AQUATIC PLANT SURVEY
LITTLE RICE LAKE

March 7, 2024

Prepared for:
Little Rice Lake Association
Crandon, Forest County, WI

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Contents

1.0 Executive Summary

Little Rice Lake is a flowage created by a dam on the Upper Wolf River located in Forest County WI approximately 6 miles west of Crandon. The lake is 1219 acres in size with a maximum depth of 10 feet. A history of severe winter fish kills have greatly reduced fish populations. The main uses of the lake include fishing, waterfowl hunting, canoeing/kayaking, recreational boating and ice fishing.

The residents on Little Rice Lake wanted to improve the health of the lake and the fishery. In 2016, the residents contacted Forest County to sponsor a WDNR (Wisconsin Department of Natural Resources) Lake Planning Grant. The grant was awarded in February 2017 to complete a comprehensive lake management plan. The Little Rice Lake Association was formed after the grant was awarded and has been the main participant in various projects on the lake.

There were two main problems that were addressed in the 2017 project; extensive aquatic vegetation along the eastern and western shores of the lake that impede navigation and winter fish kills due to low oxygen levels. The private residence along Flowage Lane on the east side and along Yocum Road on the west side have limited to no access to the lake due to thick aquatic vegetation. The aquatic plant survey documented this in 2017 and in 2023.

2.0 Baseline Information

Little Rice Lake is a flowage created by a dam on the Upper Wolf River located in Forest County WI approximately 6 miles west of Crandon. The lake is 1219 acres in size with a maximum depth of 10 feet. The historical fish population has included northern pike, largemouth bass, black crappie, yellow perch, rock bass, bluegill, bullhead and white sucker. Little Rice Lake has an extensive history of fish kills dating back to the 1940's. Winter fish kills occurred in 2012/13, 2013/14 and again in 2018/19 that reduced the fish population in the lake. The main uses of the lake include fishing, waterfowl hunting, canoeing/kayaking, recreational boating and ice fishing.

Historical human use of the area began with the Chippewa Indian harvest of wild rice on the lake, which at that time was a rice bed on the Wolf River. Many log drives in the late 1800s began at the lake. Two logging dams were operated on the Wolf River; one located about 2 miles north of the lake and the other was just below Little Rice Lake. The dam below the lake was rebuilt in 1910, parts of this dam remained until 1935 when the Town of Crandon and Forest County received approval from Works of Progress Administration to construct the dam at its present location. In 1952 the WI Conservation Department, now the Wisconsin Department of Natural Resources, agreed to purchase the dam and surrounding lands from the Town of Crandon and develop the Little Rice Wildlife Area. The Wisconsin Department of Natural Resources (DNR) owns and operates the dam and holds flowage easement rights to the 94' contour level identified in the original dam permit. The DNR manages the dam and the 1,200 acre flowage for a variety of public benefits including: hunting, fishing, trapping, outdoor recreation and to protect and enhance wildlife habitat for a variety of species. The current Little Rice Wildlife Area is located on the north end of the lake and provides access to the lake. Two boat landings, an access road and a picnic area were developed along with the wildlife area. The south portion of the lake is in private ownership and consists of typical lake lots with a mix of seasonal cabins and year round homes.

Little Rice Lake is listed in state administrative code as an Outstanding Resource Water due to the abundant wild rice in the lake. The surrounding wildlife area provides habitat that many species of wildlife, waterfowl, birds and amphibians use, some of which may be endangered.

The following summarizes the lake's physical attributes:

Table 1 – Little Rice Lake Physical Attributes

Lake Name	**Little Rice Lake**
Lake Type	Flowage
Surface Area (acres)*	1219
Shoreline Length (miles)	11.04
Open Water (acres)**	626
Shoreline Length (miles)	9.7
Maximum depth (feet)	10
Public Landing	Yes

*Based on water surface DNR Surface Water Data Viewer
**Based on open water in Spring 2017 aerial photo; much of the surface area of the lake is covered with bogs and thick vegetation.

3.0 Discussion of Project Results

3.1 Aquatic Plant Ecology

Aquatic plants are vital to the health of a water body. Unfortunately, people all too often refer to rooted aquatic plants as "weeds" and ultimately wish to eradicate them. This type of attitude, and the misconceptions it breeds, must be overcome in order to properly manage a lake ecosystem. Rooted aquatic plants (macrophytes) are extremely important for the well-being of a lake community and possess many positive attributes. Despite their importance, aquatic macrophytes sometimes grow to nuisance levels that hamper recreational activities.

When "managing" aquatic plants, it is important to maintain a well-balanced, stable, and diverse aquatic plant community that contains high percentages of desirable native species. To be effective, aquatic plant management in most lakes must maintain a plant community that is robust, species rich, and diverse.

3.2 Aquatic Invasive Species

Aquatic Invasive Species (AIS) are aquatic plants and animals that have been introduced by human action to a location, area, or region where they did not previously exist. AIS often lack natural control mechanisms they may have had in their native ecosystem and may interfere with the native plant and animal interactions in their new "home". Some AIS have aggressive reproductive potential and contribute to a decline of a lake's ecology and interfere with recreational use of a lake. Common Wisconsin AIS include:

- Eurasian Watermilfoil
- Curly-leaf Pondweed
- Zebra Mussels
- Rusty Crayfish
- Spiny Water Flea
- Purple Loosestrife
- Phragmites
- Banded and Chinese Mystery Snails

The only AIS listed for Little Rice Lake is the Chinese Mystery Snail. The following link on the DNR website has detailed information on AIS in Wisconsin http://dnr.wi.gov/lakes/invasives/BySpecies.aspx.

3.3 2023 Aquatic Plant Survey

The full vegetation survey was completed on August 23, 2023. A total of 177 points of 820 were surveyed and vegetation was documented at 120 of these points. The remaining points were deeper than vegetation grows on this lake or the vegetation was too thick to enter (north half and bays). The aquatic macrophyte community of the lake included submersed, floating-leaf and emergent communities.

The following data represents the conditions of the aquatic plant community at the time of the survey conducted in 2023. The following table lists the taxa identified during the 2023 aquatic plant survey.

Table 2 – Little Rice Lake Taxa Identified in 2023 Aquatic Plant Survey

Plant Species	Frequency of Occurrence*	No. Sites	Rake Fullness	No. of Visual Sites
Bidens beckii (formerly *Megalodonta*), Water marigold	3.33	4	1.25	
Braseria schreberi, Watershield	0.83	1	1	
Ceratophyllum demersum, Coontail	5	6	1	
Ceratophyllum echinatum, Spiny hornwort	0.83	1	2	
Chara sp., Muskgrasses	4.17	5	1	
Elodea canadensis, Common waterweed	35	42	1	
Myriophyllum sibiricum, Northern water-milfoil	5	6	1	
Najas flexilis, Slender naiad	34.17	41	1.1	
Nitella sp., Nitella	38.33	46	1.02	
Nuphar variegata, Spatterdock	v	2		
Nymphaea odorata, White water lily	v	2		2
Potamogeton epihydrus, Ribbon-leaf pondweed	0.83	1	1	
Potamogeton gramineus, Variable pondweed	0.83	1	1	
Potamogeton natans, Floating-leaf pondweed	0.83	1	1	
Potamogeton praelongus, White-stem pondweed	4.17	5	1.2	2
Potamogeton pusillus, Small pondweed	30	36	1	
Potamogeton strictifoloius, Stiff pondweed	1.67	2	1	
Potamogeton zosteriformis, Flat-stem pondweed	2.5	3	1	
Sagittaria latifolia, Common arrowhead	v	1		
Schoenoplectus subterminalis, Water bulrush	1.67	2	1	
Sparganium sp., Bur-reed	9.17	11	1	
Vallisneria americana, Wild celery	34.17	41	1.12	
Zizania palustris, Northern wild rice	0.83	1	1	1
Aquatic moss	4.17	5	1.2	

*Frequency of Occurrence within vegetated areas.

The most abundant aquatic plant identified during the aquatic plant survey was nitella, followed closely by common waterweed with naiad and wild celery tied for third. These four species were the most dominant in the open water area of the lake based on the point intercept survey but a large area of the lake could not be surveyed due to thick vegetation. See Figure 4 for the areas that were not navigable during the survey.

The following table lists the statistics of the 2023 and 2017 plant surveys.

Table 3 – Little Rice Lake - Summary of Aquatic Plant Survey Statistics

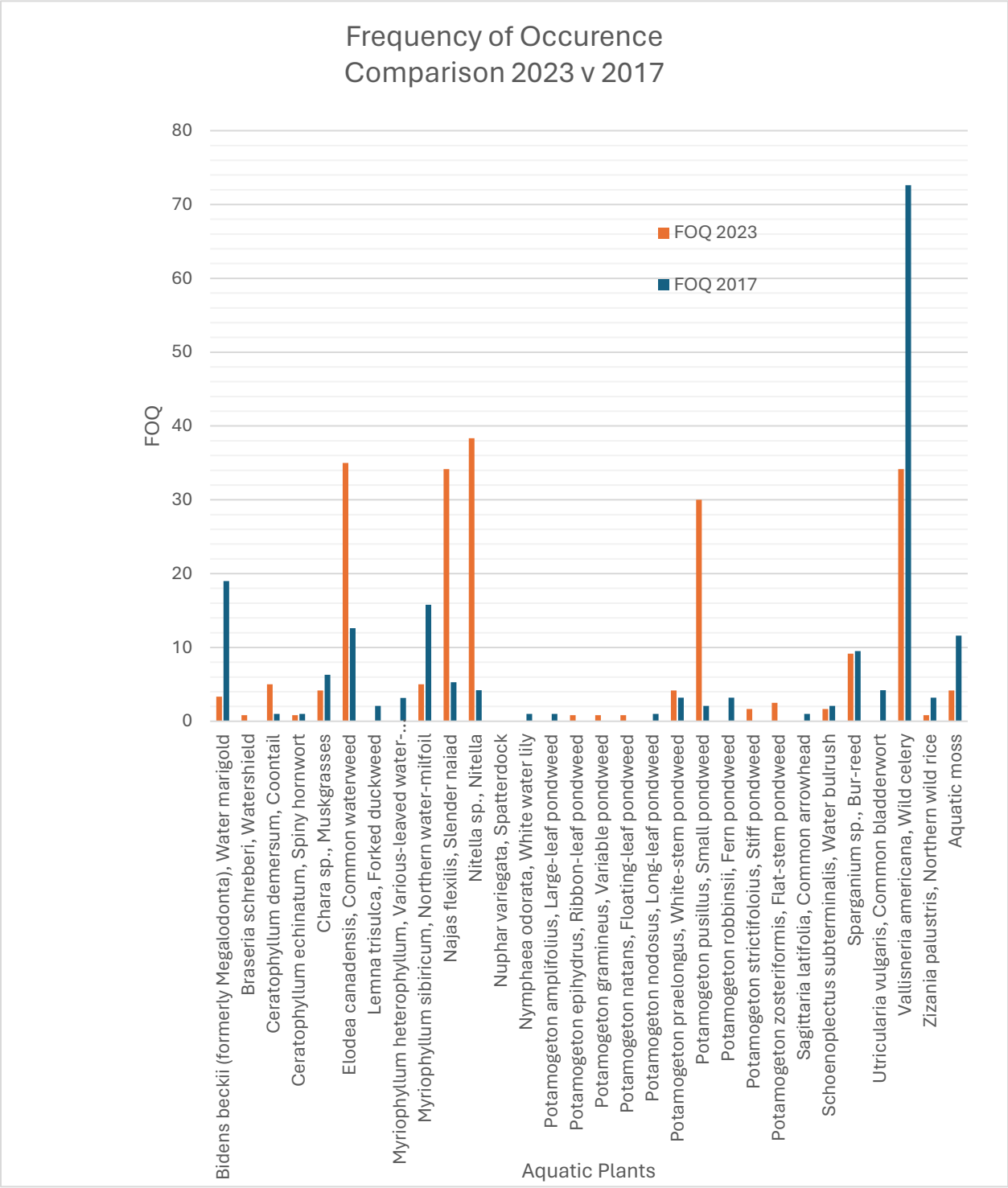
Statistic	2023	2017
Total number of points sampled	177	189
Total number of sites with vegetation	120	95
Total number of sites shallower than maximum depth of plants	169	157
Frequency of occurrence at sites shallower than maximum depth of plants	71.01	60.51
Simpson Diversity Index	0.87	0.79
Maximum depth of plants (ft)	7.7	7
Average number of all species per site (shallower than max depth)	1.51	1.06
Average number of all species per site (veg. sites only)	2.13	1.75
Species Richness	20	22
Species Richness (including visuals)	23	23

In 2023, vegetation was identified to a maximum depth of 7.7 feet (photic zone). Aquatic vegetation was detected at 71% of photic zone intercept points. A diverse plant community inhabited the lake during 2023. The Simpson Diversity Index value of the community was 0.87, taxonomic richness was 23 species (including visuals), and there was an average of 1.51 species identified at points that were within the photic zone. There was an average of 2.13 species present at points with vegetation present.

The results of the plant survey in 2023 are comparable to the data collected in 2017. There is an increase in all of the values listed in the table above indicating an increase in vegetation coverage, density and diversity.

The following chart shows the abundance of species in 2023 and 2017 based on the frequency of occurrence in vegetated areas.

Figure 1 - FOQ 2023 vs 2017



A few items to note in the above chart are a marked increase in waterweed, naiad, nitella and small pondweed. Several species that decreased significantly are water marigold, northern watermifoil and wild celery.

The following table lists the change in species presence/absence data from 2017 to 2023. The chi-square test is used to determine how significant the change is for each species.

