McKenzie Lakes Aquatic Plant Management Plan (2022-2027)

Sponsored by:

McKenzie Lakes Association (MLA)

Burnett County Land Services Department – Conservation Division (BCLSD)

Advisory Committee:

Dave Ferris – Burnett County Conservationist

Pamela Toshner – WDNR Lake Biologist

Plan Writing and Facilitation: Emily Moore – Burnett County Water Resources Specialist/Aquatic Invasive Species Coordinator (BC WRS/AIS Coordinator)

Mapping and GIS Design: Emily Moore – Burnett County Water Resources Specialist/Aquatic Invasive Species Coordinator

Proofing and Editing: Ann Lane – Administrative Assistant

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Introduction

The aquatic plant management plan (APM) for the McKenzie Lakes is sponsored by the McKenzie Lakes Association (MLA), who is on their third APM update with the Burnett County Land Services Department. The planning phase of the project is funded, in part, by the Burnett County Land Services Department – Conservation Division (BCLSD) AEPP grant and the MLA. Several APM planning meetings were executed with the BCLSD and the MLA APM committee to discuss goals and objectives for the APM. A public input meeting was held at the McKenzie Landing Restaurant on May 28th, 2022 after the MLA annual meeting. The meeting date, location and partial agenda were published in the Spooner Advocate and the Burnett County Sentinel from May 9th to May 19th to promote the meeting (See Public Notice). Roughly 30 members of the public were present, along with the APM committee to discuss the upcoming goals and objectives for the 2022-2027 APM update for the McKenzie Lakes.

PUBLIC NOTICE

MCKENZIE LAKES
AQUATIC PLANT MANAGEMENT PLAN GOALS

The McKenzie Lakes Association will hold a public session to provide information and accept comments and questions regarding the McKenzie Lakes Aquatic Plant Management Plan goals and objectives for Big, Middle and Lower McKenzie Lakes, Burnett/Washburn County, WI. The public comment session will be held Saturday, May 28, 2022 at 10:30 A.M at the McKenzie Landing Restaurant on Big McKenzie Lake, 1350 County Highway E, Spooner, WI 54801. All interested persons are invited to present comments at the session.

Sandy Swanson
President

A24T2WNAXLP

Executive Summary

Two surveys were completed across Big, Middle and Lower McKenzie Lakes, one being the aquatic invasive species survey and the second was the full macrophyte survey. Both surveys followed the WDNR Point Intercept Protocol using a double sided rake or a pole grabber while following a point generated map. Below outlines a brief description of the survey findings for Big, Middle and Lower McKenzie Lakes.

Findings

1. No new aquatic invasive species were observed during the development of this plan, however, increased monitoring efforts for Yellow Flag Iris should occur in future years as the population around Big McKenzie continues to increase since initial findings in 2020.
2. During the AIS point intercept survey, curly-leaf pondweed was found in water depths of 17 feet and the presence is spreading in Big McKenzie.
3. From the complete aquatic macrophyte surveys all three lakes received a high diversity index and species richness values. All three lakes had a Simpson Diversity Index of 0.91. Big McKenzie had the highest species richness of all three lakes with 40 species collected, followed by Lower McKenzie with 35 and Middle McKenzie with 34.
4. Zebra mussels were not detected in Lower McKenzie during the lake surveys and the veliger tows. Big McKenzie reproduction is showing a progressive decline over the years (2019: 87.4/L; 2020: 6.43/L; 2021: 0.580/L and 2022: 0.199/L). Middle McKenzie zebra mussel reproduction is experiencing an increase (2021: 0.240/L and 2022: 9.20/L)
5. Out of the three lakes, Big McKenzie had poor water clarity during lake survey months with increased turbidity and green filamentous algae coating most plants.

Big, Middle and Lower McKenzie Lakes Management Goals:

Goal 1: Prevent the introduction and spread of aquatic invasive species. This goal is aimed at preventing the introduction and spread of aquatic invasive species by continuing to monitor the boat landings through the Clean Boats Clean Waters Program and educate the public on the local ordinances in effect. Branching out from previous APMs, the MLA continue to prevent the spread of zebra mussels into Lower McKenzie by implementing various monitoring efforts. All actions on this goal can be found on page 41-45.

Goal 2: Reduce and control existing populations of invasive species. The MLA will continue to monitor and control already existing populations of invasive species including Curly-leaf Pondweed, Purple Loosestrife, Yellow Flag Iris, Chinese/Banded Mystery Snails and Zebra Mussels. All actions on this goal can be found on page 41-45.

Goal 3: Educate the McKenzie Lakes community regarding aquatic plant management. Several important messages were discussed and focused on that should be distributed to members of the community, business owners, lake users and all lake residents. Messages may include: the summary of the APM and where to find the complete version, when and where educational workshops are being held, and local/state regulations. All actions on this goal can be found on page 41-45.

Goal 4: Enhance and maintain diverse populations of native aquatic plants. Information on the importance of aquatic plants will be relayed and the proper ways to manage aquatic plants that are safe and follows WDNR protocols. All actions on this goal can be found on page 41-45.

Goal 5: Maintain and improve water quality conditions. Water quality monitoring will continue through the Citizen Lake Monitoring Network Program. Additionally, programs such as the Healthy Lakes and Rivers and the Burnett County Shoreline Incentives Program will be provided through workshops and presentations. All actions on this goal can be found on page 41-45.

Lake Information

This Aquatic Plant Management Plan encompasses a chain of three lakes, Big, Middle and Lower McKenzie Lakes. Although the waterbodies are connected by McKenzie Creek, the lakes are very unique in size, aquatic plant abundance, development and water chemistry conditions. Volunteers of the Citizen Lake Monitoring Network (CLMN) take water chemistry measurements during the summer months for these lakes to determine the health and Trophic State. The Trophic State Index (TSI) measures the amount of algae in the water and takes into account water quality measurements including, Secchi Disk, water chemistry, and temperature/D.O. profiles. TSI values have a range that gives the waterbody a classification of productivity levels that ranges from 0 – 100. The higher the value of TSI, the more nutrients are present in the waterbody, with a TSI of 50 or more being the threshold for Eutrophic conditions, 40-50 as mesotrophic (moderate productivity) and values below 40 as oligotrophic (poor productivity).

Big McKenzie

Big McKenzie is 1129 acre drainage lake that straddles the eastern edge of Burnett County and western edge of Washburn County. The average and maximum depth is 19 and 71 feet, respectively. The WDNR classifies Big McKenzie as having a 70% sand, 20% gravel, 5% rock and 5% muck lake-bottom. Big McKenzie has one public boat launch located in Washburn County on County HWY E. The Trophic State Index (TSI) measurements, *amount of algae in the water*, have been taken for Big McKenzie since 1986. The WDNR classifies Big McKenzie as eutrophic, *a lake with rich amounts of dissolved nutrients*, with an overall TSI measurement of 52. The average Secchi Disk reading for Big McKenzie for year 2022 was 9.5 feet, which is near average for the Northwest Georegion (9 feet average). The average summer Chlorophyll measurement was below the Northwest Georegion average (15.5 µg/l) at 9.2 µg/l. Total phosphorus was nearing the mark of the algal bloom threshold (20 µg/l) measuring a similar value as Lower McKenzie with 19.2 µg/l, which indicates the lakes have an excess amount of phosphorus. Big McKenzie was fairly turbid during the July sampling for aquatic plants. Much of the vegetation was covered in filamentous green algae.

Middle McKenzie

Middle McKenzie is a 527 acre drainage lake that straddles the eastern edge of Burnett County and western edge of Washburn County. The average and maximum depth is 20 and 45 feet, respectively. The WDNR classifies Middle McKenzie as having a 60% sand, 30% gravel, 10% rock and 0% muck lake bottom. The public can access the one public boat landing directly to Middle McKenzie off of Racine Dr in Burnett County. The Trophic State Index measurements have been collected for Middle McKenzie since 2010. The WDNR classifies Middle McKenzie as Oligotrophic, *a lake low in dissolved nutrients with an abundance of dissolved oxygen*, with an average Secchi Disk reading of 18 feet for 2022, which is way above average for the Northwest Georegion (9 feet average). The average summer Chlorophyll measurement was well below the average for the Northwest Georegion (15.5 µg/l) measuring at 1.9 µg/l. Out of all three lakes, Middle McKenzie had the highest water clarity conditions during the summer months.

Lower McKenzie

Lower McKenzie is a 206 acre drainage lake located in Washburn County. The maximum depth is 17 feet. The WDNR classifies Lower McKenzie as having a lake bottom with 12% sand, 50% gravel and 38% muck. The public can access the one public boat landing on Lower McKenzie on Lower McKenzie Landing Road. The Trophic State Index measurements have been collected for Lower McKenzie since 1990. The WDNR classifies Lower McKenzie as mesotrophic, *a lake with rich to moderate amounts of dissolved nutrients*, with a TSI value of 47 from the deep hole. The average Secchi Disk reading of 10.5 feet for 2022, which is above average for the Northwest Georegion (9 feet average). Chlorophyll was collected at the deep hole site during the summer and averaged 5.1 µg/l measuring lower than the average for the Northwest Georegion. Total phosphorus was taken during the summer with an average measurement of 19.7 µg/l, which is close to the threshold the lake could experience noticeable algae blooms (20 µg/l – threshold). This measurement indicates that Lower McKenzie has an excess amount of phosphorus within the lake. Lower McKenzie had fairly clear water quality during the surveys, however, caution should be made with the high phosphorus measurements taken this sampling year.

Past Management and Monitoring Efforts

Curly Leaf Pondweed

- Management hasn't been conducted for Curly-Leaf Pondweed (CLP) on any of the lakes to date. Extensive monitoring of population changes have occurred since 2011 or earlier using the WDNR Point Intercept Sampling Protocol. There is evidence of CLP in new areas around all three lakes, however, in some years the population rises and falls. Overall, Big and Middle McKenzie have showed similar growing and migration patterns throughout sampling years, with a visual increase in growth and new areas of the lakes having CLP. Lower McKenzie has stayed fairly consistent with CLP occurrences over the sampling years. Below outlines past surveys for Big, Middle and Lower McKenzie Lakes. Previous CLP maps can be found in Appendix A.

Big McKenzie

- Sampling years 2010, 2012, and 2014 showed similar densities of CLP, with the most occurrences discovered in the southern bay. The northeast bay is the second most common area where CLP has been found. In sampling year 2012 there was a noticeable migration of CLP up the western and eastern shoreline from the southern bay. Curly-Leaf Pondweed could almost be found around the entire littoral zone of Big McKenzie in 2012. In sampling years 2018 and 2020 there was a noticeable decline in occurrence of CLP, with the majority of the occurrences found in the southern bay. This year, 2022, CLP increased, with the occurrence map looking almost similar to 2012 in that almost the entire littoral zone detected CLP. The invasive was found growing in 17 feet of water nearly touching the water surface in some areas this deep.

Middle McKenzie

- The CLP occurrences stayed consistent between sampling years 2012, 2014, 2018, and 2020 with detections occurring in the west and east littoral zones. In 2014 and 2018 samplings the only major difference was detections in the McKenzie Creek. Similarly to Big McKenzie this year's sampling showed an increase in CLP occurrences in both rake fullness and migration to new areas around the lake including visual sightings in the northwest bay and southwest littoral zone.

Lower McKenzie

- The CLP occurrences on Lower McKenzie have stayed fairly consistent throughout 2015, 2020 and 2022. In 2015 CLP had low occurrences near the mouth of the McKenzie Creek with a visual sighting and one detection of a rake fullness of 1 on the east side of the lake. CLP increased and stayed consistent in 2020 and 2022 with detections in 4 spots by the McKenzie Creek.

Purple Loosestrife

- Purple Loosestrife has been controlled both by biocontrol and cut and spray techniques for 10 years or more on Big and Middle McKenzie. Purple Loosestrife has not been detected on Lower McKenzie to date, but continued monitoring is still in effect. Control of this species is still an ongoing effort by the lake association and volunteers.

Zebra Mussels

- Zebra Mussels have not been controlled on either Big or Middle McKenzie to date, however, volunteers have been monitoring the size and abundance on plates scattered evenly around all three lakes. Zebra Mussels have not been detected in Lower McKenzie but continued monitoring with zebra mussel plates and other hard surfaces is an ongoing effort by volunteers and the MLA. From the McKenzie Lakes veliger concentrations summary report for 2022, the population on Middle McKenzie has grown significantly from previous years with 9.201/L in the sample. Big McKenzie concentrations were significantly lower with 0.199/L.

Long-term Planning

Long-term planning is different for the three lakes because each system is unique in nutrients, water chemistry, invasive species status and more. Below outlines long-term planning efforts for all lakes and specific planning for each individual lake.

The McKenzie Lakes Long-term Planning

Continue monitoring and prevention will take place on all three lakes, some include:

- Aquatic invasive species and full macrophyte surveys every 3-5 years.
- Maintaining the decontamination stations at the public boat landings and conducting Clean Boats Clean Waters boat inspections seasonally.
- Monitoring water quality using the Citizen Lake Monitoring Network program.
- Monitor and control Purple Loosestrife on Big and Middle McKenzie. Additionally, continue to monitor and prevent Purple Loosestrife from getting into Lower McKenzie.
- Future monitoring and control efforts should be taken next year for Yellow Flag Iris on Big McKenzie. There is evidence the population is expanding around the waterbody.
- Continue monitoring zebra mussels with sampling plates. New areas near the Cranberry Marsh, locations along the McKenzie Creek to Lower McKenzie and additional sites will have plates installed in 2023.
- To protect water quality septic systems should be pumped/updated.
- Dissolved oxygen CLMN measurements should be taken to determine the oxygen content during the spring, summer and fall seasons.
- Shoreline practices should be implemented to help reduce phosphorus runoff into the lakes.

Data Analysis – 2022

Methods

Using a standard formula that takes into account the shoreline shape and distance, islands, water clarity, depth and total lake acres, Michelle Nault (WDNR) generated a point intercept sampling grid for Big, Middle and Lower McKenzie Lakes (Figure 1.). In June of 2022, BCLSD conducted invasive species surveys on all three lakes, with Lower McKenzie sampled first due to the waterbody not containing Zebra Mussels. During this survey, BCLSD went to each sampling point for the three waterbodies and each lake consisted of a different set of points with Big McKenzie having 1011 points, Middle McKenzie with 631, and Lower McKenzie having 290. Points were sampled for Curly-leaf pondweed and Eurasian water milfoil and the shoreline was

scanned for Purple Loosestrife and Yellow Flag Iris. This type of survey should result in both early detection and mapping of any infestation that may have occurred. During the June survey, we documented changes in Curly-leaf pondweed between the lakes. Yellow Flag Iris was found to increase on Big McKenzie, but not detected on Middle or Lower McKenzie. Eurasian watermilfoil was not detected on any of the lakes and lastly, Zebra Mussels were not found on Lower McKenzie but present in Big and Middle McKenzie.

Aquatic Plant Rake Criteria: At each point a double-sided rake is thrown and invasive species were documented by a fullness criteria. Below outlines this criteria:

- **Rake fullness 1** – there are not enough plants to cover the length of the rake in a single layer.
- **Rake fullness 2** – there are enough plants to cover the length of the rake in a single layer, but the tines are not covered.
- **Rake fullness 3** – the rake is completely covered with plants, and the tines are not visible.

We also recorded visual sightings of plants within six feet of the sample point. Substrate type was assigned at each site where the bottom was visible or it could be reliably determined using the rake. The substrate is defined as either being sand, muck or rock.

Data Analysis
We entered all data collected into the standard UW-Extension APM spreadsheet. From this, we calculated the following:

Total number of points sampled: This included the total number of points on the lake that were within the littoral zone (0-maximum depth where plants are found).

Total number of sites with vegetation: These included all sites where we found vegetation after doing a rake sample. For example, if 20% of all sample sites have vegetation, it suggests that 20% of the lake has plant coverage.

Total number of sites shallower than the maximum depth of plants: This is the number of sites that are in the littoral zone. Because not all sites that are within the littoral zone actually have vegetation, we use this value to estimate how prevalent vegetation is throughout the littoral zone. For example, if 60% of the sites shallower than the maximum depth of plants have vegetation, then we estimate that 60% of the lake's littoral zone has plants.

Frequency of occurrence: The frequency of all plants (or individual species) is generally reported as a percentage of occurrences at all sample points. It can also be reported as a percentage of occurrences at sample points within the littoral zone.

Frequency of occurrence example:
Plant A is sampled at 70 out of 700 total points = 70/700 = 0.10 = 10%
This means that plant A's frequency of occurrence = 10% considering the entire lake sample.

Plant A is sampled at 70 out of 350 total points in the littoral zone = 70/350 = 0.20 = 20%
This means that plant A's frequency of occurrence = 0.20% when only considering the littoral zone.

From these frequencies, we can estimate how common each species was at depths where plants were able to grow. Note the second value will be greater as not all the points (in this example only ½) occur at depths shallow enough for plant growth.

Simpson's diversity index: A diversity index allows the entire plant community at one location to be compared to the entire plant community at another location. It also allows the plant community at a single location to be compared over time thus allowing a measure of community degradation or restoration at that site. With Simpson's diversity index, the index value represents the probability that two individuals (randomly selected) will be different species. The index values range from 0 -1 where 0 indicates that all the plants sampled are the same species, to 1 where none of the plants sampled are the same species. The greater the index value, the higher the diversity in a given location. Although many natural variables like lake size, depth, dissolved minerals, water clarity, mean temperature, etc. can affect diversity, in general, a more diverse lake indicates a healthier ecosystem. Perhaps most importantly, plant communities with high diversity also tend to be **more resistant** to invasion by exotic species.
Maximum depth of plants: This indicates the deepest point that vegetation was sampled. In clear lakes, plants may be found at depths of over 20 feet, while in stained or turbid locations, they may only be found in a few feet of water. While some species can tolerate very low light conditions, others are only found near the surface. In general, the diversity of the plant community decreases with increased depth.

Number of sites sampled using rope/pole rake: This indicates which rake type was used to take a sample. Protocol suggests a 15 foot pole rake, and a 25 foot rope rake for sampling.

Average number of species per site: This value is reported using four different considerations.
1. *Shallower than maximum depth of plants* indicates the average number of plant species at all sites in the littoral zone.
2. *Vegetative sites only* indicate the average number of species where plants were found.
3. *Native species shallower than maximum depth of plants* and
4. *Native species at vegetative sites only* excludes exotic species from consideration.

Species richness: This value indicates the number of different plant species found in and directly adjacent to (on the waterline) the lake.

Mean and median depth of plants: The mean depth of plants indicates the average depth in the water column where plants were sampled. Because a few samples in deep water can skew this data, median depth is also calculated. This tells us that half of the plants sampled were in water shallower than this value, and half were in water deeper than this value.

Relative frequency: This value shows a species' frequency relative to all other species. It is expressed as a percentage, and the total of all species' relative frequency will add up to 100%. Organizing species from highest to lowest relative frequency value gives us an idea of which species are most important within the macrophyte community.

Relative Frequency Example:
Suppose that 100 points were sampled, and 4 species of plants were found with the following results:

Plant A was found at 70 sites. Its frequency of occurrence is thus 70/100 = 70%
Plant B was found at 50 sites. Its frequency of occurrence is thus 50/100 = 50%
Plant C was found at 20 sites. Its frequency of occurrence is thus 20/100 = 20%
Plant D was found at 10 sites. Its frequency of occurrence is thus 10/100 = 10%

To calculate an individual species' relative frequency, divide the number of sites a plant is sampled at by the total number of times all plants were sampled. In our example, this would be 150 samples (70+50+20+10).

Plant A = 70/150 = 0.4667 = 46.67%
Plant B = 50/150 = 0.3333 = 33.33%
Plant C = 20/150 = 0.1333 = 13.33%
Plant D = 10/150 = 0.0667 = 6.67%

This tells us that 46.67% of all plants sampled were plant A.

Floristic Quality Index (FQI): This index measures the impact of human development on a lake's aquatic plants. Species in the index are assigned a Coefficient of Conservatism (C) which ranges from 0-10. The higher the value assigned, the more likely the plant is to be negatively impacted by human activities relating to water quality or habitat modifications. Plants with low values are tolerant of human habitat modifications, and often exploit these changes to the point where they may crowd out other species. The FQI is calculated by averaging the conservatism value for each species found in the lake. Consequently, a higher index value indicates a healthier macrophyte community. Nichols (1999) identified four eco-regions in Wisconsin: Northern Lakes and Forests, Northern Central Hardwood Forests, Driftless Area and Southeastern

Wisconsin Till Plain. It is recommended to make comparisons of lakes within ecoregions to determine the target lake's relative diversity and health.[11]

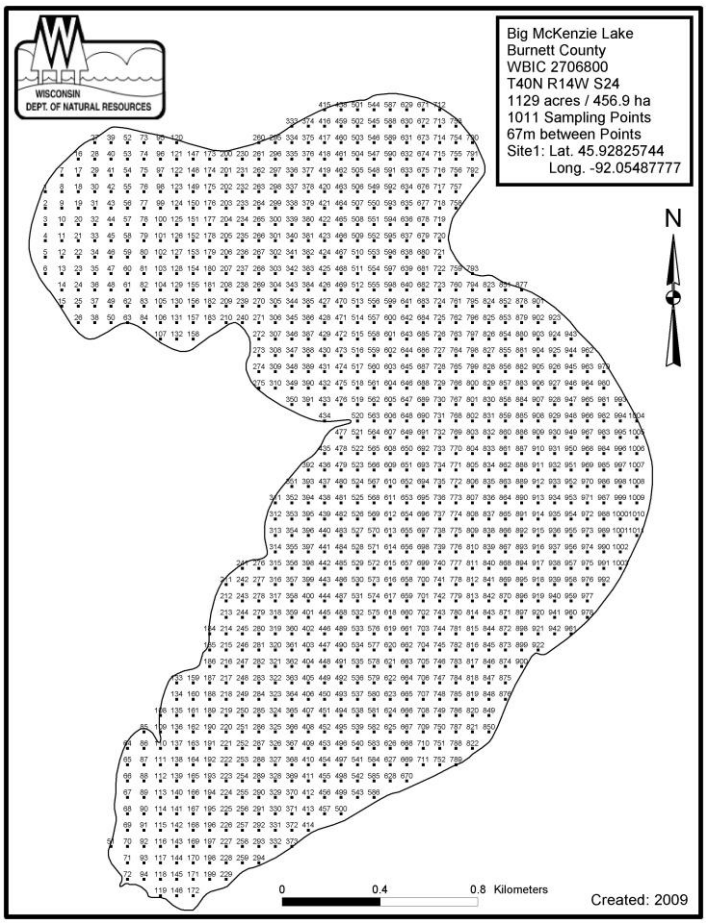
Aquatic Invasive Species and Aquatic Plant Survey Results for Big, Middle and Lower McKenzie Lakes

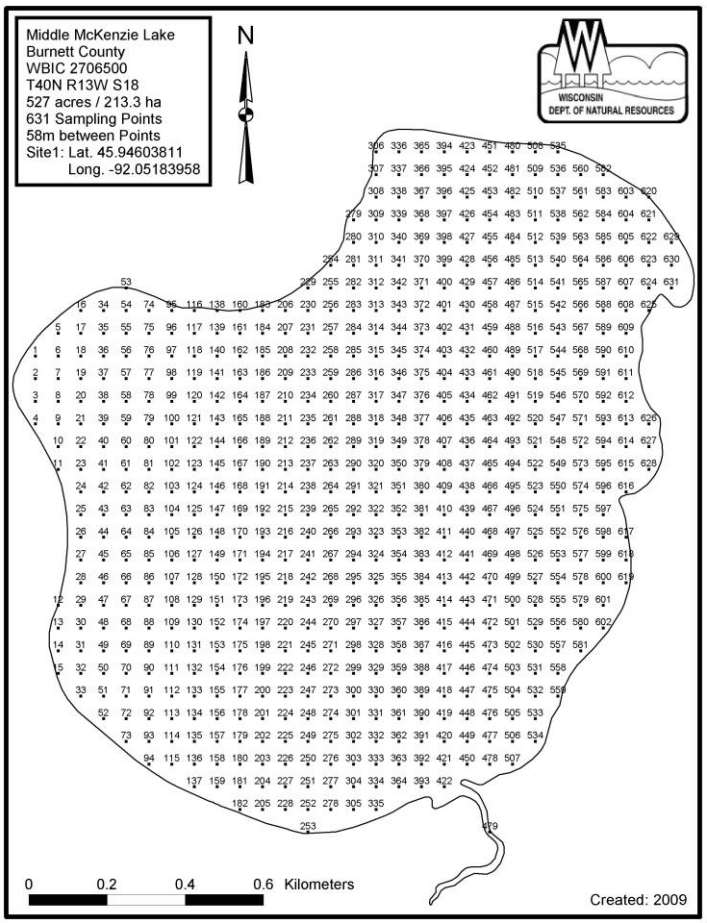
A complete aquatic plant (macrophyte) survey was completed for Big, Middle and Lower McKenzie Lakes in August 2022. Prior to the whole lake monitoring, an invasive species survey was conducted to confirm the presence or absence of any invasive species. The species of high concern was curly leaf pondweed (CLP). Since CLP grows earlier than native species, it typically dies in early July; therefore, an invasive plant survey is done in early June while this plant is still robust. The results of the invasive plant survey and the point intercept complete macrophyte survey are discussed in this section.

Invasive Species Survey:
Invasive species surveys consists of sampling all points on a sampling grid provided by the WDNR in early June. The McKenzie Lakes point intercept sampling grid can be viewed in Figure 1. Aquatic plants surveyed are determined to be either "native" or "invasive" and are not identified to species level.

Complete Macrophyte Survey:
A complete aquatic plant (macrophyte) survey utilizes the same point intercept sampling grid as the invasive species survey. However, at each point every plant is identified down to species level. This survey goes beyond determining whether what is examined is a "native" or "invasive" species.

Using a standard formula based on a lake's shoreline shape and distance, islands, water clarity, depth, and size in acres, the Wisconsin Department of Natural Resources (WDNR) generated the point intercept sampling grid of Big, Middle and Lower McKenzie Lakes.





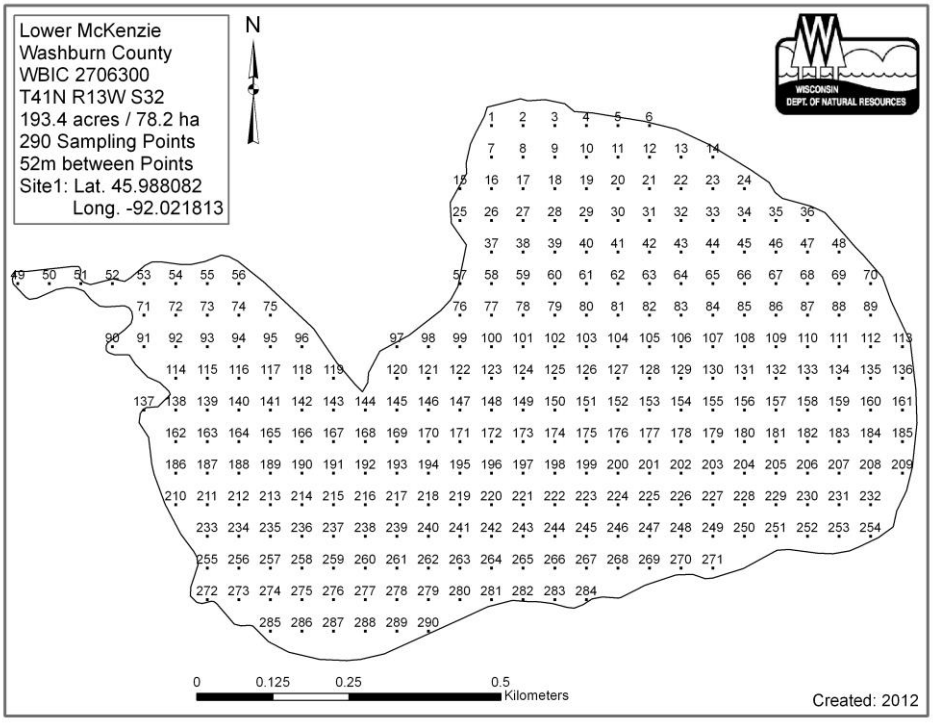


Figure 1: Sampling points for the Chain of Lakes.

Aquatic Invasive Species Survey Results

Big McKenzie Aquatic Invasive Species Survey Results

An invasive species point-intercept survey was completed over a 3 day period on Big McKenzie in June of 2022. During the survey, 683 sites were visited and 57 of those contained Curly-leaf pondweed with an 8% frequency of occurrence when considering the littoral zone and a 5% chance finding CLP in the entire lake. CLP ranged in water depths of 1 to 18 feet, with an average depth of 9 feet. The number of occurrences for CLP are up from the previous 3 surveys in years 2015 (47 sites), 2018 (32 sites) and 2020 (18 sites), however, 2022 had lower occurrences from 2010 (107 sites), 2012 (126 sites) and 2014 (68 sites). The distribution map from 2022 looks similar to the occurrence maps from 2010 and 2012 where CLP was shown to occupy almost the entire littoral zone of the lake. The increase in CLP frequency of occurrence in 2022 from the previous 3 sampling years could be partly due to a dormant turion seedbank in the lake sediment, a gradual decrease in water quality from previous years, and/or environmental conditions favoring CLP growth over previous years.

Table 1: Survey data for CLP on Big McKenzie during AIS point intercept survey.

Curly-leaf Pondweed Survey Data – Big McKenzie 2022	
Total # of sites visited	683
Total # of sites with Curly-Leaf Pondweed	57
Average Rake Fullness	1.30
Total # of visual sightings	28
Average depth of Curly-leaf Pondweed (ft)	9

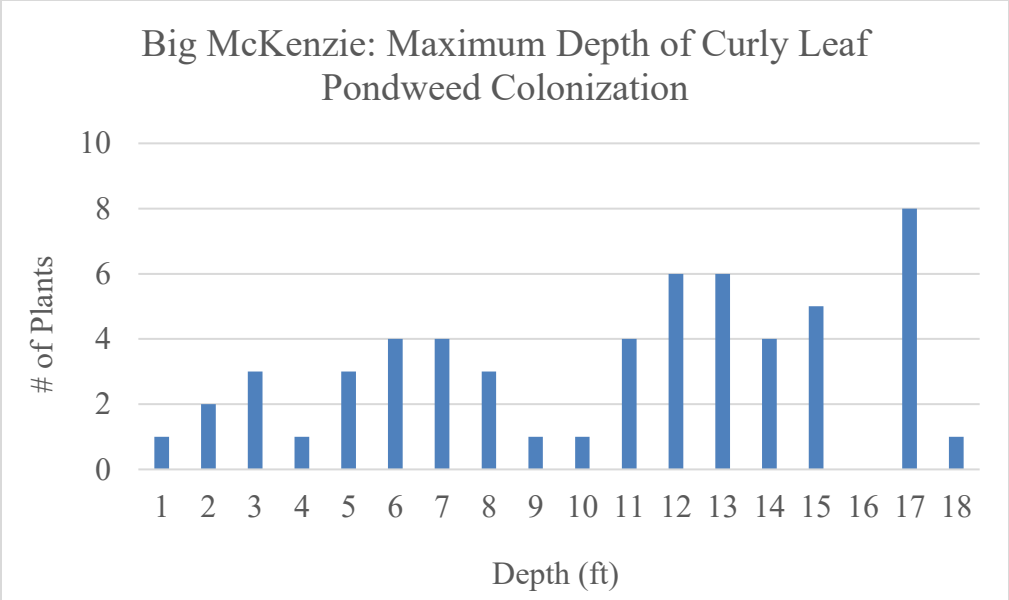


Figure 2: Depth profiles of CLP on Big McKenzie.

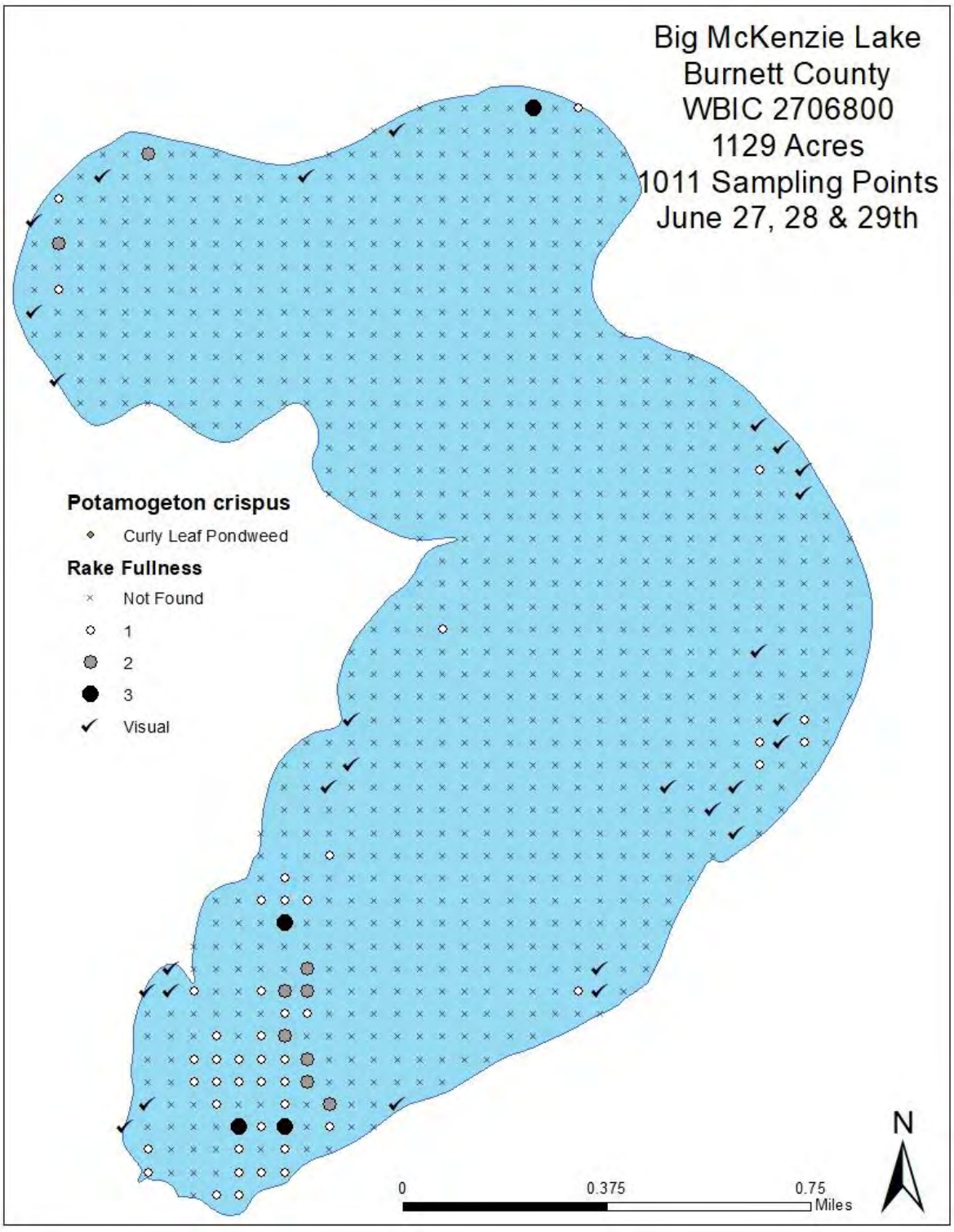


Figure 3: Distribution of CLP on Big McKenzie from AIS point intercept survey.

Middle McKenzie Aquatic Invasive Species Survey Results

An invasive species point-intercept survey was completed over a 2 day period on Middle McKenzie on June 22nd & June 23rd. During the survey, 592 sites were visited and 26 of those locations contained CLP with a 2% frequency of occurrence when considering the littoral zone and in the entire waterbody. CLP occurrences ranged in water depths from 4 to 16 feet, with an average depth of 8.5 feet. The number of occurrences for CLP is at an all-time high from all previous survey years. CLP was found at 26 sampling points for 2022, which is up by 21 points from the 2020 survey where CLP was found in 5 locations scattered along the west and east side of the lake. Survey years 2018 and 2014 found CLP in similar locations, predominantly along the east side of the lake and near the mouth of the McKenzie Creek. In 2012, CLP was found at 12 locations scattered along the west and east side of the lake.

Table 2: Survey data for CLP on Middle McKenzie during AIS point intercept survey.

Curly-leaf Pondweed Survey Data – Middle McKenzie 2022	
Total # of sites visited	592
Total # of sites with Curly-leaf Pondweed	14
Average Rake Fullness	1.79
Total # of visual sightings	12
Average depth of Curly-leaf Pondweed (ft)	8.5

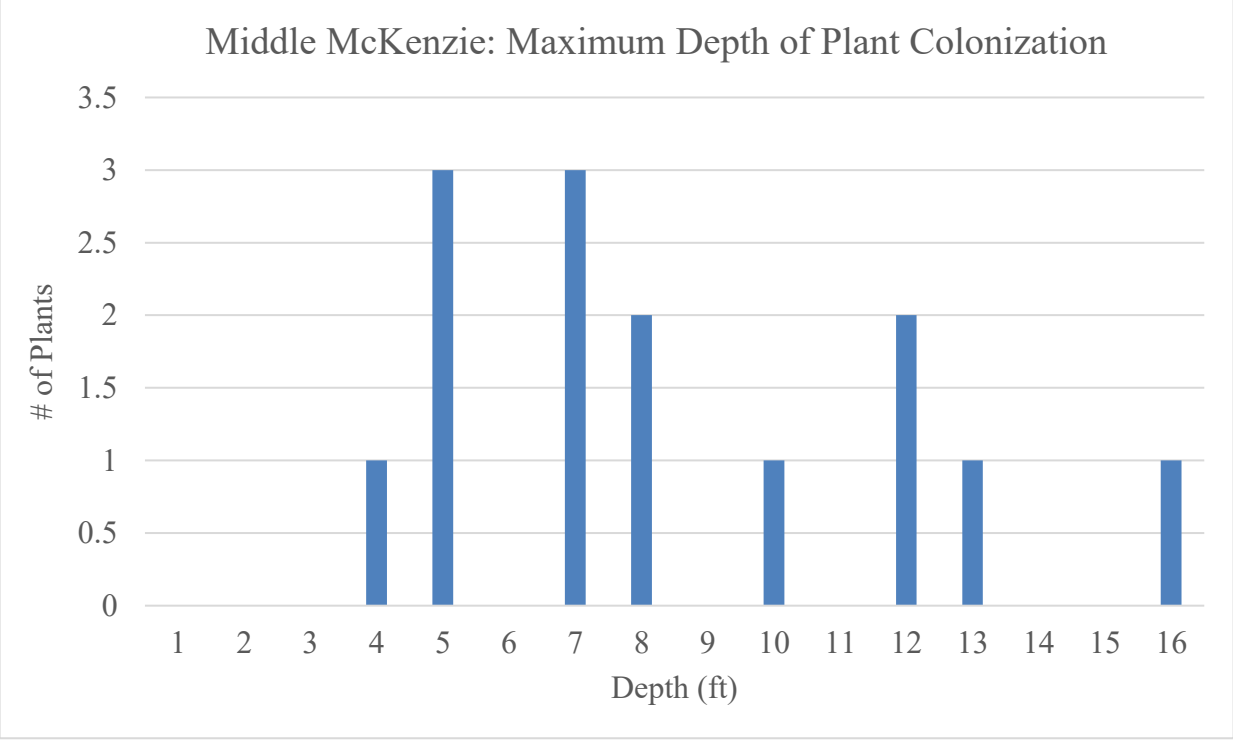


Figure 4: Depth profiles of CLP on Middle McKenzie

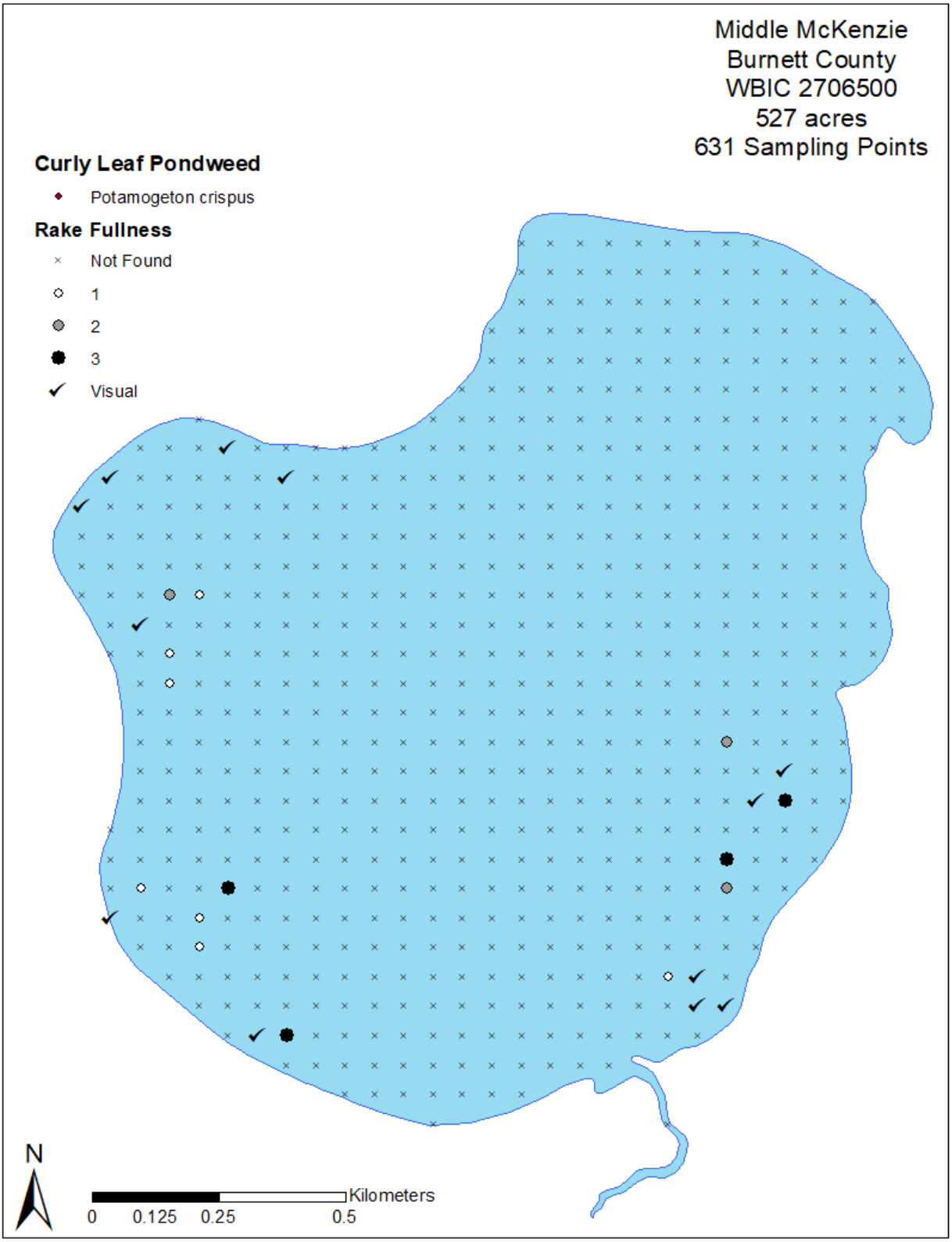


Figure 5: Distribution of CLP on Middle McKenzie during AIS Point intercept survey.

Lower McKenzie Aquatic Invasive Species Survey Results

An invasive species point-intercept survey was completed over a 2 day period on Middle McKenzie on June 16th & June 17th. During the survey, 245 sites were visited and 6 of those locations contained CLP. CLP was found predominately in depths of 12 feet, however, the majority of the locations CLP was found were visual sightings. CLP occurrences on Lower McKenzie have stayed fairly consistent throughout the sampling years, with the majority of locations found near the mouth of the McKenzie Creek on the west side of the lake. In 2013, 6 sampling points indicated CLP presence with 4 visual sightings near the McKenzie Creek, 1 visual sighting on the north end of the lake and a rake fullness of 3 near the middle of Lower McKenzie. The remainder of the sampling years, 2015, 2020, and 2022 showed a decrease in occurrences ranging from 2 occurrences to 4 occurrences all near the McKenzie Creek. One speculation of the low occurrences of CLP in Lower McKenzie compared to Big and Middle is the flourishing native aquatic plant community occupying nearly the entire waterbody, not allowing CLP to occupy much space.

Table 3: Survey data for CLP on Lower McKenzie during the AIS point intercept survey.

Curly-leaf Pondweed Survey Data – Lower McKenzie 2022	
Total # of sites visited	245
Total # of sites with Curly-leaf Pondweed	6
Average Rake Fullness	1.00
Total # of visual sightings	6
Average depth of Curly-leaf Pondweed (ft)	12

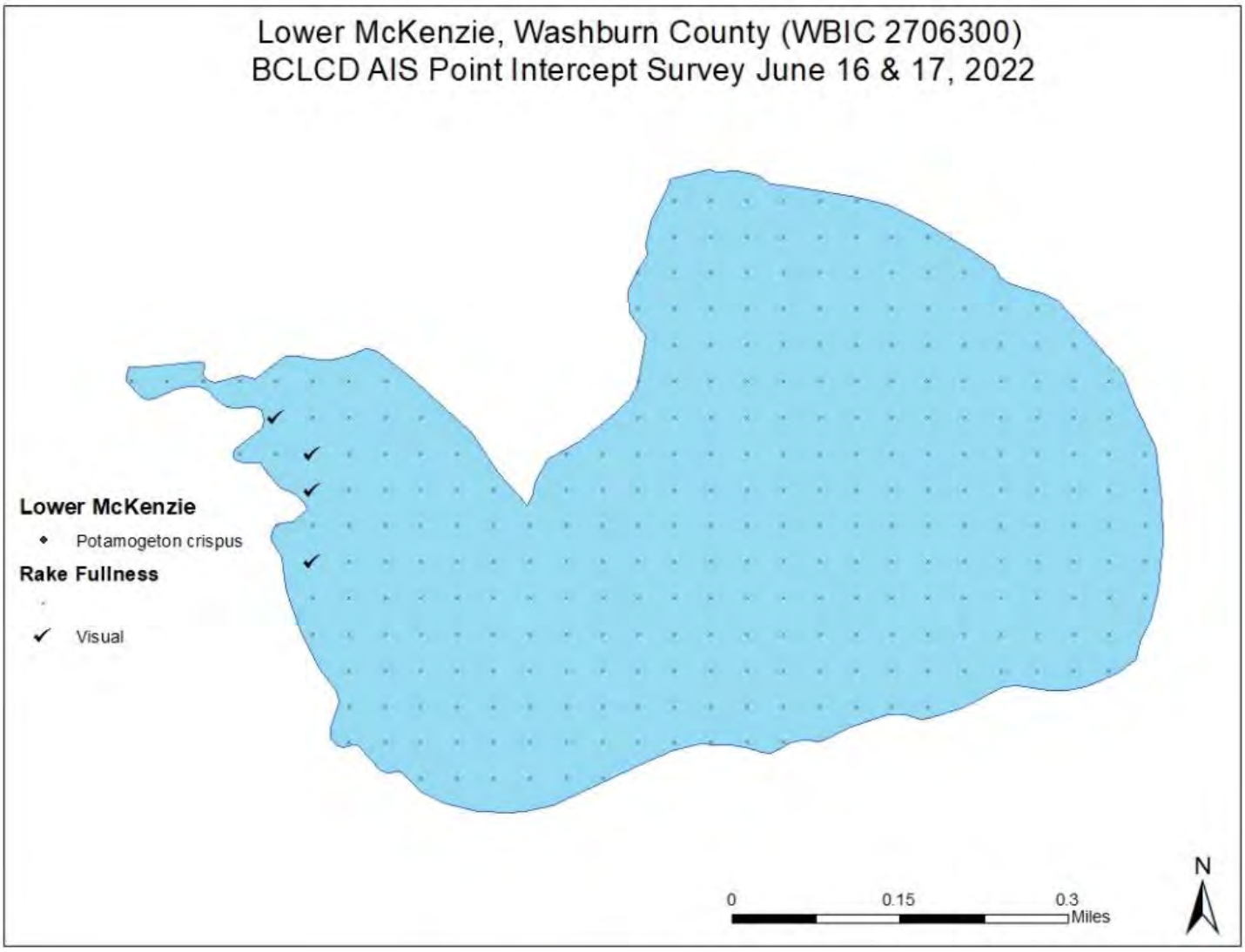


Figure 6: Distribution of CLP on Lower McKenzie during AIS point intercept survey.

Aquatic Macrophyte Survey Results for Big, Middle and Lower McKenzie Lakes – 2022

Big McKenzie

An aquatic macrophyte survey was completed on Big McKenzie between 7/25/2022 and 7/27/2022 along a sampling grid comprised of 1011 points. Of the 1011 points, 1003 points were sampled. The remaining points not sampled were either in areas with thick vegetation or too shallow with a rocky lake bottom. Areas that contained a muck lake bottom supported higher plant growth with a rake fullness of 3, particularly in the southern bay of Big McKenzie. Areas with a sandy bottom supported plants with a rake fullness of 1. Aquatic plants were found at an average of 7 feet.

A total of 40 species, including visuals, were found during the aquatic macrophyte survey. The Mean Coefficient of Conservation (C) for 2022 was 6.3 and the Floristic Index (FQI) of 34.51. The total number of species, the mean C and FQI is down from previous years, where 53 native species were found on Big McKenzie, mean C of 6.96 and FQI of 36.88 in the 2015-2020 APM. The average mean C for the Northern Lakes and Forest Region is 6.7, putting Big McKenzie below average (Nichols 1999). Big McKenzie is still higher than the average FQI for the Northern Lakes and Forest Region, with the average being 24.3 (Nichols 1999).

The four species that were commonly found during the macrophyte survey included: *Ceratophyllum demersum* (Coontail), *Potamogeton zosterformis* (Flat-stem pondweed), *Najas flexilis* (Slender naiad), *Vallisneria americana* (Water celery). Plants were found at a frequency in vegetated areas of 38.72%, 36.89%, 31.71% and 26.22%, respectively. All four species were commonly found in mucky substrate, with some occurrences in sand on the eastern shoreline of Big McKenzie.

Table 4: Big McKenzie Summary Stats from the Aquatic Macrophyte Survey.

Summary Stats – Big McKenzie:	
Total Number Of Sites Visited	1003
Total Number Of Sites With Vegetation	328
Total Number Of Sites Shallower Than Maximum Depth Of Plants	723
Frequency Of Occurrence At Sites Shallower Than Maximum Depth Of Plants	45.37
Simpson Diversity Index	0.91
Maximum Depth Of Plants (ft)**	15.00
Number Of Sites Sampled Using Rake On Rope (R)	254
Number Of Sites Sampled Using Rake On Pole (P)	147
Average Number Of All Species Per Site (Shallower Than Max Depth)	1.18
Average Number Of All Species Per Site (Veg. Sites Only)	2.60
Average Number Of Native Species Per Site (Shallower Than Max Depth)	1.18
Average Number Of Native Species Per Site (Veg. Sites Only)	2.59
Species Richness	32
Species Richness (Including Visuals)	40
Average Depth Of Plants (ft)	7

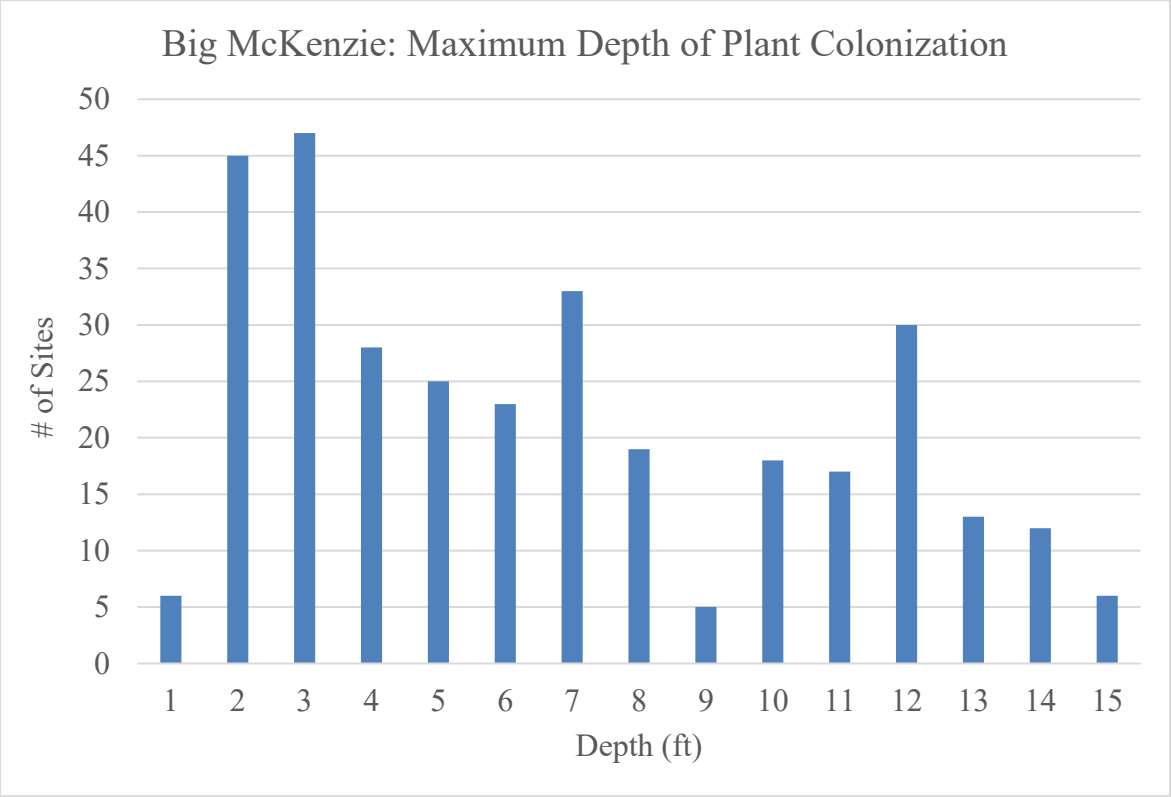


Figure 7: Depth of Plant Colonization from the Aquatic Macrophyte Survey.

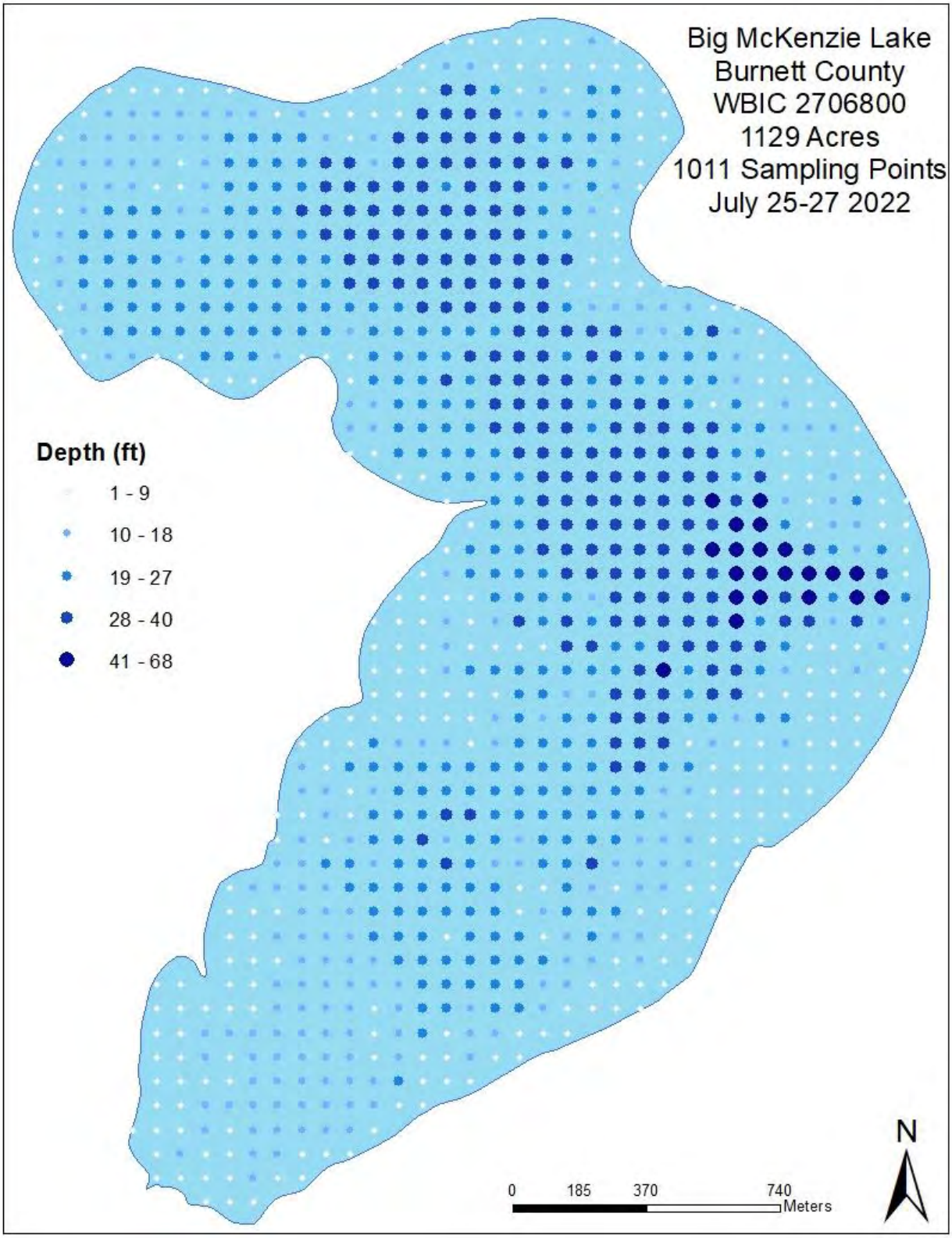


Figure 8: Depth map of Big McKenzie.

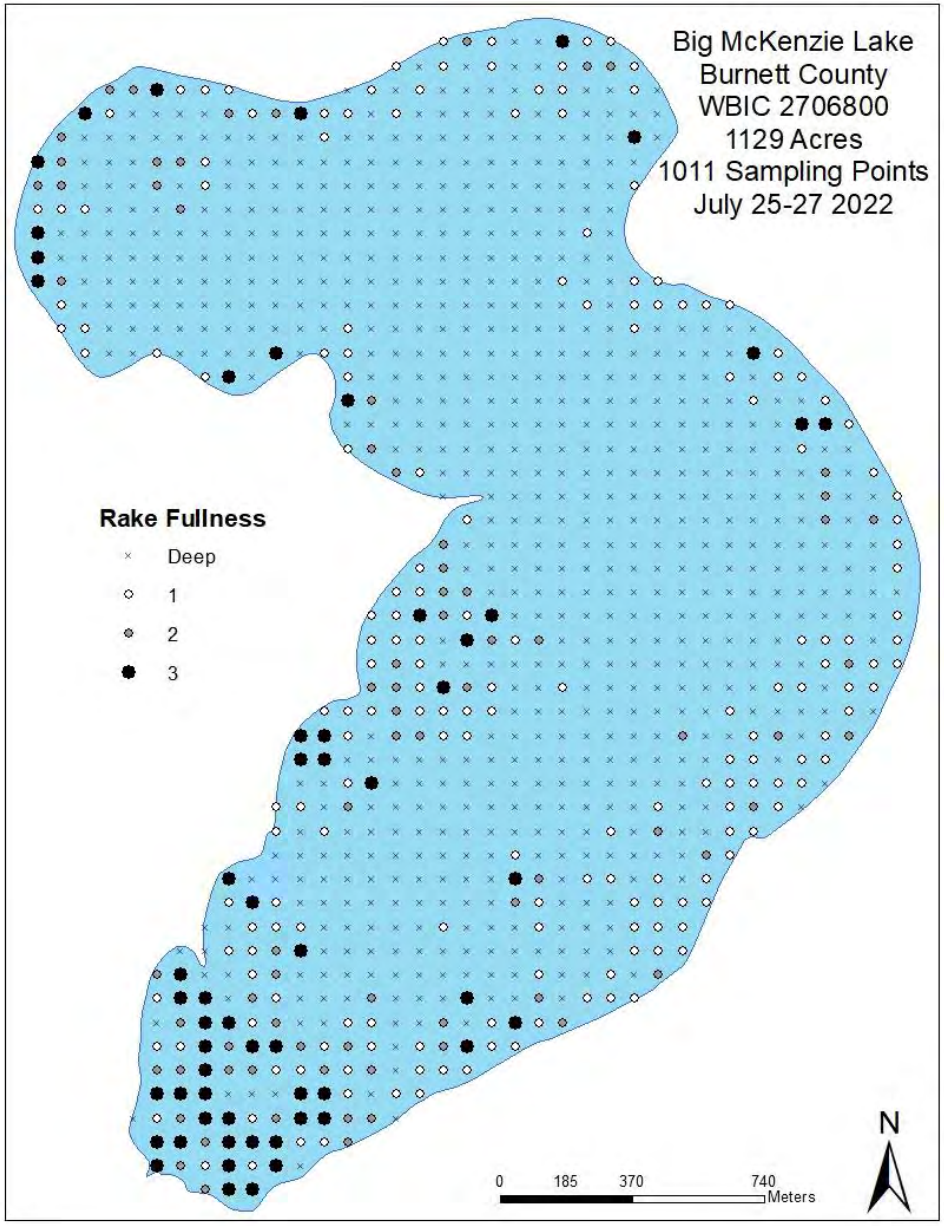
Table 4: Big McKenzie FQI Species and Conservatism Values.

Scientific Name	Common Name	C
Bidens beckii	Water marigold	8
Brasenia schreberi	Watershield	6
Ceratophyllum demersum	Coontail	3
Chara	Muskgrasses	7
Elatine minima	Waterwort	9
Eleocharis acicularis	Needle spikerush	5
Eleocharis erythropoda	Bald spikerush	3
Elodea canadensis	Common waterweed	3
Heteranthera dubia	Water star-grass	6
Isoetes sp.	Quillwort	8
Lemna trisulca	Forked duckweed	6
Myriophyllum sibiricum	Northern water-milfoil	6
Myriophyllum tenellum	Dwarf water-milfoil	10
Najas flexilis	Slender naiad	6
Najas gracillima	Northern naiad	7
Nitella	Nitella	7
Nuphar variegata	Spatterdock	6
Potamogeton friesii	Fries' pondweed	8
Potamogeton gramineus	Variable pondweed	7
Potamogeton illinoensis	Illinois pondweed	6
Potamogeton natans	Floating-leaf pondweed	5
Potamogeton praelongus	White-stem pondweed	8
Potamogeton pusillus	Small pondweed	7
Potamogeton richardsonii	Clasping-leaf pondweed	5
Potamogeton robbinsii	Fern pondweed	8
Potamogeton zosteriformis	Flat-stem pondweed	6
Ranunculus aquatilis	White water crowfoot	8
Schoenoplectus acutus	Hardstem bulrush	6
Stuckenia pectinata	Sago pondweed	3
Vallisneria americana	Wild celery	6

Table 5: Frequencies and Average Rake Sample of Aquatic Macrophytes on Big McKenzie.

Scientific Name	Common Name	Total Sites	Relative Frequency (%)	Frequency of Occurrences Vegetated (%)	Average Rake Fullness
Ceratophyllum demersum	Coontail	127	14.9	38.72	1.63
Potamogeton zosterformis	Flat-stem Pondweed	121	14.2	36.89	1.62
Najas flexilis	Slender Naiad	104	12.2	31.71	1.31
Vallisneria americana	Water Celery	86	10.1	26.22	1.19
Chara sp.	Muskgrass	59	6.9	17.99	1.03
Myriophyllum sibiricum	Northern Watermilfoil	55	6.4	16.77	1.31
Elodea canadensis	Canada Waterweed	49	5.7	14.94	1.55
Potamogeton gramineus	Variable Pondweed	31	3.6	9.45	1.03
Potamogeton pusillus	Small Pondweed	28	3.3	8.54	1.21
Myriophyllum tenellum	Dwarf Watermilfoil	25	2.9	7.62	1
Najas gracillima	Northern Naiad	24	2.8	7.32	1.17
Eleocharis acicularis	Needle Spikerush	22	2.6	6.71	1
Isoetes sp.	Quillwort	22	2.6	6.71	1
Potamogeton illinoensis	Illinois Pondweed	18	2.1	5.49	1.06
Potamogeton friesii	Fries' Pondweed	13	1.5	3.96	1.31
Potamogeton robbinsi	Fern Pondweed	11	1.3	3.35	1.36
Potamogeton richardsonii	Clasping-leaf Pondweed	10	1.2	3.05	1.1
Heteranthera dubia	Water Stargrass	6	0.7	1.83	1.33
Ranunculus aquatilis	White Water Crowfoot	6	0.7	1.83	1
Bidens beckii	Water Marigold	5	60	1.52	1
Potamogeton praelongus	White-stem Pondweed	18	0.6	1.52	1
Potamogeton crispus	Curly-leaf Pondweed	3	40	0.91	1.67
Potamogeton natans	Floating-leaf Pondweed	4	0.4	0.91	1

Scientific Name	Common Name	Total Sites	Relative Frequency (%)	Frequency of Occurrences Vegetated (%)	Average Rake Fullness
Lemna trisulca	Forked Duckweed	2	0	0.61	1
Brasenia schreberi	Watershield	2	0.1	0.3	2
Elatine minima	Waterwort	2	0.1	0.3	1
Eleocharis erythropoda	Bald Spikerush	1	0.1	0.3	1
Nitella sp.	Nitella	1	0.1	0.3	1
Nuphar variegata	Spatterdock	1	0.1	0.3	1
Sagittaria sp	Arrowhead	12	1.4	0.3	1
Schoenoplectus acutus	Hardstem Bulrush	6	0.1	0.3	1
Stuckenia pectinata	Sago Pondweed	4	0.1	0.3	1
Eleocharis palustris	Creeping Spikerush	6			
Iris pseduacorus	Yellow Flag Iris				
Lythrum salicaria	Purple Loosestrife				
Nymphaea odorata	White Waterlily				
Ponteria cordata	Pickerelweed				
Potamogeton ampilfolius	Large-leaf Pondweed				
Schoenoplectus pungens	Three-square Bulrush				
Utriculuaria minor	Small Bladderwort				



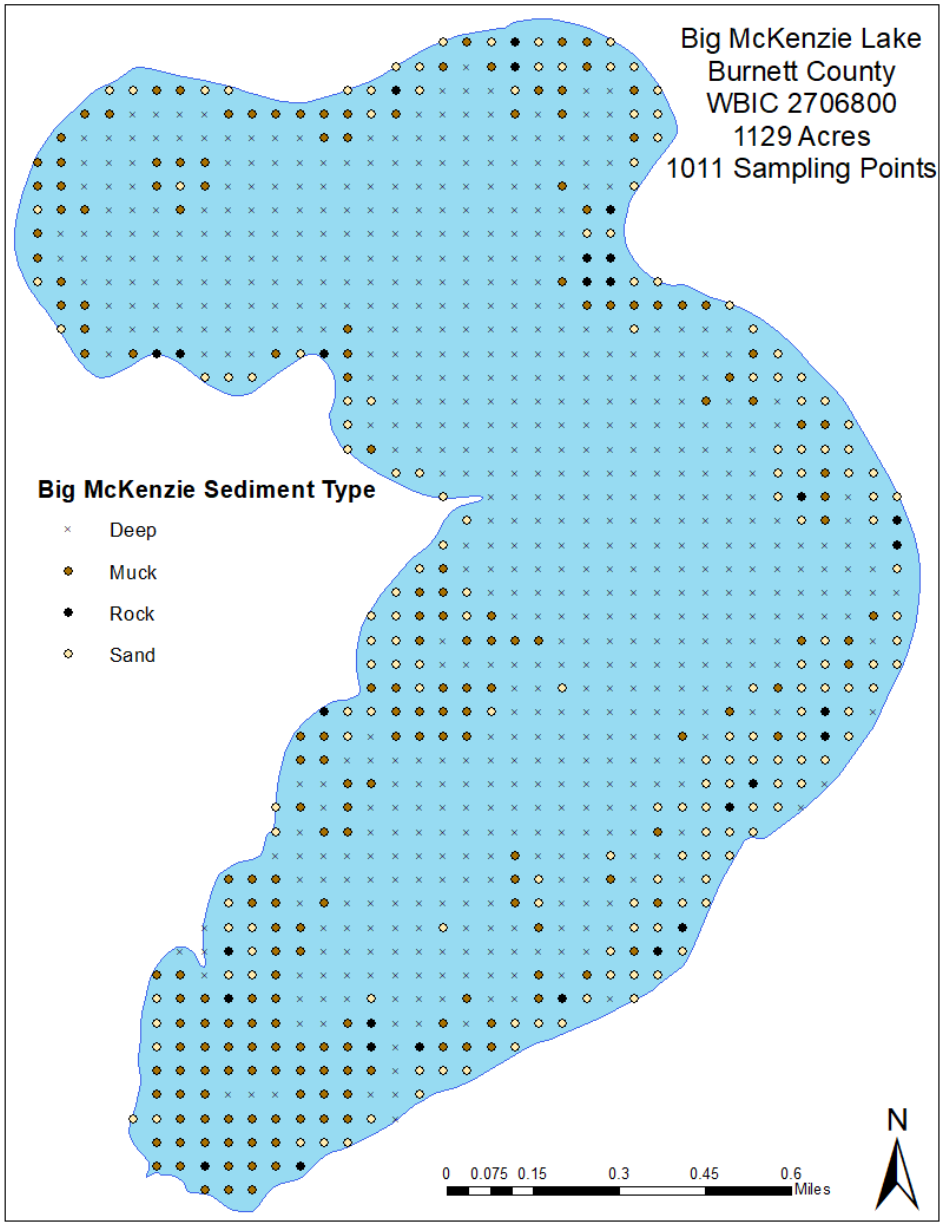


Figure 9: Rake fullness and sediment types for Big McKenzie.

Middle McKenzie

An aquatic macrophyte survey was completed for Middle McKenzie on 7/19/2022 and 7/22/2022 using a point-intercept sampling method. The lake has 631 sampling points, of which 624 were visited and 211 contained vegetation. Areas in the lakebed that were muck supported more plant growth than sand and rock sediment. The average depth of plants found was 5.9 feet, with the deepest depth being 18 feet. The mean and maximum depth of aquatic plants found did not change compared to the previous APM, where average depth of plants found was 5.5 ft and maximum depth of 18 feet. The total number of sites aquatic plants were found decreased from the previous APM by 16 sampling points.

