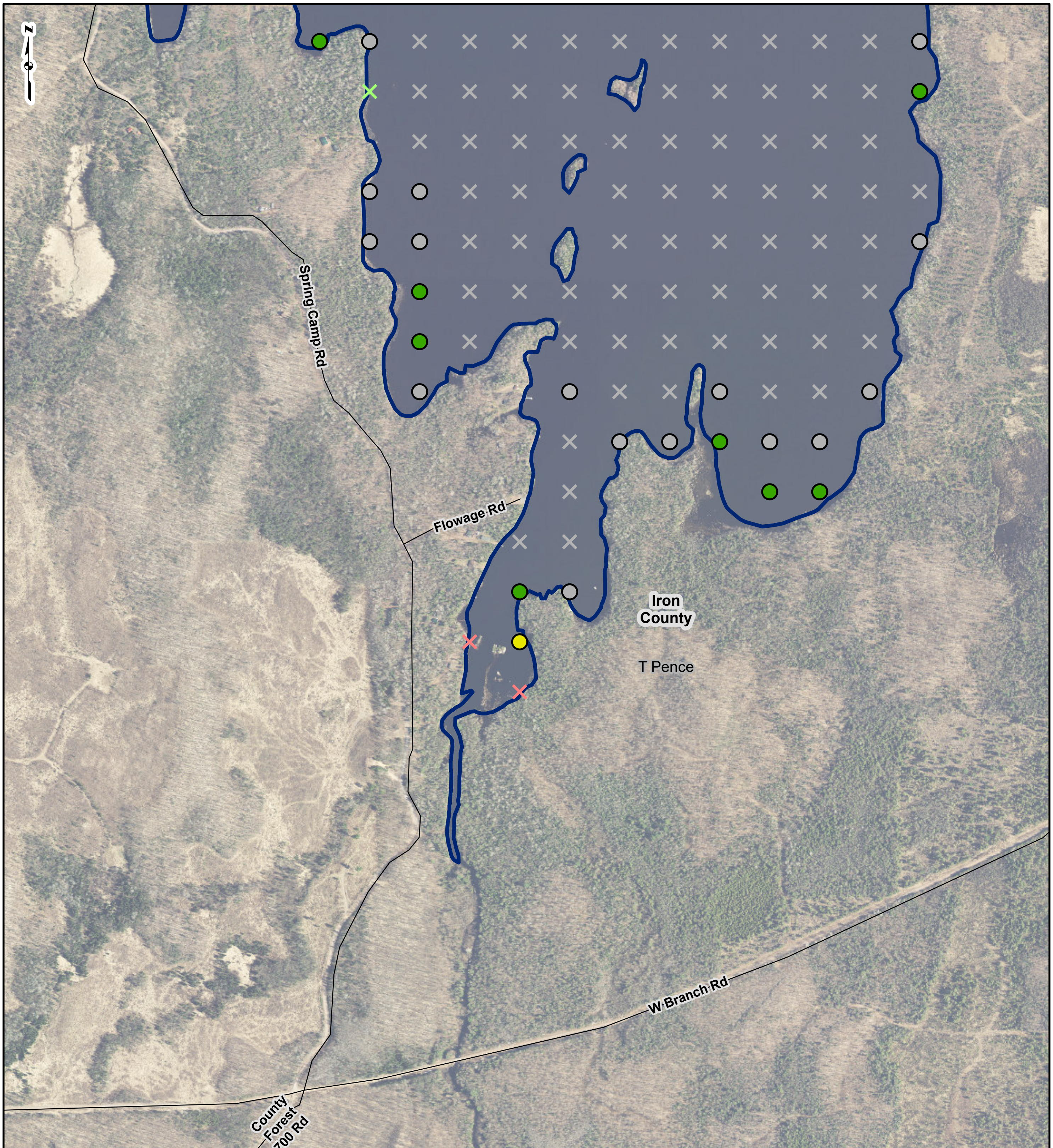
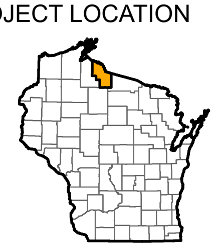


PROJECT LOCATION



IRON COUNTY, WISCONSIN

LEGEND

Deeper than Plant Growth
Non-Navigable Vegetation
Non-Navigable Terrestrial

Rake Fullness
0
1
2
3

Project Boundary
Road Centerline
Community Boundary
County Boundary

0 500 1,000 2,000 Feet

Figure 4
Late July Point Intercept Survey
Sheet 6 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

gai consultants

Mead & Hunt

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G:_2022\R220323.00 - GIS\AGP\Invasive_Mapping\Gile\R220323_00_Gile_ATIS_Mapping\R220323_00_Gile_ATIS_Mapping.aprx

FIGURE 5
Rake Fullness per WDNR Protocol

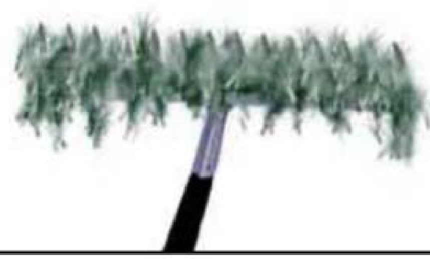
Fullness Rating	Coverage	Description
1		Only few plants. There are not enough plants to entirely cover the length of the rake head in a single layer.
2		There are enough plants to cover the length of the rake head in a single layer, but not enough to fully cover the tines.
3		The rake is completely covered and tines are not visible.

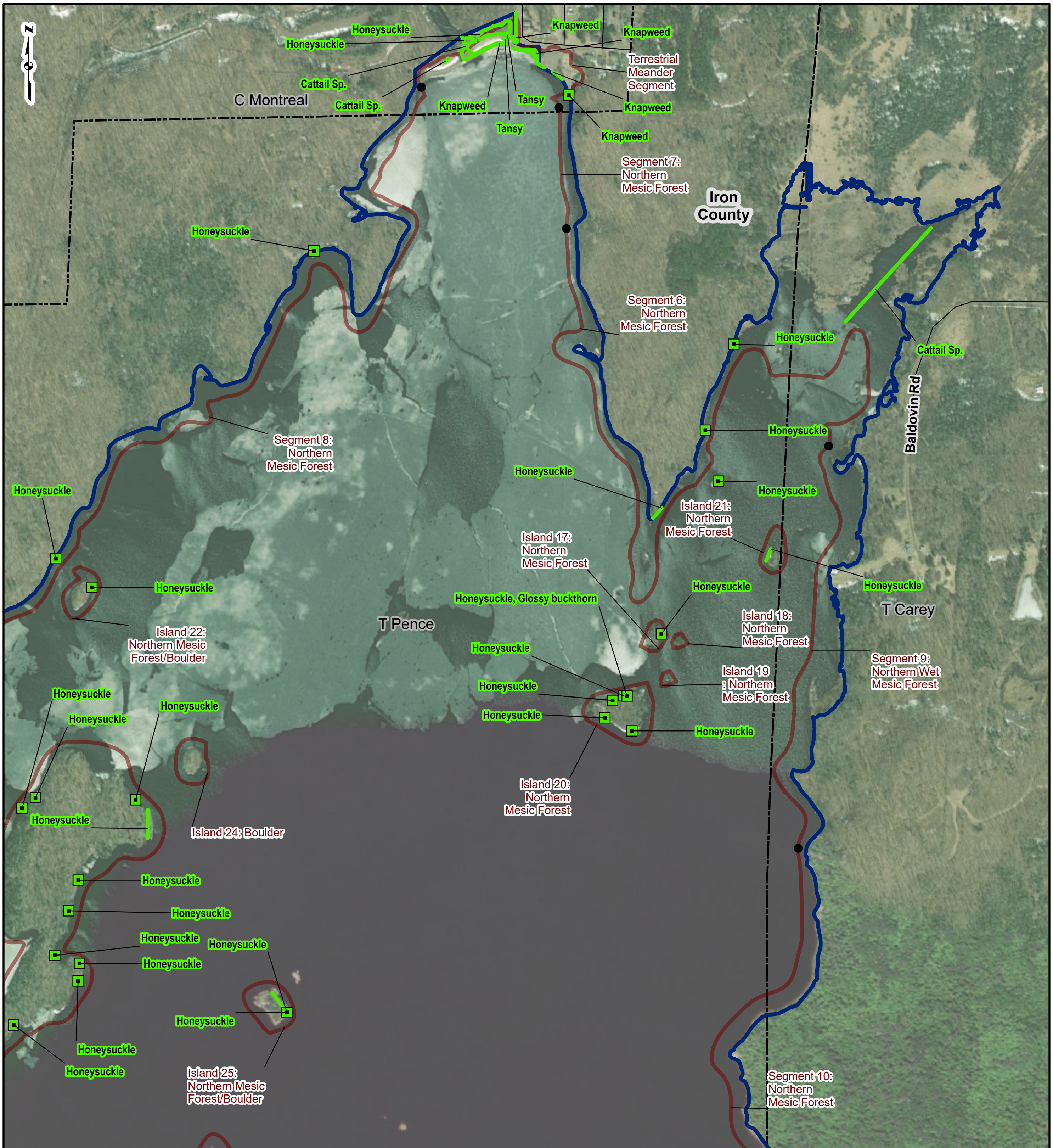
Figure 5. Rake Fullness per WDNR protocol.
Illustration of rake fulness rating used during the survey, photo used from *Recommended Baseline Monitoring of Aquatic Plants in Wisconsin: sampling design, field and laboratory procedures, data entry and analysis, and applications*. PUB-SS-1068,WDNR 2019.

FIGURE 6
Sediment Basket

Figure 6. Sediment basket.

Using a 10-inch Tetra Pond Planter Basket, with a 1/32nd inch mesh, a sample is being rinsed for examination.

FIGURE 7
Upland and Shoreline Terrestrial and Invasive Species



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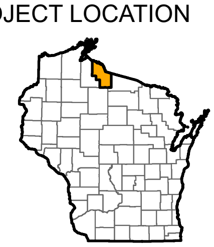

IRON COUNTY, WISCONSIN

LEGEND

- Start/Stop Locations
- Invasive Point
- Invasive Line
- Meander Segments
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 7
Upland and Shoreline Terrestrial and Invasive Species
Sheet 1 OF 7

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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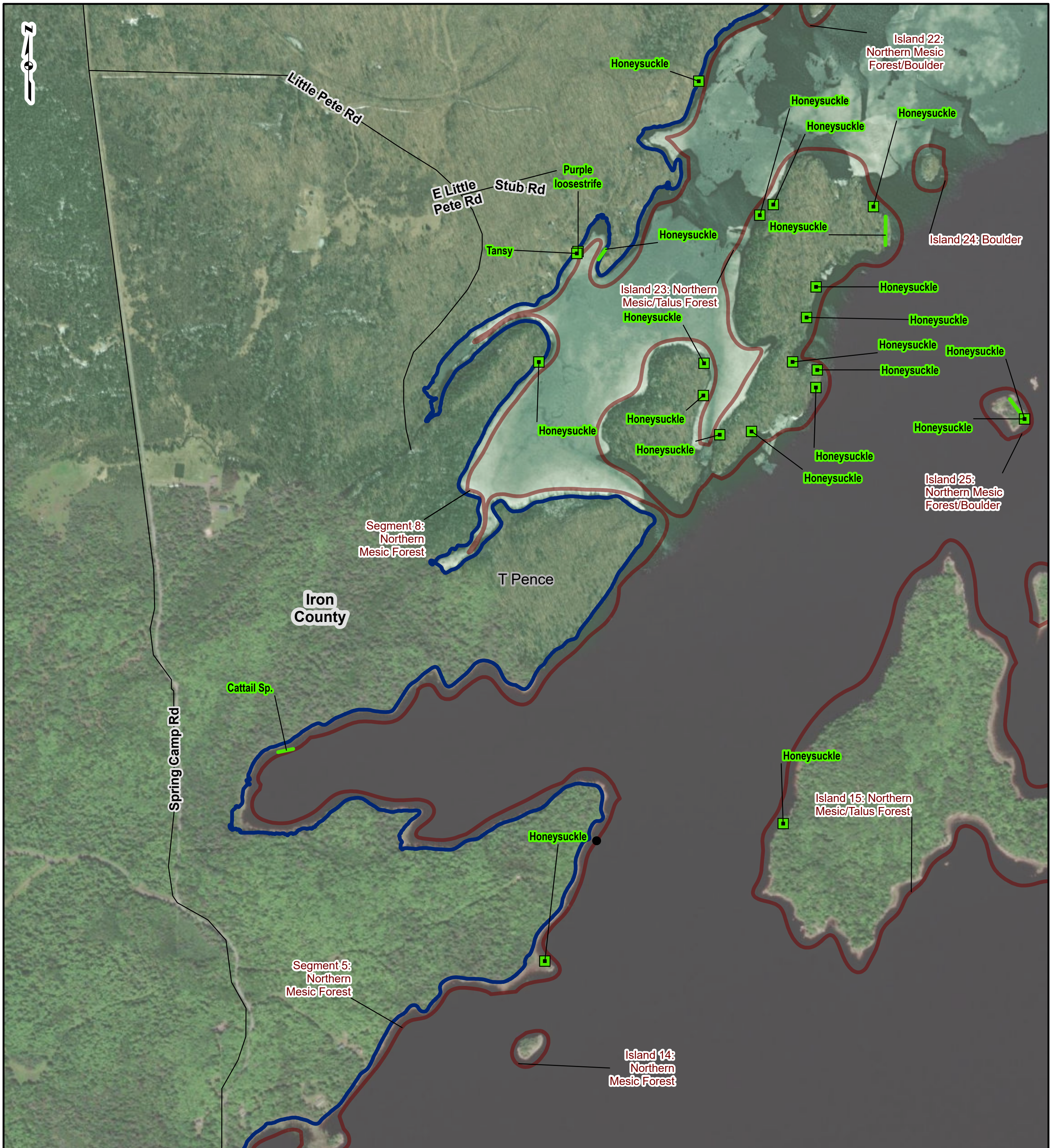

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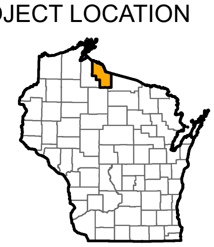

IRON COUNTY, WISCONSIN

LEGEND

- Start/Stop Locations
- Invasive Point
- Invasive Line
- Meander Segments
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 7
Upland and Shoreline Terrestrial and Invasive Species
Sheet 2 OF 7

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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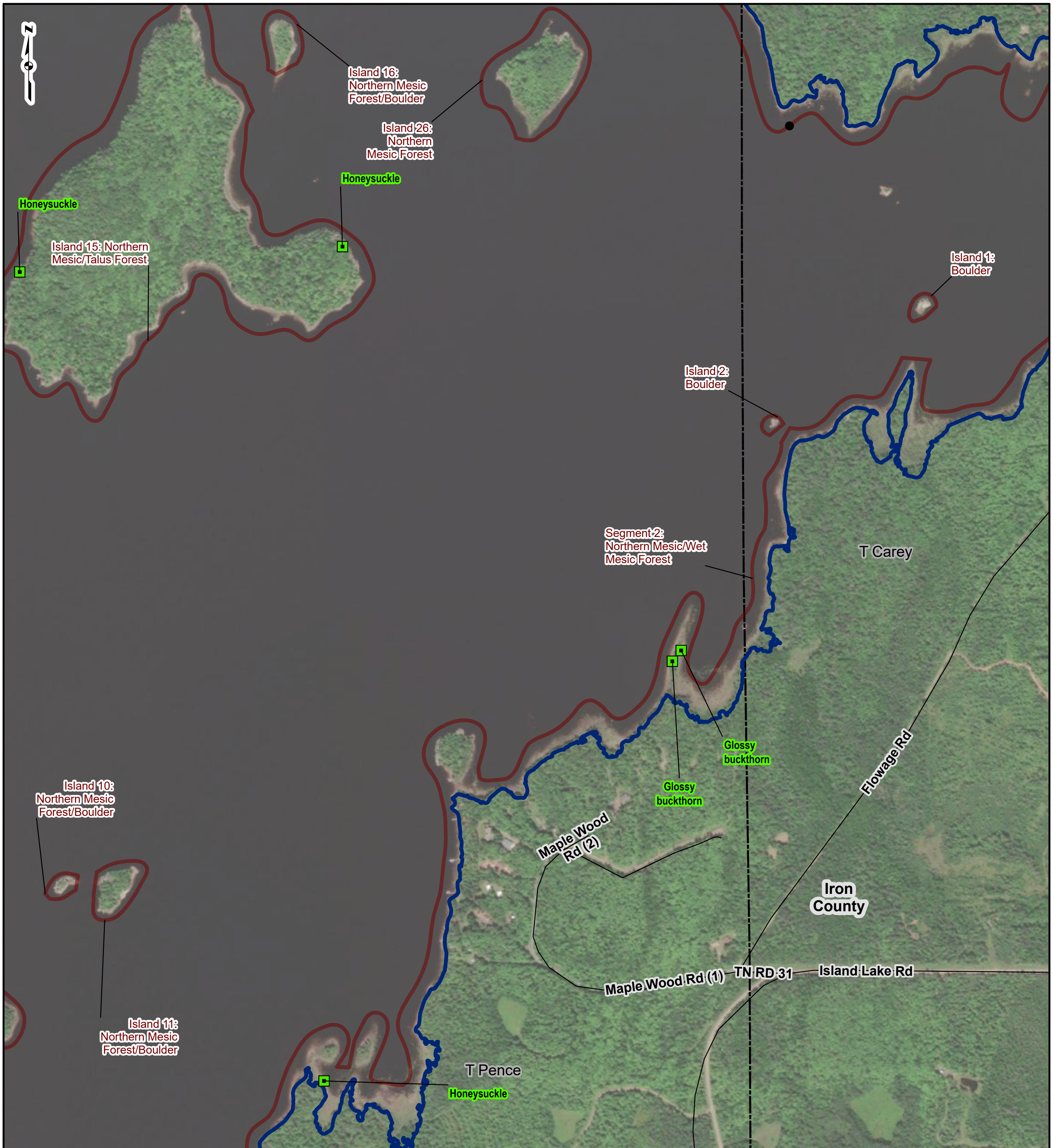

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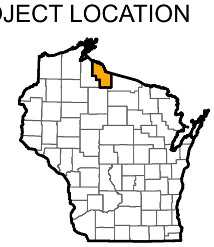

IRON COUNTY, WISCONSIN

LEGEND

- Start/Stop Locations
- Invasive Point
- Invasive Line
- Meander Segments
- Project Boundary
- Road Centerline
- Community Boundary
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0 500 1,000 2,000 Feet

Figure 7
Upland and Shoreline Terrestrial and Invasive Species
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Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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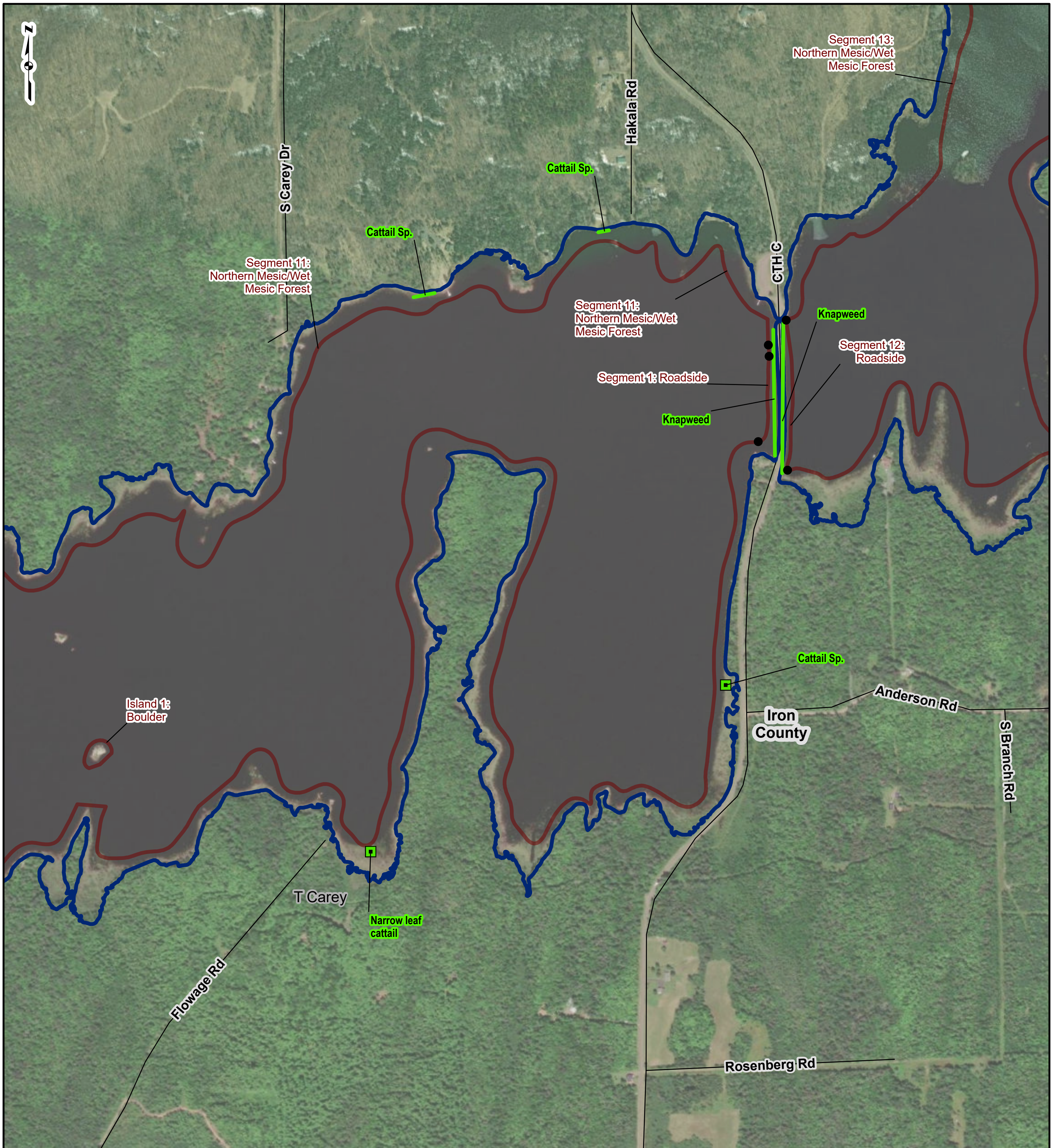

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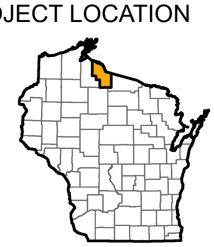

IRON COUNTY, WISCONSIN

LEGEND

- Start/Stop Locations
- Invasive Point
- Invasive Line
- Meander Segments
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 7
Upland and Shoreline Terrestrial and Invasive Species
Sheet 4 OF 7