Table 4 - Change In Species Presence 2023 vs 2017

2017 survey total points	**189**			
2023 survey total points	**177**			**Increase/Decrease**
	2017 present	**2023 present**	**Significant change**	**(proportional to # sampling points)**
Bidens beckii (formerly Megalodonta), Water marigold	18	4	**	-
Braseria schreberi, Watershield		1	n.s.	+
Ceratophyllum demersum, Coontail	1	6	*	+
Ceratophyllum echinatum, Spiny hornwort	1	1	n.s.	+
Chara sp., Muskgrasses	6	5	n.s.	-
Elodea canadensis, Common waterweed	12	42	***	+
Myriophyllum sibiricum, Northern water-milfoil	15	6	n.s.	-
Najas flexilis, Slender naiad	5	41	***	+
Nitella sp., Nitella	4	46	***	+
Nuphar variegata, Spatterdock	0	2	n.s.	+
Nymphaea odorata, White water lily	1	2	n.s.	+
Potamogeton amplifolius, Large-leaf pondweed	1		n.s.	-
Potamogeton epihydrus, Ribbon-leaf pondweed		1	n.s.	+
Potamogeton gramineus, Variable pondweed		1	n.s.	+
Potamogeton natans, Floating-leaf pondweed		1	n.s.	+
Potamogeton praelongus, White-stem pondweed	3	5	n.s.	+
Potamogeton pusillus, Small pondweed	2	36	***	+
Potamogeton robbinsii, Fern pondweed	3		n.s.	-
Potamogeton strictifoloius, Stiff pondweed		2	n.s.	+
Potamogeton zosteriformis, Flat-stem pondweed		3	n.s.	+
Sagittaria latifolia, Common arrowhead	1	1	n.s.	+
Schoenoplectus subterminalis, Water bulrush	2	2	n.s.	+
Sparganium sp., Bur-reed	9	11	n.s.	+
Utricularia vulgaris, Common bladderwort	4		n.s.	-
Vallisneria americana, Wild celery	69	41	**	-
Zizania palustris, Northern wild rice	3	1	n.s.	-
Aquatic moss	11	5	n.s.	-

Based on the data in the table above there was a significant increase in coontail, waterweed, naiad, nitella and small pondweed. Nitella and naiad are the most abundant species in the open water area; these are low growing and typically do not cause a nuisance. Waterweed increased significantly and is now the second most abundant plant in the lake, this plant is tolerant of low light conditions and disturbed areas and can cause a navigation nuisance if it becomes too abundant. There was a significant decrease in water marigold and wild celery.

The following figure show the coverage and density of vegetation found during the 2023 and 2017 surveys.

Figure 2 - Aquatic Plant Coverage and Density 2023

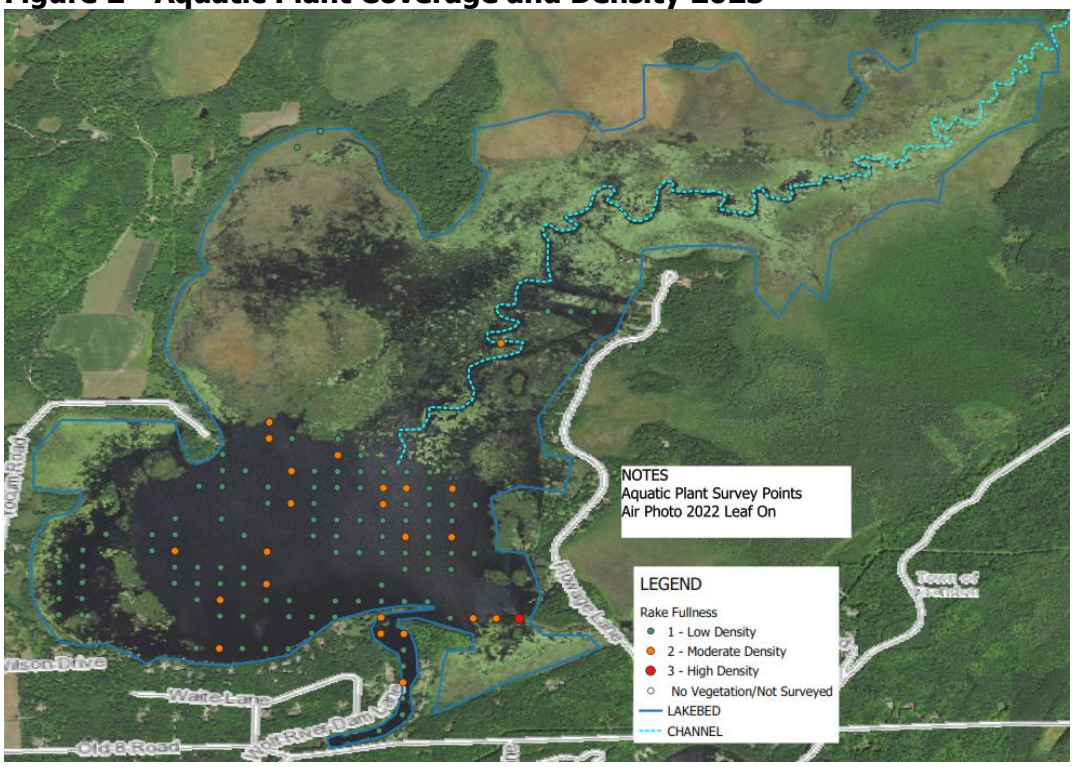
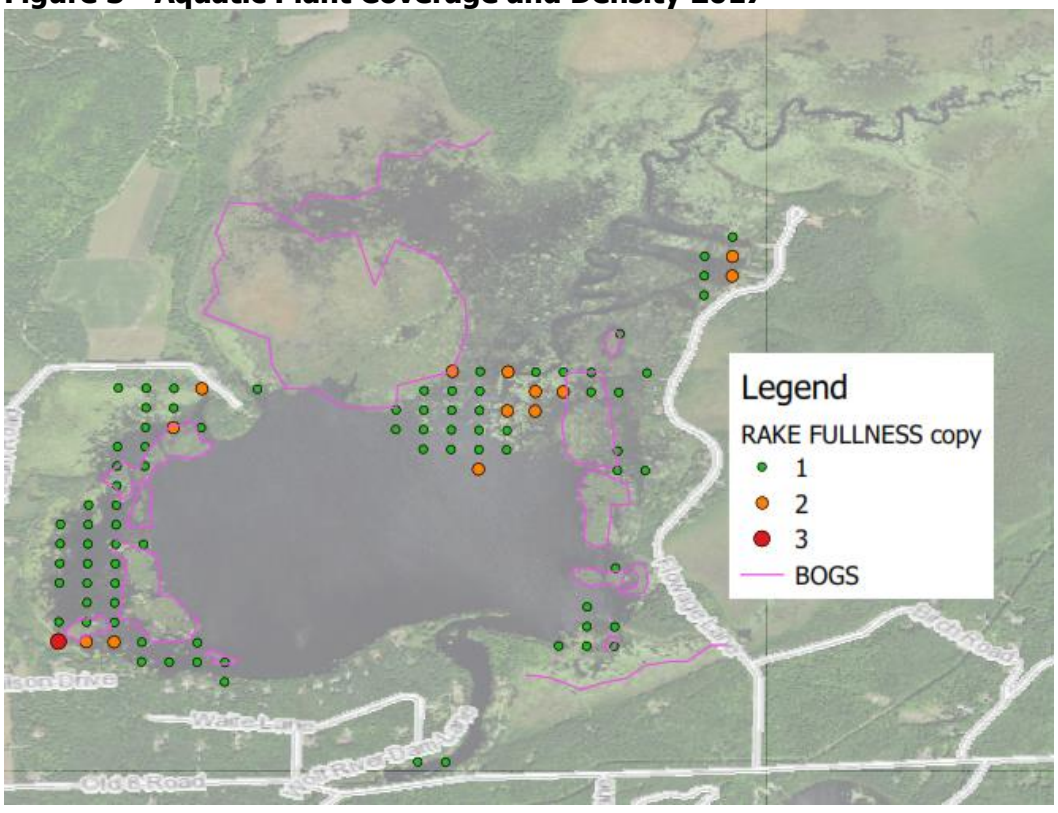


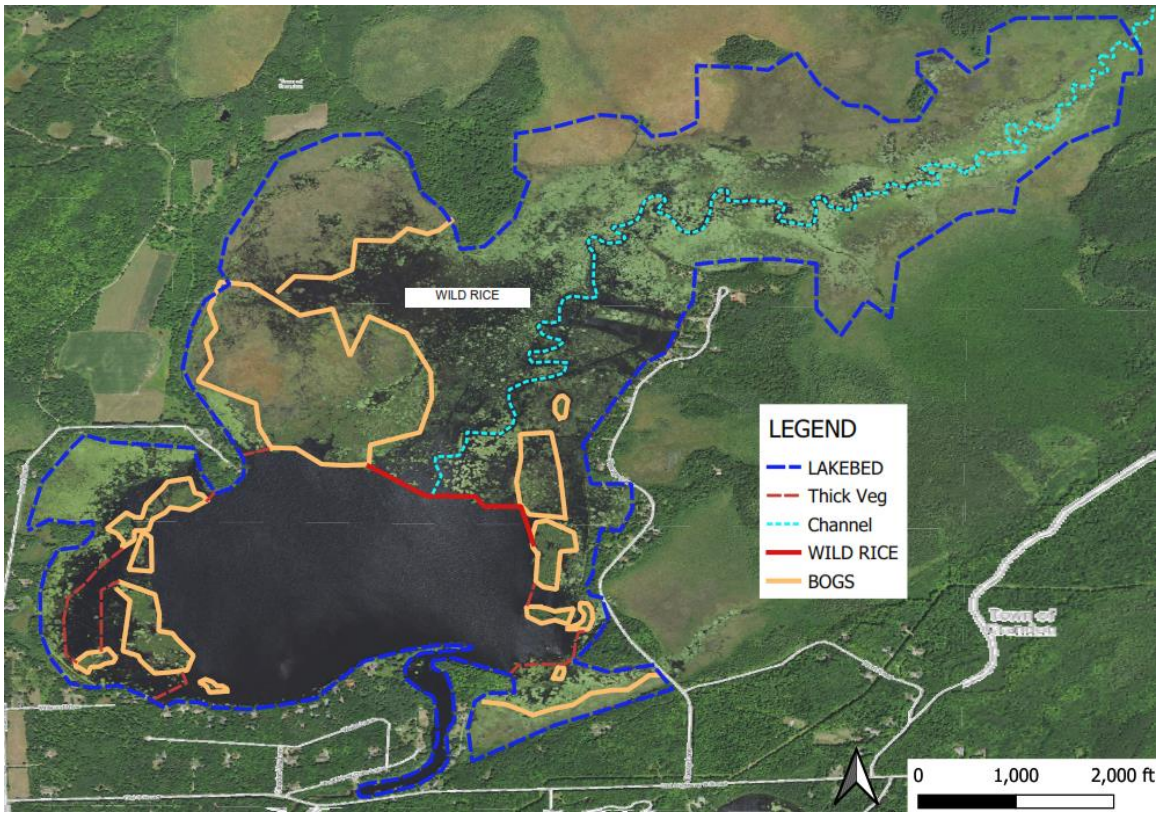
Figure 3 - Aquatic Plant Coverage and Density 2017



Based on the above maps from 2023 and 2017, there is a definite increase in the coverage of aquatic plants. Almost the entire central portion of the lake (open water) had vegetation in 2023 but did not in 2017. This may not be noticeable from the surface as the majority of the plants that are now inhabiting this area are low growing (naiad and nitella). There are however two species that can cause navigation issues if they become abundant; common waterweed and coontail. There was little coontail found but the waterweed showed a significant increase over 2017 and is not the second most abundant plant in the lake.

There is a large portion of the impoundment that is not navigable due to aquatic vegetation and bogs in both 2017 and 2023. The north half of the lake is not navigable with a motor boat except through the river channel as shown below and is dominated by wild rice and bogs. There are also several bays in the south half of the lake that were not navigable due to a thick cover of floating leaf and emergent aquatic plants. The following map indicates the areas of wild rice and thick vegetation based on 2022 leaf on aerial photo.

Figure 4 - Little Rice Lake Thick Vegetation



Following is a summary of the types of aquatic plants found in the lake in 2023.

Floating-Leaf Plants

The following floating-leaf aquatic plant species were identified during the 2023 aquatic plant survey.

- *Braseria schreberi*, Watershield
- *Nuphar variegate*, Spatterdock
- *Nymphaea odorata*, White water lily
- Vallisneria americana, Wild celery

Submersed Plants

The following submersed aquatic plant species were identified during the 2023 aquatic plant survey.

- *Bidens beckii*, Water marigold
- *Ceratophyllum demersum*, Coontail
- *Ceratophyllum echinatum*, Spiny hornwort
- *Chara sp.*, Muskgrass
- *Elodea canadensis*, Common waterweed
- *Myriophyllum sibiricum*, Northern water-milfoil
- *Najas flexilis*, Slender naiad
- *Nitella sp.*, Nitella
- *Potamogeton epihydrus*, Ribbon-leaf pondweed
- *Potamogeton gramineus*, Variable pondweed
- *Potamogeton natans*, Floating-leaf pondweed
- *Potamogeton praelongus*, White-stem pondweed
- *Potamogeton pusillus*, Small pondweed
- *Potamogeton strictifolius*, Stiff pondweed
- *Potamogeton zosteriformis*, Flat-stem pondweed
- Aquatic moss

Emergent Plants

The following emergent plants were found in the 2023 surveys.