A total of 34 species were found during the lake survey, with a Simpson Diversity Index of 0.91. For 2022, Middle McKenzie had a Mean Coefficient of Conservation (C) of 6.37 and a FQI of 33.10, scoring below the Northern Lakes and Forest Region in Mean C (6.7) but slightly above average for FQI of 24.3 (Nichols 1999). Species richness decline between 2015 and 2022, with 2015 having 55 total species found and a Simpson's Diversity of 0.93.

The four common macrophytes found during the survey included: *Potamogeton zosterformis* (Flat-stem pondweed), *Ceratophyllum demersum* (Coontail), *Myriophyllum sibiricum* (Northern watermilfoil) and *Potamogeton pusillus* (Small pondweed). Plants were found at a frequency in vegetated areas at 43.46%, 35.51%, 30.84%, and 28.97%, respectively.

Table 6: Middle McKenzie Summary Stats from the Aquatic Macrophyte Survey.

Summary Stats – Middle McKenzie	
Total number of sites visited	624
Total number of sites with vegetation	211
Total number of sites shallower than maximum depth of plants	270
Frequency of occurrence at sites shallower than maximum depth of plants	78.15
Simpson Diversity index	0.91
Maximum depth of plants (ft)**	18.00
Number of sites sampled using rake on rope (r)	104
Number of sites sampled using rake on pole (p)	139
Average number of all species per site (shallower than max depth)	2.25
Average number of all species per site (veg. Sites only)	2.88
Average number of native species per site (shallower than max depth)	2.24
Average number of native species per site (veg. Sites only)	2.88
Species richness	28
Species richness (including visuals)	34
Average depth of plants (ft)	5.9

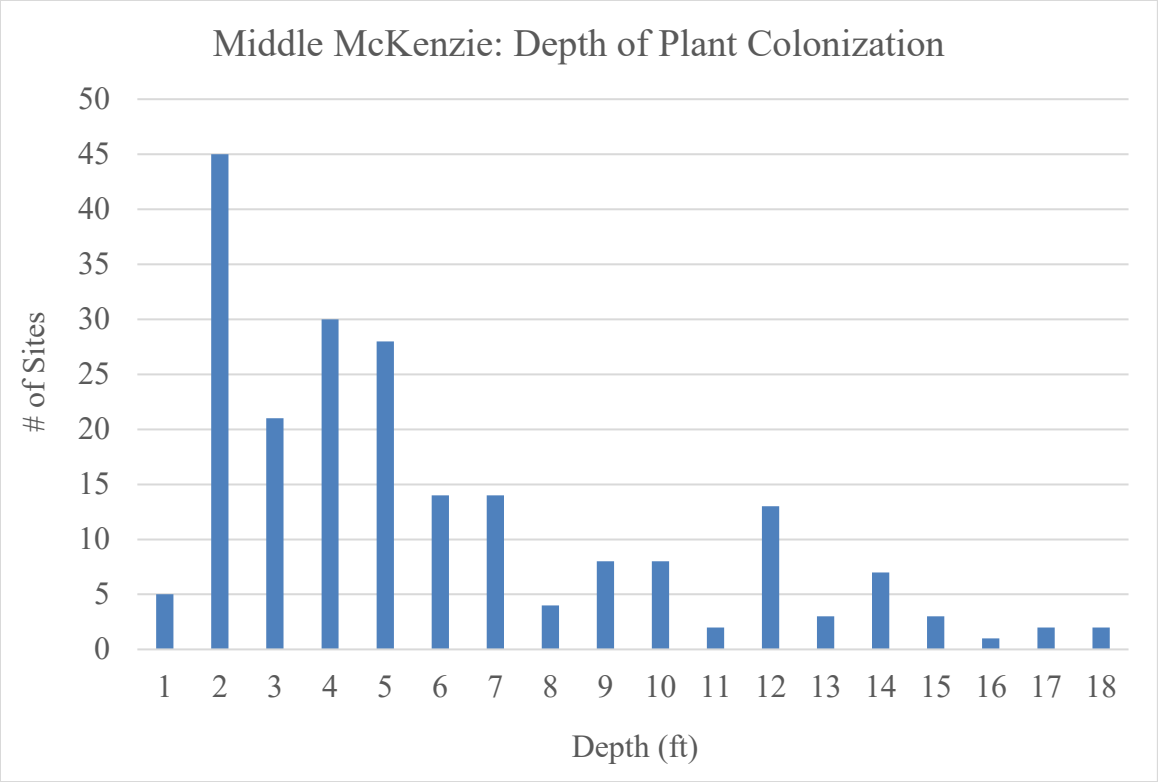


Figure 10: Depth of Plant Colonization from the Aquatic Macrophyte Survey.

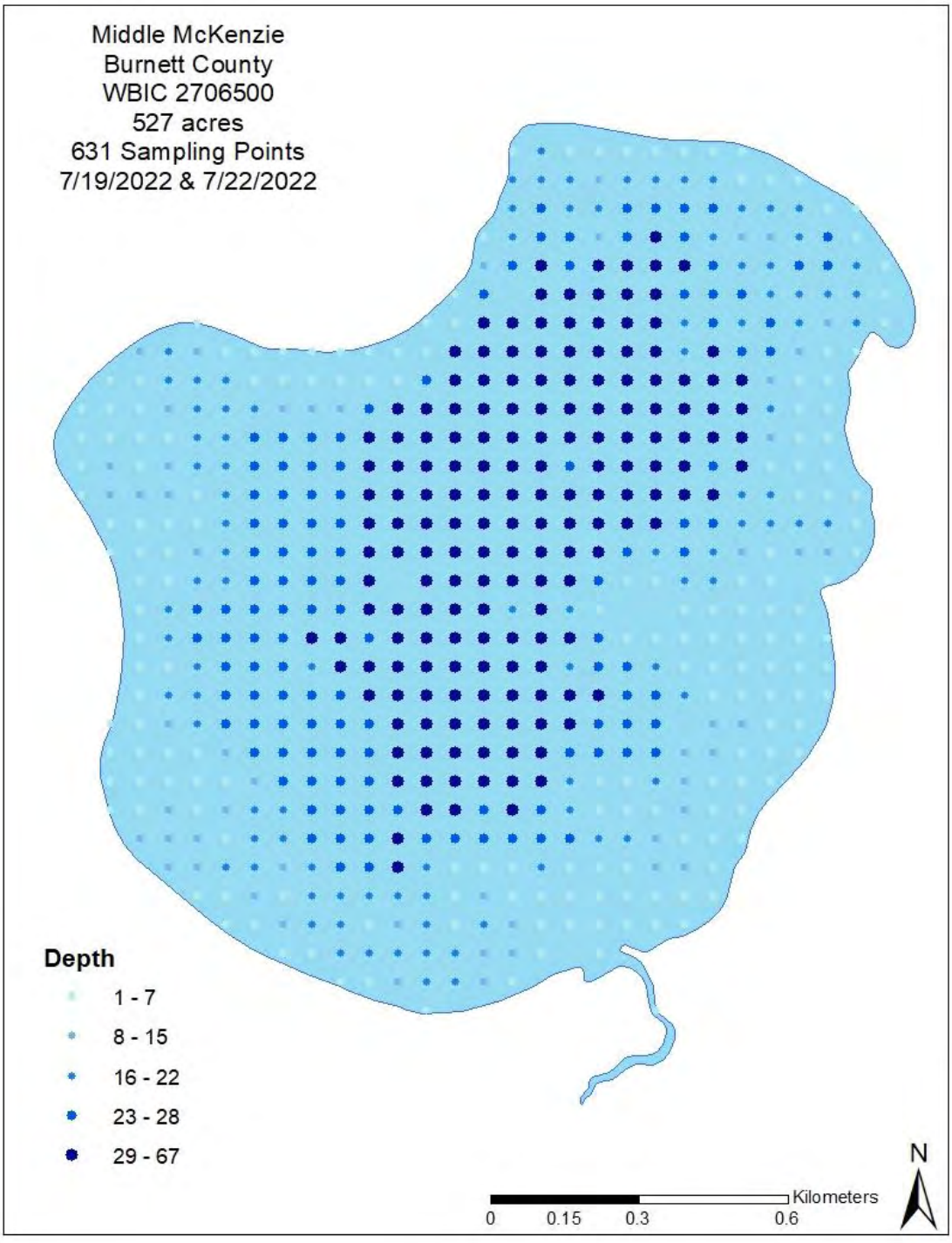


Figure 11: Depth map for Middle McKenzie.

Table 7: Middle McKenzie FQI Species and Conservatism Values.

Species	Common Name	C
Bidens beckii	Water Marigold	8
Ceratophyllum demersum	Coontail	3
Chara	Muskgrasses	7
Eleocharis acicularis	Needle Spikerush	5
Eleocharis erythropoda	Bald Spikerush	3
Elodea canadensis	Common Waterweed	3
Heteranthera dubia	Water Star-Grass	6
Isoetes sp.	Quillwort	8
Myriophyllum sibiricum	Northern Water-Milfoil	6
Myriophyllum tenellum	Dwarf Water-Milfoil	10
Najas gracillima	Northern Naiad	7
Nuphar variegata	Spatterdock	6
Potamogeton friesii	Fries' Pondweed	8
Potamogeton gramineus	Variable Pondweed	7
Potamogeton illinoensis	Illinois Pondweed	6
Potamogeton praelongus	White-Stem Pondweed	8
Potamogeton pusillus	Small Pondweed	7
Potamogeton richardsonii	Clasping-Leaf Pondweed	5
Potamogeton robbinsii	Fern Pondweed	8
Potamogeton strictifolius	Stiff Pondweed	8
Potamogeton zosteriformis	Flat-Stem Pondweed	6
Ranunculus aquatilis	White Water Crowfoot	8
Sagittaria brevirostra	Midwestern Arrowhead	9
Schoenoplectus acutus	Hardstem Bulrush	6
Schoenoplectus pungens	Three-Square Bulrush	5
Stuckenia pectinata	Sago Pondweed	3
Vallisneria americana	Wild Celery	6

Table 8: Frequencies and Average Rake Sample of Aquatic Macrophytes on Middle McKenzie.

Scientific Name	Common Name	Total Sites	Relative Frequency (%)	Frequency Of Occurrences Vegetated (%)	Average Rake Fullness
Potamogeton zosterformis	Flat-Stem Pondweed	93	15.2	43.46	1.68
Ceratophyllum demersum	Coontail	76	12.4	35.51	1.66
Myriophyllum sibiricum	Northern Watermilfoil	66	10.8	30.84	1.61
Potamogeton pusillus	Small Pondweed	62	10.1	28.97	1.89
Chara sp	Muskgrass	56	9.2	26.17	1.21
Elodea canadensis	Canada Waterweed	42	6.9	19.63	1.62
Vallisneria americana	Water Celery	40	6.5	18.69	1.48
Eleocharis acicularis	Needle Spikerush	28	4.6	13.08	1.11
Potamogeton gramineus	Variable Pondweed	24	3.9	11.21	1.13
Potamogeton praelongus	White-Stem Pondweed	21	3.4	9.81	1.29
Najas gracillima	Northern Naiad	19	3.1	8.88	1.32
Potamogeton robbinsii	Fern Pondweed	19	3.1	1.4	1
Myriophyllum tenellum	Dwarf Watermilfoil	13	2.1	6.07	1.08
Potamogeton friesii	Fries' Pondweed	11	1.8	5.14	1.27
Potamogeton illinoensis	Illinois Pondweed	9	1.5	4.21	1
Sagittaria breviostra	Midwestern Arrowhead	6	1	2.8	1
Bidens beckii	Water Marigold	5	0.8	2.34	1.2
Decodon verticillatus	Swamp Loosestrife	5			
Ranunculus aquatilis	Whitewater Crowfoot	4	0.7	1.87	1.25
Potamogeton strictifolius	Stiff Pondweed	3	0.5	1.4	3
Heterantheria dubia	Water Stargrass	2	0.3	0.93	1

Scientific Name	Common Name	Total Sites	Relative Frequency (%)	Frequency of Occurrences Vegetated (%)	Average Rake Fullness
Isoetes sp	Quillwort	2	0.3	0.93	1
Nuphar variegata	Spatterdock	2	0.3	0.93	1
Potamogeton richardsonii	Clasping Leaf Pondweed	2	0.3	0.93	2
Schoenoplectus pungens	Three-Square Bulrush	2	0.3	0.93	1
Potamogeton crispus	Curly-Leaf Pondweed	1	0.2	0.47	1
Eleocharis erythropoda	Bald Spikerush	1	0.2	0.47	1
Schoenoplectus acutus	Hardstem Bulrush	1	0.2	0.47	1
Stuckenia pectinata	Sago Pondweed	1	0.2	0.47	1
Nymphaea odorata	White Waterlily				
Pontederia cordata	Pickerelweed				
Potamogeton epihydrus	Ribbon-Leaf Pondweed				
Schoenoplectus tabernaemontani	Softstem Bulrush				
Typha sp	Cattail				

Lower McKenzie

An aquatic macrophyte survey was completed on Lower McKenzie between 7/18/2022 and 7/19/2022 using a point-intercept sampling method. The lake has 290 sampling points, of which 272 were visited and 261 contained vegetation. Areas in the lakebed that were muck supported more plant growth than sand and rock sediment. The average depth of plants found was 8.5 feet, with the deepest depth being 20 feet. The total number of sites aquatic plants were found increased from the previous APM.

A total of 35 species were found during the lake survey, with a Simpson Diversity Index of 0.91. For 2022, Lower McKenzie had a Mean Coefficient of Conservation (C) of 6.04 and a FQI of 30.2, scoring below the Northern Lakes and Forest Region in Mean C (6.7) but slightly above average for FQI of 24.3 (Nichols 1999). Species richness declined between 2015 and 2022, with 2014 having 45 total species found and a Simpson's Diversity of 0.93.

The four common macrophytes found during the survey included: *Ceratophyllum demersum* (Coontail), *Potamogeton robbinsii* (Fern Pondweed), *Elodea canadensis* (Canada Waterweed) and *Nitella* (Stoneworts). Plants were found at a frequency in vegetated areas at 57.09%, 38.31%, 36.02%, and 27.2%, respectively.

Table 9: Lower McKenzie Summary Stats from the Aquatic Macrophyte Survey.

Summary Stats – Lower Mckenzie:	
Total number of sites visited	272
Total number of sites with vegetation	261
Total number of sites shallower than maximum depth of plants	272
Frequency of occurrence at sites shallower than maximum depth of plants	95.96
Simpson Diversity index	0.91
Maximum depth of plants (ft)**	20.00
Number of sites sampled using rake on rope (R)	0
Number of sites sampled using rake on pole (P)	3
Average number of all species per site (shallower than max depth)	3.03
Average number of all species per site (veg. Sites only)	3.16
Average number of native species per site (shallower than max depth)	3.03
Average number of native species per site (veg. Sites only)	3.16
Species richness	29
Species richness (including visuals)	35
Average depth of plants (ft)	8.5

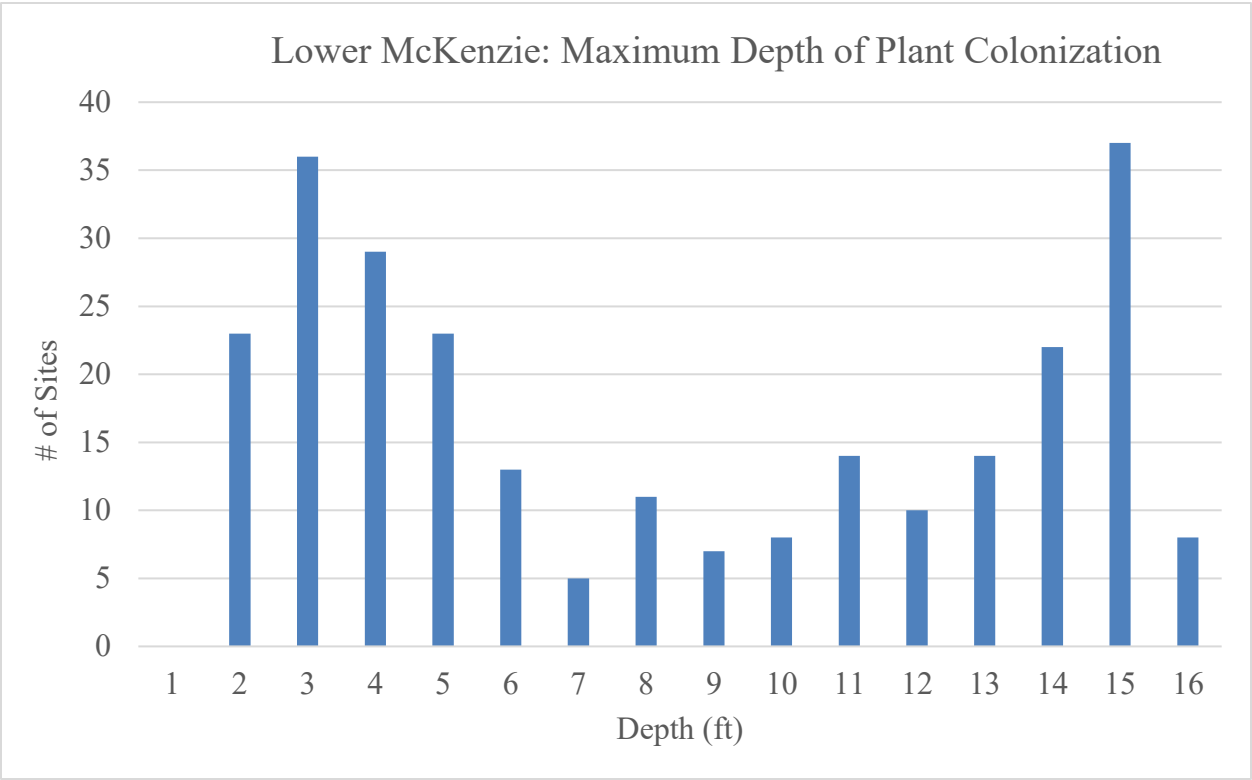


Figure 12: Depth of Plant Colonization from the Aquatic Macrophyte Survey.

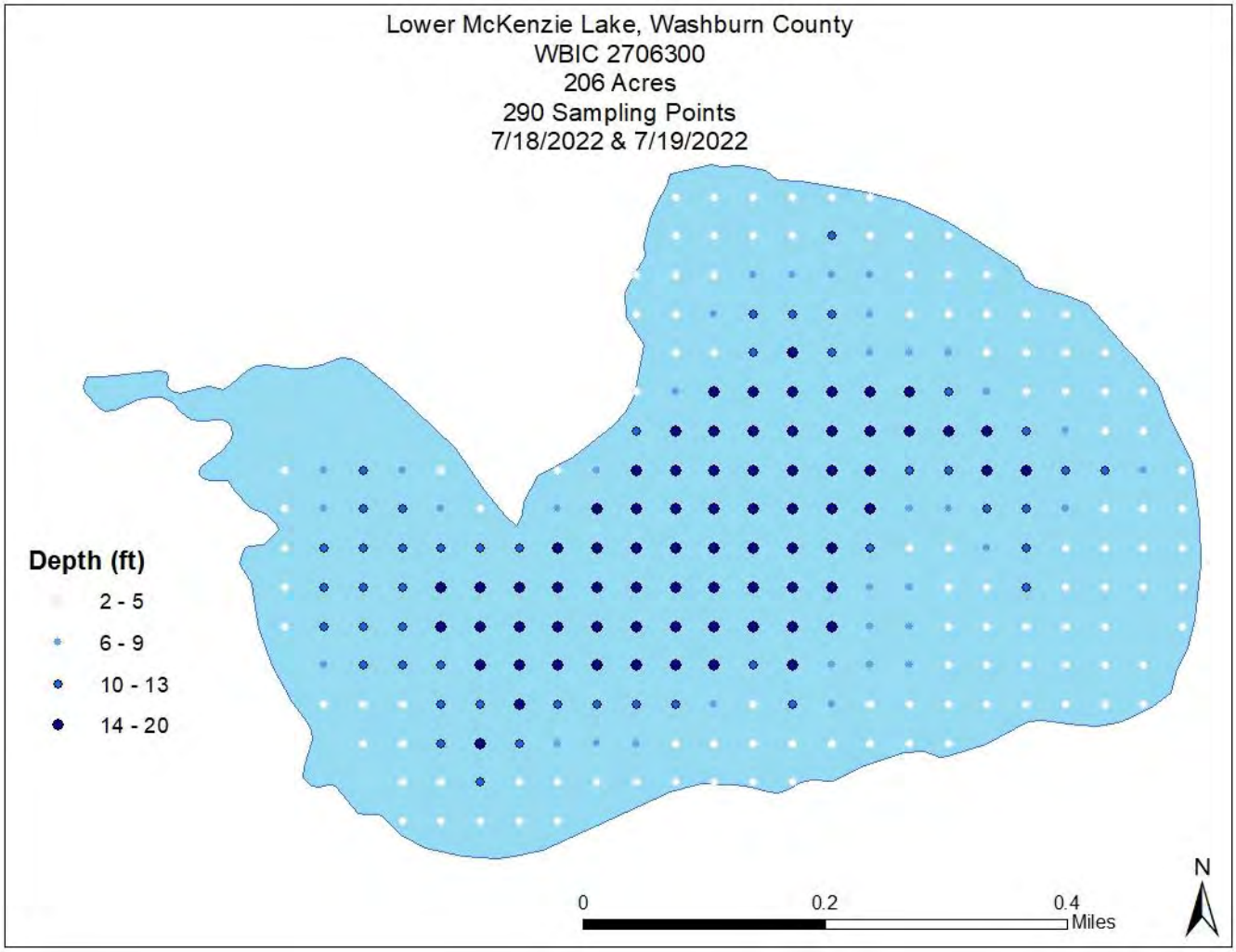


Figure 13: Depth map for Lower McKenzie.

Table 10: Lower McKenzie FQI Species and Conservatism Values.

Species	Common Name	C
Bidens beckii	Water marigold	8
Brasenia schreberi	Watershield	6
Ceratophyllum demersum	Coontail	3
Chara	Muskgrasses	7
Eleocharis acicularis	Needle spikerush	5
Eleocharis palustris	Creeping spikerush	6
Elodea canadensis	Common waterweed	3
Heteranthera dubia	Water star-grass	6
Lemna minor	Small duckweed	4
Lemna trisulca	Forked duckweed	6
Myriophyllum sibiricum	Northern water-milfoil	6
Najas flexilis	Slender naiad	6
Nitella	Nitella	7
Nuphar variegata	Spatterdock	6
Nymphaea odorata	White water lily	6
Potamogeton friesii	Fries' pondweed	8
Potamogeton illinoensis	Illinois pondweed	6
Potamogeton natans	Floating-leaf pondweed	5
Potamogeton praelongus	White-stem pondweed	8
Potamogeton pusillus	Small pondweed	7
Potamogeton richardsonii	Clasping-leaf pondweed	5
Potamogeton robbinsii	Fern pondweed	8
Potamogeton zosteriformis	Flat-stem pondweed	6
Utricularia vulgaris	Common bladderwort	7
Vallisneria americana	Wild celery	6

Table 11: Frequencies and Average Rake Sample of Aquatic Macrophytes on Lower McKenzie.

Scientific Name	Common Name	Total Sites	Relative Frequency (%)	Frequency of Occurrence Vegetated (%)	Average Rake Fullness	Visual Sightings
Ceratophyllum demersum	Coontail	149	18.1	57.09	2.02	2
Potamogeton robbinsii	Fern Pondweed	100	12.1	38.31	1.52	5
Elodea canadensis	Canada Waterweed	94	11.4	36.02	1.67	0
Nitella sp	Nitella	71	8.6	27.2	2.48	1
Potamogeton zosterformis	Flat-stem Pondweed	67	8.1	25.67	1.72	14
Potamogeton pusillus	Small Pondweed	54	6.6	20.69	1.46	3
Myriophyllum sibiricum	Northern Watermilfoil	50	6.1	19.16	1.44	26
Lemna trisulca	Forked Duckweed	45	5.5	17.24	1.58	8
Vallisneria americana	Wild Celery	41	5	15.71	1.29	0
Potamogeton illinoensis	Illinois Pondweed	38	4.6	14.56	1.42	43
Chara sp	Muskgrass	29	3.5	11.11	1.38	1
Potamogeton praelongus	White-stem Pondweed	13	1.6	4.98	1.08	17
Najas Flexilis	Slender Naiad	10	1.2	3.83	1.7	1
Potamogeton friesii	Fries' Pondweed	9	1.1	3.44	1.67	1
Brasenia schreberi	Watershield	8	1	3.07	1.75	8
Nymphaea odorata	White Waterlily	8	1	3.07	1.75	27
Heteranthera dubia	Water Stargrass	7	0.8	2.68	1	0
Bidens beckii	Water Marigold	6	0.7	2.3	1.33	2
Utricularia vulgaris	Common Bladderwort	6	0.7	2.3	1.5	1
Eleocharis acicularis	Needle Spikerush	5	0.6	1.92	1.8	0
Lemna minor	Small Duckweed	5	0.6	1.92	1	4
Aquatic Moss	Aquatic Moss	5		1.92	1.4	0
Nuphar variegata	Spatterdock	2	0.2	0.77	1	27
Decodon verticillatus	Swamp Loosestrife	1	0.1	0.37	2	2
Eleocharis palustris	Creeping Spikerush	1	0.1	0.38	1	0
Potamogeton natans	Floating-leaf Pondweed	1	0.1	0.38	3	8
Potamogeton richardsonii	Clasping-leaf Pondweed	1	0.1	0.38	2	0
Sagittaria sp	Arrowhead	1	0.1	0.38	1	3

Sparganium sp	Bur-reed	1	0.1	0.38	2	1
Utricularis geminiscapa	Hidden-fruit Bladderwort	1	0.1	0.38	3	0
Isoetes sp	Quillwort					1
Myriophyllum tenellum	Dwarf Watermilfoil					1
Pontederia cordata	Pickerelweed					6
Spirodela polythiza	Large Duckweed					1
Typha latifolia	Broad-leaved Cattail					3

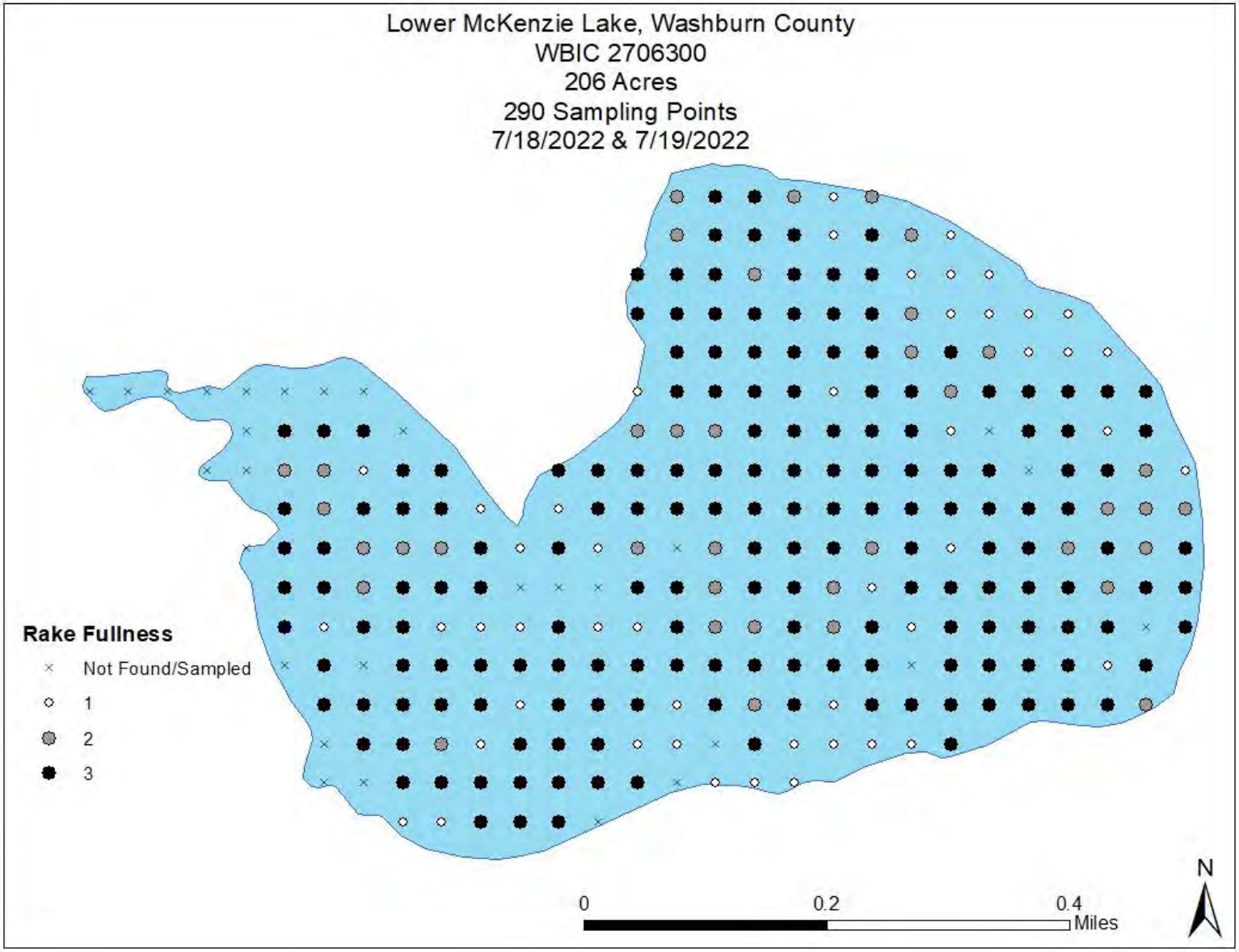


Figure 14: Rake fullness map for Lower McKenzie.

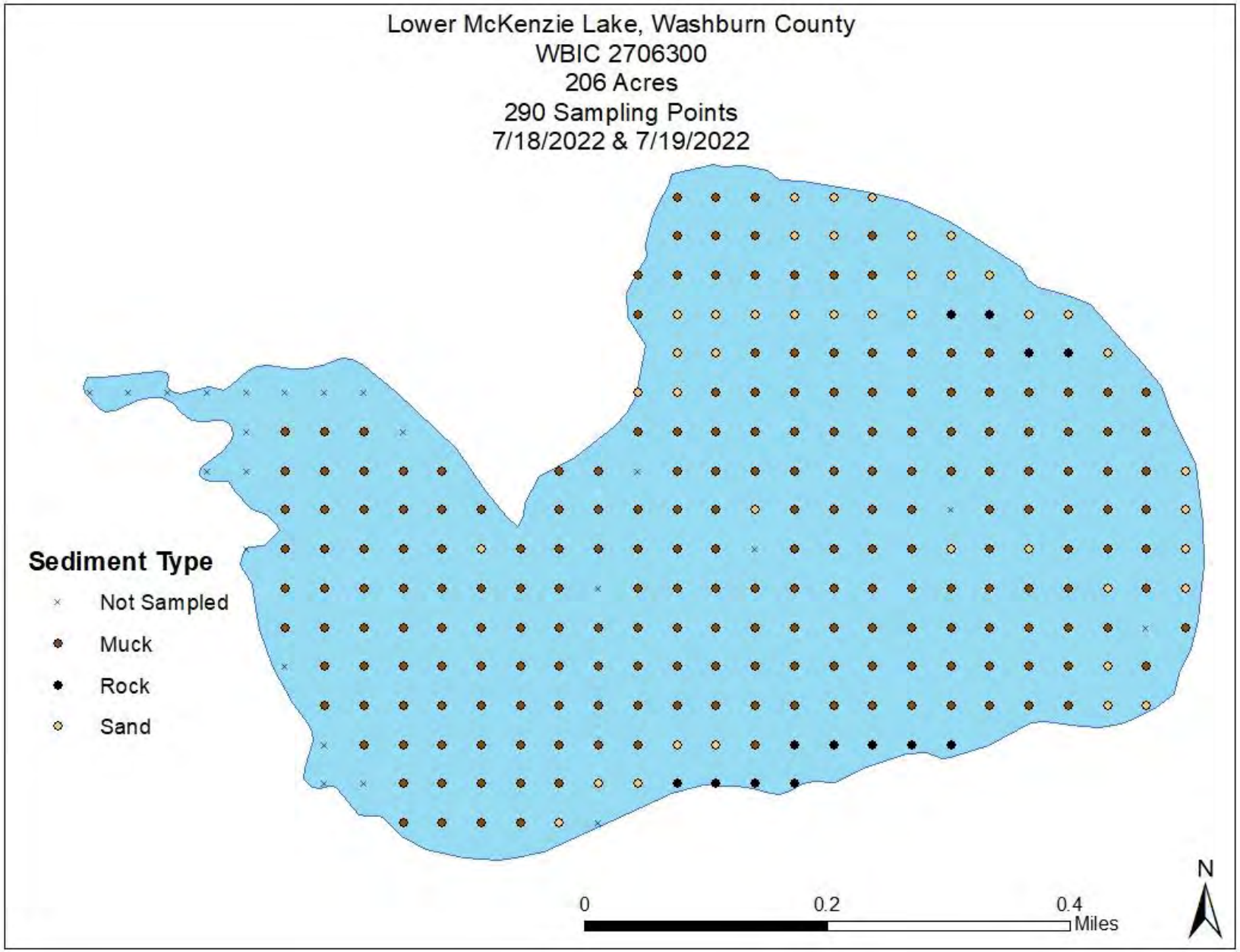


Figure 15: Lake Sediment type for Lower McKenzie.

Plan Goals and Strategies

Overall Purpose

The following section outlines the goals, objectives, and actions set by the McKenzie Lakes Association (MLA). The MLA strives to continue to plan, monitor, protect, and educate lake residents about the health and quality of the McKenzie Chain of Lakes.

Aquatic Plant Management Goals

1. Prevent the introduction and spread of aquatic invasive species (AIS).
2. Reduce and control existing populations of invasive species
3. Educate the McKenzie Lakes community regarding aquatic plant management.
4. Enhance and maintain diverse populations of native aquatic plants.
5. Maintain and improve water quality.

Goal 1: Prevent the introduction and spread of aquatic invasive species (AIS).

***Objective*:** 100% of McKenzie Lakes watercraft users will receive inspections and clean, drain, and decontaminate boats, trailers and equipment.
Action: Train members of the McKenzie Lakes Association (MLA) to conduct Clean Boats Clean Waters (CBCW) inspections at public boat landings.
Action: Hire a consultant to conduct CBCW surveys at public boat landings on Big, Middle and Lower McKenzie.

Objective: MLA will continue to monitor for AIS introductions.
Action: MLA will revise and/or update the rapid response plan for Eurasian watermilfoil (EWM) if needed.
Action: Continue to conduct point-intercept (PI) surveys on each lake.
Action: Continue to deploy zebra mussel plates on Big, Middle and Lower McKenzie.
Action: Train members of the MLA on the Citizen Lake Monitoring Network (CLMN) AIS protocol in order to conduct lake monitoring on a yearly basis.

Objective: 100% enforcement of Burnett and/or Washburn Counties "Do Not Transport" ordinance. (https://www.burnettcounty.com/1043/County-Ordinances)
Action: Work with the Burnett and Washburn County Sheriff's Department to encourage and enforce fines for the "Do Not Transport" ordinance.
Action: Educate lake users on the laws and proper decontamination methods at the landings.
Action: Hire and train volunteers to manage the decontamination station at all MLA landings with stations present.

Objective: 100% enforcement of Burnett County "No Power Loading" ordinance on the McKenzie Lakes Chain. (https://www.burnettcounty.com/1043/County-Ordinances)
Action: Work with the Burnett County Sheriff's Department to encourage and enforce fines for the ordinance.

Objective: Prevent the introduction of zebra mussels into Lower McKenzie Lake.
Action: Deploy zebra mussel plate samplers on Big, Middle and Lower McKenzie Lakes.
Action: Sample for zebra mussel veligers on Lower McKenzie Lake.
Action: Place samplers in McKenzie Creek and the Reservoir.
Action: Volunteers to report zebra mussels found on plates to the Burnett County AIS Coordinator; if under 250 individuals, use report forms; if over 250 individuals, submit a photo of the entire plate.

Goal 2: Reduce and control existing populations of invasive species.

Objective: Continue to survey and document changes in curly-leaf pondweed (CLP) populations found in all three McKenzie Lakes.
Action: Conduct CLP surveys on each lake every two years in early spring and fall.
Action: Monitor each year through Citizen Lake Monitoring Network (CLMN) AIS volunteers on Lower, Middle and Big McKenzie Lakes.
Action: If treatment is needed for CLP, consult with the appropriate agency for treatment options and permits.

Objective: Minimize populations of purple loosestrife on Big and Middle McKenzie Lakes.
Action: Control with beetles and cut and/or spray as needed. **Before cutting and spraying, consult with Burnett/Washburn County Land and Water Conservation Department for assistance.* *
Action: Cut and spray individual plants where identification has been confirmed by the MLA board, or Burnett/Washburn County Land and Water Conservation Department.
Action: If control is implemented, monitor controlled populations in subsequent years with trained volunteers and Citizen Lake Monitoring Network (CLMN) AIS volunteers.

Objective: Manually control Chinese mystery snail (CMS) and banded mystery snail (BMS) populations.
Action: Educate lake residents on the proper disposal protocols of invasive snail buildup along the shoreline.
Action: Design and implement an outreach event to manually control populations of snails along the shoreline.

Objective: Manually control and monitor yellow flag iris (YFI) on Big McKenzie Lake.
Action: Determine the population extent of YFI along the shoreline.

Action: Contact property owners for permission to control YFI on their property. If permission is granted, assist the MLA with YFI management.
Action: Educate the Chain of Lakes residences on the impacts of YFI, and introduce native alternatives, including northern blue iris (*Iris versicolor*).
Yellow flag iris is poisonous to humans and animals, if eaten or the sap touches the skin can cause skin irritation. Caution needs to be taken during management and control efforts. Assistance is available from Burnett County Land Services Department*

Goal 3: Educate the McKenzie Lakes community on aquatic plant management.

Audience for education:

- All lake residents.
- Business owners.
- Lake users.
- Residents interested in managing waterfront properties.

Educational messages could include, but not limited to:

- Summary of Aquatic Plant Management Plan, notice of public meeting, and where to receive the complete plan.
- Native aquatic plant values.
- Critical habitat areas/Sensitive areas.
- The impacts of recreational boats that create large wakes.
- Education on procedure for individual corridor herbicide applications, and descriptions of where applications are allowed.
- Identification workshops for invasive species such as purple loosestrife, zebra mussels, yellow flag iris, Chinese mystery snails, banded mystery snails, and more.
- Identification workshops for native aquatic plant species.
- Data on nearby lakes with Eurasian watermilfoil.
- A watch-list of potential aquatic invasive species that are a threat to the Chain of Lakes.
- Training for CBCW inspections.
- Additional Resources for landowners:
    - https://dnr.wisconsin.gov/topic/ShorelandZoning/Care/explore.html
    - https://www.co.washburn.wi.us/
- Methods to reach audiences for education:
- Inform where past and current Aquatic Plant Management Plan is located.
    - https://www.burnettcounty.com/1120/Past-Projects
    - https://mckenzielakes.com/
- Coordinate AIS workshops for identification and trainings.
- Improve signage at boat landings and/or willing businesses.
- Send out mailings to residents.
    - Newsletters

    - AIS handouts
    - Door to door handouts and brochures
    - Shoreline restoration brochures
    - Stickers for boats and cars
- Attend annual meetings and special meetings to answer any questions and present on topics if needed.

Goal 4: Enhance and maintain the diverse populations of native aquatic plants on the Chain of Lakes.

Objective: Implement a strict adherence to treatment standards and monitoring methods prior to and after herbicide treatment; permits are required, see Invasive Species Management Section.
Action: Consider alternative methods to herbicide and mechanical harvesting for the removal of native plants.
Action: Educate the McKenzie Lakes community on the importance of native aquatic plant communities.

Objective: Monitor the diverse native aquatic plant community on the McKenzie Chain of Lakes.
Action: Conduct point intercept (PI) surveys every five to ten years, or as needed.
Action: Update the aquatic plant management plan every five to ten years, or as needed.

Goal 5: Maintain and improve water quality conditions.

Objective: Continue to sample and record water samples and Secchi Disk readings.
Action: Train and recruit Citizen Scientists to sample the lakes and submit data to Surface Water Integrated Monitoring System (SWIMS) or the Burnett County Land Services Department.

Objective: Educate and encourage lake residents to restore and preserve shoreline buffers.
Action: The MLA or Burnett County will provide workshops and presentations for lake residents on healthy shoreline practices.
Action: Recruit new property owners into the Burnett County Shoreline Incentives Program.
Action: Introduce cost sharing grant programs, including Healthy Lakes and Rivers and Burnett County Shoreline Incentives Program.
Action: Describe and educate lake residents of the shoreline buffer requirements used by Burnett/Washburn Counties and how to report violations.

Objective: Inform McKenzie lakes residents of phosphorus run off and assist in reducing phosphorus and sediment loads into the lakes.
Action: Encourage riparian land owners to adopt and implement shoreline practices.
Action: Educate riparian landowners on filamentous algae issues and the relationship between runoff into the waterbody.

Abbreviations

AIS: Aquatic Invasive Species

APM: Aquatic Plant Management

BC: Burnett County

BC LWCD: Burnett County Land and Water Conservation Division

BMS: Banded mystery snails

CBCW: Clean Boats Clean Waters

CLMN: Citizen Lake Monitoring Network

CLP: Curly-leaf pondweed

CMS: Chinese mystery snails

EWM: Eurasian watermilfoil

MLA: McKenzie Lake Association

PI: Point-intercept survey

PLS: Purple Loosestrife

SWIMS: Surface Water Integrated Monitoring Systems

YFI: Yellow Flag Iris

WC: Washburn County

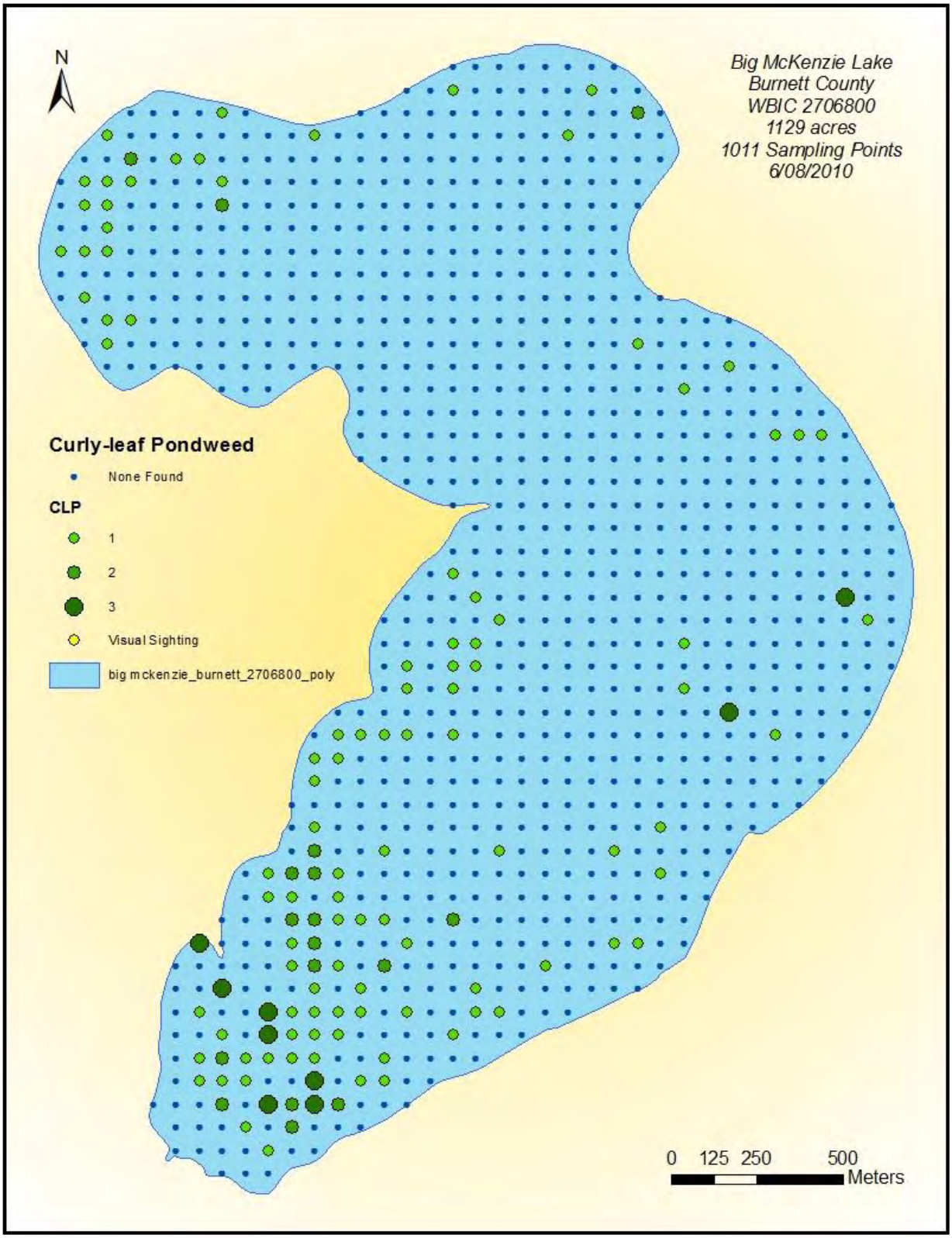
WC LWCD: Washburn County Land and Water Conservation Division

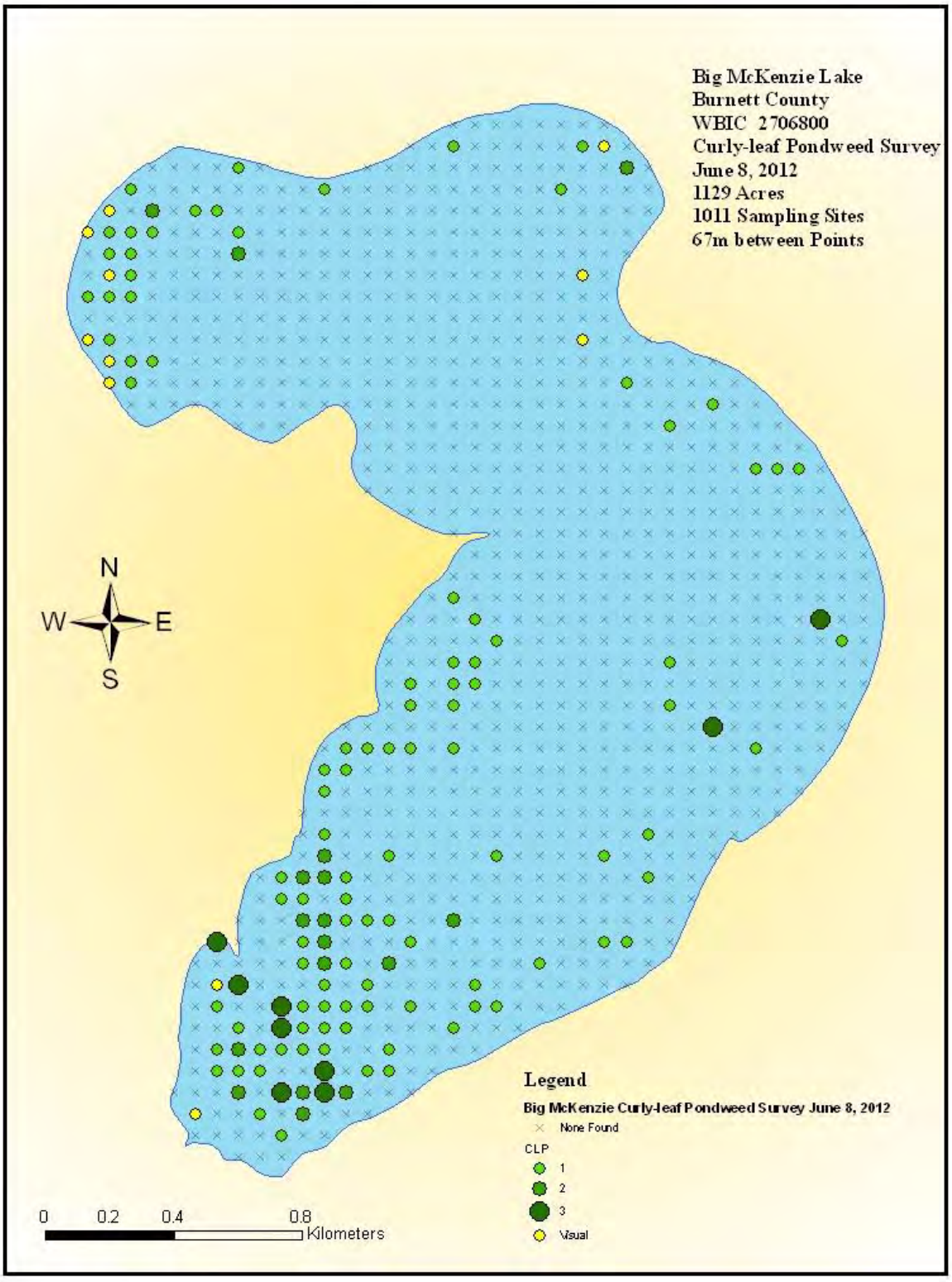
Implementation Plan and Budget

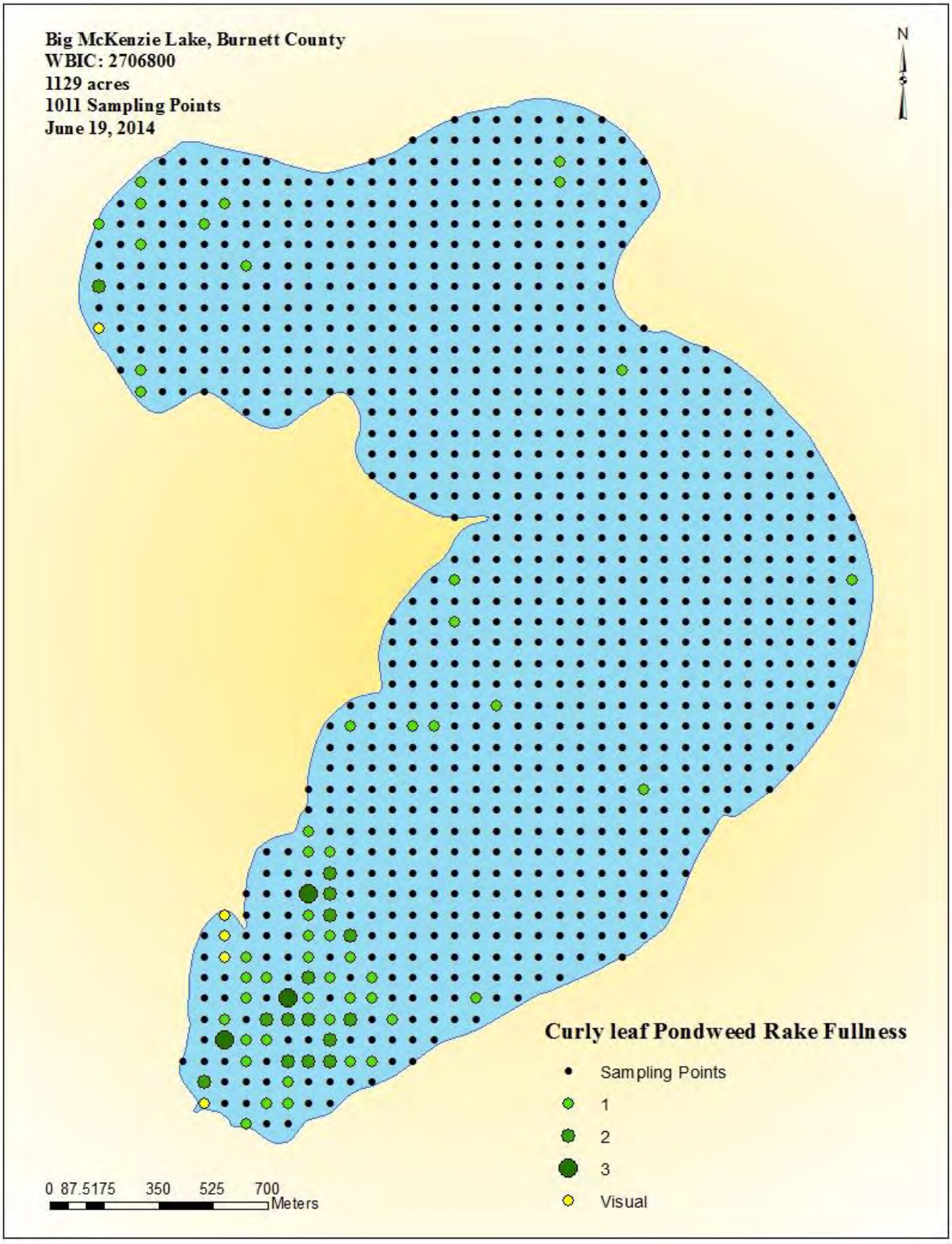
Action Items	*Timeline*	*Budget 2022*	*Budget 2023*	*Budget 2024*	*Budget 2025*	*Budget 2026*	*Budget 2027*	*Responsible Parties*
Prevent AIS Introduction								
Identify and organize volunteer workers / employers for CBCW program	Ongoing	20 hours	20 hours	20 hours	20 hours	20 hours	20 hours	MLA
Conduct CBCW program	Ongoing	20 hours	20 hours	20 hours	20 hours	20 hours	20 hours	MLA
Increase enforcement of BC / WC "Do Not Transport" ordinance	Ongoing	10 hours	10 hours	10 hours	10 hours	10 hours	10 hours	MLA, BC & WC Sheriff, BC LWCD & WC LWCD
Increase enforcement of BC Power Loading ordinance	Ongoing	4 hours	4 hours	4 hours	4 hours	4 hours	4 hours	MLA, BC Sheriff, BC LWCD
Increase enforcement of BC / WC Decontamination station	Ongoing	4 hours	4 hours	4 hours	4 hours	4 hours	4 hours	MLA, BC & WC Sheriff, BC LWCD & WC LWCD
Monitor Boat Landings	Ongoing	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500	MLA, Burnett County LWCD
Train Volunteer monitors in CLMN	As needed	$0	$0	$0	$0	$0	$0	Burnett / Washburn County LWCD
Rapid Response plan review	Ongoing	3 Hours	3 Hours	3 Hours	3 Hours	3 Hours	3 Hours	MLA, Lake Consultant Manager
AIS Reduction and Prevention								
Provide Identification information and encourage volunteer monitoring	May — August	20 hours	20 hours	20 hours	20 hours	20 hours	20 hours	MLA AIS Committee, BC LWCD
Monitor Lakes for PLS growth	July — August	20 hours	20 hours	20 hours	20 hours	20 hours	20 hours	MLA / community
Cut and Spray PLS plants as needed	July — August	$250	$250	$250	$250	$250	$250	MLA / community
Track and monitor previously sprayed areas in previous years	Ongoing	20 hours	20 hours	20 hours	20 hours	20 hours	20 hours	MLA / community
Monitor & map all CLP beds every two years or more often if warranted	Mid May — Mid June	TBD		TBD		TBD		BC LWCD, Lake Consultant Manager
Consider treatment options if CLP control is warranted	September	TBD						MLA
Track and control YFI population	May — Sept	$0	$0	$0	$0	$0	$0	BC LWCD, MLA

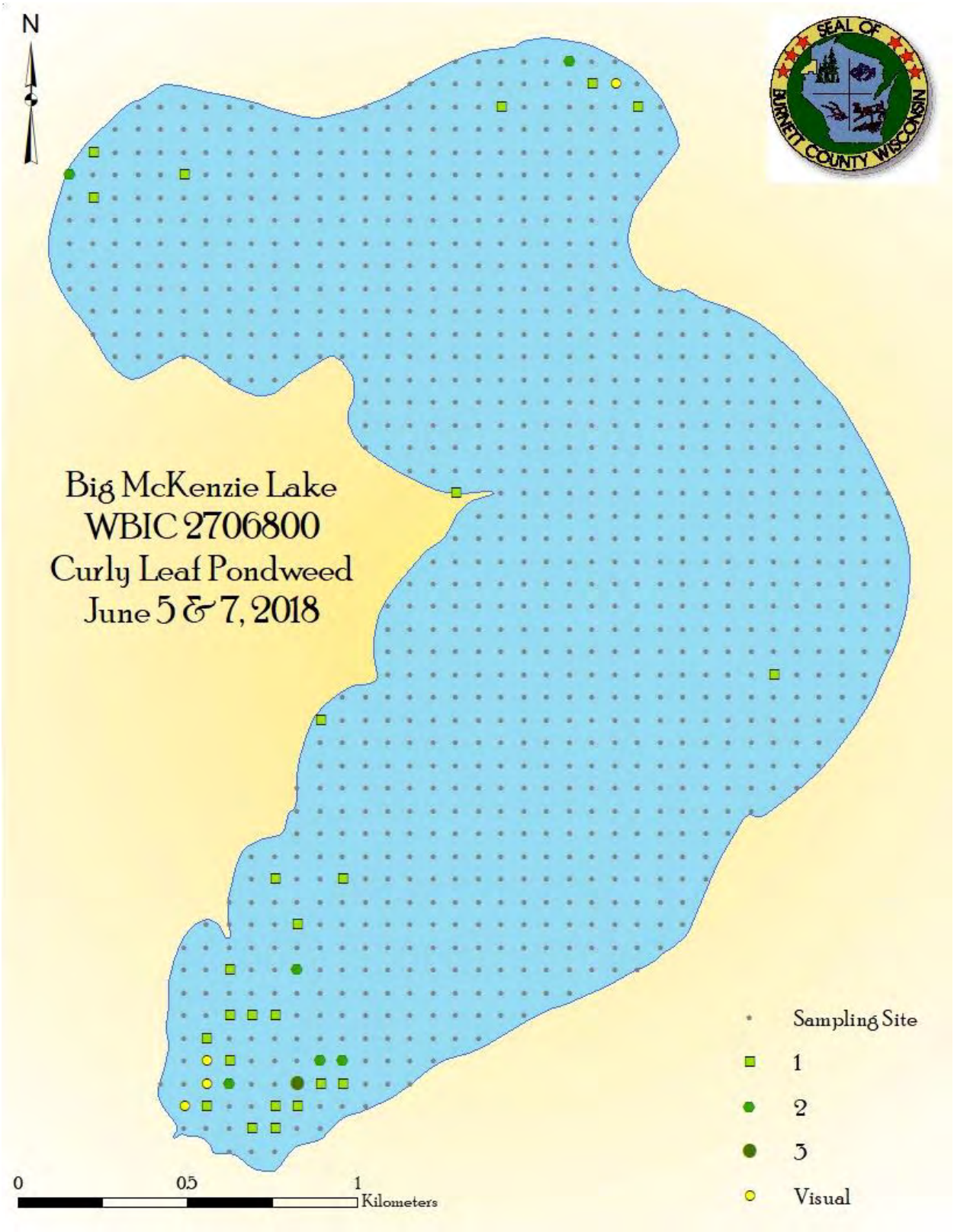
Invasive snail One-Day remove all event	June — July	$0	$0	$0	$0	$0	$0	BC LWCD, MLA
Preserve Native Plants								
Conduct a point intercept survey of the lakes	2022			TBD			TBD	
Update APM plan	2027						TBD	MLA, Lake Consultant Manager
Educate McKenzie Lakes Community								
AIS workshops	Ongoing	$0	$0	$0	$0	$0	$0	BC / WC LWCD
AIS signage	Ongoing	$0	$0	$0	$0	$0	$0	BC LWCD
Handouts, mailings, door-to-door distribution	As needed	$500	$550	$600	$650	$700	$750	MLA
MLA newsletter articles	Ongoing	$200	$200	$200	$200	$200	$200	MLA
MLA Website updates	Ongoing	$1,000	$1,200	$1,300	$1,400	$1,500	$1,600	MLA
Annual and special meetings	Ongoing	$200	$200	$200	$200	$200	$200	MLA
Water Quality								
Water chemistry and Secchi sampling	Ongoing	80 hours	80 hours	80 hours	80 hours	80 hours	80 hours	MLA
Reduce phosphorus and sediment loads from immediate watershed	Ongoing	TBD						MLA, Lake Consultant Manager
Educate and assist McKenzie Lakes community members in the restoration and preservation of shoreland buffers and shoreland vegetation	Ongoing	$500	$550	$600	$650	$700	$750	MLA, Lake Consultant Manager
Continue implementation of shoreline owners' education program	Ongoing	TBD						MLA, BC LWCD

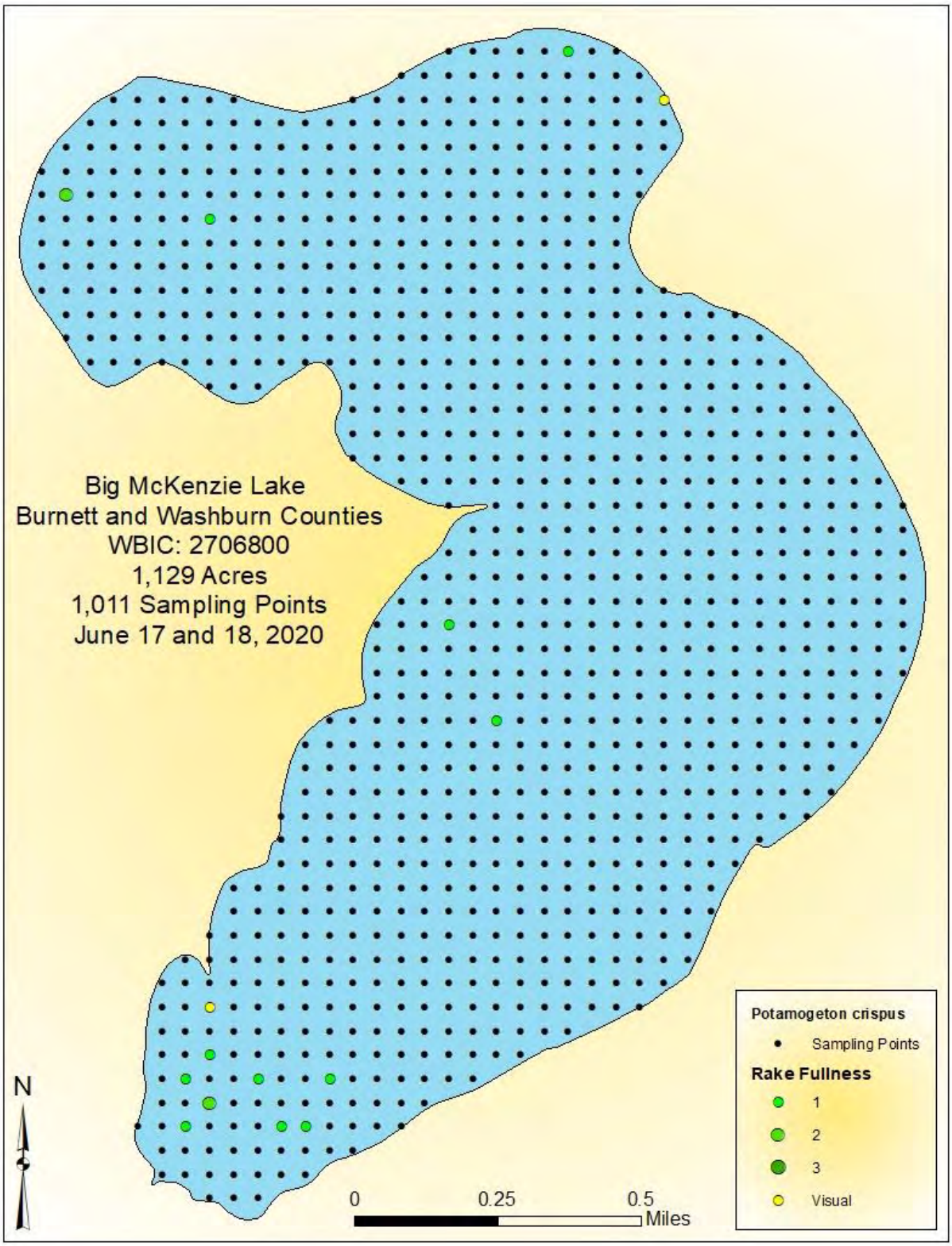
Appendix A. Past Aquatic Invasive Species Surveys

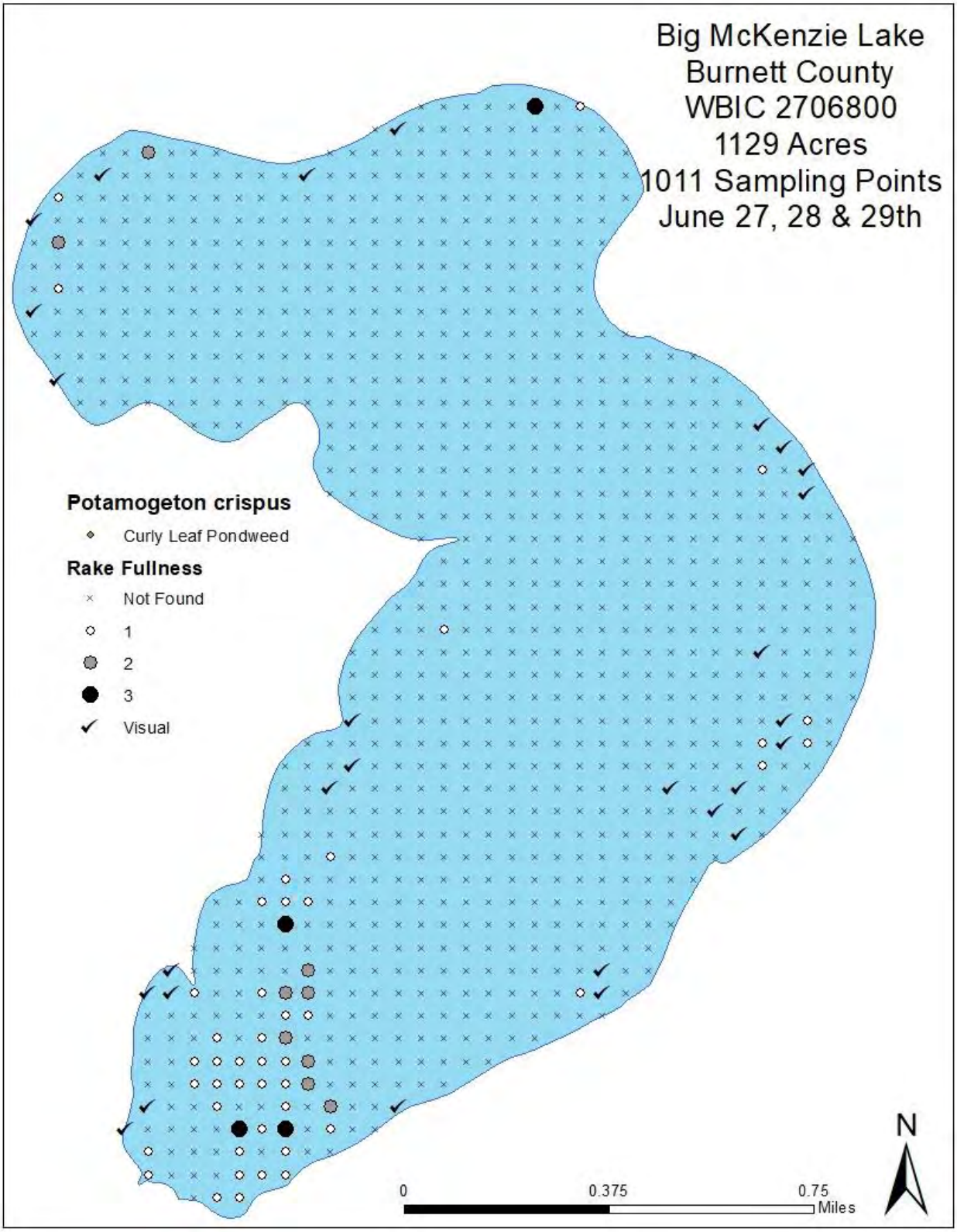


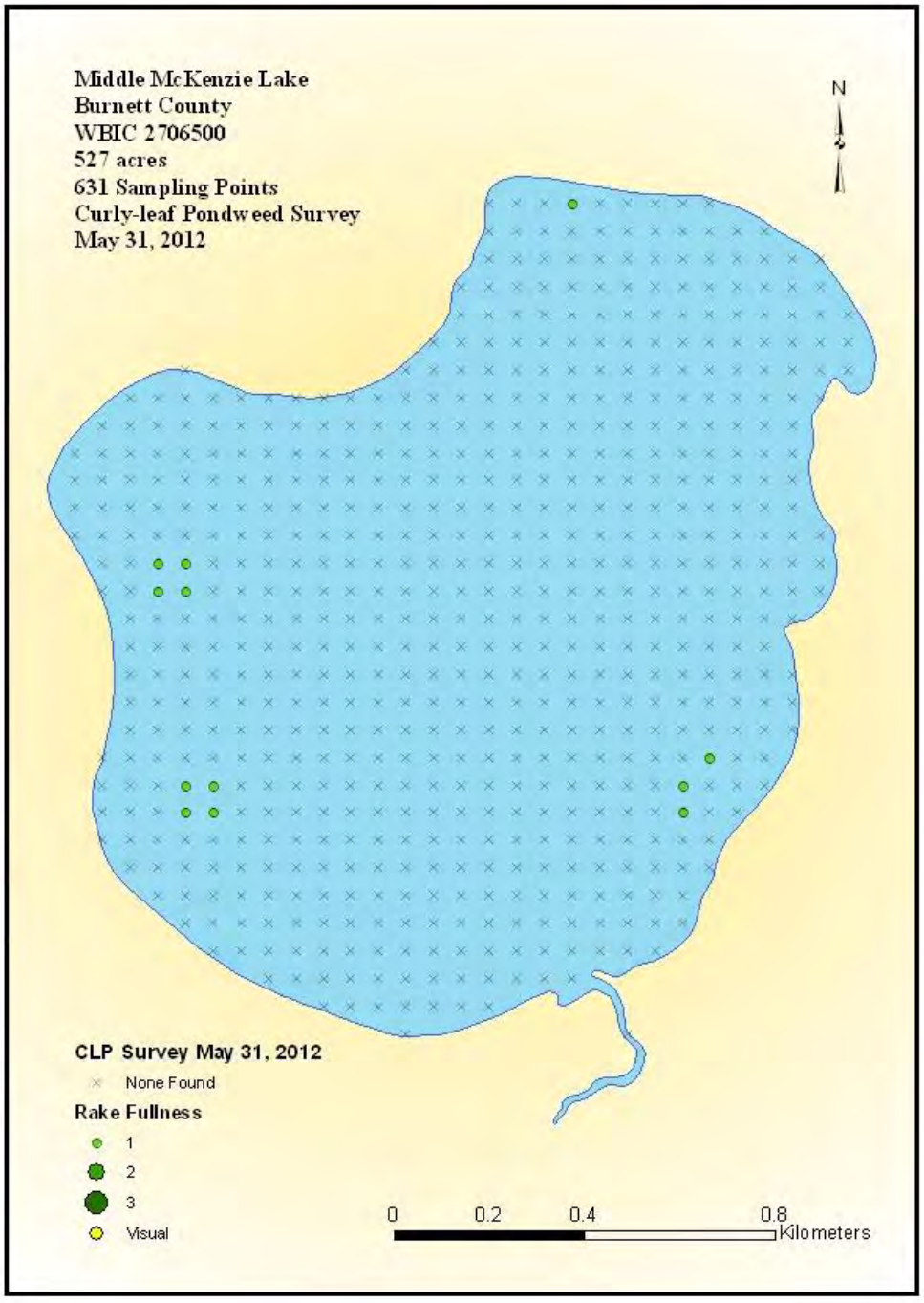

Big McKenzie Lake
Burnett County
WBIC 2706800
Curly-leaf Pondweed Survey
June 8, 2012
1129 Acres
1011 Sampling Sites
67m between Points
N
W
E
S
0
0.2
0.4
0.8
Kilometers
Legend
Big McKenzie Curly-leaf Pondweed Survey June 8, 2012
None Found
CLP
1
2
3
Visual