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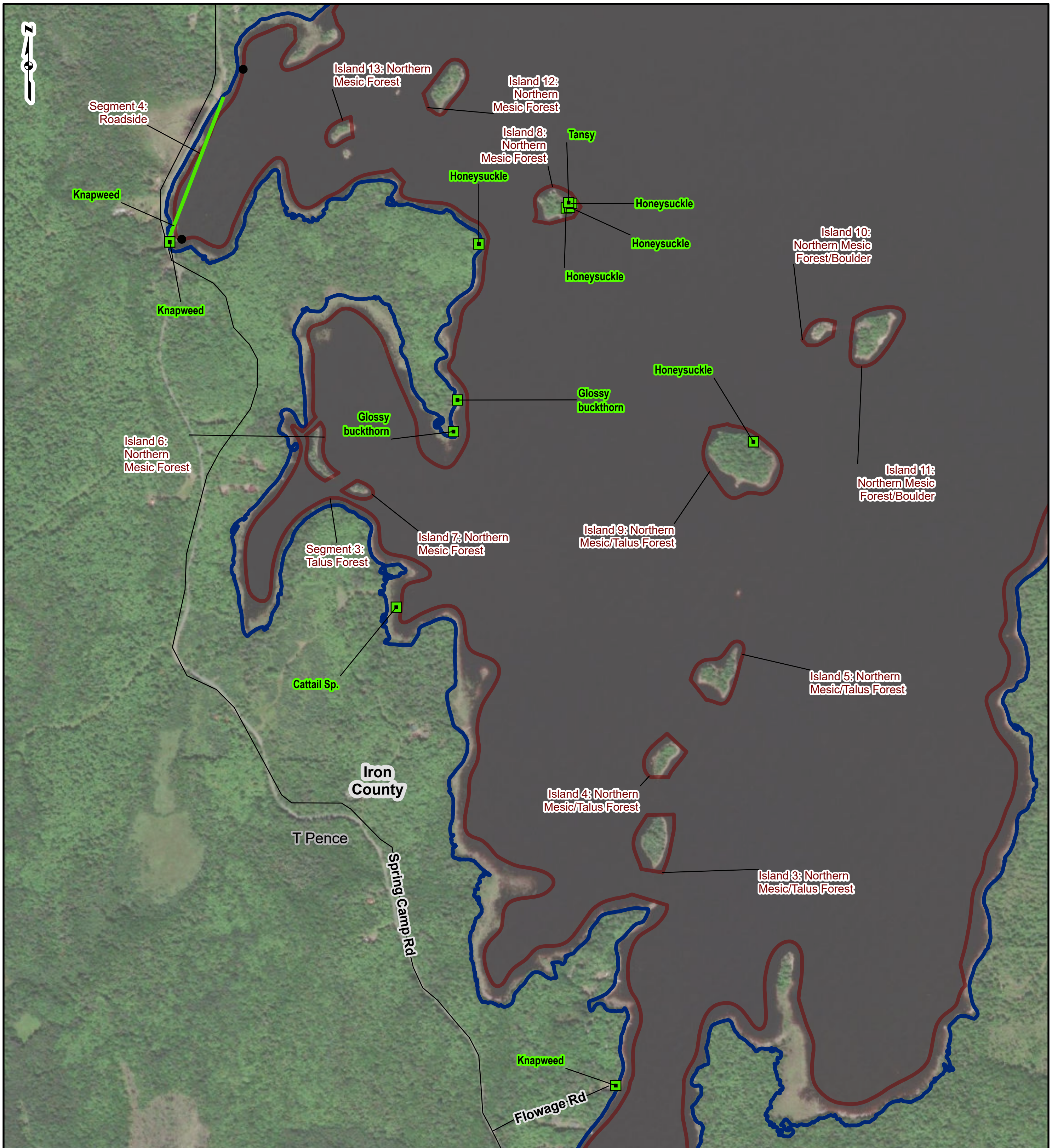

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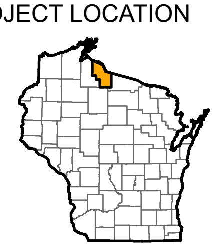

IRON COUNTY, WISCONSIN

LEGEND

- Start/Stop Locations
- Invasive Point
- Invasive Line
- Meander Segments
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 7
Upland and Shoreline Terrestrial and Invasive Species
Sheet 5 OF 7

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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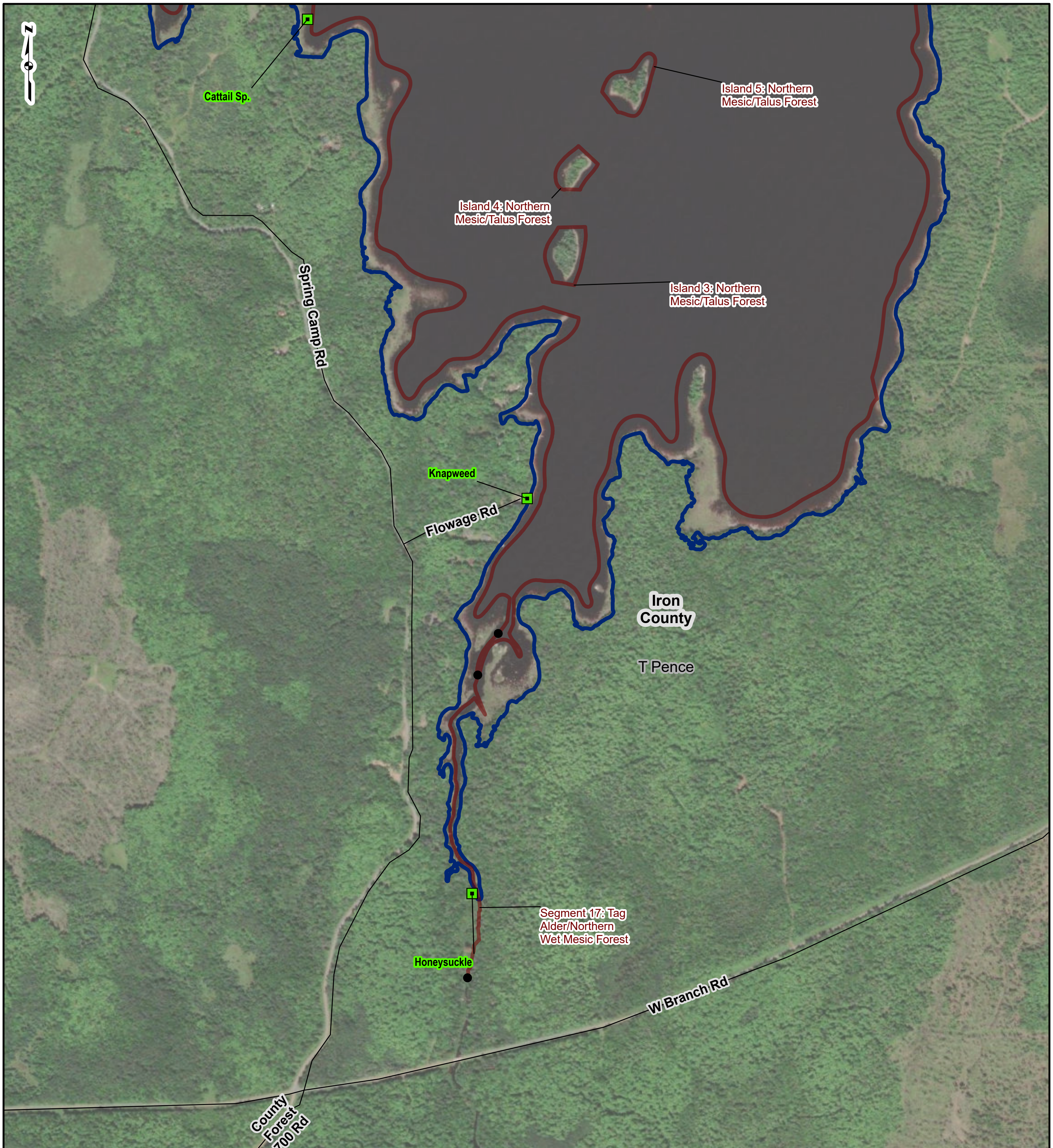

PROJECT LOCATION

IRON COUNTY, WISCONSIN

LEGEND

Start/Stop Locations
Invasive Point
Invasive Line
Meander Segments
Project Boundary
Road Centerline
Community Boundary
County Boundary

0 500 1,000 2,000 Feet

Figure 7
Upland and Shoreline Terrestrial and Invasive Species
Sheet 6 OF 7

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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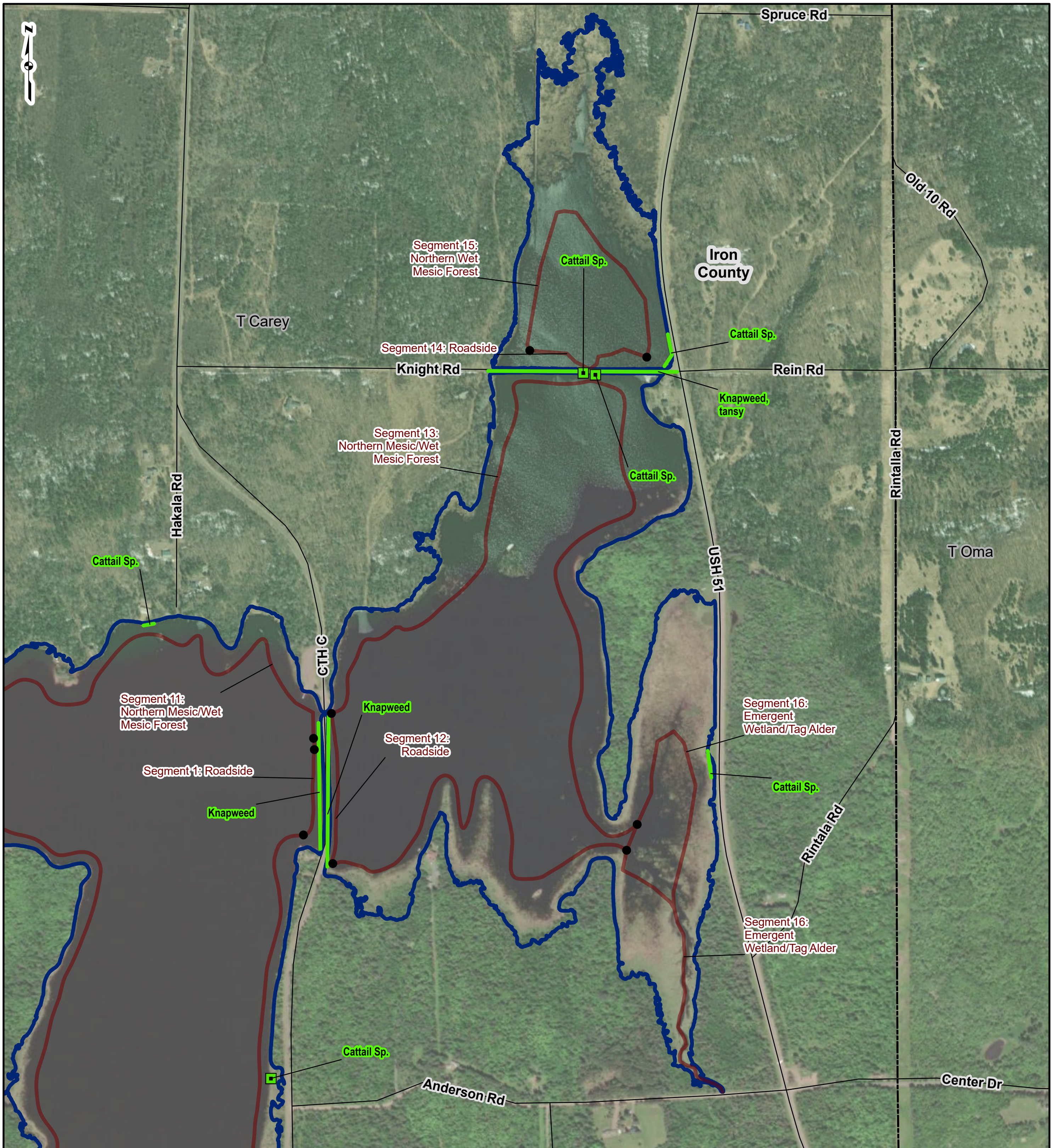

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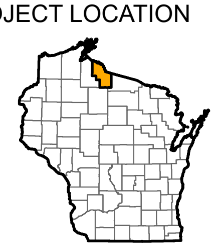

IRON COUNTY, WISCONSIN

LEGEND

- Start/Stop Locations
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- Invasive Line
- Meander Segments
- Project Boundary
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- Community Boundary
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0 500 1,000 2,000 Feet

Figure 7
Upland and Shoreline Terrestrial and Invasive Species
Sheet 7 OF 7

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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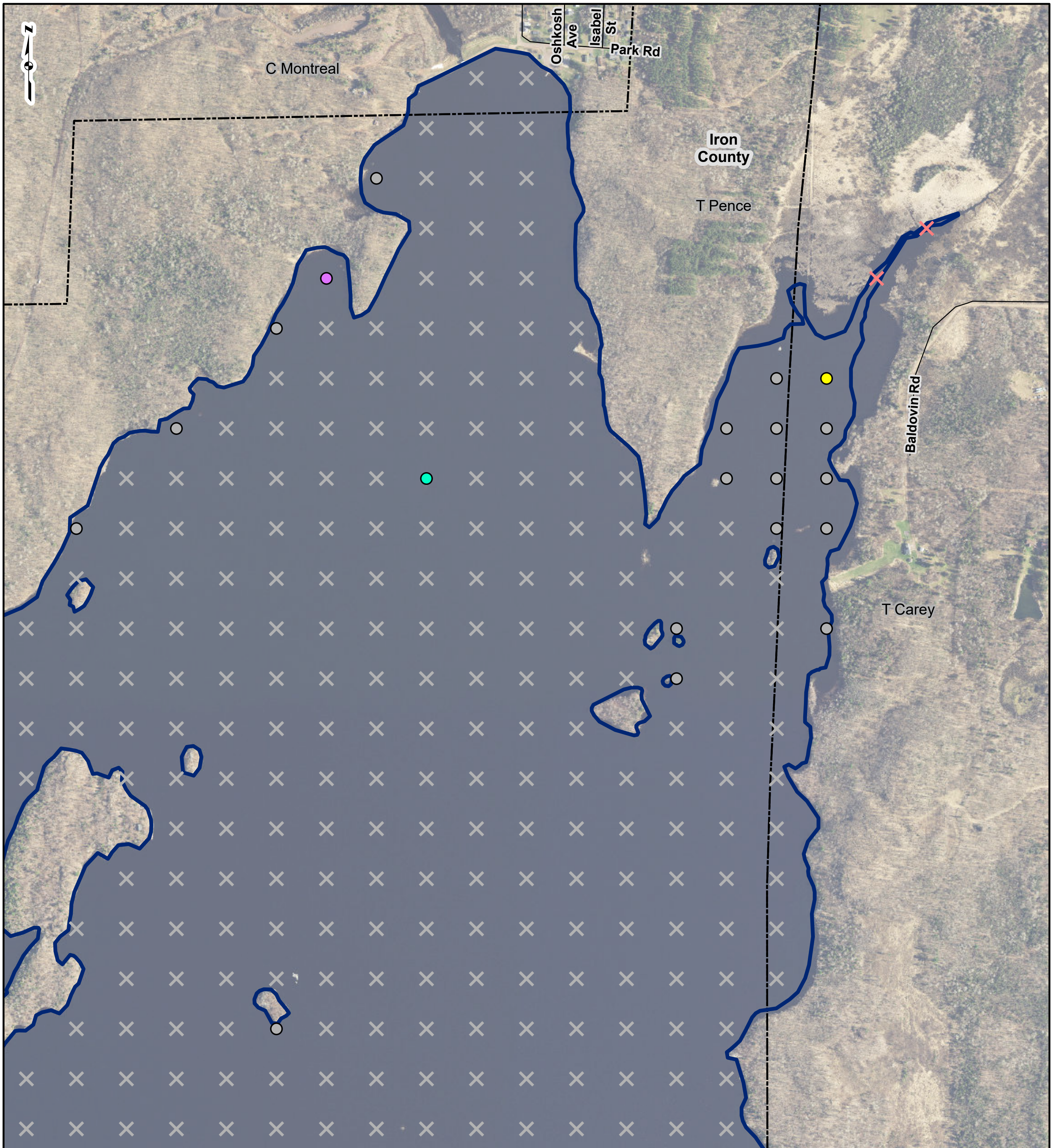
FIGURE 8
June Predominant Species



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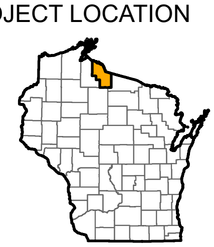

IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Predominant Species

- None
- Alternate-flowered watermilfoil
- Common waterweed
- Creeping spearwort
- Narrow-leaf bur-reed
- Large-leaf pondweed
- Long-leaf pondweed
- Nitella
- Slender waterweed
- Variable pondweed
- Waterwort
- Whorled watermilfoil
- Wild rice
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 8
June Predominant Species
Sheet 1 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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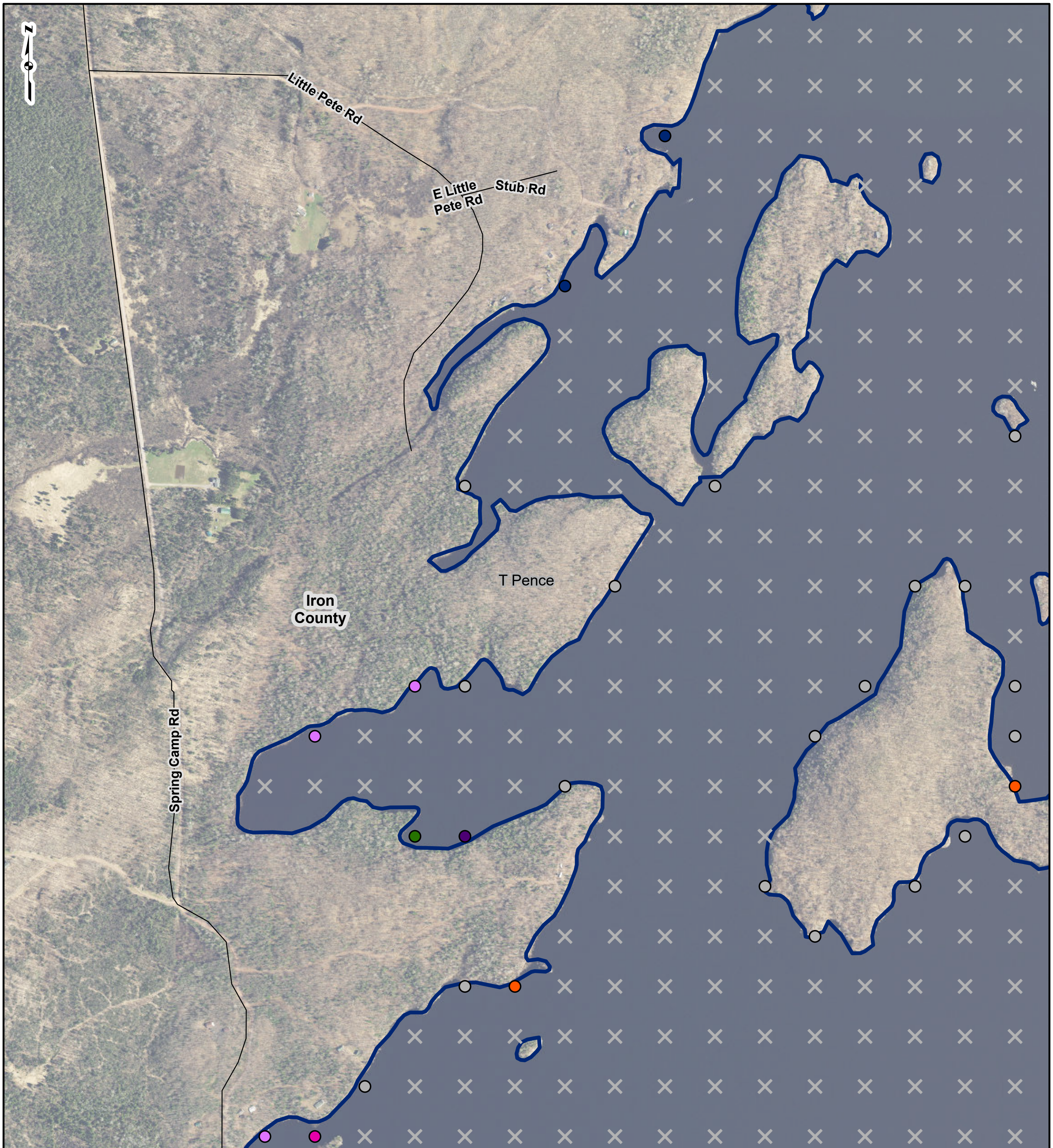

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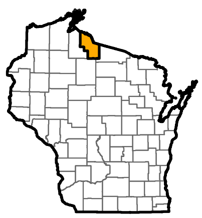

IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Predominant Species

- None
- Alternate-flowered watermilfoil
- Common waterweed
- Creeping spearwort
- Narrow-leaf bur-reed
- Large-leaf pondweed
- Long-leaf pondweed
- Nitella
- Slender waterweed
- Variable pondweed
- Waterwort
- Whorled watermilfoil
- Wild rice
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 8
June Predominant Species
Sheet 2 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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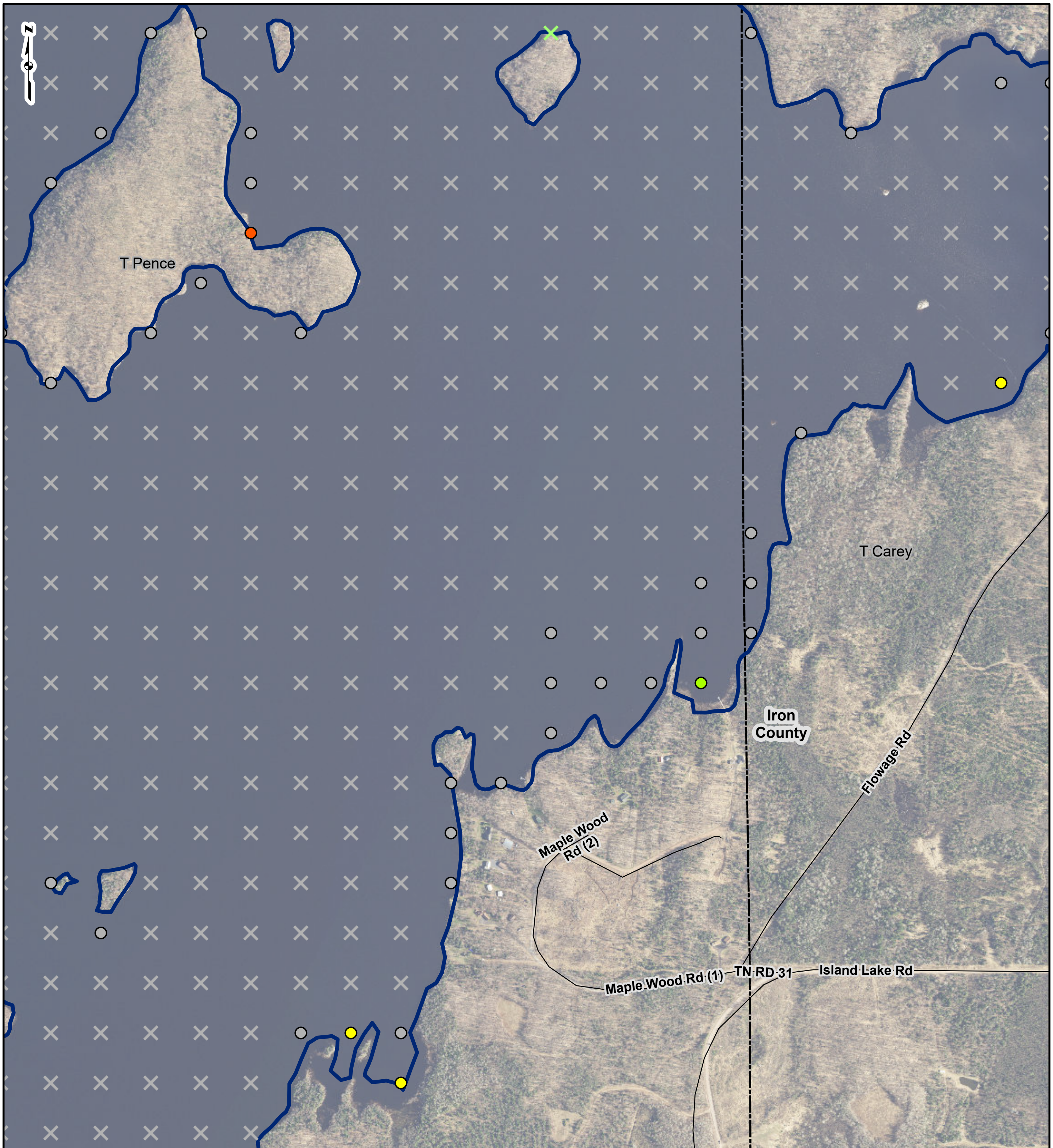