- Sagittaria latifolia, Common arrowhead
- *Schoenoplectus subterminalis*, Water bulrush
- Sparganium sp., Bur-reed
- Zizania palustris, Northern wild rice

3.4 Floristic Quality Index

Floristic Quality is a measure of biological integrity and relative disturbance; higher FQI numbers indicate higher floristic quality and biological integrity and a lower level of disturbance impacts. FQI varies around the state of Wisconsin and ranges from 3.0 to

44.6 with the average FQI of 22.2 (DNR, 2005). The FQI calculated from the 2023 aquatic plant survey data was 30.8, this is up slightly from 2017 (30.3).

This FQI value is higher than Wisconsin's northern region mean of 24.3 and suggests that Little Rice Lake has a lower level of disturbance when using aquatic plants as an indicator. The following plants observed in Little Rice Lake have a high FQI rating (C value >=7): water marigold, muskgrass, floating-leaf bur-reed, nitella, white-stem pondweed, small pondweed, ribbonleaf pondweed, water bulrush, spiny hornwort and wild rice.

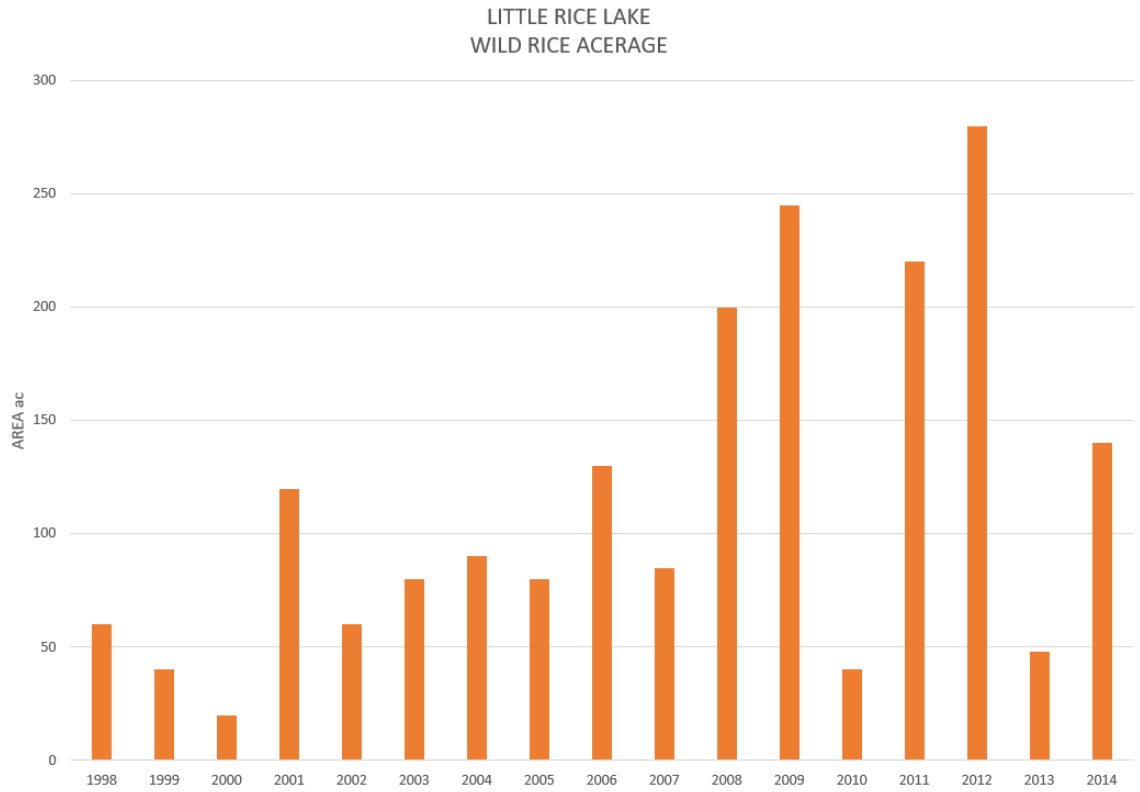
3.5 Wild Rice

Wild rice is well established in Little Rice Lake, is native to the Wolf River system and was present before the lake was created by the series of dams that were constructed over the last 100+ years. There are historic records of Native American use of this area for collecting wild rice. Wild rice is very beneficial to the lake ecosystem but can cause navigation problems. The following photo was taken from the GLIFWC (Great Lakes Indians Fish and Wildlife Commission) website that show the wild rice beds on the north end of Little Rice Lake in 2018 (Flowage Lane on right).

Figure 5 - Wild Rice Coverage 2018

The coverage of wild rice fluctuates over the years. The following figure indicates the coverage of wild rice each year as calculated by GLIFWC.

Figure 6 – Acreage of Wild Rice



*The latest data available on the GLIFWC website is from 2014.

The wild rice coverage in Little Rice Lake fluctuates over the years but appears to be trending up based on the above graph. There is no recent data available on the GLIFWC website; the latest report is from 2014. The habitat in the north half of the lake is optimal for wild rice growth. Wild rice prefers flowing water as is present along the river channel; water depth of 0.5 to 3 feet (optimal 1-2 feet); clear water is preferred but in stained water depths of 1-2 feet provide adequate light penetration. Wild rice prefers slightly fluctuating water levels; stable during the growing season then slightly receding. Too much stability can hamper rice growth; in a dammed system the stable water level over many years may allow perennial plants to outcompete the rice. Several inches of organic muck is the preferred substrate but rice is tolerant of sand and gravel.

The following text discusses the importance of wild rice. This excerpt is taken from DNR website (http://dnr.wi.gov/topic/outdoorrecreation/activities/rice.html)

Though recognized as a prized food source for Native Americans, both historically and today, few people are aware of the importance of wild rice to many of Wisconsin's wildlife species. Capable of producing over 500 pounds of seed per acre, wild rice provides a nutrient-rich food source, offers refuge from predators and increases the overall vegetation structure on the landscape, in turn enhancing biodiversity.

Wild rice is most-often known for its importance to fall-migrating waterfowl. Mallard, blue-winged teal, ring-necked duck and wood duck consume wild rice, as do many other waterfowl species. In fact, a study conducted in wild rice country found the plant to be the most important food source for mallards during fall migration. In addition to a food source, wild rice provides several species of breeding ducks, Canada geese and trumpeter swans with a place to roost and loaf, and offers brood cover for their young. Because wild rice tends to occur in areas of gently flowing water, spring melt tends to expose these areas first, and the rice seed bank and associated invertebrate populations serve as a valuable food source for waterfowl during spring migration.

Common loons, red-necked grebes and muskrats commonly use wild rice for nesting materials. Muskrats forage heavily on the green shoots of wild rice during the spring. The presence of muskrats enhance the use of rice beds by some waterfowl species due to the small openings created amid dense cover. Additionally, muskrat houses are used as nesting sites by trumpeter swans and Canada geese, as perching sites for herons and eagles, and as sunning areas for turtles. Other species that forage on wild rice include beaver, white-tailed deer and moose.

A rich community of insects—both terrestrial and aquatic—is found among wild rice, providing a bountiful food source for blackbirds, bobolinks, rails and wrens. Wild rice is also a source of food for amphibian and fish populations, which in turn attract loons, herons and mink.

Wild rice beds exist as places of high biological diversity with numerous benefits that extend throughout the food chain. Protecting important areas where wild rice thrives will help ensure the persistence of many of Wisconsin's wildlife for all to enjoy.

4.0 Conclusion

The aquatic plant survey completed on Little Rice Lake in August 2023 indicates a diverse, healthy population of native aquatic plants. There were not any aquatic invasive plant species found during the survey. The plant population varied from 2017 by an increase in coverage, density and diversity in the open water area of the south basin. There was a significant increase in nitella, waterweed and naiad which are growing throughout the open water area in the south half of the lake. Large areas of the impoundment were not navigable in 2017 or 2023; the north half of the lake due to wild rice and bogs and bays in the south half due to floating-leaf/emergent vegetation and bogs. Access to the north half of the lake is limited to the river channel due to the wild rice beds.

Appendix A

2023 Aquatic Plant Point Intercept Survey Statistics

Sample Point Map

Maximum Depth of Vegetation Map

	A	B	C	H	J	Q	R	S	AC	BA	BD	BI	BM	BN	BY	CB	CE	CI	CK	CO
1		**STATS**	Total vegetation	Bidens beckii (formerly Megalodonta), Water marigold	Brasenia schreberi, Watershield	Ceratophyllum demersum, Coontail	Ceratophyllum echinatum, Spiny hornwort	Chara sp., Muskgrasses	Elodea canadensis, Common waterweed	Myriophyllum sibiricum, Northern water-milfoil	Najas flexilis, Slender naiad	Nitella sp., Nitella	Nuphar variegata, Spatterdock	Nymphaea odorata, White water lily	Potamogeton epihydrus, Ribbon-leaf pondweed	Potamogeton gramineus, Variable pondweed	Potamogeton natans, Floating-leaf pondweed	Potamogeton praelongus, White-stem pondweed	Potamogeton pusillus, Small pondweed	Potamogeton strictifolius, Stiff pondweed
2	**Lake**	LITTLE RICE																		
3	**County**	FOREST																		
4	**WBIC**	406400																		
5	**Survey Date**	08/23/23																		
6		**INDIVIDUAL SPECIES STATS:**																		
7		**Frequency of occurrence within vegetated areas (%)**		3.33	0.83	5.00	0.83	4.17	35.00	5.00	34.17	38.33			0.83	0.83	0.83	4.17	30.00	1.67
8		**Frequency of occurrence at sites shallower than maximum depth of plants**		2.37	0.59	3.55	0.59	2.96	24.85	3.55	24.26	27.22			0.59	0.59	0.59	2.96	21.30	1.18
9		**Relative Frequency (%)**		1.6	0.4	2.3	0.4	2.0	16.4	2.3	16.0	18.0			0.4	0.4	0.4	2.0	14.1	0.8
10		Relative Frequency (squared)	0.13	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.03			0.00	0.00	0.00	0.00	0.02	0.00
11		**Number of sites where species found**		4	1	6	1	5	42	6	41	46			1	1	1	5	36	2
12		**Average Rake Fullness**	1.20	1.25	1.00	1.00	2.00	1.00	1.00	1.00	1.10	1.02			1.00	1.00	1.00	1.20	1.00	1.00
13		**#visual sightings**											2	3				2		
14		**present (visual or collected)**		present	present	present	present	present	present	present	present	present	present	present	present	present	present	present	present	present
15																				
16		**SUMMARY STATS:**																		
17		**Total number of sites visited**	**177**																	
18		**Total number of sites with vegetation**	**120**																	
19		**Total number of sites shallower than maximum depth of plants**	**169**																	
20		**Frequency of occurrence at sites shallower than maximum depth of plants**	**71.01**																	
21		**Simpson Diversity Index**	**0.87**																	
22		**Maximum depth of plants (ft)****	**7.70**																	
23		**Number of sites sampled using rake on Rope (R)**	**0**																	
24		**Number of sites sampled using rake on Pole (P)**	**0**																	
25		**Average number of all species per site (shallower than max depth)**	**1.51**																	
26		**Average number of all species per site (veg. sites only)**	**2.13**																	
27		**Average number of native species per site (shallower than max depth)**	**1.51**																	
28		**Average number of native species per site (veg. sites only)**	**2.13**																	
29		**Species Richness**	**20**																	
30		**Species Richness (including visuals)**	**23**																	
31																				
32		****SEE "MAX DEPTH GRAPH" WORKSHEET TO CONFIRM**																		