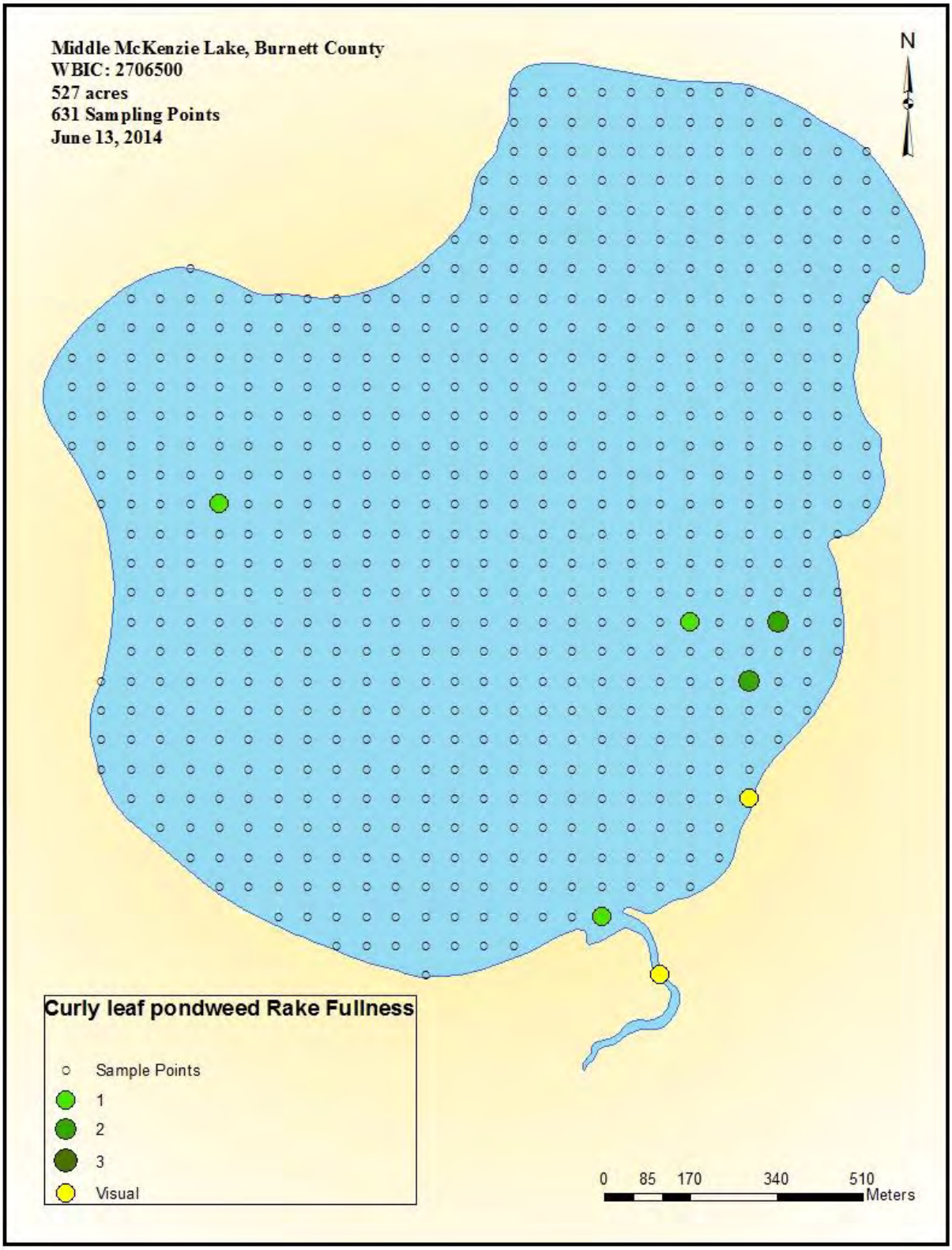

Big McKenzie Lake, Burnett County
WBIC: 2706800
1129 acres
1011 Sampling Points
June 19, 2014
N
Curly leaf Pondweed Rake Fullness
Sampling Points
1
2
3
Visual
0 87.5175 350 525 700
Meters

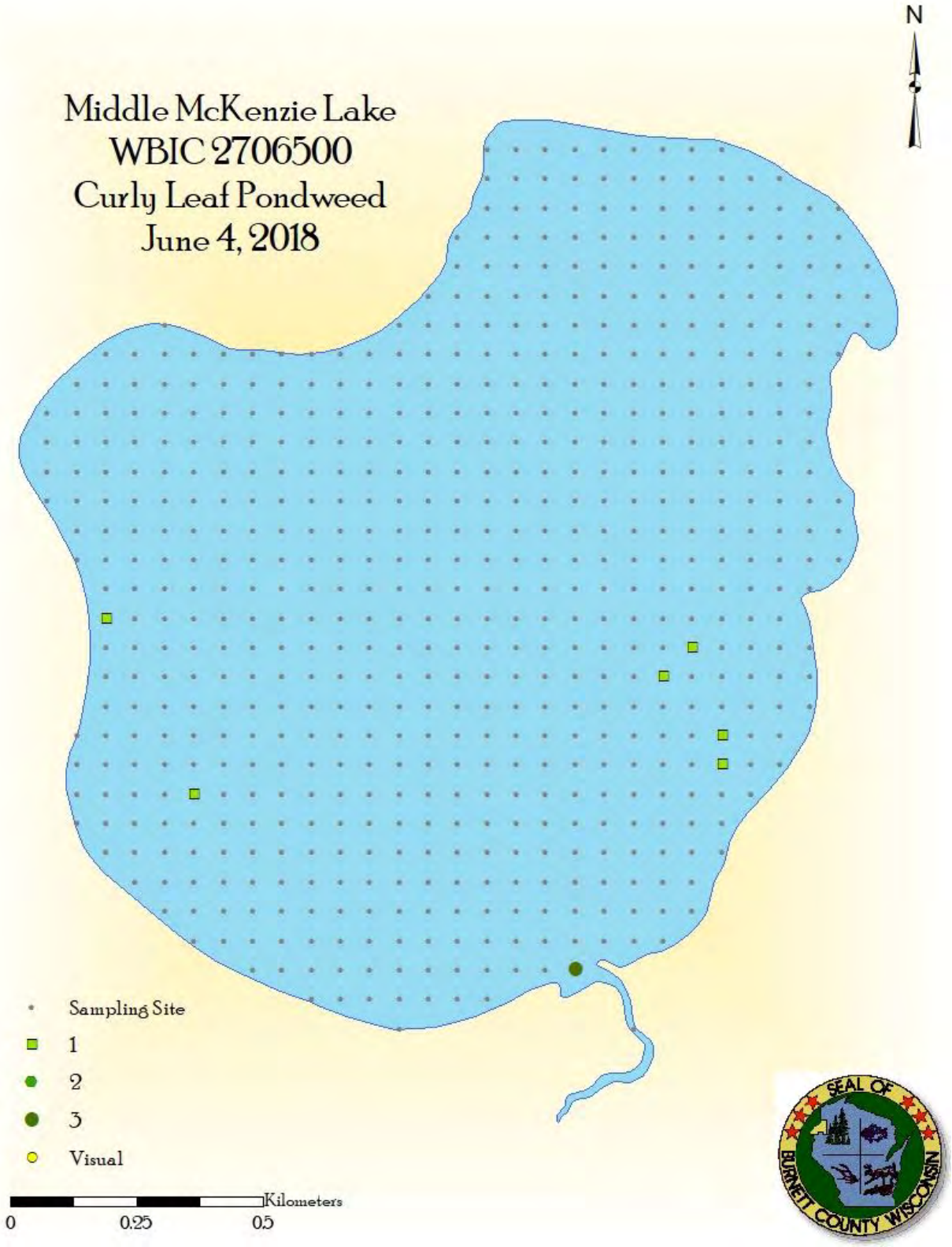

N
SEAL OF
BURNETT COUNTY WISCONSIN
Big McKenzie Lake
WBIC 2706800
Curly Leaf Pondweed
June 5 & 7, 2018
Sampling Site
1
2
3
Visual
0
0.5
1
Kilometers

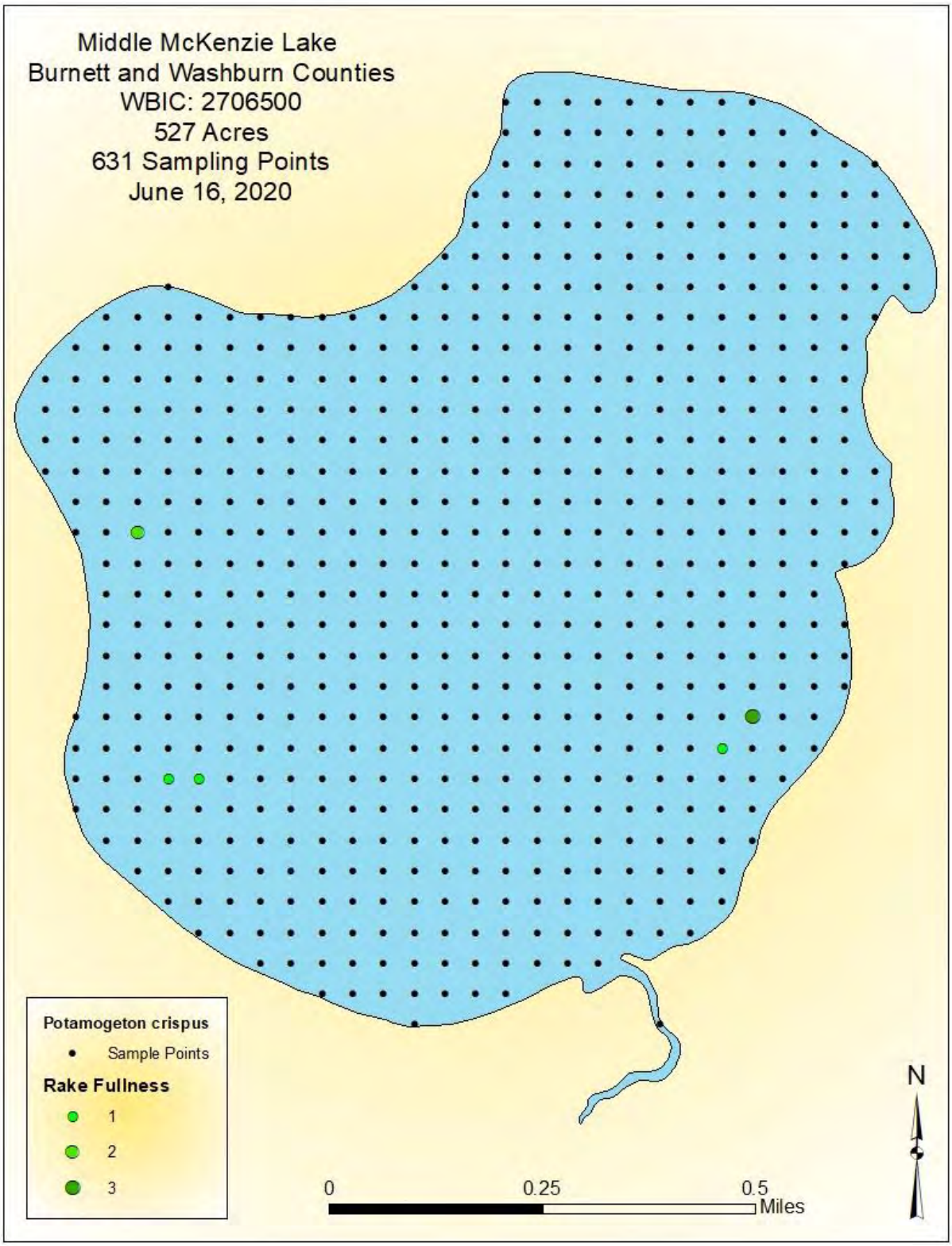

Big McKenzie Lake
Burnett and Washburn Counties
WBIC: 2706800
1,129 Acres
1,011 Sampling Points
June 17 and 18, 2020
N
0
0.25
0.5
Miles
Potamogeton crispus
Sampling Points
Rake Fullness
1
2
3
Visual

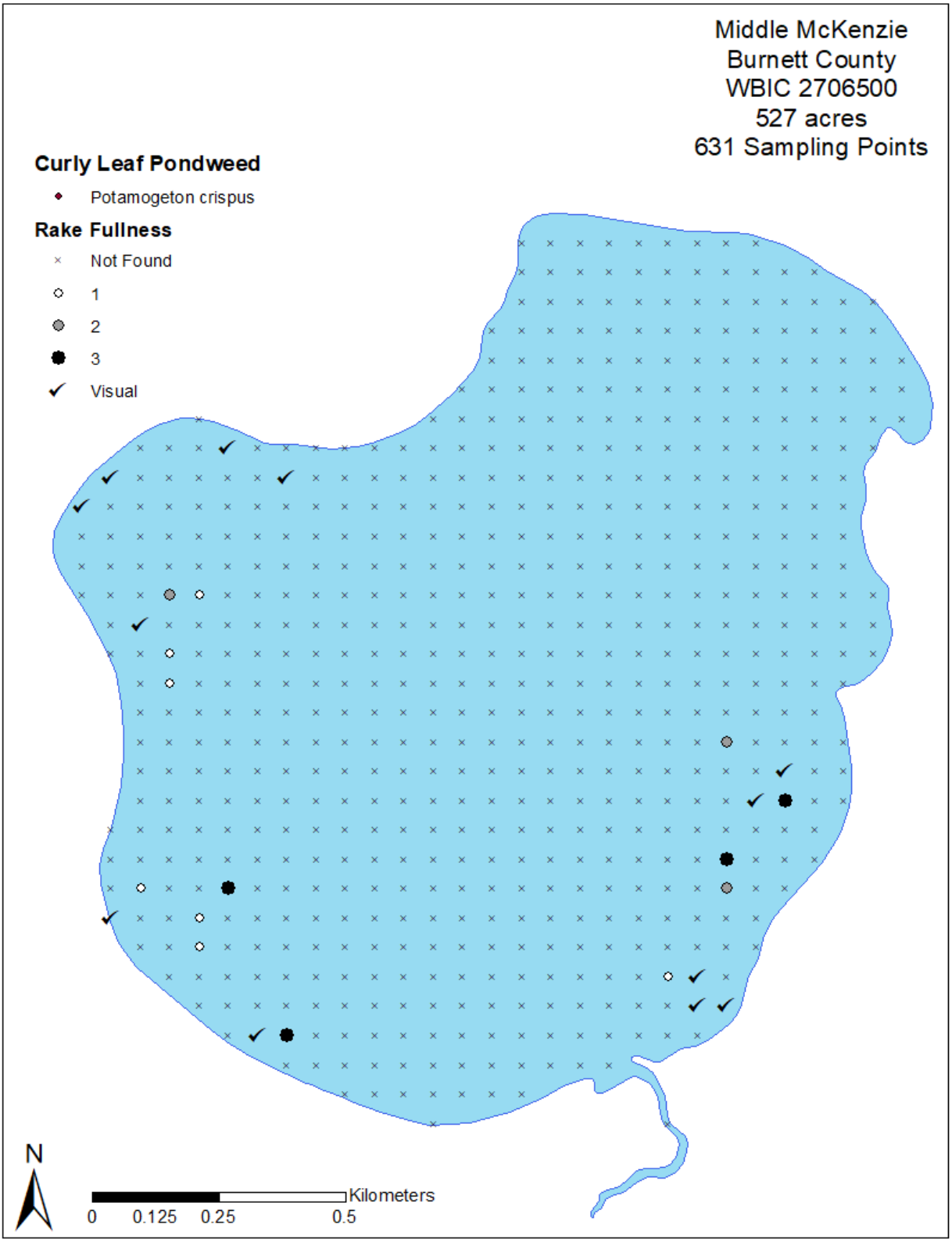

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
June 27, 28 & 29th
Potamogeton crispus
Curly Leaf Pondweed
Rake Fullness
Not Found
1
2
3
Visual
0
0.375
0.75
Miles
N

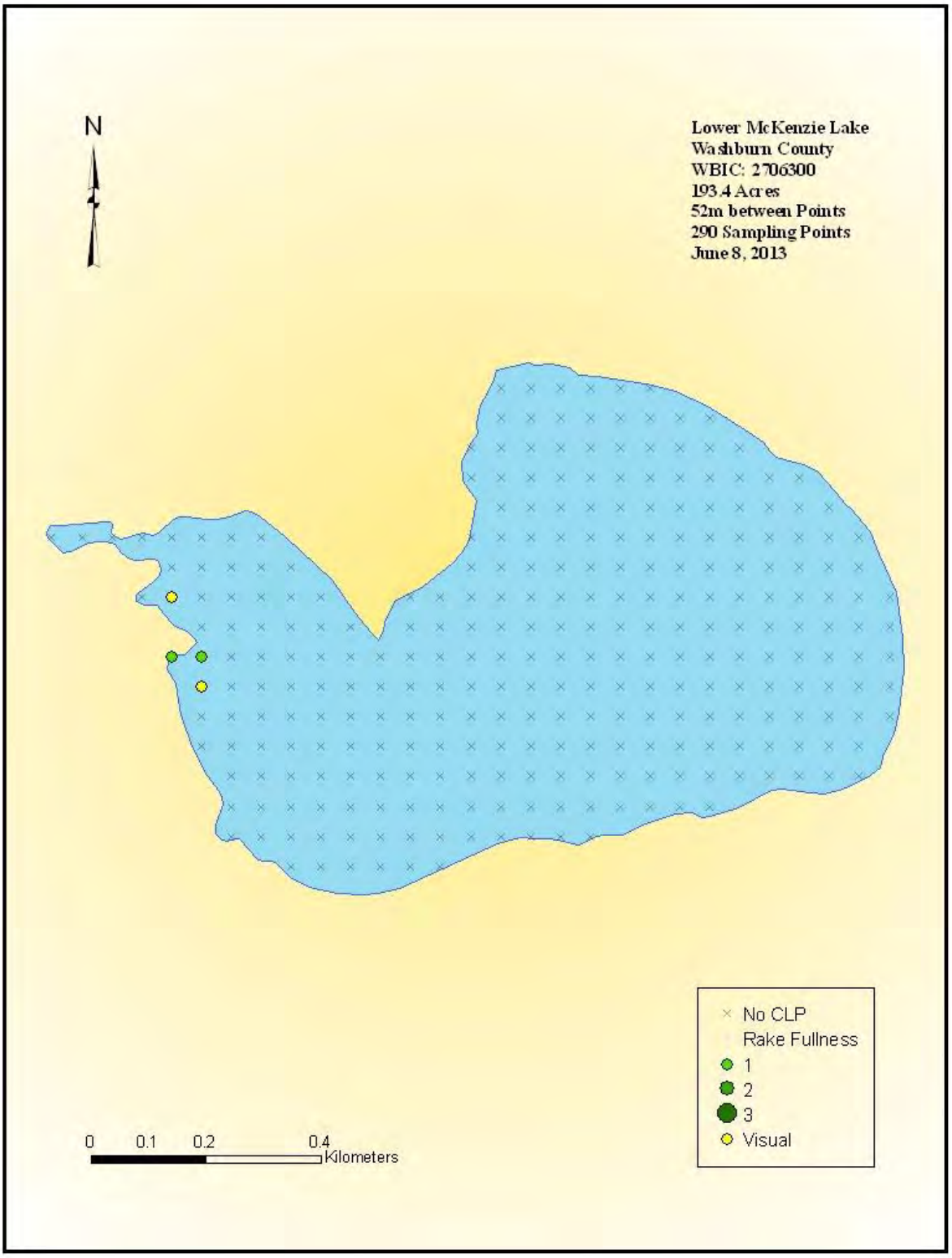

Middle McKenzie Lake
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Curly-leaf Pondweed Survey
May 31, 2012
N
CLP Survey May 31, 2012
None Found
Rake Fullness
1
2
3
Visual
0
0.2
0.4
0.8
Kilometers

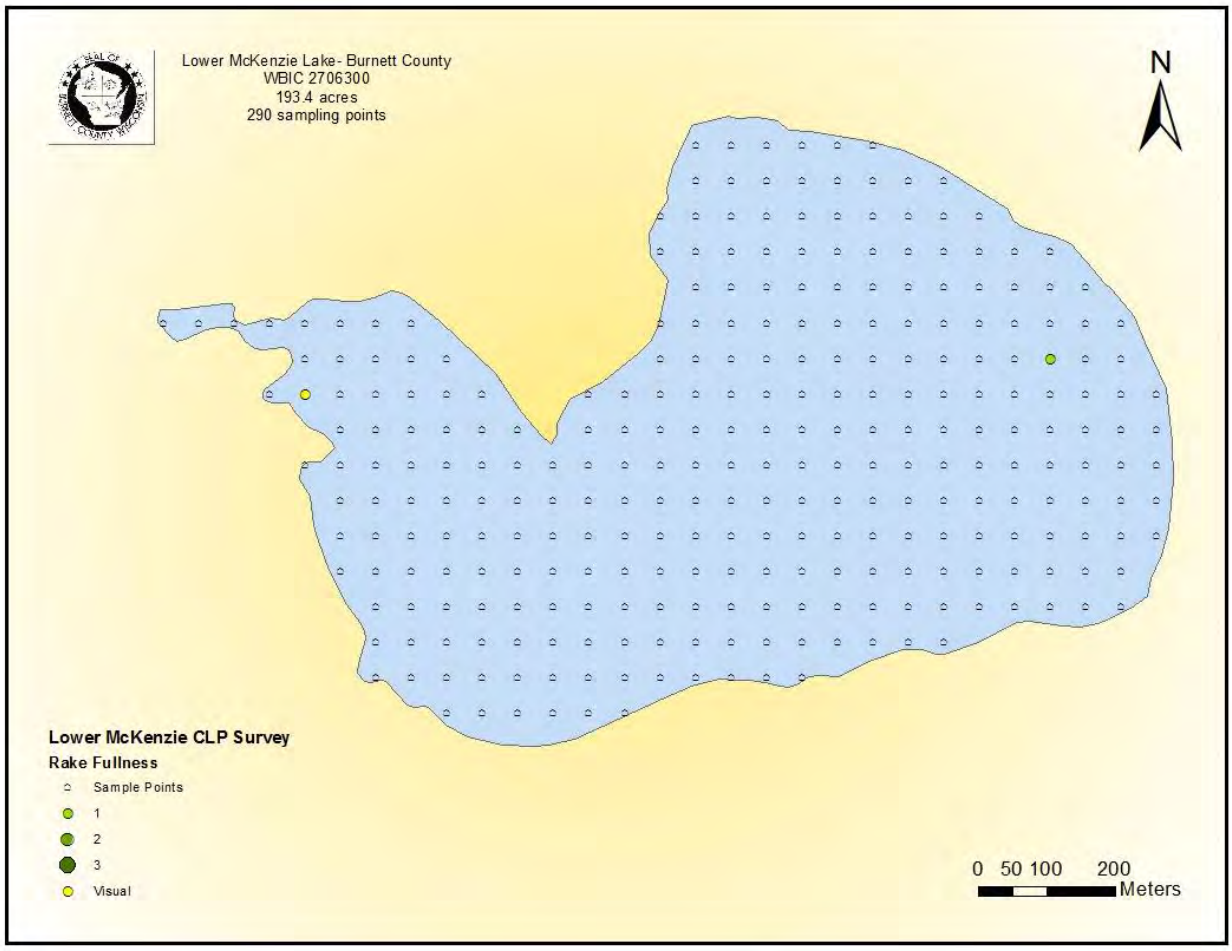

Middle McKenzie Lake, Burnett County
WBIC: 2706500
527 acres
631 Sampling Points
June 13, 2014
N
Curly leaf pondweed Rake Fullness
Sample Points
1
2
3
Visual
0 85 170 340 510
Meters

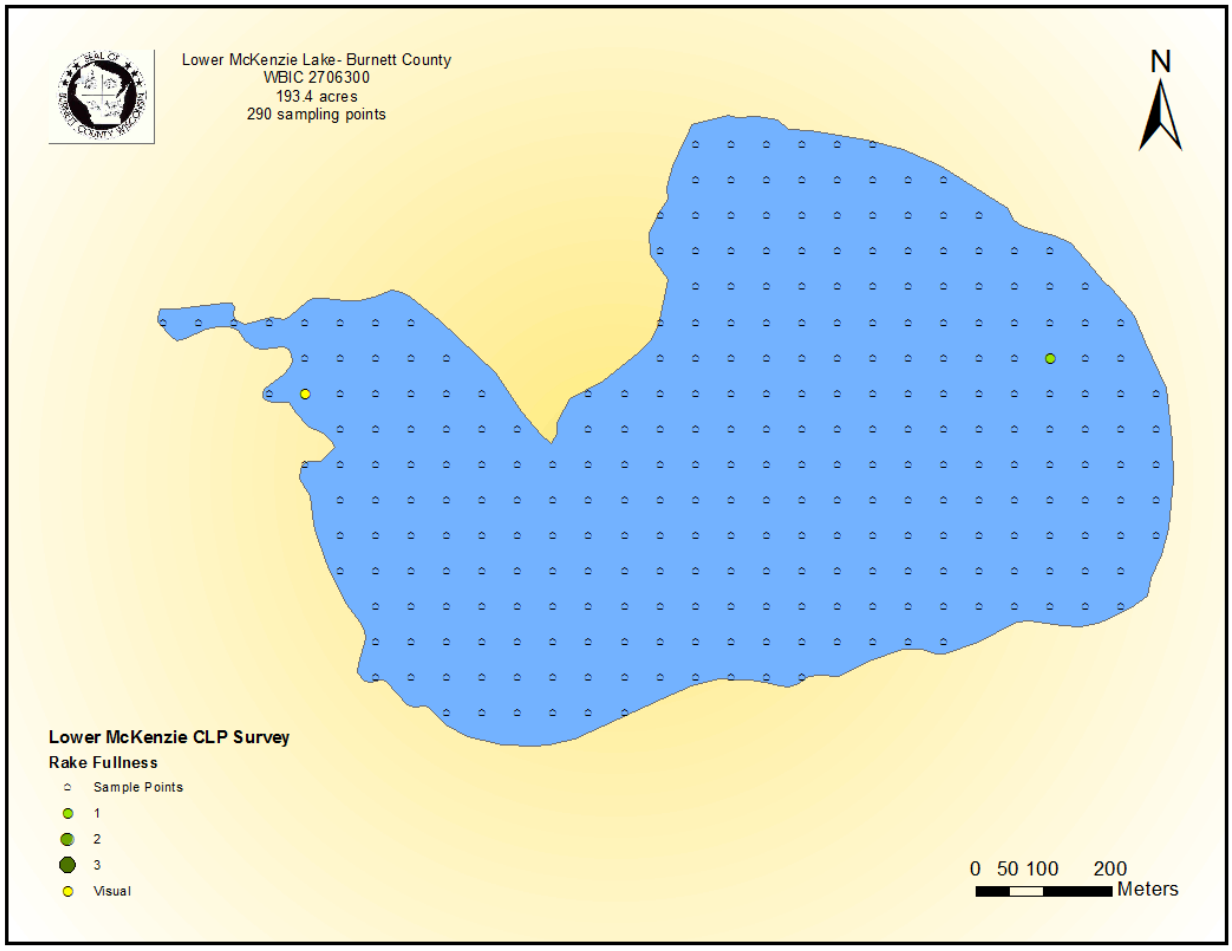

N
Middle McKenzie Lake
WBIC 2706500
Curly Leaf Pondweed
June 4, 2018
Sampling Site
1
2
3
Visual
Kilometers
0
0.25
0.5
SEAL OF
BURNETT COUNTY WISCONSIN

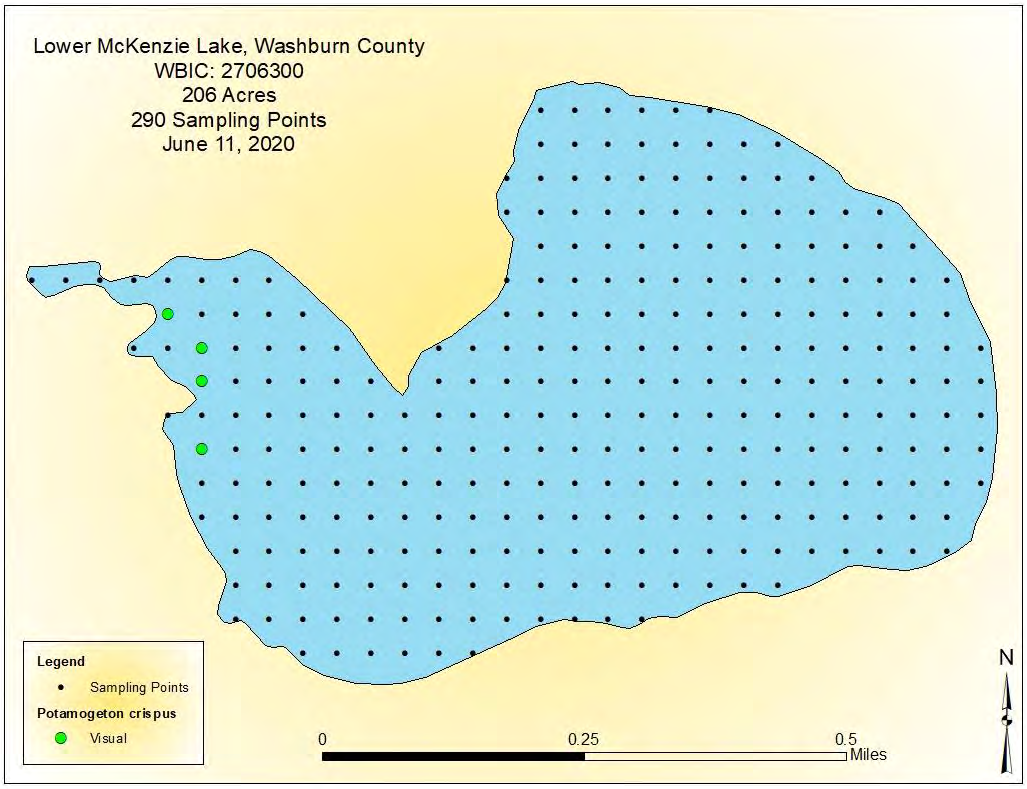

Middle McKenzie Lake
Burnett and Washburn Counties
WBIC: 2706500
527 Acres
631 Sampling Points
June 16, 2020
Potamogeton crispus
Sample Points
Rake Fullness
1
2
3
0
0.25
0.5
Miles
N

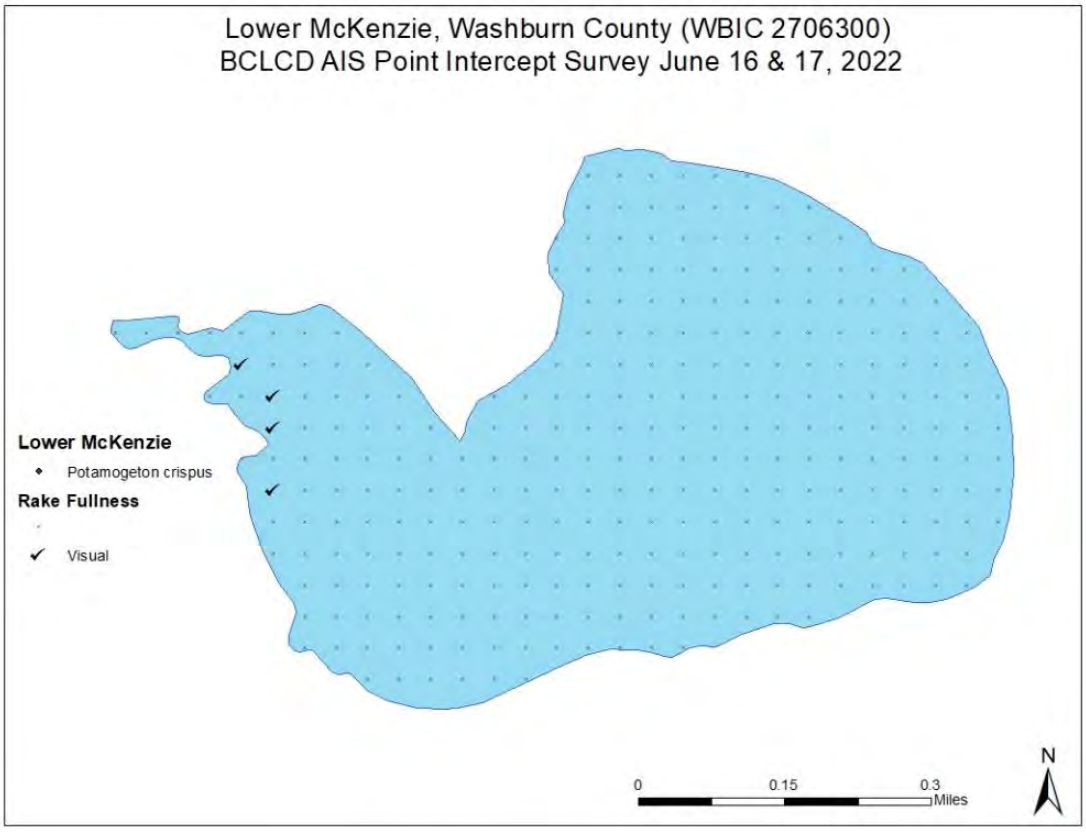

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Curly Leaf Pondweed
Potamogeton crispus
Rake Fullness
Not Found
1
2
3
Visual
N
Kilometers
0
0.125
0.25
0.5


N
Lower McKenzie Lake
Washburn County
WBIC: 2706300
193.4 Acres
52m between Points
290 Sampling Points
June 8, 2013
No CLP
Rake Fullness
1
2
3
Visual
0
0.1
0.2
0.4
Kilometers

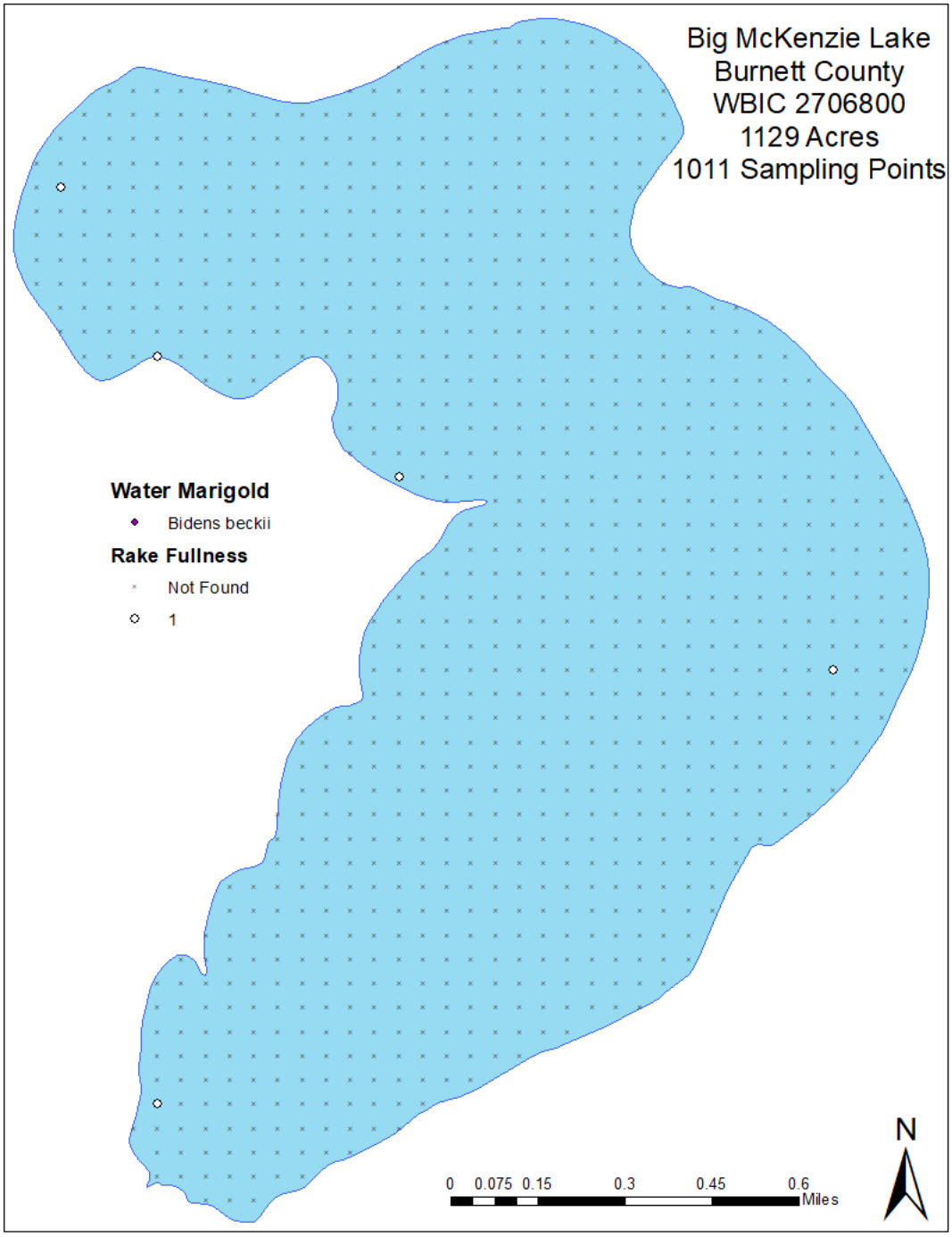

Lower McKenzie Lake- Burnett County
WBIC 2706300
193.4 acres
290 sampling points
N
Lower McKenzie CLP Survey
Rake Fullness
Sample Points
1
2
3
Visual
0 50 100 200
Meters

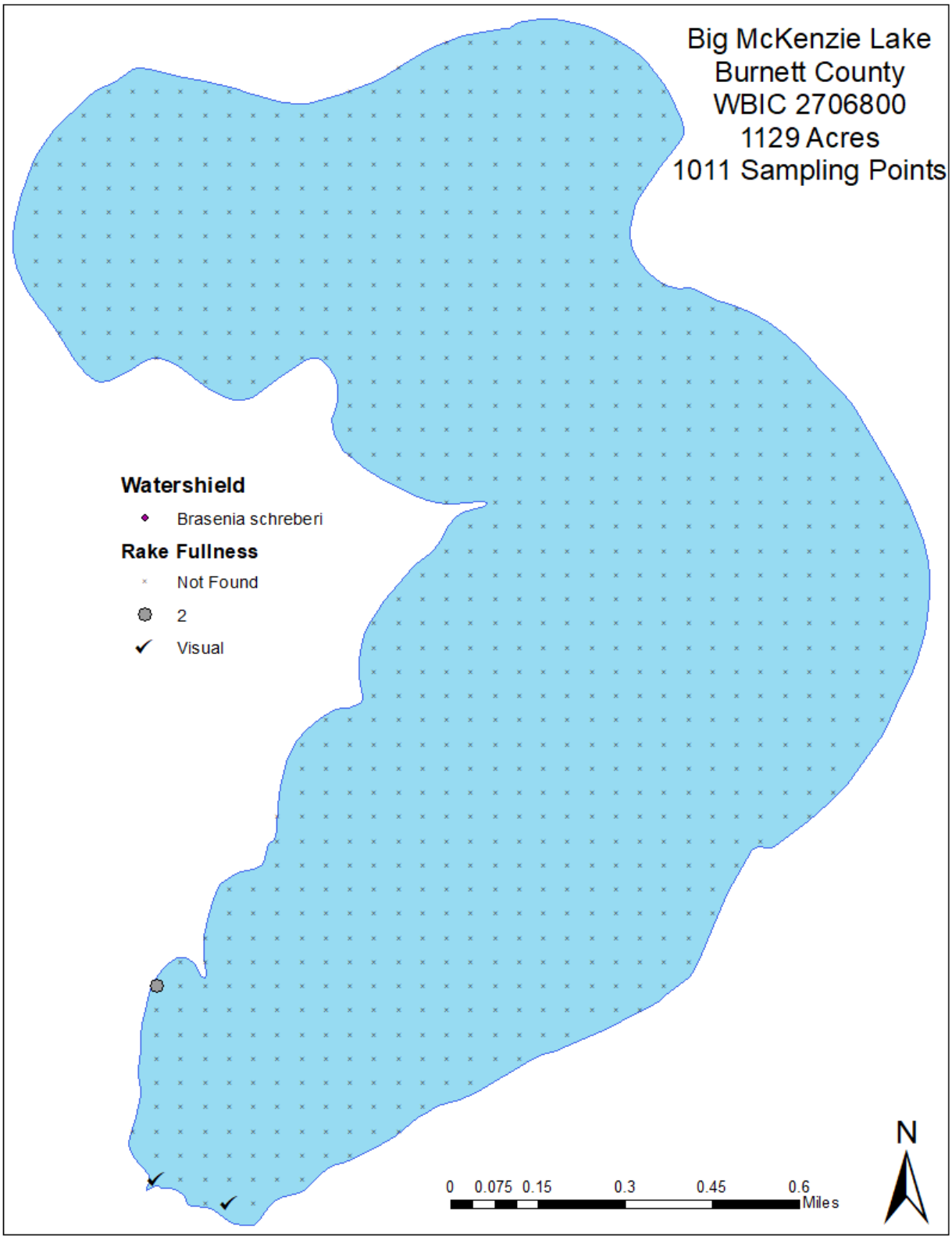

Lower McKenzie Lake- Burnett County
WBIC 2706300
193.4 acres
290 sampling points
N
Lower McKenzie CLP Survey
Rake Fullness
Sample Points
1
2
3
Visual
0 50 100 200
Meters

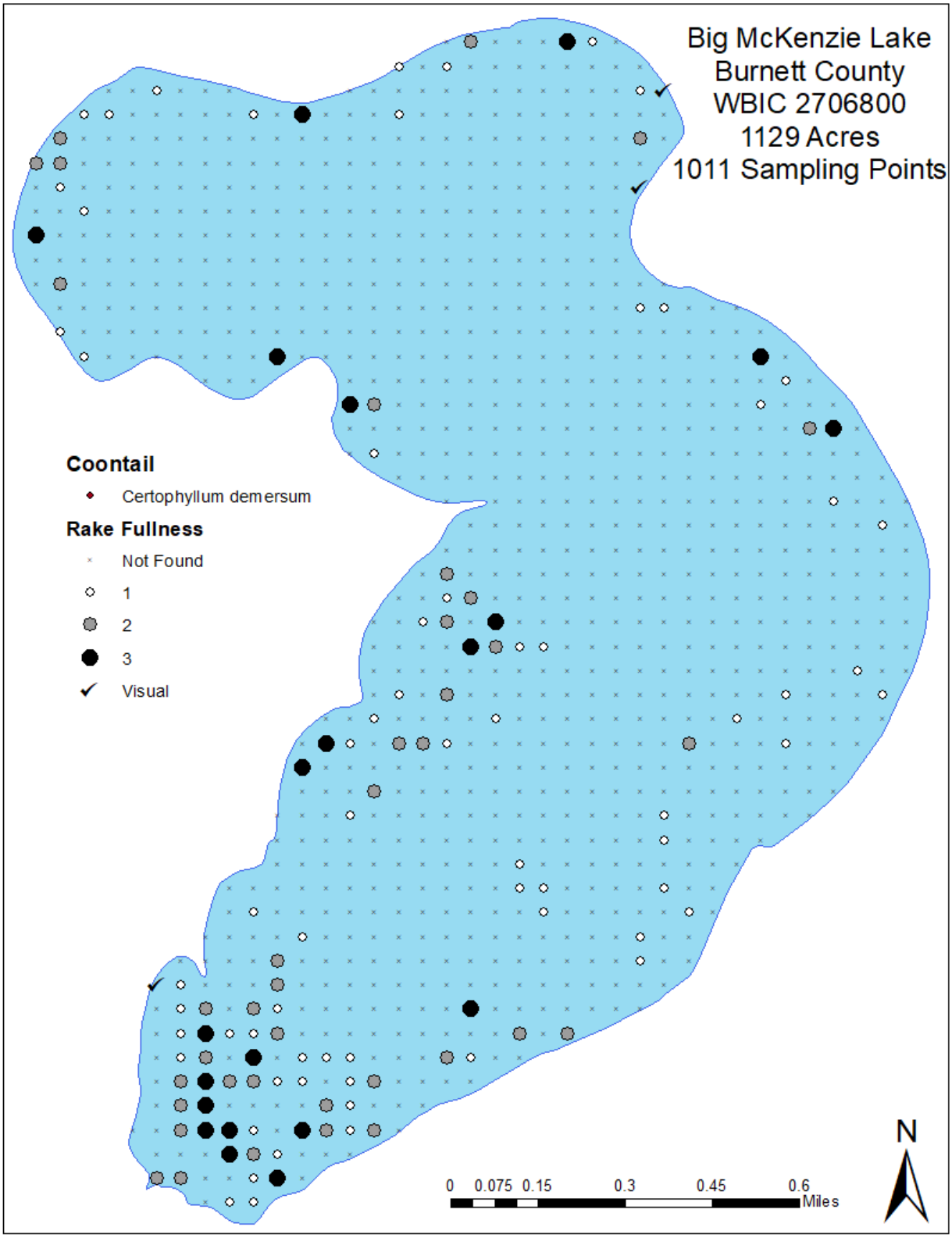

Lower McKenzie Lake, Washburn County
WBIC: 2706300
206 Acres
290 Sampling Points
June 11, 2020
Legend
Sampling Points
Potamogeton crispus
Visual
0
0.25
0.5
Miles
N

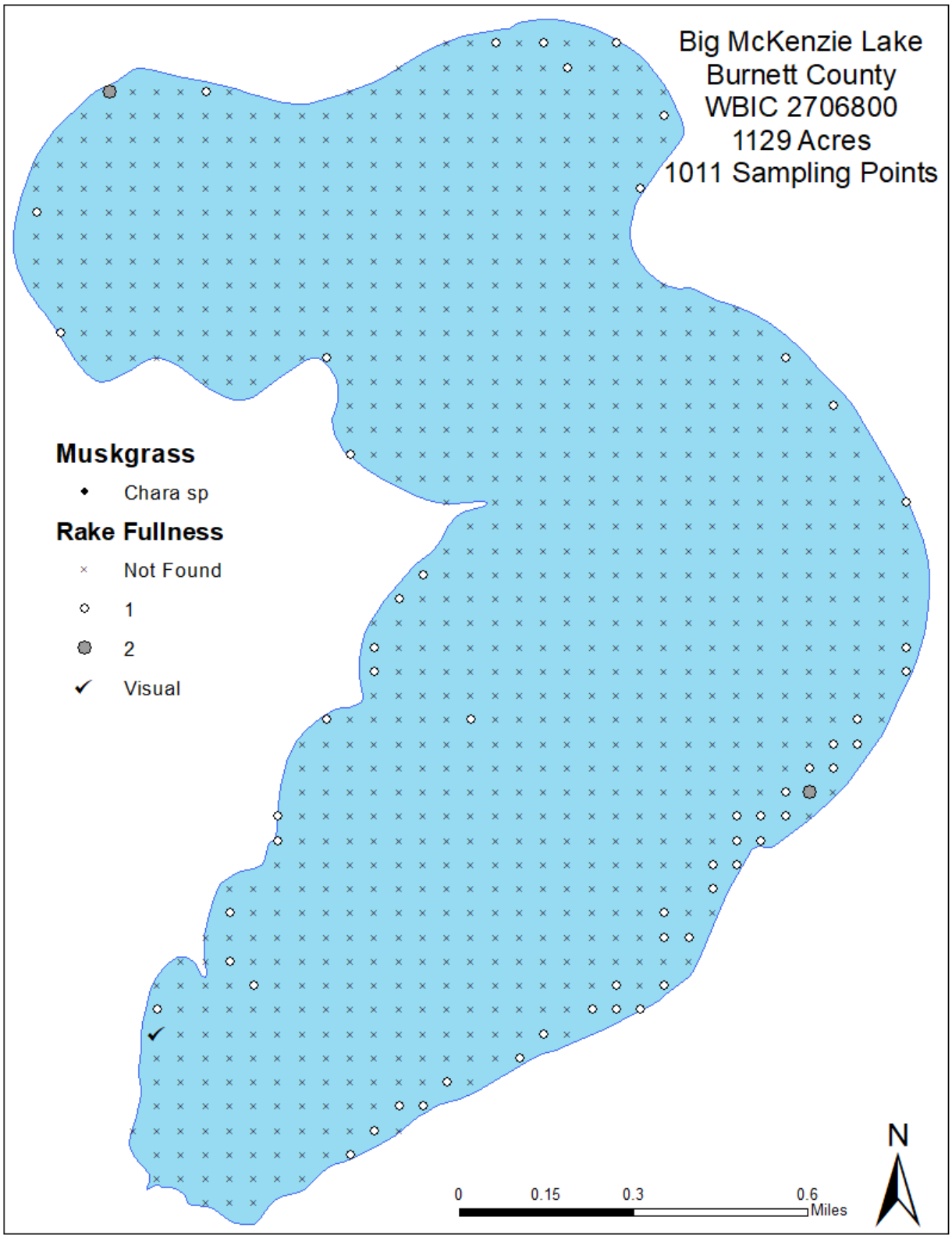

Lower McKenzie, Washburn County (WBIC 2706300)
BCLCD AIS Point Intercept Survey June 16 & 17, 2022
Lower McKenzie
Potamogeton crispus
Rake Fullness
Visual
0
0.15
0.3
Miles
N

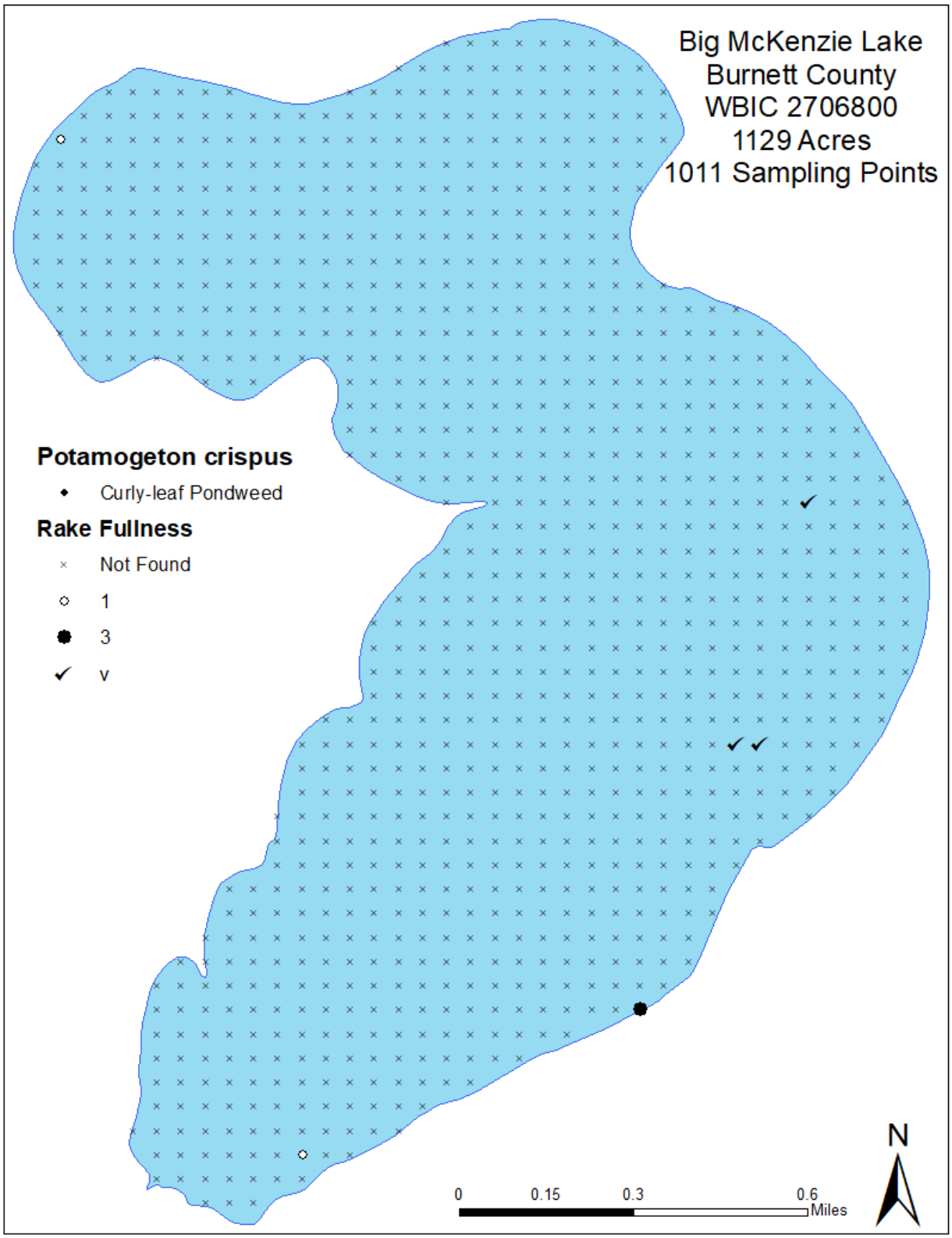
Appendix B. Big McKenzie Aquatic Plant Maps

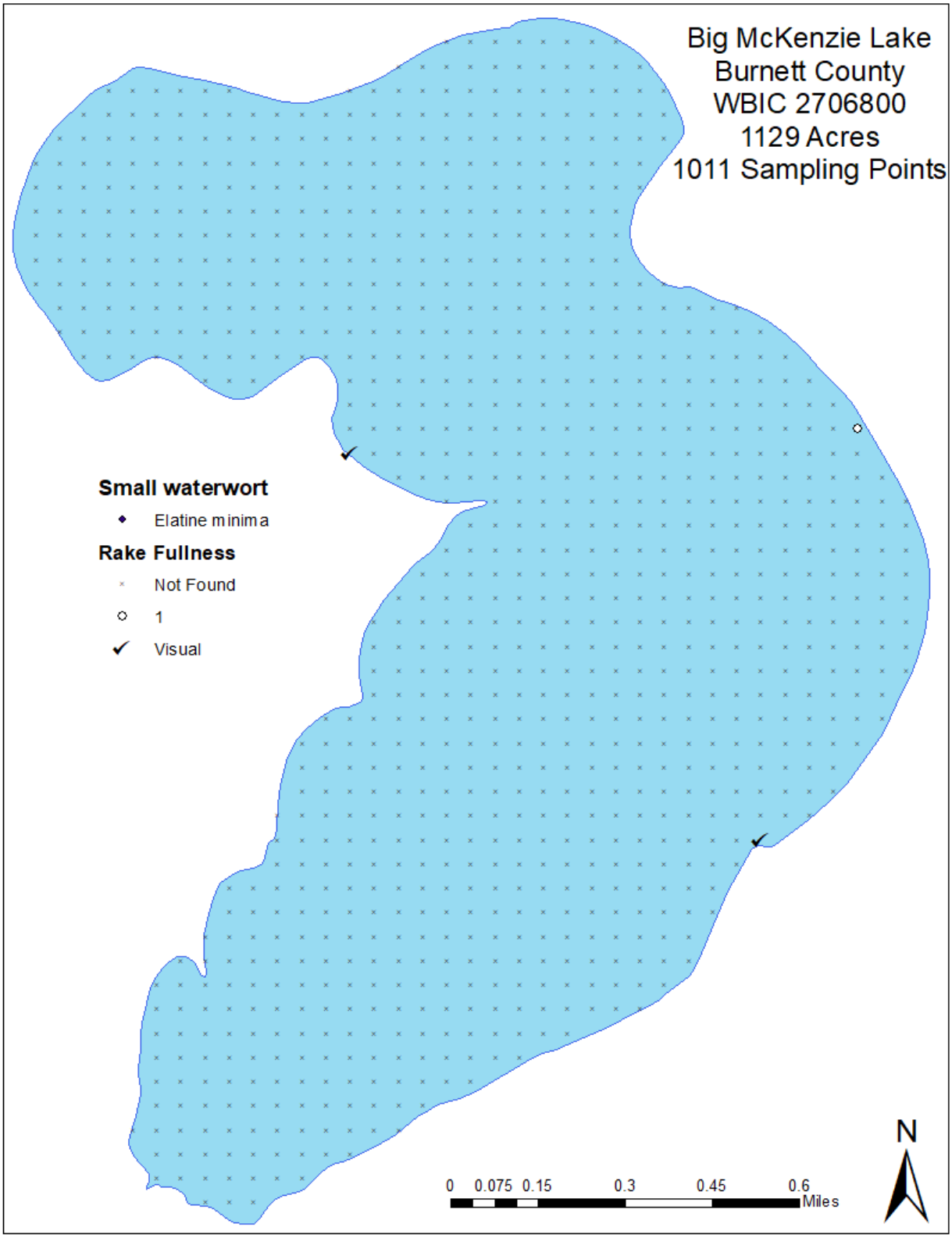


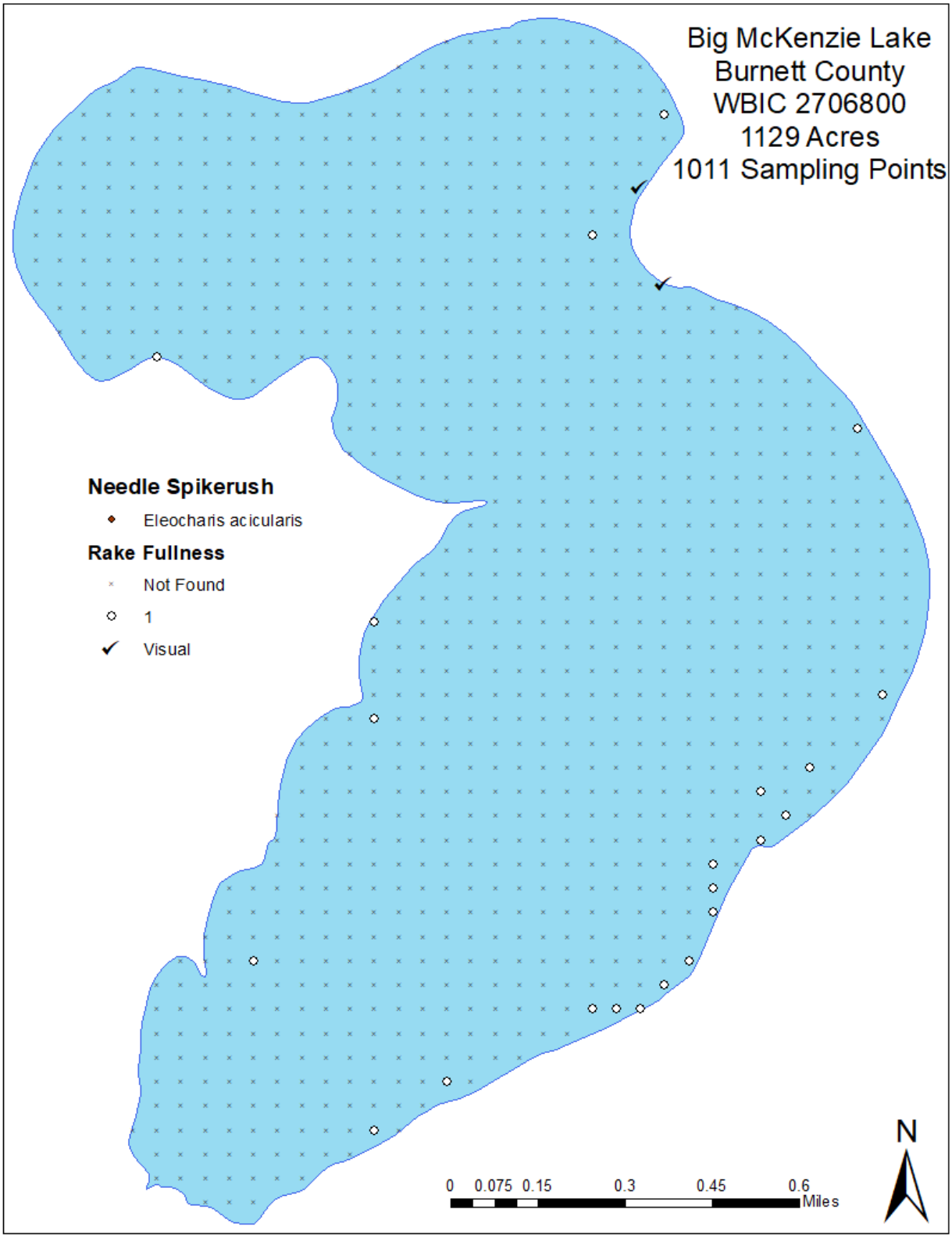

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Watershield
Brasenia schreberi
Rake Fullness
Not Found
2
Visual
0 0.075 0.15 0.3 0.45 0.6
Miles
N

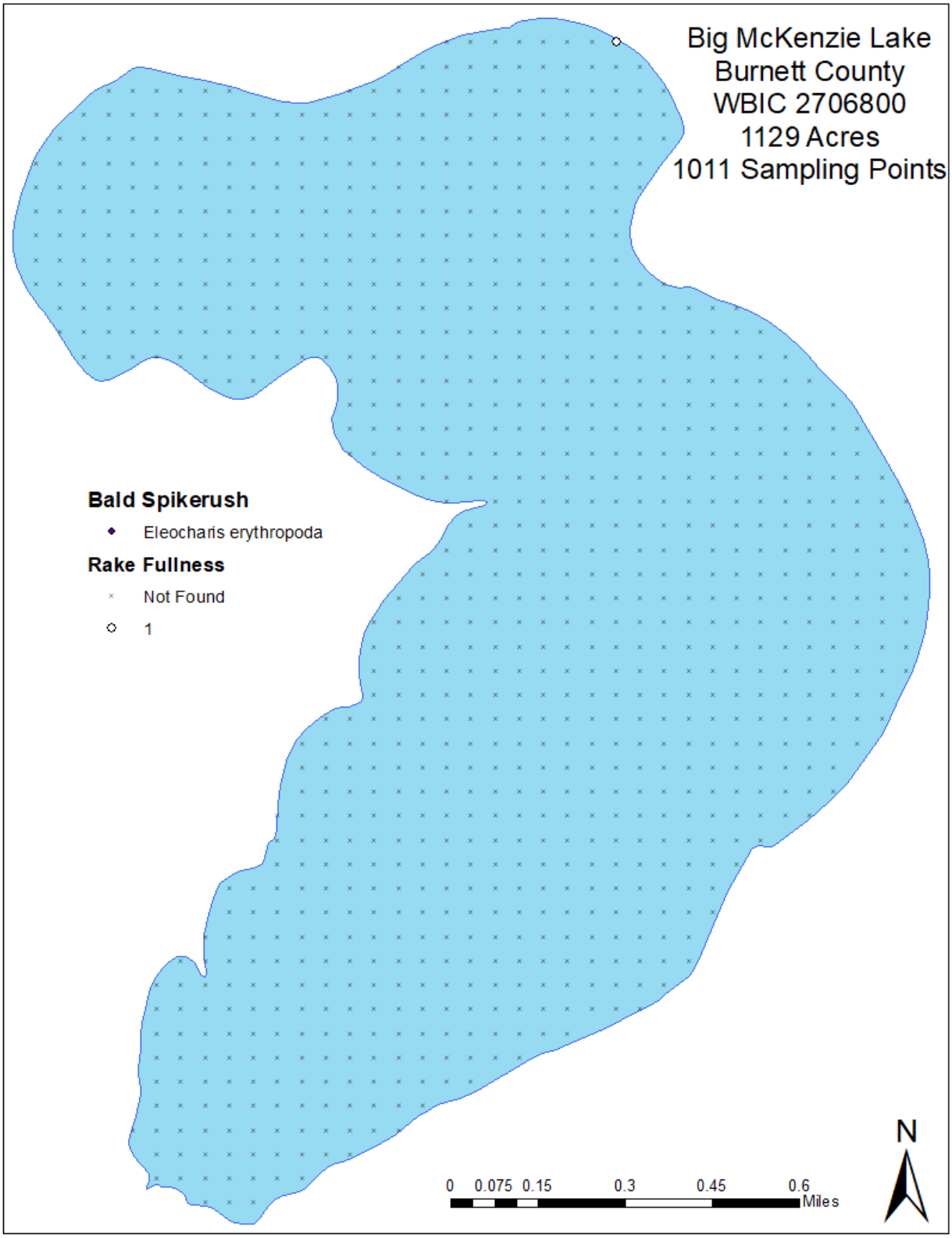

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Coontail
Certophyllum demersum
Rake Fullness
Not Found
1
2
3
Visual
0 0.075 0.15 0.3 0.45 0.6
Miles
N

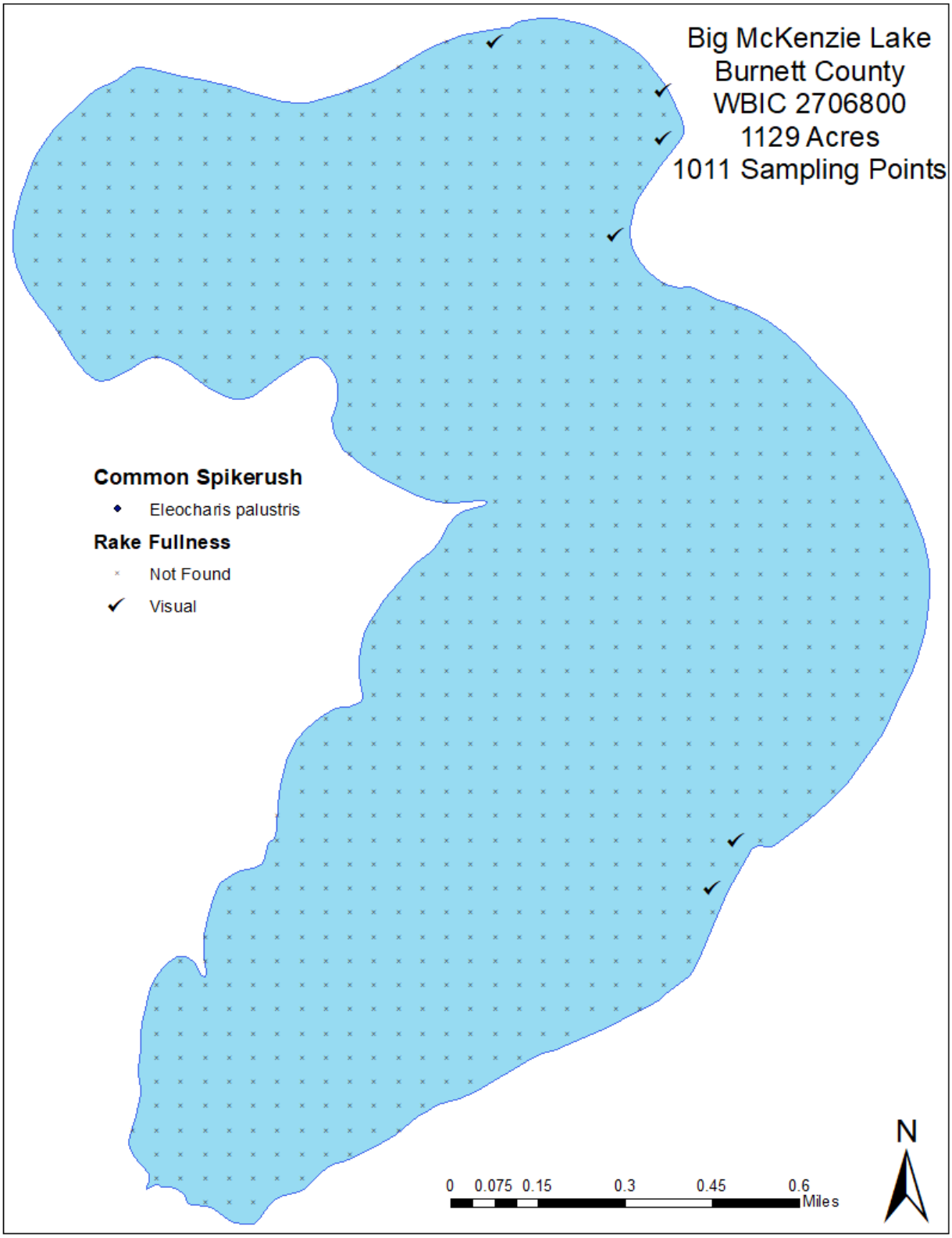

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Muskgrass
Chara sp
Rake Fullness
Not Found
1
2
Visual
0
0.15
0.3
0.6
Miles
N