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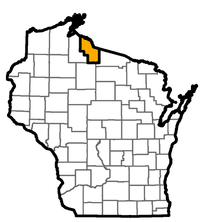

IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Predominant Species

- None
- Alternate-flowered watermilfoil
- Common waterweed
- Creeping spearwort
- Narrow-leaf bur-reed
- Large-leaf pondweed
- Long-leaf pondweed
- Nitella
- Slender waterweed
- Variable pondweed
- Waterwort
- Whorled watermilfoil
- Wild rice
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 8
June Predominant Species
Sheet 3 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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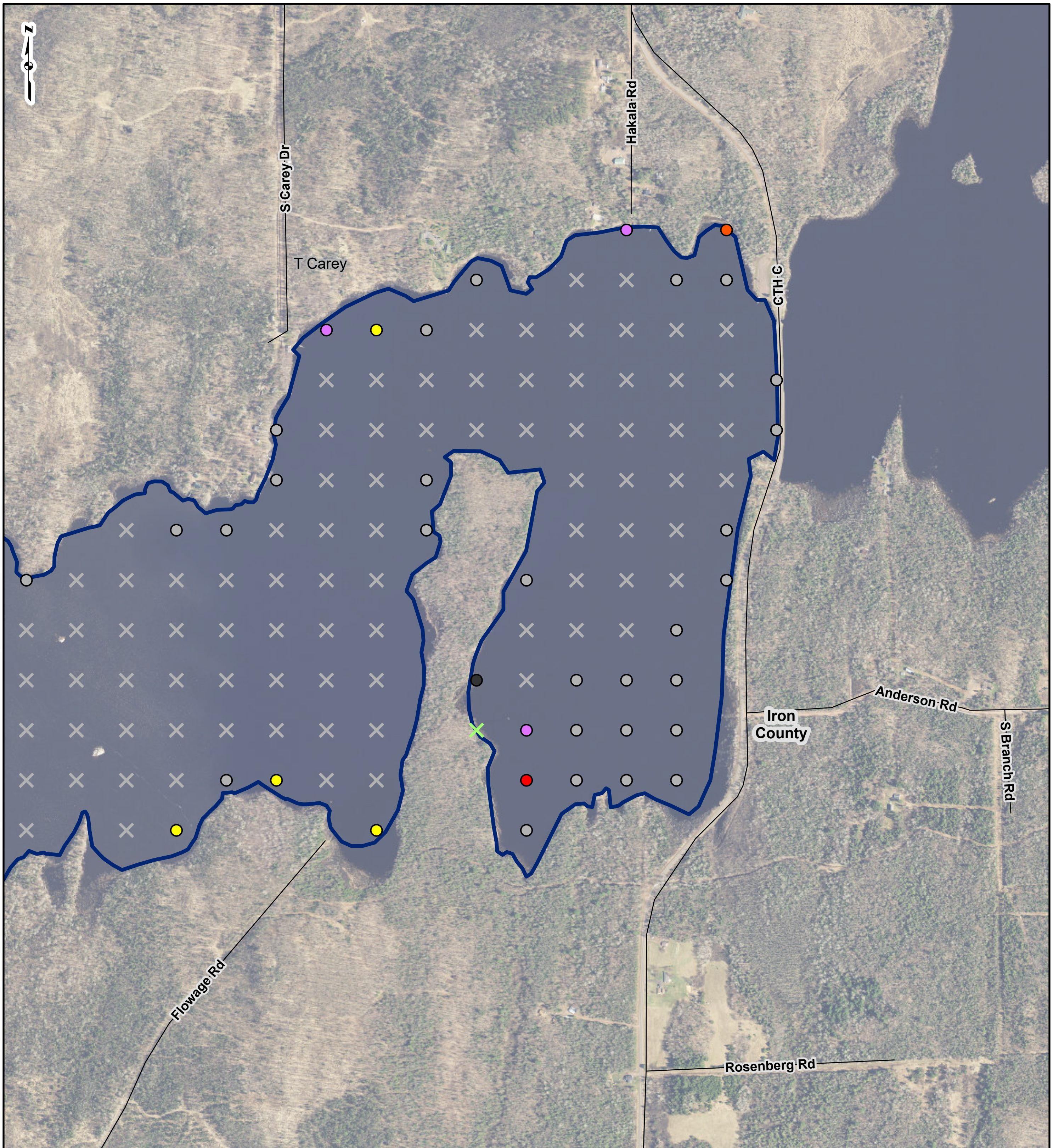

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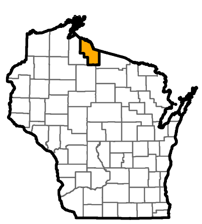

IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Predominant Species

- None
- Alternate-flowered watermilfoil
- Common waterweed
- Creeping spearwort
- Narrow-leaf bur-reed
- Large-leaf pondweed
- Long-leaf pondweed
- Nitella
- Slender waterweed
- Variable pondweed
- Waterwort
- Whorled watermilfoil
- Wild rice
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 8
June Predominant Species
Sheet 4 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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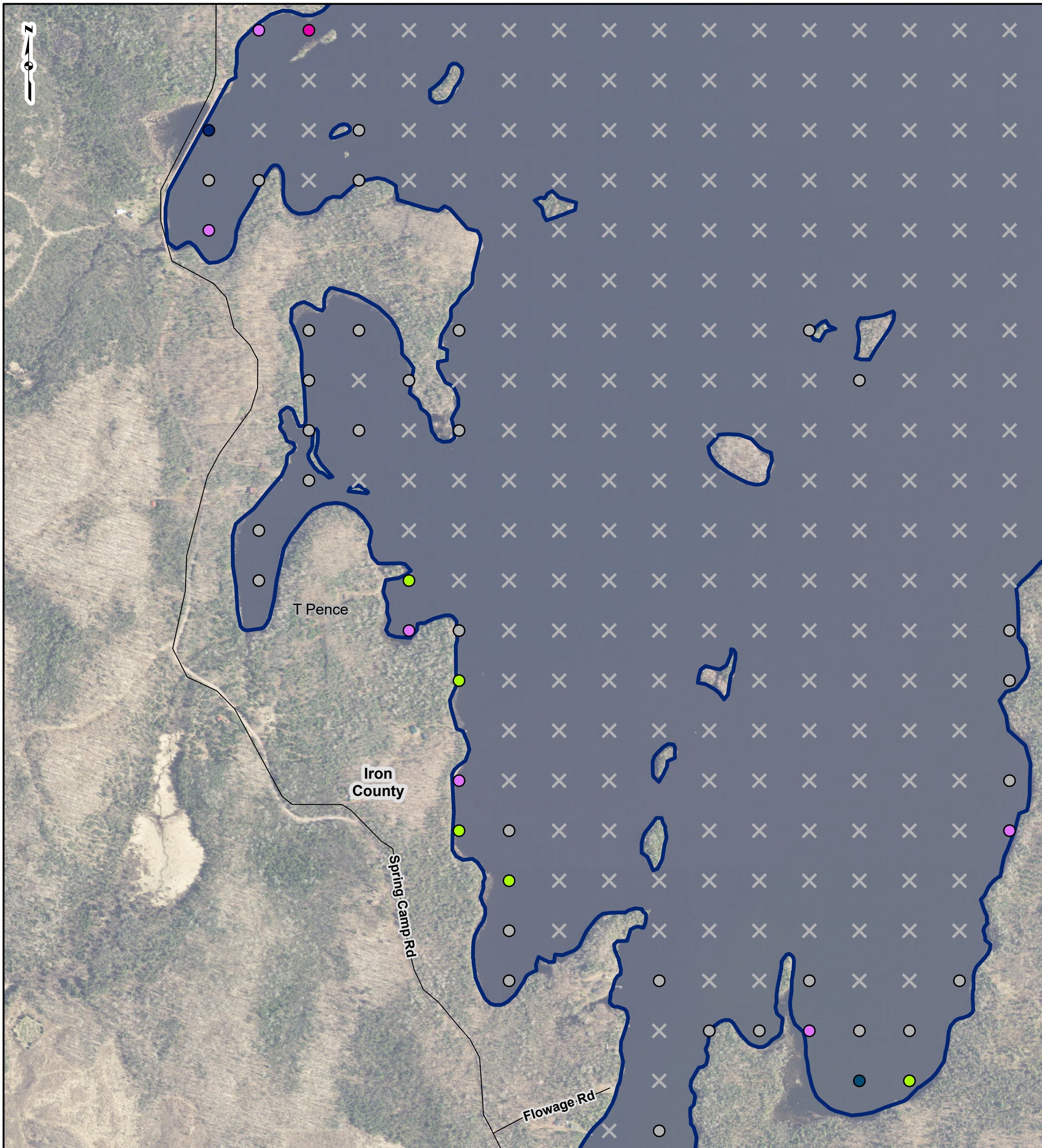

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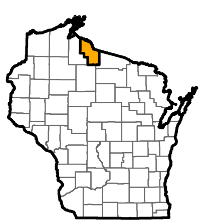

IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Predominant Species

- None
- Alternate-flowered watermilfoil
- Common waterweed
- Creeping spearwort
- Narrow-leaf bur-reed
- Large-leaf pondweed
- Long-leaf pondweed
- Nitella
- Slender waterweed
- Variable pondweed
- Waterwort
- Whorled watermilfoil
- Wild rice
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 8
June Predominant Species
Sheet 5 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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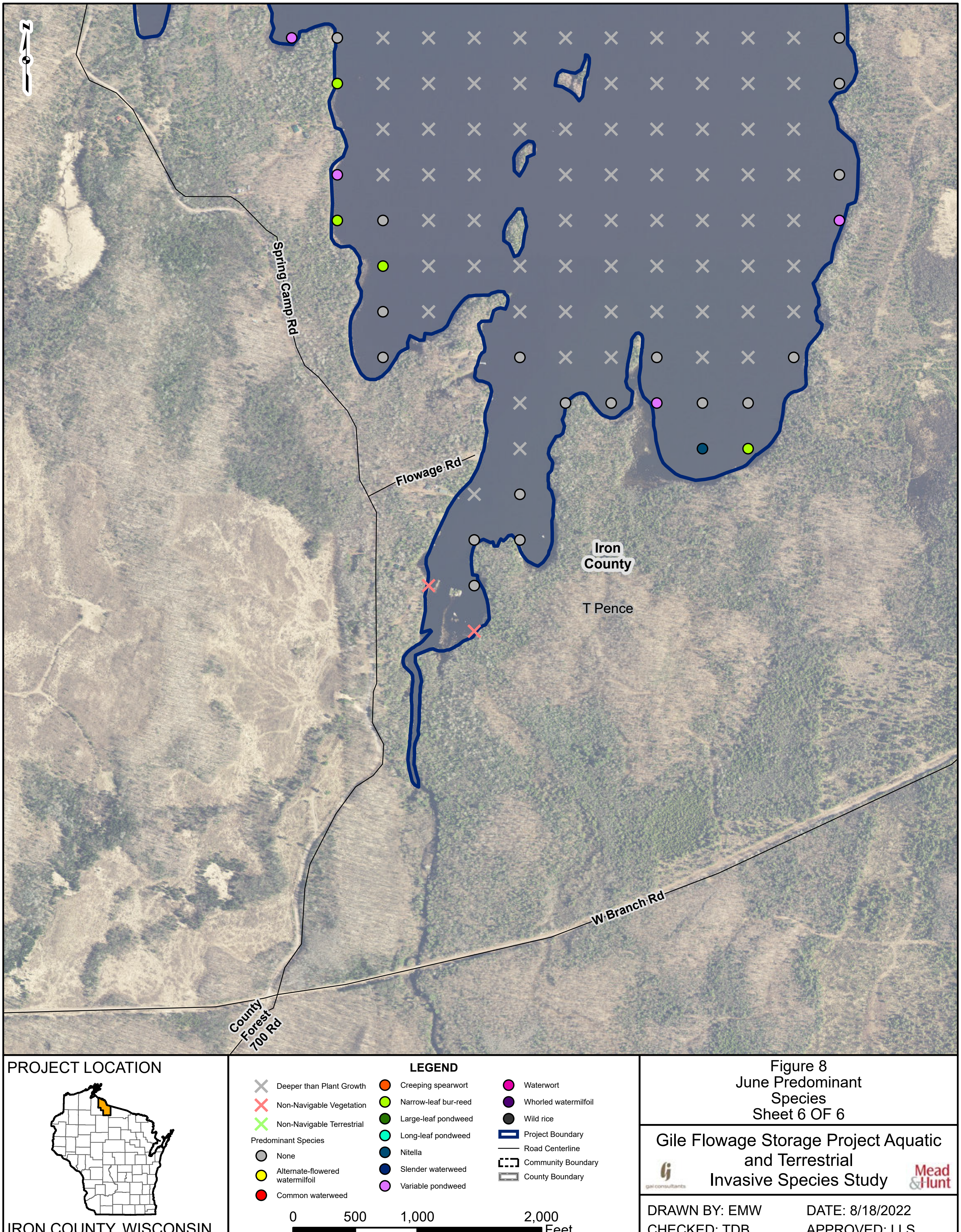

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Predominant Species

- None
- Alternate-flowered watermilfoil
- Common waterweed
- Creeping spearwort
- Narrow-leaf bur-reed
- Large-leaf pondweed
- Long-leaf pondweed
- Nitella
- Slender waterweed
- Variable pondweed
- Waterwort
- Whorled watermilfoil
- Wild rice
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 8
June Predominant Species
Sheet 6 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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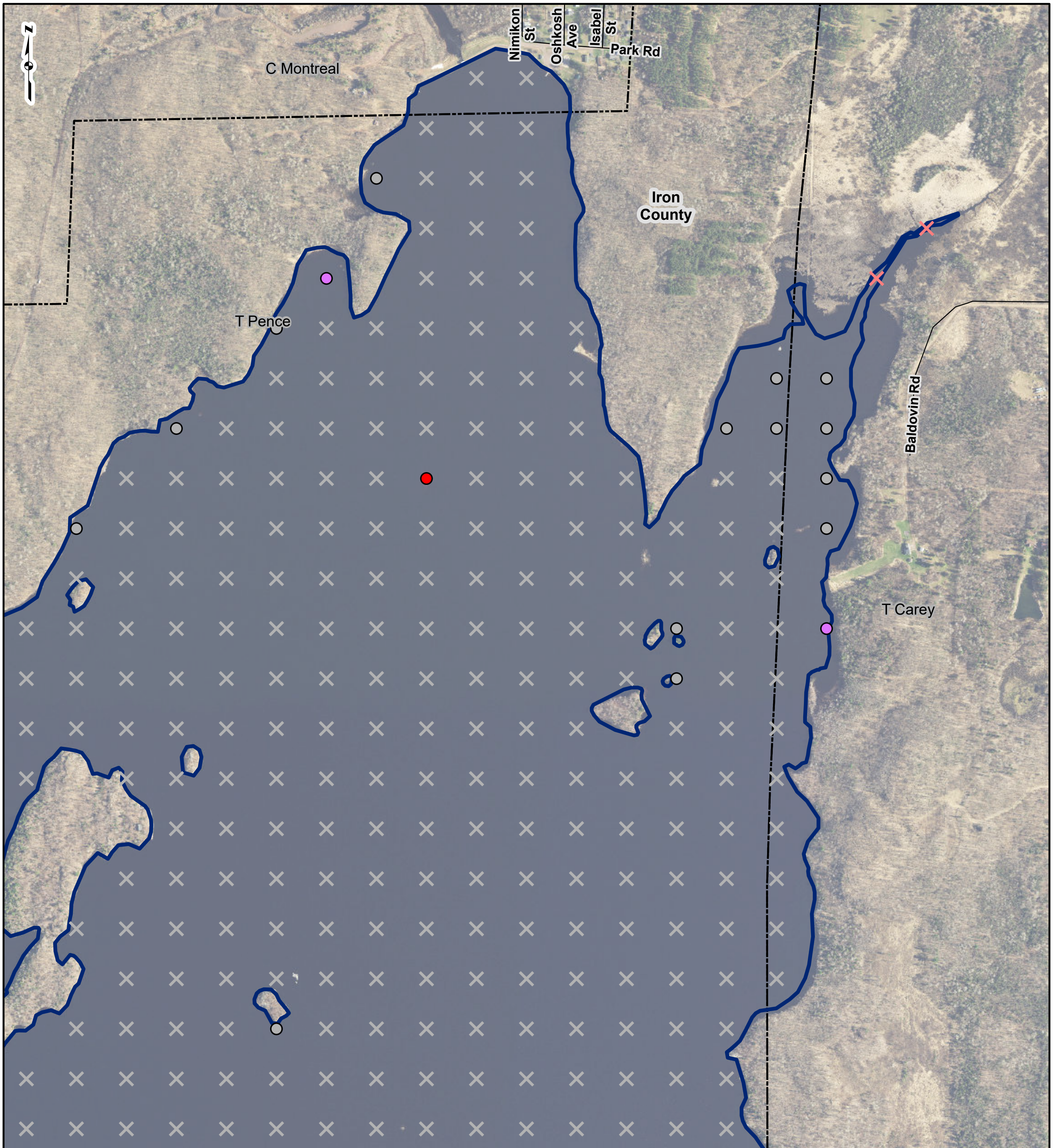
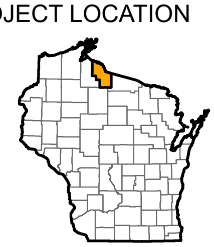
FIGURE 9

Late-July Predominant Species



PROJECT LOCATION



IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Predominant Species

- None
- Common waterweed
- Creeping spearwort
- Narrow-leaf bur-reed
- Ribbon-leaf pondweed
- Slender waterweed
- Spiral-fruited pondweed
- Stoneworts
- Variable pondweed
- Various-leaved watermilfoil
- Whorled watermilfoil
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 9
Late July
Predominant Species
Sheet 1 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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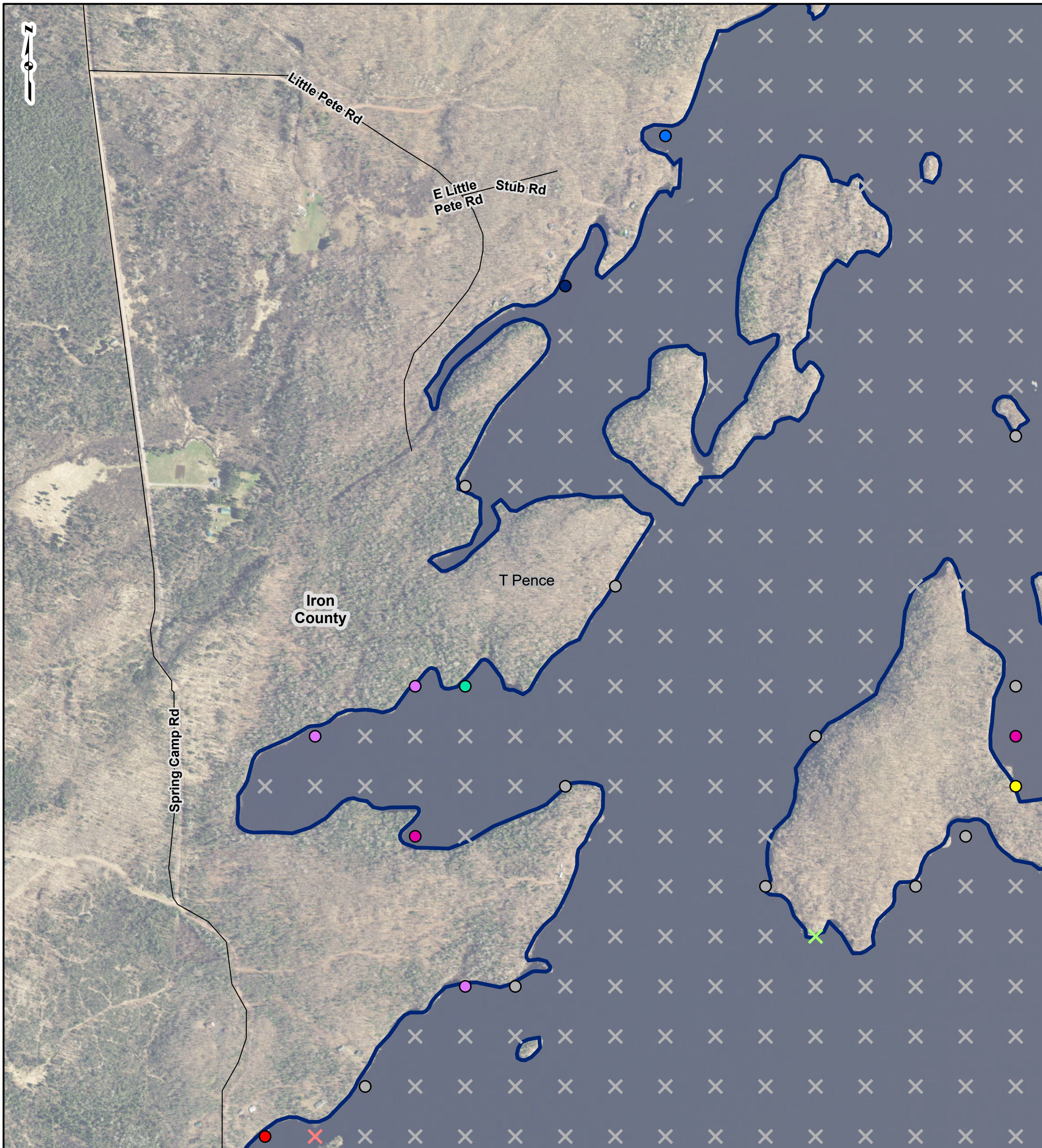
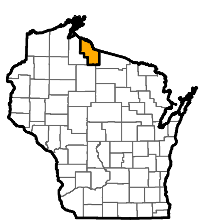