	CQ	CZ	DF	DM	EE	EJ	EL
1	Potamogeton zosteriformis, Flat-stem pondweed	Sagittaria latifolia, Common arrowhead	Schoenoplectus subterminalis, Water bulrush	Sparganium fluctuans, Floating-leaf bur-reed	Vallisneria americana, Wild celery	Zizania palustris, Northern wild rice	Aquatic moss
2							
3							
4							
5							
6							
7	2.50		1.67	9.17	34.17	0.83	4.17
8	1.78		1.18	6.51	24.26	0.59	2.96
9	1.2		0.8	4.3	16.0	0.4	
10	0.00		0.00	0.00	0.03	0.00	
11	3		2	11	41	1	5
12	1.00		1.00	1.00	1.12	1.00	1.20
13		1				1	
14	present	present	present	present	present	present	present
15							
16							
17							
18							
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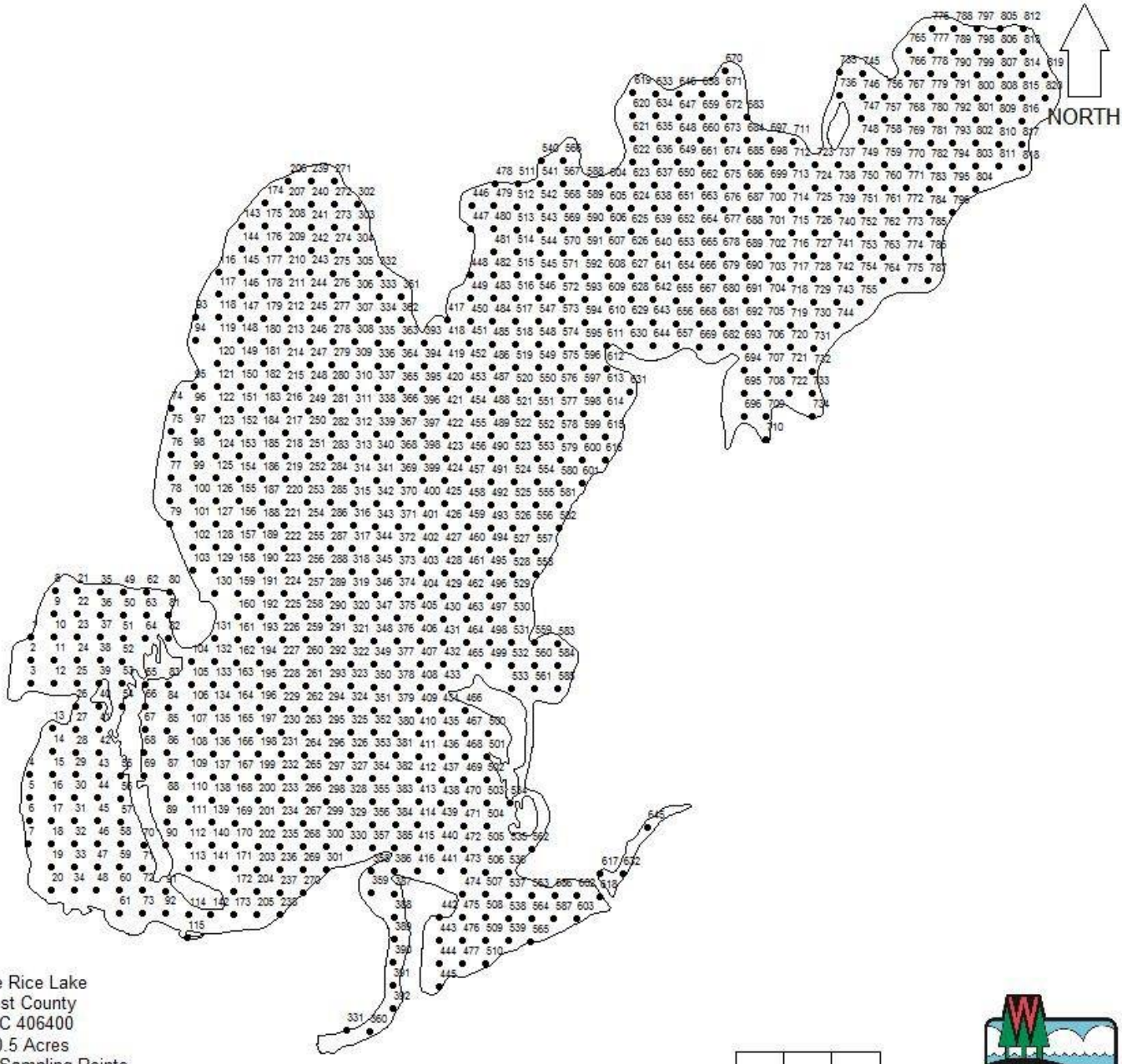
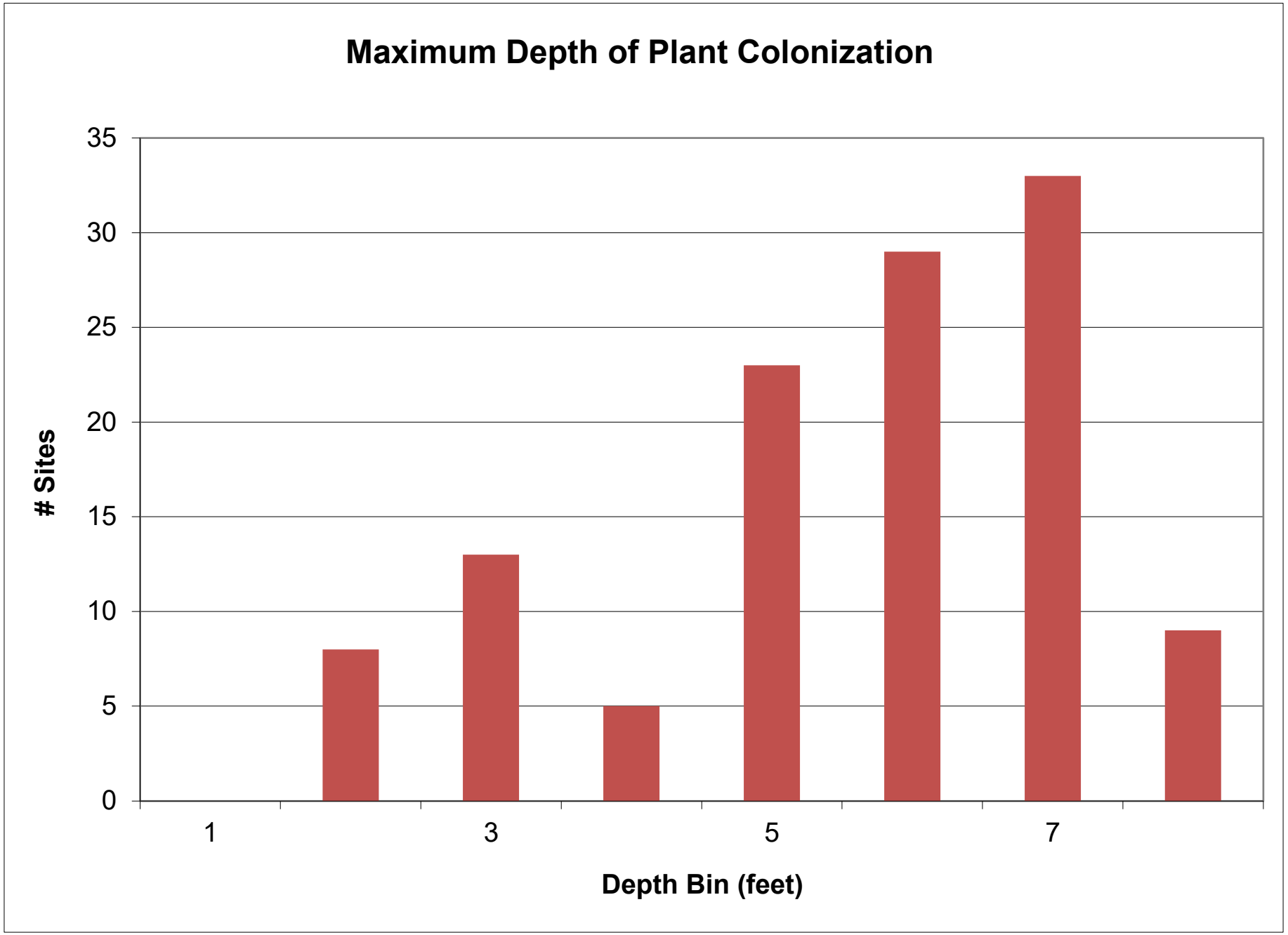
Sampling maps created using the 24K hydro layer available from the WDNR in spring 2015.
We suggest checking these maps against the most recent aerial imagery or by field verification.
If major discrepancies exist, please notify DNR Baseline Aquatic Plants Survey at DNRBASELINEAQUATICPLANTS@wisconsin.gov.



Little Rice Lake
Forest County
WBIC 406400
1200.5 Acres
820 Sampling Points
77m between points

0 0.1 0.2 0.3 mi

WISCONSIN DEPT OF NATURAL RESOURCES


Maximum Depth of Plant Colonization
35
30
25
20
15
10
5
0
Sites
1
3
5
7
Depth Bin (feet)

Appendix B

2023 Point Intercept Species Maps

- Total Rake Fullness Map
- Emergent/Floating-leaf Vegetation Map
- Submersed Vegetation Map
- Abundant Species Comparision Map 2023 v 2017
- Individual Species Maps

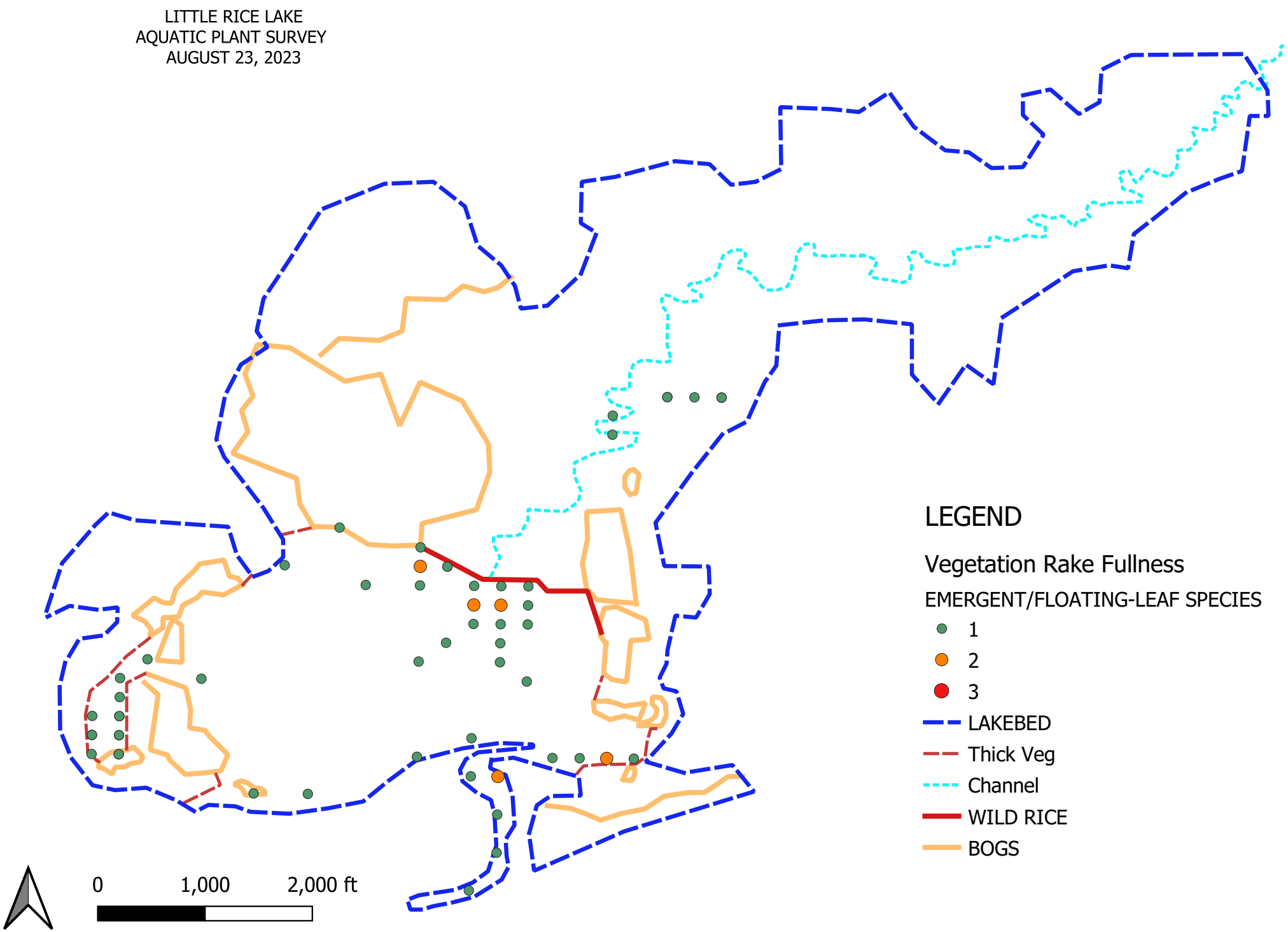
LITTLE RICE LAKE
AUGUST 2023
AQUATIC PLANT SURVEY
TOTAL RAKE FULLNESS

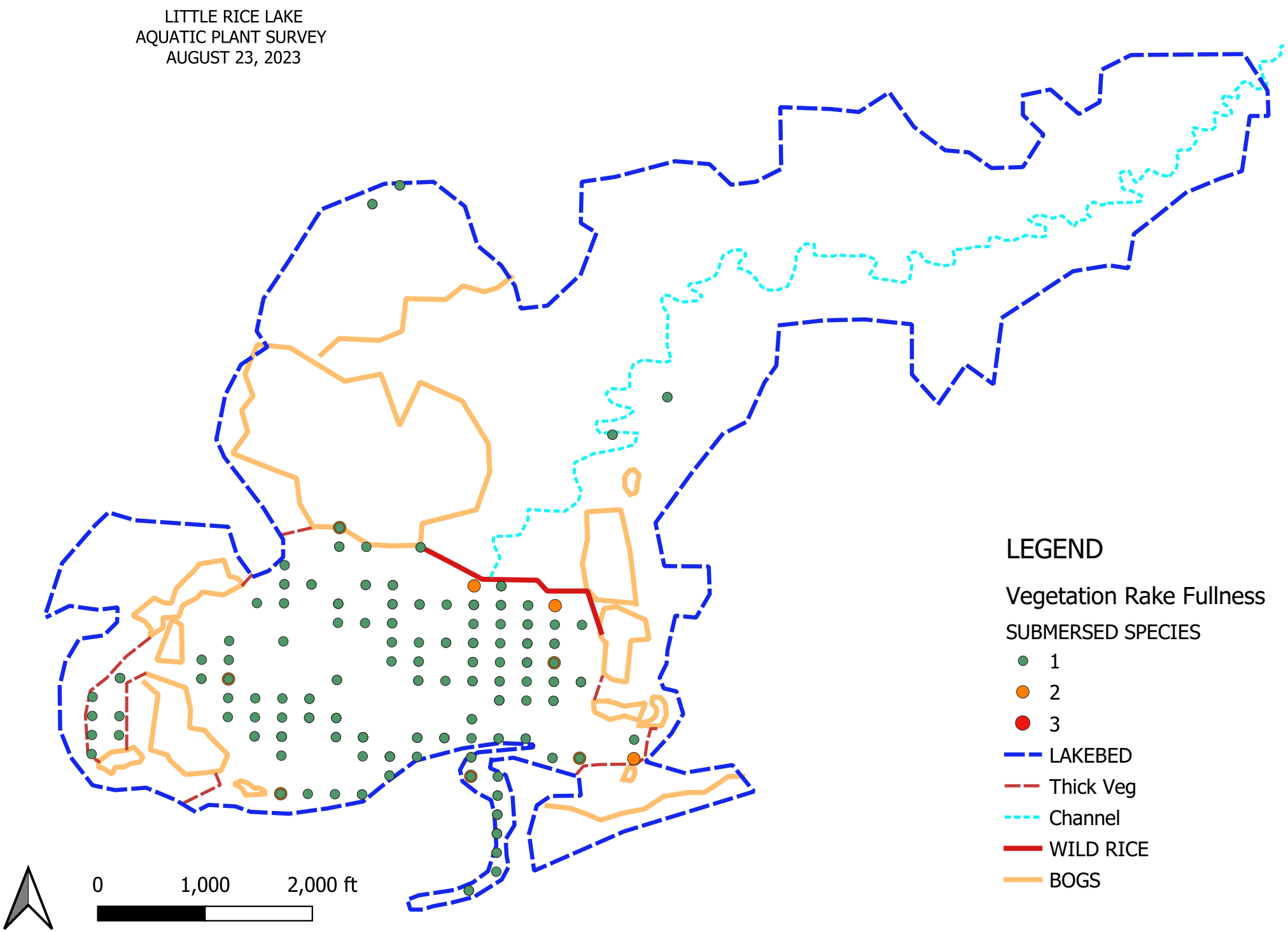
NOTES
Aquatic Plant Survey Points
Air Photo 2022 Leaf On