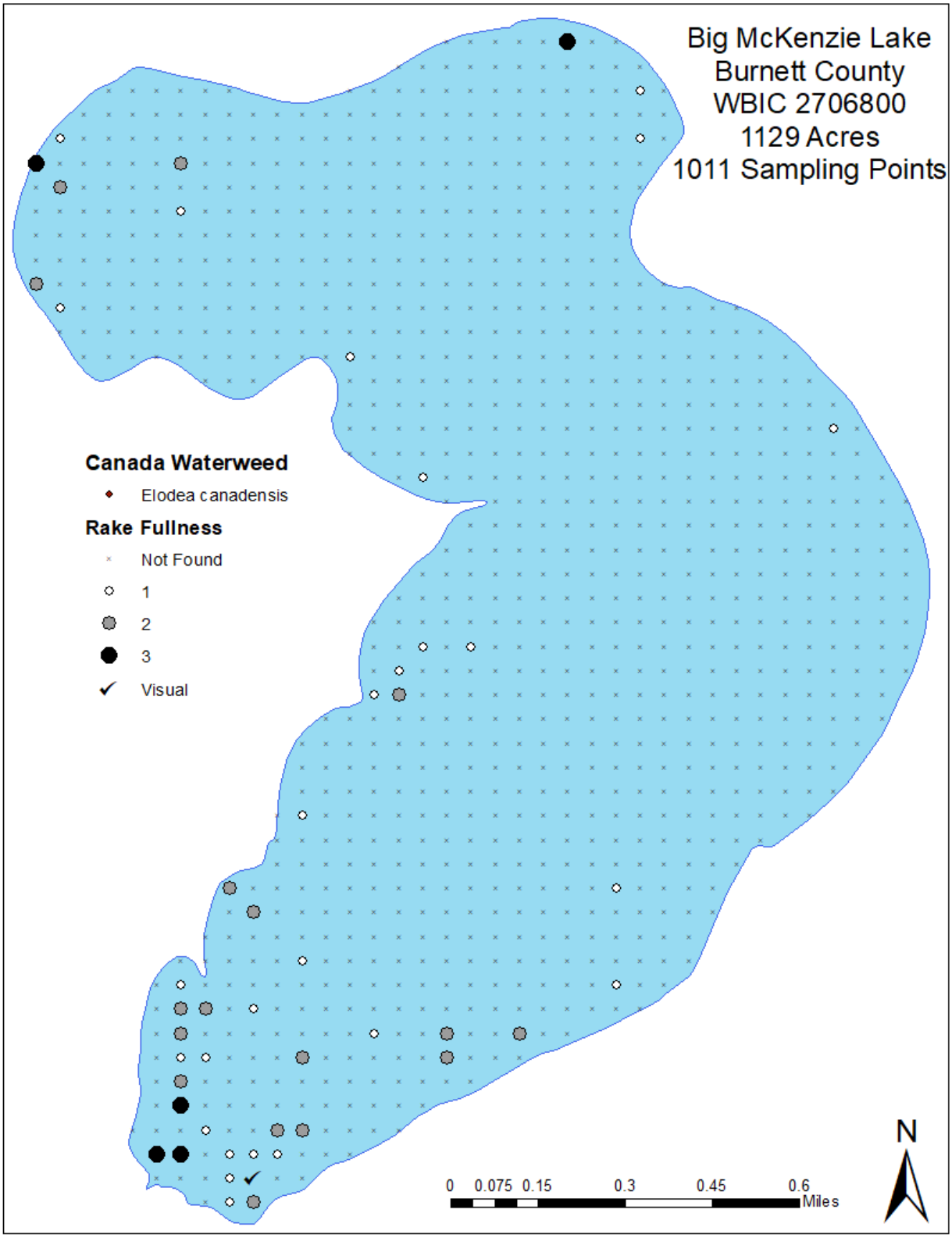

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Potamogeton crispus
Curly-leaf Pondweed
Rake Fullness
Not Found
1
3
v
0
0.15
0.3
0.6
Miles
N

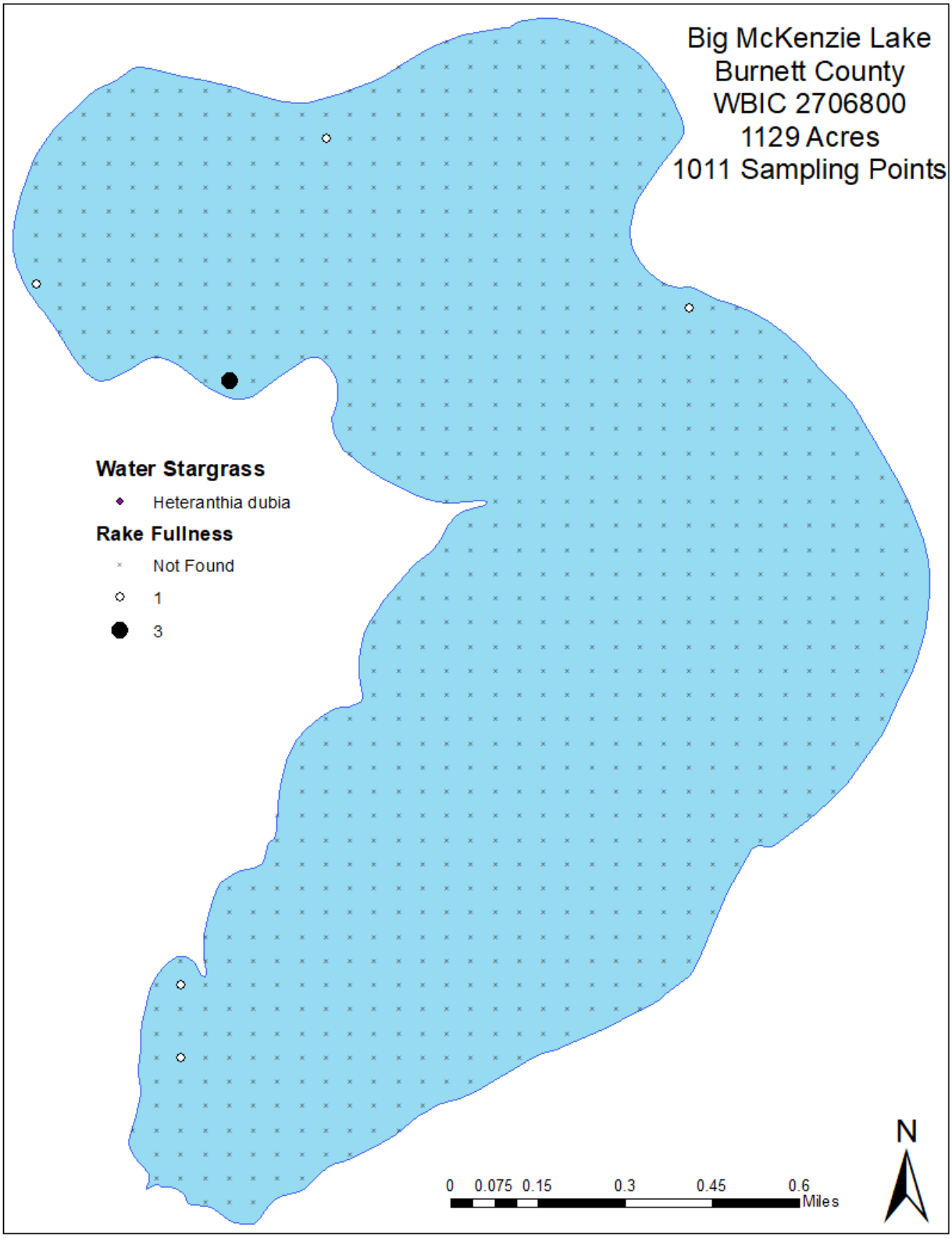

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Small waterwort
Elatine minima
Rake Fullness
Not Found
1
Visual
0 0.075 0.15 0.3 0.45 0.6
Miles
N

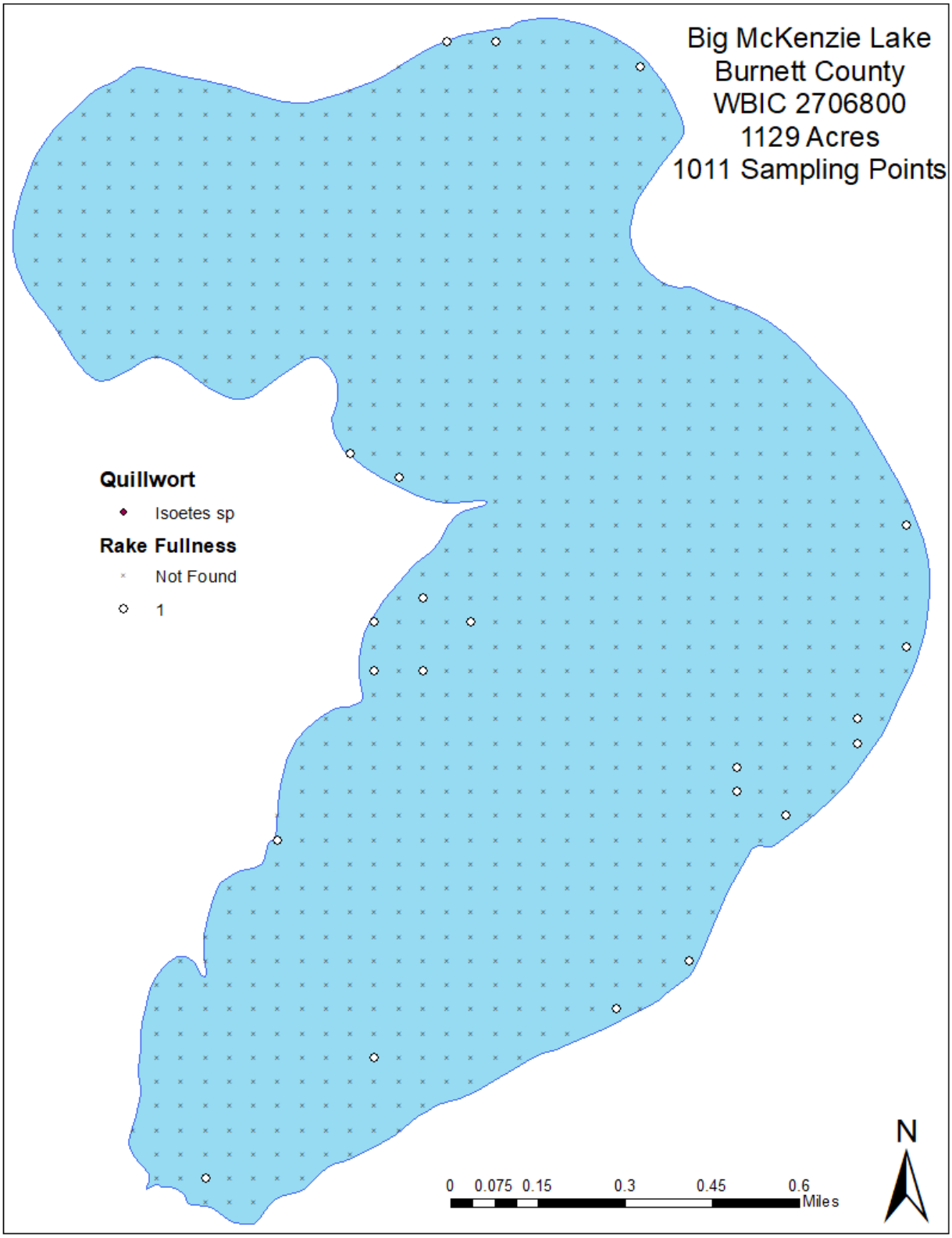

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Needle Spikerush
Eleocharis acicularis
Rake Fullness
Not Found
1
Visual
0 0.075 0.15 0.3 0.45 0.6
Miles
N

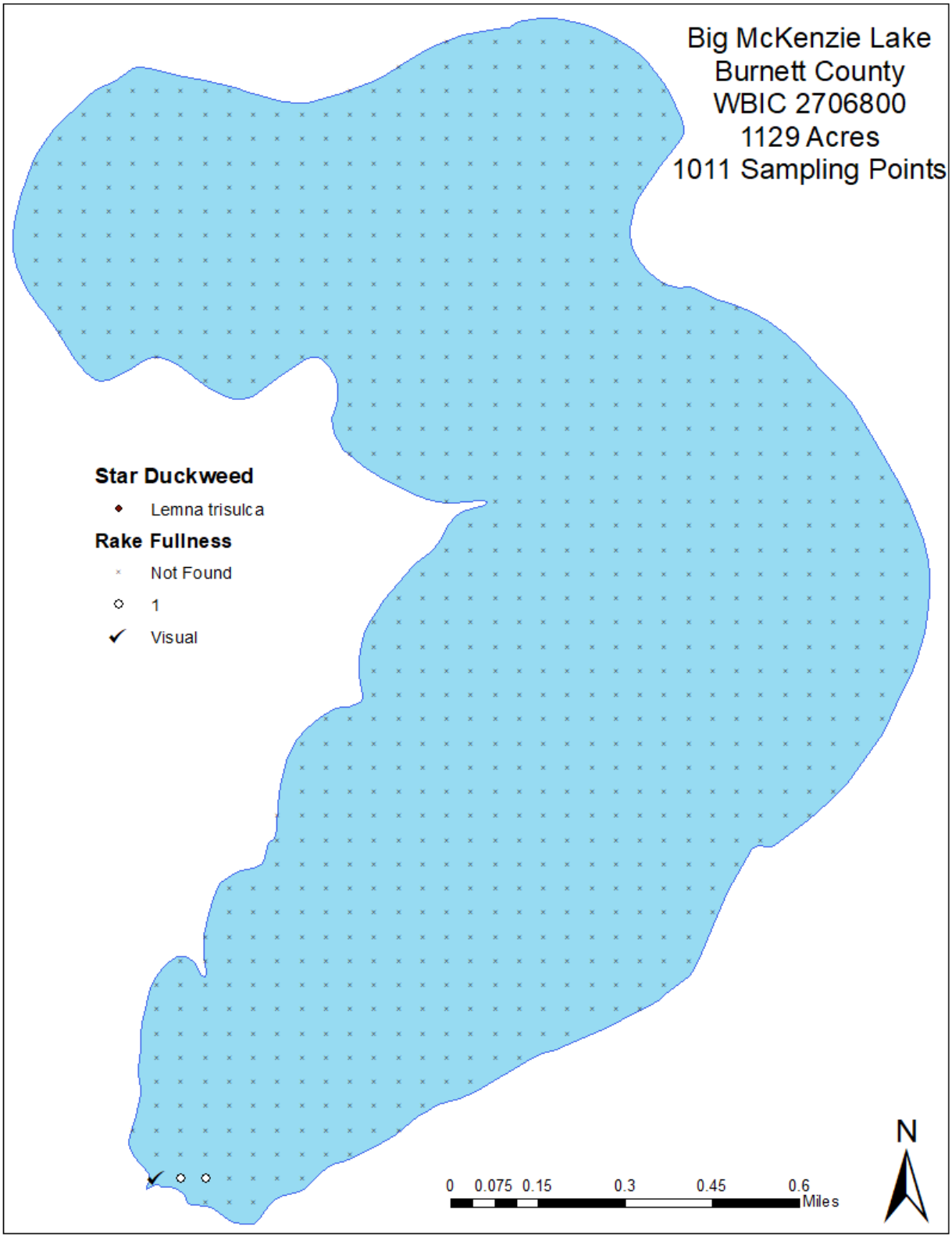

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Bald Spikerush
Eleocharis erythropoda
Rake Fullness
Not Found
1
0 0.075 0.15 0.3 0.45 0.6
Miles
N

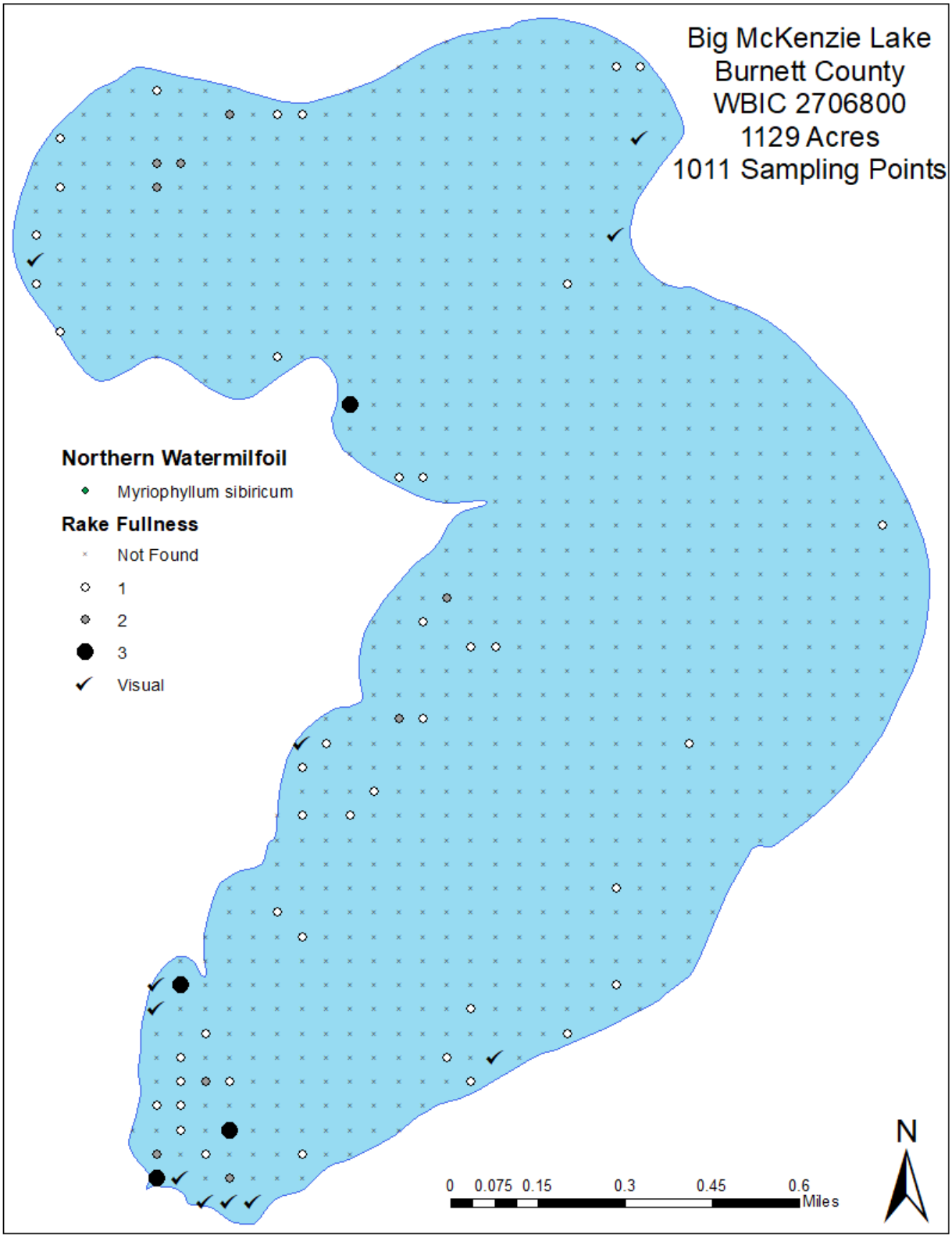

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Common Spikerush
Eleocharis palustris
Rake Fullness
Not Found
Visual
0 0.075 0.15 0.3 0.45 0.6
Miles
N

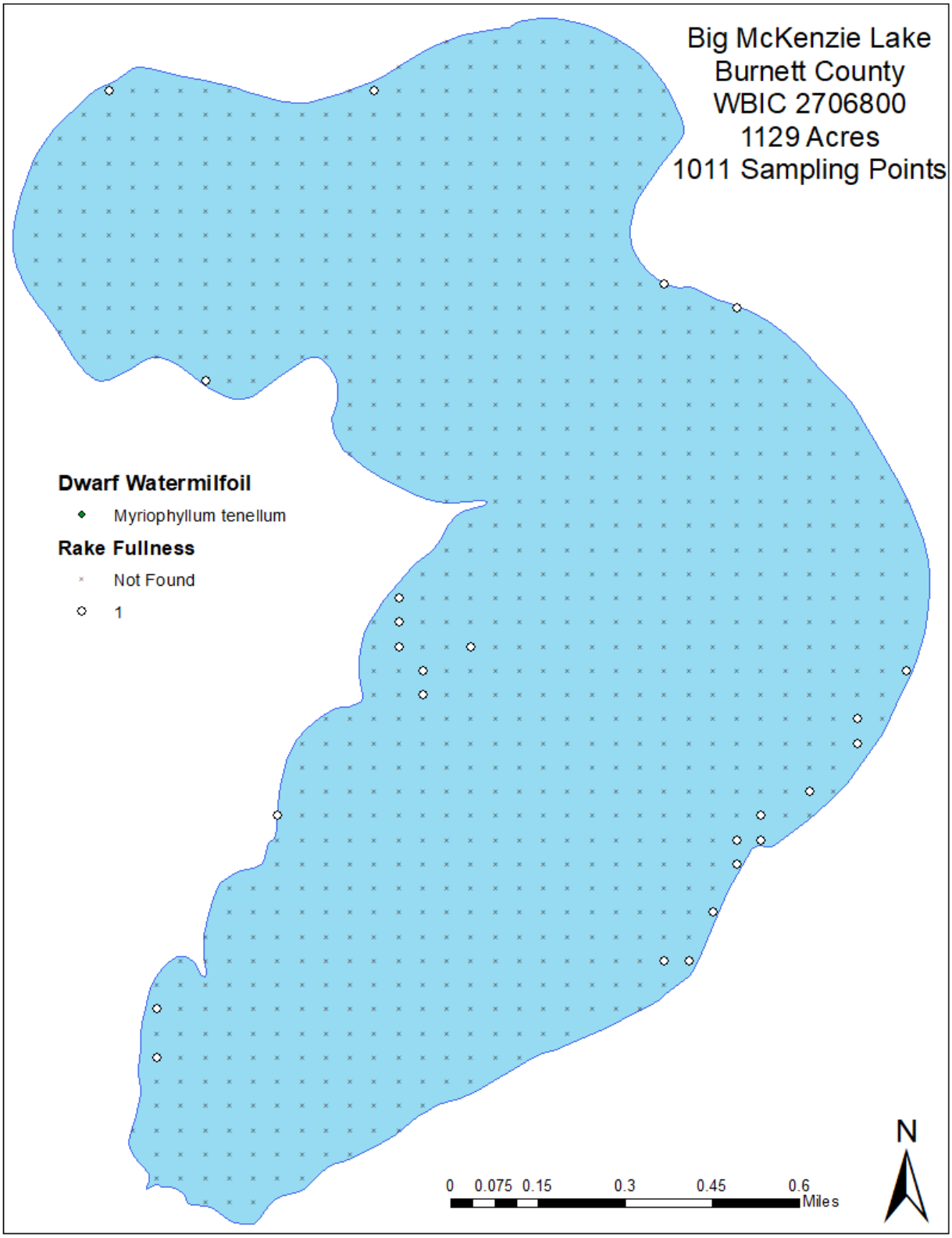

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Canada Waterweed
Elodea canadensis
Rake Fullness
Not Found
1
2
3
Visual
0 0.075 0.15 0.3 0.45 0.6
Miles
N

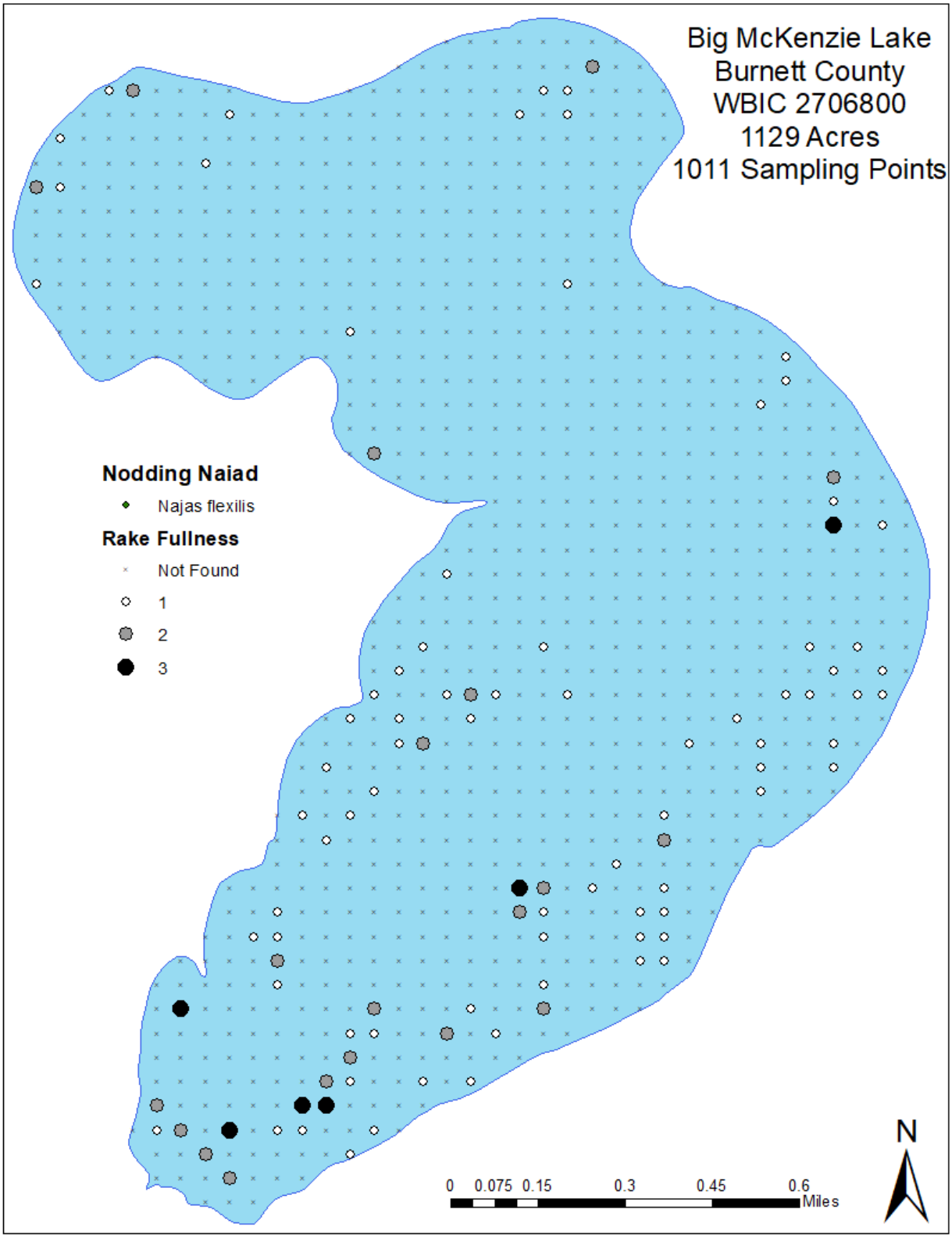

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Water Stargrass
Heteranthia dubia
Rake Fullness
Not Found
1
3
0 0.075 0.15 0.3 0.45 0.6
Miles
N

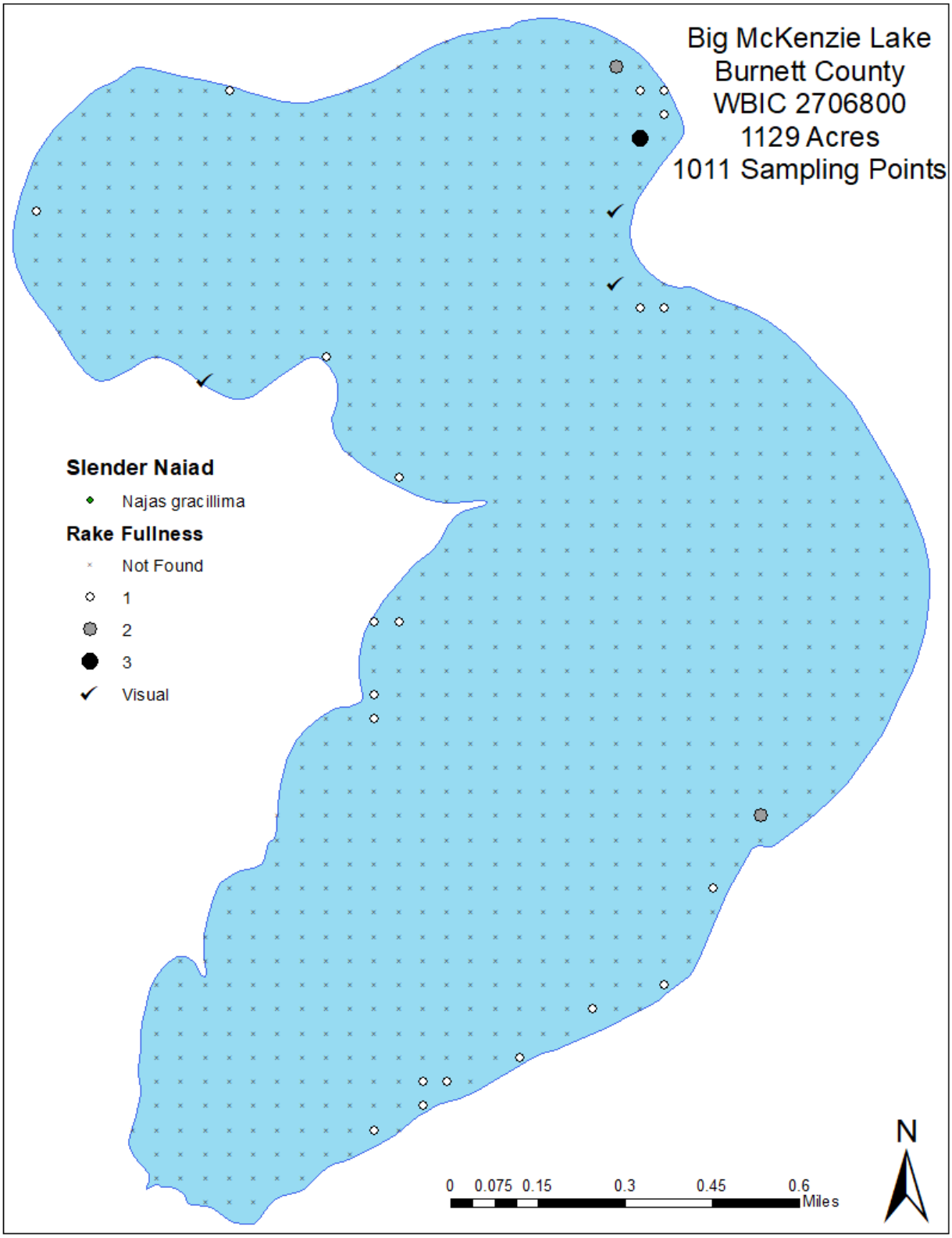

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Quillwort
Isoetes sp
Rake Fullness
Not Found
1
0 0.075 0.15 0.3 0.45 0.6
Miles
N

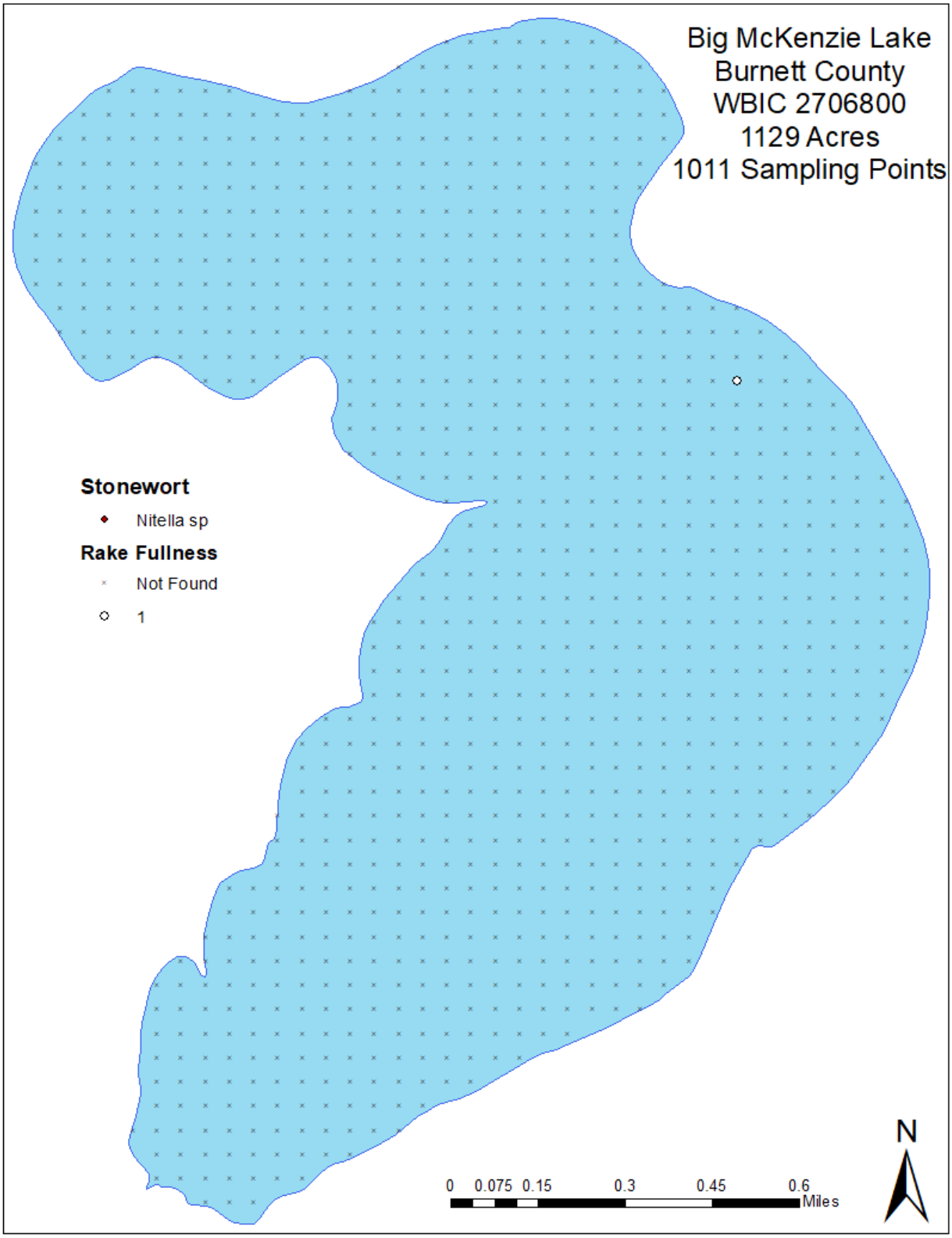

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Star Duckweed
Lemna trisulca
Rake Fullness
Not Found
1
Visual
0 0.075 0.15 0.3 0.45 0.6
Miles
N

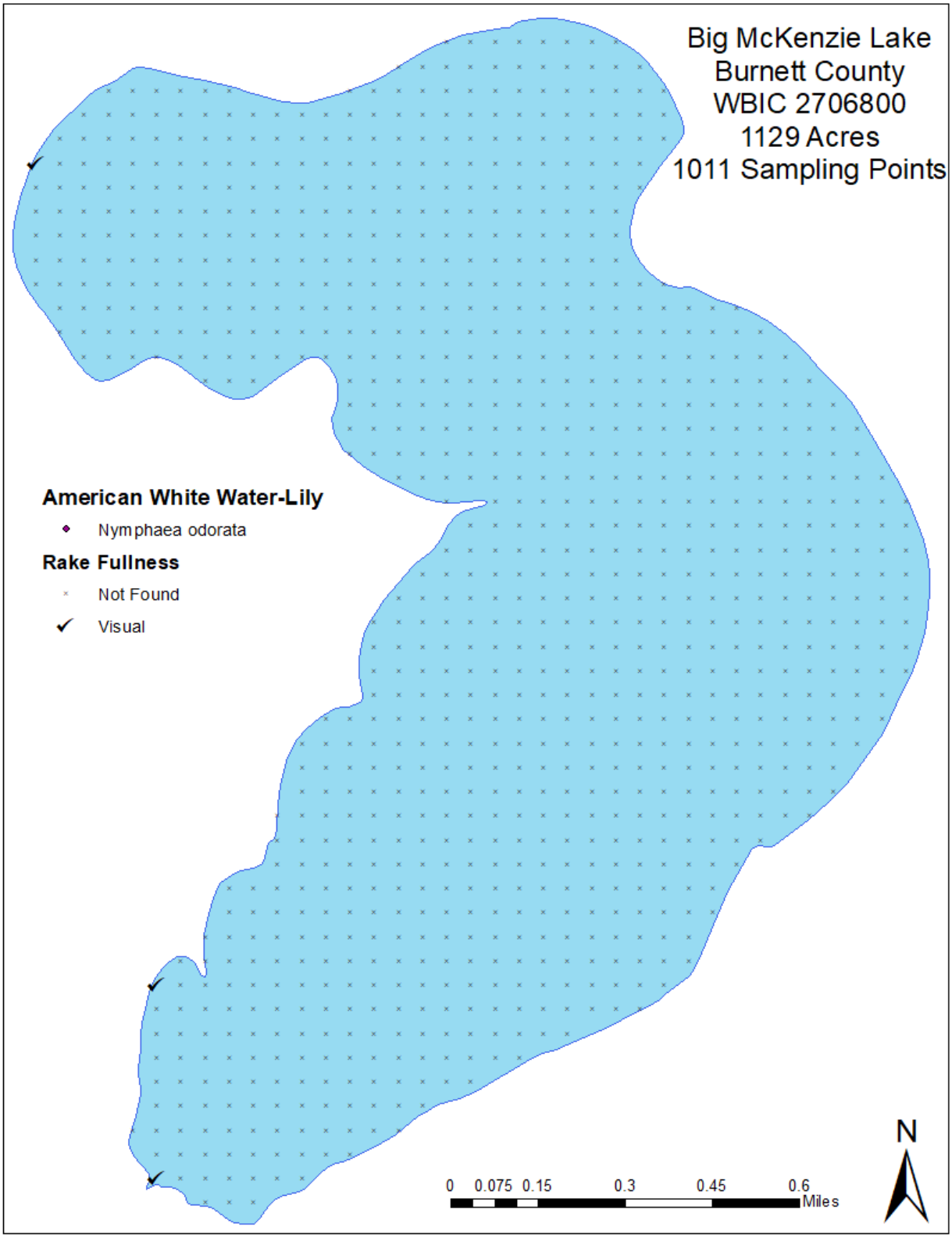

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Northern Watermilfoil
Myriophyllum sibiricum
Rake Fullness
Not Found
1
2
3
Visual
0 0.075 0.15 0.3 0.45 0.6
Miles
N

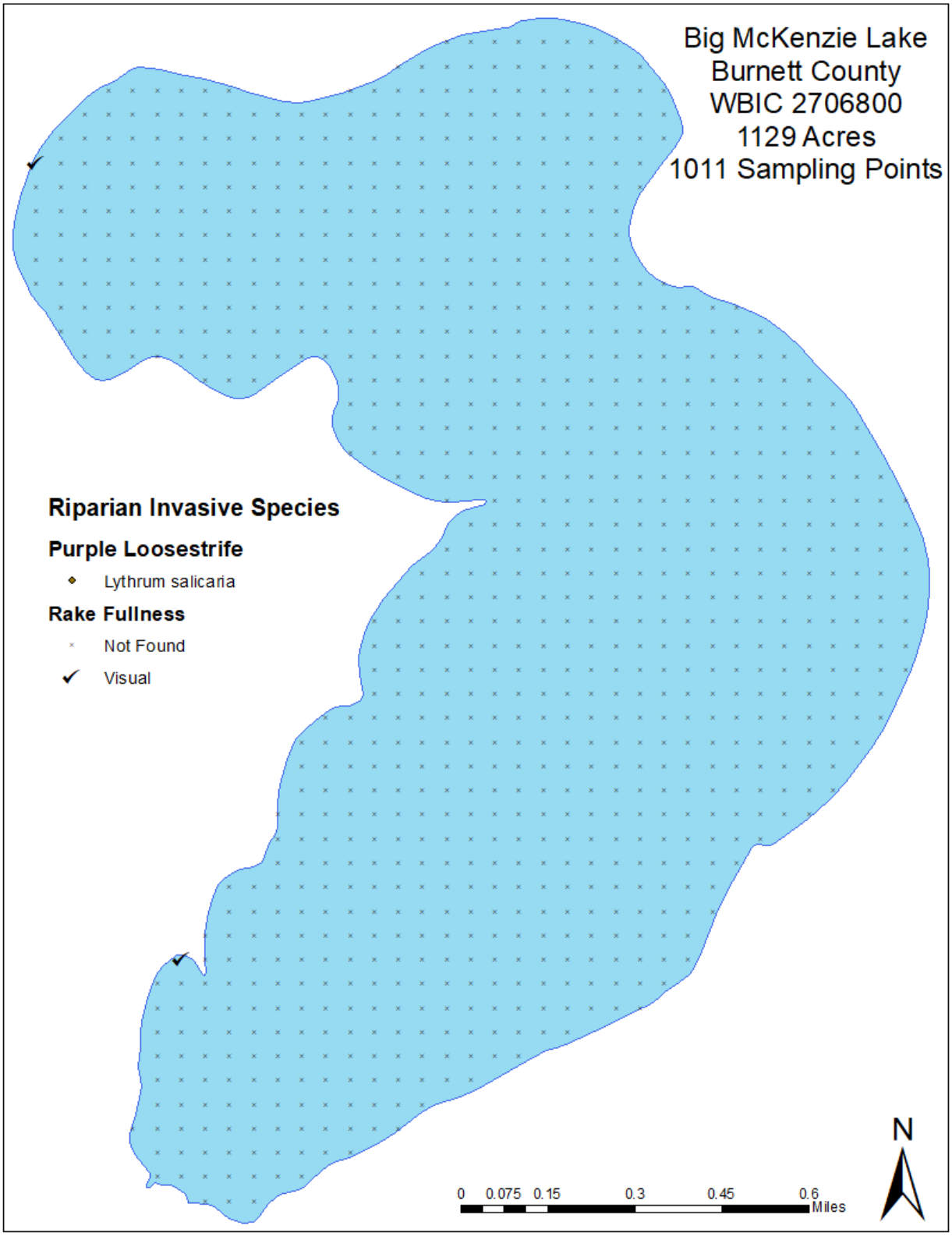

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Dwarf Watermilfoil
Myriophyllum tenellum
Rake Fullness
Not Found
1
0 0.075 0.15 0.3 0.45 0.6
Miles
N

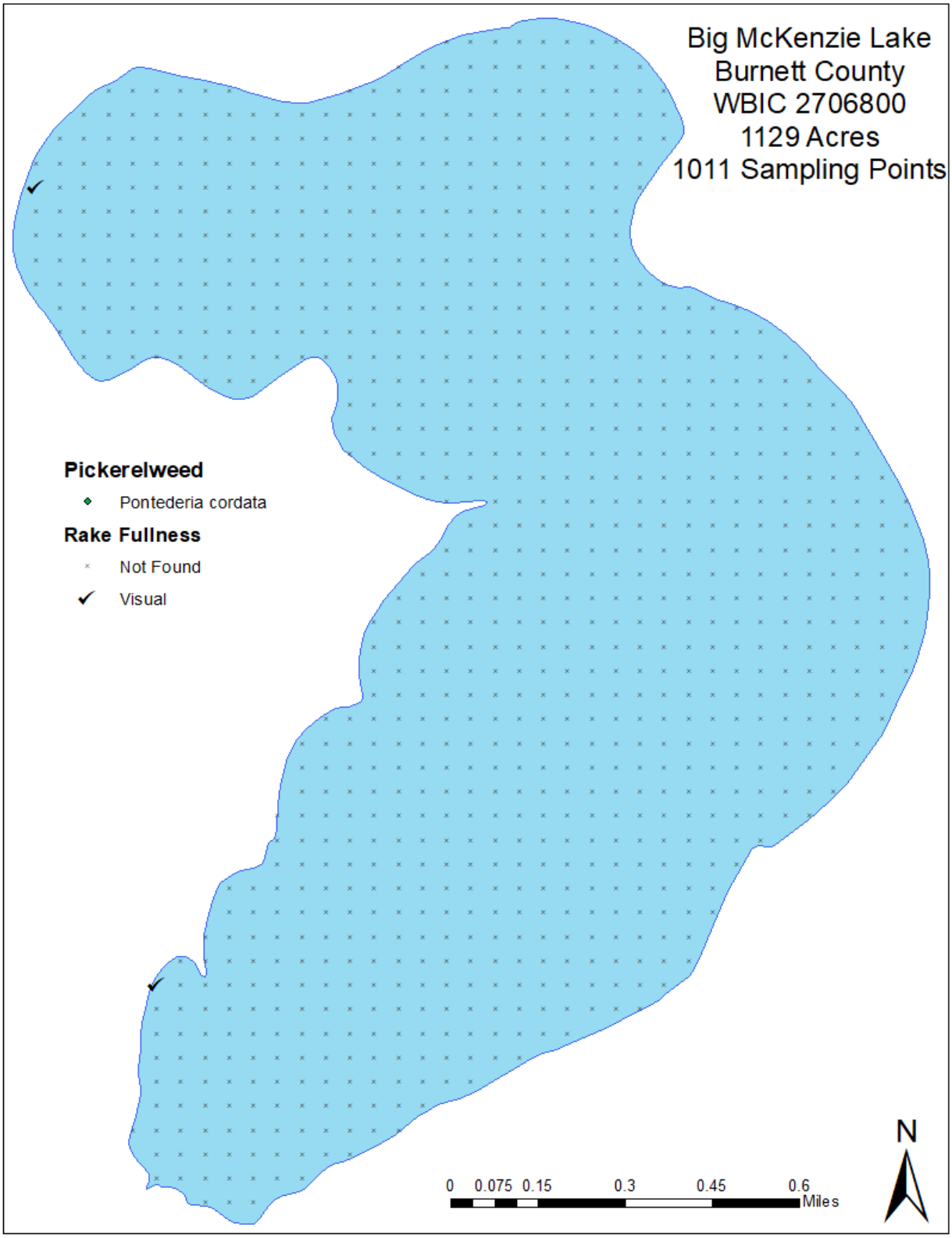

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Nodding Naiad
Najas flexilis
Rake Fullness
Not Found
1
2
3
0 0.075 0.15 0.3 0.45 0.6
Miles
N

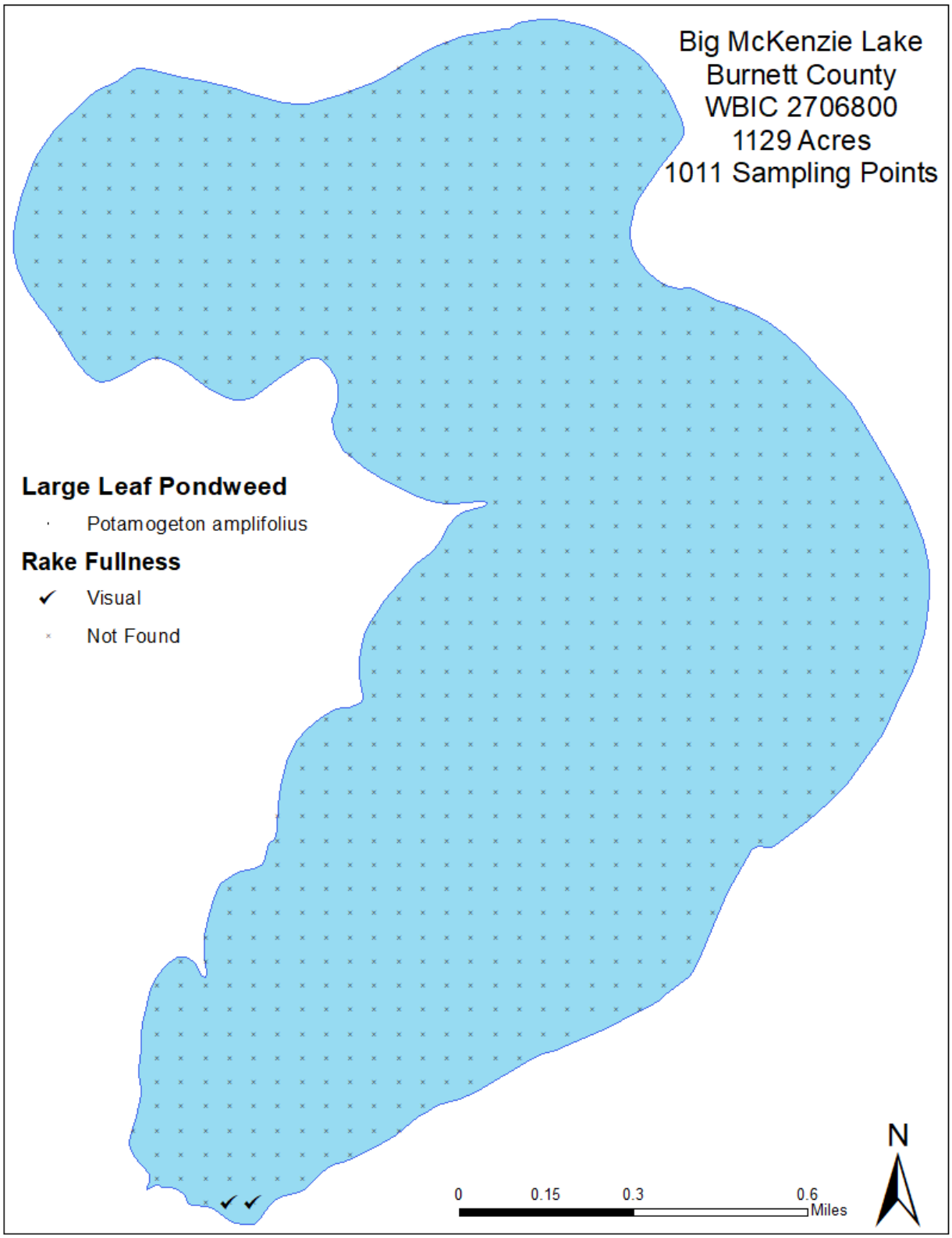

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Slender Naiad
Najas gracillima
Rake Fullness
Not Found
1
2
3
Visual
0 0.075 0.15 0.3 0.45 0.6
Miles
N

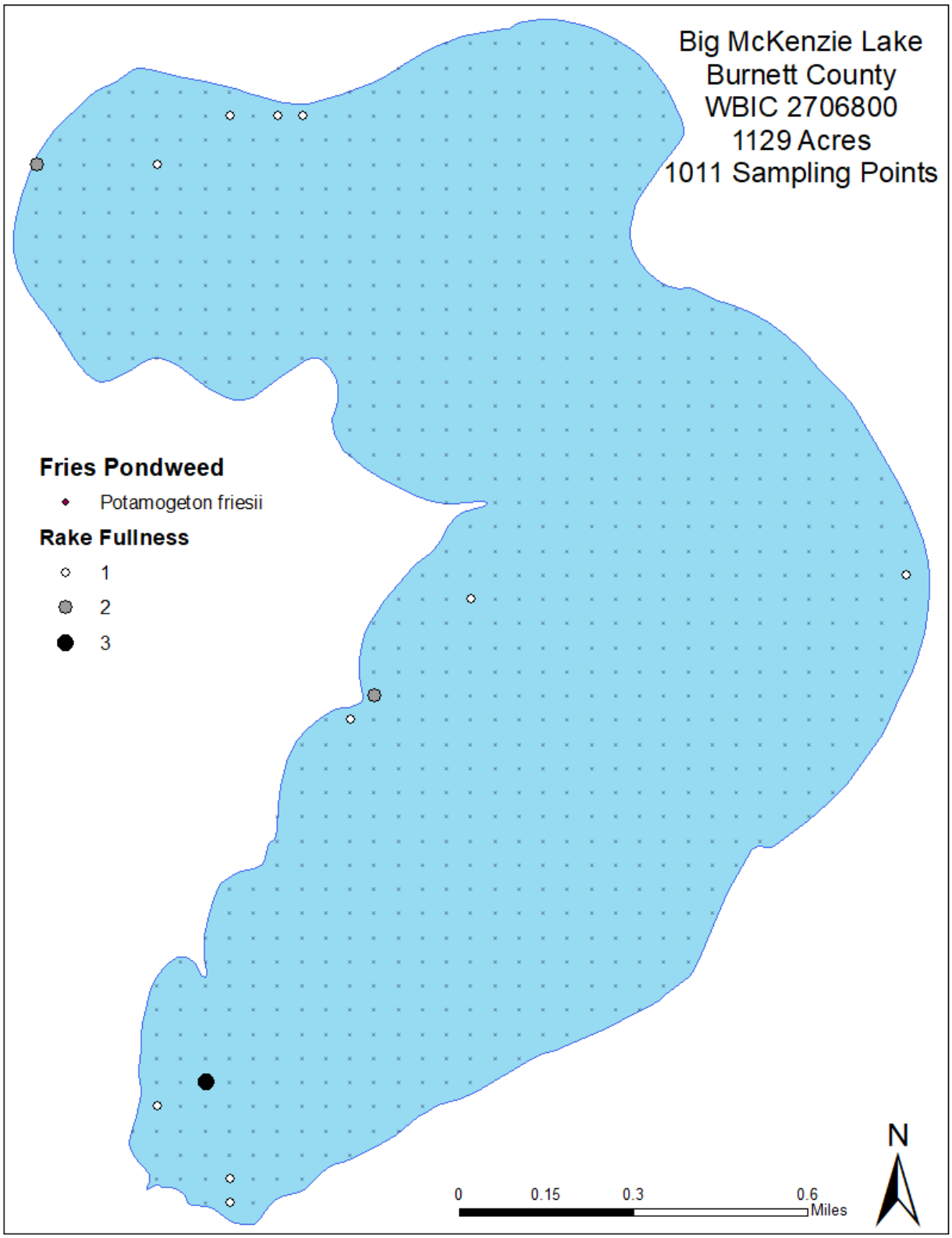

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Stonewort
Nitella sp
Rake Fullness
Not Found
1
0 0.075 0.15 0.3 0.45 0.6
Miles
N

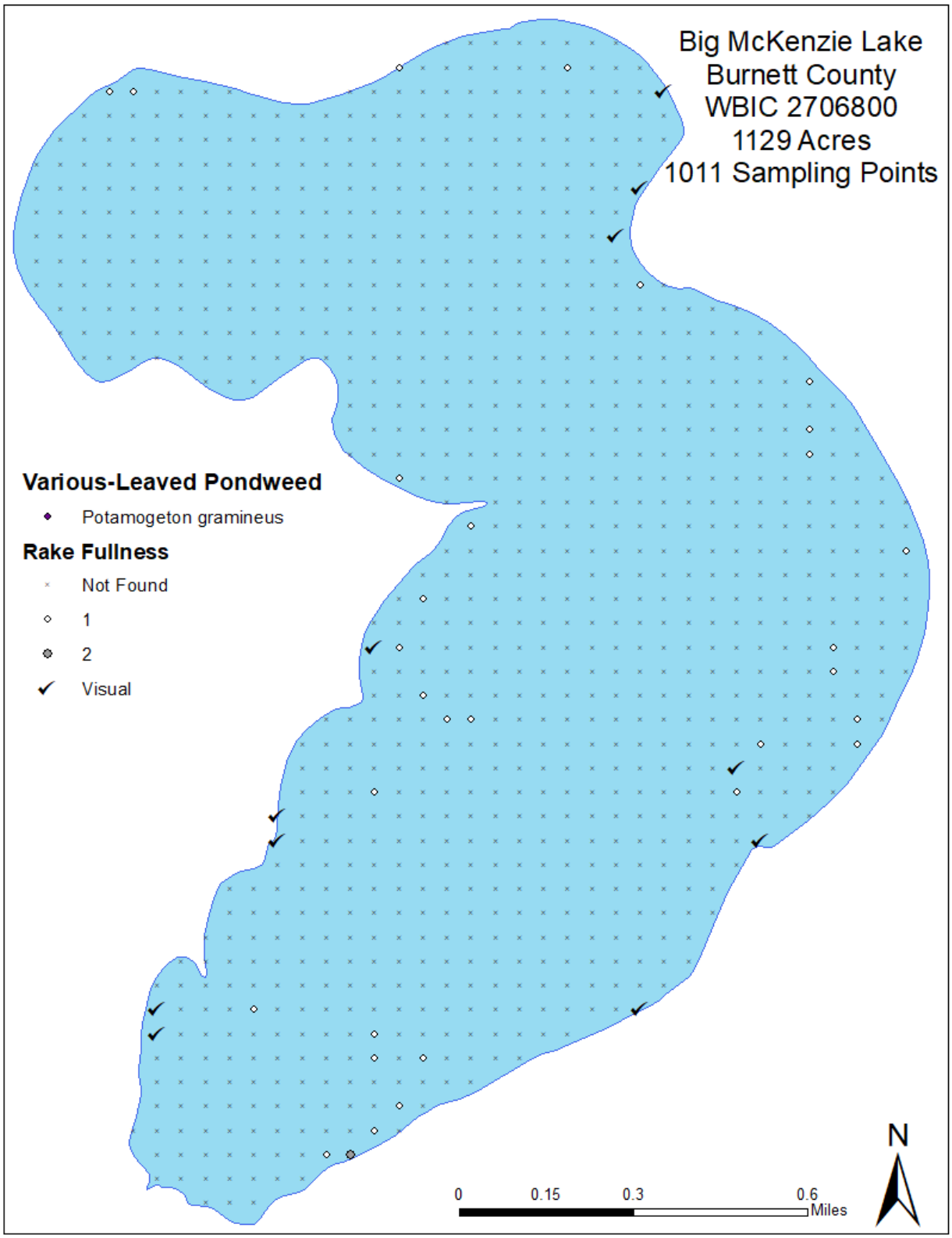

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
American White Water-Lily
Nymphaea odorata
Rake Fullness
Not Found
Visual
0 0.075 0.15 0.3 0.45 0.6
Miles
N

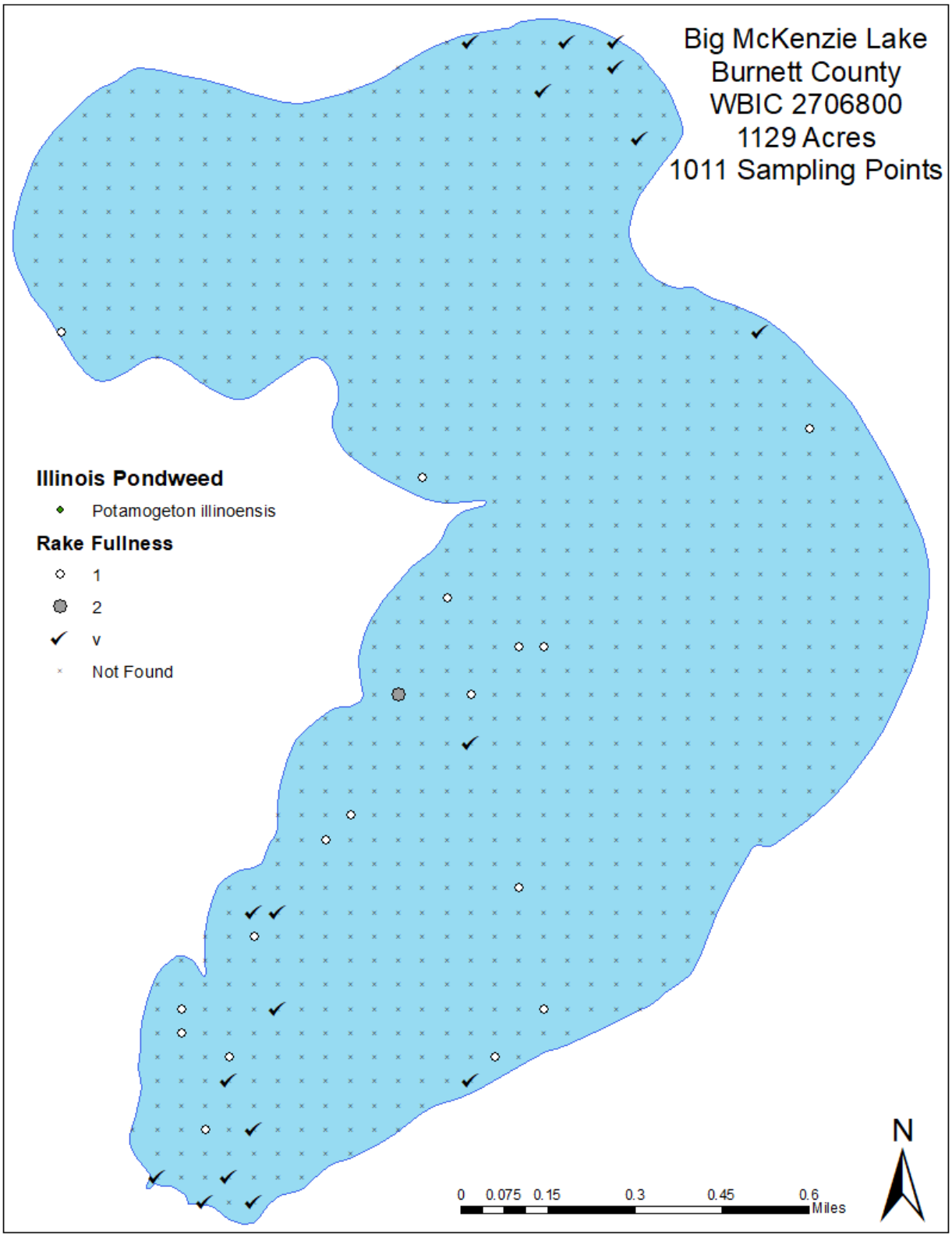

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Riparian Invasive Species
Purple Loosestrife
Lythrum salicaria
Rake Fullness
Not Found
Visual
0 0.075 0.15 0.3 0.45 0.6
Miles
N

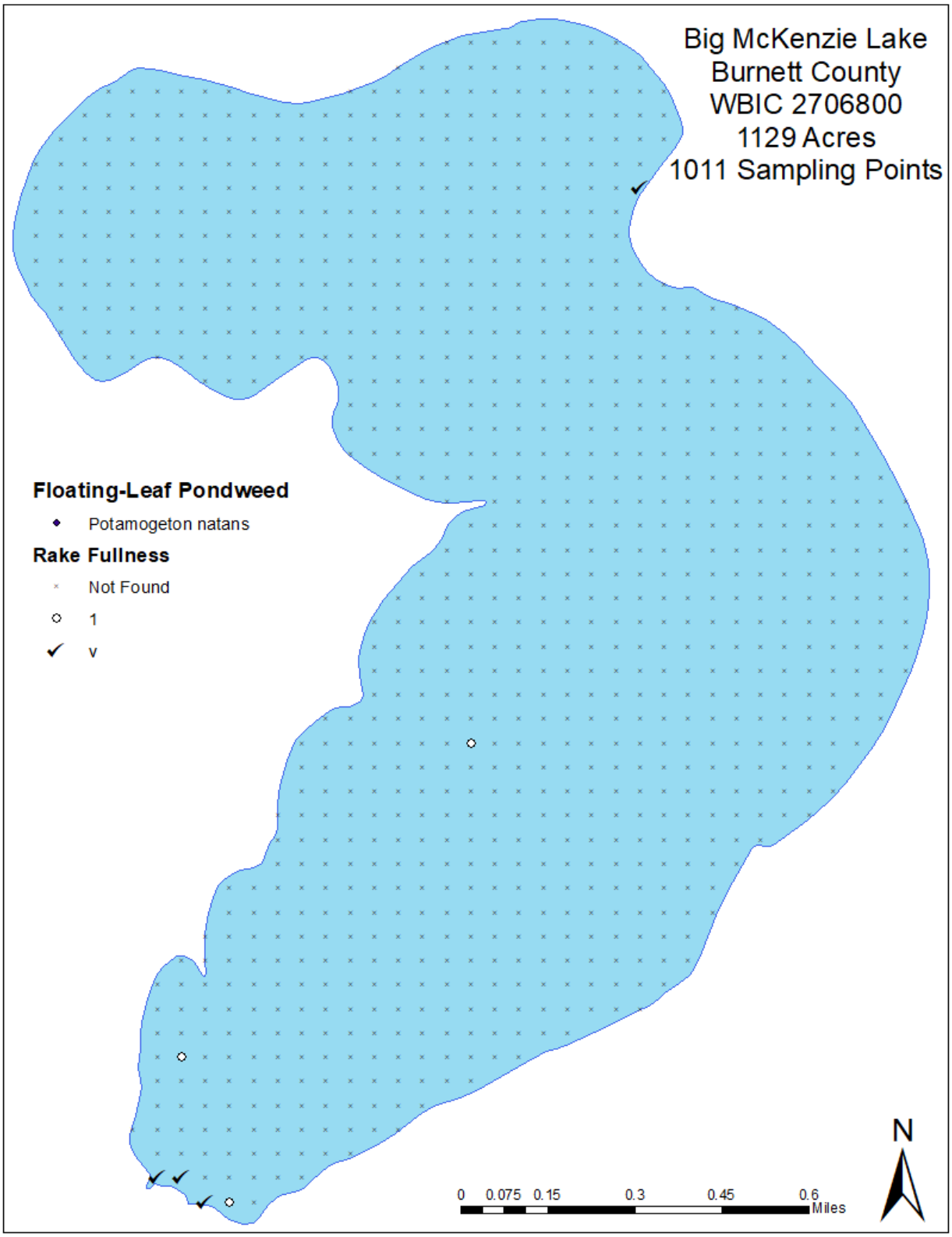

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Pickerelweed
Pontederia cordata
Rake Fullness
Not Found
Visual
0 0.075 0.15 0.3 0.45 0.6
Miles
N

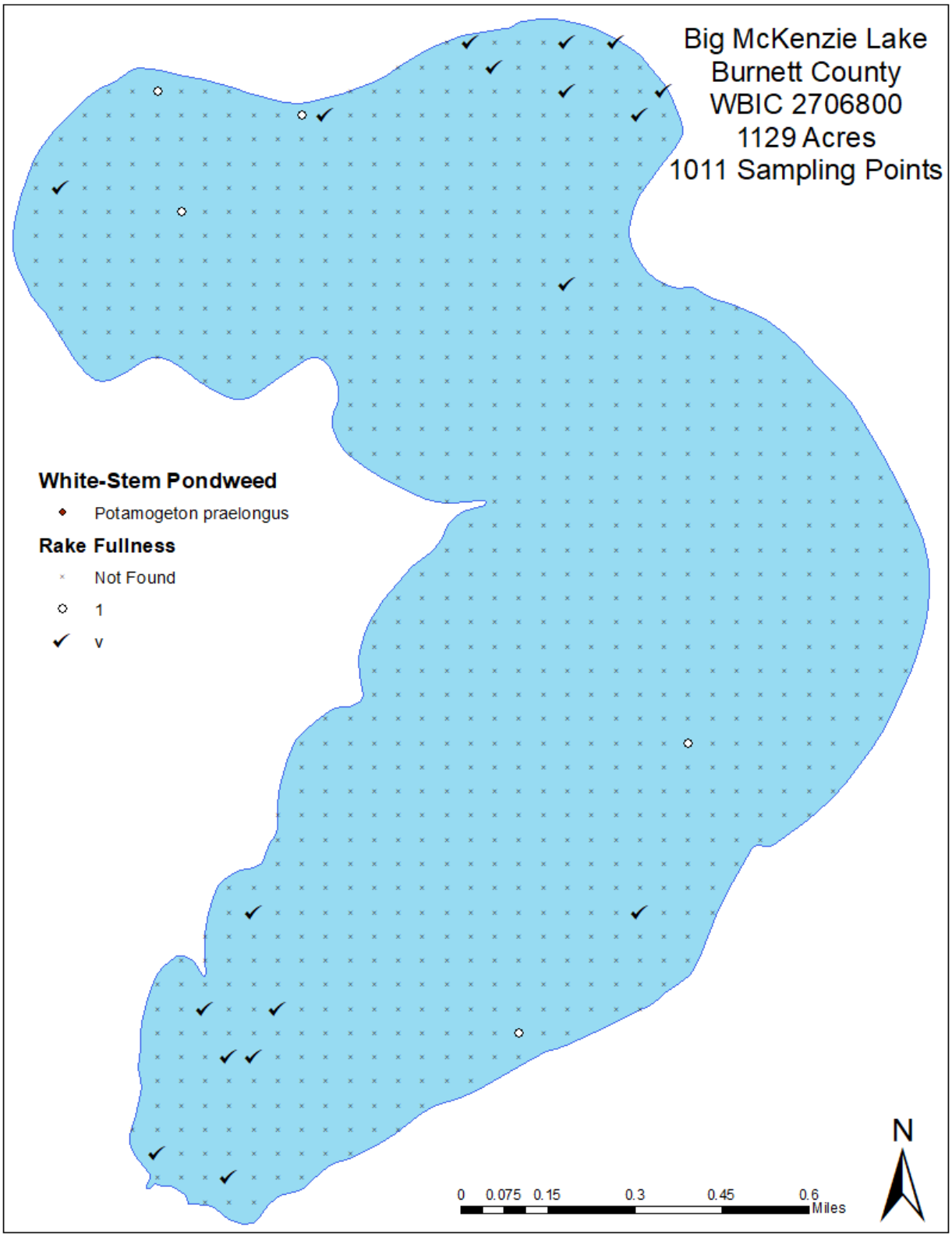

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Large Leaf Pondweed
Potamogeton amplifolius
Rake Fullness
Visual
Not Found
0
0.15
0.3
0.6
Miles
N

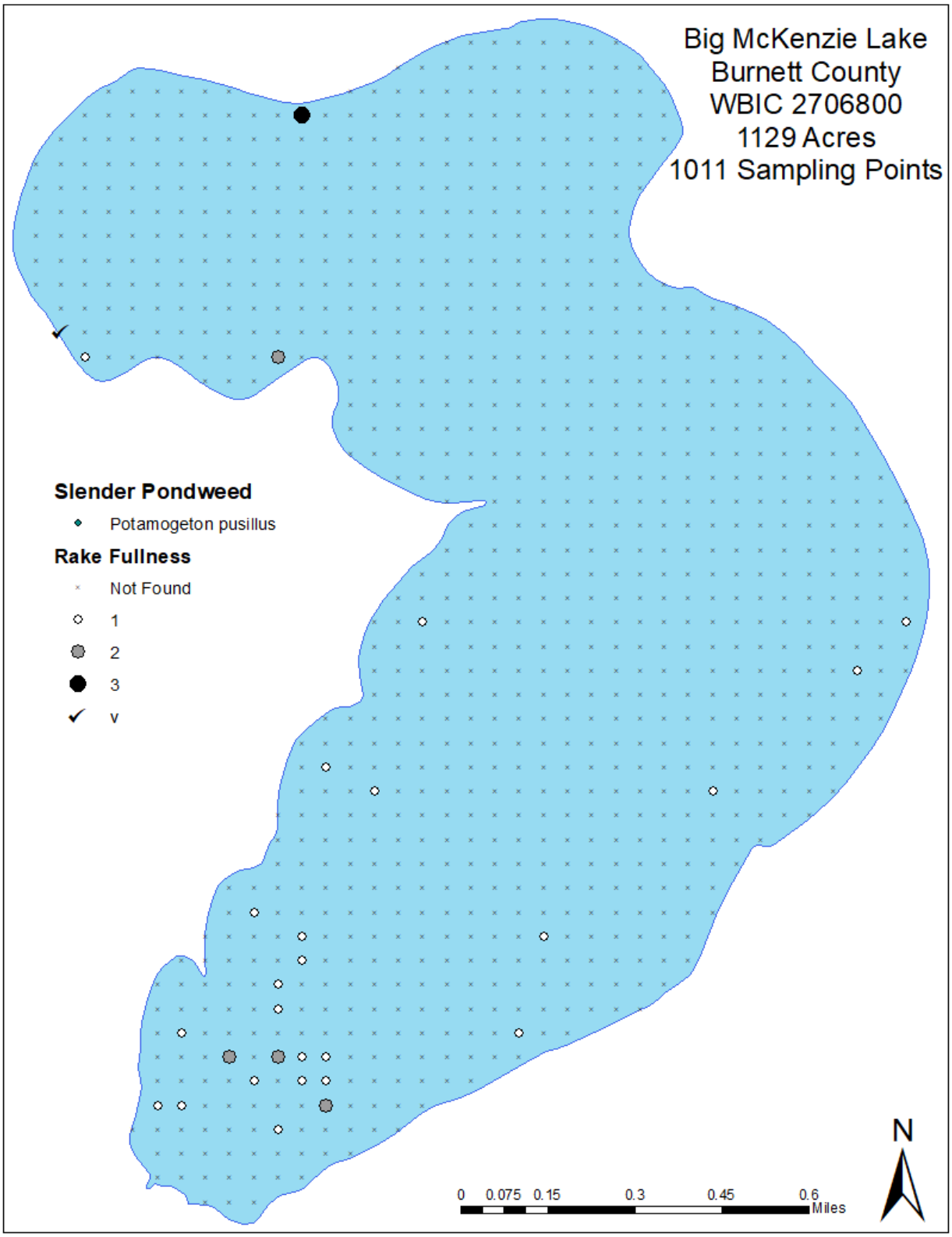

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Fries Pondweed
Potamogeton friesii
Rake Fullness
1
2
3
0
0.15
0.3
0.6
Miles
N