PROJECT LOCATION



IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Predominant Species

- None
- Common waterweed
- Creeping spearwort
- Narrow-leaf bur-reed
- Ribbon-leaf pondweed
- Slender waterweed
- Spiral-fruited pondweed
- Stoneworts
- Variable pondweed
- Various-leaved watermilfoil
- Whorled watermilfoil
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 9
Late July
Predominant Species
Sheet 2 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

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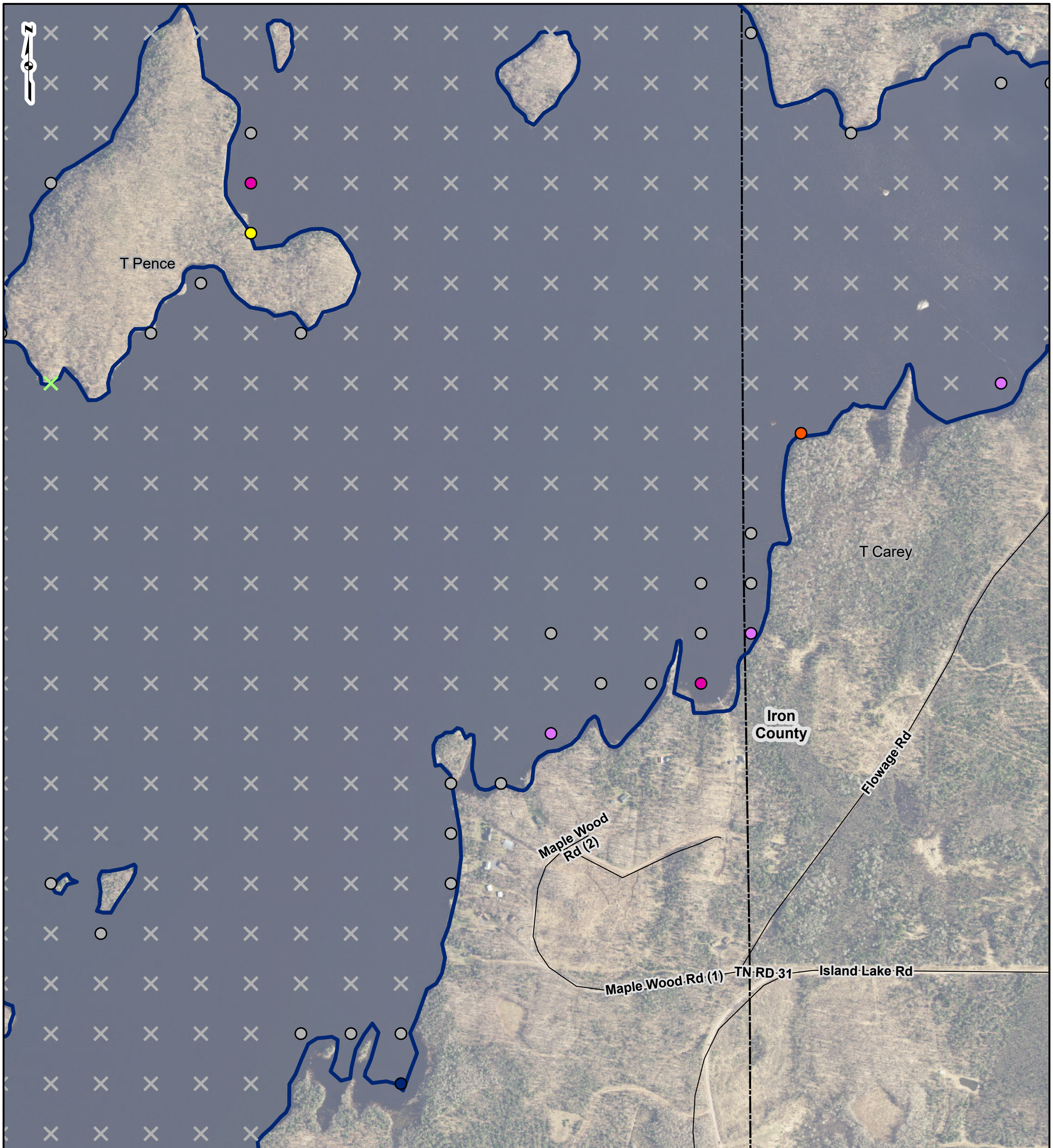
WISDOT Road Centerlines, 2021.

G:_2022\R220323.00 - GIS\AGP\Invasive_Mapping\Gile\R220323_00_Gile_ATIS_Mapping\R220323_00_Gile_ATIS_Mapping.aprx



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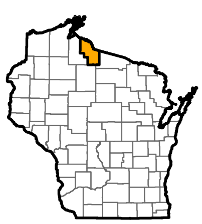


IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Predominant Species

- None
- Common waterweed
- Creeping spearwort
- Narrow-leaf bur-reed
- Ribbon-leaf pondweed
- Slender waterweed
- Spiral-fruited pondweed
- Stoneworts
- Variable pondweed
- Various-leaved watermilfoil
- Whorled watermilfoil
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 9
Late July
Predominant Species
Sheet 3 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

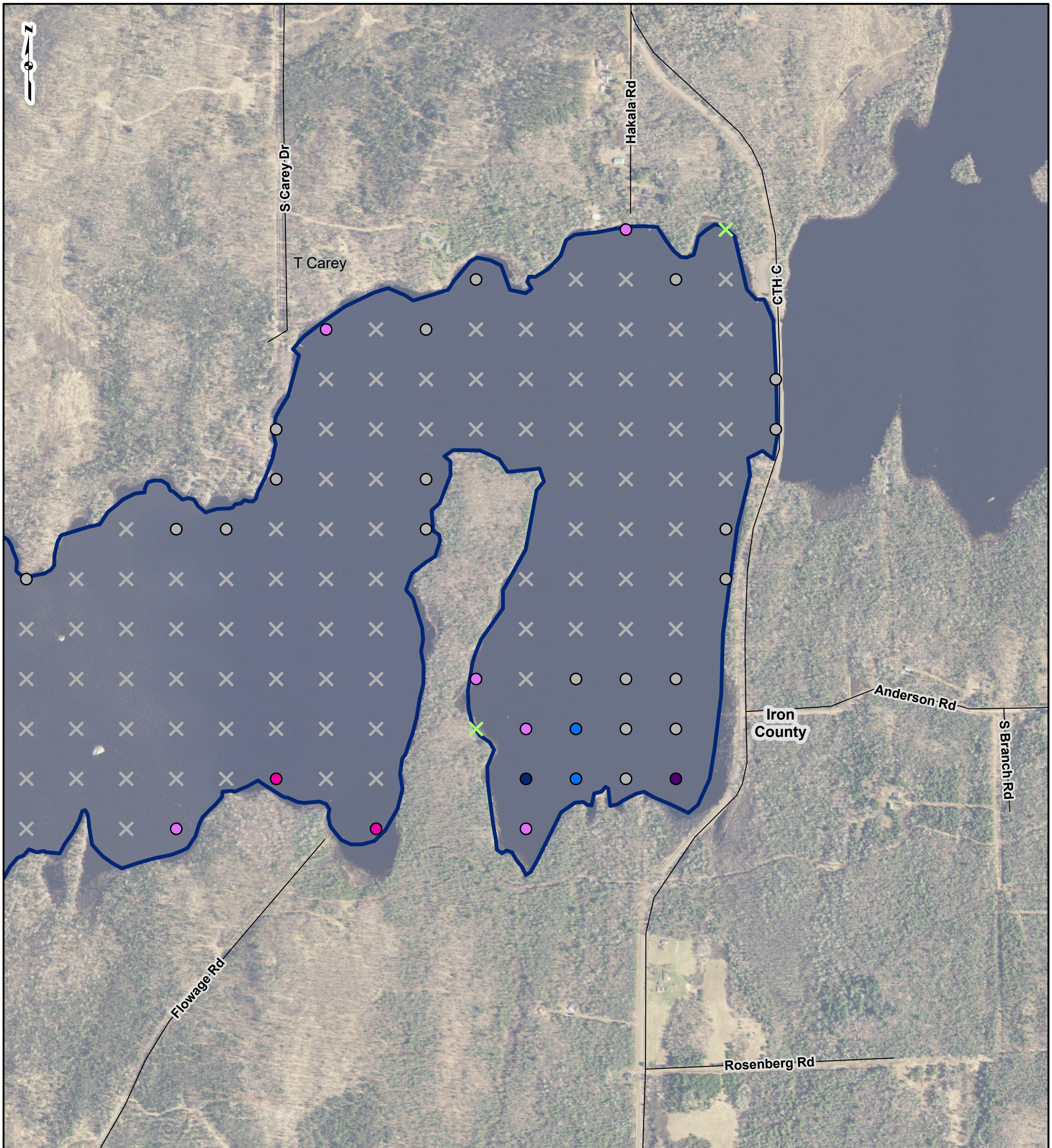
gai consultants

Mead & Hunt

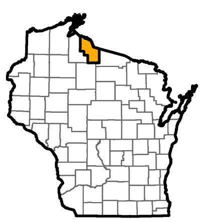
DRAWN BY: EMW
DATE: 8/18/2022
CHECKED: TDB
APPROVED: LLS

REFERENCE: ESRI WORLD IMAGERY 2021, Accessed 8/18/2022. WDNR Counties, 2011. WISLR Community Boundary 2021. WISDOT Road Centerlines, 2021.

G:_2022\R220323.00 - GIS\AGP\Invasive_Mapping\Gile\R220323_00_Gile_ATIS_Mapping\R220323_00_Gile_ATIS_Mapping.aprx



PROJECT LOCATION



IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Predominant Species

- None
- Common waterweed
- Creeping spearwort
- Narrow-leaf bur-reed
- Ribbon-leaf pondweed
- Slender waterweed
- Spiral-fruited pondweed
- Stoneworts
- Variable pondweed
- Various-leaved watermilfoil
- Whorled watermilfoil
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 9
Late July
Predominant Species
Sheet 4 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

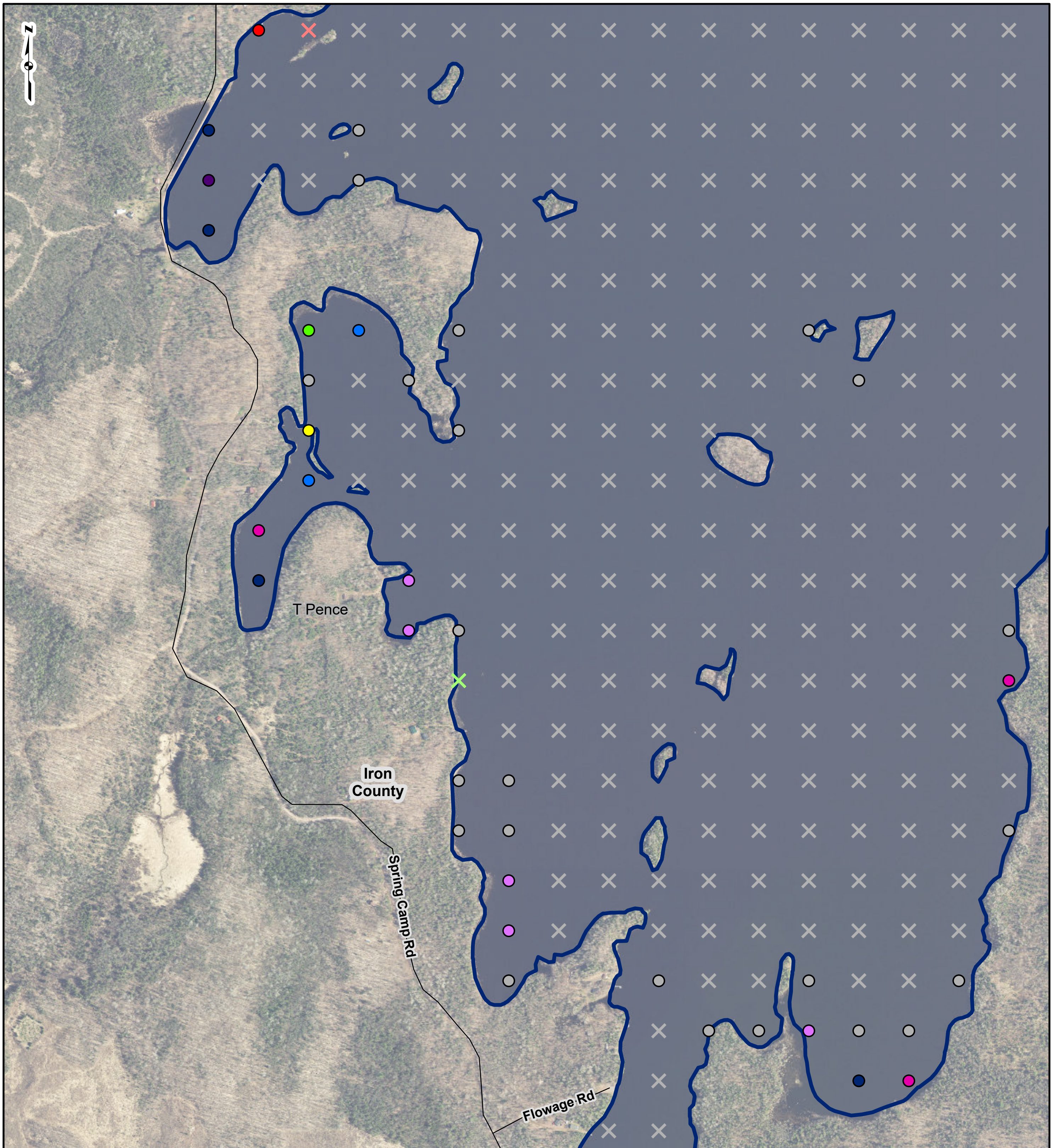
gai consultants

Mead & Hunt

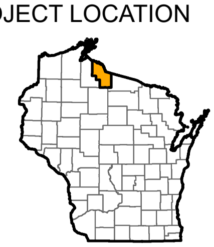
DRAWN BY: EMW
CHECKED: TDB
DATE: 8/18/2022
APPROVED: LLS

REFERENCE: ESRI WORLD IMAGERY 2021, Accessed 8/18/2022. WDNR Counties, 2011. WISLR Community Boundary 2021.
WISDOT Road Centerlines, 2021.

G:_2022\R220323.00 - GIS\AGP\Invasive_Mapping\Gile\R220323_00_Gile_ATIS_Mapping\R220323_00_Gile_ATIS_Mapping.aprx



PROJECT LOCATION



IRON COUNTY, WISCONSIN

LEGEND

Deeper than Plant Growth
Non-Navigable Vegetation
Non-Navigable Terrestrial
Predominant Species
None
Common waterweed
Creeping spearwort
Narrow-leaf bur-reed
Ribbon-leaf pondweed
Slender waterweed
Spiral-fruited pondweed
Stoneworts
Variable pondweed
Various-leaved watermilfoil
Whorled watermilfoil
Project Boundary
Road Centerline
Community Boundary
County Boundary

0 500 1,000 2,000 Feet

Figure 9
Late July
Predominant Species
Sheet 5 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

DRAWN BY: EMW
CHECKED: TDB
DATE: 8/18/2022
APPROVED: LLS

REFERENCE: ESRI WORLD IMAGERY 2021, Accessed 8/18/2022. WDNR Counties, 2011. WISLR Community Boundary 2021. WISDOT Road Centerlines, 2021.

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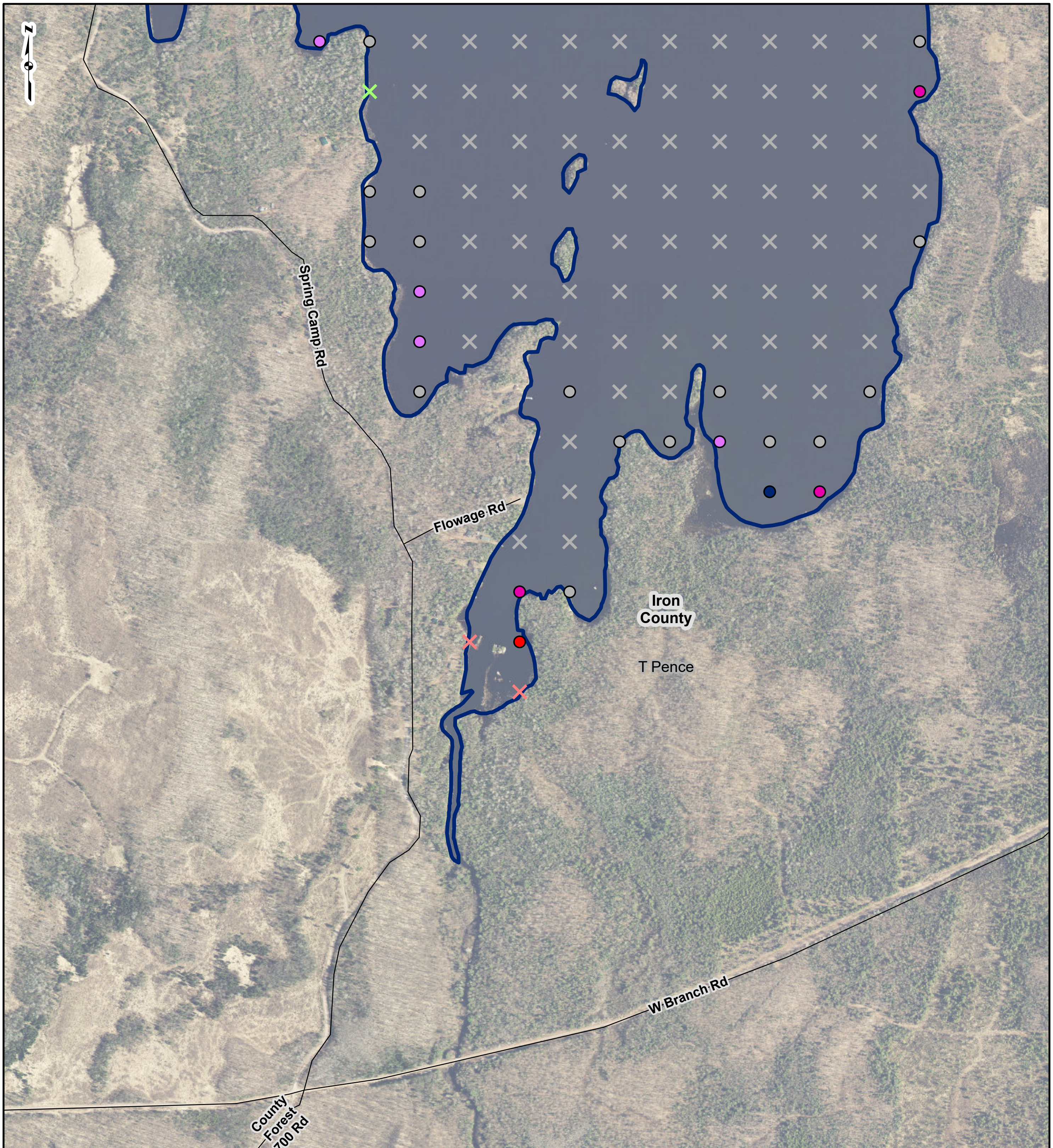
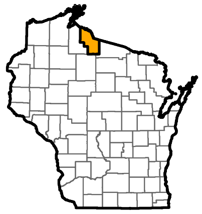


PROJECT LOCATION



IRON COUNTY, WISCONSIN

LEGEND

- Deeper than Plant Growth
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Predominant Species

- None
- Common waterweed
- Creeping spearwort
- Narrow-leaf bur-reed
- Ribbon-leaf pondweed
- Slender waterweed
- Spiral-fruited pondweed
- Stoneworts
- Variable pondweed
- Various-leaved watermilfoil
- Whorled watermilfoil
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 9
Late July
Predominant Species
Sheet 6 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

gai consultants

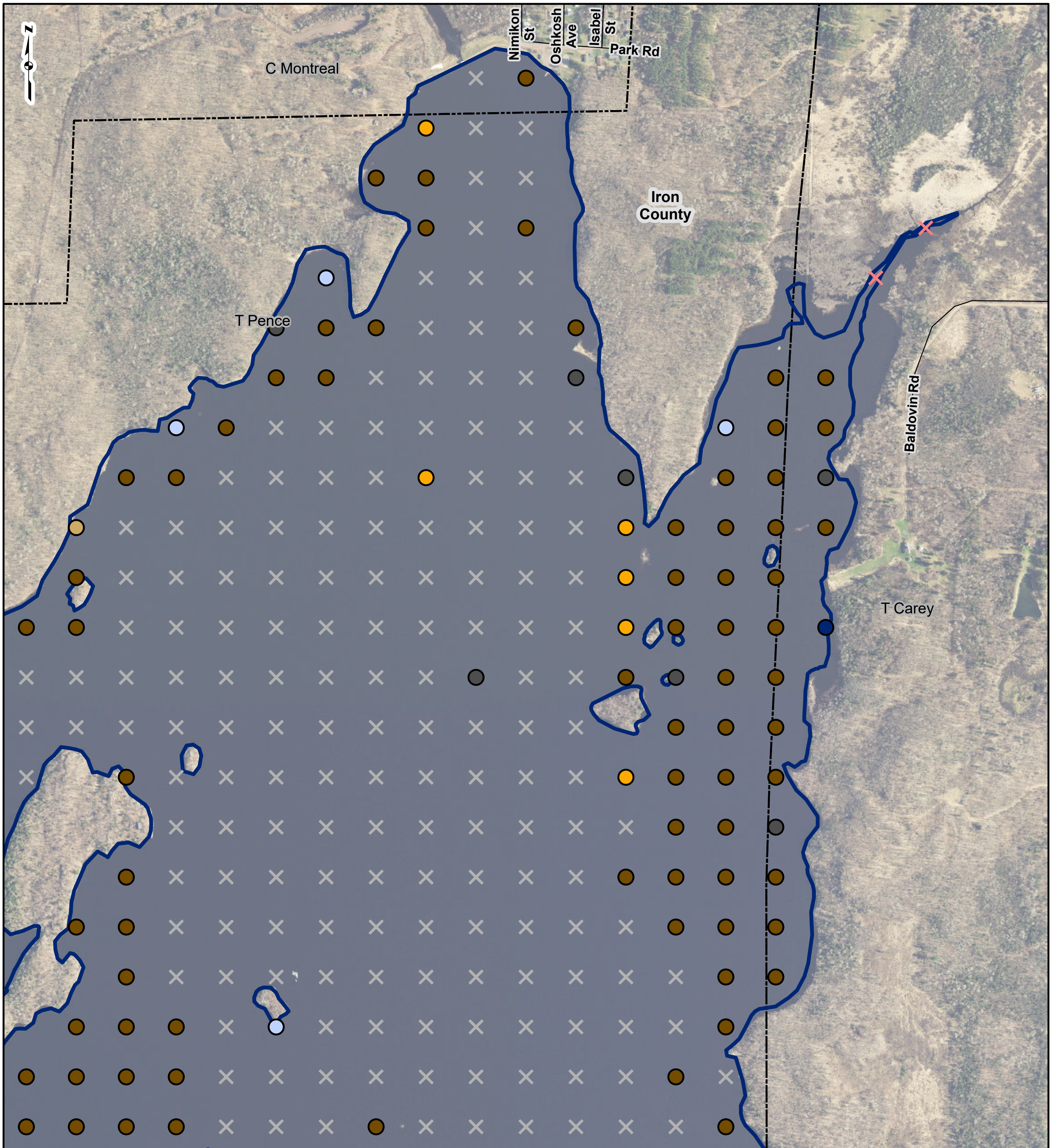
Mead & Hunt

DRAWN BY: EMW DATE: 8/18/2022
CHECKED: TDB APPROVED: LLS

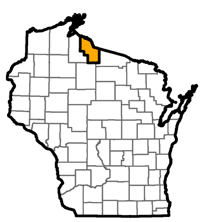
REFERENCE: ESRI WORLD IMAGERY 2021, Accessed 8/18/2022. WDNR Counties, 2011. WISLR Community Boundary 2021. WISDOT Road Centerlines, 2021.