LEGEND

Rake Fullness
- 1 - Low Density
- 2 - Moderate Density
- 3 - High Density
- No Vegetation/Not Surveyed
- LAKEBED
- CHANNEL

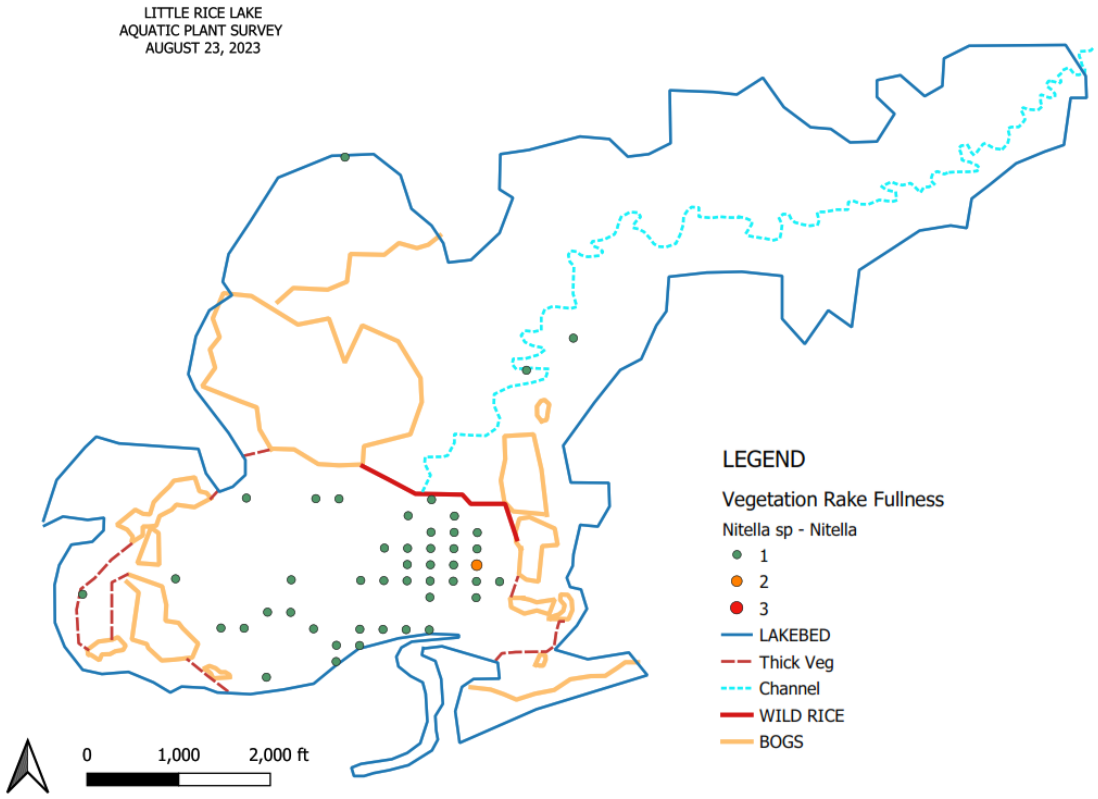
Young Road
Bailey Road
Wilson Drive
Waite Lane
Old 8 Road
Town of Shanty Bay

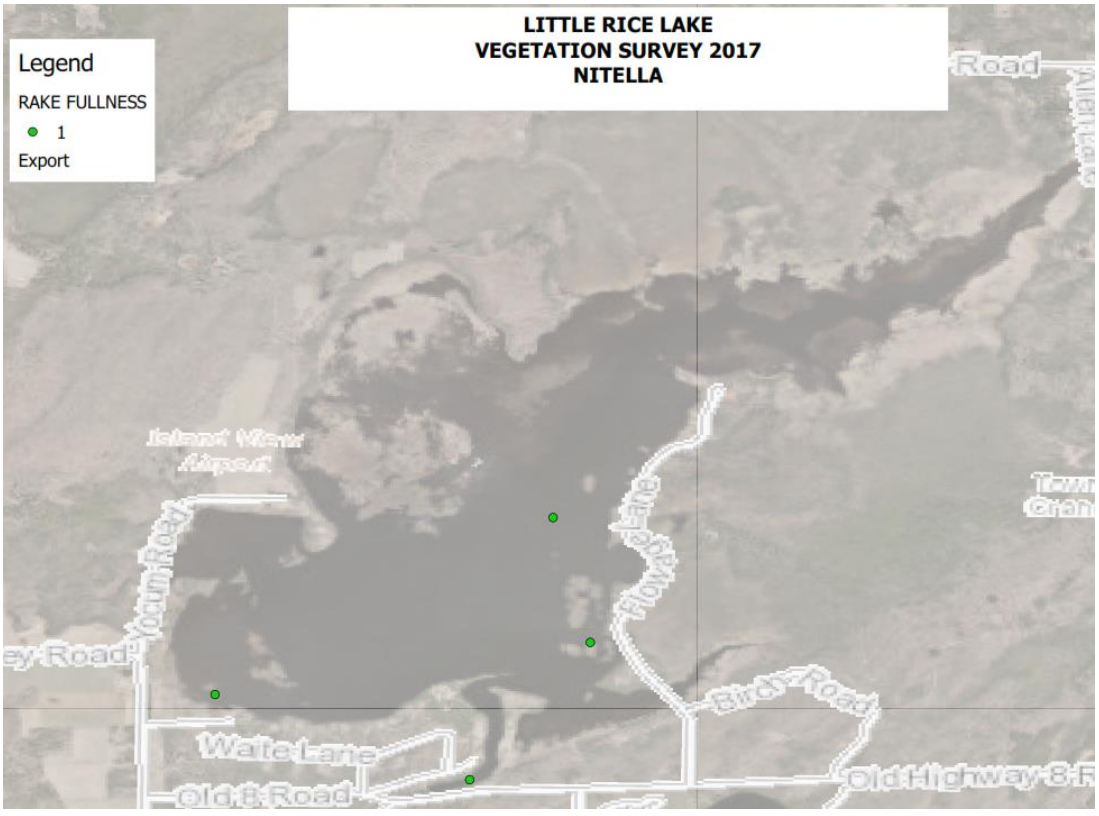

LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023
LEGEND
Vegetation Rake Fullness
EMERGENT/FLOATING-LEAF SPECIES
1
2
3
LAKEBED
Thick Veg
Channel
WILD RICE
BOGS
0
1,000
2,000 ft


LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023
LEGEND
Vegetation Rake Fullness
SUBMERSED SPECIES
1
2
3
LAKEBED
Thick Veg
Channel
WILD RICE
BOGS
0
1,000
2,000 ft