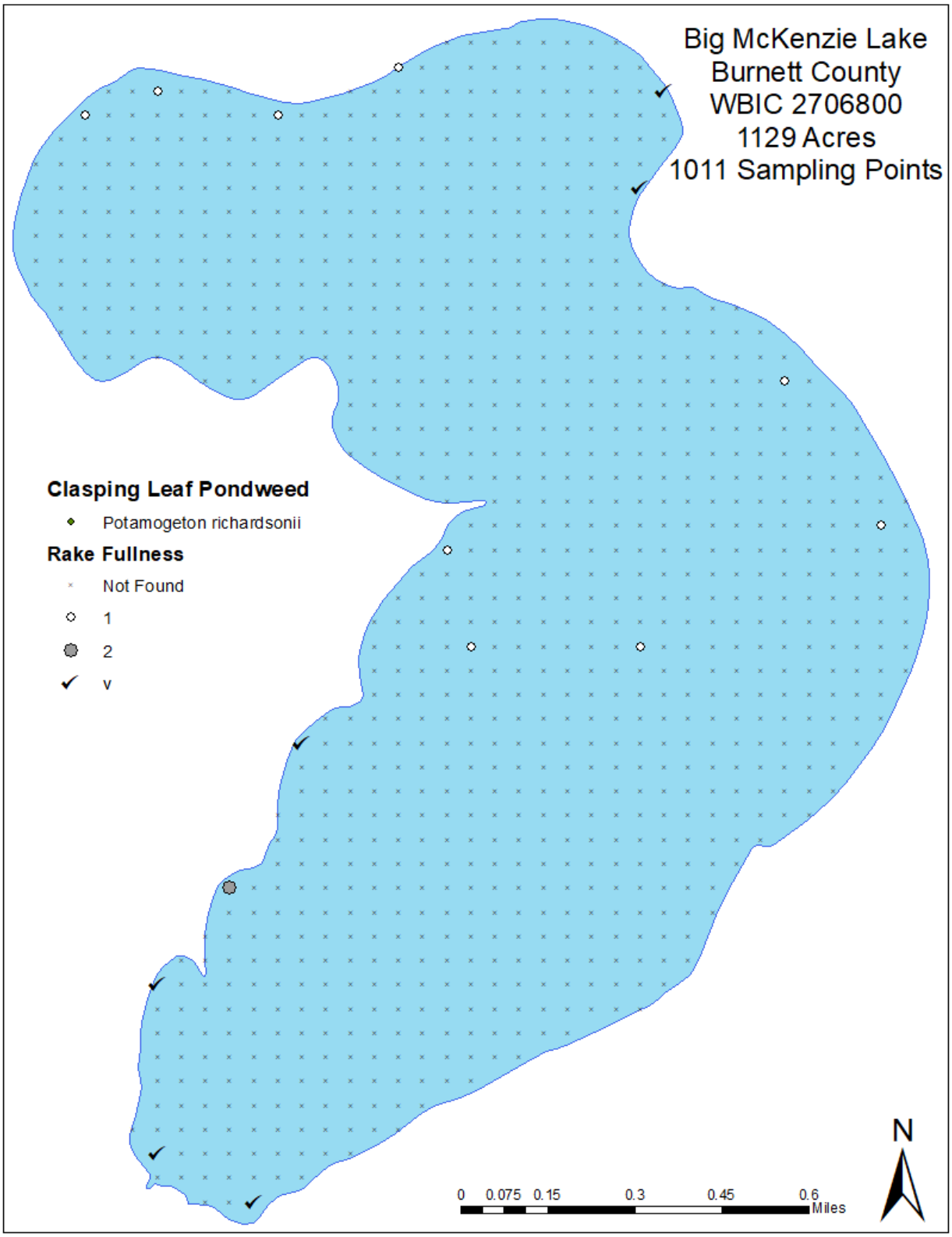

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Various-Leaved Pondweed
Potamogeton gramineus
Rake Fullness
Not Found
1
2
Visual
N
0
0.15
0.3
0.6
Miles

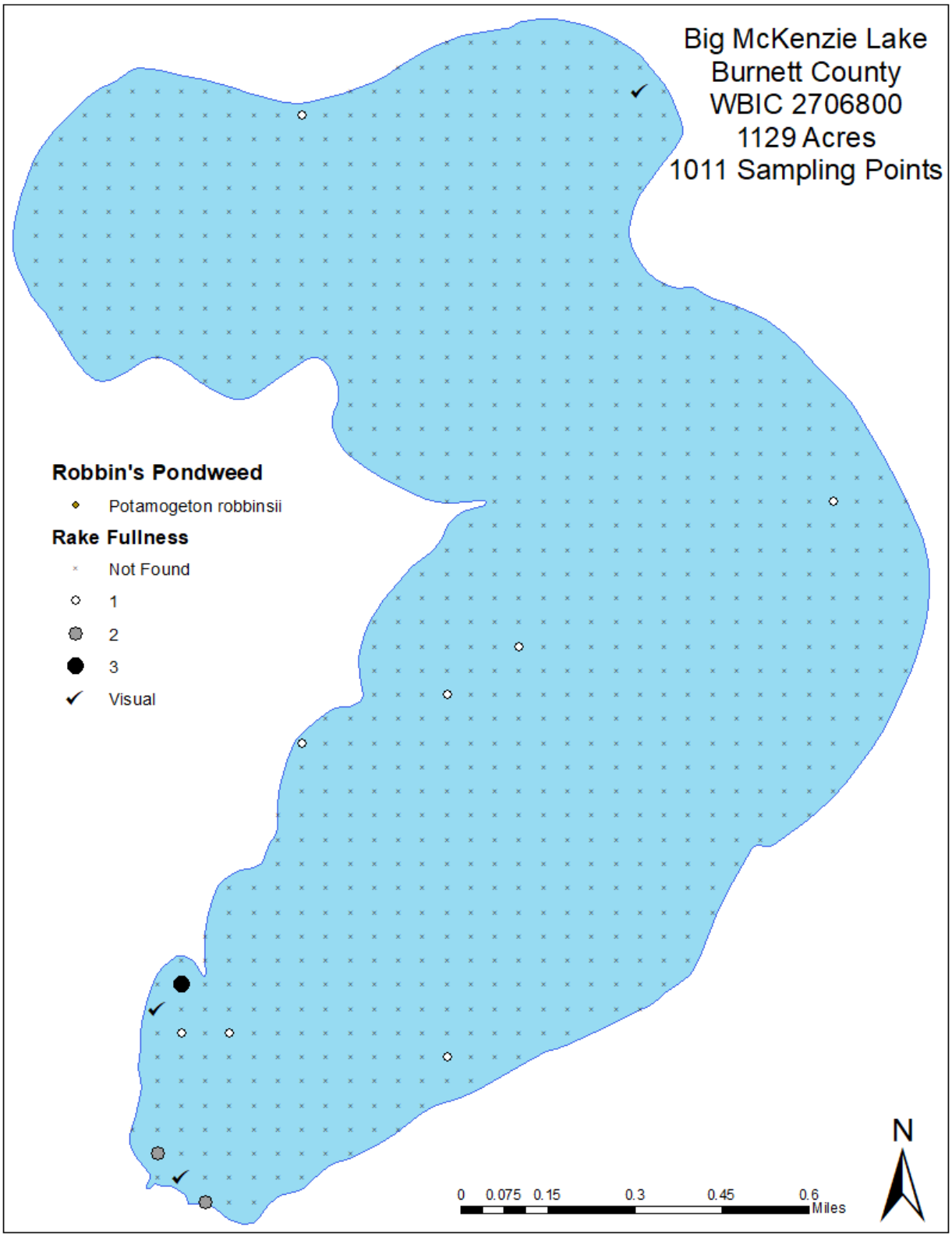

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Illinois Pondweed
Potamogeton illinoensis
Rake Fullness
1
2
v
Not Found
N
0 0.075 0.15 0.3 0.45 0.6
Miles

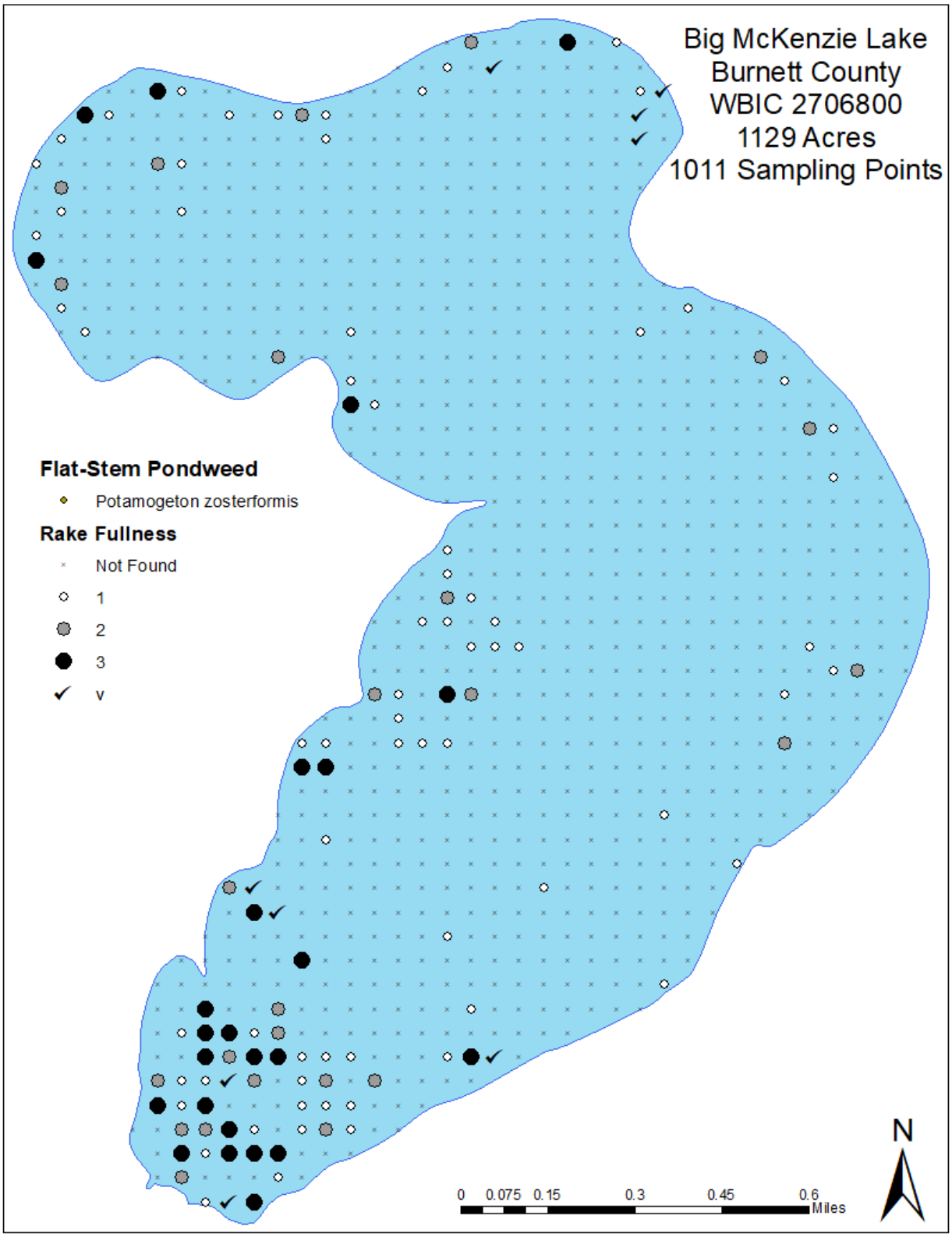

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Floating-Leaf Pondweed
Potamogeton natans
Rake Fullness
Not Found
1
v
N
0 0.075 0.15 0.3 0.45 0.6
Miles

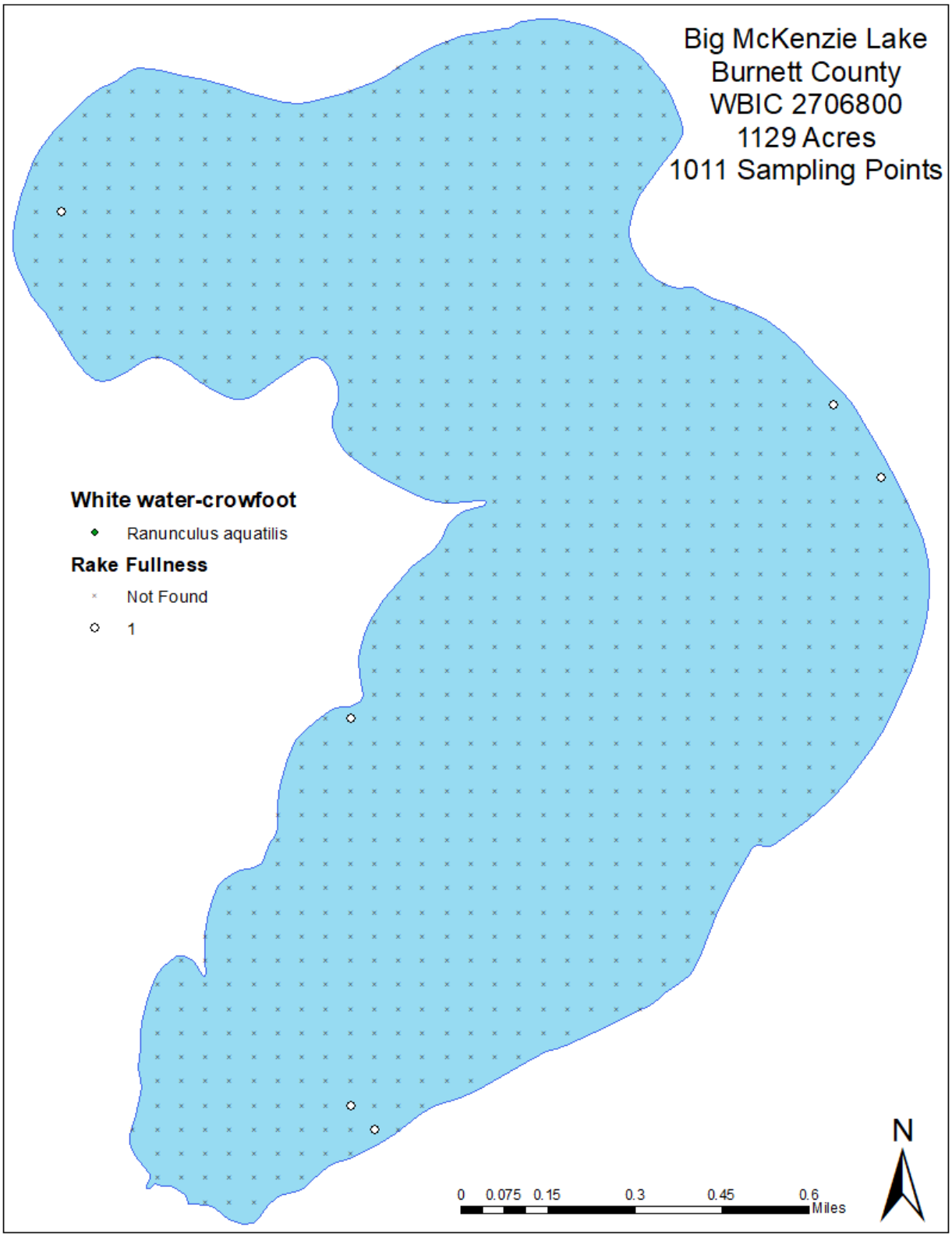

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
White-Stem Pondweed
Potamogeton praelongus
Rake Fullness
Not Found
1
v
N
0 0.075 0.15 0.3 0.45 0.6
Miles

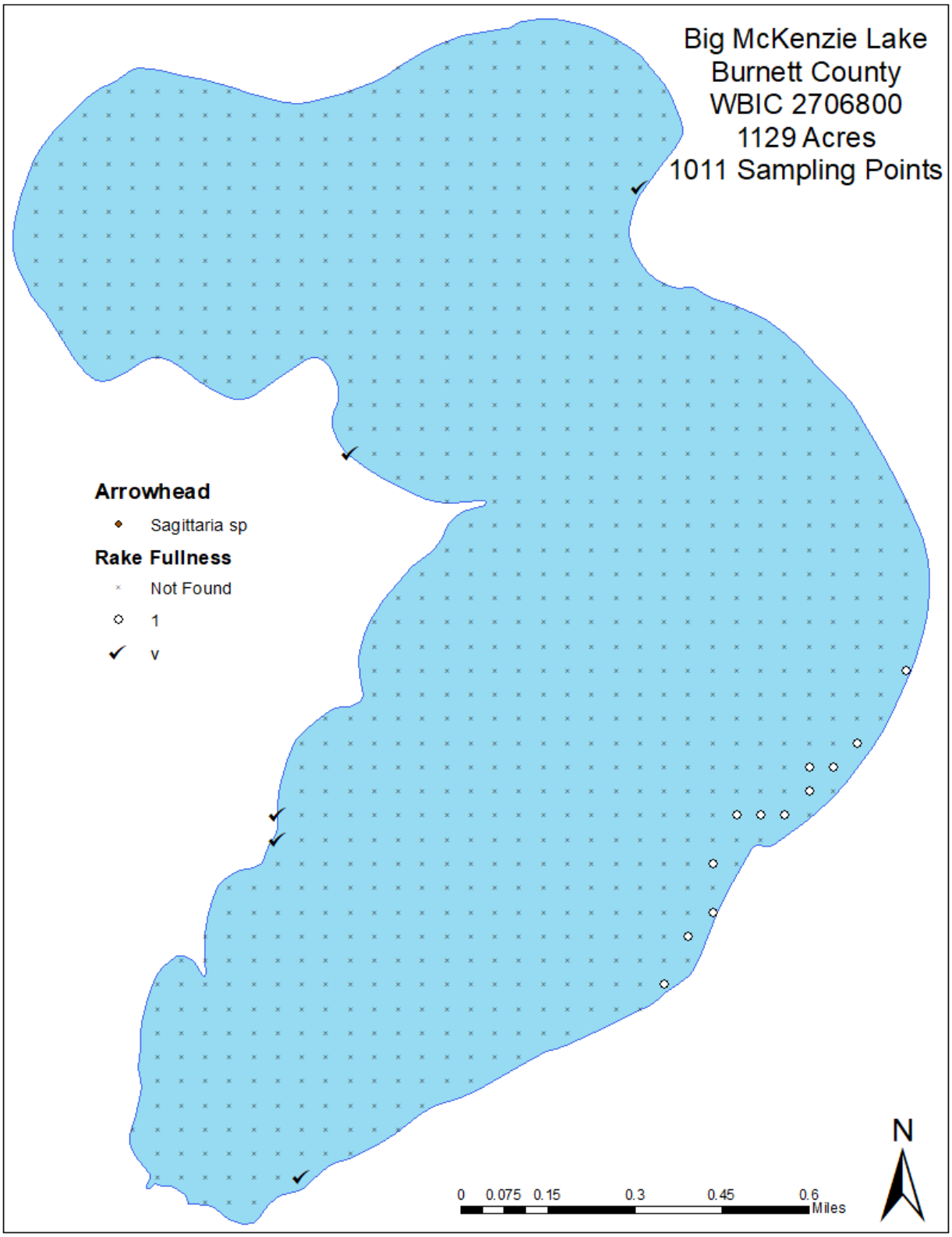

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Slender Pondweed
Potamogeton pusillus
Rake Fullness
Not Found
1
2
3
v
N
0 0.075 0.15 0.3 0.45 0.6
Miles

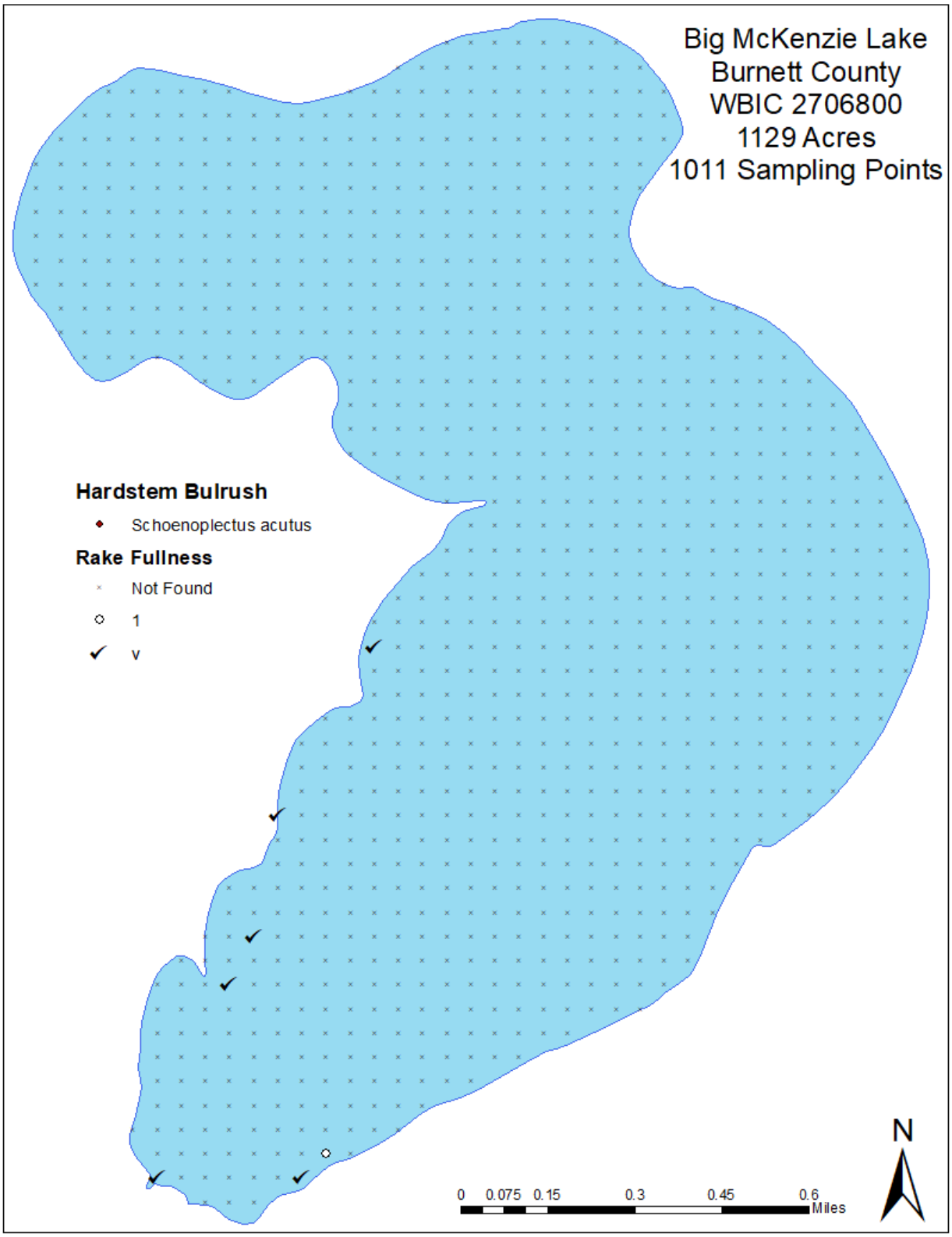

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Clasping Leaf Pondweed
Potamogeton richardsonii
Rake Fullness
Not Found
1
2
v
N
0 0.075 0.15 0.3 0.45 0.6
Miles

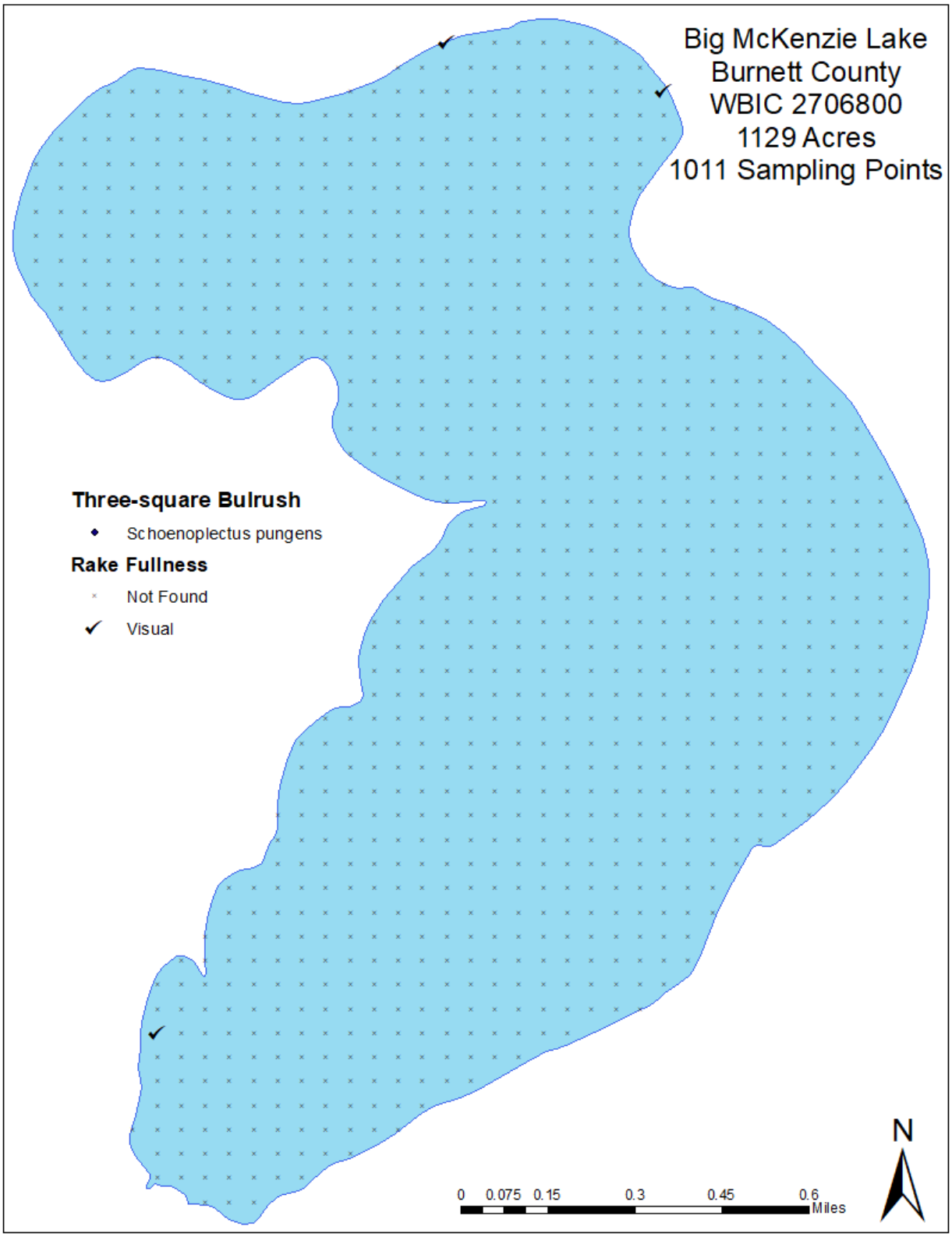

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Robbin's Pondweed
Potamogeton robbinsii
Rake Fullness
Not Found
1
2
3
Visual
0 0.075 0.15 0.3 0.45 0.6
Miles
N

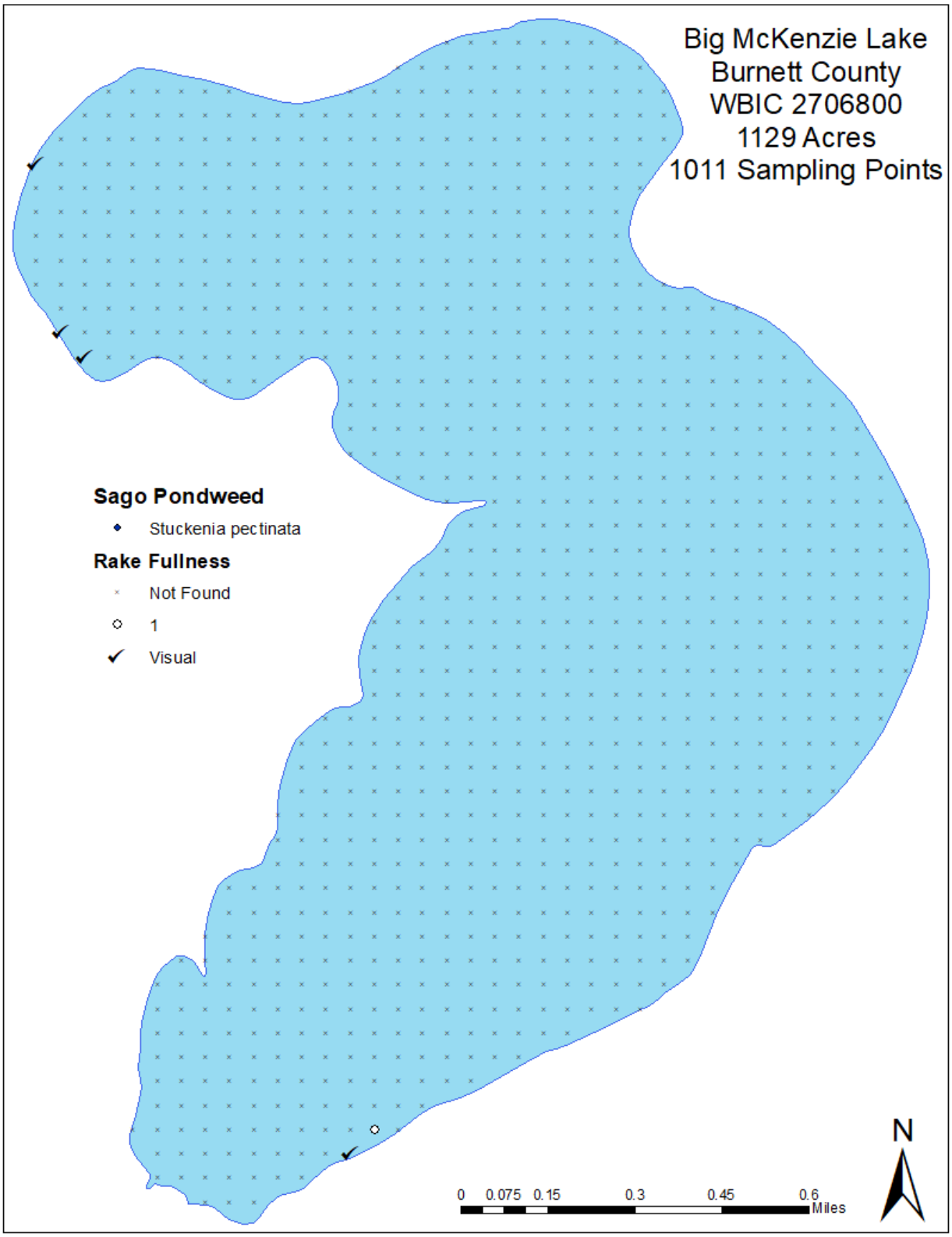

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Flat-Stem Pondweed
Potamogeton zosterformis
Rake Fullness
Not Found
1
2
3
v
N
0 0.075 0.15 0.3 0.45 0.6
Miles

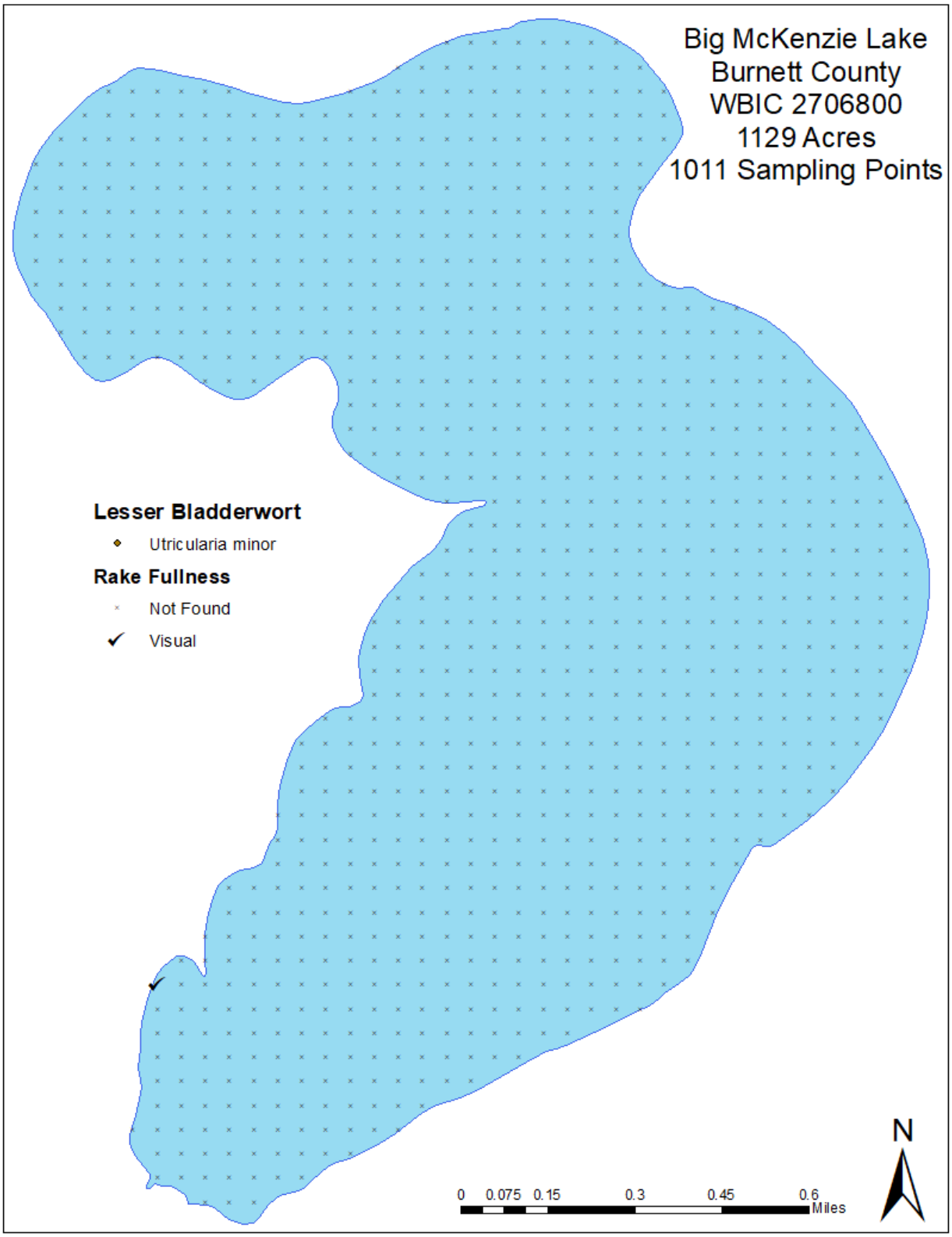

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
White water-crowfoot
Ranunculus aquatilis
Rake Fullness
Not Found
1
N
0 0.075 0.15 0.3 0.45 0.6
Miles

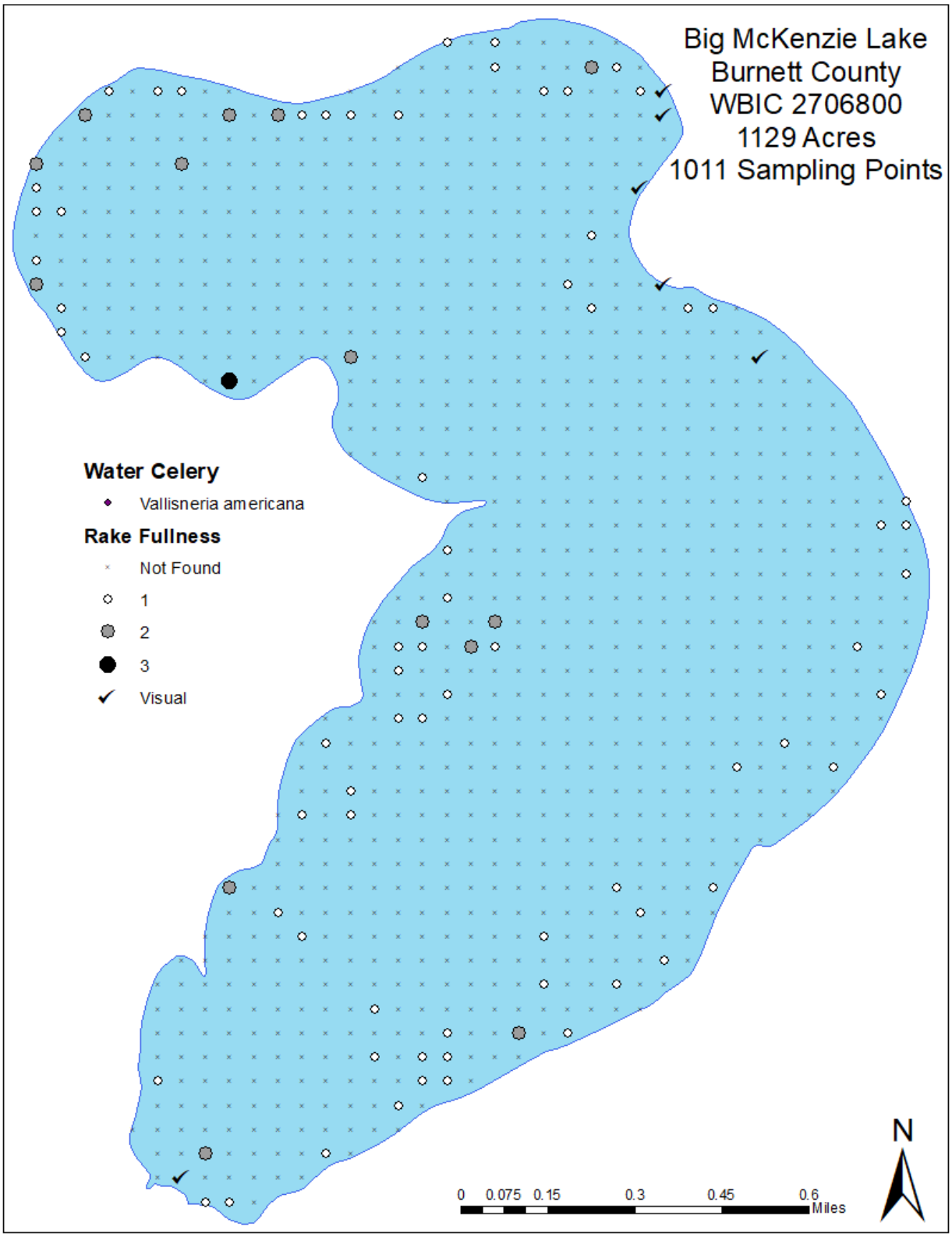

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Arrowhead
Sagittaria sp
Rake Fullness
Not Found
1
v
N
0 0.075 0.15 0.3 0.45 0.6
Miles

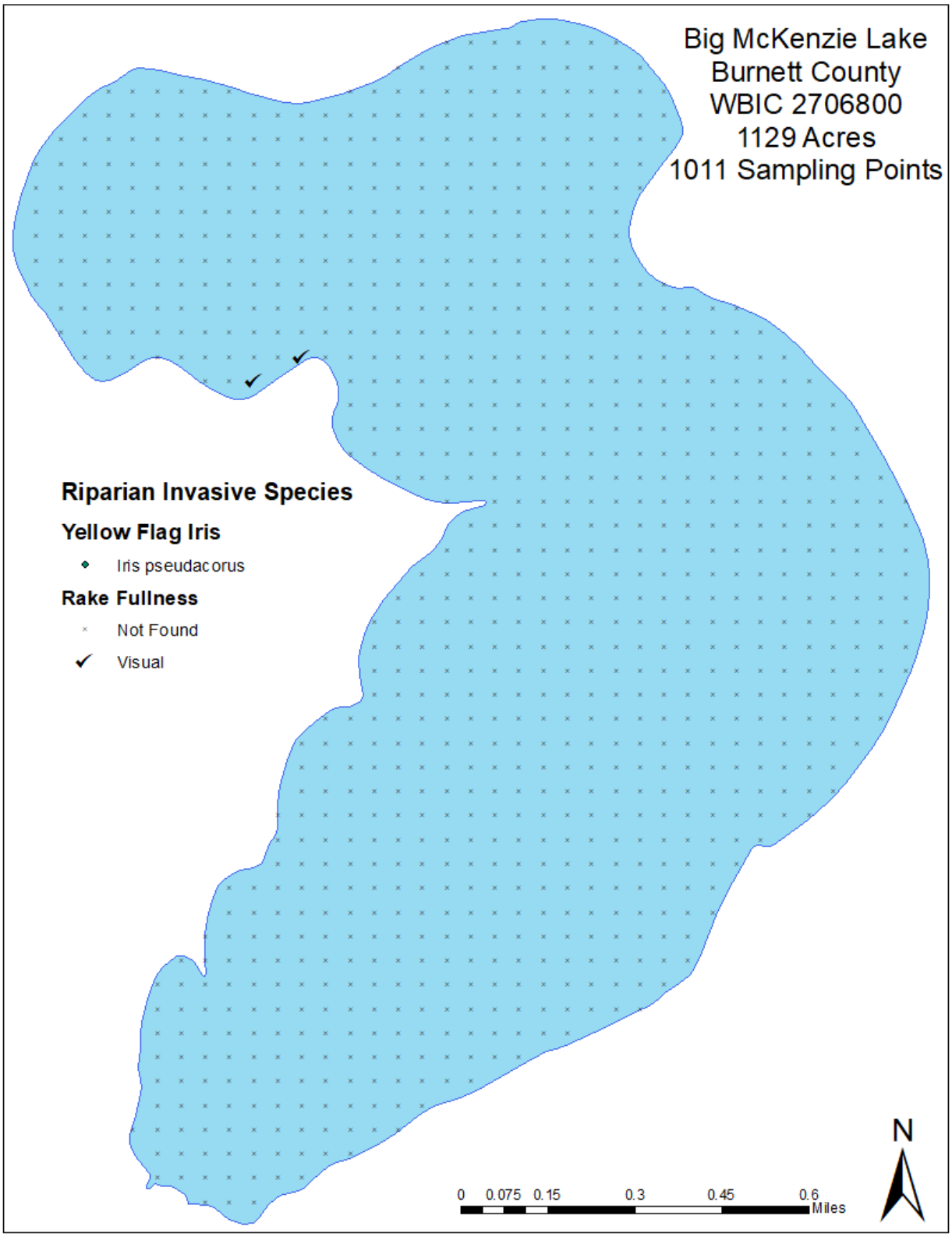

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Hardstem Bulrush
Schoenoplectus acutus
Rake Fullness
Not Found
1
v
N
0 0.075 0.15 0.3 0.45 0.6
Miles


Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Three-square Bulrush
Schoenoplectus pungens
Rake Fullness
Not Found
Visual
N
0 0.075 0.15 0.3 0.45 0.6
Miles

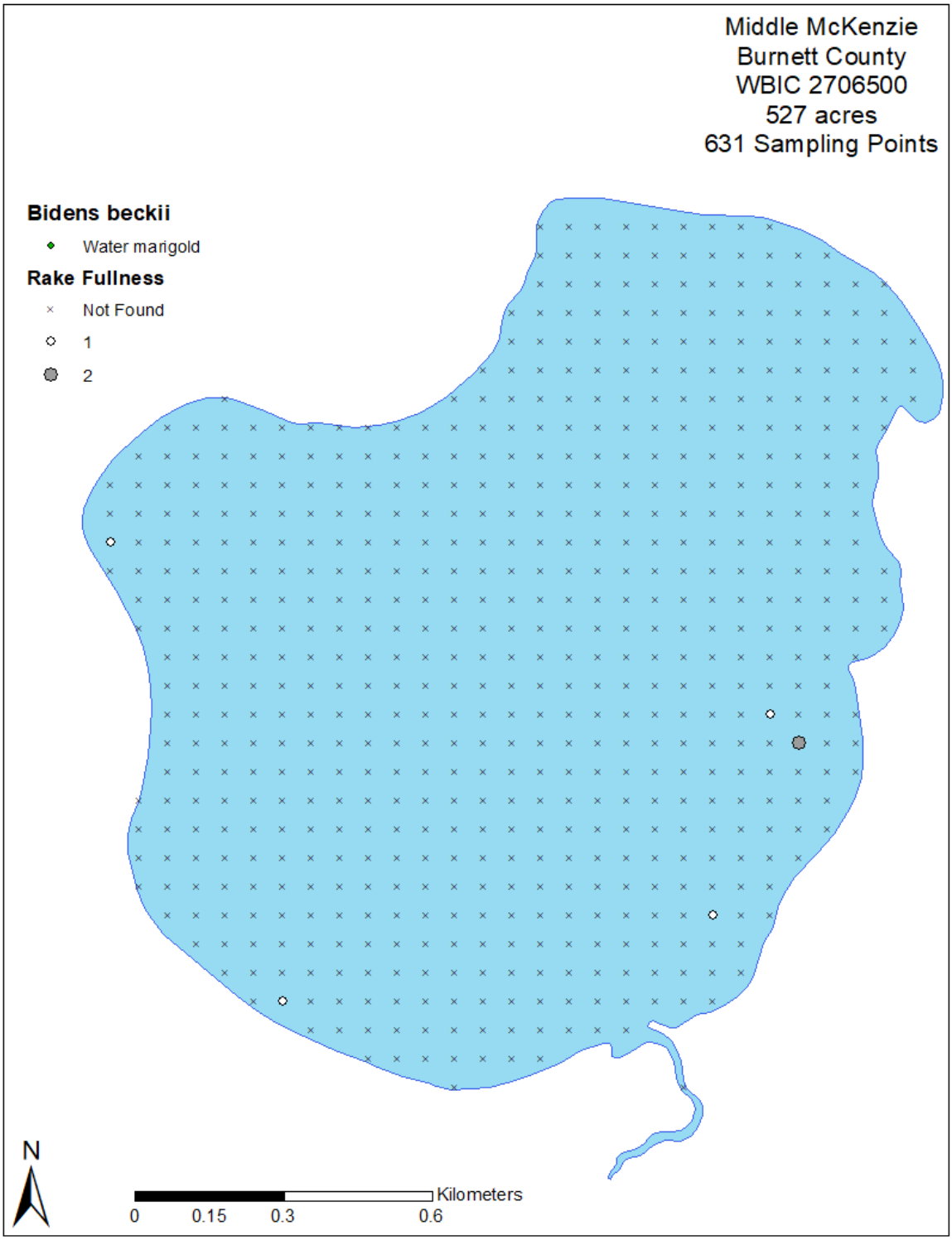

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Sago Pondweed
Stuckenia pectinata
Rake Fullness
Not Found
1
Visual
0 0.075 0.15 0.3 0.45 0.6
Miles
N

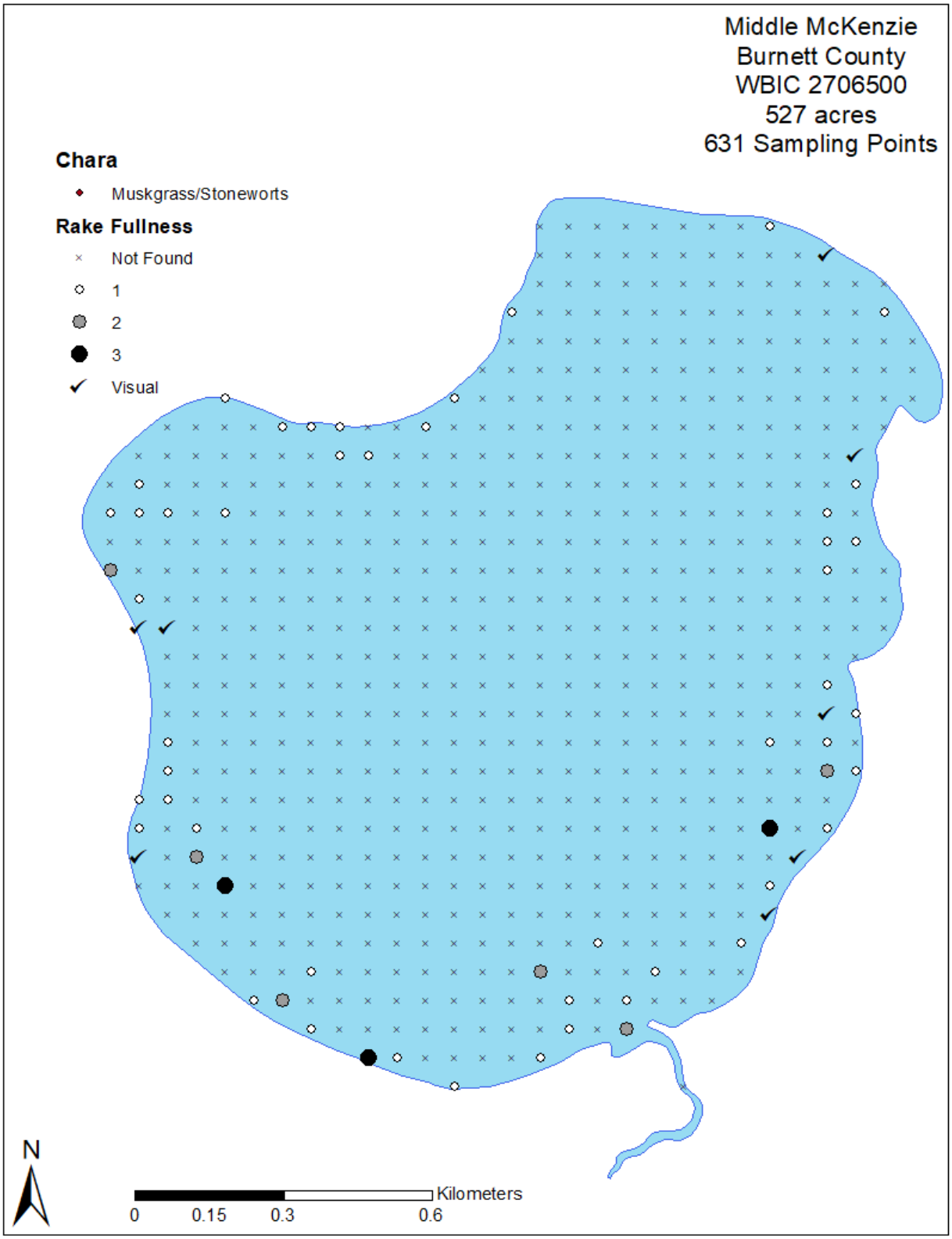

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Lesser Bladderwort
Utricularia minor
Rake Fullness
Not Found
Visual
N
0 0.075 0.15 0.3 0.45 0.6
Miles

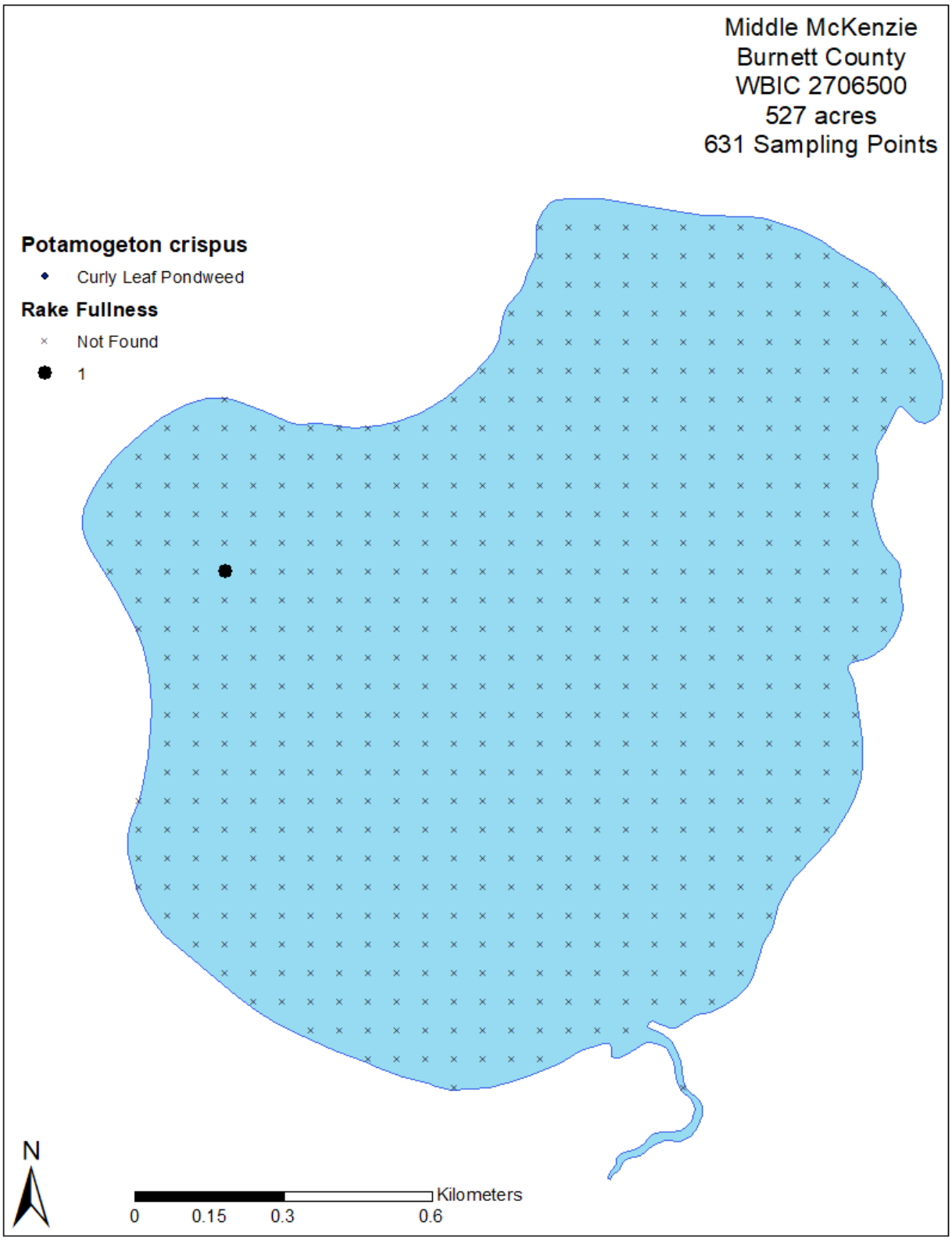

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Water Celery
Vallisneria americana
Rake Fullness
Not Found
1
2
3
Visual
N
0 0.075 0.15 0.3 0.45 0.6
Miles

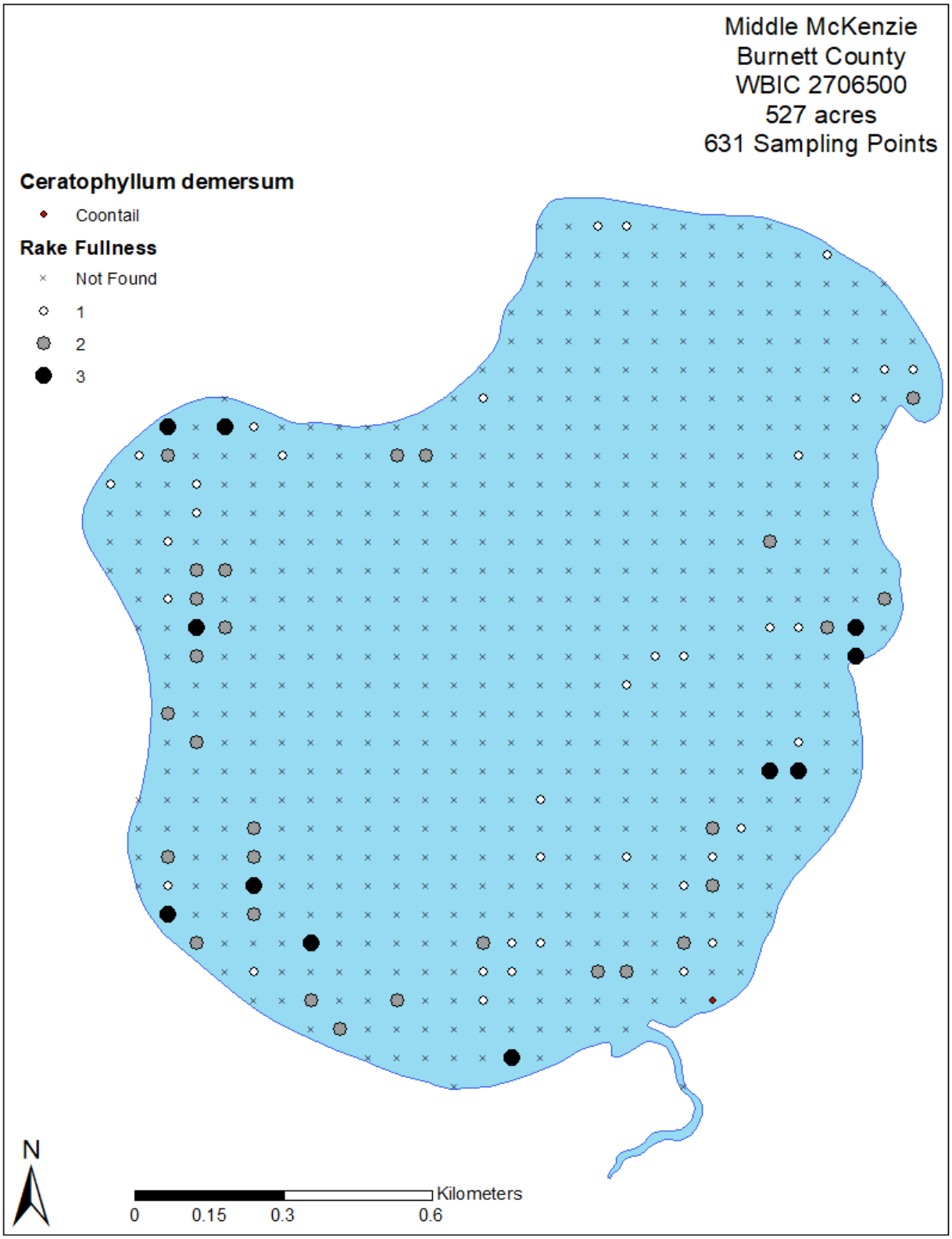

Big McKenzie Lake
Burnett County
WBIC 2706800
1129 Acres
1011 Sampling Points
Riparian Invasive Species
Yellow Flag Iris
Iris pseudacorus
Rake Fullness
Not Found
Visual
N
0 0.075 0.15 0.3 0.45 0.6
Miles

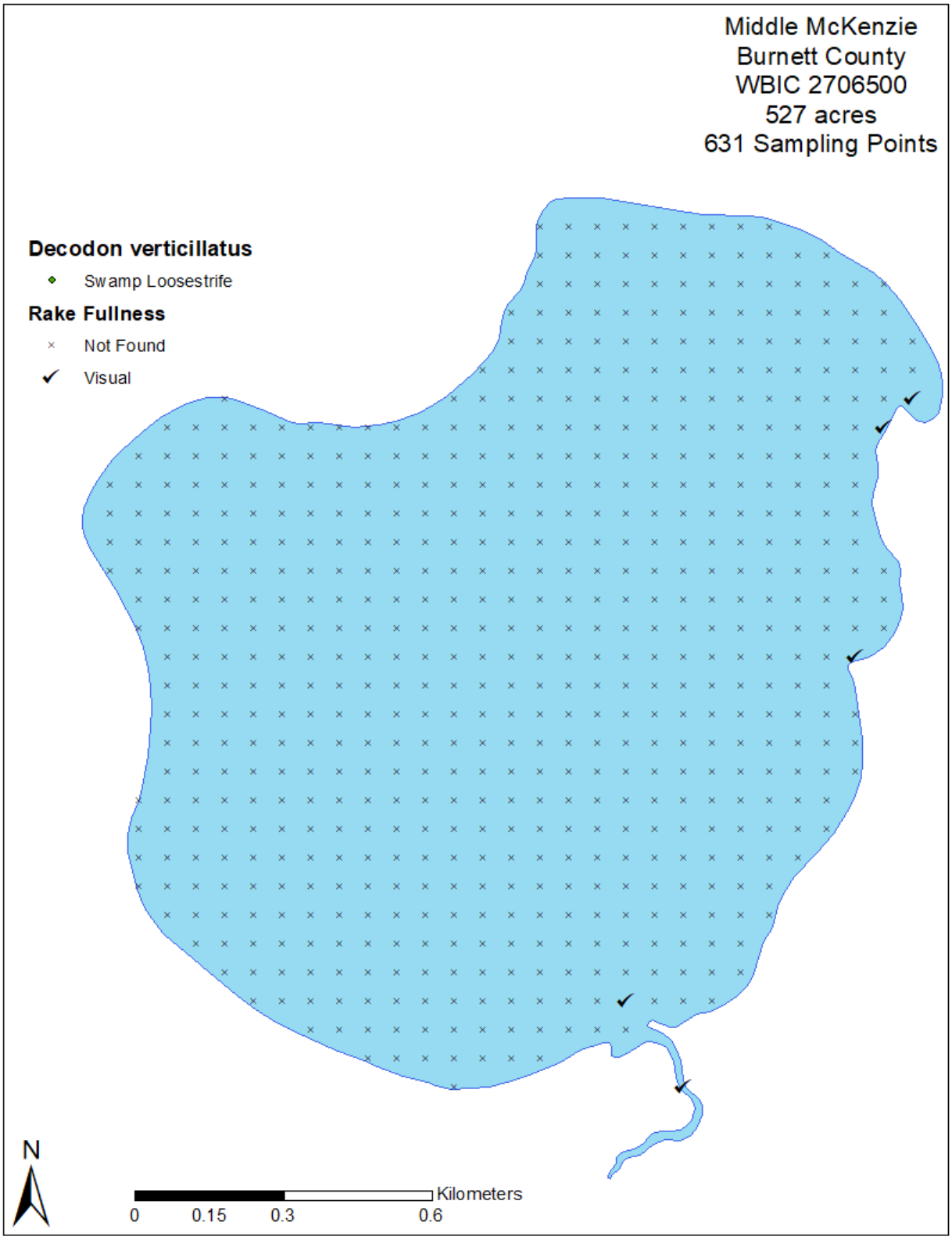
Appendix C. Middle McKenzie Aquatic Plant Maps

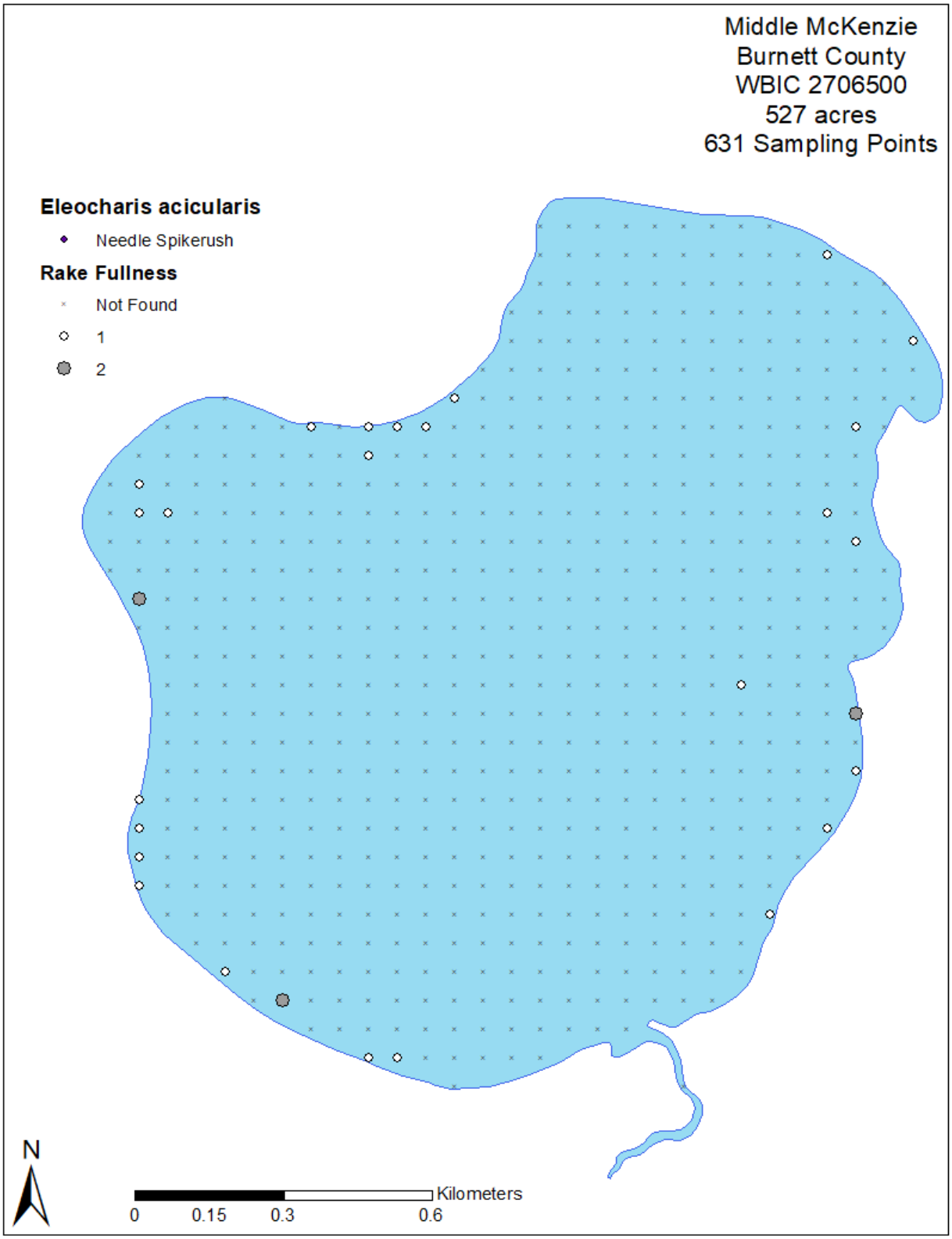


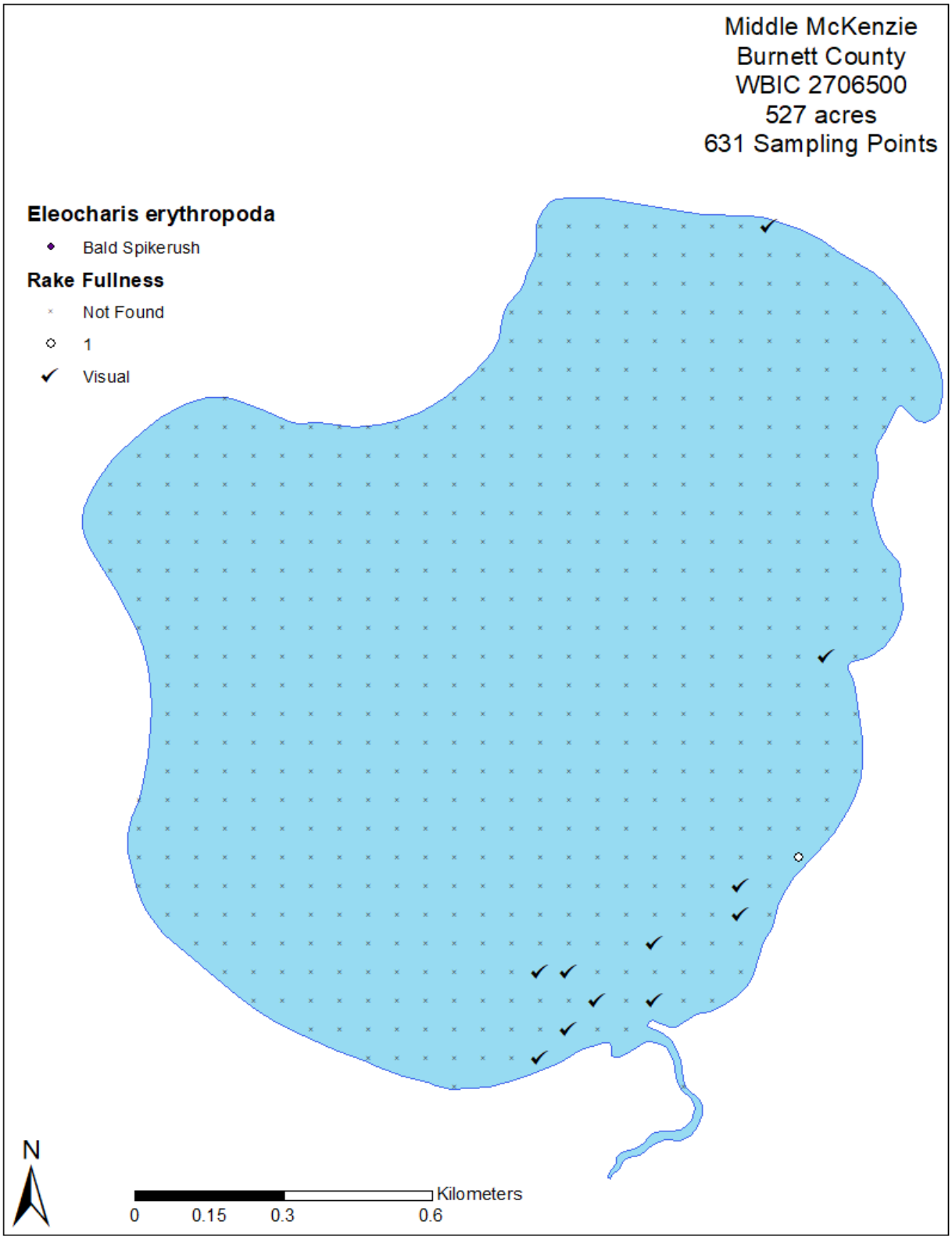

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Chara
Muskgrass/Stoneworts
Rake Fullness
Not Found
1
2
3
Visual
N
Kilometers
0
0.15
0.3
0.6