G:_2022\R220323.00 - GIS\AGP\Invasive_Mapping\Gile\R220323_00_Gile_ATIS_Mapping\R220323_00_Gile_ATIS_Mapping.aprx

FIGURE 10
Substrate Types



PROJECT LOCATION



IRON COUNTY, WISCONSIN

LEGEND

- Over 15 Feet Deep
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Dominant Substrate

- Boulder
- Cobble
- Gravel
- Organic
- Sand
- Silt
- Wood
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 10
Substrate Types
Sheet 1 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

gai consultants

Mead & Hunt

DRAWN BY: EMW
DATE: 8/18/2022
CHECKED: TDB
APPROVED: LLS

REFERENCE: ESRI WORLD IMAGERY 2021, Accessed 8/18/2022. WDNR Counties, 2011. WISLR Community Boundary 2021.
WISDOT Road Centerlines, 2021.

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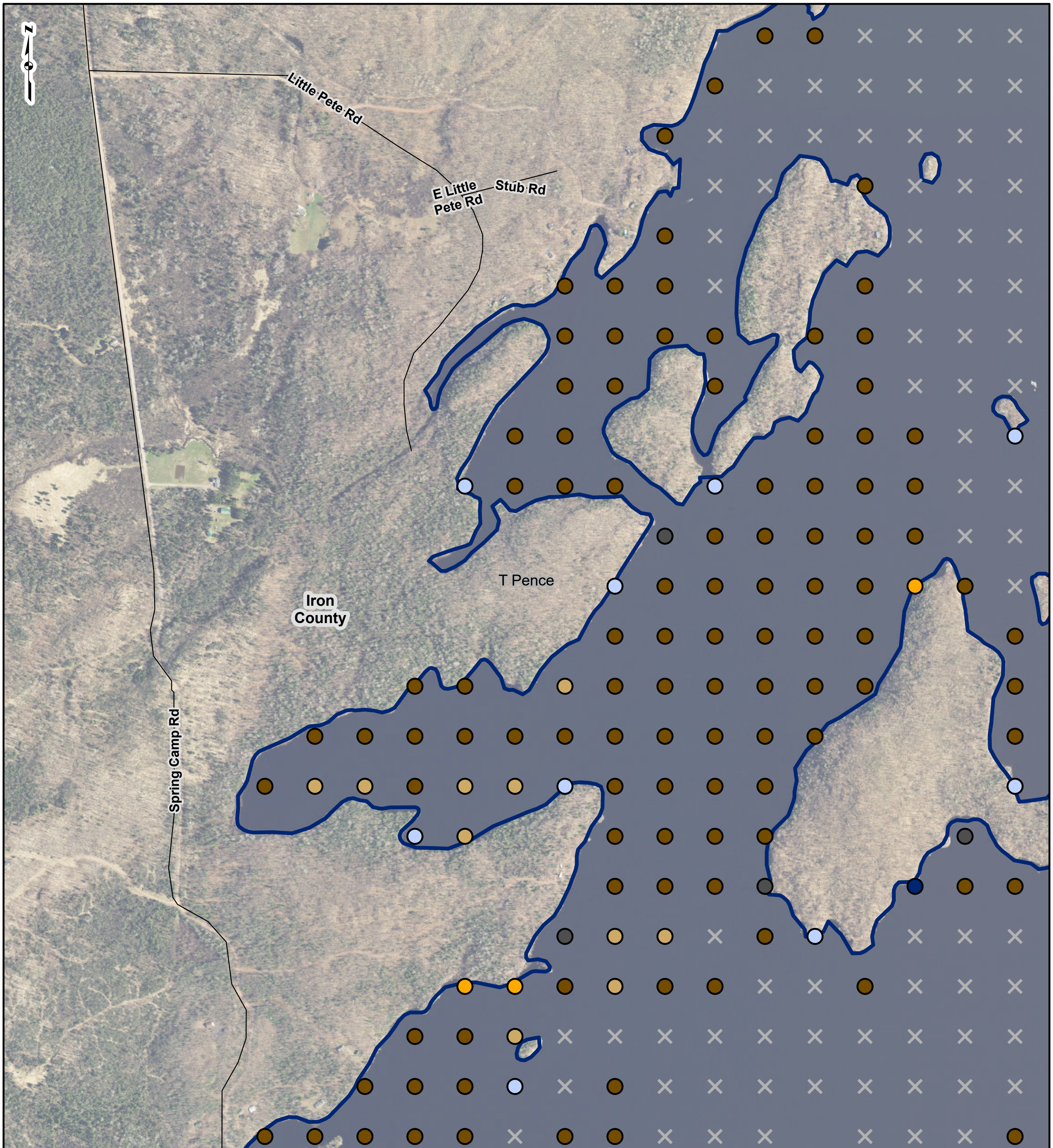

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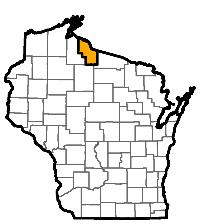

IRON COUNTY, WISCONSIN

LEGEND

Over 15 Feet Deep
Non-Navigable Vegetation
Non-Navigable Terrestrial

Dominant Substrate
Boulder
Cobble
Gravel
Organic
Sand
Silt
Wood
Project Boundary
Road Centerline
Community Boundary
County Boundary

0 500 1,000 2,000 Feet

Figure 10
Substrate Types
Sheet 2 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

DRAWN BY: EMW DATE: 8/18/2022
CHECKED: TDB APPROVED: LLS

REFERENCE: ESRI WORLD IMAGERY 2021, Accessed 8/18/2022. WDNR Counties, 2011. WISLR Community Boundary 2021. WISDOT Road Centerlines, 2021.

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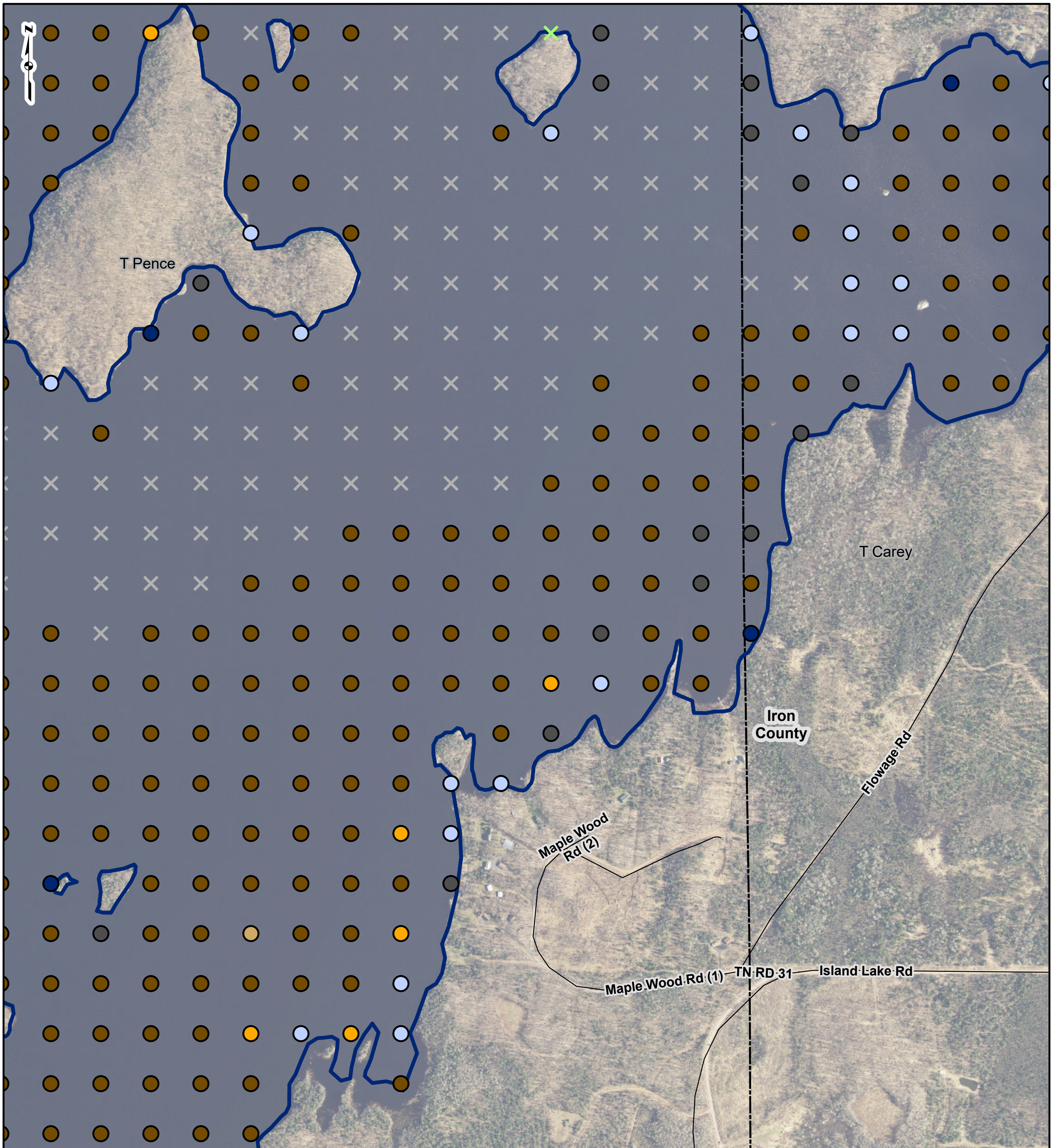
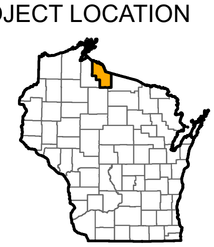


PROJECT LOCATION



IRON COUNTY, WISCONSIN

LEGEND

- Over 15 Feet Deep
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Dominant Substrate

- Boulder
- Cobble
- Gravel
- Organic
- Sand
- Silt
- Wood
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 10
Substrate Types
Sheet 3 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

DRAWN BY: EMW DATE: 8/18/2022
CHECKED: TDB APPROVED: LLS

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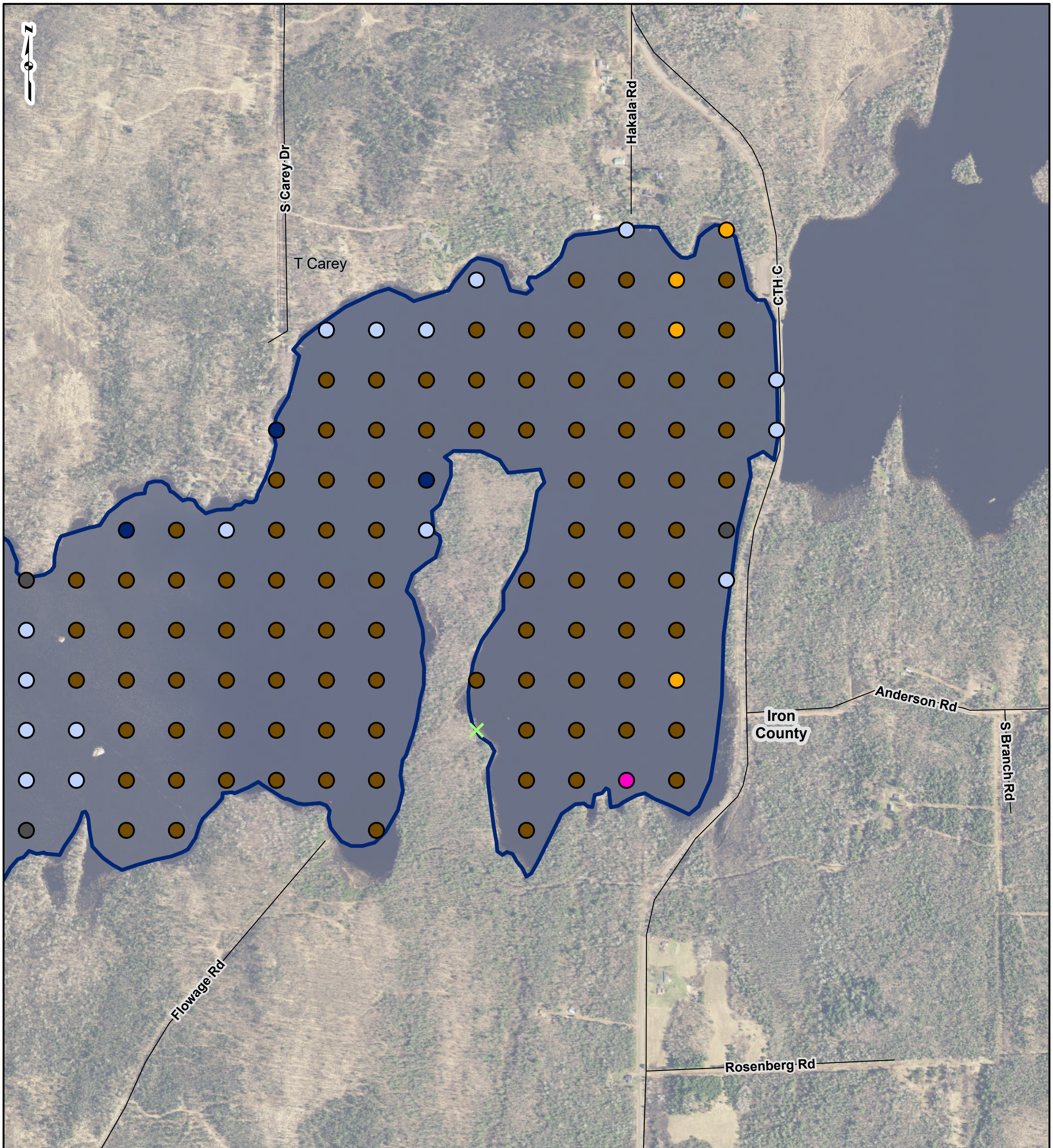
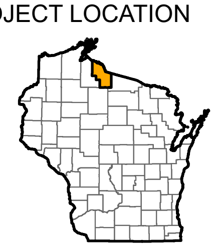


PROJECT LOCATION



IRON COUNTY, WISCONSIN

LEGEND

- Over 15 Feet Deep
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Dominant Substrate
- Boulder
- Cobble
- Gravel
- Organic
- Sand
- Silt
- Wood
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 10
Substrate Types
Sheet 4 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

DRAWN BY: EMW
CHECKED: TDB
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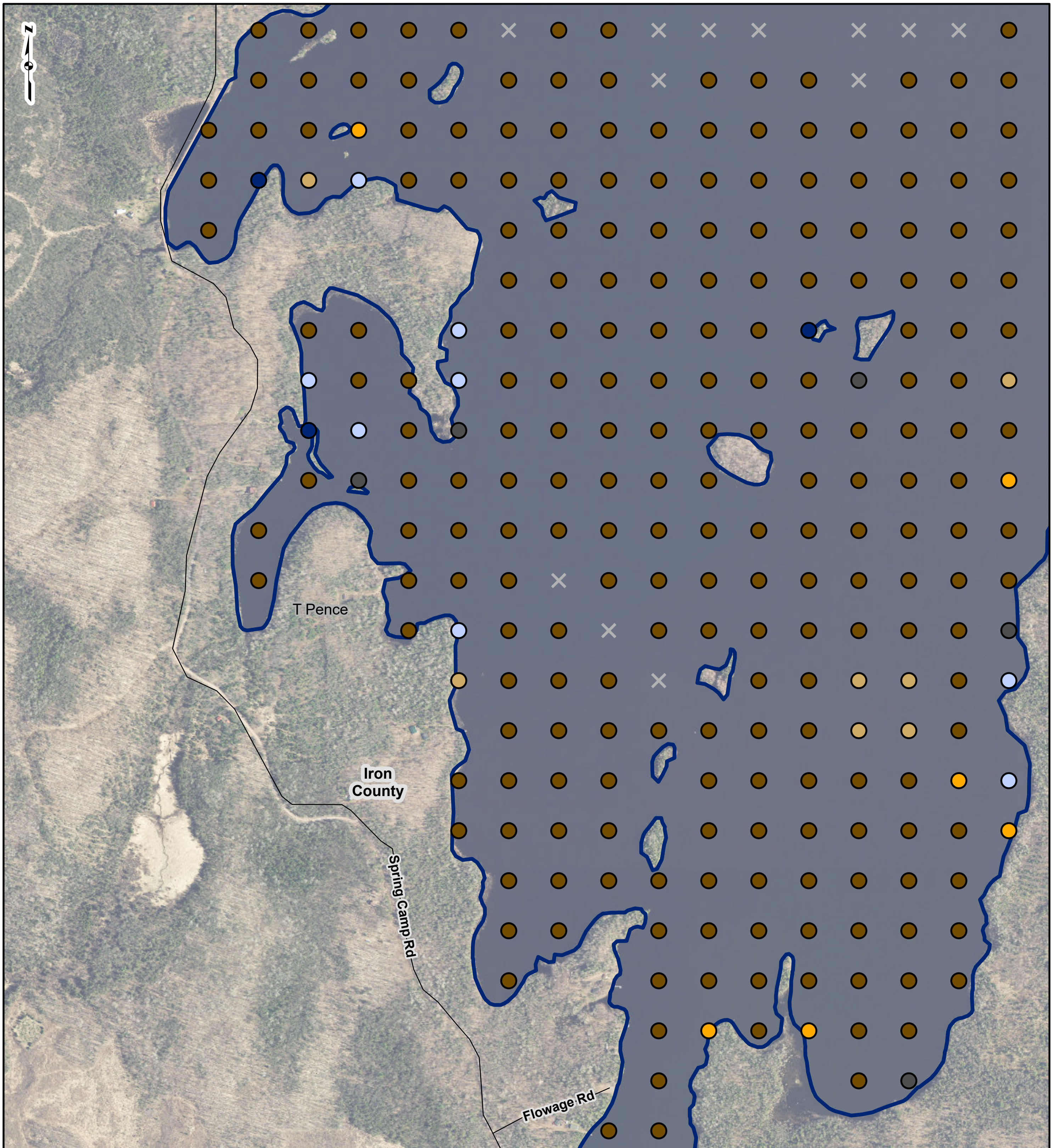

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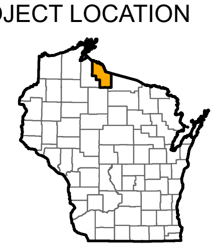

IRON COUNTY, WISCONSIN

LEGEND

Over 15 Feet Deep
Non-Navigable Vegetation
Non-Navigable Terrestrial

Dominant Substrate
- Boulder
- Cobble
- Gravel
- Organic
- Sand
- Silt
- Wood

Project Boundary
Road Centerline
Community Boundary
County Boundary

0 500 1,000 2,000 Feet

Figure 10
Substrate Types
Sheet 5 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

DRAWN BY: EMW
DATE: 8/18/2022
CHECKED: TDB
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REFERENCE: ESRI WORLD IMAGERY 2021, Accessed 8/18/2022. WDNR Counties, 2011. WISLR Community Boundary 2021. WISDOT Road Centerlines, 2021.