LITTLE RICE LAKE ABUNDANT SPECIES COMPARISON 2023 V 2017

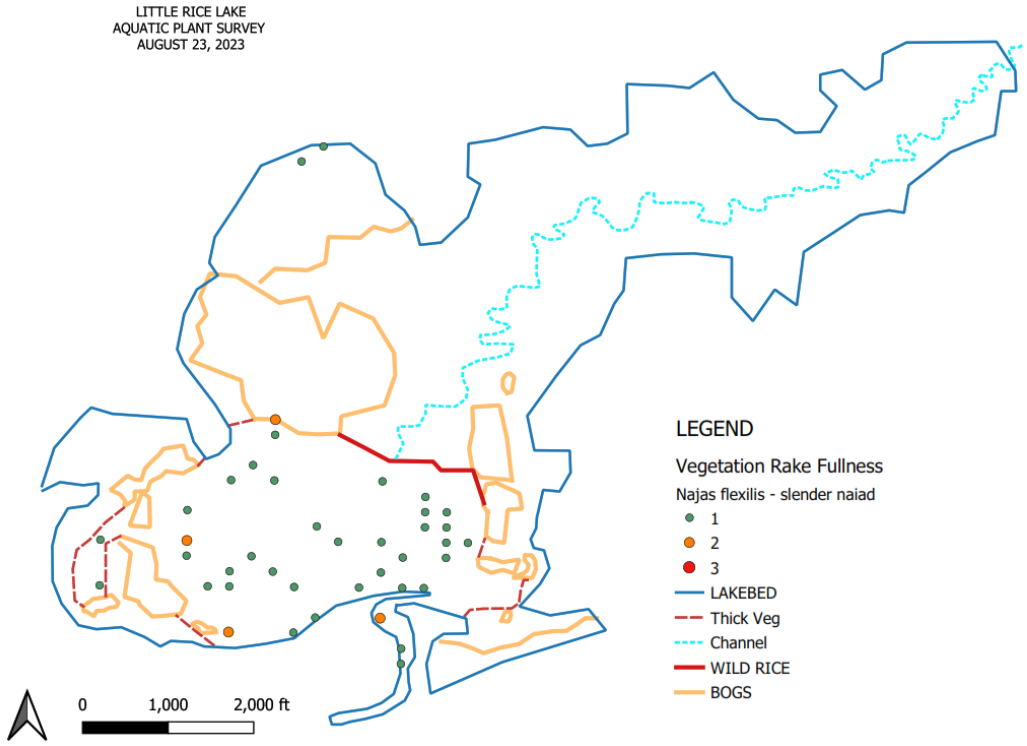
NITELLA 2023 V 2017

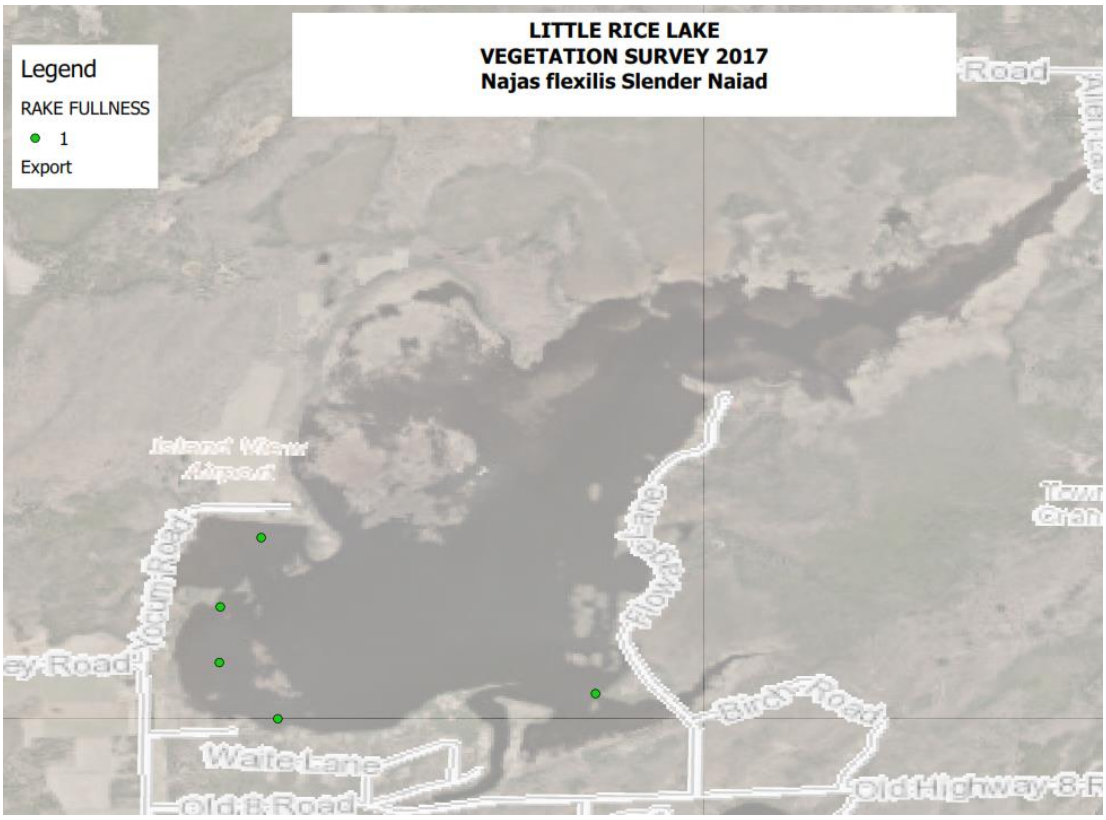




LITTLE RICE LAKE ABUNDANT SPECIES COMPARISON 2023 V 2017

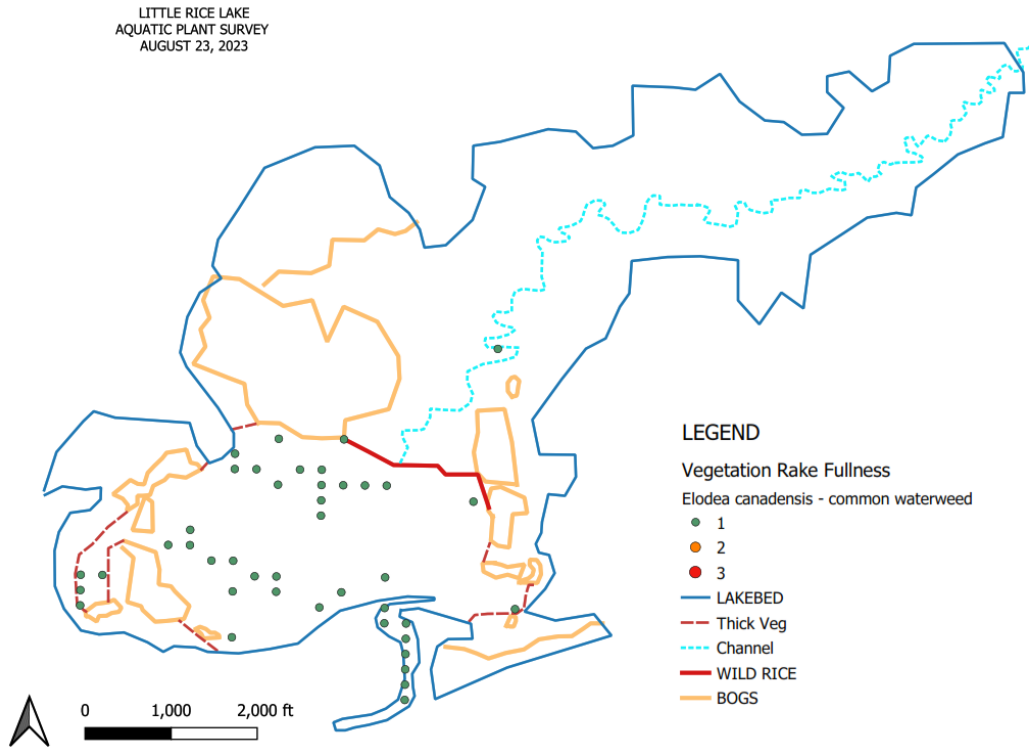
NAIAD 2023 V 2017

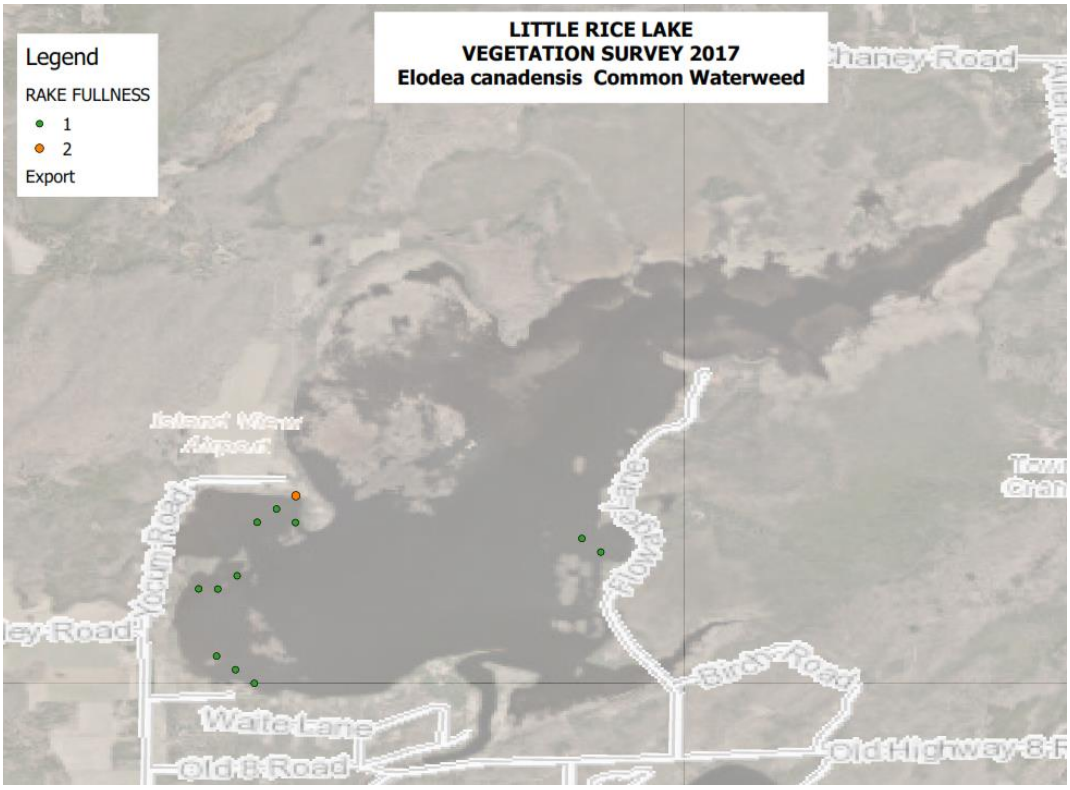




LITTLE RICE LAKE ABUNDANT SPECIES COMPARISON 2023 V 2017

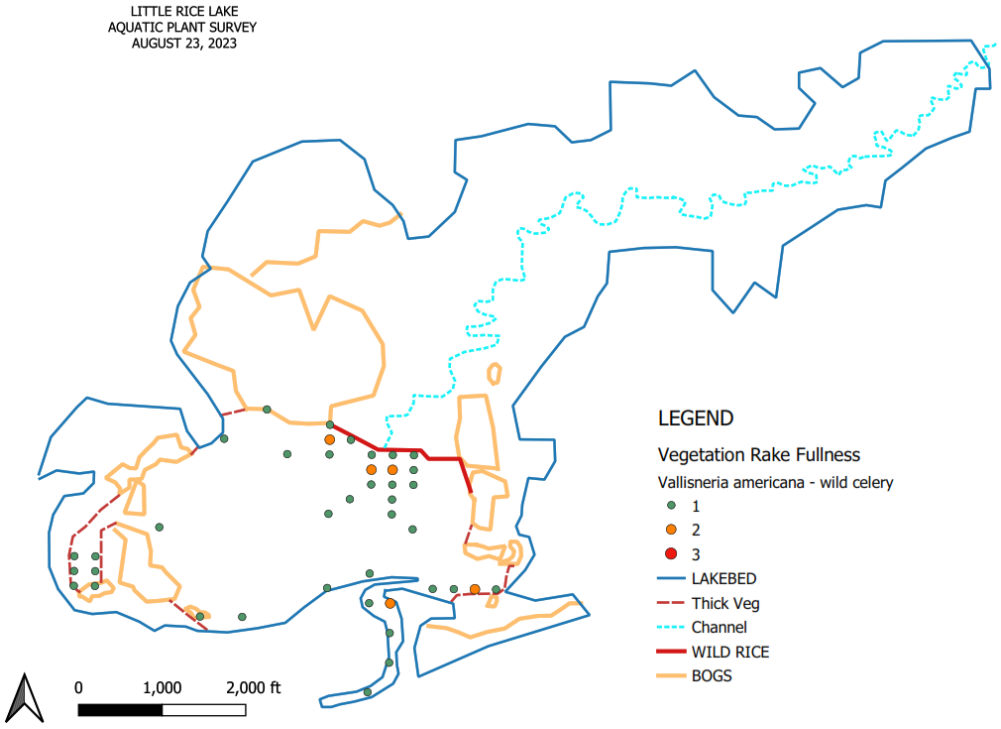
WATERWEED 2023 V 2017

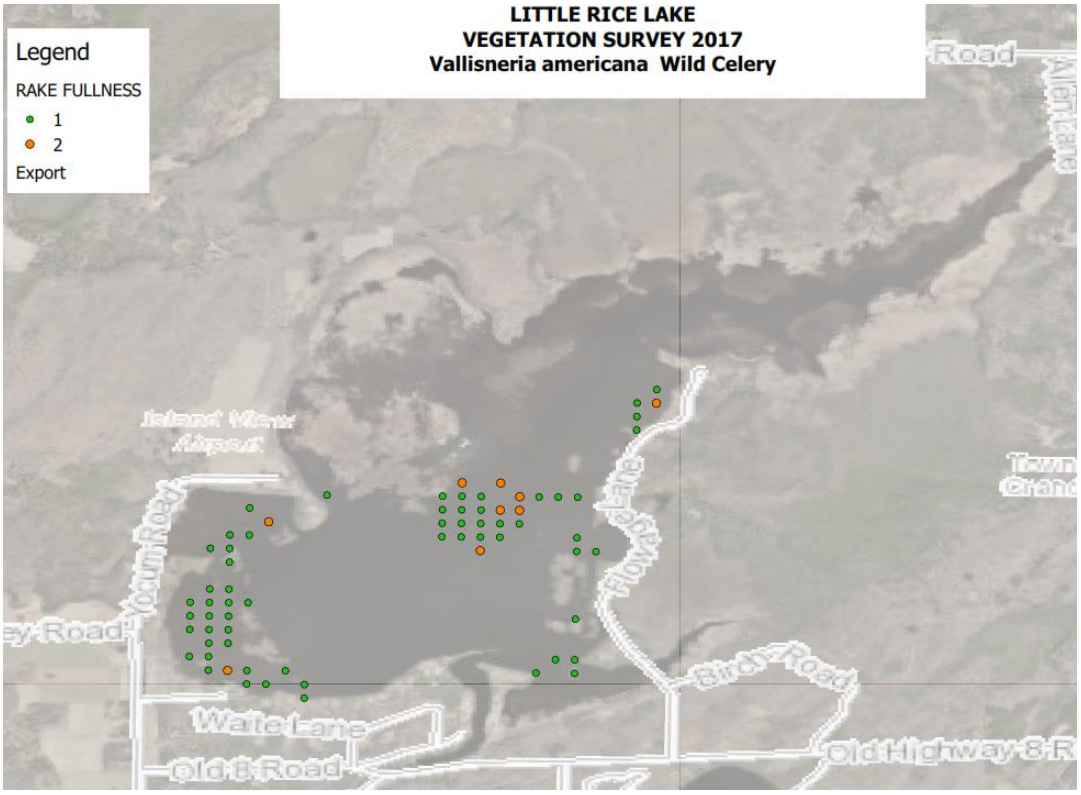