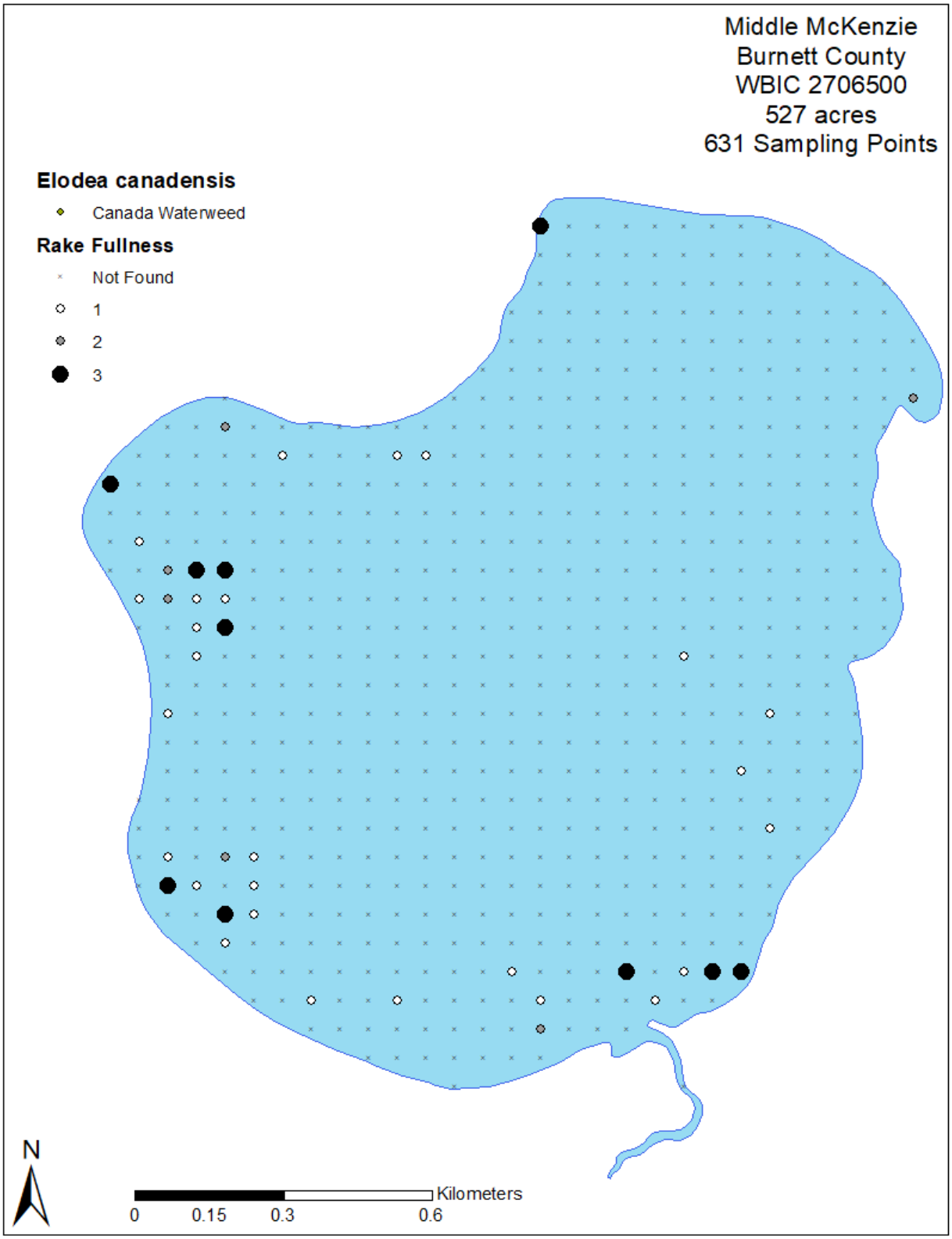

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Potamogeton crispus
Curly Leaf Pondweed
Rake Fullness
Not Found
1
N
Kilometers
0
0.15
0.3
0.6

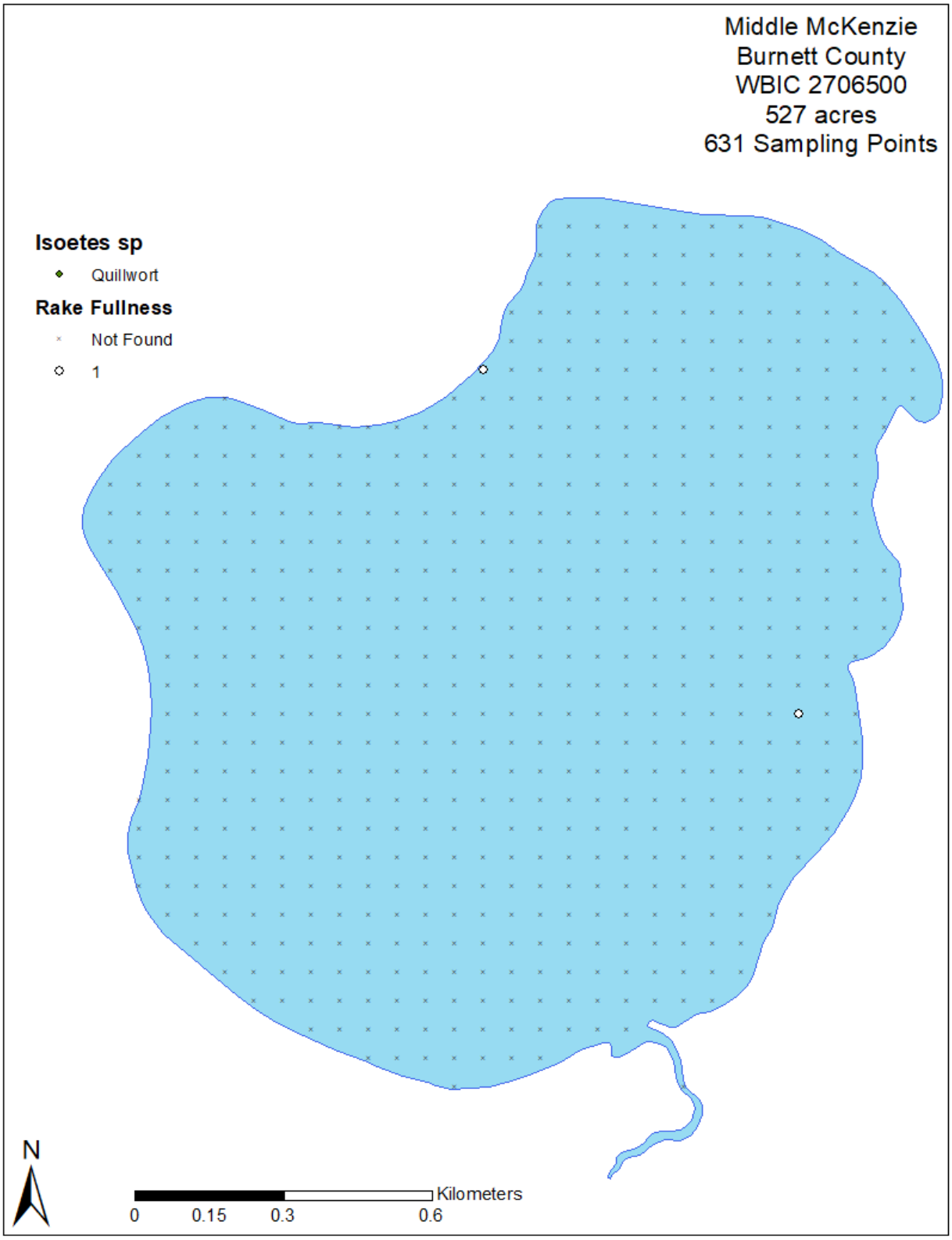

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Ceratophyllum demersum
Coontail
Rake Fullness
Not Found
1
2
3
N
Kilometers
0
0.15
0.3
0.6

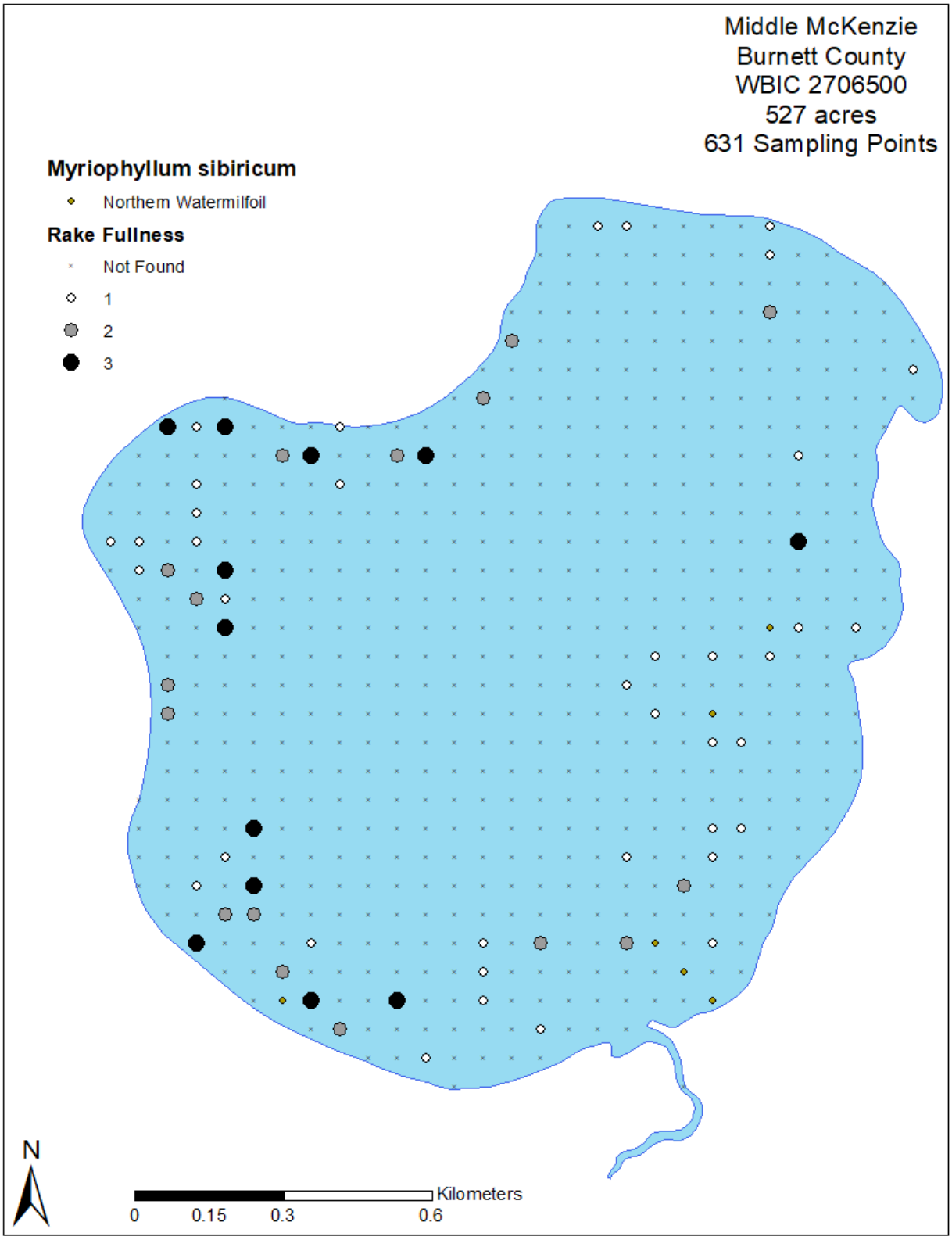

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Decodon verticillatus
Swamp Loosestrife
Rake Fullness
Not Found
Visual
N
Kilometers
0
0.15
0.3
0.6

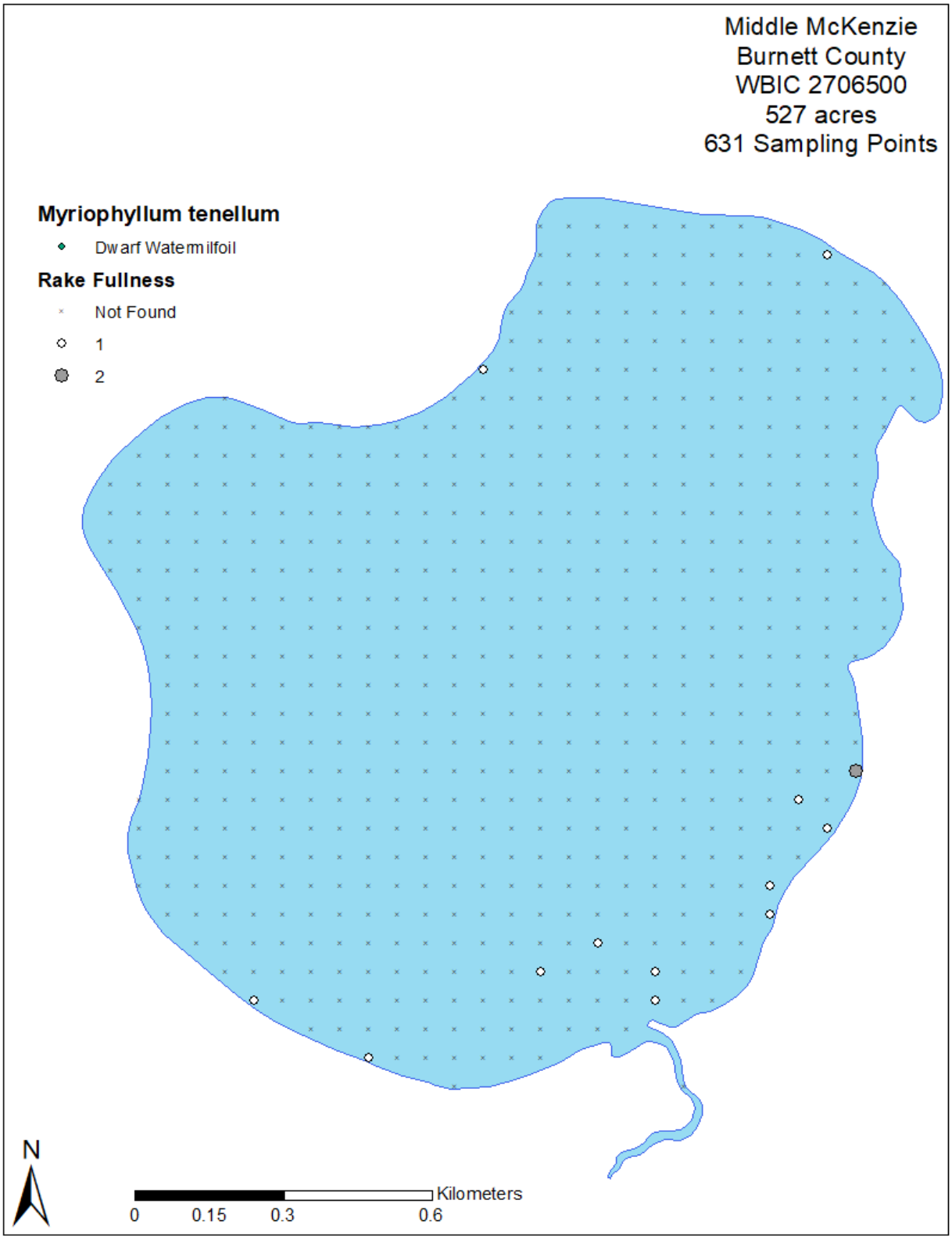

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Eleocharis acicularis
Needle Spikerush
Rake Fullness
Not Found
1
2
N
Kilometers
0
0.15
0.3
0.6

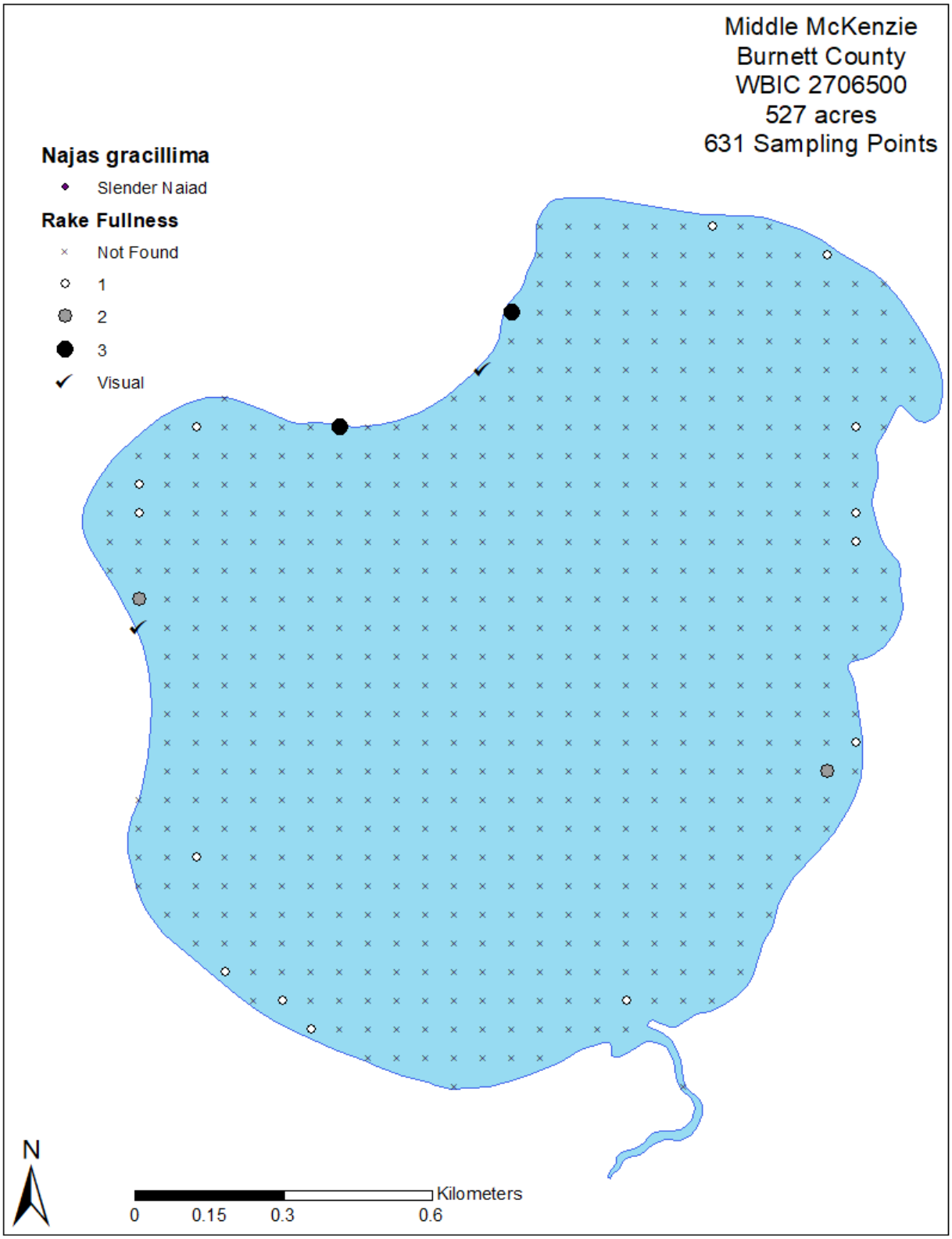

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Eleocharis erythropoda
Bald Spikerush
Rake Fullness
Not Found
1
Visual
N
Kilometers
0
0.15
0.3
0.6

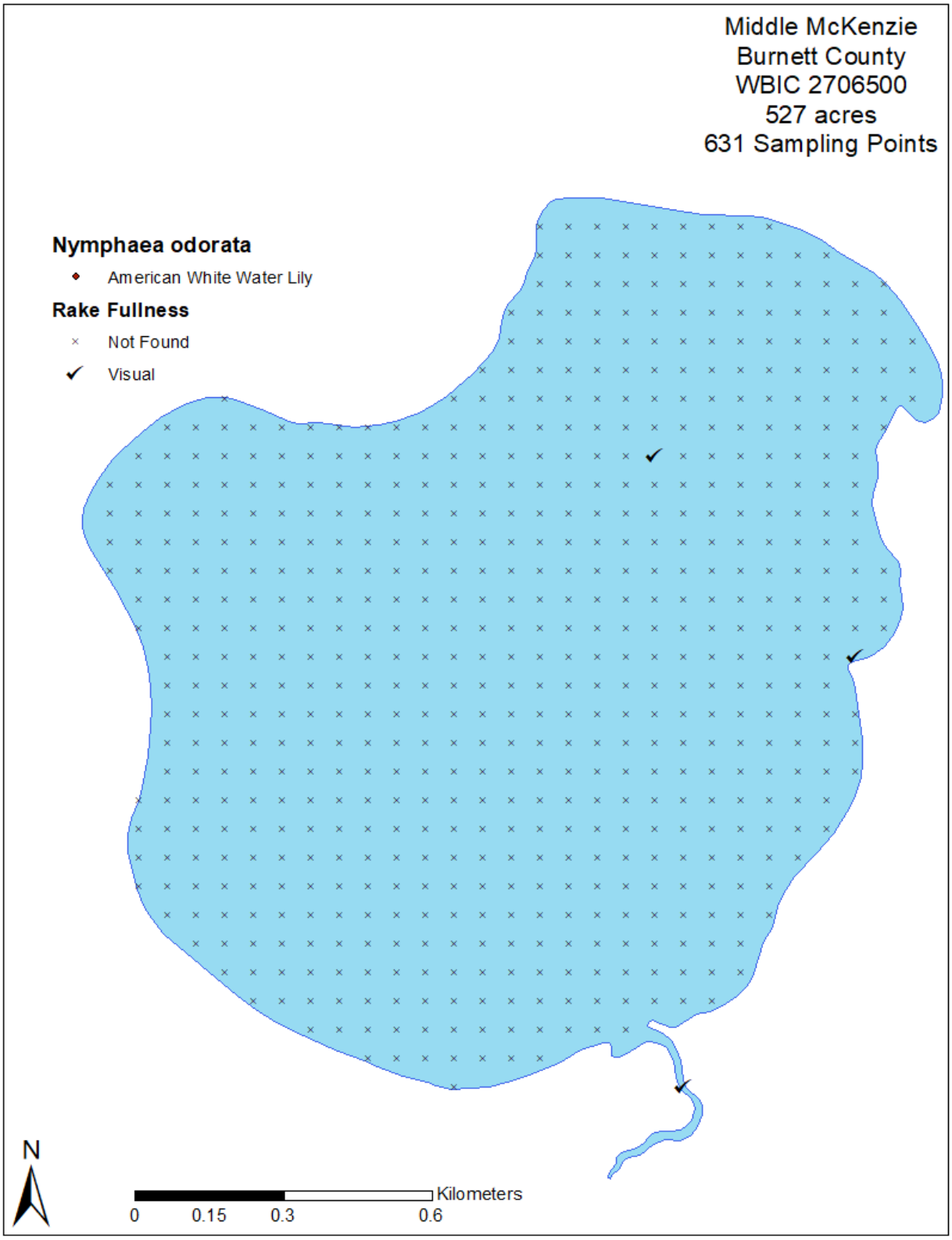

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Elodea canadensis
Canada Waterweed
Rake Fullness
Not Found
1
2
3
N
Kilometers
0
0.15
0.3
0.6

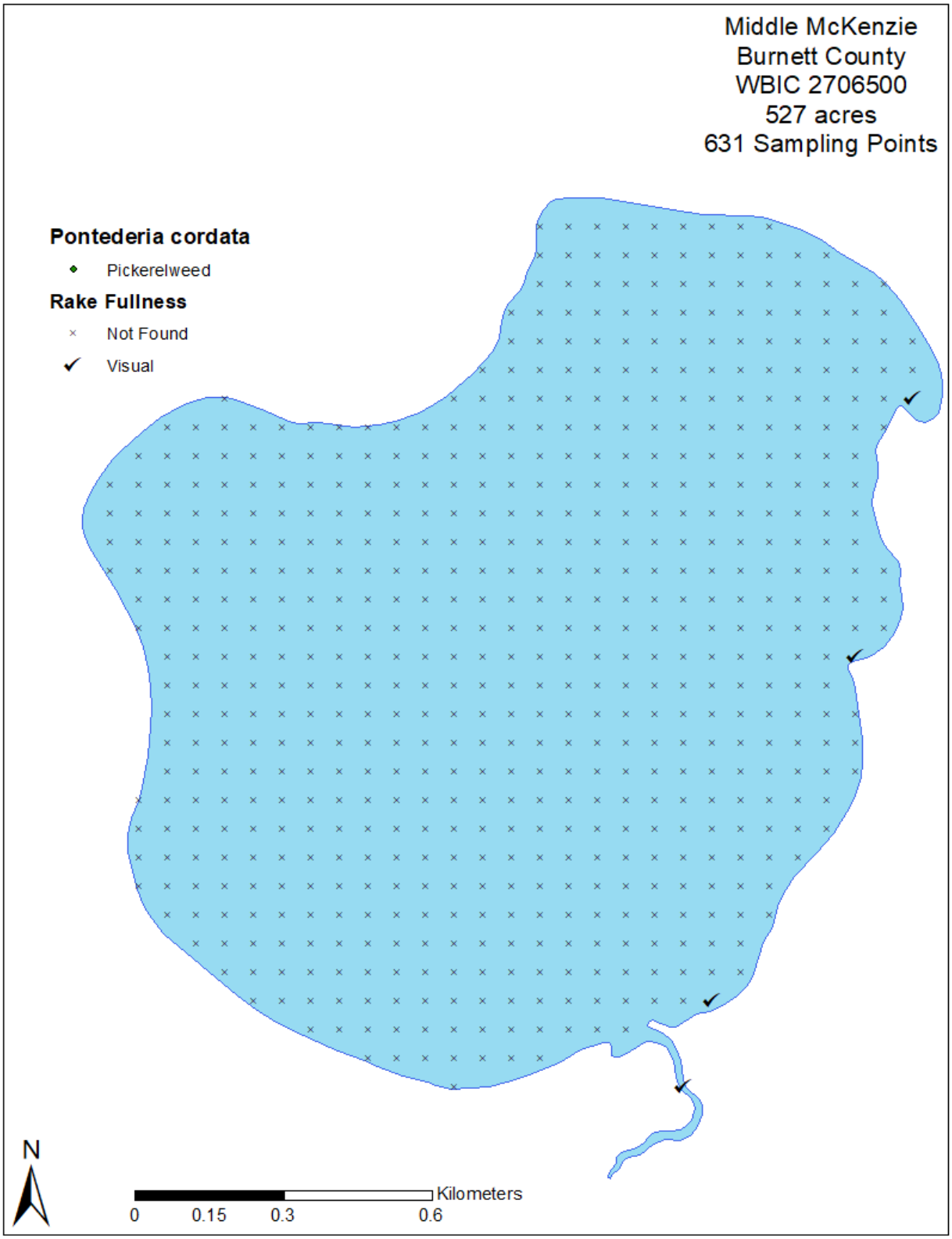

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Isoetes sp
Quillwort
Rake Fullness
Not Found
1
N
Kilometers
0
0.15
0.3
0.6


Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Myriophyllum sibiricum
Northern Watermilfoil
Rake Fullness
Not Found
1
2
3
N
Kilometers
0
0.15
0.3
0.6


Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Myriophyllum tenellum
Dwarf Watermilfoil
Rake Fullness
Not Found
1
2
N
Kilometers
0
0.15
0.3
0.6


Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Najas gracillima
Slender Naiad
Rake Fullness
Not Found
1
2
3
Visual
N
Kilometers
0
0.15
0.3
0.6


Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Nymphaea odorata
American White Water Lily
Rake Fullness
Not Found
Visual
N
Kilometers
0
0.15
0.3
0.6


Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Pontederia cordata
Pickerelweed
Rake Fullness
Not Found
Visual
N
Kilometers
0
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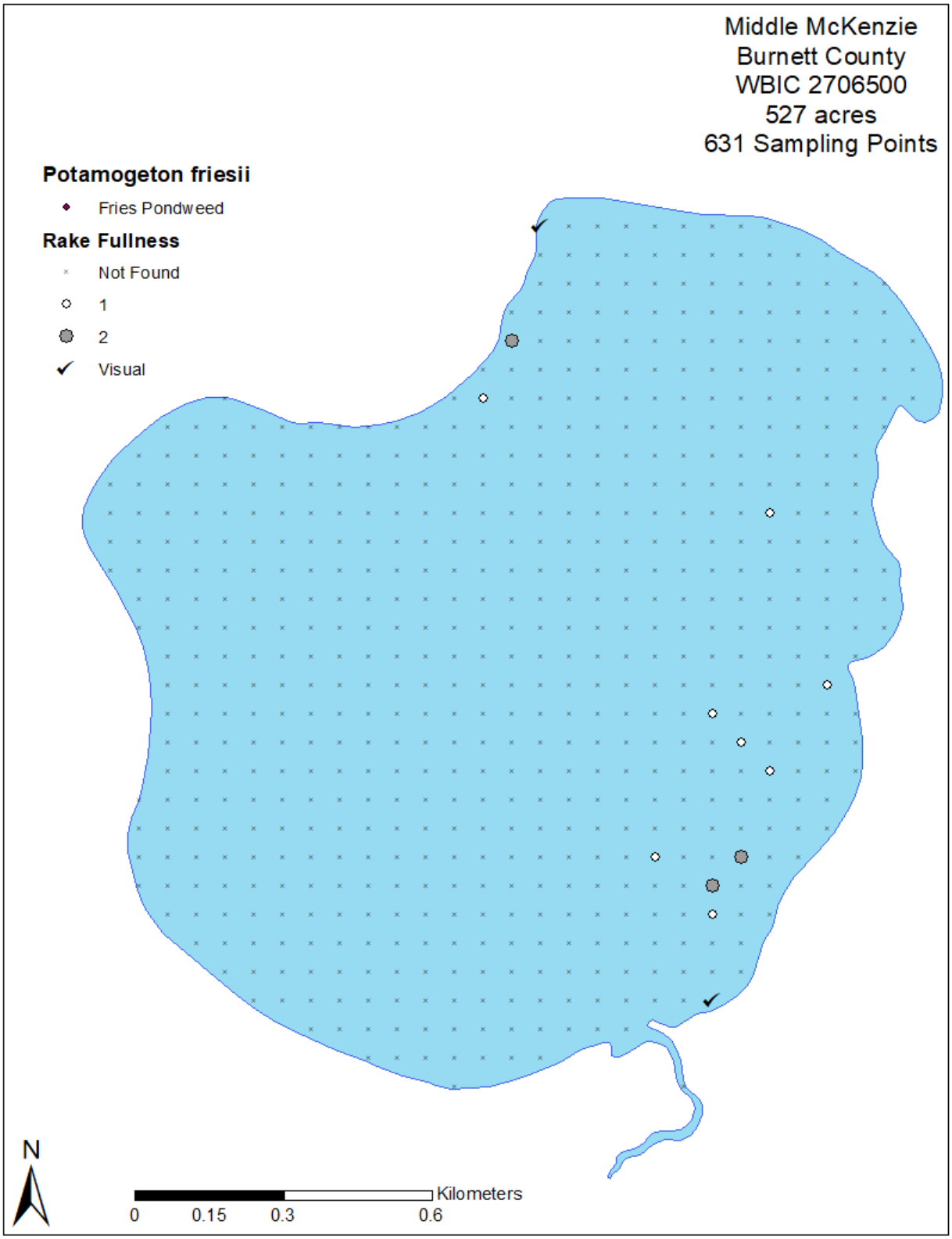
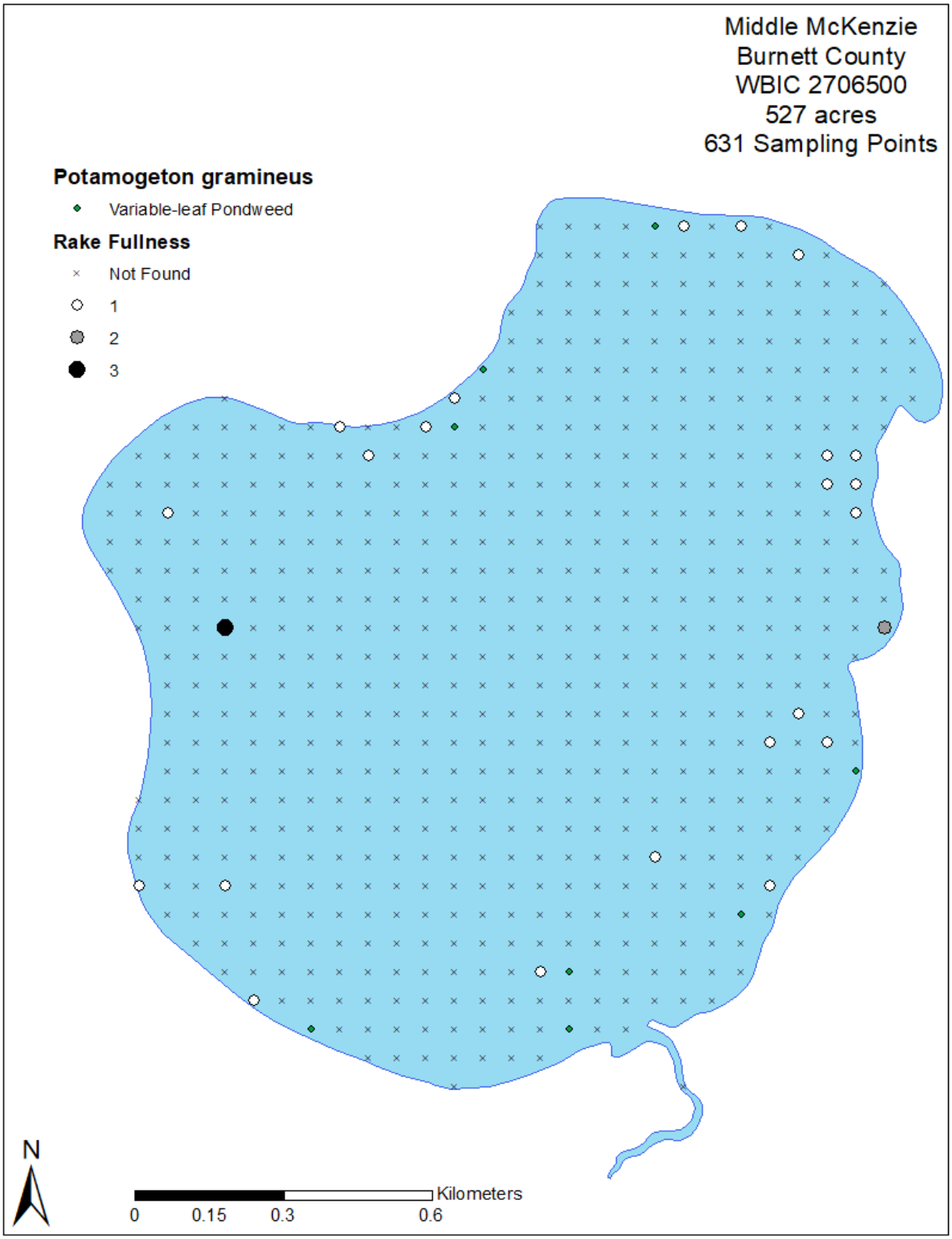
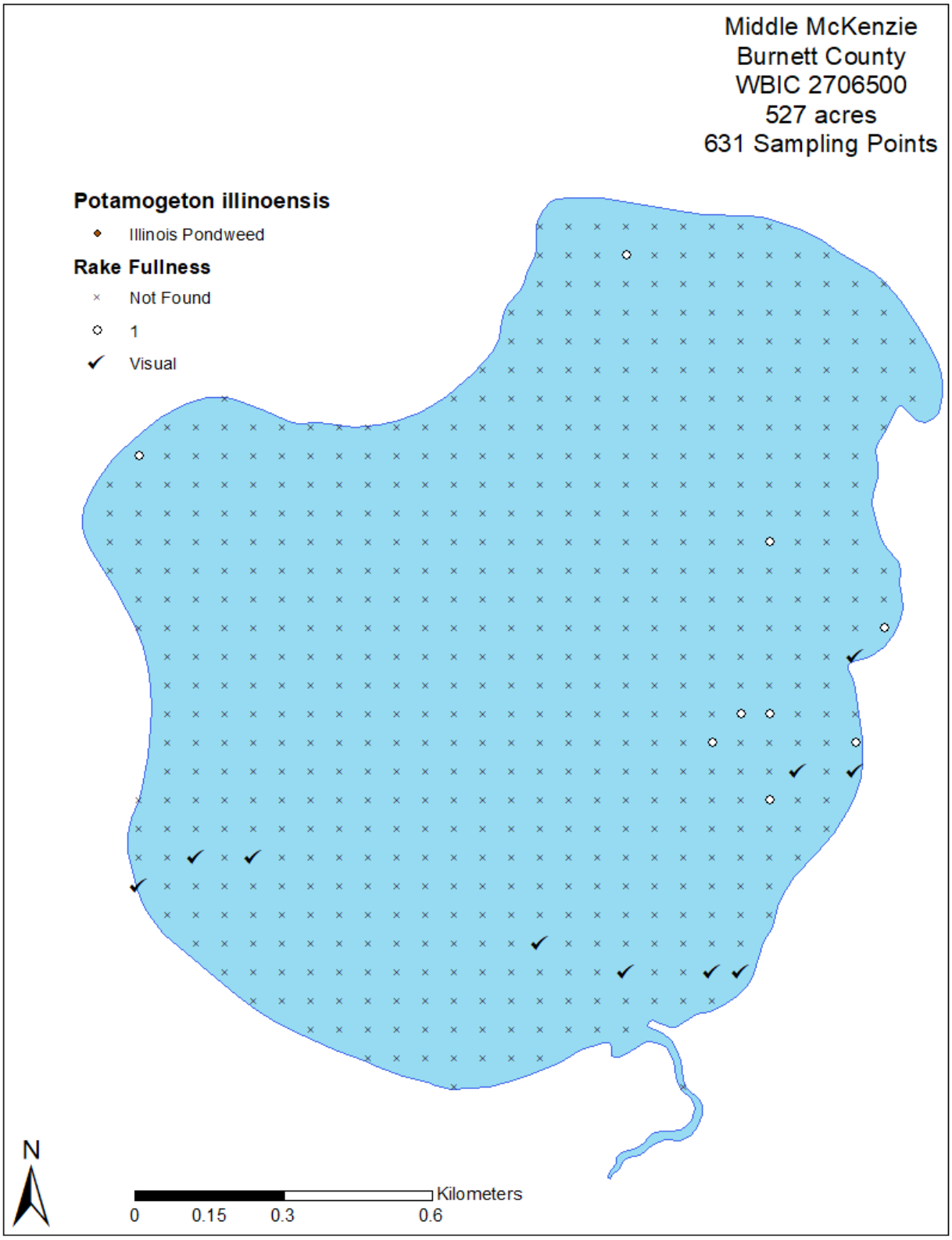
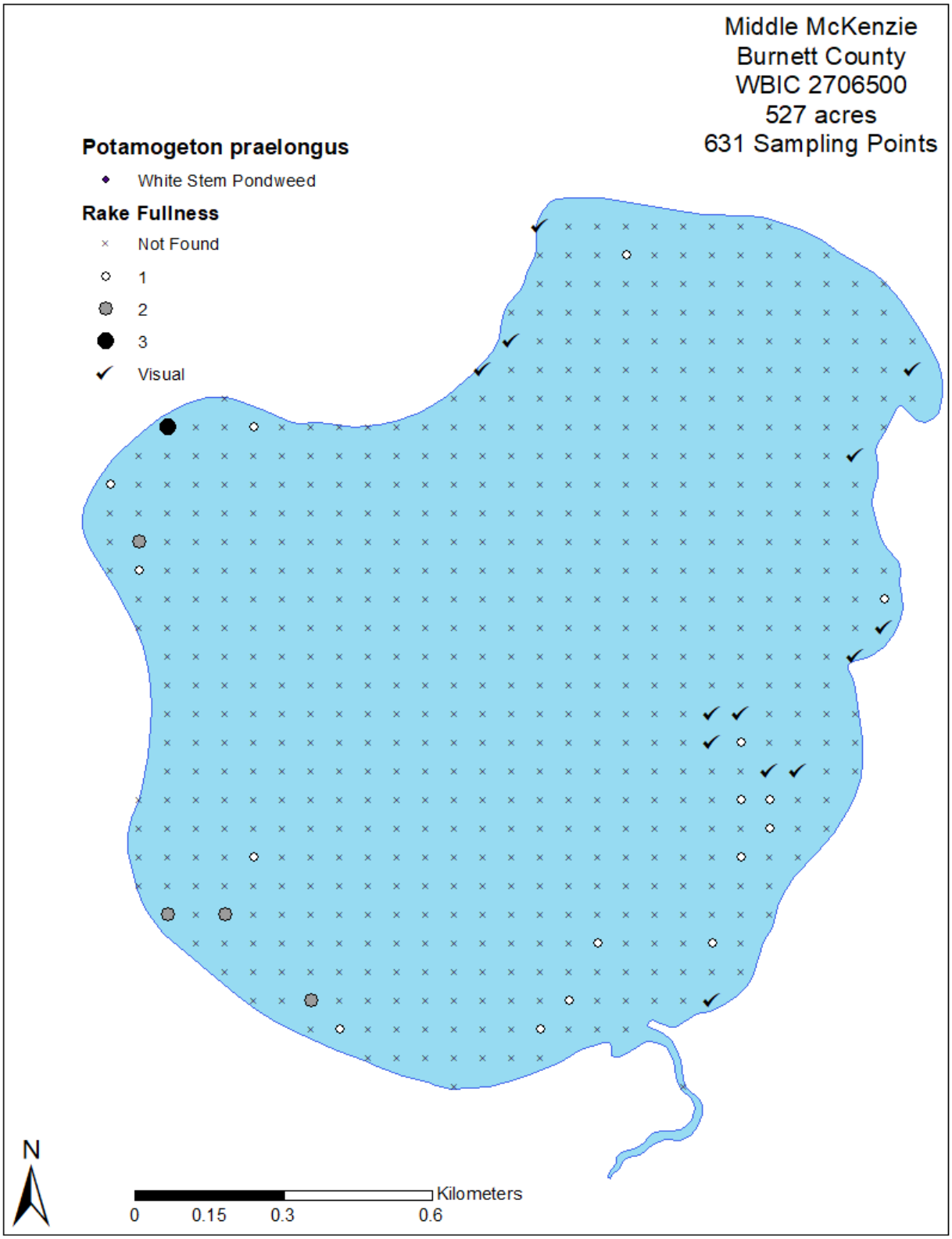
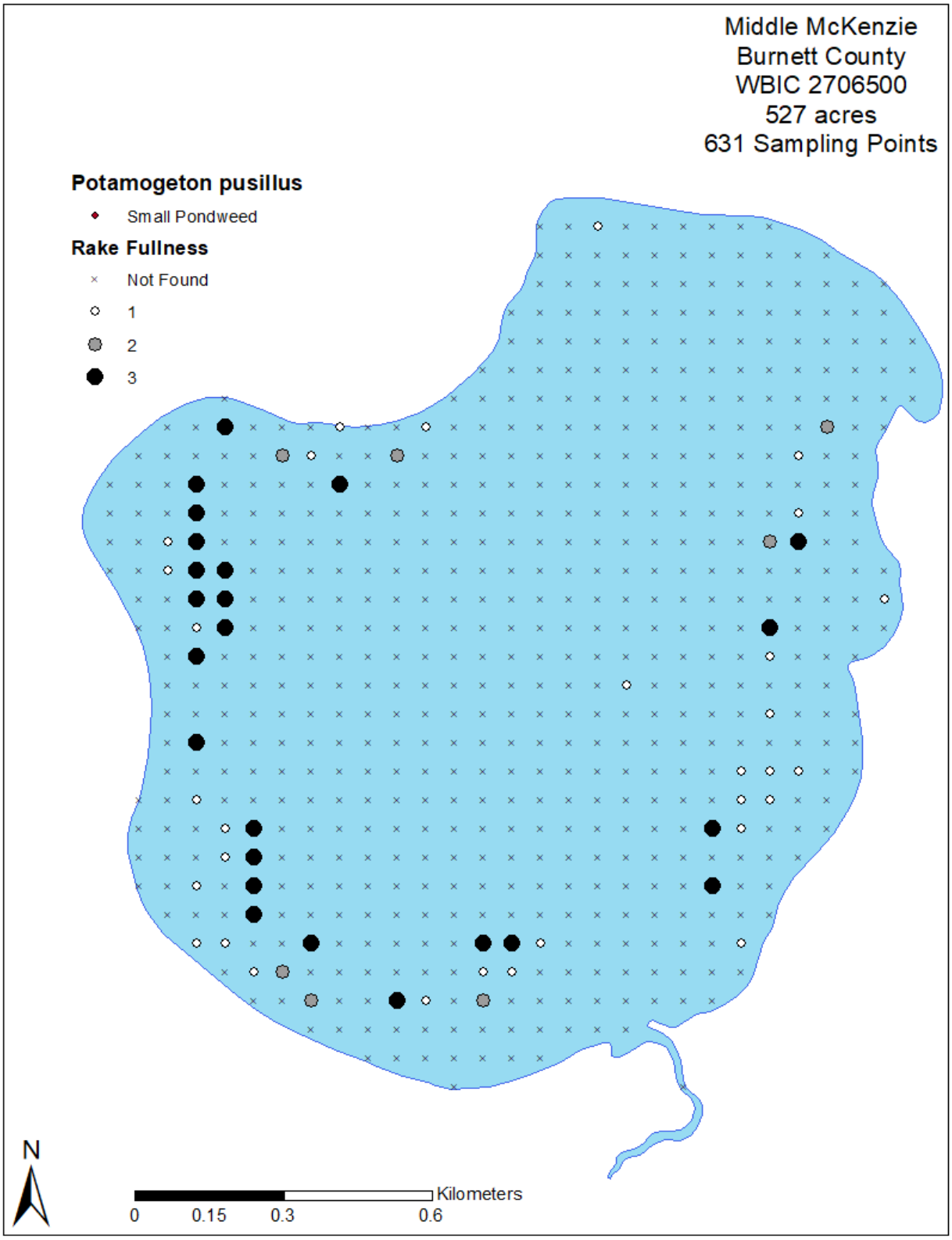
0.3
0.6

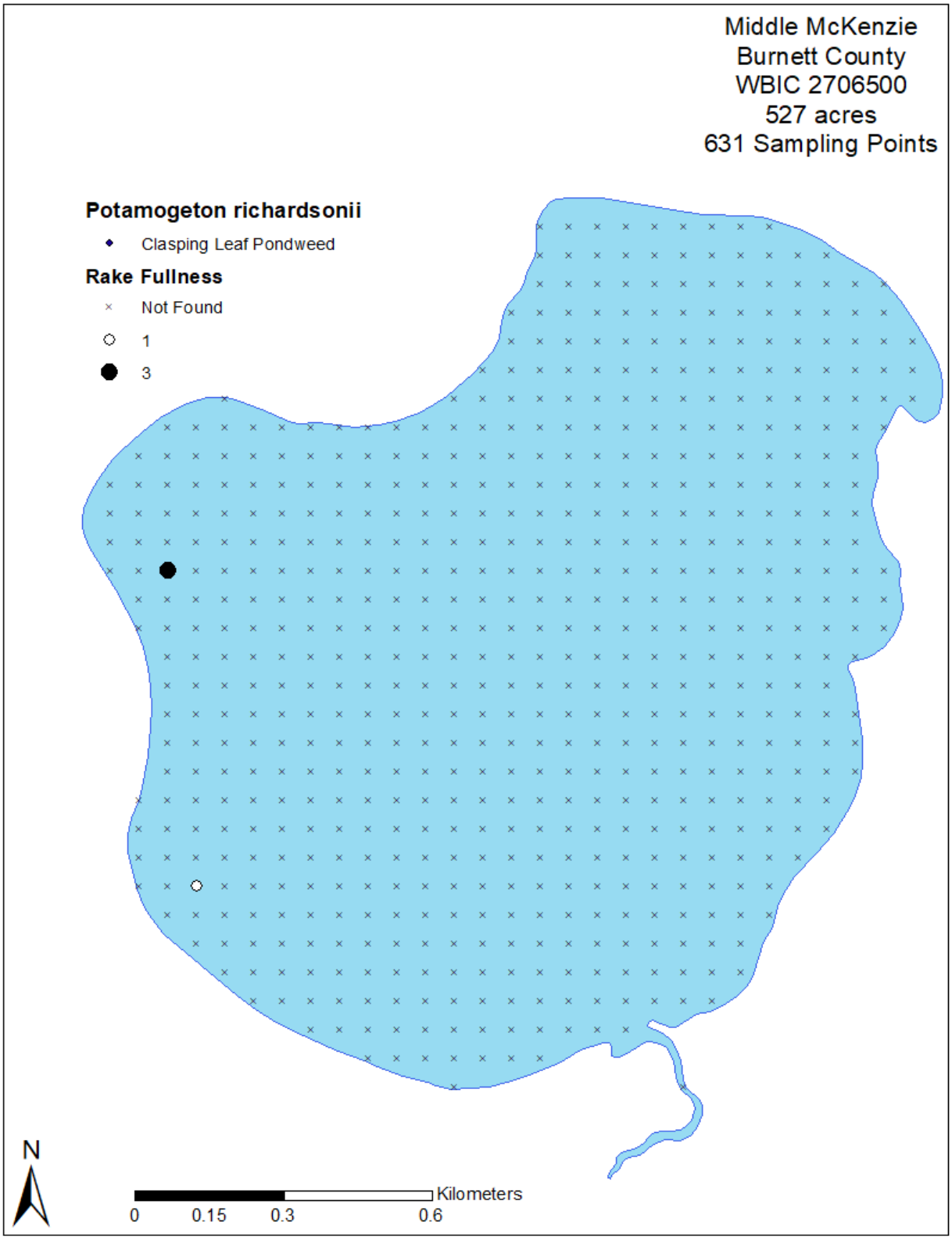

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Potamogeton friesii
Fries Pondweed
Rake Fullness
Not Found
1
2
Visual
N
Kilometers
0
0.15
0.3
0.6

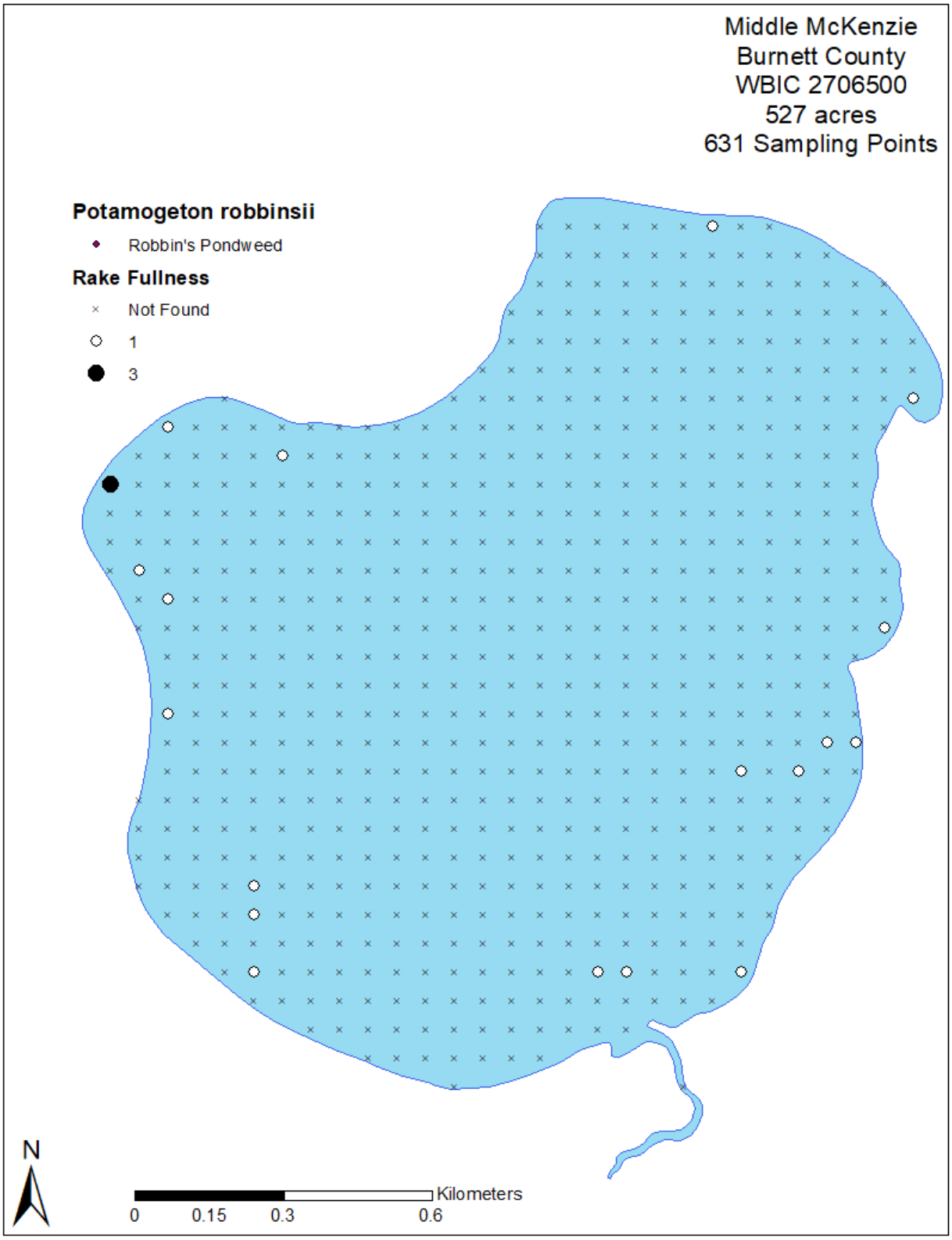

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Potamogeton gramineus
Variable-leaf Pondweed
Rake Fullness
Not Found
1
2
3
N
Kilometers
0
0.15
0.3
0.6

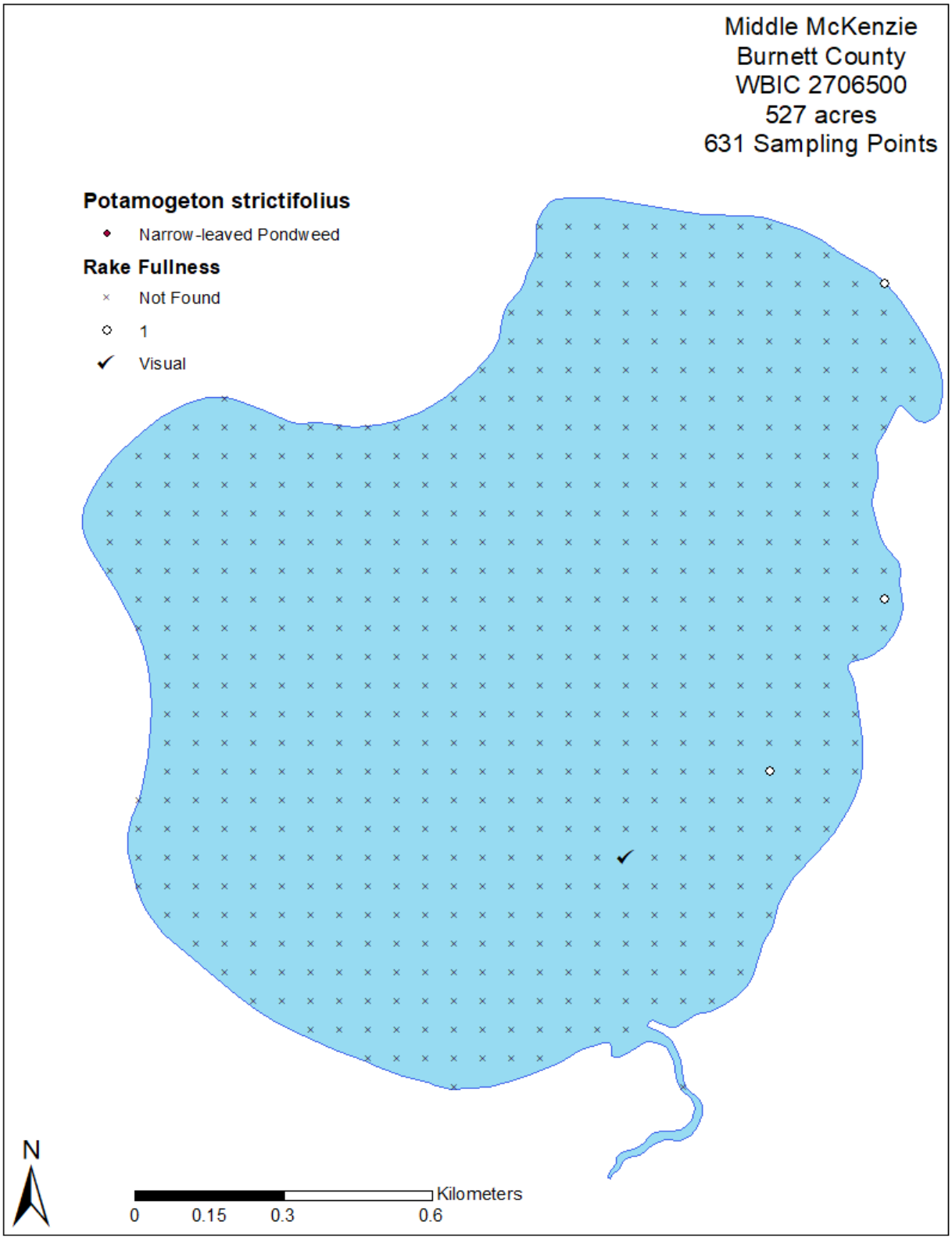

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Potamogeton illinoensis
Illinois Pondweed
Rake Fullness
Not Found
1
Visual
N
Kilometers
0
0.15
0.3
0.6

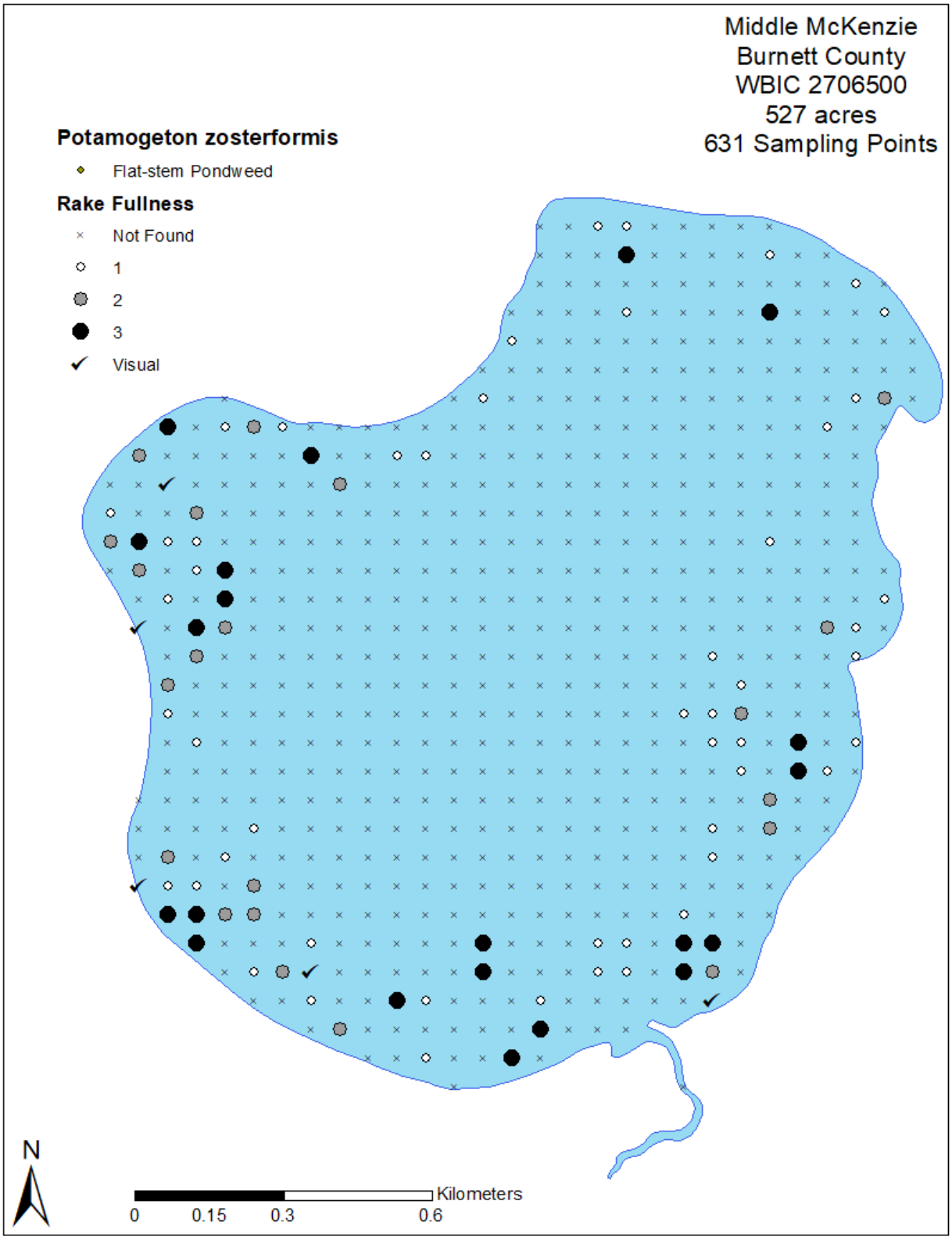

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Potamogeton praelongus
White Stem Pondweed
Rake Fullness
Not Found
1
2
3
Visual
N
Kilometers
0
0.15
0.3
0.6

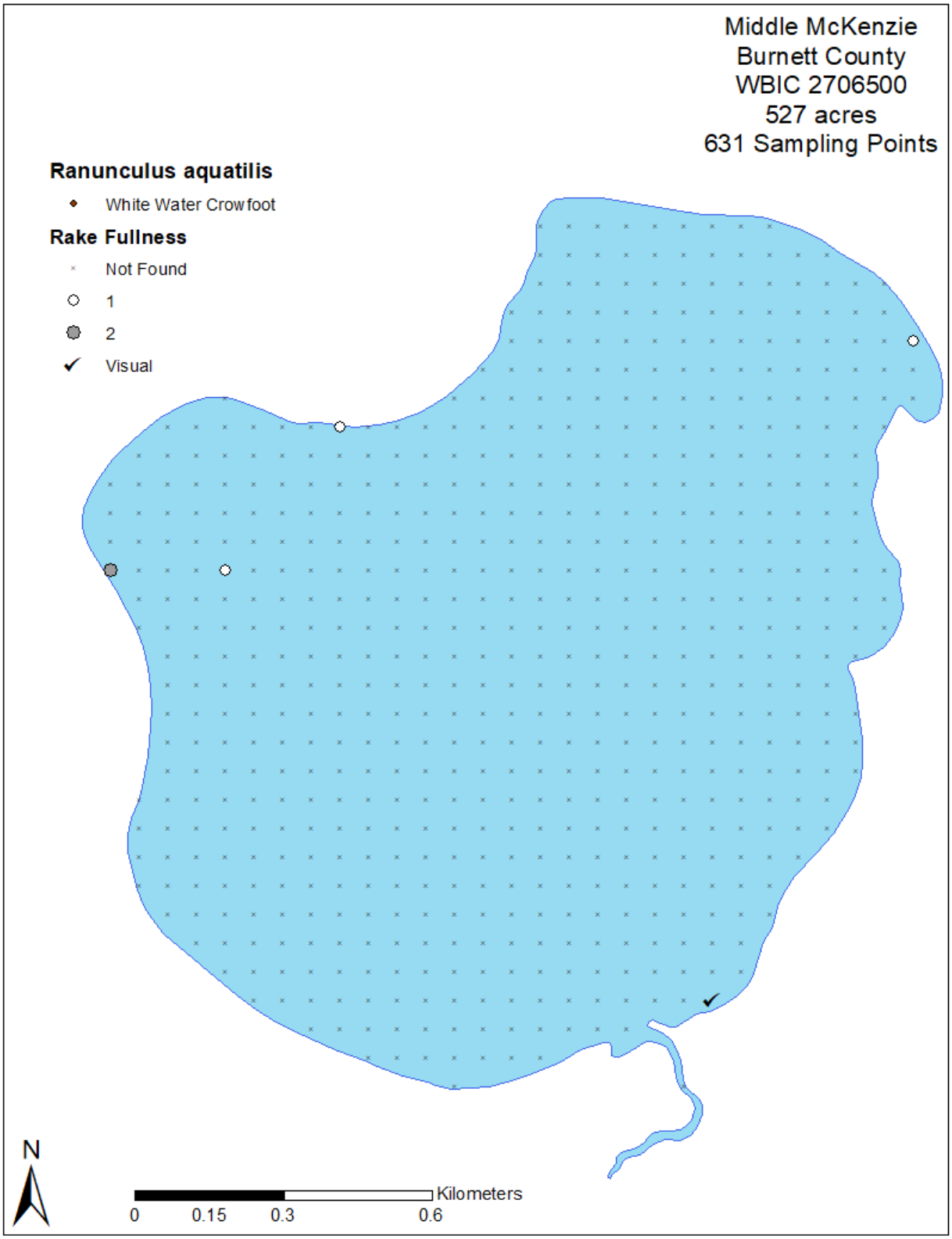

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Potamogeton pusillus
Small Pondweed
Rake Fullness
Not Found
1
2
3
N
Kilometers
0
0.15
0.3
0.6

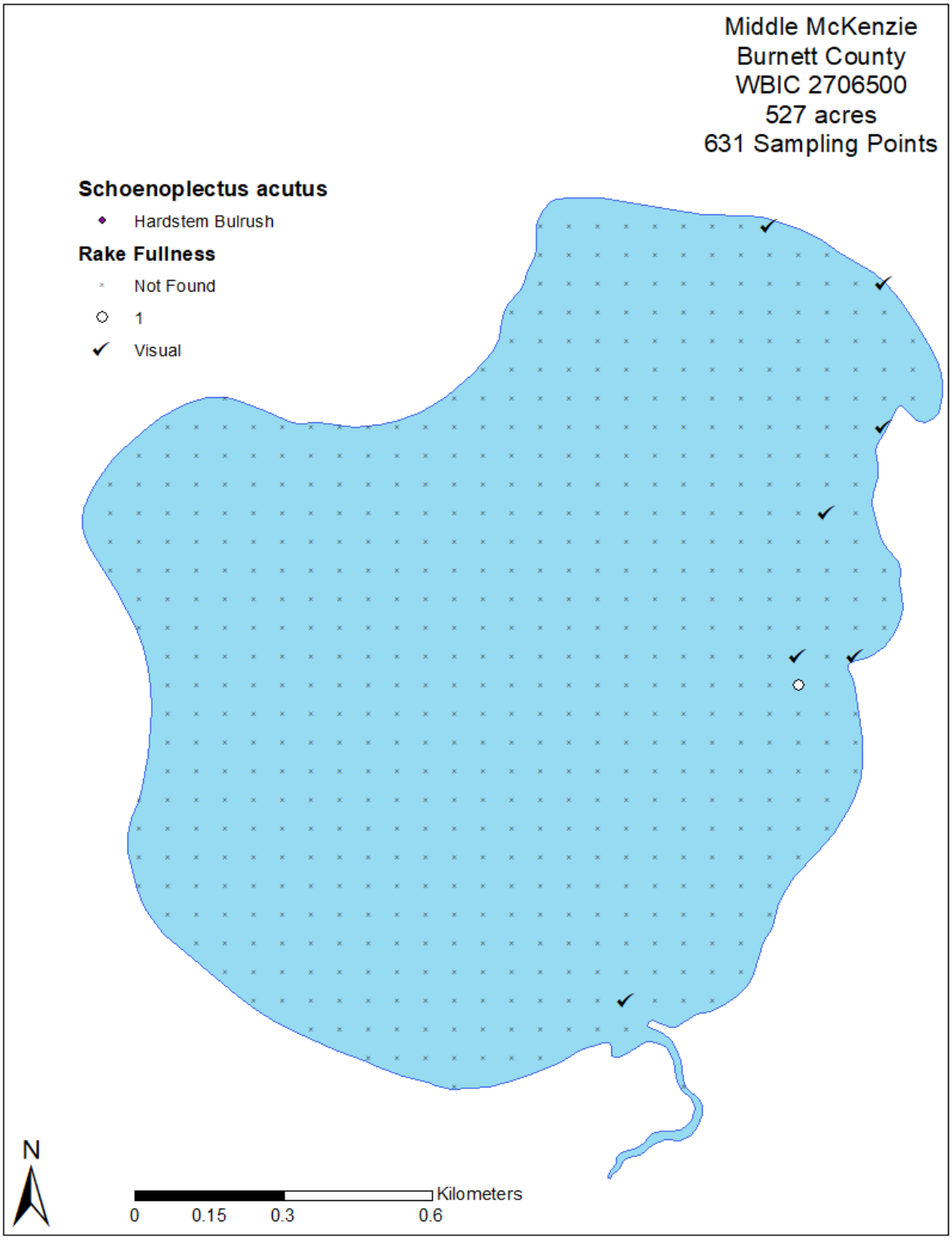

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Potamogeton richardsonii
Clasping Leaf Pondweed
Rake Fullness
Not Found
1
3
N
Kilometers
0
0.15
0.3
0.6