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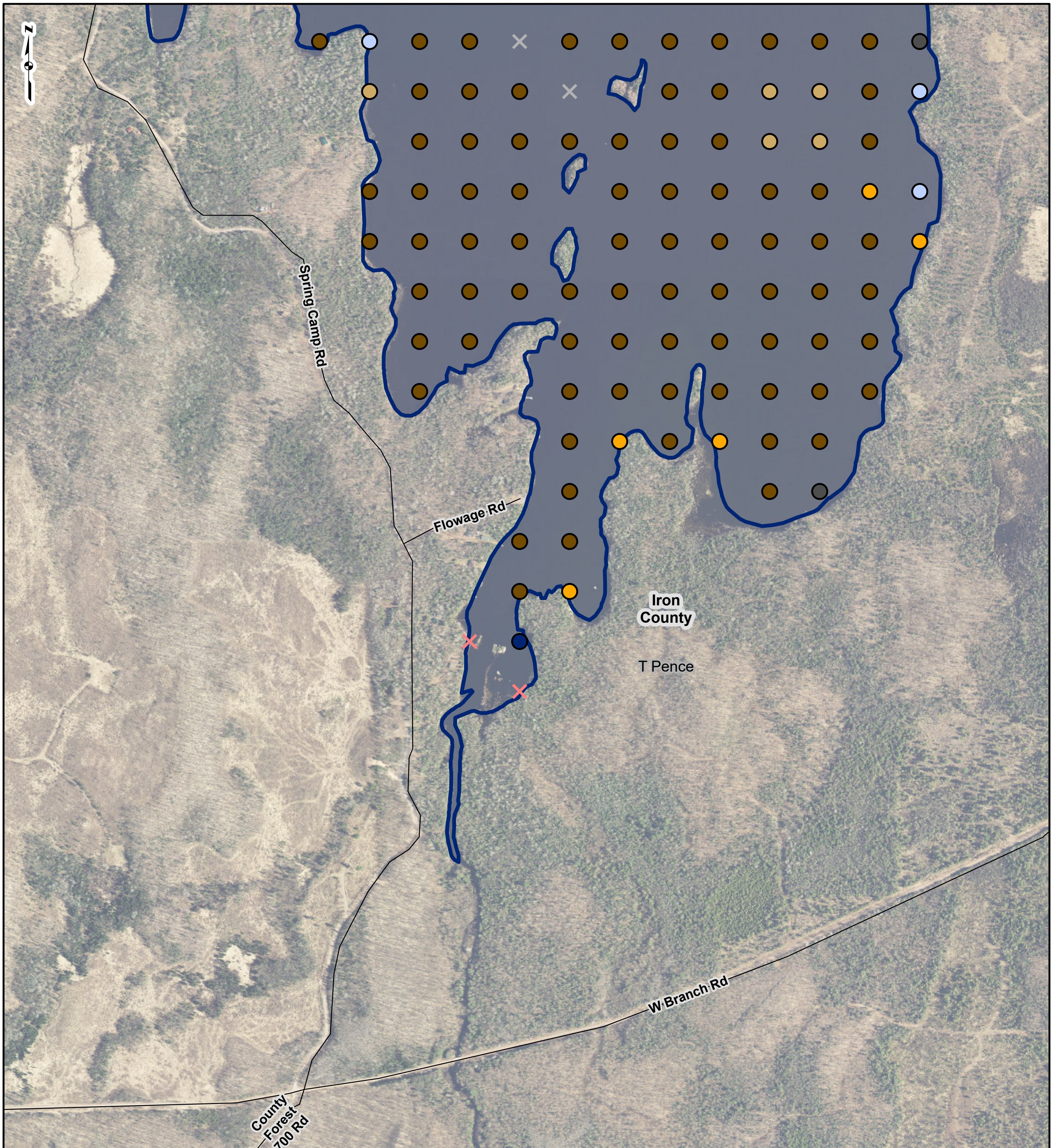

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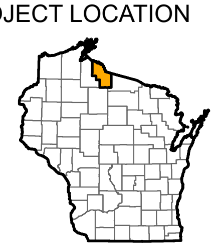

IRON COUNTY, WISCONSIN

LEGEND

- Over 15 Feet Deep
- Non-Navigable Vegetation
- Non-Navigable Terrestrial

Dominant Substrate

- Boulder
- Cobble
- Gravel
- Organic
- Sand
- Silt
- Wood
- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 500 1,000 2,000 Feet

Figure 10
Substrate Types
Sheet 6 OF 6

Gile Flowage Storage Project Aquatic and Terrestrial Invasive Species Study

gai consultants

Mead & Hunt

DRAWN BY: EMW
DATE: 8/18/2022
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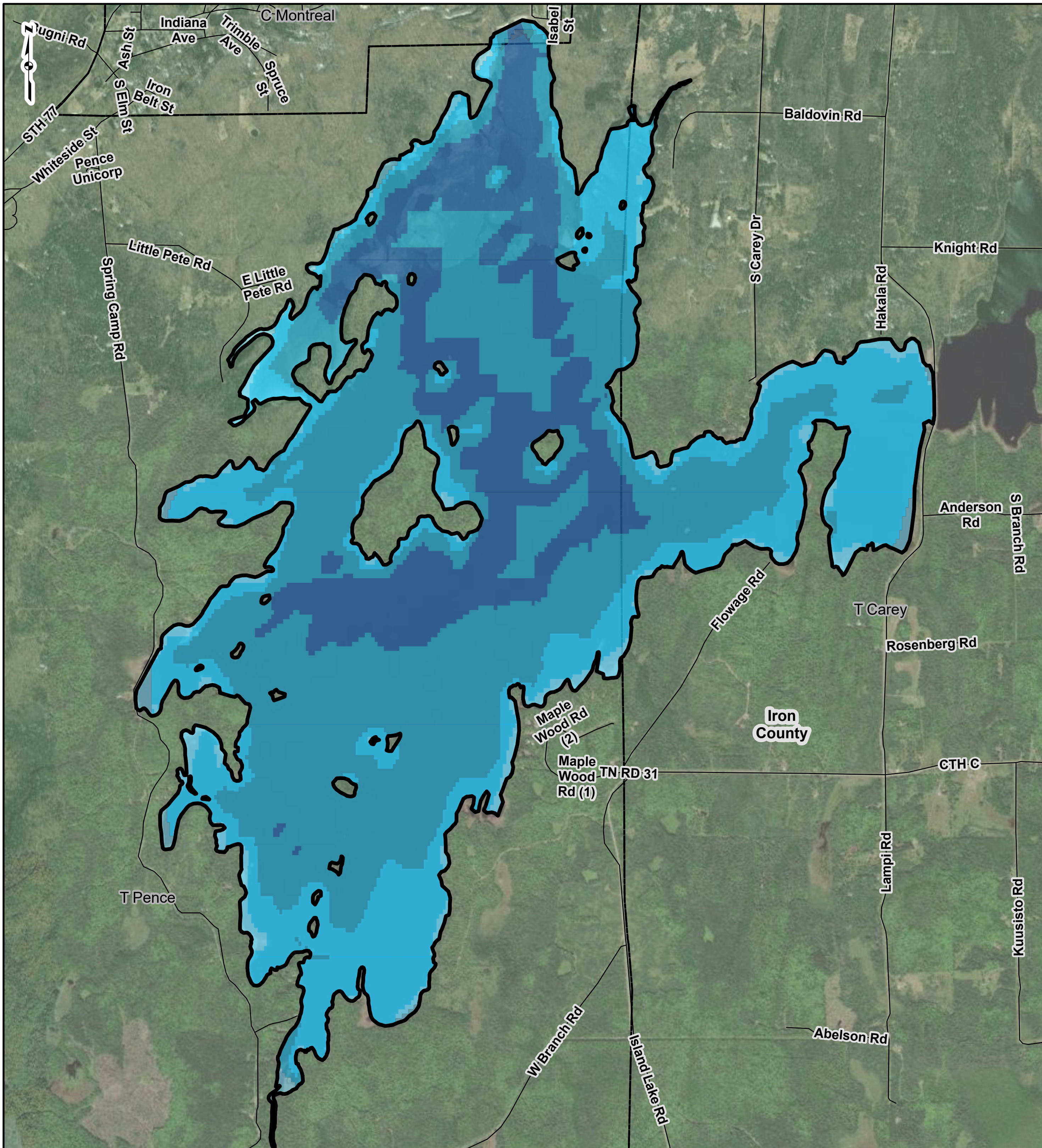
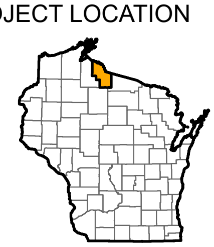
REFERENCE: ESRI WORLD IMAGERY 2021, Accessed 8/18/2022. WDNR Counties, 2011. WISLR Community Boundary 2021. WISDOT Road Centerlines, 2021.

G:_2022\R220323.00 - GIS\AGP\Invasive_Mapping\Gile\R220323_00_Gile_ATIS_Mapping\R220323_00_Gile_ATIS_Mapping.aprx

FIGURE 11
Bathymetric Map



PROJECT LOCATION



IRON COUNTY, WISCONSIN

LEGEND

Depth

- 0- 5 ft
- 5 - 10 ft
- 10 - 15 ft
- >15 ft

- Project Boundary
- Road Centerline
- Community Boundary
- County Boundary

0 1,375 2,750 5,500 Feet

FIGURE 11
DEPTH SURVEY

GILE FLOWAGE DEPTH SURVEY
2022 SURVEYS

gai consultants

Mead & Hunt

DRAWN BY: EMW	DATE: 7/19/2022
CHECKED: TDB	APPROVED: LLS

REFERENCE: ESRI WORLD IMAGERY 2021, Accessed 7/19/2022. WDNR Counties, 2011. WISLR Community Boundary 2021.
WISDOT Road Centerlines, 2021.

G:_2022\R220323.00 - GIS\AGP\Depth_Mapping\R220323_00_Gile_Depth_Mapping\R220323_00_Gile_Depth_Mapping.aprx

ATTACHMENT A
Aquatic Invasive Species Survey Field Data Sheets – June

Waterbody/Project: Gile Date: 6/13/2022

Crew: Laura Sass Heather Lutzow

Sampling Point	Depth (ft)	CWD Y/N	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	Persicaria amphibia	Wild Rice (in area)	Ranunculus flammula	aquatic moss
289	5.0	N	R	P	cobble	Ø				
317	4.5	N	R	P	cobble	Ø				
288	9.6	N	M	P	org	Ø	bottom is firm but bouncy when pushed on - seems like a mix of sand, org + silt			
259	9.9	N	M	P	org	Ø				
234	7.5	N	M	P	org	Ø				
212	1.9	N	S	P	sand	1	V	V	1	
233	4.5	N	S	P	sand	Ø				
~~258~~	9.5	N	S	P	sand	Ø				
287	10.5	N	M	P	org	Ø				
315	9.5	N	M	P	org	Ø				
316	9.4	N	M	P	org	Ø				
344	8.9	N	M	P	org	Ø				
370	7.2	N	R	P	gravel	Ø				
404	6.0	N	R	P	cobble	Ø				
439	7.5	N	M	P	org	Ø				
474	7.5	N	S	P	sand	Ø				
503	6.5	N	M	P	org	Ø			1.	
533	5.3	N	M	P	org	1			1	
532	5.8	N	M	P	Silt	Ø			1	
502	6.5	N	M	P	org	Ø				
473	7.3	N	M	P	org	Ø				
438	7.8	N	M	P	org	Ø				
402	8.3	N	M	P	org	Ø				
403	8.1	N	M	P	org	Ø				
369	8.8	N	M	P	org	Ø				
368	8.6	N	M	P	org	Ø				
349	9.4	N	M	P	org	Ø				
343	9.1	N	M	P	org	Ø				

Waterbody/Project: Gile

Date: 6/13/2022

Crew: Laura Sass Heather Lutzow

Sampling Point	Depth (ft)	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	Potamogeton alpinus	Elodea canadensis	P. pusillus	Wild Rice
314	9.6 N	M	P	org	Ø				
286	10.3 N	M	P	org	Ø				
357	9.3 N	M	P	org	Ø				
232	8.6 N	M	P	org	Ø				
211	2.8 N	R	P	cobble	1	1			
231	8.6 N	M	P	org	Ø				
256	9.0 N	M	P	org	Ø				
285	9.0 N	M	P	org	Ø				
313	9.7 N	M	P	org	Ø				
341	10.0 N	M	P	org	Ø				
367	9.3 N	M	P	org	Ø				
401	8.5 N	M	P	org	Ø				
437	8.0 N	M	P	org	Ø				
472	7.1 N	M	P	org	Ø				
501	6.5 N	M	P	org	Ø				
531	5.5 N	M	P	org	Ø				
558	3.4 N	M	P	org	Ø				
530	6.0 N	M	P	org	Ø		1		
300	6.5 N	M	P	org	Ø	1		1	
499	terrestrial		—	wild rice near by					
470	1.5 N	M	P	org	1			1	
471	8.0 N	M	P	org	Ø				
436	8.5 N	M	P	org	Ø				
400	7.4 N	M	P	org	Ø				
312	9.9 N	M	P	org	Ø				
284	9.4 N	M	P	org	Ø				
255	9.0 N	M	P	org	Ø				
230	5.0 N	R	P	cobble	Ø				

Waterbody/Project: Gile

Date: 6/13/2022

Crew: Laura Sass Heather Lutzow

Sampling Point	Depth (ft)	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	myriophyllum alterniflorum	
254	9.5 N	M	P	org	Ø		
283	11.0 N	M	P	org	Ø		
311	10.3 N	M	P	org	Ø		
310	10.5 N	M	P	org	Ø		
282	10.4 N	M	P	org	Ø		
253	6.5 N	R	P	cobble	Ø		
252	7.6 N	R	P	cobble	1	1	
281	9.6 N	M	P	org	Ø		
309	11.6 N	M	P	org	Ø		
339	10.9 N	M	P	org	Ø		
340	6.8 N	R	P	Boulders	Ø		
366	8.4 N	R	P	cobble	Ø		
365	11.8 N	M	P	org	Ø		
399	9.4 N	M	P	org	Ø		
435	10.1 N	M	P	org	Ø		
459	9.5 N	M	P	org	Ø		
498	9.1 N	M	P	org	Ø		
529	7.8 N	M	P	org	Ø		
557	4.6 N	M	P	org	2	2	Lots detritus + some cobble
528	8.5 N	M	P	org	Ø		
497	10.0 N	M	P	org	Ø		
468	10.3 N	M	P	org	Ø		
434	10.8 N	M	P	org	Ø		
398	11.9 N	M	P	org	Ø		
364	11.7 N	M	P	org	Ø		
338	10.8 N	M	P	org	Ø		
308	10.7 N	M	P	org	Ø		
280	9.2 N	M	P	org	Ø		

Waterbody/Project: Gile Date: 6/13/2022

Crew: Laura Sass Heather Lutzow

Sampling Point	Depth (ft)	CWD Y/N	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	Potamogeton alpinus	Myriophyllum alterniflorum
251	4.2	N	R	P	cobble	2	2	
307	3.5	N	R	P	boulder	∅		
337	6.0	N	M	P	org	∅	Wild Rice near shore	
363	9.9	N	M	P	org	∅		
397	11.8	N	M	P	org	∅		
433	11.1	N	M	P	org	∅		
467	11.2	N	M	P	org	∅		
496	9.0	N	M	P	org	∅		
527	4.6	N	M	P	org	1		1
526	4.8	N	M	P	org	∅		
495	11.3	N	M	P	org	∅		
466	11.3	N	M	P	org	∅		
432	11.8	N	M	P	org	∅		
396	11.1	N	M	P	org	∅		
362	4.7	N	R	P	cobble	∅		
361	7.4	N	M	P	org	∅		
395	12.0	N	M	P	org	∅		
431	12.0	N	M	P	org	∅		
465	12.1	N	M	P	org	∅		
494	11.7	N	M	P	org	∅		
525	9.7	N	M	P	org	∅		
556	6.8	N	M	P	org	1		1
555	7.8	N	M	P	org	∅		
524	10.6	N	M	P	org	∅		
493	11.4	N	M	P	org	∅		
464	12.7	N	M	P	org	∅		
430	12.4	N	M	P	org	∅		
394	12.6	N	M	P	org	∅		

Waterbody/Project: Gile Date: 6/13/2022
Crew: Laura Sass Heather Lutzow

Sampling Point	Depth (ft) CWD Y/N	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness		Sampling Point (sampled w/ Pole Rake)	Depth CWD Y/N	Dom sed type	Add'l Info	Total Rake fullness							Too deep	depth if measured			
360	7.8 N	R	P	Boulder	Ø		188	14.5 N	M	org	Ø							490	15.5			
393	12.1 N	M	P	org	Ø		171	14.1 N	M	org	Ø							489	16.1			
429	10.9 N	M	P	org	Ø		172	12.8 N	M	org	Ø							460	16.1			
463	13.3 N	M	P	org	Ø		173	12.1 N	R	gravel	Ø							426	16.1			
492	13.0 N	R	P	cobble	Ø		191	12.7 N	M	org	Ø							335	16.0			
523	10.6 N	R	P	cobble	Ø		210	12.1 N	M	org	Ø							358	16.0			
554	8.2 N	R	P	gravel	Ø		209	13.9 N	M	org	Ø							389	17.0			
522	10.6 N	R	P	cobble	Ø		190	13.4 N	M	org	Ø							425	17.1			
491	14.0 N	R	P	cobble	Ø		189	14.4 N	M	org	Ø							305	16.2			
462	14.5 N	R	P	cobble	Ø		155	12.3 N	S	sand	Ø							277	16.1			
428	11.1 N	R	P	cobble	Ø		122	10.2 N	M	org	Ø							248	15.4			
392	1.8 N	R	P	gravel	Ø		123	5.7 N	R	gravel	Ø							249	15.4			
391	8.0 N	R	P	cobble	Ø		140	10.5 N	M	org	Ø							227	15.2			
427	13.2 N	R	P	gravel	Ø		156	13.7 N	M	org	Ø							207	15.2			
461	14.1 N	M	P	org	Ø		157	9.0 N	M	org	Ø							187	16.2			
521	13.9 N	M	P	org	Ø		158	9.0 N	M	org	Ø							169	16.2			
553	12.0 N	M	P	org	Ø		142	10.6 N	M	org	Ø							170	15.2			
581	3.0 N	R	P	gravel	Ø		141	11.6 N	M	org	Ø							154	16.7			
520	14.3 N	M	P	org	Ø		124	10.9 N	M	org	Ø							139	16.6			
390	14.3 N	R	P	gravel	Ø		125	10.6 N	M	org	Ø							121	16.3			
355	11.5 N	R	P	gravel	Ø		108	2.8 N	R	boulder	Ø											
336	5.0 N	R	P	cobble	Ø		107	10.2 N	M	org	Ø											
306	9.0 N	M	P	org	Ø		106	10.8 N	M	org	Ø											
278	14.3 N	M	P	org	Ø		105	7.4 N	M	org	Ø											
250	12.9 N	M	P	org	Ø		89	8.6 N	M	org	Ø											
229	10.0 N	M	P	org	Ø		90	10.0 N	M	org	Ø											
228	13.1 N	M	P	org	Ø		91	7.8 N	M	org	Ø											
208	14.2 N	M	P	org	Ø		76	4.0 N	M	org	Ø											

Waterbody/Project: Gile

Date: 6/13/2022

Crew: Heather Lutzow Laura Sass

Sampling Point	Depth (ft)	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness (TRF)	aquatic moss (d/n count toward TRF)	Sparganium fluctuans	Schoenoplectus subterminalis	Wild Rice	Sampling Point	Depth	CWD Y/N	Dom Substrate	Extra Info	Total Rake Fullness	Sparganium fluctuans	Potamogeton alpinus	Too deep	depth
952	7.2 N	M	P	org	Ø					895	10.3	N	M	org	Ø			863	16.0
942	9.0 N	M	P	org	Ø					894	9.0	N	M	org	Ø			839	19.2
935	7.5 N	M	P	org	Ø					893	2.5	N	M	org	1	1	1		
936	9.3 N	M	P	org	Ø					883	10.7	N	M	org	Ø				
928	10.0 N	M	P	org	Ø					884	10.7	N	M	org	Ø				
919	9.4 N	M	P	org	Ø					874	11.4	N	M	org	Ø				
908	10.2 N	M	P	org	Ø					873	11.2	N	M	org	Ø				
897	10.5 N	M	P	org	Ø					872	1.8	Y	M	wood	1	1			
887	10.9 N	M	P	org	Ø					860	3.0	N	R	cobble	Ø				
886	8.2 N	M	P	org	Ø					861	12.0	N	M	org	Ø				
876	15.2 N	M	P	org	Ø					862	11.7	N	M	org	Ø				
865	11.4 N	M	P	org	Ø					850	11.0	N	M	org	Ø				
864	10.6 N	M	P	org	Ø					848	13.1	N	M	org	Ø				
875	11.2 N	M	P	org	Ø					847	11.5	N	M	org	Ø				
885	10.7 N	M	P	org	Ø					846	3.5	Y	M	org	1	1			
896	10.0 N	M	P	org	Ø					859	4.0	Y	M	org	1		1		
907	9.4 N	M	P	org	Ø					812	8.4	N	R	cobble	Ø				
917	10.1 N	M	P	org	Ø					813	7.1	N	M	org	Ø				
918	8.4 N	M	P	org	Ø					830	5.9	N	M	org	Ø				
927	10.3 N	M	P	org	Ø					845	5.1	N	M	org	Ø				
926	9.3 N	M	P	org	Ø					795	4.3	N	R	boulder	Ø				
934	6.4 Y	M	P	org	Ø					796	7.6	N	R	cobble	Ø				
922	6.2 N	M	P	org	Ø	1				778	7.7	N	M	org	Ø				
916	9.1 N	M	P	org	Ø					777	4.0	N	R	cobble	Ø				
915	2.5 N	M	P	org	1	1	1	1	V	760	3.5	N	M	org	Ø	wild Rice near shore			
904	2.4 N	M	P	org	1	3	1			761	6.0	N	M	org	Ø				
905	7.4 N	M	P	org	Ø					729	3.0	N	M	org	Ø	Aq moss - 1			
906	9.7 N	M	P	org	Ø														

Bottom substrate is a firm consolidated combination of organic muck, detritis, and sand. In the middle the combination is more organic muck - fine, silty and sand. In the bays the org muck is domin'd by detritis and has sand mixed in.