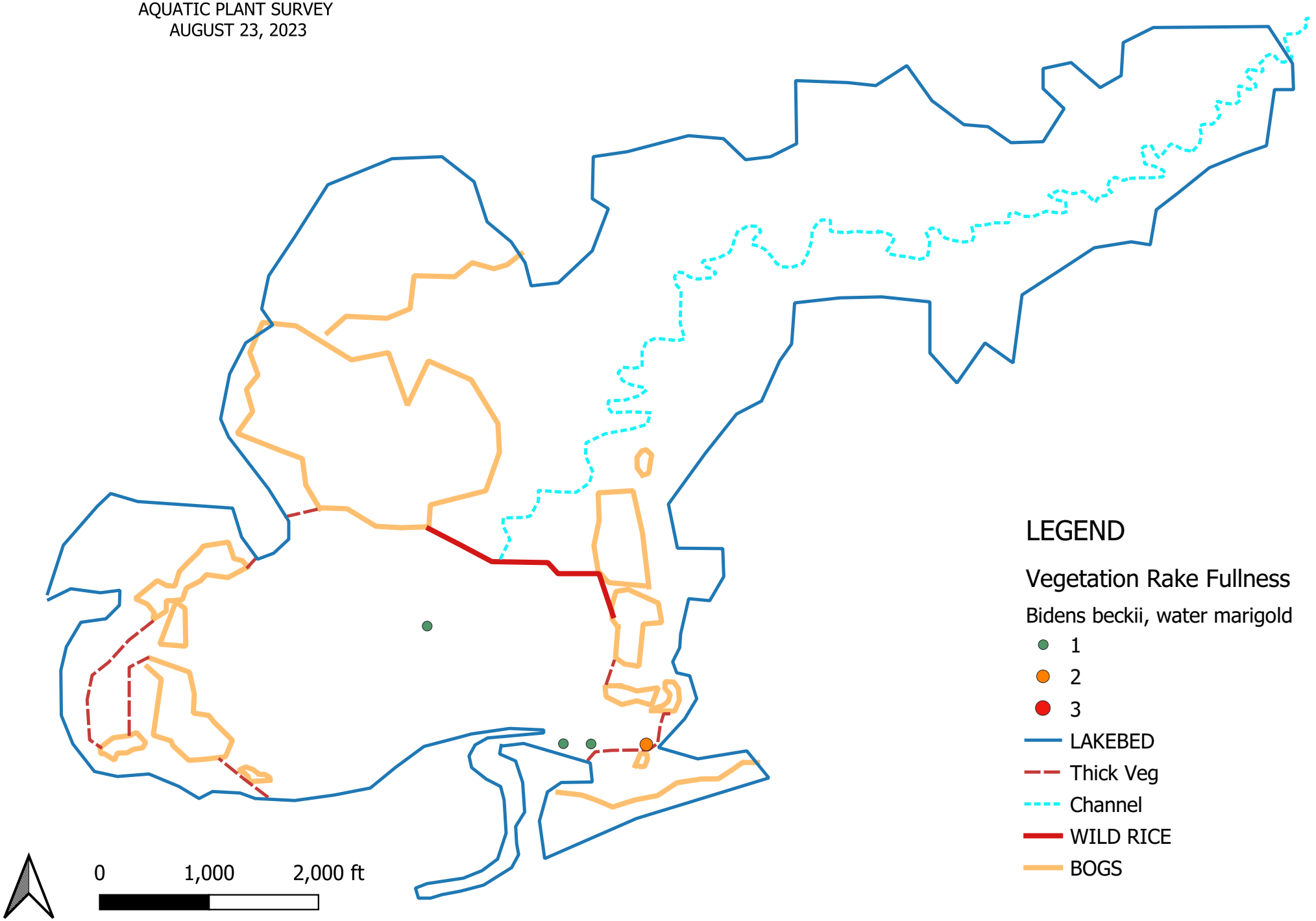
LITTLE RICE LAKE ABUNDANT SPECIES COMPARISON 2023 V 2017

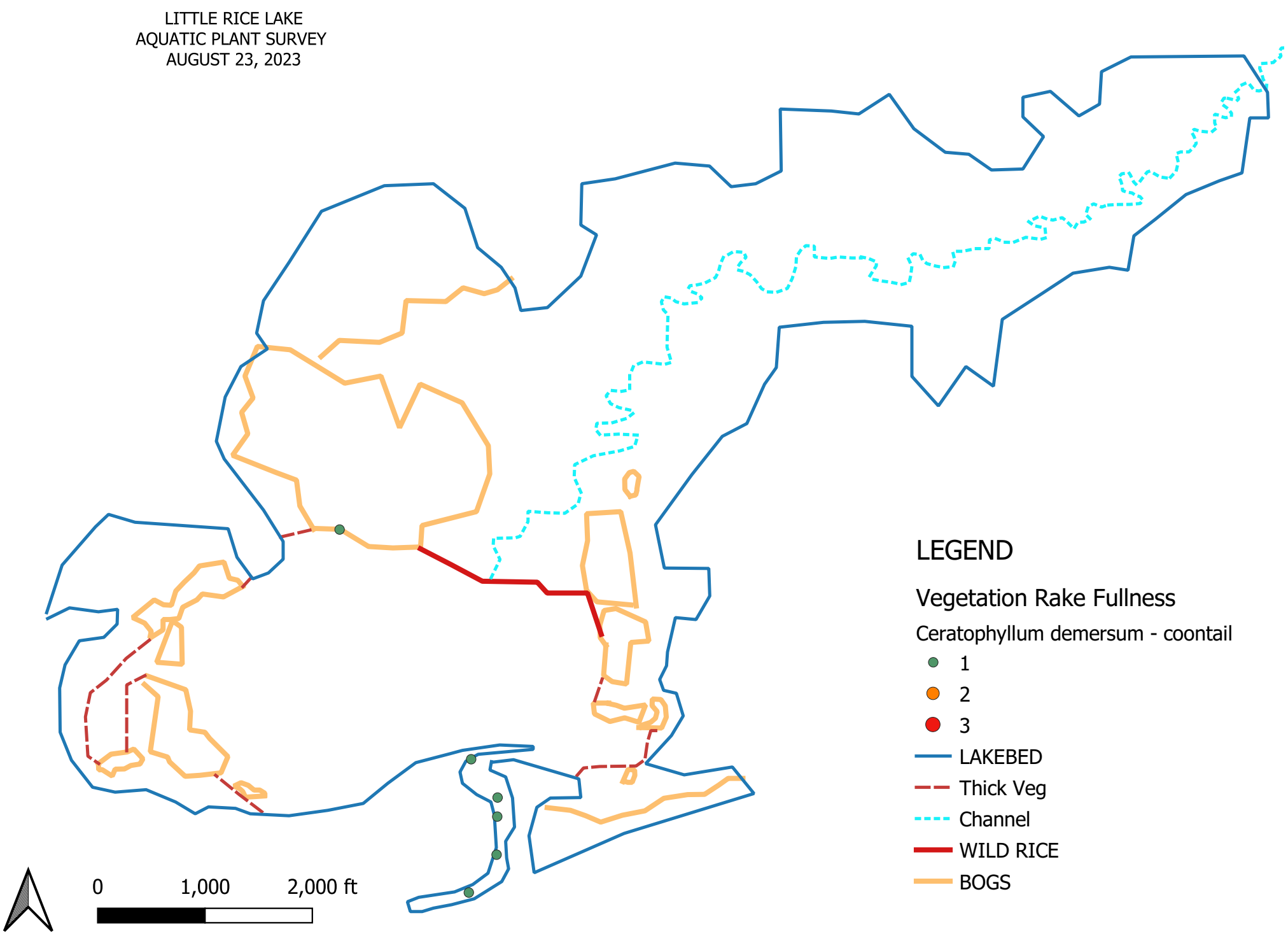
WILD CELERY 2023 V 2017



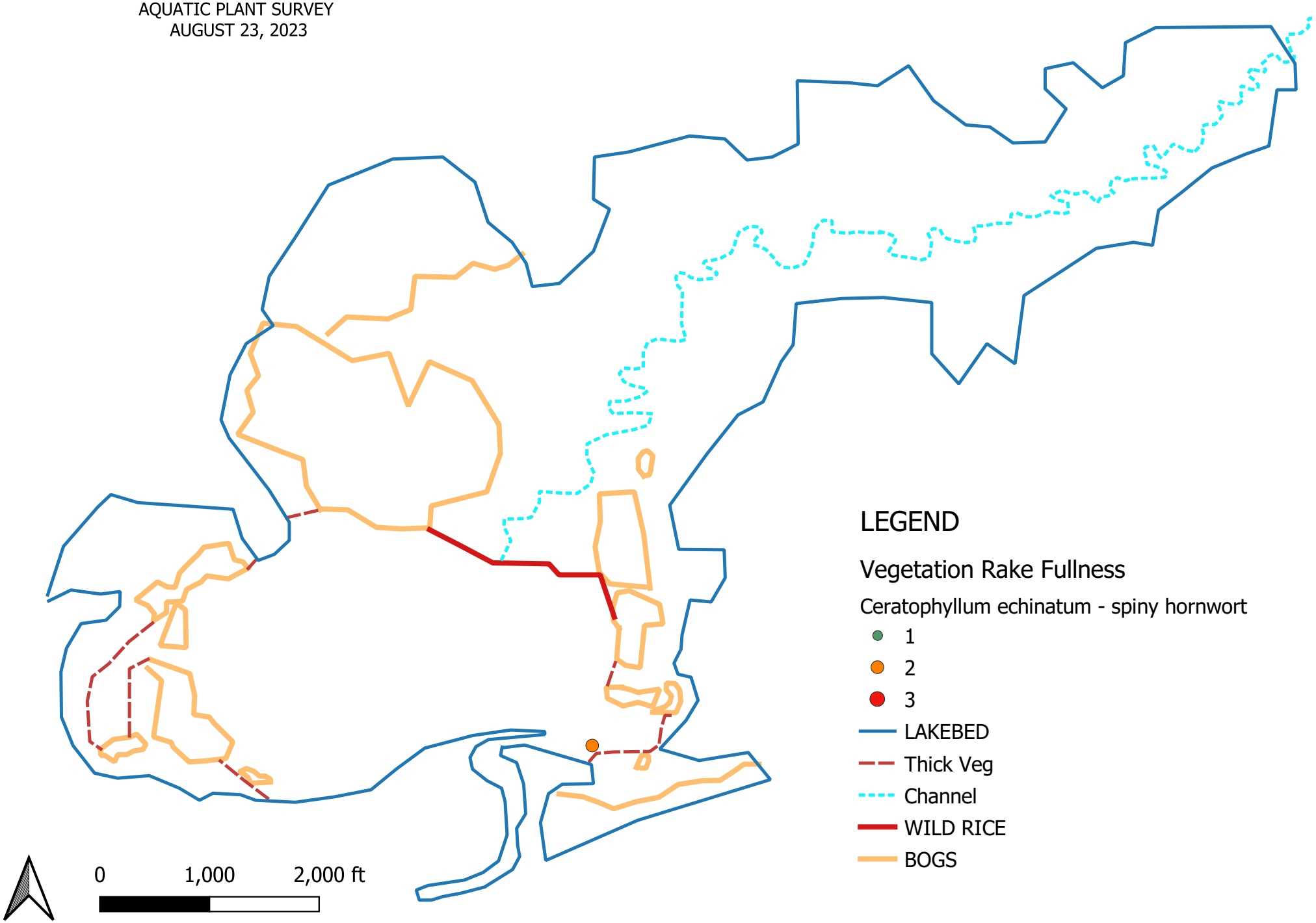


LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023

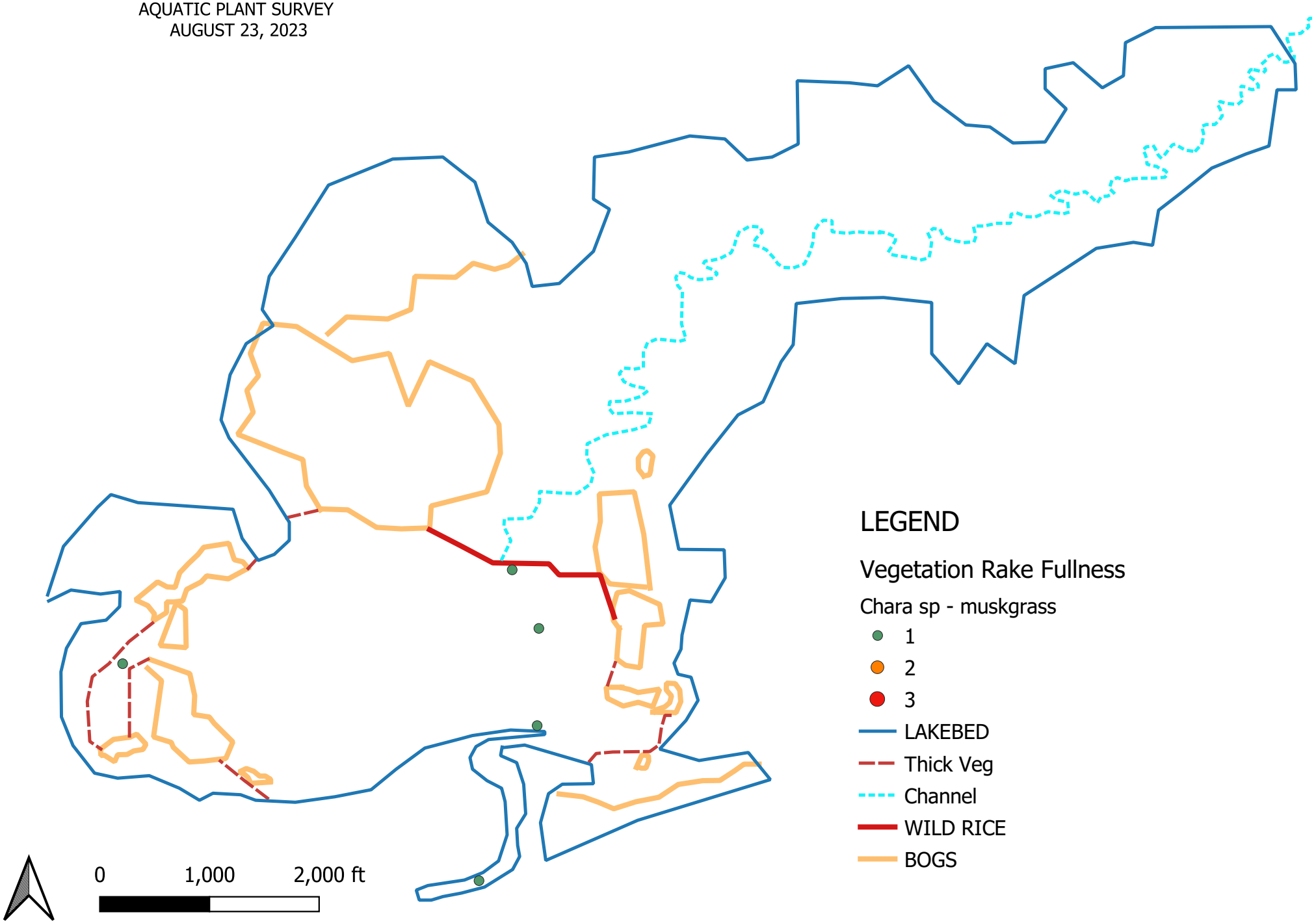



LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023
LEGEND
Vegetation Rake Fullness
Ceratophyllum demersum - coontail
1
2
3
LAKEBED
Thick Veg
Channel
WILD RICE
BOGS
0
1,000
2,000 ft