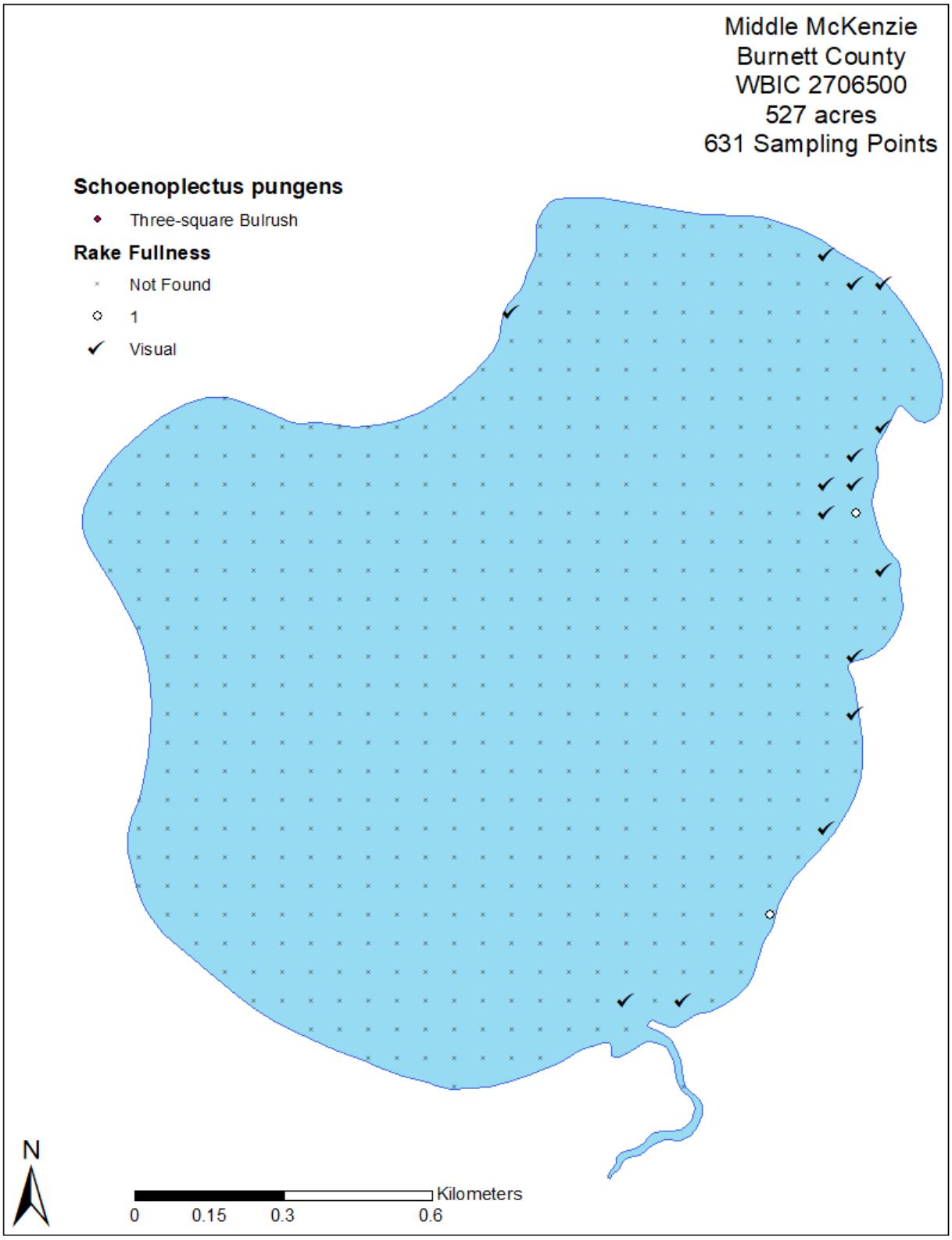

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Potamogeton robbinsii
Robbin's Pondweed
Rake Fullness
Not Found
1
3
N
Kilometers
0
0.15
0.3
0.6

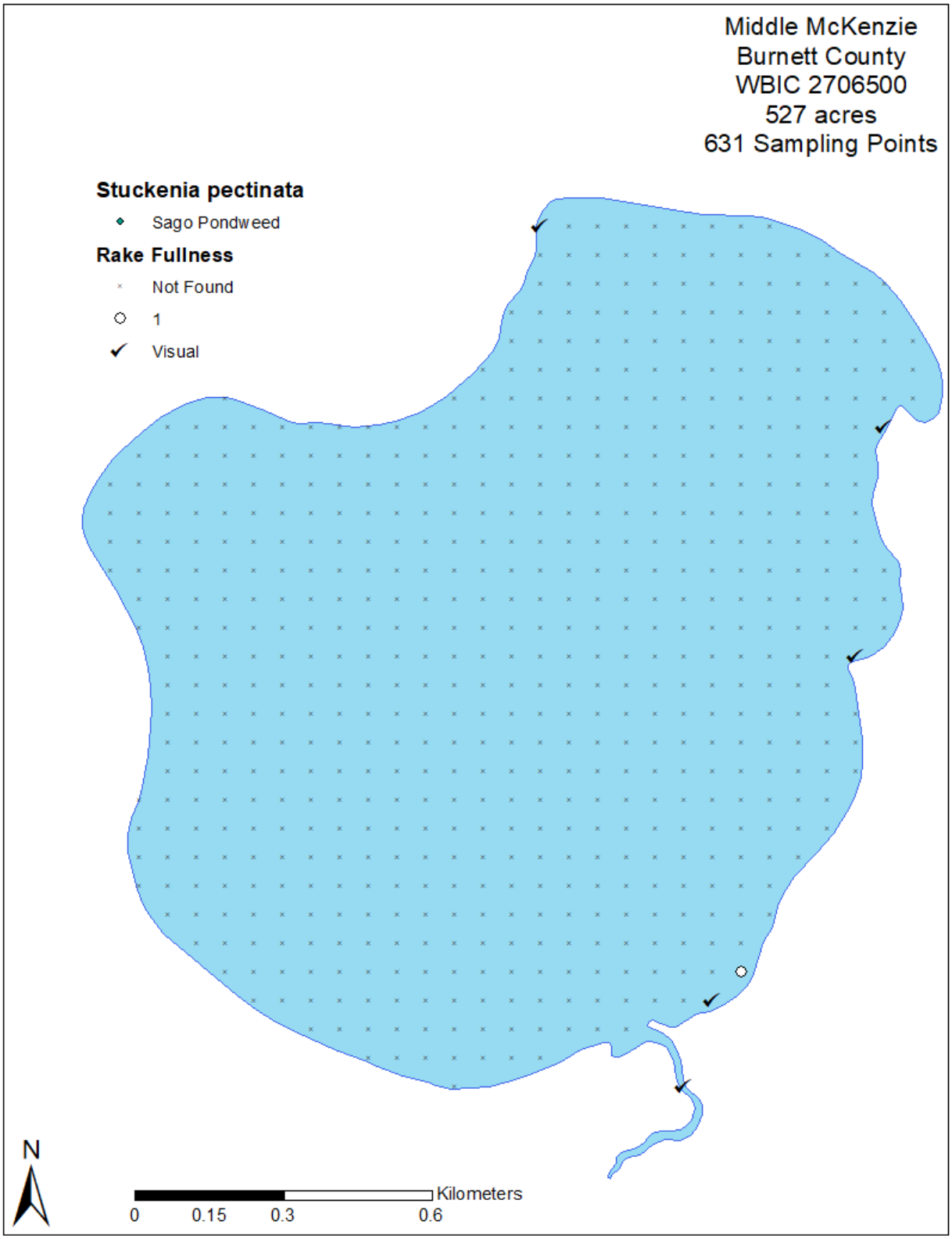

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Potamogeton strictifolius
Narrow-leaved Pondweed
Rake Fullness
Not Found
1
Visual
N
Kilometers
0
0.15
0.3
0.6

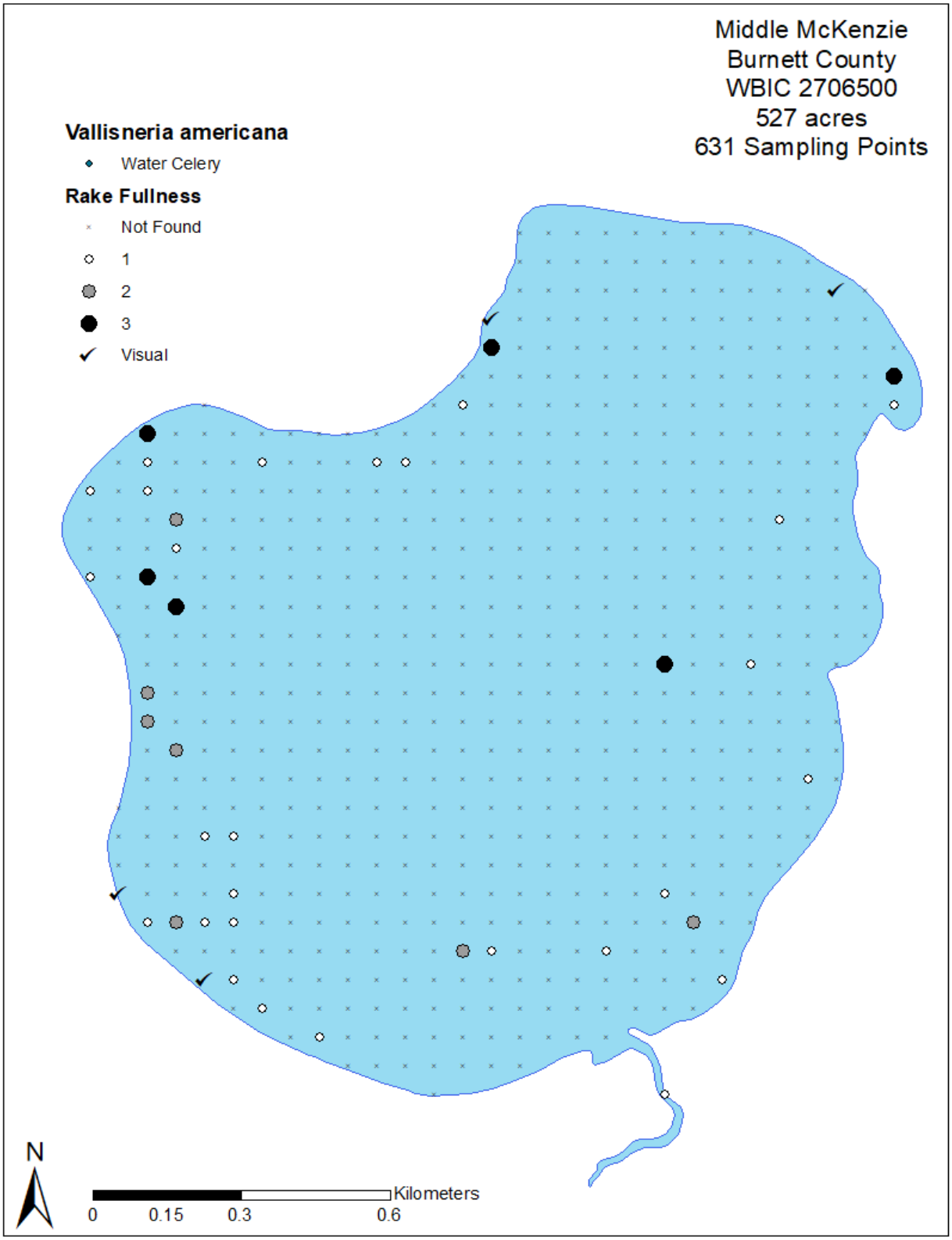

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Potamogeton zosterformis
Flat-stem Pondweed
Rake Fullness
Not Found
1
2
3
Visual
N
Kilometers
0
0.15
0.3
0.6


Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Ranunculus aquatilis
White Water Crowfoot
Rake Fullness
Not Found
1
2
Visual
N
Kilometers
0
0.15
0.3
0.6

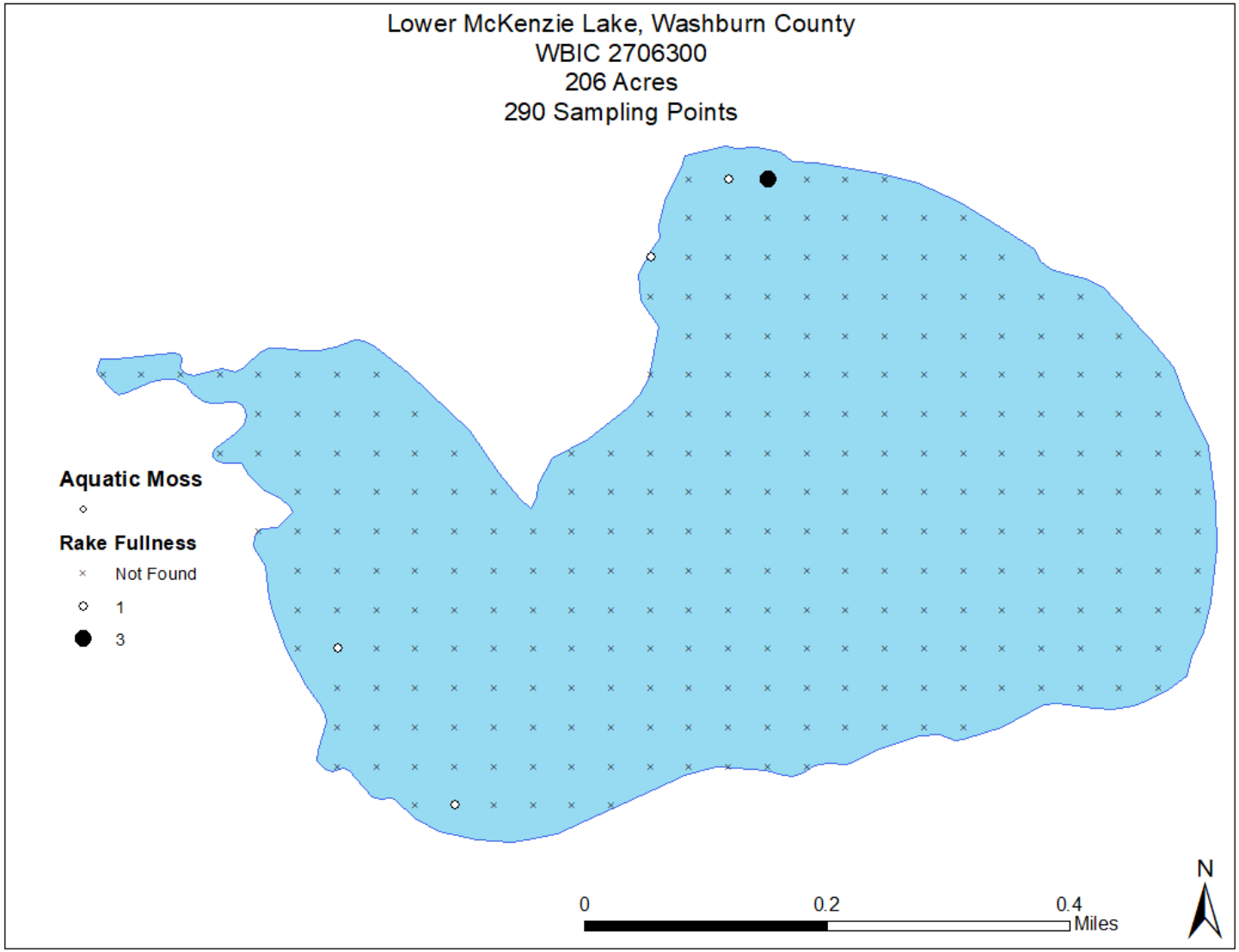

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Schoenoplectus acutus
Hardstem Bulrush
Rake Fullness
Not Found
1
Visual
N
Kilometers
0
0.15
0.3
0.6

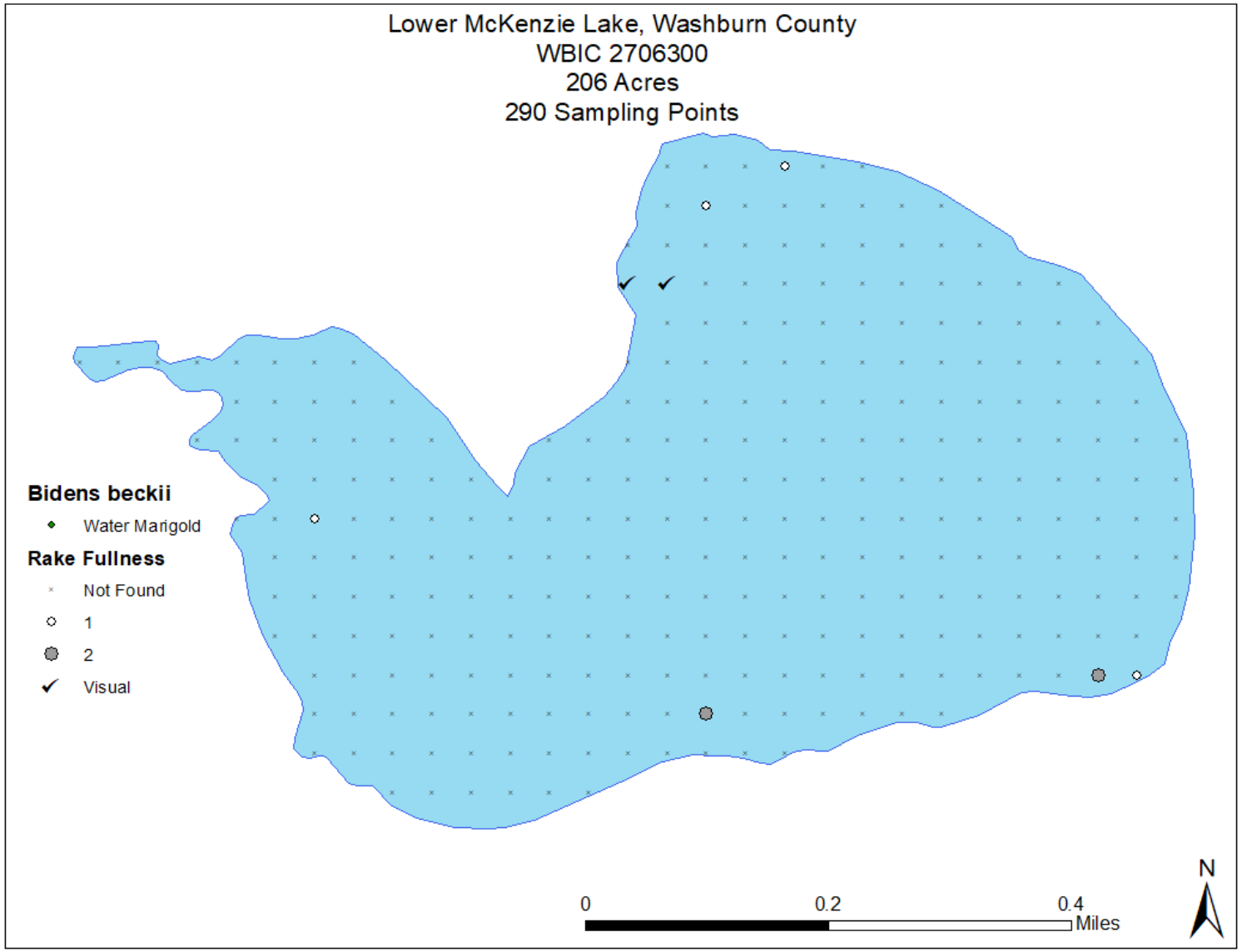

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Schoenoplectus pungens
Three-square Bulrush
Rake Fullness
Not Found
1
Visual
N
Kilometers
0
0.15
0.3
0.6

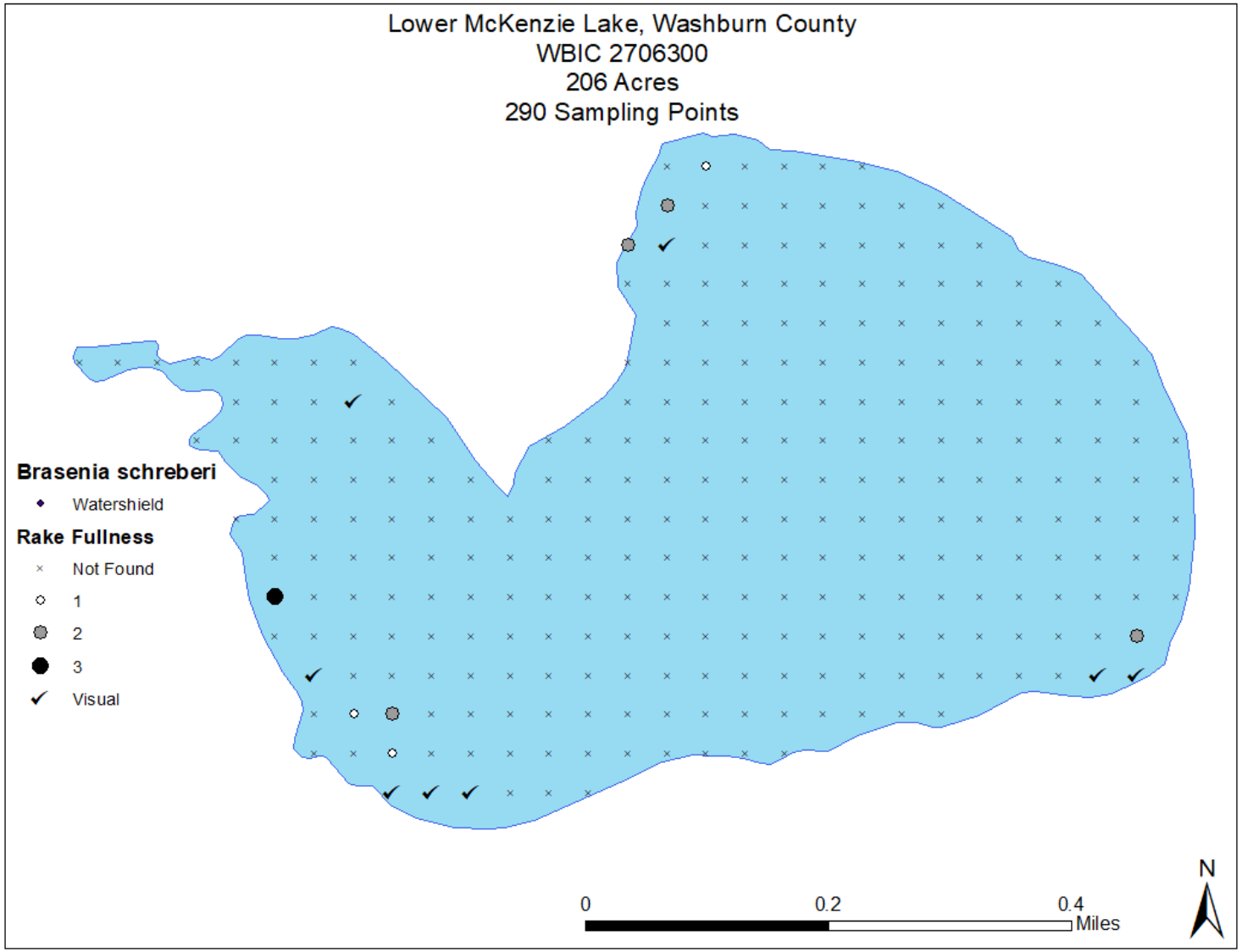

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Stuckenia pectinata
Sago Pondweed
Rake Fullness
Not Found
1
Visual
N
Kilometers
0
0.15
0.3
0.6

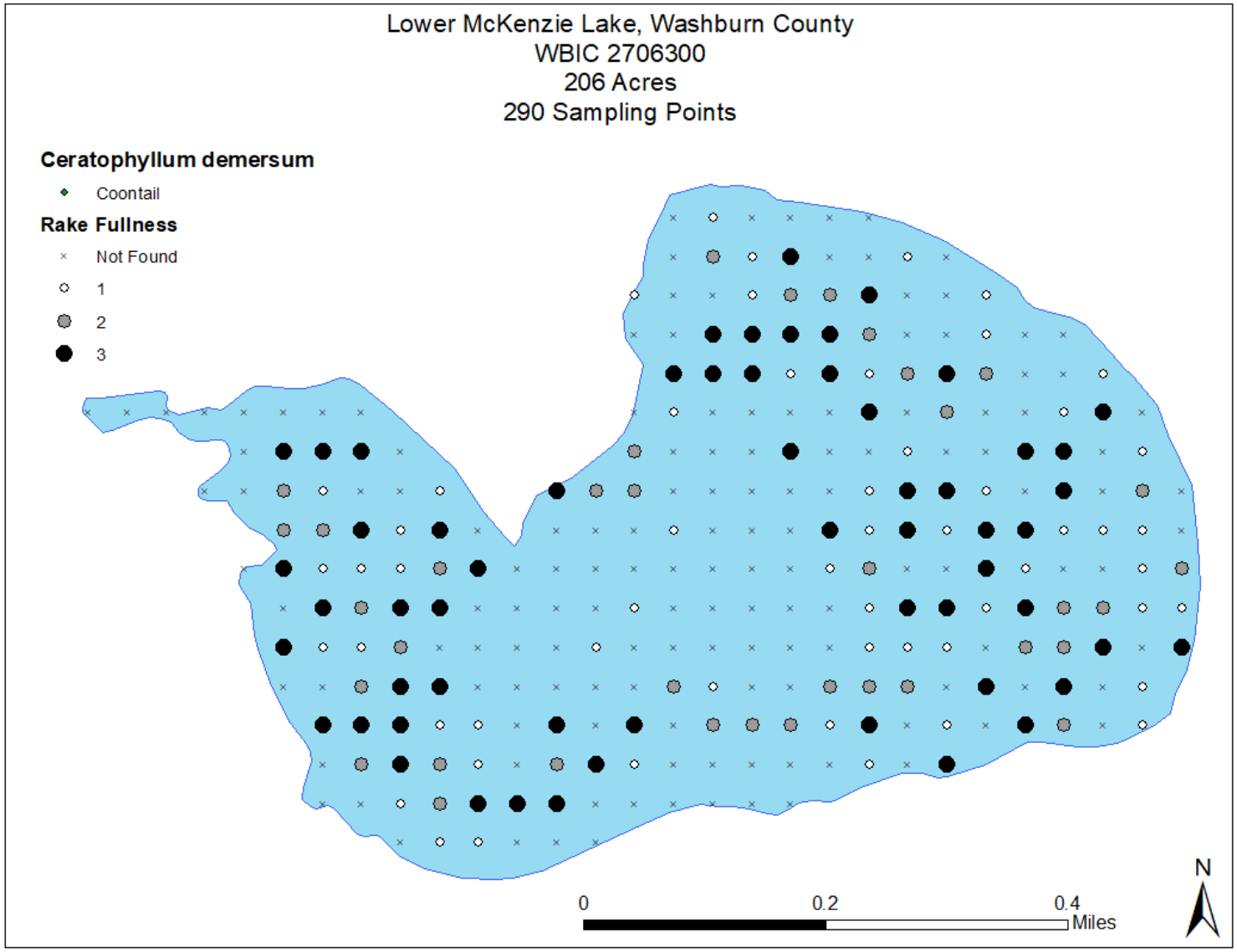

Middle McKenzie
Burnett County
WBIC 2706500
527 acres
631 Sampling Points
Vallisneria americana
Water Celery
Rake Fullness
Not Found
1
2
3
Visual
N
Kilometers
0
0.15
0.3
0.6

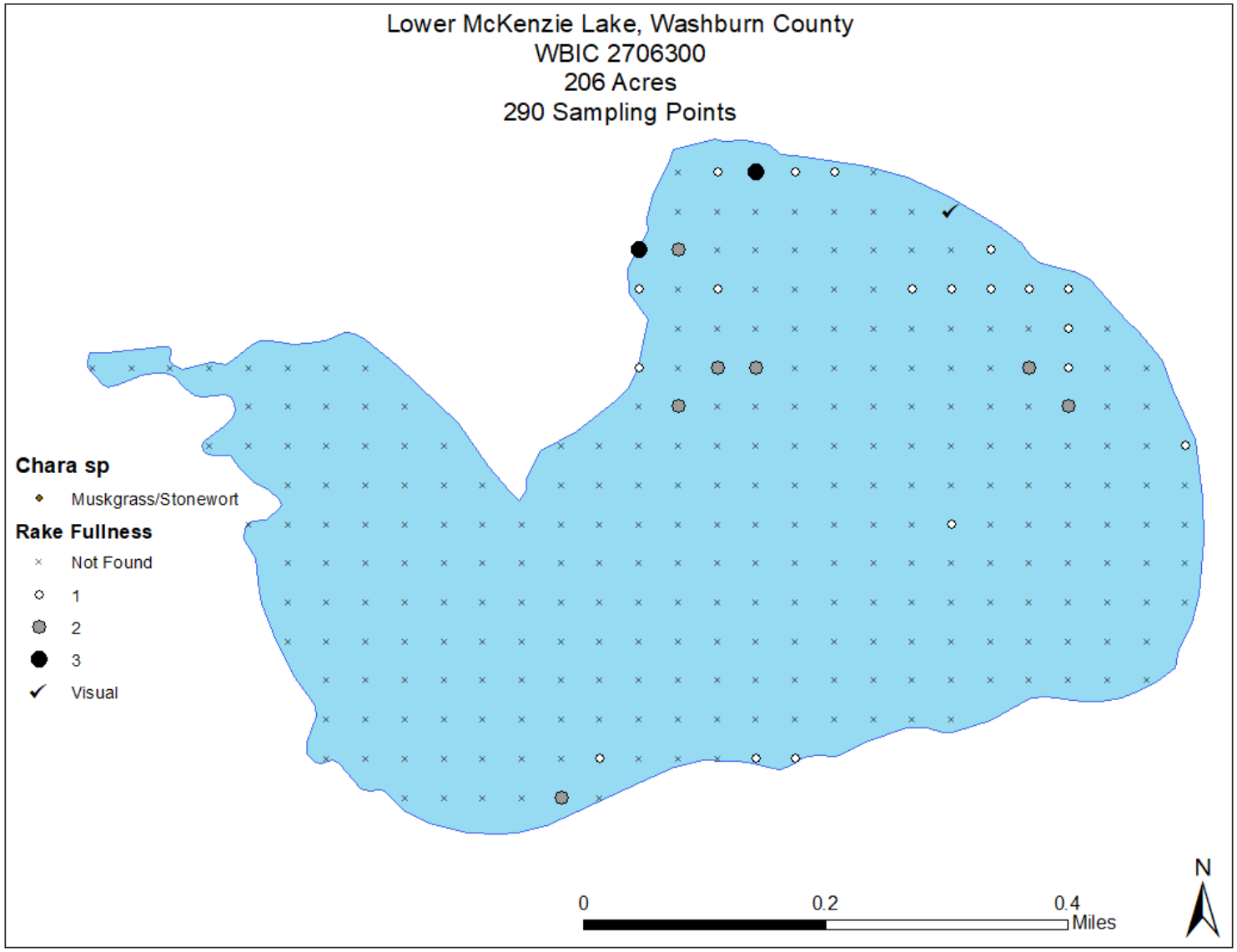
Appendix D. Lower McKenzie Aquatic Plant Maps

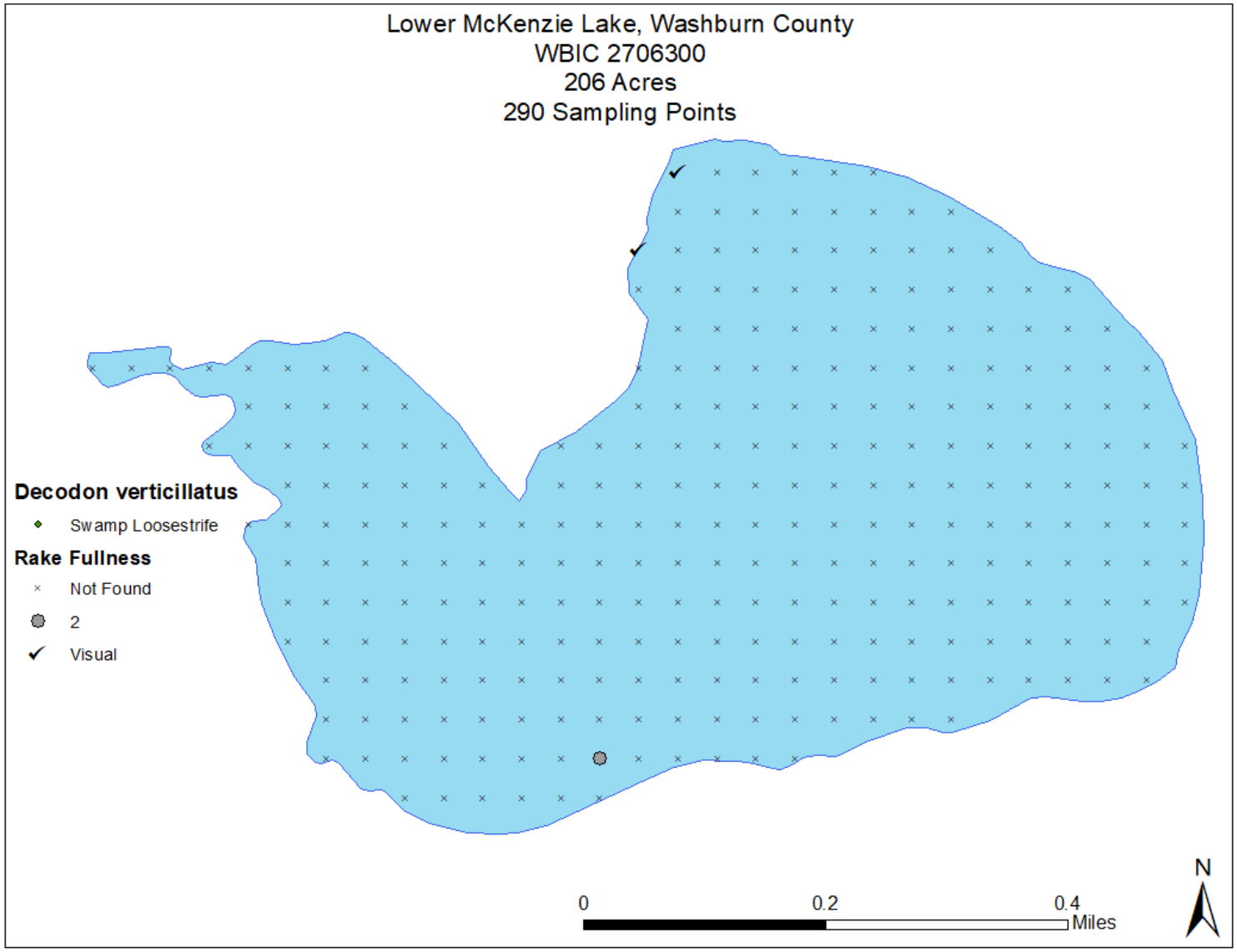


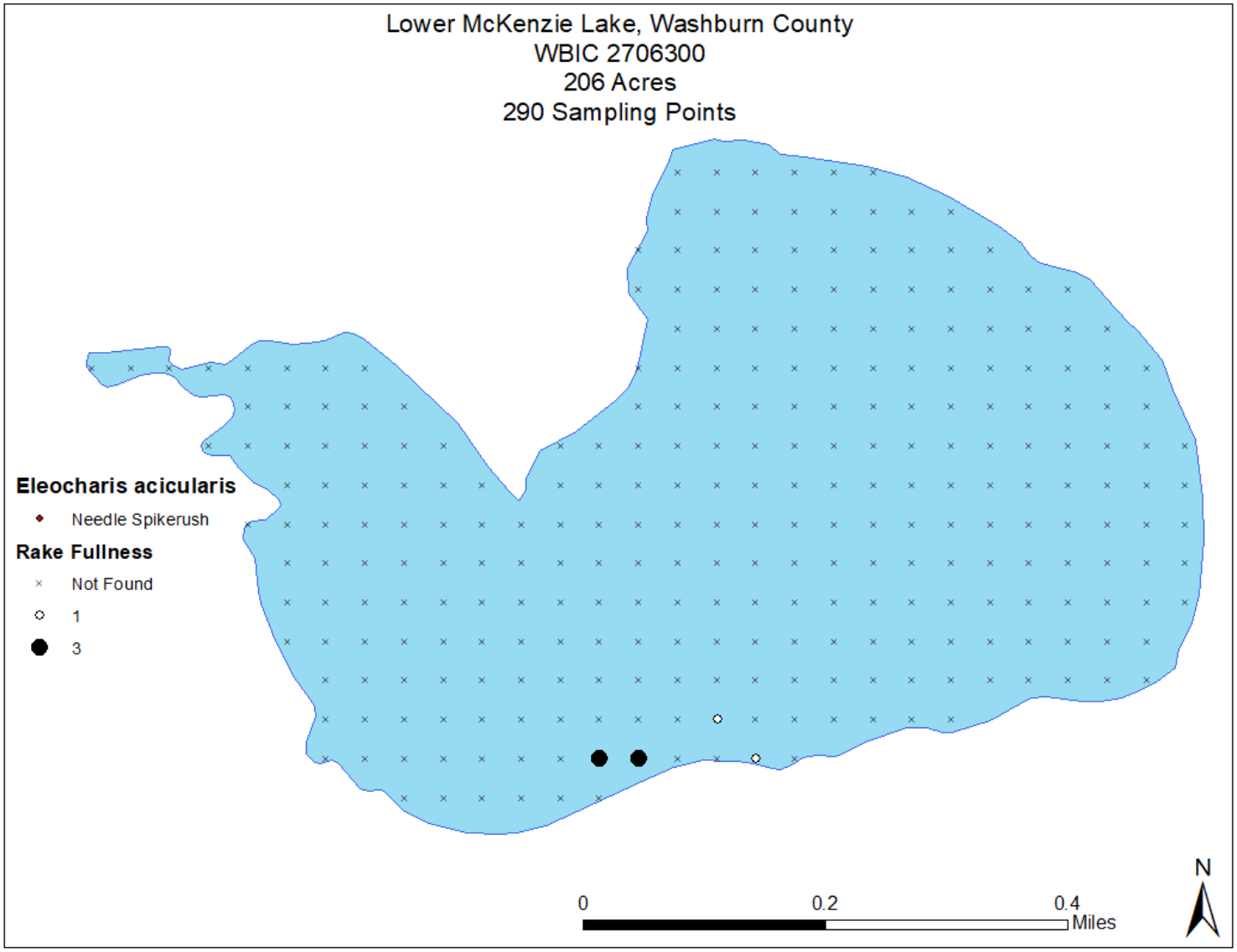

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Bidens beckii
Water Marigold
Rake Fullness
Not Found
1
2
Visual
0
0.2
0.4
Miles
N

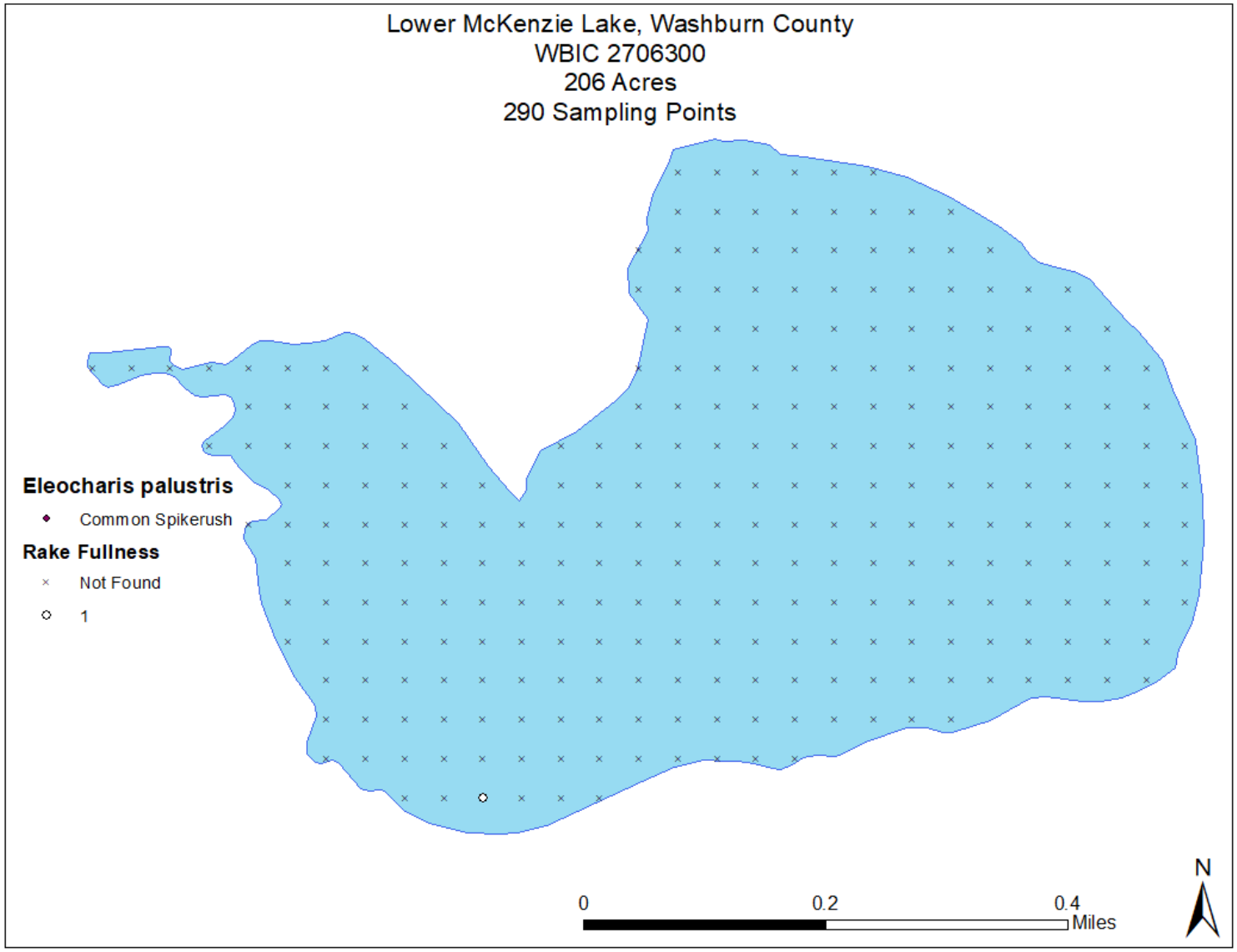

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Brasenia schreberi
Watershield
Rake Fullness
Not Found
1
2
3
Visual
0
0.2
0.4
Miles
N

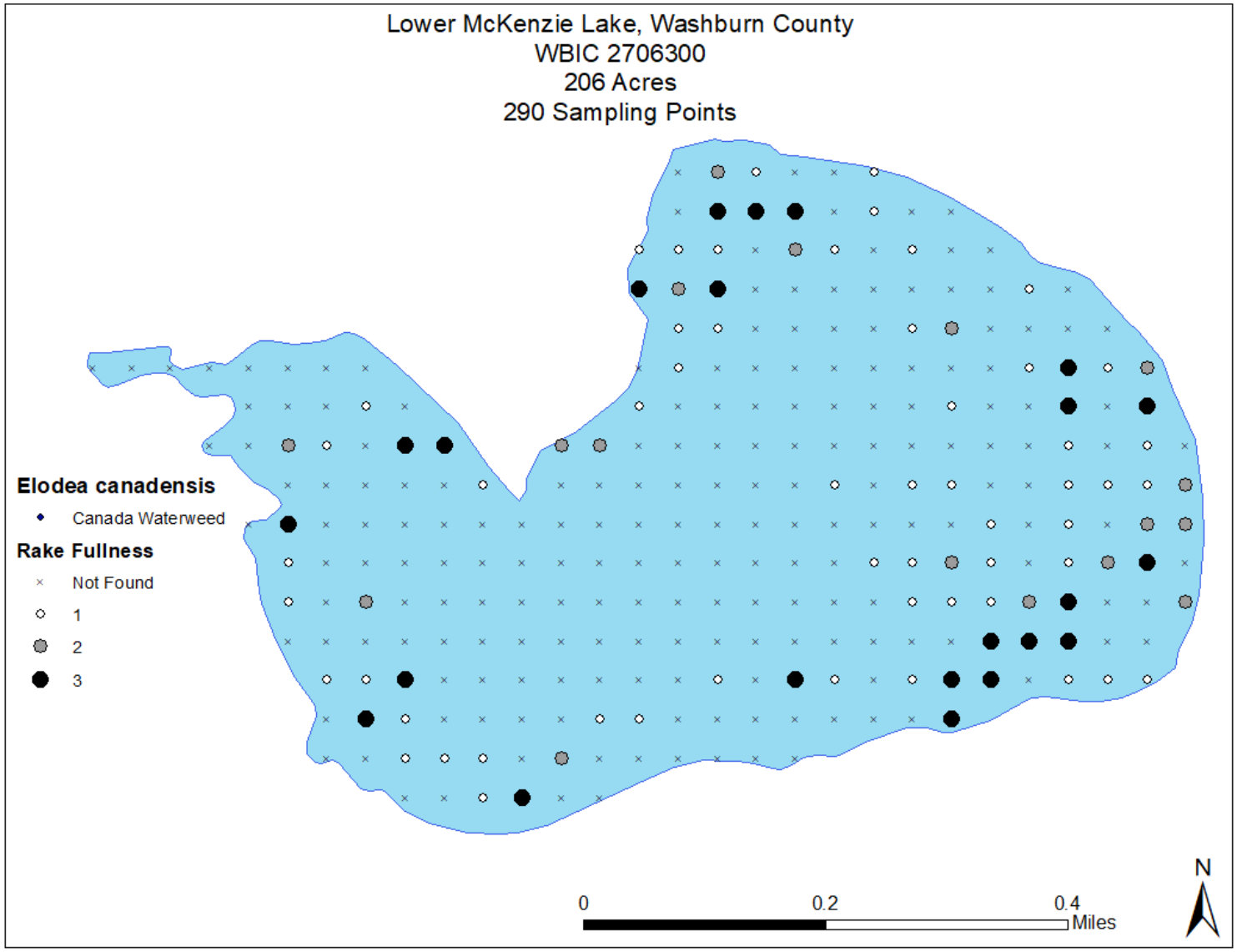

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Ceratophyllum demersum
Coontail
Rake Fullness
Not Found
1
2
3
0
0.2
0.4
Miles
N

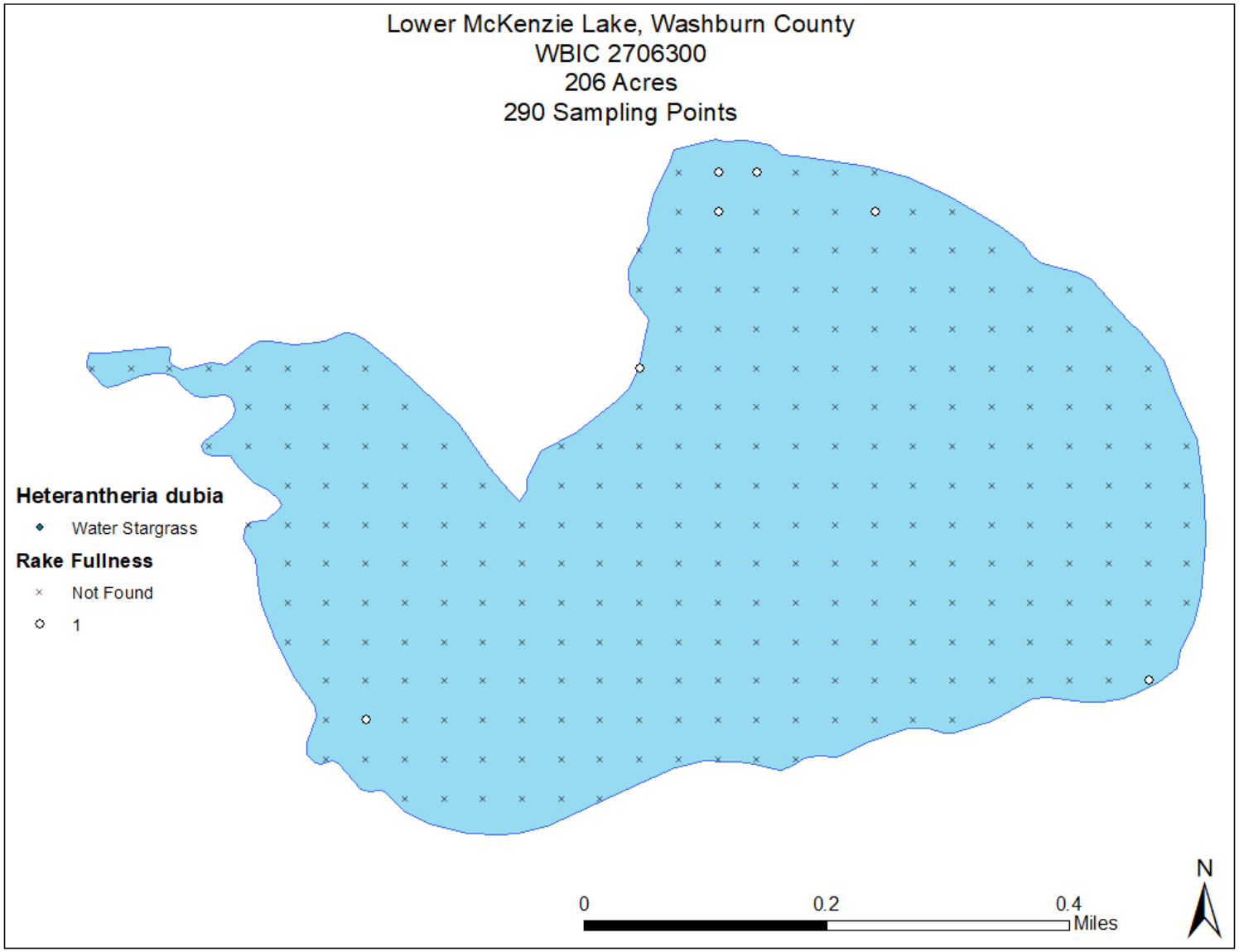

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Chara sp
Muskgrass/Stonewort
Rake Fullness
Not Found
1
2
3
Visual
0
0.2
0.4
Miles
N

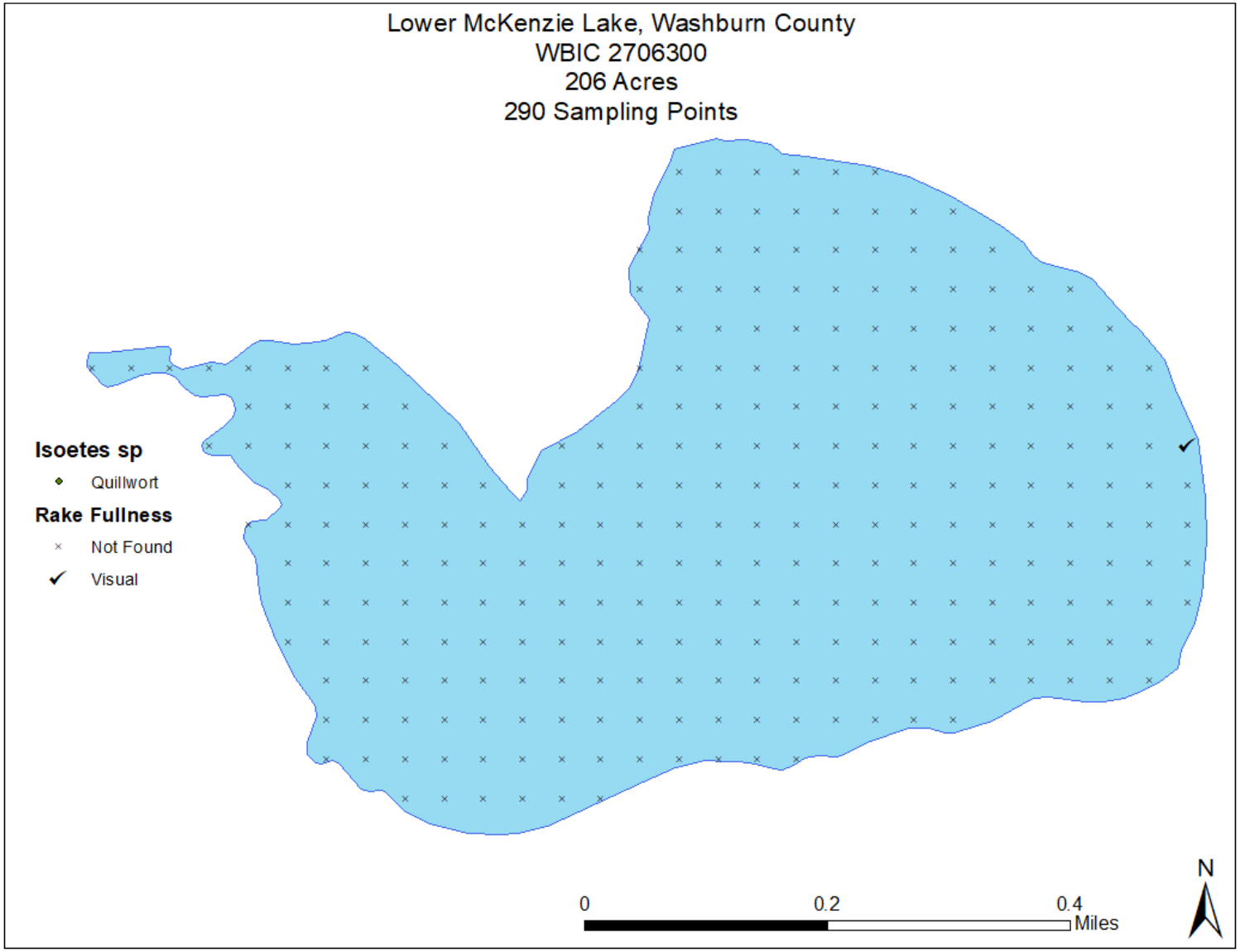

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Decodon verticillatus
Swamp Loosestrife
Rake Fullness
Not Found
2
Visual
0
0.2
0.4
Miles
N

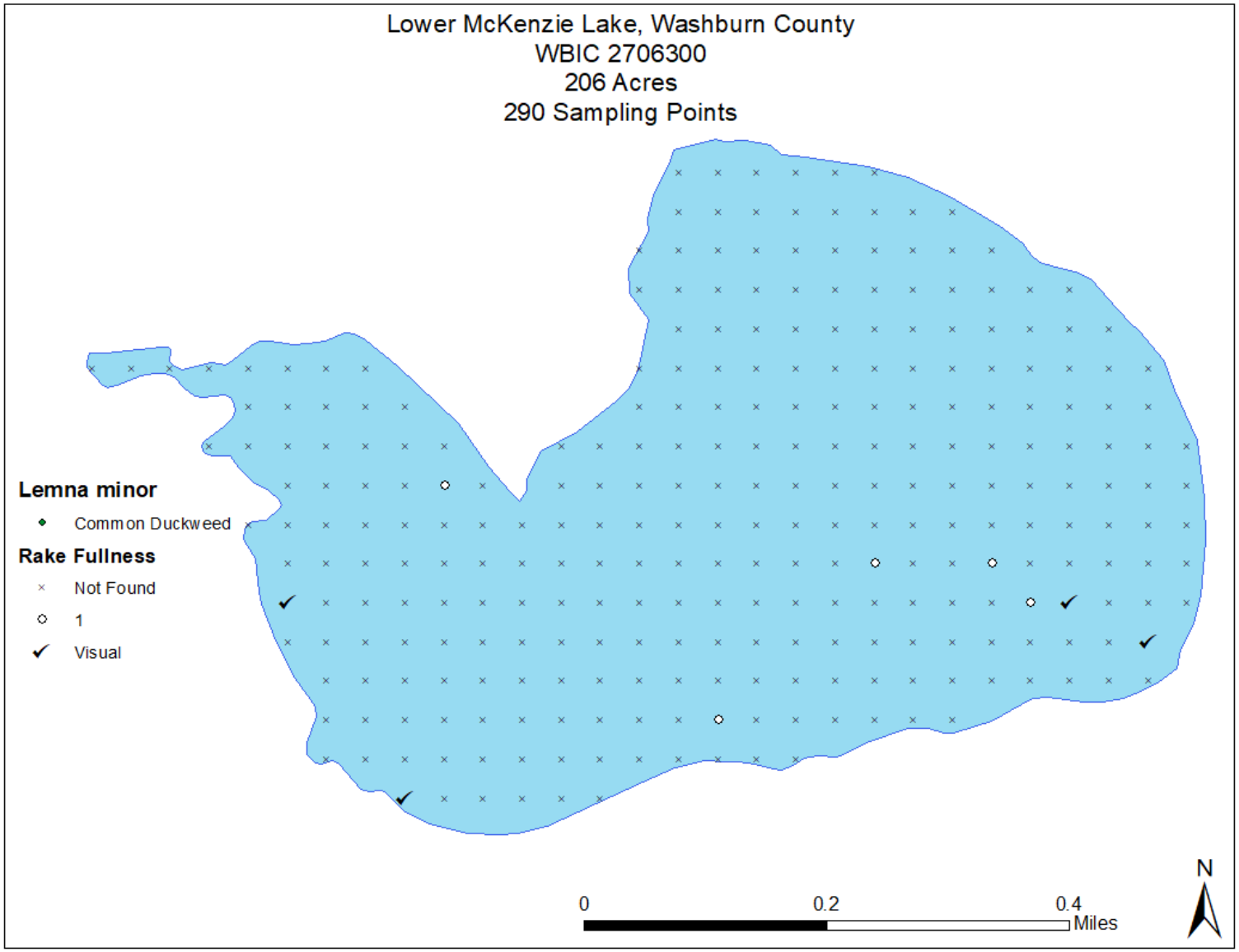

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Eleocharis acicularis
Needle Spikerush
Rake Fullness
Not Found
1
3
0
0.2
0.4
Miles
N

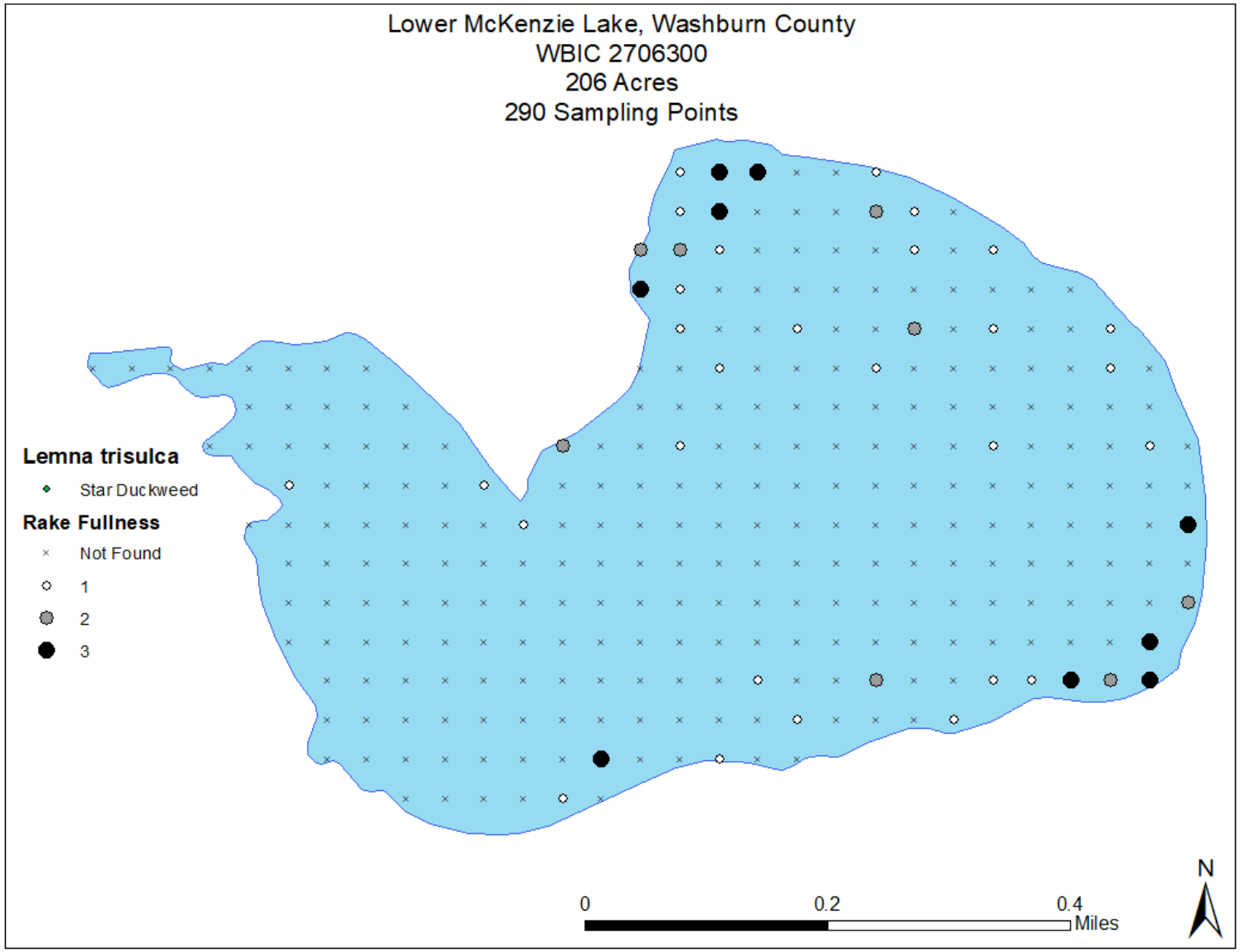

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Eleocharis palustris
Common Spikerush
Rake Fullness
Not Found
1
0
0.2
0.4
Miles
N

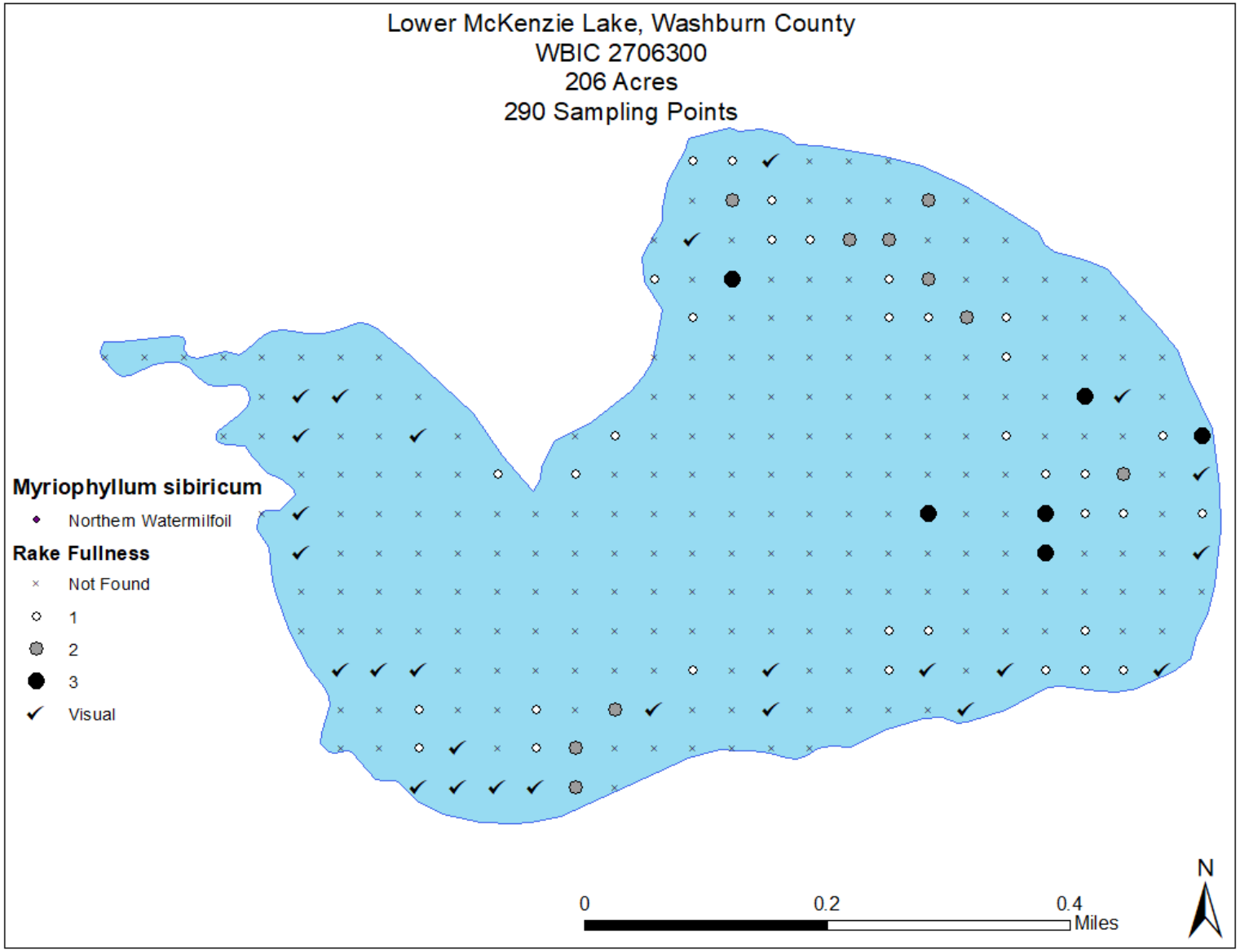

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Elodea canadensis
Canada Waterweed
Rake Fullness
Not Found
1
2
3
0
0.2
0.4
Miles
N

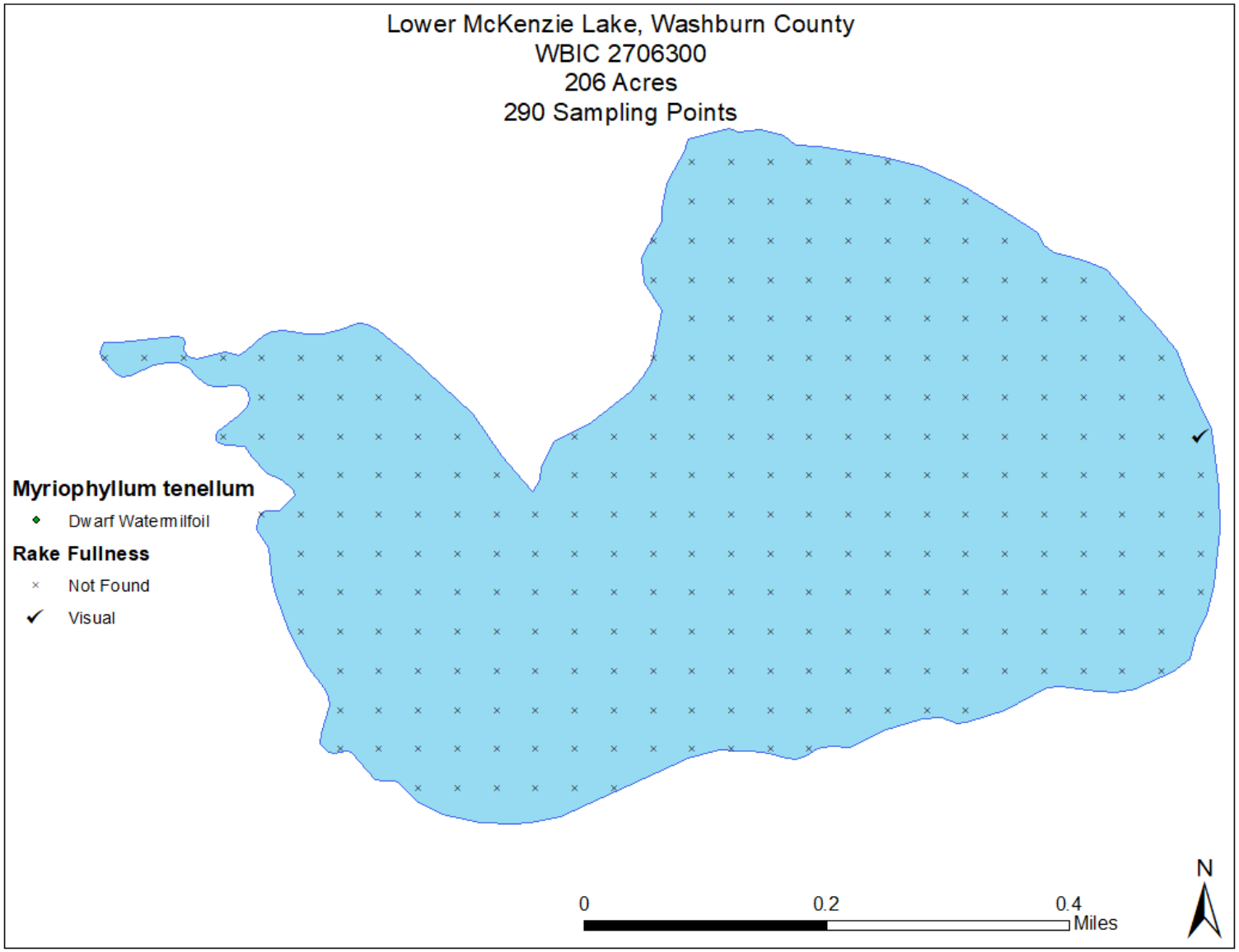

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Heterantheria dubia
Water Stargrass
Rake Fullness
Not Found
1
0
0.2
0.4
Miles
N

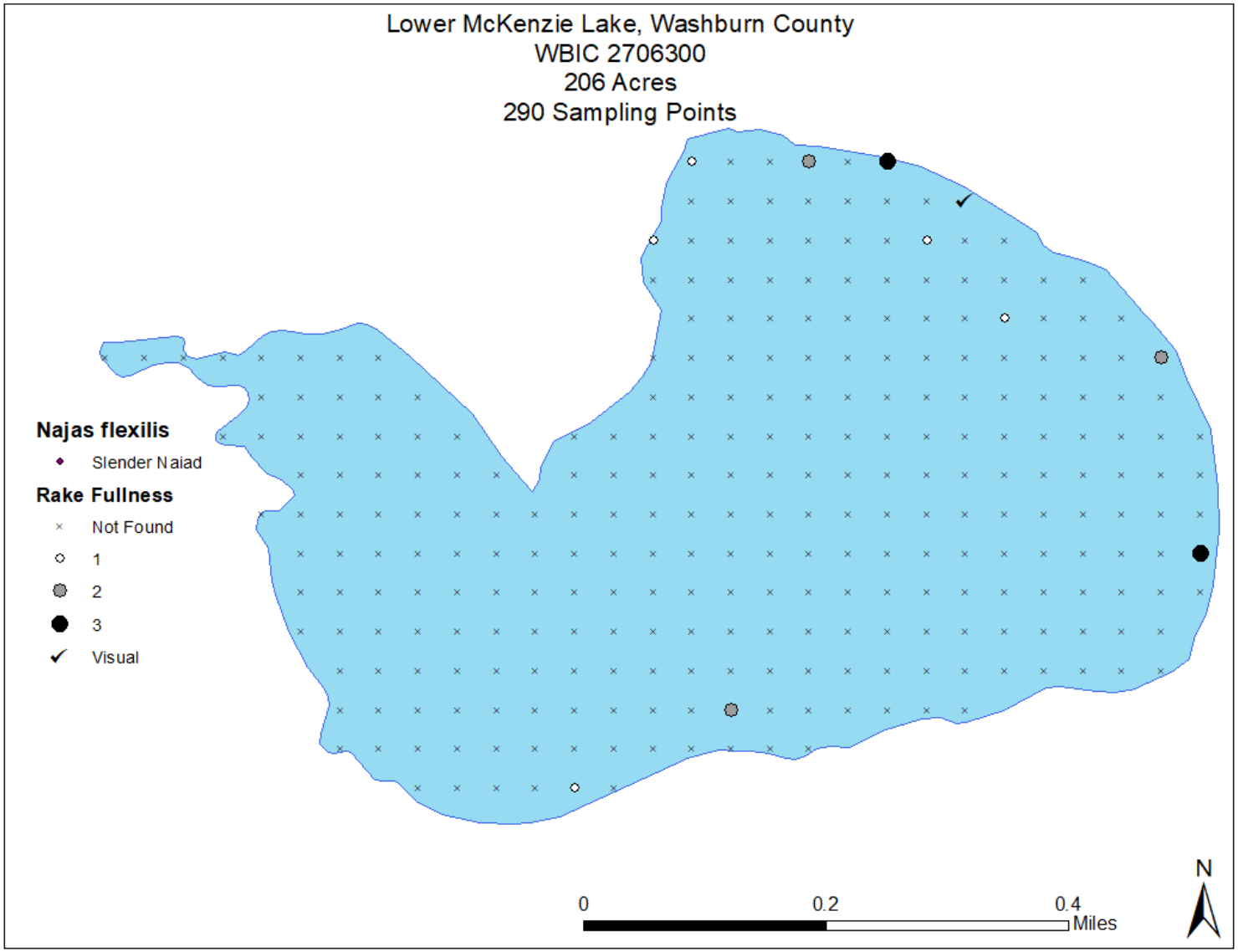

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Isoetes sp
Quillwort
Rake Fullness
Not Found
Visual
0
0.2
0.4
Miles
N