Waterbody/Project: Gile Date: 6/14/2022
Crew: Heather Lutzow Laura Sass

Sampling Point	Depth (ft)	CWD Y/N	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness (TRF)	aquatic moss (d/n count for TRF)	Ranunculus flammula	Potamogeton alpinus	Sparganium fluctuans		
773	12.0	N	M	P	org	Ø						
792	11.3	N	M	P	org	Ø						
812	10.5	N	M	P	org	Ø						
827	6.5	N	R	P	cobble	Ø						
826	1.2	N	S	P	sand	Ø						
843	10.3	N	M	P	org	Ø						
858	9.5	N	M	P	org	Ø						
871	3.7	N	R	P	gravel	Ø						
889	4.9	N	R	P	cobble	Ø	1					
881	10.0	N	M	P	org	Ø						
892	9.9	N	M	P	org	Ø						
902	9.7	N	S	P	sand	Ø						
903	6.9	N	R	P	cobble	Ø						
914	2.4	N	S	P	sand	1		1	1			
913	9.2	N	M	P	org	Ø						
924	8.6	N	M	P	org	Ø						
933	8.2	N	M	P	org	Ø						
941	6.0	N	M	P	org	Ø						
950	4.0	N	R	P	gravel	1				1		
947	6.8	N	M	P	org	Ø						
940	8.3	Y	M	P	org	Ø						
932	8.4	N	M	P	org	Ø						
923	8.8	N	M	P	org	Ø						
912	9.5	N	M	P	org	Ø						
901	9.5	N	M	P	org	Ø						
900	9.7	N	M	P	org	Ø						
911	9.4	N	M	P	org	Ø						
922	9.1	N	M	P	org	Ø						

Sampling Point	Depth	CWD Y/N	Dominant Substrate	Extra Substrate	Total Rake Fullness	Nitella	P. alpinus	M. alterniflorum		
931	8.41	N	M	org	Ø					
939	8.1	N	M	org	Ø					
946	7.0	Y	M	org	Ø					
949	6.0	N	M	org	1	1				
945	5.0	N	S	sand	1		1 1			
938	7.4	Y	M	org	Ø					
930	9.0	N	M	org	Ø					
921	9.4	N	M	org	Ø					
910	9.7	N	M	org	Ø					
899	9.9	N	M	org	Ø					
889	10.2	N	M	org	Ø					
878	10.5	N	M	org	Ø					
877	10.6	N	M	org	Ø					
888	10.4	N	M	org	Ø					
898	10.7	N	M	org	Ø					
909	10.4	N	M	org	Ø					
920	9.6	N	M	org	Ø					
929	9.0	N	M	org	Ø					
937	8.2	N	M	org	Ø					
944	4.8	N	M	org	Ø					
943	5.1	N	S	sand	Ø					
948	8.1	N	M	org	Ø					
951	10.3	N	M	org	Ø					
953	4.6	N	M	org	Ø					
956	6.0	N	R	boulder	Ø					
955	Non Nav									
957	Non Nav									
954	5.0	Y	S	sand	Ø					

Waterbody/Project: Gile

Date: 6/14/2022

Crew: Heather Lutzow Laura Sass

Sampling Point	Depth (ft) CWD (Y/N)	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	ceratophyllum echinatum	myriophyllum alterniflorum													too deep	depth	
623	14.7 N	M	P	org	Ø															599	15.4	
577	12.4 N	M	P	org	Ø															548	16.4	
549	14.0 N	M	P	org	Ø															517	15.9	
386	7.7 N	R	P	cobble	Ø															422	17.4	
356	13.9 N	R	P	gravel	Ø															387	16.7	
333	14.2 N	R	P	gravel	Ø															334	16.0	
74	8.9 N	M	P	org	Ø															357	—	
75	7.1 N	M	P	org	Ø															388	—	
59	7.6 N	M	P	org	Ø															304	15.9	
60	4.0 N	R	P	gravel	Ø																	
46	6.5 N	M	P	org	Ø																	
34	5.9 Y	M	P	org	1	1	1															
33	6.4 Y	M	P	org	Ø																	
45	7.5 Y	M	P	org	Ø																	
44	7.0 N	R	P	cobble	Ø	wild Rice on shore																
58	7.3 N	M	P	org	Ø																	
73	7.7 N	M	P	org	Ø																	
104	12.6 N	S	P	sand	Ø																	
88	13.4 N	S	P	Sand	Ø																	
72	13.2 N	S	P	Sand	Ø																	
57	8.7 N	R	P	gravel	Ø																	

overcast
wind 8-10 mph

Waterbody/Project: Gile
Date: 6/14/2022
Crew: Heather Lutzow Laura Sass

Sampling Point	Depth (ft) CWD Y/N	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	Sparganium fluctuans					Samplepoint	Depth	CWD Y/N	dom substrate	extra substrate	Total Rake Fullness	Myriophyllum alterniflorum	Too deep	depth if measured			
552	13.7N	M	P	org	Ø						675	6.9	N	M	org	Ø		488	15.1			
580	11.2N	M	P	org	Ø						702	7.2	N	S	sand	Ø		459	16.2			
604	7.8 N	M	P	org	Ø						727	4.0	N	R	gravel	Ø		487	15.4			
628	7.5 N	R	P	gravel	Ø						744	3.2	N	R	cobble	Ø		518	15.1			
654	6.6 N	M	P	org	Ø						726	10.1	N	M	org	Ø		550	15.[illegible]			
679	4.0 N	R	P	Boulders	Ø	Wild Rice ~~on shore~~/near shore					701	12.8	N	M	org	Ø						
705	3.0 N	M	P	org	1	1					674	13.3	N	M	org	Ø						
678	6.3 N	M	P	org	Ø						649	14.0	N	M	org	Ø						
653	6.0 N	R	P	gravel	Ø						700	13.3	N	M	org	Ø						
627	9.3 N	R	P	gravel	Ø						725	12.4	N	M	org	Ø						
603	11.8 N	M	P	org	Ø						742	12.1	N	M	org	Ø						
579	12.5 N	M	P	org	Ø						743	2.5	N	R	cobble	Ø						
551	13.7N	M	P	org	Ø						759	5.5	N	R	cobble	Ø						
519	14.6 N	M	P	org	Ø						758	11.3	N	S	sand	Ø						
578	13.6 N	M	P	org	Ø						775	10.8	N	M	org	Ø						
602	12.9N	M	P	org	Ø						776	1.5	N	R	gravel	Ø						
626	11.9 N	M	P	org	Ø						794	10.5	N	S	sand	Ø						
652	11.1 N	M	P	org	Ø	clay?					812	9.2	N	R	gravel	Ø						
677	8.6 N	M	P	org	Ø						829	5.0	N	R	cobble	Ø						
704	6.0 N	M	P	org	Ø						844	4.0	Y	M	org	1	1					
703	6.0 N	R	P	cobble	Ø						828	6.5	N	S	Sand	1	1					
676	8.0 N	R	P	gravel	Ø						811	10.8	N	M	org	Ø						
651	10.0 N	M	P	org	Ø						793	11.2	N	M	org	Ø						
625	11.1 N	M	P	org	Ø						774	11.8	N	M	org	Ø						
601	11.2N	M	P	org	Ø						757	12.2	N	M	org	Ø						
600	14.8 N	M	P	org	Ø						741	12.2	N	M	org	Ø						
624	11.9 N	M	P	org	Ø						740	12.5	N	M	org	Ø						
650	10.8 N	M	P	org	Ø						756	12.0	N	M	org	Ø						

Very firm wouldn't come up on rake - dom org but lots of sand in [illegible]

Waterbody/Project: Gile

Date: 6/17/2022

Crew: Laura Sass, Heather Lutzow

Sampling Point	Depth (ft) CWD (Y/N)	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness					sampling point	depth	cwd (Y/N)	dom substrate	extra info	Tota Rake Fullness
831	10.3 N	M	P	org	Ø					731	14.2	N	M	org	Ø
815	11.0 N	M	P	org	Ø					730	10.4	N	M	org	Ø
797	8.5 N	M	P	org	Ø										
832	12.1 N	M	P	org	Ø										
816	12.3 N	M	P	org	Ø										
833	11.9 N	M	P	org	Ø										
834	13.0 N	M	P	org	Ø										
835	12.9 N	M	P	org	Ø										
819	12.9 N	M	P	org	Ø										
818	12.7 N	M	P	org	Ø										
817	12.8 N	M	P	org	Ø										
798	6.5 N	R	P	gravel	Ø	dead mudpuppy									
799	12.0 N	M	P	org	Ø										
800	12.9 N	M	P	org	Ø										
801	13.5 N	M	P	org	Ø										
783	13.9 N	M	P	org	Ø										
782	13.2 N	M	P	org	Ø										
781	14.0 N	M	P	org	Ø										
780	9.0 N	R	P	cobble	Ø										
762	7.3 Y	R	P	cobble	Ø										
763	12.7 N	M	P	org	Ø										
764	13.3 N	M	P	org	Ø										
746	13.8 N	M	P	org	Ø										
745	12.8 N	M	P	org	Ø										
729	14.1 N	M	P	org	Ø										
712	14.5 N	M	P	org	Ø										
713	13.5 N	M	P	org	Ø										
714	14.7 N	M	P	org	Ø										

Waterbody/Project: Gile   Date: 6/22/22
Crew: Laura Sass, Heather Lutzow

Sampling Point	Depth (ft)	CWD (Y/N)	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	Potamogeton alpinus	Potamogeton nodosus	Ceratophyllum echinatum	Elodea nuttallii	Myriophyllum verticillatum	Baby saggitaria spp.						Point too deep	depth		Point Too deep	depth	
2	9.5	N	M	P	org	Ø												51	20.8		5	15.7	
12	14.8	N	M	P	org	Ø												38	17.9		9	15.3	
25	9.5	N	M	P	org	Ø												37	17.5		17	15.6	
32	9.5	N	R	P	gravel	Ø												49	16.8		24	20.1	
3	8.3	N	S	P	sand	Ø												50	18.7		43	16.7	
6	5.0	N	M	P	org	Ø												64	17.7		56	18.1	
7	12.7	N	M	P	org	Ø												63	16.7		71	16.7	
10	14.6	N	M	P	org	Ø												62	15.5		87	17.0	
21	11.0	N	M	P	org	Ø												78	16.4		103	16.3	
20	16.7	N	M	P	org	Ø												94	18.0		31	20.1	
14	16.0	N	R	P	cobble	1	1											110	15.5		23	16.1	
19	4.0	N	R	P	gravel	Ø												111	17.6		16	18.3	
26	13.9	N	M	P	org	Ø												129	18.5		11	19.1	
27	14.8	N	M	P	org	Ø												130	18.0		8	18.1	
51	5.3	N	S	P	sand	1		1										131	17.8		4	23.5	
36	12.1	N	M	P	org	Ø												132	18.0		1	19.5	
35	5.0	N	R	P	cobble	Ø												147	17.1		15	15.9	
47	11.0	N	M	P	org	Ø												146	17.1		22	17.5	
48	12.9	N	M	P	org	Ø												128	16.6		28	18.6	
61	4.0	Y	M	P	wood	Ø												127	15.6		39	19.6	
77	8.0	N	M	P	org	Ø												144	16.3		68	16.8	
93	13.6	N	M	P	org	Ø												143	16.3		107	22.6	
92	10.5	N	M	P	org	Ø												160	15.8		52	19.5	
109	11.9	N	M	P	org	Ø												177	15.2		40	19.9	
145	11.6	N	M	P	org	Ø															41	20.5	
126	5.0	N	M	P	org	1			1	1	1	1									54	19.4	
159	14.9	N	M	P	org	Ø															69	19.4	
176	14.3	N	M	P	org	Ø															66	20.9	

incidentals: N. variegata

Leoparad Frogs
Green Frogs
calling

Waterbody/Project: Gile
Date: 6/22/22
Crew: Laura Sass Heather Lutzow

org = lots of woody debris + org silt mixed w/ some sand

Sampling Point	Depth (ft) CWD?	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	Potamogeton alpinus	Potamogeton amplifolius	Myriophyllum verticillatum
373	10.8 N	M	P	small wood	Ø			
375	12.1 N	M	P	org	Ø			
376	12.3 N	M	P	org	Ø			
377	12.6 N	M	P	org	Ø			
378	12.1 N	M	P	org	Ø			
379	10.9 N	M	P	org	Ø			
415	10.5 N	M	P	org	Ø			
414	12.6 N	M	P	org	Ø			
413	12.5 N	M	P	org	Ø			
412	12.1 N	M	P	org	Ø			
411	11.6 N	M	P	org	Ø			
410	10.1 N	M	P	org	Ø			
409	10.5 N	M	P	org	Ø			
408	10.0 Y	M	P	org	Ø			
372	5.2 Y	M	P	org	Ø			
371	3.0 Y	M	P	org	1	1		
407	9.5 Y	M	P	org	Ø			
406	9.5 N	M	P	org	Ø			
405	3.0 N	M	P	org	1	1		
440	7.8 N	M	P	org	Ø	FW sponge		
441	9.0 N	M	P	wood	Ø			
442	9.3 Y	M	P	wood	Ø			
443	9.5 N	M	P	org	Ø			
475	3.0 N	R	P	cobble	1		1	
473	2.3 Y	M	P	wood	1			1
444	9.8 N	M	P	wood	1			
445	10.0 Y	M	P	wood	Ø			
446	3.5 N	R	P	cobble	Ø			

Sampling Point	Depth CWD Y/N	Dom Sed type	Additional Info	Total Rake Fullness	Ranunculus flamula	Point too deep	Depth
447	10.0 N	M	org	Ø		568	16.6
448	12.2 N	M	org	Ø		540	15.4
449	12.7 N	M	org	Ø		542	16.7
450	11.8 N	M	org	Ø		541	16.5
480	11.2 N	M	org	Ø		512	16.9
479	13.3 N	M	org	Ø		544	17.4
478	13.0 N	M	org	Ø		545	16.5
477	12.5 N	M	org	Ø		513	16.8
504	13.3 N	M	org	Ø		482	17.4
505	13.7 N	M	org	Ø		453	17.8
506	13.8 N	M	org	Ø		418	17.3
507	5.4 N	R	grav	Ø		381	15.7
538	14.6 N	M	org	Ø		382	—
539	1.8 N	R	cobble	Ø		571	15.9
567	14.9 N	M	org	Ø		570	17.2
508	7.0 N	R	Boulder	Ø		566	15.4
509	14.8 N	M	org	Ø		565	15.1
481	6.5 N	R	gravel	Ø		537	16.4
510	12.0 N	M	org	Ø			
543	13.1 N	M	org	Ø			
511	3.3 N	R	cobble	Ø			
452	11.9 N	M	org	Ø			
417	8.9 N	M	org	Ø			
451	1.8 N	R	cobble	1	1		
416	6.8 N	M	org	Ø			
380	6.3 N	M	org	Ø			
564	14.9 N	M	org	Ø			
536	14.5 Y	M	wood	Ø			

Northern Blue flag on shore

Waterbody/Project: Gile Date: 6/22/22

Crew: Laura Sass + Heather Lutzow

Sampling Point	Depth (ft) CWD?	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	Elodea nuttallii	Potamogeton epihydrus				Sampling point	Depth (ft)	CWD (Y/N)	Substrate	Extra info	Total Rake Fullness				Point too deep	Depth	
175	11.6 N	M	P	org	Ø						267	14.2	N	M	org	Ø				179	15.6	
174	5.3 Y	M	P	org	1	1	1				293	13.3	Y	M	org	Ø				161	16.4	
192	8.9 N	M	P	org	Ø						292	13.2	N	M	org	Ø				198	15.6	
193	11.5 N	M	P	org	Ø						291	12.2	N	M	org	Ø				217	15.2	
194	13.0 N	M	P	org	Ø						290	8.0	N	R	gravel	Ø				240	15.1	
195	13.5 N	M	P	org	Ø						319	12.4	Y	M	org	Ø				242	16.2	
215	11.0 N	M	P	org	Ø						320	12.3	N	M	org	Ø				271	16.2	
214	11.4 N	M	P	org	Ø						321	13.1	N	M	org	Ø				270	15.6	
213	10.5 N	M	P	org	Ø						322	12.9	N	M	org	Ø				269	15.5	
235	9.6 N	M	P	org	Ø						323	13.8	N	M	org	Ø				296	15.1	
360	2.9 N	R	P	cobble	Ø						294	14.3	N	M	org	Ø				297	15.6	
261	9.6 N	M	P	org	Ø						295	14.6	N	M	org	Ø				298	16.3	
262	9.8 N	M	P	org	Ø						327	9.9	N	M	org	Ø				329	17.6	
236	9.9 N	M	P	org	Ø						328	8.9	N	M	org	Ø				300	17.2	
263	9.9 N	M	P	org	Ø						299	11.6	N	M	org	Ø				272	16.2	
264	7.0 N	R	P	cobble	Ø						385	10.0	N	M	org	Ø				~~329~~	~~17.4~~	
265	13.3 N	M	P	org	Ø						352	14.8	N	M	org	Ø				330	17.6	
266	13.5 N	M	P	org	Ø						351	10.3	N	M	org	Ø				331	16.9	
237	14.2 N	M	P	org	Ø						325	7.5	N	M	org	Ø				332	terres.	
238	14.9 N	M	P	org	Ø						324	7.0	N	S	sand	Ø				355	17.3	
216	13.9 N	M	P	org	Ø						350	12.9	N	M	org	Ø				384	17.8	
196	8.5 N	M	P	org	Ø						349	13.3	N	M	org	Ø				421	15.1	
197	13.6 N	M	P	org	Ø						348	12.5	N	M	org	Ø				420	18.7	
178	11.3 N	M	P	org	Ø						347	12.2	N	M	org	Ø				419	18.6	
239	14.9 N	M	P	org	Ø						346	11.7	N	M	org	Ø				383	18.0	
241	6.6 N	R	P	cobble	Ø						345	11.5	N	M	org	Ø				354	17.2	
268	14.7 N	M	P	org	Ø															353	17.2	
318	3.9 N	R	P	cobble	Ø															326	15.1	

623- Mayfly hatch

Waterbody/Project: Gile

Date: 6/22/22 / 6/23/2022

Crew: Laura Sass + Heather Lutzow

Sampling Point	Depth (ft) CWD?	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	Ranunculus flamula	Elatine minima	Potamogeton alpinus		Sampling point	Depth (ft)	CWD? (Y/N) Dominant sediment	Additional Info	Total Rake Fullness						Too deep	Depth	
535	14.0 Y	M	P	wood	∅					635	14.5	N M	org	∅			614	15.7		587	18.9	
534	9.7 N	R	P	gravel	∅					633	14.7	N M	org	∅			613	15.4		586	15.9	
561	11.5 N	M	P	org	∅					632	14.7	N M	org	∅			612	15.2		585	16.3	
560	1.3 N	S	P	sand	1	1				656	12.8	N M	org	∅			611	15.1		609	15.7	
559	2.8 N	S	P	sand	∅					655	9.5	N M	org	∅			634	15.4		588	18.2	
562	14.5 N	M	P	wood	∅					707	7.0	N R	boulder	∅						589	15.7	
563	14.5 N	M	P	org	∅					708	9.0	Y M	wood	∅						590	17.7	
584	11.8 Y	M	P	wood	∅					709	2.0	N R	cobble	∅						591	15.7	
583	10.6 N	M	P	org	∅					683	7.5	N S	sand	∅						592	16.9	
582	8.0 N	M	P	org	∅					657	12.3	N M	org	∅						593	16.7	
605	7.0 N	M	P	org	∅					658	13.0	N M	org	∅						594	18.1	
606	13.7 N	M	P	org	∅					684	11.8	N M	org	∅						595	16.3	
607	14.5 N	M	P	org	∅					710	8.0	N M	org	∅						596	16.1	
608	13.5 N	R	P	cobble	∅					711	13.5	N M	org	∅						597	15.9	
119	10.8 N	R	P	gravel	∅					685	14.1	N M	org	∅						598	15.4	
622	14.3 N	M	P	org	∅					686	13.7	N M	org	∅						301	17.9	
621	14.7 N	M	P	org	∅					659	14.4	N M	org	∅						220	17.6	
620	14.4 N	M	P	org	∅					660	13.3	N M	org	∅						219	15.5	
610	14.8 N	M	P	org	∅					687	13.9	N M	org	∅						218	15.7	
636	14.6 N	M	P	org	∅					688	14.5	N M	org	∅						118	19.1	
631	13.1 N	M	P	org	∅					689	13.7	N M	org	∅						101	16.4	
638	1.8 N	M	P	org	1	also ag m 638	1			715	14.0	N M	org	∅						137	17.6	
629	3.0 N	M	P	org	1			1		732	13.6	N M	org	∅						120	17.2	
~~630~~	~~5.0 N~~	~~M~~	~~P~~	~~org~~	~~1~~					747	13.4	N M	org	∅						619	15.5	
681	9.0 N	M	P	org	∅					748	13.0	N M	org	∅						618	15.9	
706	7.0 N	M	P	org	∅															617	16.6	
728	5.0 N	M	P	org	1			1	Tiny PW Vouchered											616	16.2	
682	9.8 N	M	P	org	∅															615	15.3	

Incidental - Schoenoplectus acutis

Waterbody/Project: Gile Date: 6/23/22

Crew: Laura Sass Heather Lutzow

Sampling Point	Depth (ft) CWD?	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness (TRF)	Myriophyllum heterophyllum	Myriophyllum verticillatum	Elodea nuttallii	Aquatic moss (Does not count for TRF)					Sample point	Depth (ft)	CWD? (Y/N) Dom substrate	Additional Info	Total Rake Fullness				
680	5.0 N	M	P	org	1	1	1	1	2					784	12.6	N M	org	Ø				
766	12.6 N	M	P	org	Ø									802	12.5	N M	org	Ø				
765	12.8 N	M	P	org	Ø									820	11.3	N M	org	Ø				
879	9.8 Y	M	P	wood	Ø									836	12.3	N M	org	Ø				
890	9.6 Y	M	P	wood	Ø									851	11.4	N M	org	Ø				
891	9.6 Y	M	P	wood	Ø									852	11.2	N M	org	Ø				
880	10.0 Y	M	P	wood	Ø									837	12.0	N M	org	Ø				
869	10.4 Y	M	P	org	Ø									821	11.0	N M	org	Ø				
870	10.9 Y	M	P	org	Ø									803	10.3	N M	org	Ø				
840	11.1 N	M	P	org	Ø									785	12.6	N M	org	Ø				
823	11.0 N	M	P	org	Ø									767	12.6	N M	org	Ø				
806	11.7 N	M	P	org	Ø									749	12.9	N M	org	Ø				
788	7.0 N	R	P	gravel	Ø									750	13.3	N M	org	Ø				
787	11.8 N	M	P	org	Ø									768	12.5	N M	org	Ø				
769	4.0 N	R	P	Boulder	Ø									786	12.2	N M	org	Ø				
751	12.4 N	M	P	org	Ø									804	9.4	N M	org	Ø				
752	12.4 N	M	P	org	Ø									805	11.5	N M	org	Ø				
753	12.6 N	M	P	org	Ø									822	11.3	N M	org	Ø				
770	11.8 N	M	P	org	Ø									839	11.3	N M	org	Ø				
789	11.5 N	M	P	org	Ø									838	11.5	N M	org	Ø				
807	11.2 N	M	P	org	Ø									853	10.8	N M	org	Ø				
824	10.9 N	M	P	org	Ø									866	9.1	N M	org	Ø				
841	10.5 N	M	P	org	Ø									867	10.3	N M	org	Ø				
842	10.8 Y	M	P	org	Ø									868	10.3	N M	org	Ø				
825	10.8 Y	M	P	org	Ø									857	10.6	N M	org	Ø				
808	11.0 N	M	P	org	Ø									856	10.4	N M	org	Ø				
790	11.5 N	M	P	org	Ø									855	10.7	N M	org	Ø				
771	11.5 N	M	P	org	Ø									854	11.1	N M	org	Ø				

*See map for the remainder of the not-sampled "too deep" points.

Waterbody/Project: Gile Date: 6/23/2022

Crew: Laura Sass Heather Lutzow

Sampling Point	Depth (ft) CWD?	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness
754	12.1 N	M	P	org	Ø
738	12.8 N	M	P	org	Ø
737	12.7 N	M	P	org	Ø
736	12.7 N	M	P	org	Ø
735	12.9 N	M	P	org	Ø
734	13.2 N	M	P	org	Ø
733	13.5 N	M	P	org	Ø
716	14.0 N	M	P	org	Ø
690	14.4 N	M	P	org	Ø
663	14.5 N	M	P	org	Ø
661	14.8 N	M	P	org	Ø
637	15.2 N	M	P	org	Ø
664	14.5 N	M	P	org	Ø
691	13.8 N	M	P	org	Ø
717	13.6 N	M	P	org	Ø
718	14.3 N	M	P	org	Ø
692	13.9 N	M	P	org	Ø
665	14.3 N	M	P	org	Ø
693	13.5 N	M	P	org	Ø
719	13.3 N	M	P	org	Ø
720	13.3 N	M	P	org	Ø
721	13.1 N	M	P	org	Ø
722	12.7 N	M	P	org	Ø
739	12.5 N	M	P	org	Ø
755	12.5 N	M	P	org	Ø
772	11.5 N	M	P	org	Ø
791	11.2 Y	M	P	wood	Ø
724	12.9 N	M	P	org	Ø

too deep	Depth
662	15.2
638	15.5
639	16.6
640	15.0
641	16.1
666	15.2
642	16.9
643	16.7
644	

Sample Point	Depth (ft)	CWD? (Y/N) Dom substrate	Add'l Info	Total Rake Fullness
723	12.7	N M	org	Ø
696	13.5	N M	org	Ø
695	13.5	N M	org	Ø
694	13.8	N M	org	Ø
667	14.7	N M	org	Ø
668	14.6	N M	org	Ø
669	14.4	N M	org	Ø
644	14.8	N M	org	Ø
645	13.8	N M	org	Ø
670	13.7	N M	org	Ø
697	12.7	N M	org	Ø
698	11.8	N M	org	Ø
671	13.3	N M	org	Ø
646	13.9	N M	org	Ø
647	14.3	N M	org	Ø
672	13.5	N M	org	Ø
699	12.6	N M	org	Ø
673	13.7	N M	org	Ø
648	14.2	N M	org	Ø

ATTACHMENT B
Aquatic Invasive Species Survey
Field Data Sheets – July

Safety Topic: Communication in the Field.