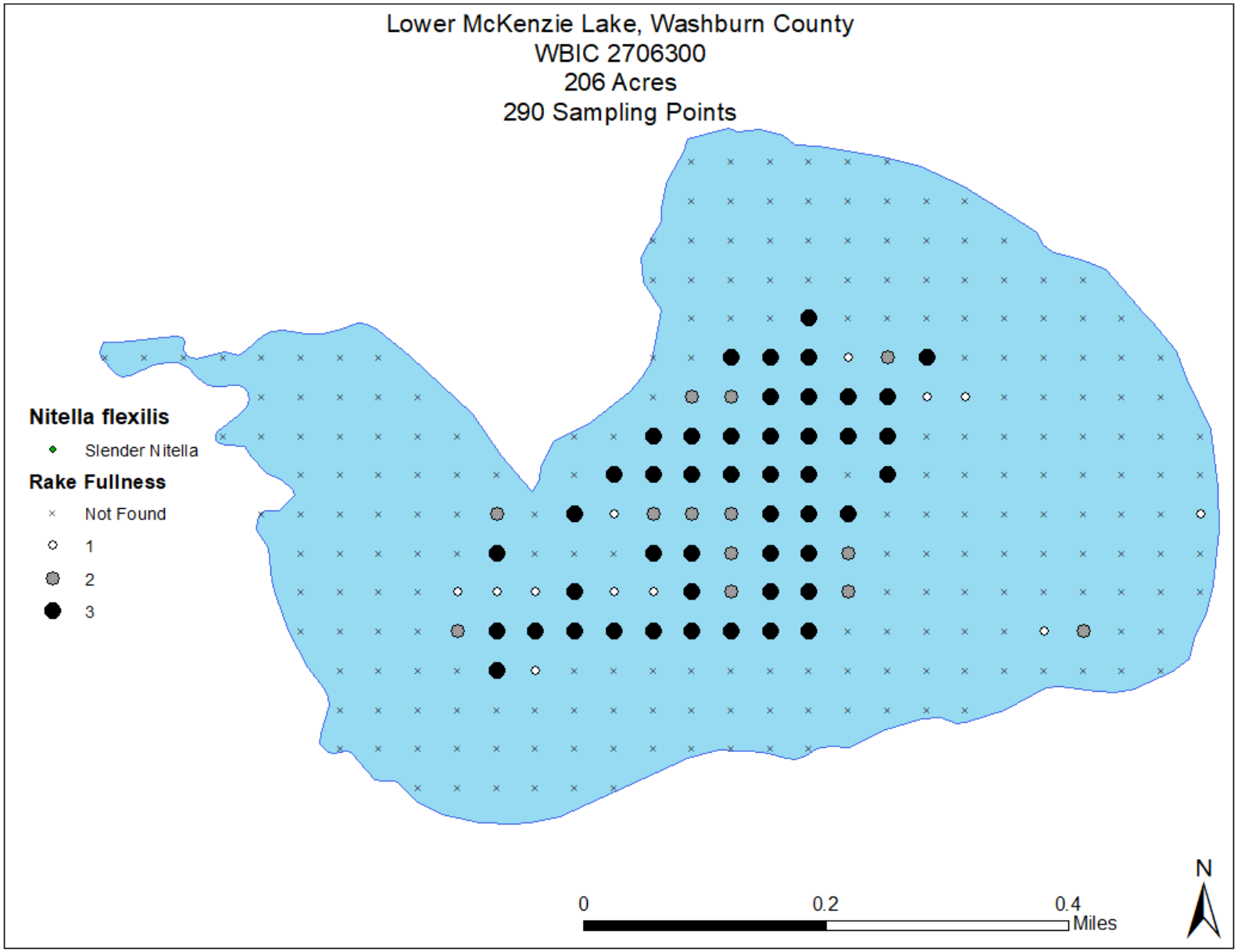

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Lemna minor
Common Duckweed
Rake Fullness
Not Found
1
Visual
0
0.2
0.4
Miles
N

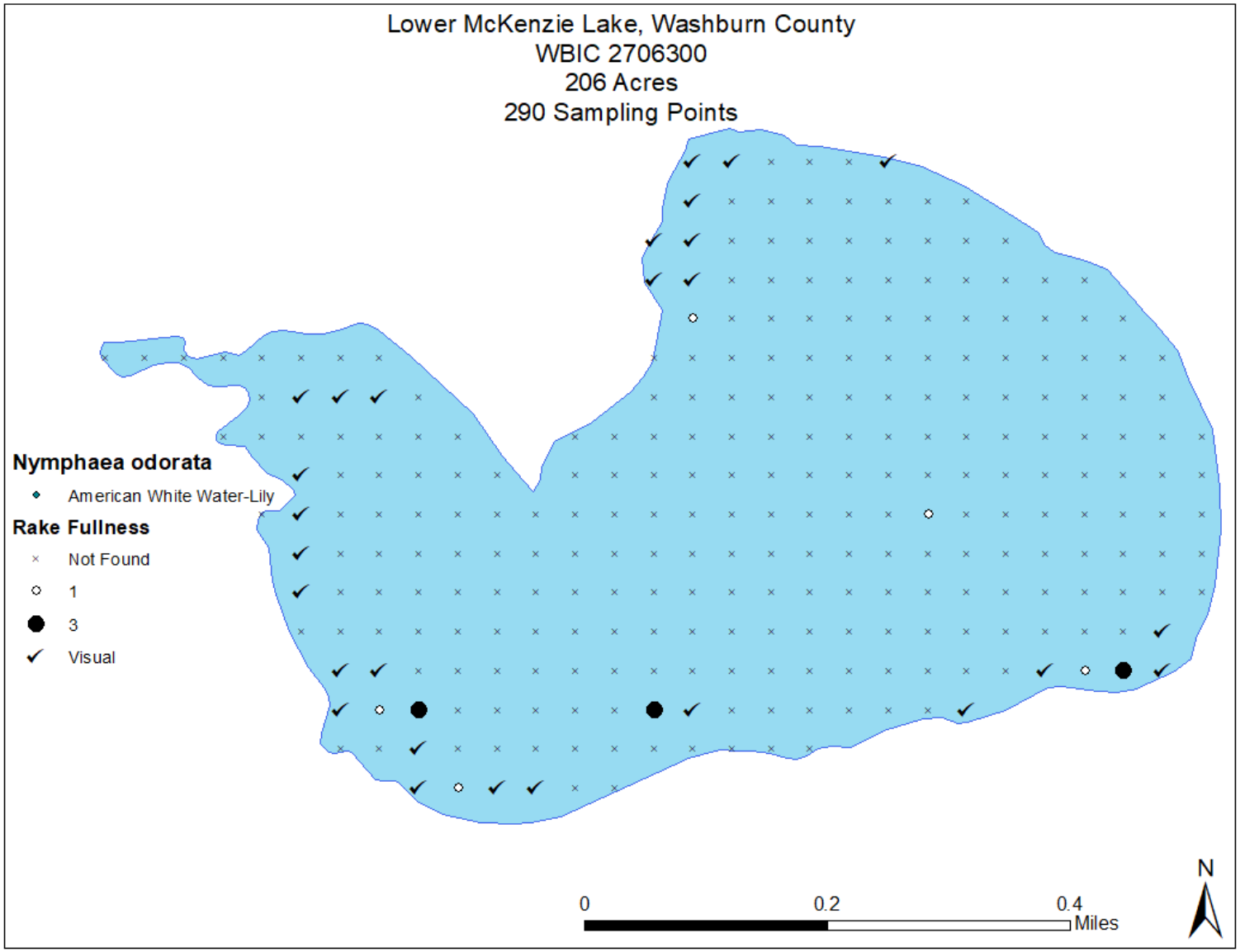

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Lemna trisulca
Star Duckweed
Rake Fullness
Not Found
1
2
3
0
0.2
0.4
Miles
N

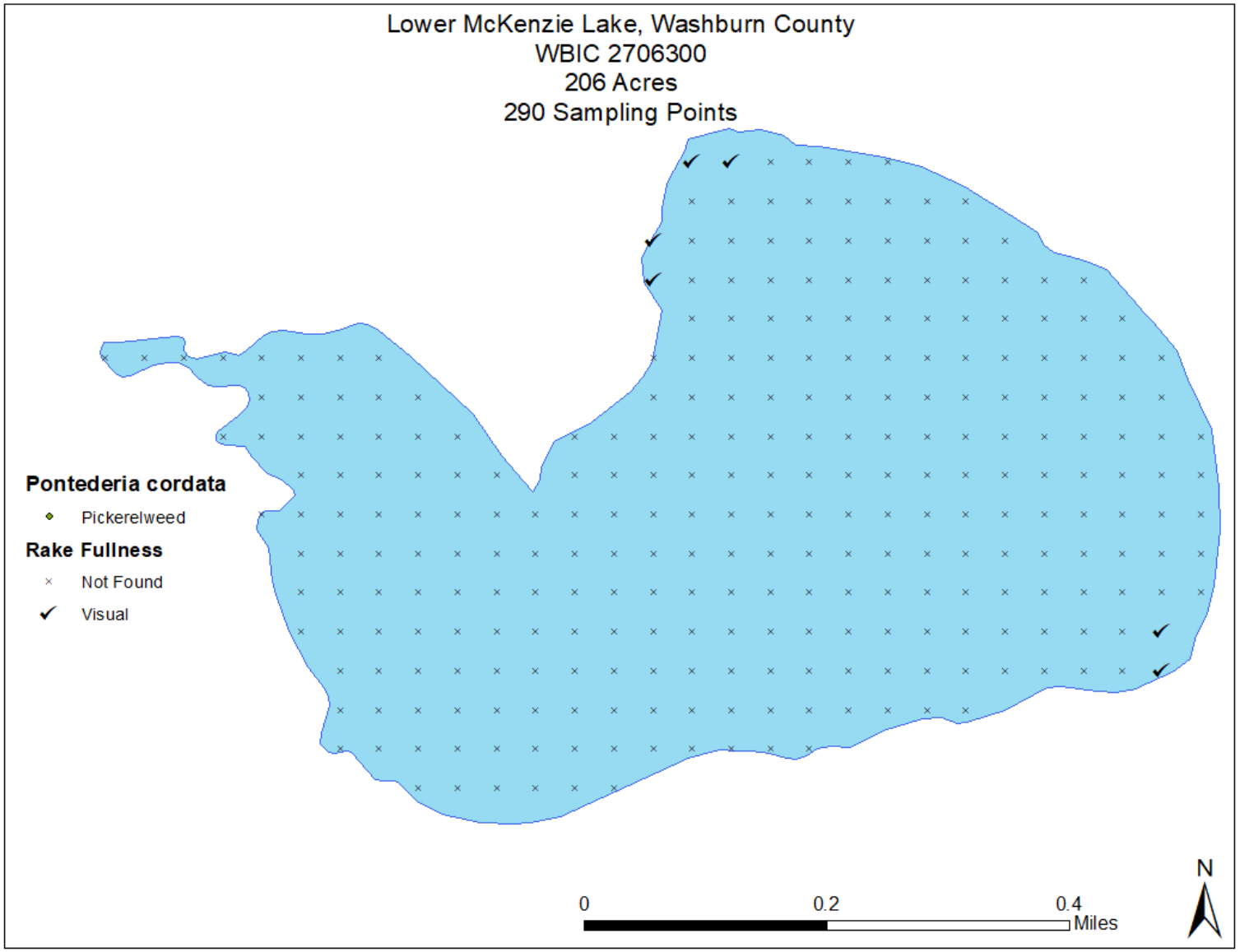

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Myriophyllum sibiricum
Northern Watermilfoil
Rake Fullness
Not Found
1
2
3
Visual
0
0.2
0.4
Miles
N

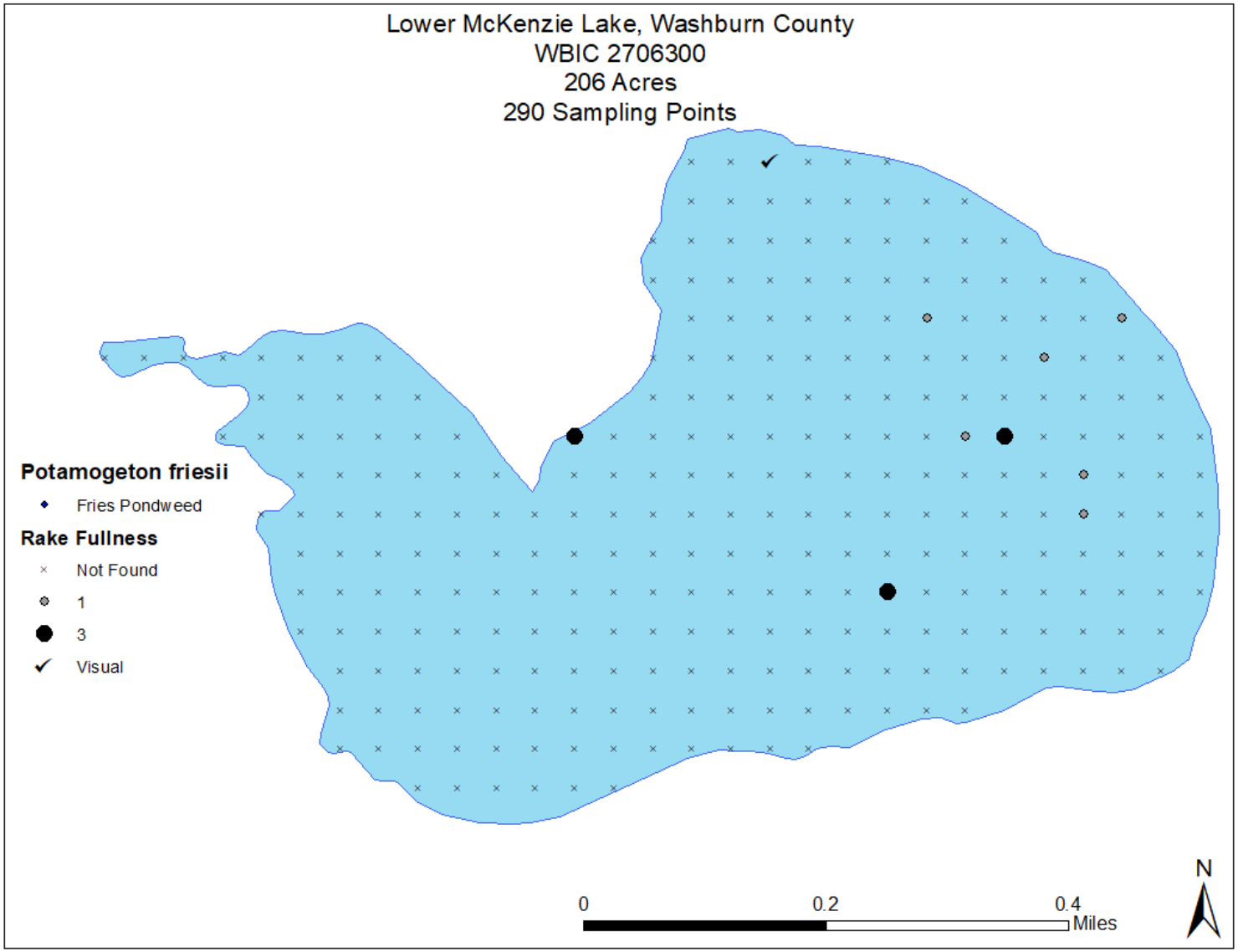

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Myriophyllum tenellum
Dwarf Watermilfoil
Rake Fullness
Not Found
Visual
0
0.2
0.4
Miles
N

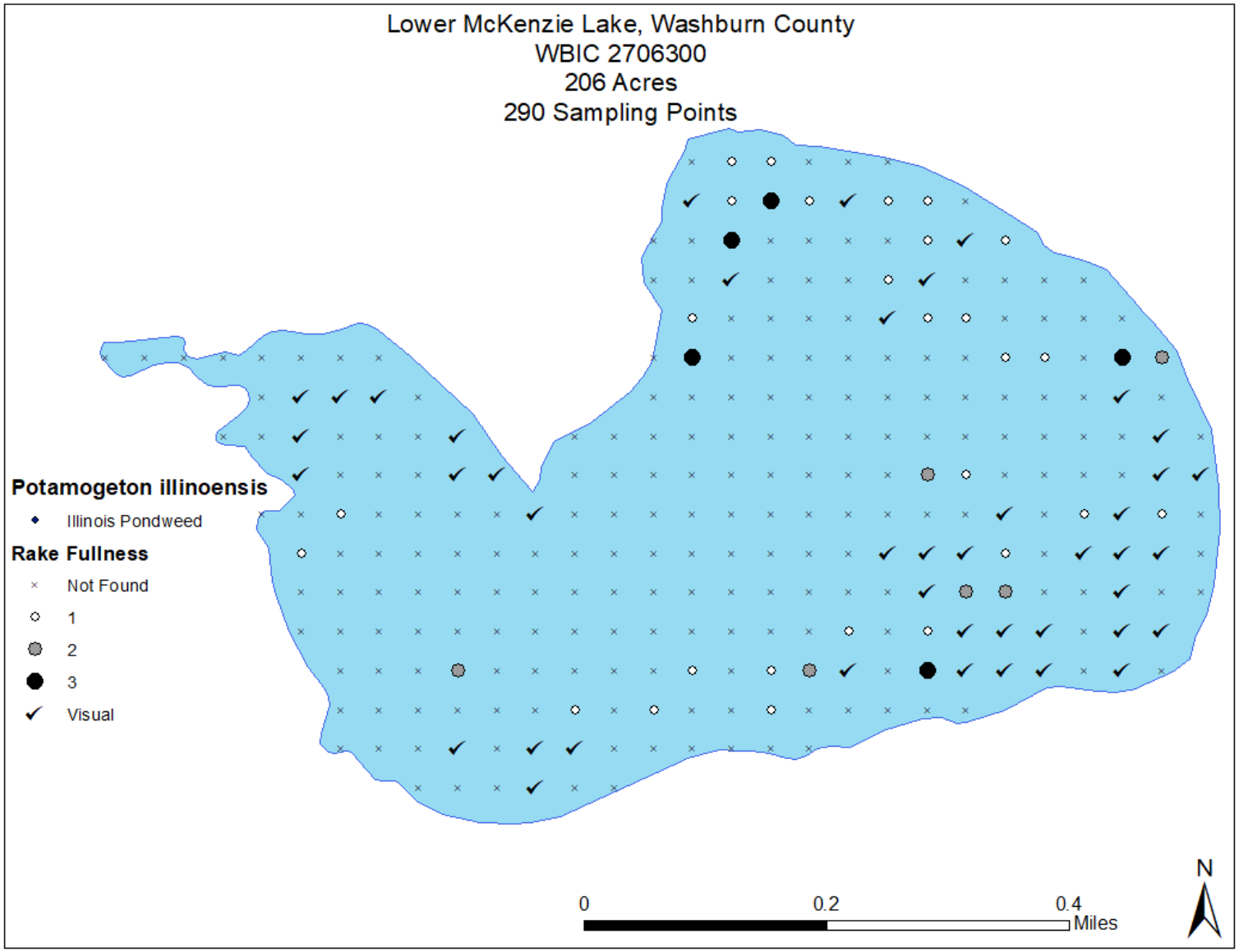

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Najas flexilis
Slender Naiad
Rake Fullness
Not Found
1
2
3
Visual
0
0.2
0.4
Miles
N

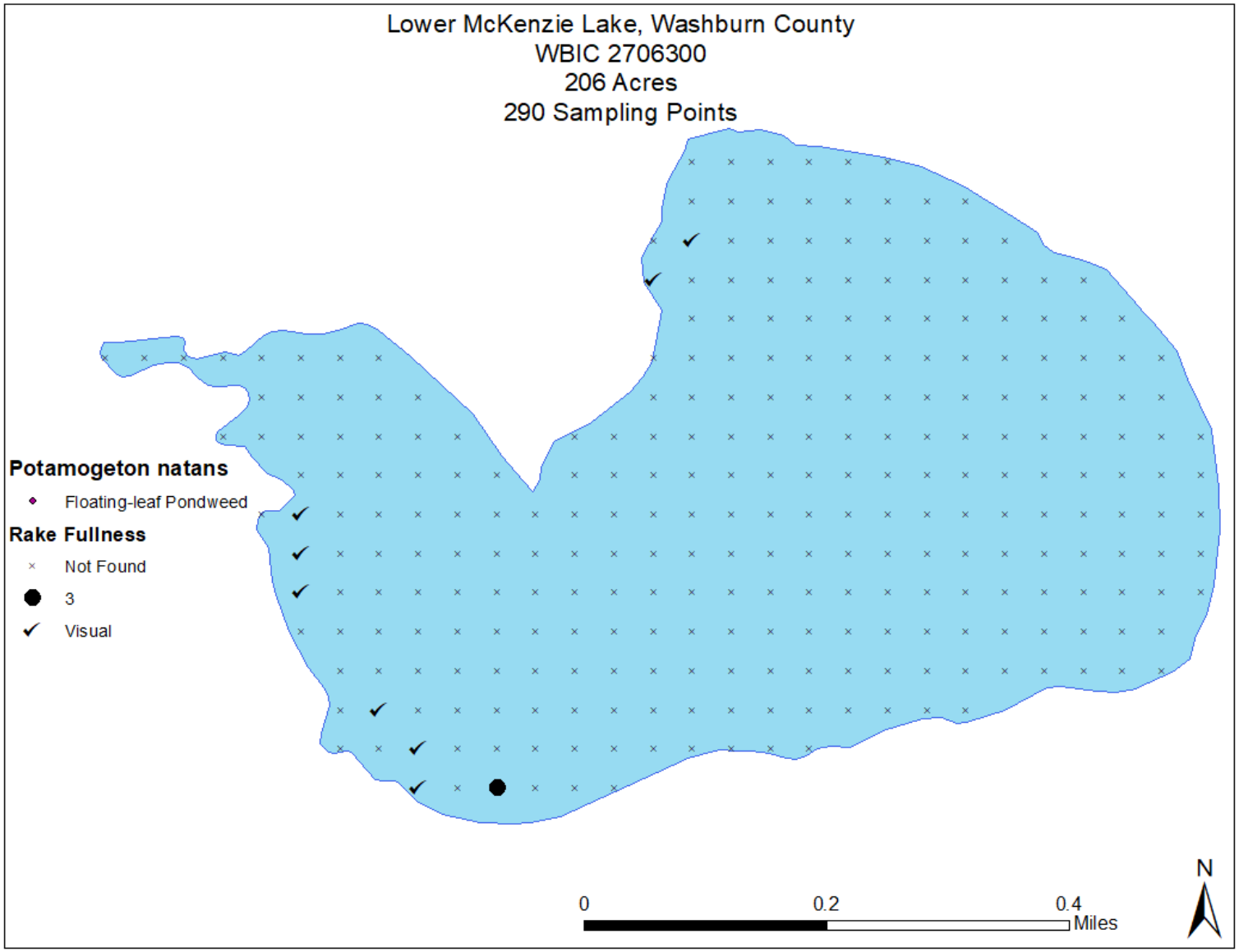

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Nitella flexilis
Slender Nitella
Rake Fullness
Not Found
1
2
3
0
0.2
0.4
Miles
N

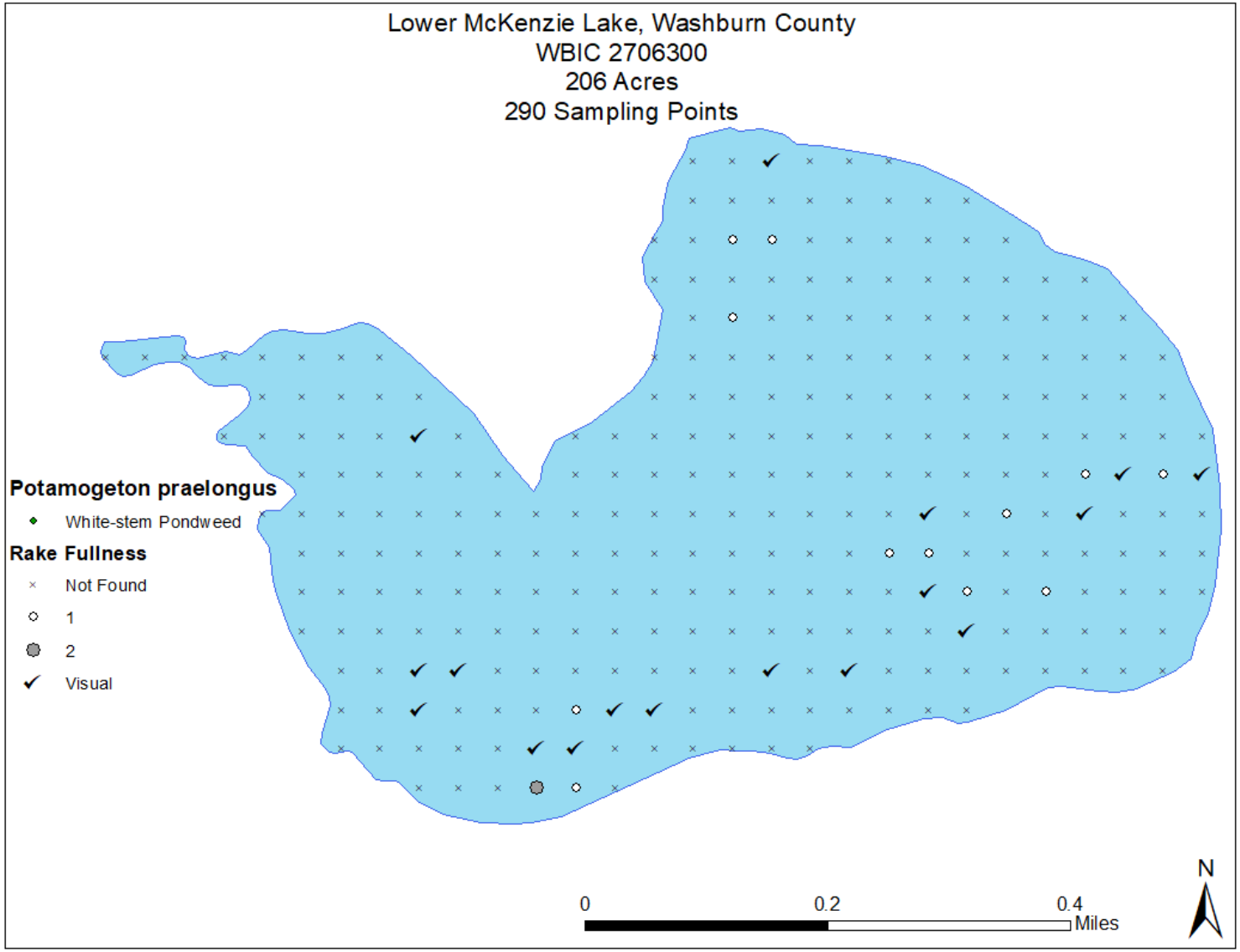

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Nymphaea odorata
American White Water-Lily
Rake Fullness
Not Found
1
3
Visual
0
0.2
0.4
Miles
N

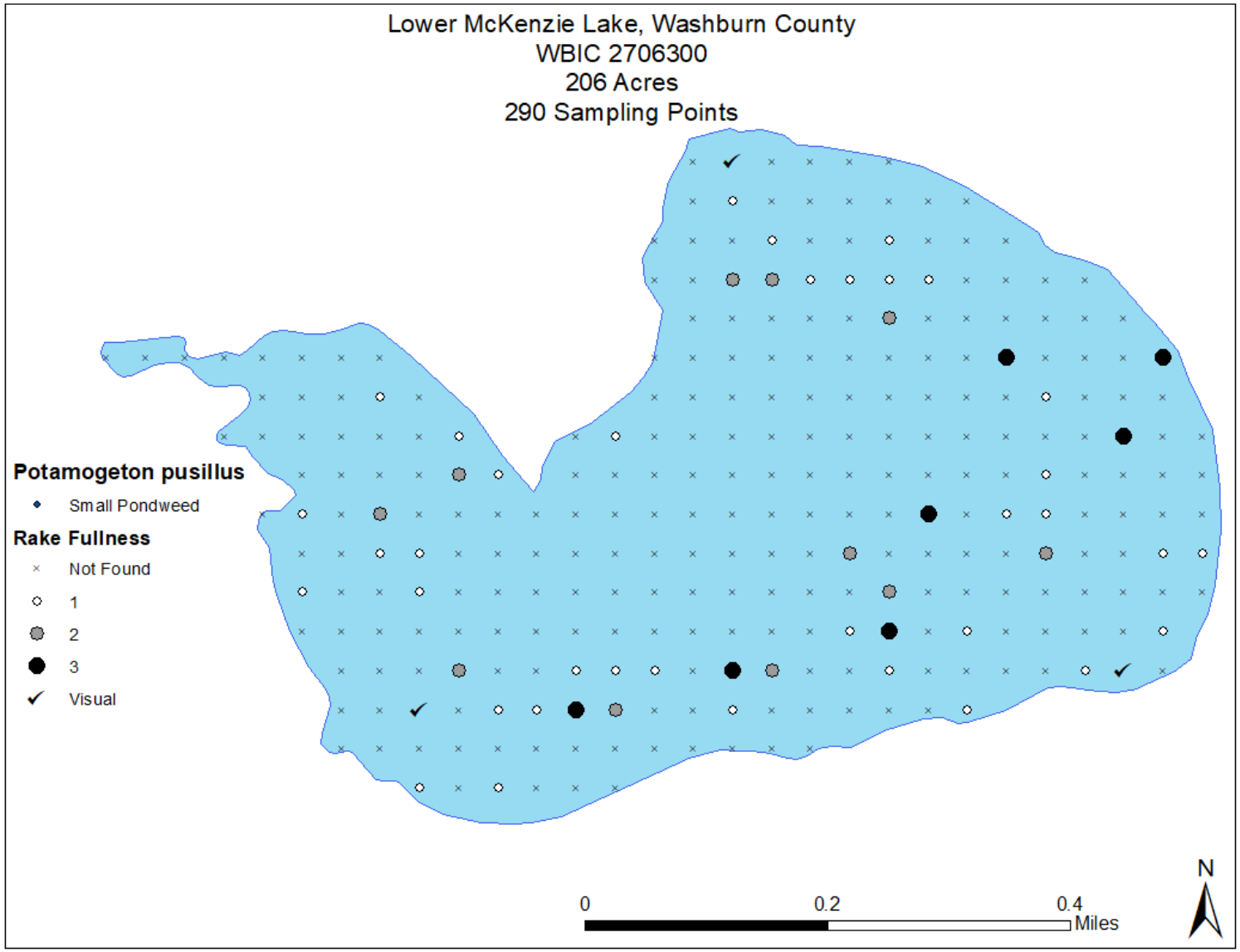

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Pontederia cordata
Pickerelweed
Rake Fullness
Not Found
Visual
0
0.2
0.4
Miles
N

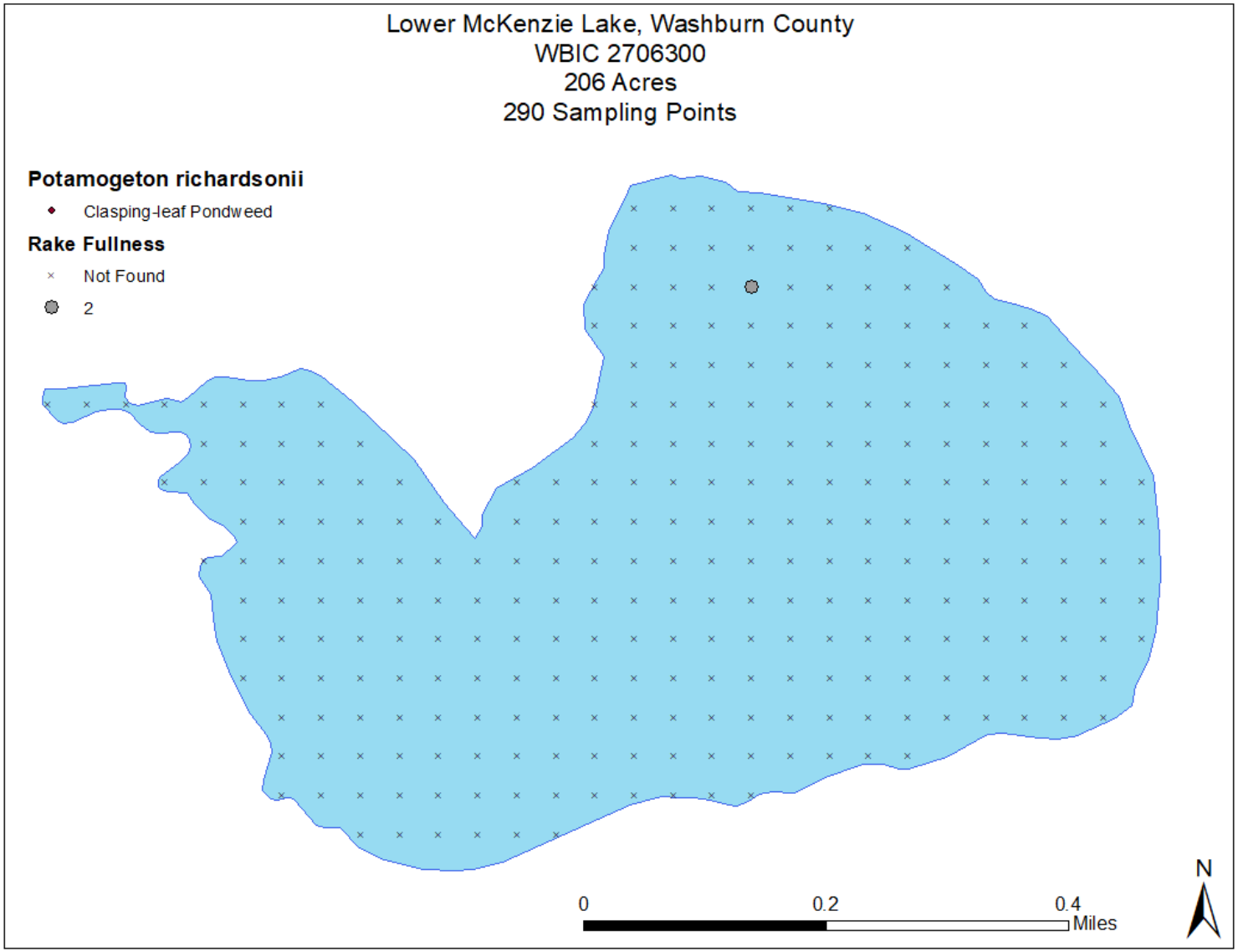

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Potamogeton friesii
Fries Pondweed
Rake Fullness
Not Found
1
3
Visual
0
0.2
0.4
Miles
N

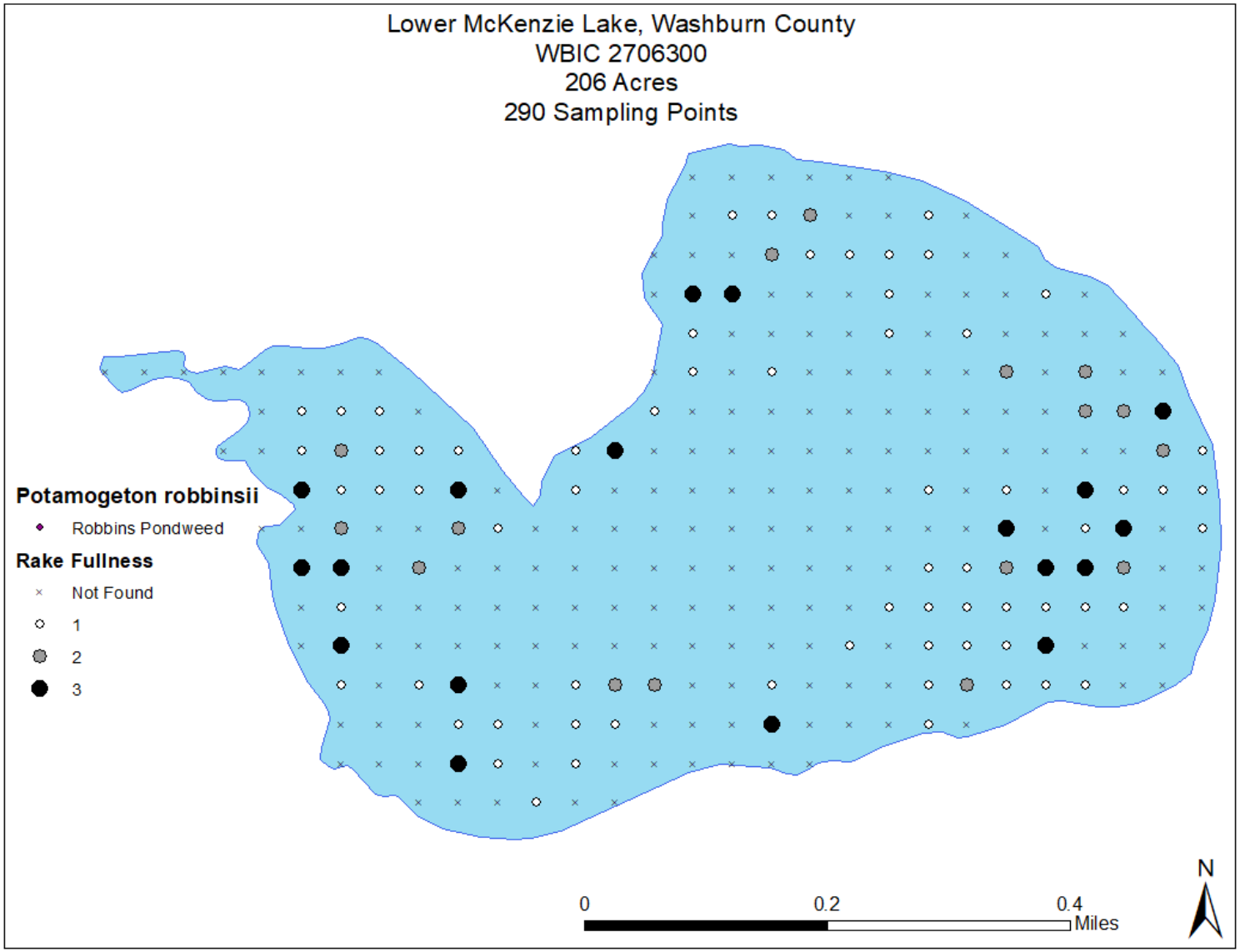

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Potamogeton illinoensis
Illinois Pondweed
Rake Fullness
Not Found
1
2
3
Visual
0
0.2
0.4
Miles
N

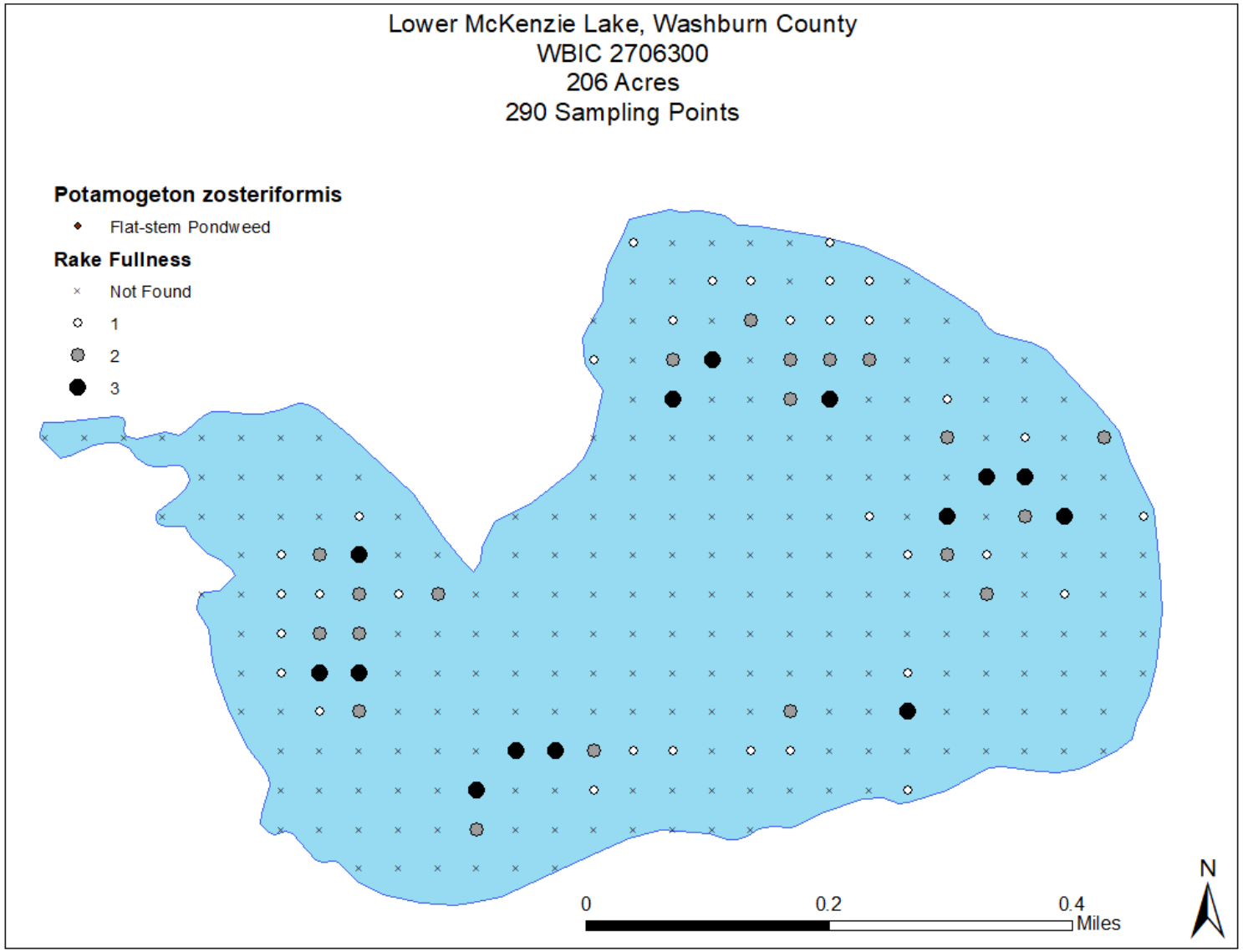

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Potamogeton natans
Floating-leaf Pondweed
Rake Fullness
Not Found
3
Visual
0
0.2
0.4
Miles
N

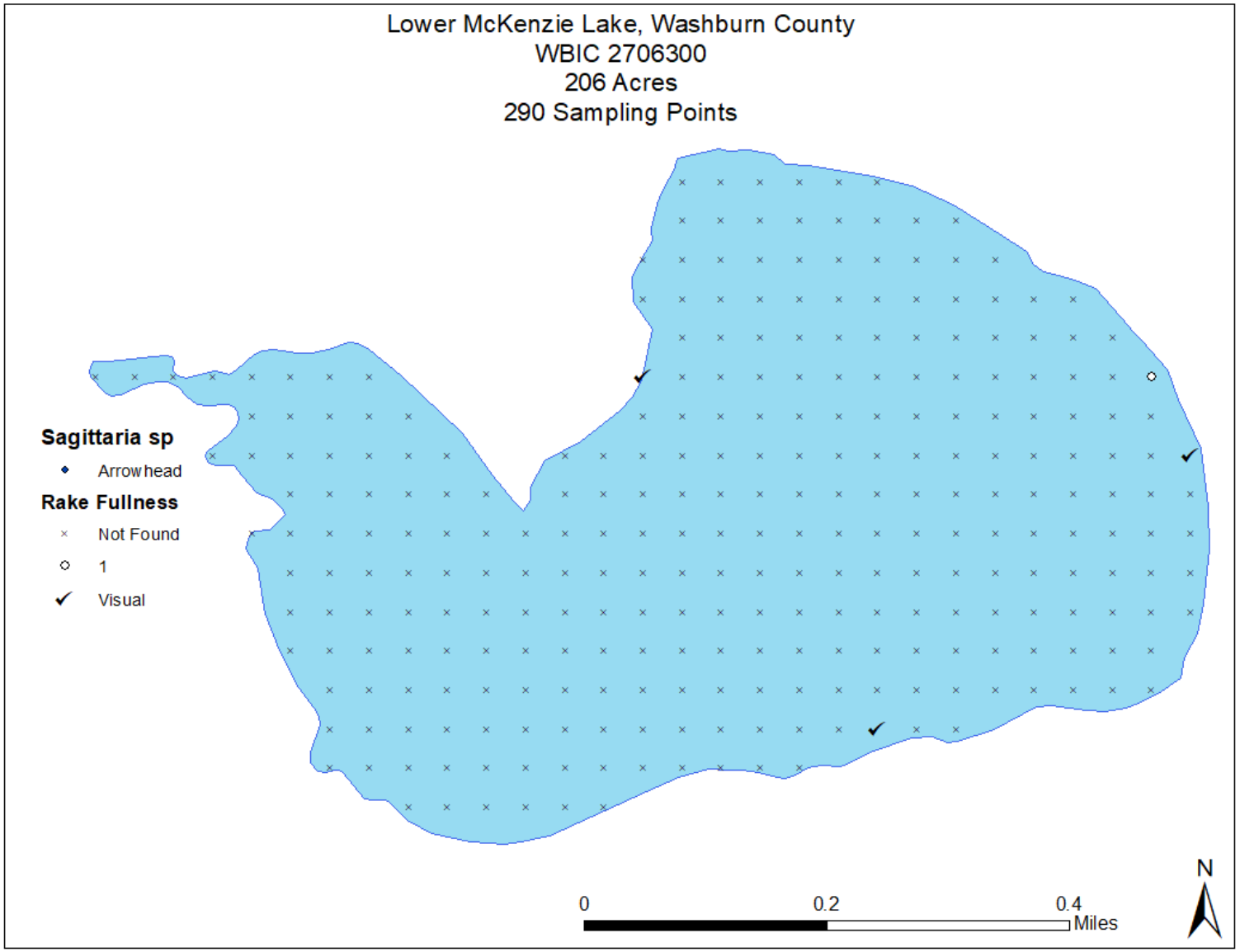

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Potamogeton praelongus
White-stem Pondweed
Rake Fullness
Not Found
1
2
Visual
0
0.2
0.4
Miles
N

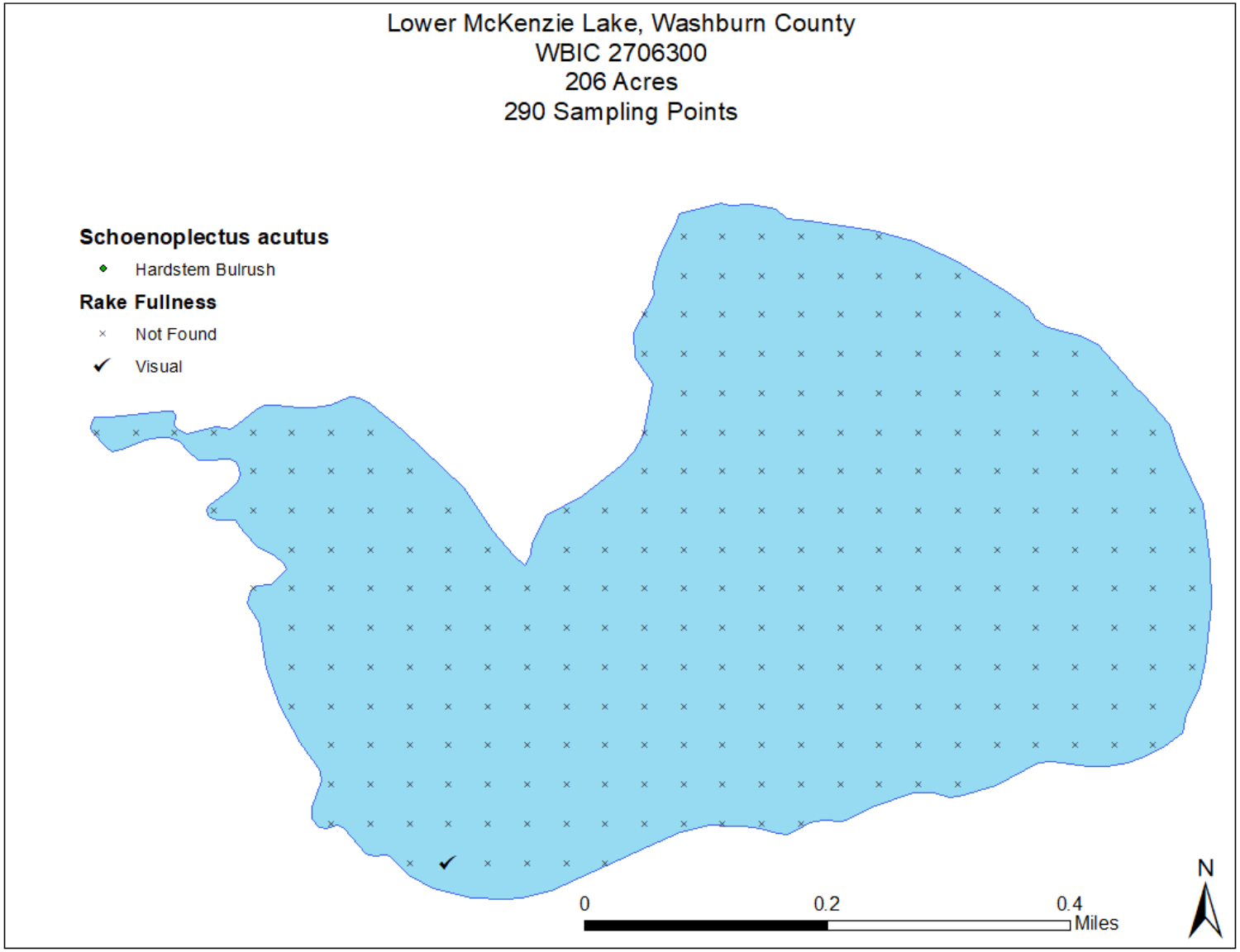

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Potamogeton pusillus
Small Pondweed
Rake Fullness
Not Found
1
2
3
Visual
0
0.2
0.4
Miles
N

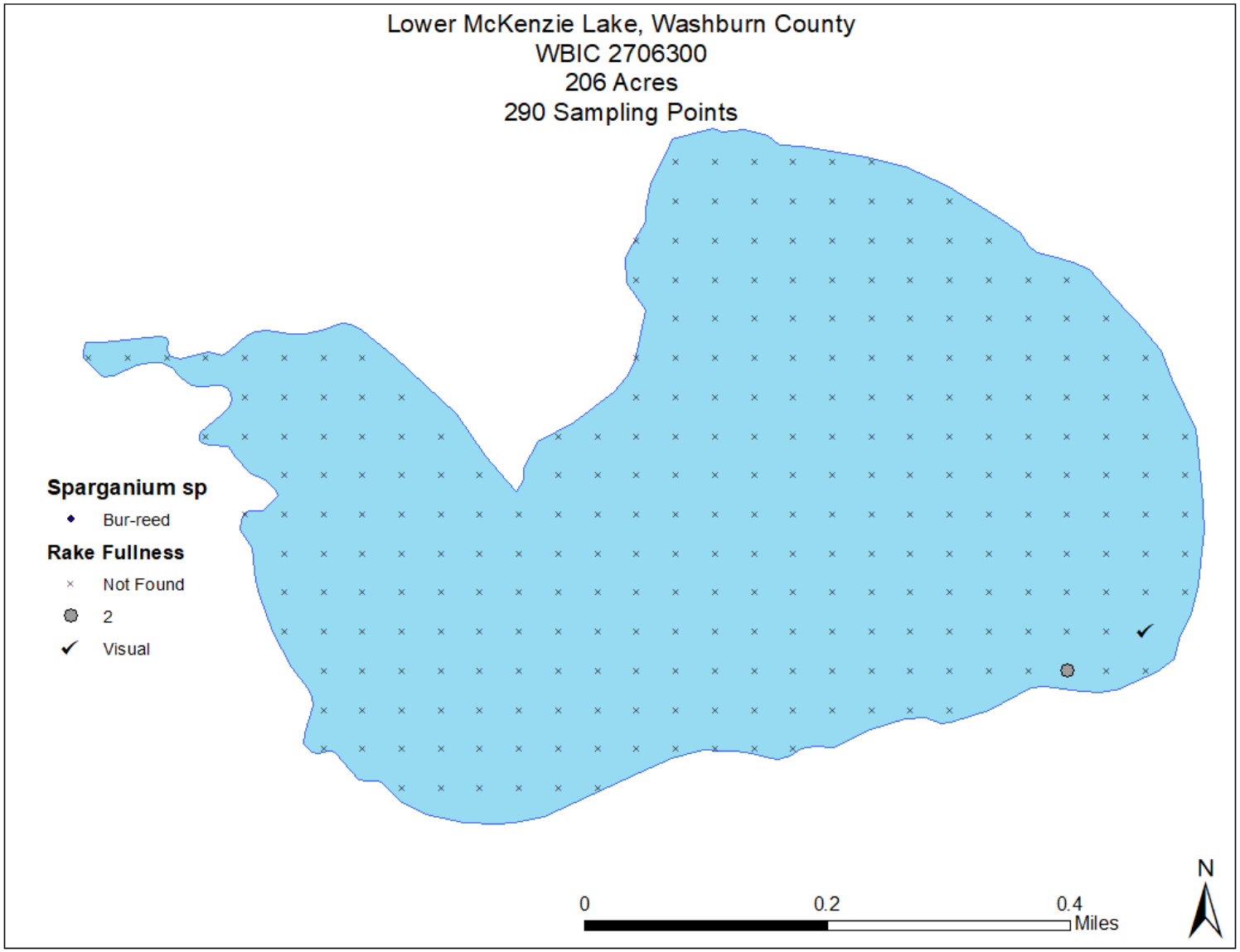

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Potamogeton richardsonii
Clasping-leaf Pondweed
Rake Fullness
Not Found
2
0
0.2
0.4
Miles
N

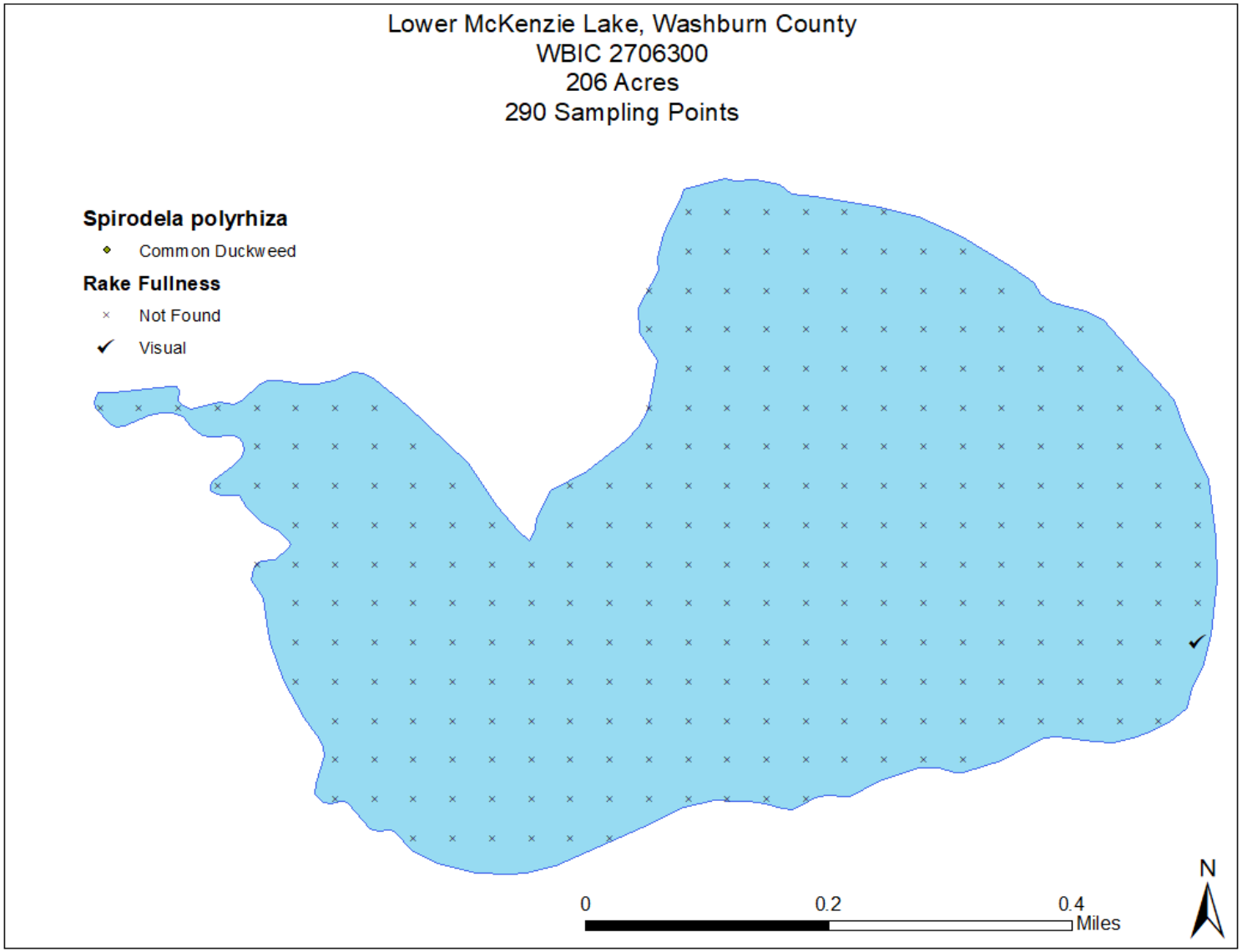

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Potamogeton robbinsii
Robbins Pondweed
Rake Fullness
Not Found
1
2
3
0
0.2
0.4
Miles
N

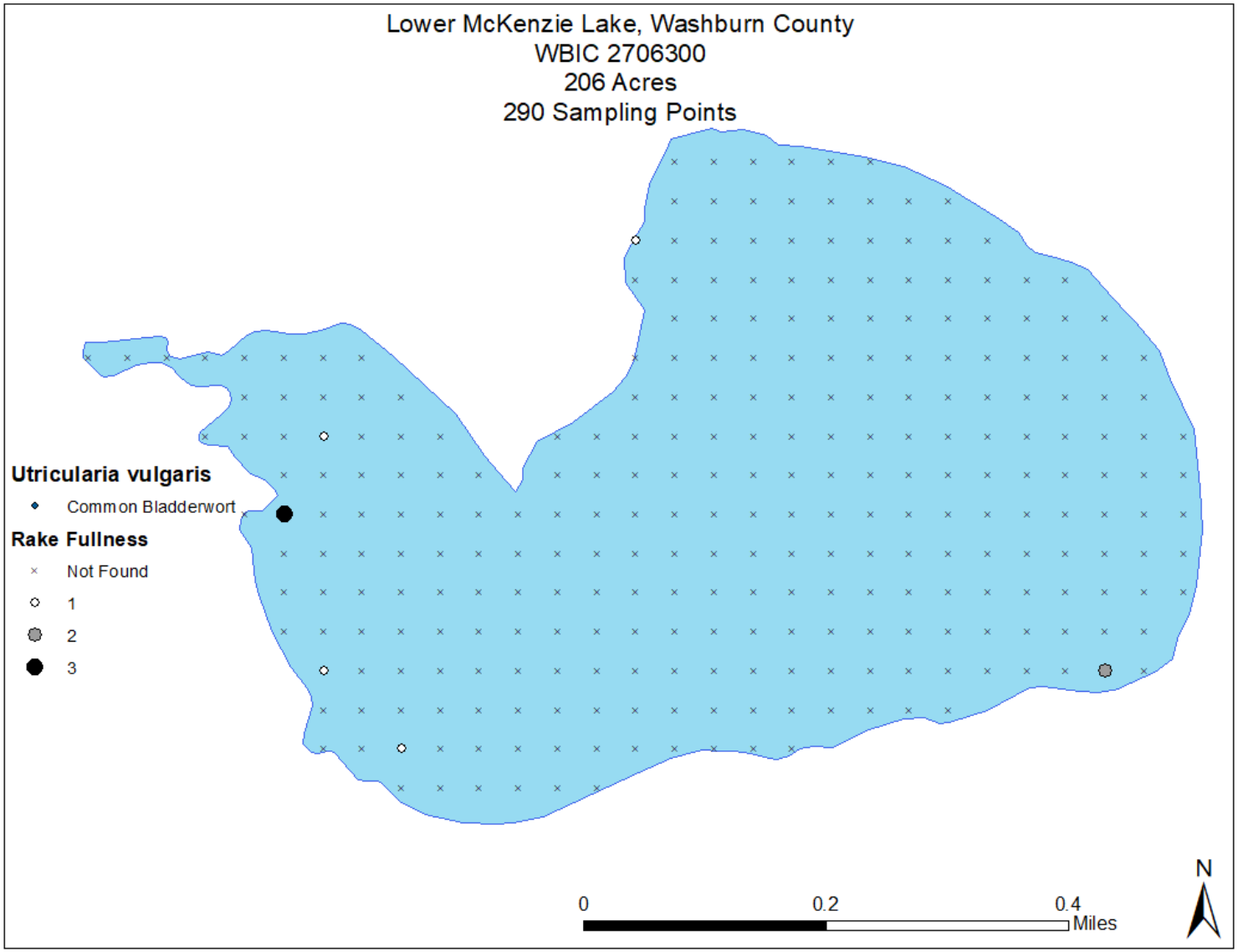

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Potamogeton zosteriformis
Flat-stem Pondweed
Rake Fullness
Not Found
1
2
3
0
0.2
0.4
Miles
N

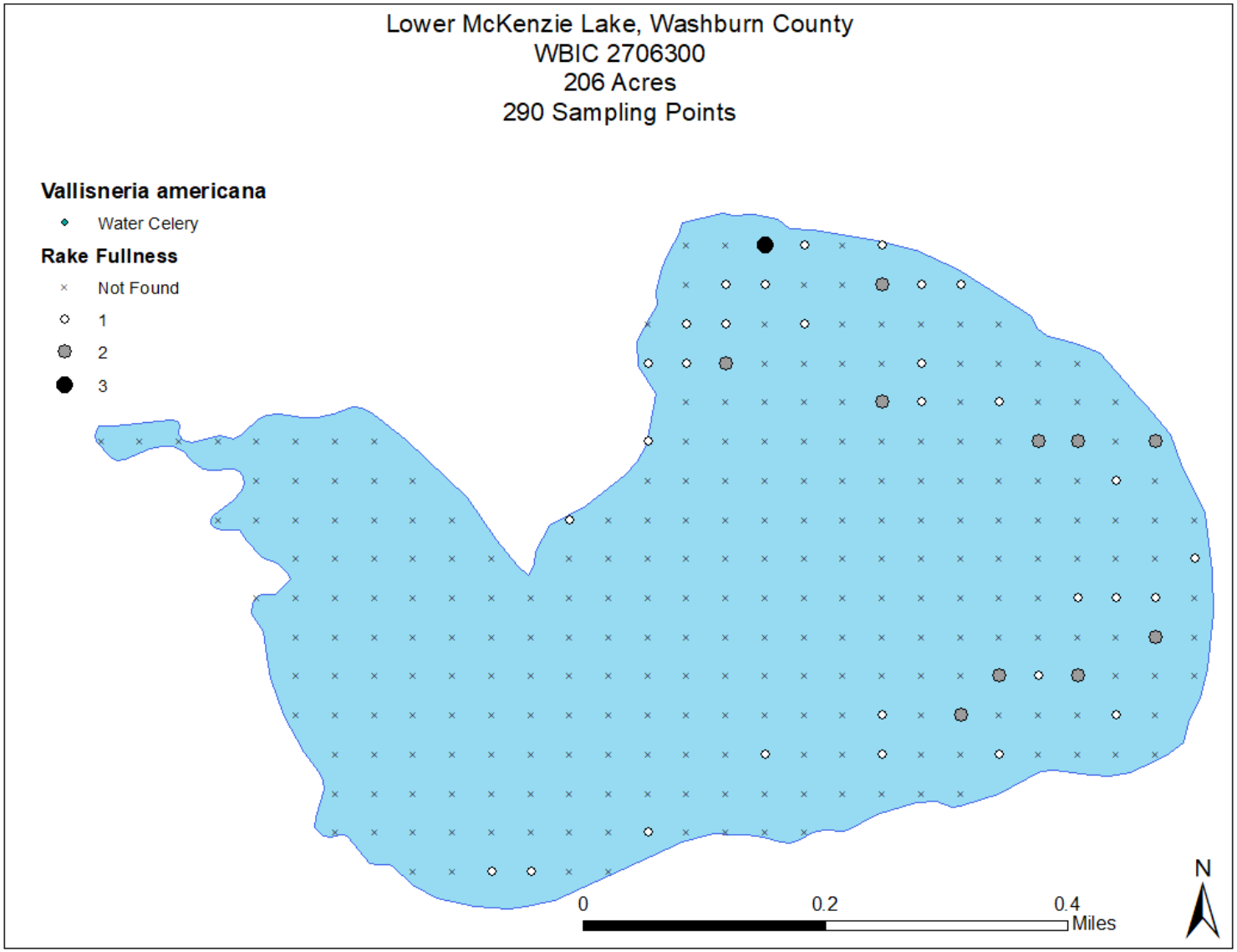

Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Sagittaria sp
Arrowhead
Rake Fullness
Not Found
1
Visual
0
0.2
0.4
Miles
N


Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Schoenoplectus acutus
Hardstem Bulrush
Rake Fullness
Not Found
Visual
0
0.2
0.4
Miles
N


Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Sparganium sp
Bur-reed
Rake Fullness
Not Found
2
Visual
0
0.2
0.4
Miles
N


Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Spirodela polyrhiza
Common Duckweed
Rake Fullness
Not Found
Visual
0
0.2
0.4
Miles
N


Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Utricularia vulgaris
Common Bladderwort
Rake Fullness
Not Found
1
2
3
0
0.2
0.4
Miles
N


Lower McKenzie Lake, Washburn County
WBIC 2706300
206 Acres
290 Sampling Points
Vallisneria americana
Water Celery
Rake Fullness
Not Found
1
2
3
0
0.2
0.4
Miles
N

Appendix E. Rapid Response for Early Detection of Eurasian Watermilfoil

1. The McKenzie Lake Association and community will be directed to contact the Eurasian Watermilfoil (EWM) identification leads (currently Sandy Swanson) or the Burnett County AIS Coordinator if they suspect a plant might be EWM. Signs at the public boat landings, web pages, and newsletter articles will be provided along with contact information.
2. If the plant is likely EWM, the AIS ID Lead will confirm identification with Burnett County LWCD and the WDNR Regional AIS Coordinator and inform the rest of the McKenzie Lakes Association Board (MLA).
3. Two entire rooted adult specimens of the suspect plants will be collected and bagged. The specimens must be delivered to the WDNR for identification.
4. Location where plant was found must be mark with GPS waypoint. (AIS ID Lead)
5. If the suspect plants are identified as EWM, the location of EWM will be marked with a permanent marker or special EWM buoy. (AIS ID Lead)
6. If identification is positive, inform the MLA board, Burnett County LWCD, herbicide applicator, the individual(s) who reported the plant, a lake management consultant, the St. Croix Tribe, Washburn County LWCD and all lake residents. (AIS ID Lead)
7. If identification is positive, post a notice at the public boat landing and in the MLA Newsletter. Notices will inform residents and visitors of the approximate location of EWM and directions on how to avoid spreading. (MLA Board)
8. Contact Burnett County LWCD to seek assistance with mapping the extent of the population and assistance with control efforts. The county has a rapid response plan in place that includes assisting lakes with AIS discoveries. If unavailable to assist within two weeks, proceed to step 9.
9. Hire a consultant to determine the extent of the EWM introduction. A diver may be used. If small amounts of EWM are found during this assessment, the consultant will be directed to identify locations of EWM and mark with a GPS waypoint. All plant fragments will be removed from the lake during hand pulling.
10. Select a control plan in cooperation with Burnett County AIS Coordinator and WDNR (MLA board of directors). Additional guidance regarding EWM treatment is found in DNR's *Response for Early Detection of Eurasian Water Milfoil Field Protocol*.
    a. Control methods may include hand pulling, use of divers to manually or mechanically remove EWM from the lake bottom, application of herbicides and/or other effective and approved control methods.
    b. The goal of the control plan will be to eradicate the EWM if feasible.
11. Implement the selected control plan including applying for the necessary permits. Individual(s) who are qualified and trained for this task will complete the technique(s) selected in the control plan.
12. MLA funds will be used to pay for any reasonable expenses that incurred in the implementation of the control plan. Implementation will not be delayed by waiting for the WDNR to approve or fund a grant application.
13. The President of the MLA will work with the WDNR to confirm, as soon as possible, a start date for an Early Detection and Rapid Response AIS Control Grant. Thereafter, the MLA shall formally apply for the grant.

14. The MLA board has the responsibility to raise funds to match the grant. The MLA may develop a rapid response contingency fund with special donations.
15. Frequently inspect the area of the EWM to determine effectiveness of the treatment and whether additional treatment is necessary.
16. Contract for professional monitoring to supplement volunteer monitoring in years following EWM discovery.