Waterbody/Project: Pg 1 of 6 Gile Flowage 70° Partly Cloudy Date: 7/26/2022
Crew: Laura Sass + Heather Lutzow

*Water is about 18" Lower than in June

"wood" is small stuff, not Logs more coarse woody detritus

Sampling Point	Depth (ft)	CWD? Y or N	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	Ceratophyllum demersum	~~Elatine minima~~ Potamogeton praelongus	Elodea canadensis	Elodea nuttallii	Myriophyllum alterniflorum	Myriophyllum heterophyllum	Myriophyllum verticillatum	Nitella sp.	~~Persicaria amphibia (Polygonum amphibium)~~ Utric Minor	Potamogeton alpinus	Potamogeton amplifolius	Potamogeton epihydrus	Potamogeton gramineus	Potamogeton nodosus	Potamogeton pusillus	Ranunculus flammula	~~Sagittaria sp.~~ Najas flexilis	Schoenoplectus subterminalis	Sparganium fluctuans	Zizania sp.	Aquatic moss* d/n incl in TRF	Riccia fluitans	Val Amer		
289	3.0	N	R	P	cobble	Ø																									
317	2.8	N	R	P	cobble	Ø																									
370	5.5	N	R	P	cobble	Ø																									
404	4.3	N	R	P	cobble	Ø																									
439	6.4	Y	M	P	wood	Ø																									
474	5.5	Y	M	P	wood	Ø																									
503	5.0	Y	M	P	org	Ø																					1	1			
533	4.0	N	M	P	org	3							3								1							1			
532	4.5	N	M	P	org	Ø	FW sponge																				1	1			
502	5.4	Y	M	P	wood	Ø																					1	1			
473	6.0	N	M	P	org	Ø																									
472	5.9	N	M	P	org	Ø																									
501	5.4	N	M	P	org	1															1										
531	4.5	N	M	P	org	1		1						1																	
558	2.0	N	M	P	org	1				1				1					1								1				
530	4.8	N	M	P	org	3				3																					
500	5.4	N	M	P	org	2													2												
471	6.4	N	M	P	org	Ø																									
470	1.0	N	M	P	org	1						1			1				1					V	V	1			1		
436	7.0	N	R	P	cobble	Ø																									
406	6.5	Y	M	P	org	Ø																									
367	8.0	N	M	P	org	Ø																									
341	9.0	N	M	P	org	Ø																									
340	6.5	N	R	P	cobble	Ø																									
366	5.0	N	R	P	cobble	Ø																									
557	4.0	Y	R	P	wood	1						1	1										1				1				
527	5.2	N	M	P	org	2						2																			
526	6.8	N	R	P	cobble	Ø																									
556	4.5	N	M	P	org	2						1							2												

Waterbody/Project: Gile Flowage Page 2 of 6 Date: 7/26/2023
Crew: Laura Sass + Heather Lutzow

Sampling Point	Depth (ft)	CWD? Y or N	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	*Ceratophyllum demersum*	*Elatine minima*	*Elodea canadensis*	*Elodea nuttallii*	*Myriophyllum alterniflorum*	*Myriophyllum heterophyllum*	*Myriophyllum verticillatum*	*Nitella sp.*	*Persicaria amphibia (Polygonum amphibium)*	*Potamogeton alpinus*	*Potamogeton amplifolius*	*Potamogeton epihydrus*	*Potamogeton gramineus*	*Potamogeton nodosus*	*Potamogeton pusillus*	*Ranunculus flammula*	*Sagittaria sp.*	*Schoenoplectus subterminalis*	*Sparganium fluctuans*	*Zizania sp.*	*Aquatic moss*				
555	6.3	N	M	P	org	Ø																									
581	1.0	N	S	P	sand	2																2									
628	5.0	N	R	P	cobble	Ø																									
654	5.0	Y	M	P	wood	Ø																									
653	5.0	N	M	P	org	Ø																									
679	1.8	N	M	P	org	1									1				1								1				
705	2.5	N	M	P	org	1						1															2				
678	5.0	Y	M	P	org	Ø																					1				
653	4.5	N.	S	P	sand	Ø																									
704	5.0	N	S	P	sand	Ø																									
703	4.5	N	R	P	cobble	Ø																									
675	5.0	N	R	P	cobble	Ø																									
702	6.5	N	M	P	org	Ø																									
727	2.0	N	S	P	sand	1													1												
744	2.4	N	M	P	org	Ø																									
743	1.5	N	R	P	gravel	Ø																									
759	3.0	N	R	P	cobble	Ø																									
776	1.0	N	R	P	gravel	Ø																									
812	8.0	Y	M	P	wood	Ø																									
829	3.6	N	R	P	cobble	Ø																									
844	2.5	Y	M	P	wood	1				1																					
828	5.5	Y	M	P	wood	Ø																									
827	5.5	N	M	P	org	Ø																									
871	4.5	N	R	P	Boulders	Ø																									
882	4.5	Y	M	P	org	1						1																			
903	6.5	Y	M	P	wood	Ø																									
914	2.4	N	R	P	gravel	Ø																									
933	6.8	Y	M	P	wood	Ø																									
941	5.0	N	M	P	org	Ø																									

Waterbody/Project: Gile Flowage Pg 3 of 6 Date: 7/26/2022

Crew: Heather Lutzow, + Laura Sass

Sampling Point	Depth (ft)	CWD? Y or N	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	*Ceratophyllum demersum*	*Elatine minima*	*Elodea canadensis*	*Elodea nuttallii*	*Myriophyllum alterniflorum*	*Myriophyllum heterophyllum*	*Myriophyllum verticillatum*	*Nitella sp.*	*Persicaria amphibia (Polygonum amphibium)*	*Potamogeton alpinus*	*Potamogeton amplifolius*	*Potamogeton epihydrus*	*Potamogeton gramineus*	*Potamogeton nodosus*	*Potamogeton pusillus*	*Ranunculus flammula*	~~*Sagittaria sp.*~~ P. stipules attached	*Schoenoplectus subterminalis*	*Sparganium fluctuans*	*Zizania sp.*	Aquatic moss	Najas flexilis			
947	5.5	Y	M	P	wood	∅																									
950	3.2	Y	M	P	org	1						1																			
949	5.0	N	M	P	org	1				1											1										
946	6.0	Y	M	P	wood	∅																									
945	3.5	N	S	P	Sand	1													1									1			
938	6.0	Y	M	P	wood	∅																									
944	4.0	Y	M	P	org	∅																									
943	4.0	N	S	P	Sand	∅																									
948	7.0	Y	M	P	org	∅																									
952	6.5	N	M	P	org	∅																									
954	3.5	Y	R	P	cobble	∅																									
953	3.5	Y	S	P	sand	1						1																			
956	2.8	Y	M	P	org	2			2												1				1						
935	6.0	N	R	P	cobble	∅																									
934	2.8	N	R	P	cobble	∅																					1				
925	3.5	N	M	P	org	1								1					1		1			1							
915	0.5	N	M	P	org	1													1				1	1							
905	6.0	Y	R	P	cobble	∅																									
904	1.0	Y	M	P	org	∅																									
894	1.0	N	M	P	org	1																				V	1				
123	1.8	N	R	P	gravel	∅																									
105	6.0	N	M	P	org	∅																									
108	1.7	N	S	P	sand	1													1			1									
91	6.7	N	S	P	sand	∅																									
75	6.5	N	M	P	org	∅																									
76	5.0	Y	M	P	org	∅																									
60	5.0	Y	M	P	org	∅																									
46	4.5	Y	M	P	org	∅																									
34	4.5	Y	M	P	wood	∅																									

Waterbody/Project: Gile Flowage Page 4 of 6 Date: 7/27/2022

Crew: Laura Sass + Heather Lutzow; Kellen Black on Terrest.

Sampling Point	Depth (ft)	CWD? Y or N	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	Ceratophyllum ~~demersum~~ echinatum	Elatine minima	Elodea canadensis	Elodea nuttallii	Myriophyllum alterniflorum	Myriophyllum heterophyllum	Myriophyllum verticillatum	Nitella sp.	Persicaria amphibia (Polygonum amphibium)	Potamogeton ~~alpinus~~ spirilus	Potamogeton amplifolius	Potamogeton epihydrus	Potamogeton gramineus	Potamogeton nodosus	Potamogeton pusillus	Ranunculus flammula	Sagittaria sp.	Schoenoplectus subterminalis	Sparganium fluctuans	Zizania sp.	Aquatic moss	Spp 1			
33	5.0	Y	M	P	wood	Ø																									
44	5.4	N	M	P	org	Ø																									
45	6.0	N	M	P	org	Ø																									
58	6.5	N	R	P	cobble	Ø																									
59	6.5	N	M	P	org	Ø																									
53	4.5	N	S	P	Sand	2			2											1											
16	3.9	N	M	P	org	Ø																									
14	5.4	N	M	P	org	1					1								1												
19	2.0	N	R	P	gravel	Ø																									
35	4.8	N	M	P	org	Ø																									
101	3.8	N	R	P	cobble	Ø																									
77	6.5	N	M	P	org	Ø																									
126	4.0	N	M	P	org	1	1							1										1				1			
264	7.9	N	M	P	org	Ø																									
174	5.5	N	M	P	org	1				1																					
200	1.5	Y	M	P	org	1																									
318	1.5	N	R	P	cobble	Ø																									
372	4.8	N	M	P	org	1										1		1													
371	2.4	N	M	P	org	1				1									1												
405	4.4	N	M	P	org	1			1	1		1		1					1												
440	7.0	N	M	P	org	Ø																									
475	3.8	N	M	P	org	1						1		1		1															
476	7.8	X	M	P	wood	Ø																									
446	2.5	N	R	P	cobble	Ø																									
241	4.0	N	R	P	cobble	Ø																									

Waterbody/Project: Gile Flowage Pg 5 of 6 Date: 7/28/22
Crew: LAURA SASS + KELLEN BLACK

Sampling Point	Depth (ft)	CWD? Y or N	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	Ceratophyllum demersum	Elatine minima	Elodea canadensis	Elodea nuttallii	Myriophyllum alterniflorum	Myriophyllum heterophyllum	Myriophyllum verticillatum	Nitella sp.	Persicaria amphibia (Polygonum amphibium)	Potamogeton alpinus	Potamogeton amplifolius	Potamogeton epihydrus	Potamogeton gramineus	Potamogeton nodosus	Potamogeton pusillus	Ranunculus flammula	Sagittaria sp.	Schoenoplectus subterminalis	Sparganium fluctuans	Zizania sp.	Aquatic moss				
234	6.4	N	R	P	GRAVEL	0																									
212	TERRESTRIAL																														
233	3.3	N	R	P	GRAVEL	0													[illegible]												
211	3.1	N	R	P	GRAVEL	2													2												
230	5.8	N	R	P	GRAVEL	0																									
253	5.8	N	R	P	GRAVEL	0																									
252	7.0	N	M	P	ORGANIC	0																									
251	2.5	N	M	P	ORG	2													2												
207	1.7	N	M	P	ORG	0																									
337	5.2	N	M	P	ORG	0																									
362	6.1	N	M	P	ORG	0																									
361	5.5	N	R	P	GRAV.	0																									
360	7.3	N	R	P	GRAV	0																									
392	1.9	N	R	P	COBB	0																									
336	4.8	N	R	P	COBB	0																									
511	4.0	N	R	P	COBB	0																									
451	1.4	N	R	P	GRAV	1																			1						
416	5.1	N	M	P	ORG	1						1																			
380	5.5	N	M	P	ORG	0																									
325	6.5	N	M	P	ORG	0																									
324	7.3	N	M	P	ORG	0																									
379	6.4	N	M	P	ORG	0																									
415	4.4	N	M	P	ORG	0																									
507	3.1	N	R	P	GRAV	0																									
539	TERRESTRIAL																														
508	4.6	N	R	P	COBB	0																									
481	6.1	N	M	P	ORG	0																									
560	2.1	N	R	P	GRAV	0																									
559	1.7	N	S	P	SAND	1													1								1				

Waterbody/Project: Gile Flowage Pg 60F6 Date: 7/28/22

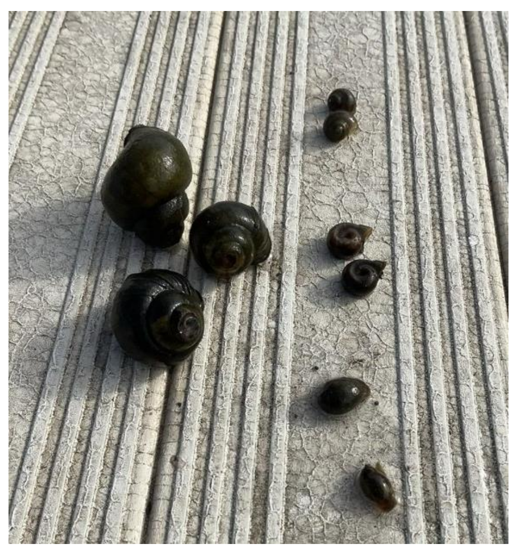
Crew: KALLEN BLACK + LAURA SASS

Sampling Point	Depth (ft)	CWD? Y or N	Dominant sediment type (M=muck, S=sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	Additional Info - Dominant Substrate type (Clay, Silt, Sand, Gravel, Cobble, Boulder, Bedrock, Wood, Organic)	Total Rake Fullness	Ceratophyllum demersum	Elatine minima	Elodea canadensis	Elodea nuttallii	Myriophyllum alterniflorum	Myriophyllum heterophyllum	Myriophyllum verticillatum	Nitella sp.	Persicaria amphibia (Polygonum amphibium)	~~Potamogeton alpinus~~ UTRICULARIA MINOR	Potamogeton amplifolius	Potamogeton epihydrus	Potamogeton gramineus	Potamogeton nodosus	Potamogeton pusillus	Ranunculus flammula	Sagittaria sp.	Schoenoplectus subterminalis	Sparganium fluctuans	Zizania sp.	Aquatic moss	PONDWEED SP.	UTRICULARIA VULGARIS		
605	5.6	N	M	P	ORG	0																									
630	N/N - SHALLOW - PLANTS																														
629	2.5	N	M	P	ORG	1			1				1			1															
680	4.5	N	M	P	ORG	1				1			1												1						
706	5.5	N	M	P	ORG	1							1																		
728	4.3	N	M	P	ORG	1				1																		1			
707	6.6	N	M	P	ORG	0																									
709	2.6	N	M	P	ORG	0																					1				
683	4.1	N	R	P	GRAV	0																									
762	6.0	N	R	P	GRAV	0																									
780	8.1	N	M	P	ORG	0																									
798	5.0	N	R	P	GRAV	0																									
779	1.5	N	M	P	ORG	0																									
778	6.3	N	M	P	ORG	0																									
761	4.5	N	M	P	ORG	1								1																	
760	2.2	N	M	P	ORG	1												1									1				
777	2.3	N	M	P	ORG	0																									
796	6.7	N	M	P	ORG	0																									
795	3.0	Y	M	P	ORG	1																			1			1			
813	5.7	N	M	P	ORG	1								1																	
830	4.5	N	M	P	ORG	1				1		1		1																	
845	6.1	N	M	P	ORG	1			1	1						1					1								1		
846	3.2	N	M	P	ORG	2													2												
859	2.9	N	M	P	ORG	1													1												
860	0.6	N	R	P	GRAV	0																									
872	TERRESTRIAL																														
788	5.0	N	R	P	GRAV	0																									
769	4.5	N	R	P	COBB	0																									

ATTACHMENT C
Photo Log

gai consultants
transforming ideas into reality®

Gile Flowage ATIS Study
Report Photo Log

	
Woody debris on sampling rake at a sampling point during the June point-intercept survey 46.377152, -90.236264 June 14, 2022	Gile tailwater sampling below the dam, 46.42594, - 90.22691 June 27, 2022
	
Slender waterweed (*Elodea nuttallii*), 46.41064, -90.2412027 June 22, 2022	Invertebrates located by boat launch, 46.406794, -90.19317472 July 6, 2022

Northern clearwater crayfish by Hwy C boat launch, 46.406775, -90.193144
July 6, 2022

Freshwater sponge growing on rocks below the dam, 46.42594, - 90.22691
July 27, 2022

An example of the plentiful wildlife habitat and basking areas in one of the bays of Gile Flowage, 46.38025, -90.24320277, June 30, 2022

ATTACHMENT D
Terrestrial Survey Field Data

Project	Gile
County	Iron
Date	7/25, 7/26, 7/27/22
Field Crew	Kellen Black
	Heather Lutzow
	Laura Sass

Site #	Landcover Classification	Starting latitude	Starting longitude	Abundance = Daubenmire Scale; Length = ft.	Glossy buckthorn	Eurasian honeysuckle	Spotted knapweed	Narrow-leaf cattail	Purple loosestrife	Tansy	.
1	Roadside	46.40563631	-90.1929027	Relative Abundance			3				
				Length of Shoreline			927				
2	Northern Mesic/Wet Mesic Forest	46.40391567	-90.19321404	Relative Abundance	1	1		1			
				Length of Shoreline	20	10		20			
3	Talus Forest	46.3679376	-90.24414009	Relative Abundance	1	1	1	1			
				Length of Shoreline	20	10	10	10			
4	Roadside	46.38771338	-90.25603765	Relative Abundance			3				
				Length of Shoreline			1126				
5	Northern Mesic Forest	46.3911494	-90.25426332	Relative Abundance		1					
				Length of Shoreline		10					
6	Northern Mesic Forest	46.41787036	-90.21598766	Relative Abundance		2		1			
				Length of Shoreline		129		931			
7	Northern Mesic Forest	46.42223762	-90.22364629	Relative Abundance							
				Length of Shoreline							
8	Northern Mesic Forest	46.42507457	-90.22788273	Relative Abundance		1		1	1	1	
				Length of Shoreline		132		115	10	10	
9	Northern Wet Mesic Forest	46.41787036	-90.21598766	Relative Abundance							
				Length of Shoreline							
10	Northern Mesic Forest	46.4097658	-90.21684433	Relative Abundance							
				Length of Shoreline							
11	Northern Mesic/Wet Mesic Forest	46.40123315	-90.21631864	Relative Abundance				1			
				Length of Shoreline				239			
12	Roadside	46.40636593	-90.19240795	Relative Abundance			3				
				Length of Shoreline			1105				
13	Northern Mesic/Wet Mesic Forest	46.40334148	-90.19235749	Relative Abundance				1			
				Length of Shoreline				20			
14	Roadside	46.41368718	-90.18665268	Relative Abundance			2	1		2	
				Length of Shoreline			695	254		695	
15	Northern Wet Mesic Forest	46.41355862	-90.18324345	Relative Abundance							
				Length of Shoreline							
16	Emergent Wetland/Tag Alder	46.40362276	-90.18379731	Relative Abundance				2			
				Length of Shoreline				197			
17	Tag Alder/ Northern Wet Mesic Forest	46.36709969	-90.24473256	Relative Abundance		1					
				Length of Shoreline		10					
Island 1	Boulder	46.39741007	-90.21231307	Relative Abundance							
				Length of Shoreline							
Island 2	Boulder	46.3950843	-90.21671714	Relative Abundance							
				Length of Shoreline							
Island 3	Northern Mesic/Talus Forest	46.3754167	-90.24174699	Relative Abundance							
				Length of Shoreline							
Island 4	Northern Mesic/Talus Forest	46.37763421	-90.2420718	Relative Abundance							
				Length of Shoreline							

Site #	Landcover Classification	Starting latitude	Starting longitude	Abundance = Daubenmire Scale; Length = ft.	Glossy buckthorn	Eurasian honeysuckle	Spotted knapweed	Narrow-leaf cattail	Purple loosestrife	Tansy	
Island 5	Northern Mesic/Talus Forest	46.37927408	-90.24043106	Relative Abundance							
				Length of Shoreline							
Island 6	Northern Mesic Forest	46.3834405	-90.25189667	Relative Abundance							
				Length of Shoreline							
Island 7	Northern Mesic Forest	46.38250543	-90.25092778	Relative Abundance							
				Length of Shoreline							
Island 8	Northern Mesic Forest	46.38810606	-90.24502808	Relative Abundance		2				2	
				Length of Shoreline		30				10	
Island 9	Northern Mesic/Talus Forest	46.38388739	-90.23944997	Relative Abundance		1					
				Length of Shoreline		10					
Island 10	Northern Mesic Forest/Boulder	46.38564955	-90.23738549	Relative Abundance							
				Length of Shoreline							
Island 11	Northern Mesic Forest/Boulder	46.38552455	-90.2355012	Relative Abundance							
				Length of Shoreline							
Island 12	Northern Mesic Forest	46.39104253	-90.24859253	Relative Abundance							
				Length of Shoreline							
Island 13	Northern Mesic Forest	46.39008992	-90.25152141	Relative Abundance							
				Length of Shoreline							
Island 14	Northern Mesic Forest	46.39339122	-90.24593133	Relative Abundance							
				Length of Shoreline							
Island 15	Northern Mesic/Talus Forest	46.3981903	-90.2335241	Relative Abundance		1					
				Length of Shoreline		20					
Island 16	Northern Mesic Forest/Boulder	46.4027304	-90.23157392	Relative Abundance							
				Length of Shoreline							
Island 17	Northern Mesic Forest	46.41416347	-90.22126764	Relative Abundance		1					
				Length of Shoreline		10					
Island 18	Northern Mesic Forest	46.41381942	-90.22026518	Relative Abundance							
				Length of Shoreline							
Island 19	Northern Mesic Forest	46.41305396	-90.22060347	Relative Abundance							
				Length of Shoreline							
Island 20	Northern Mesic Forest	46.41203925	-90.22225802	Relative Abundance	1	2					
				Length of Shoreline	40	10					
Island 21	Northern Mesic Forest	46.41589313	-90.21781638	Relative Abundance		2					
				Length of Shoreline		94					
Island 22	Northern Mesic Forest/Boulder	46.41513219	-90.23786323	Relative Abundance		1					
				Length of Shoreline		10					
Island 23	Northern Mesic/Talus Forest	46.40782333	-90.23977478	Relative Abundance		2					
				Length of Shoreline		331					
Island 24	Boulder	46.41154061	-90.23410926	Relative Abundance							
				Length of Shoreline							
Island 25	Northern Mesic Forest/Boulder	46.40622036	-90.23251253	Relative Abundance		3					
				Length of Shoreline		192					
Island 26	Northern Mesic Forest	46.40294799	-90.22408812	Relative Abundance							
				Length of Shoreline							
Gile Park Meander	Park right-of-way	46.4259705	-90.225051	Relative Abundance		2	2	1		1	
				Length of Meander Route		508	1612	71		329	