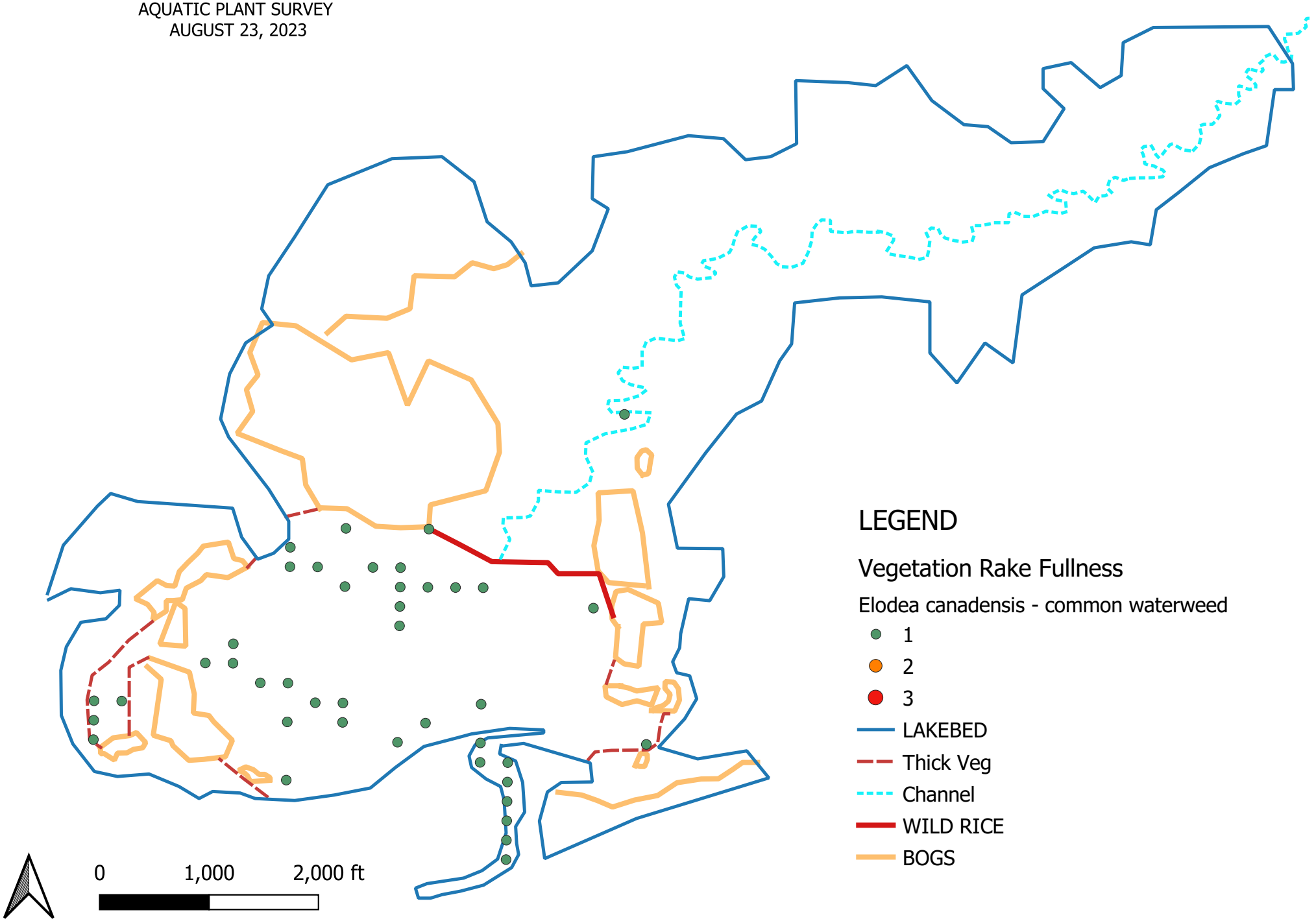
LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023

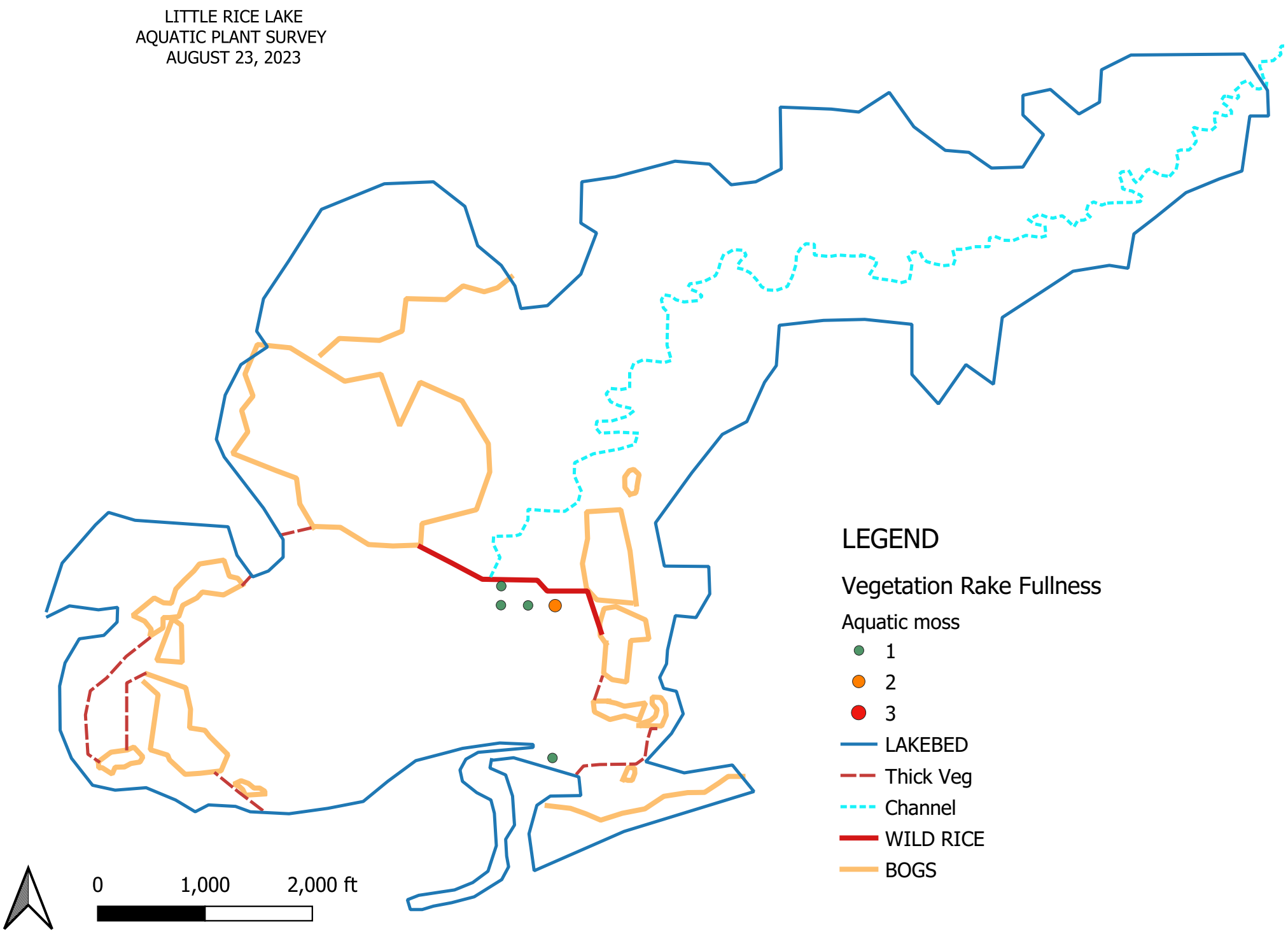


LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023

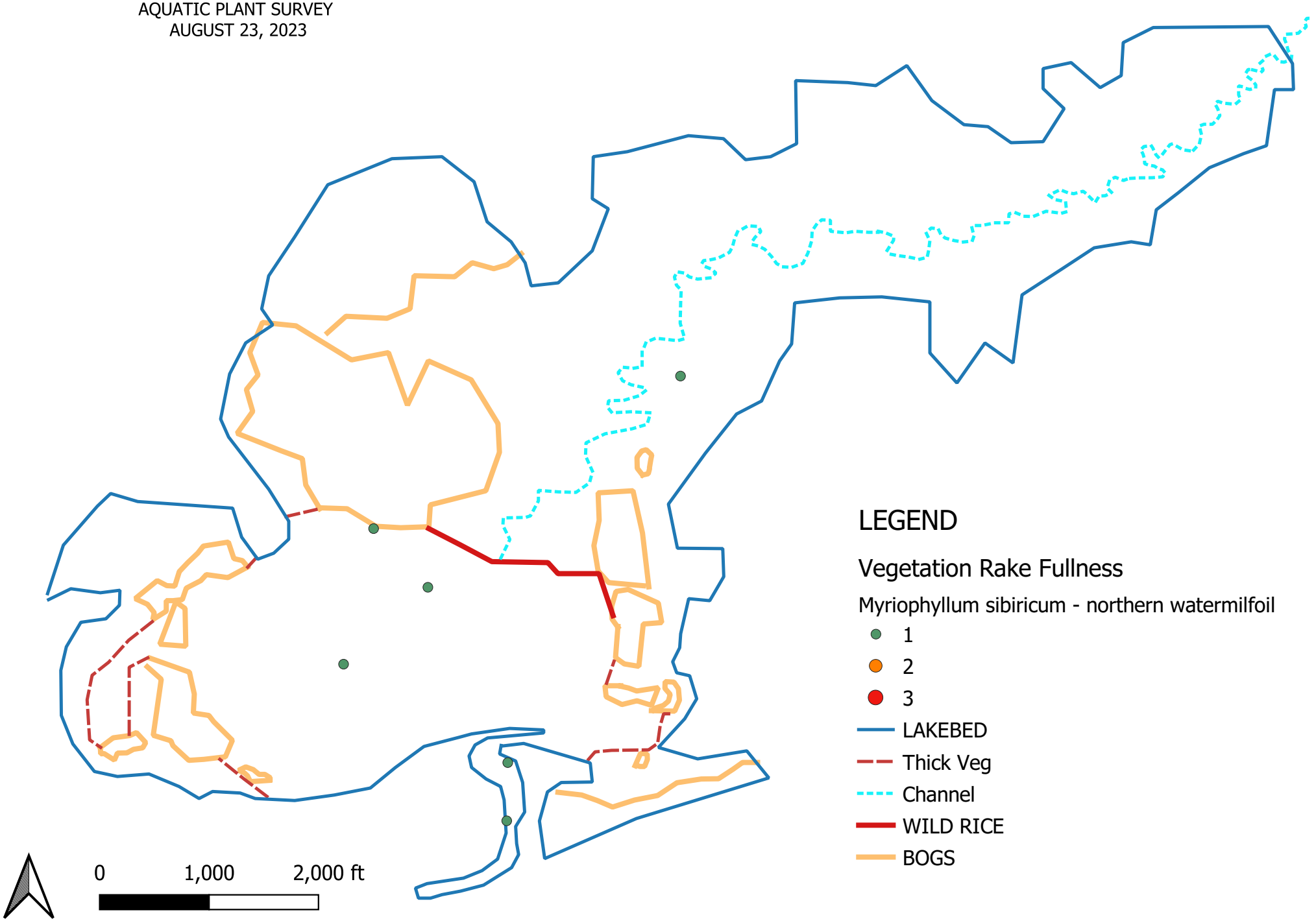


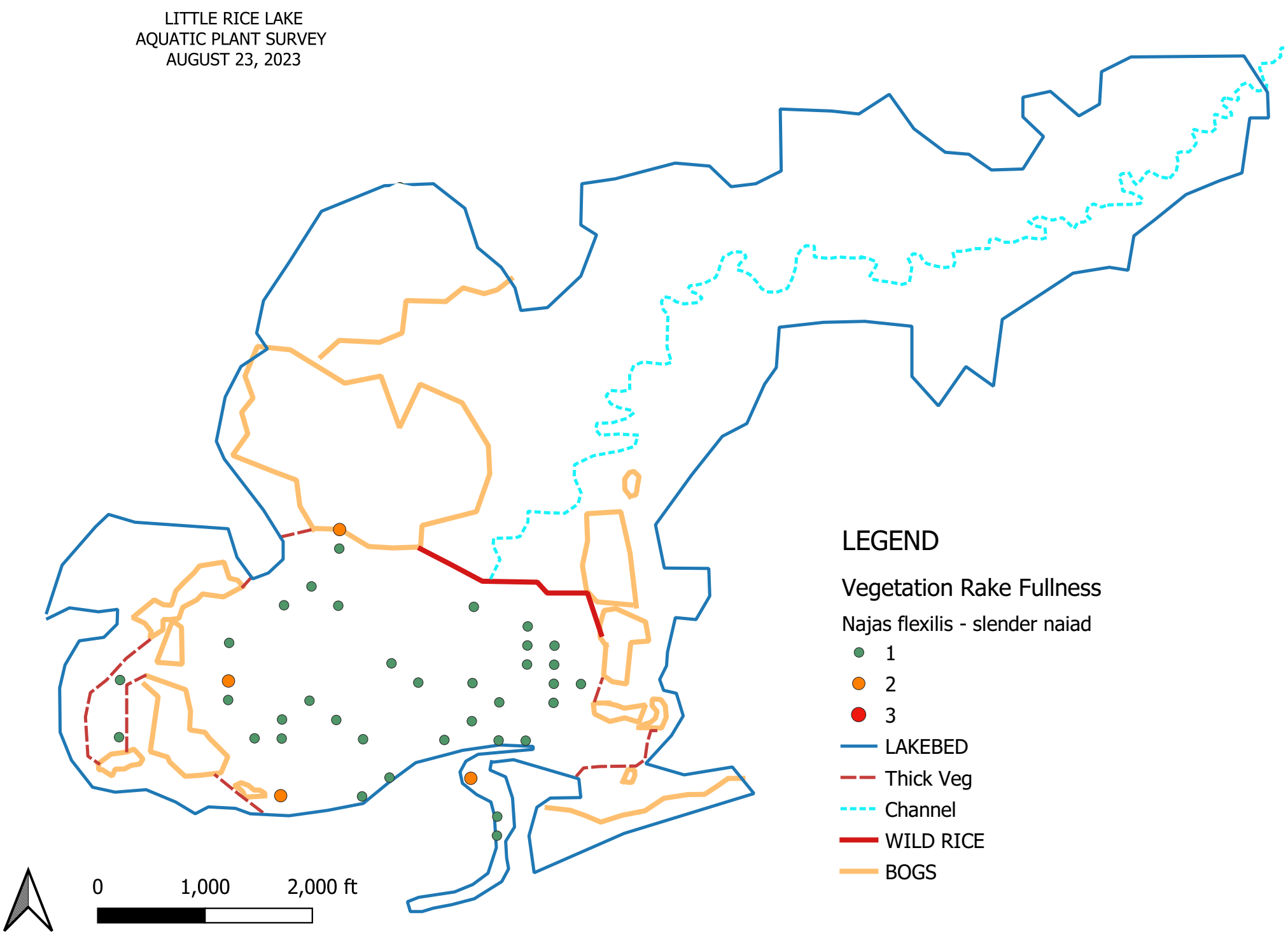
LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023

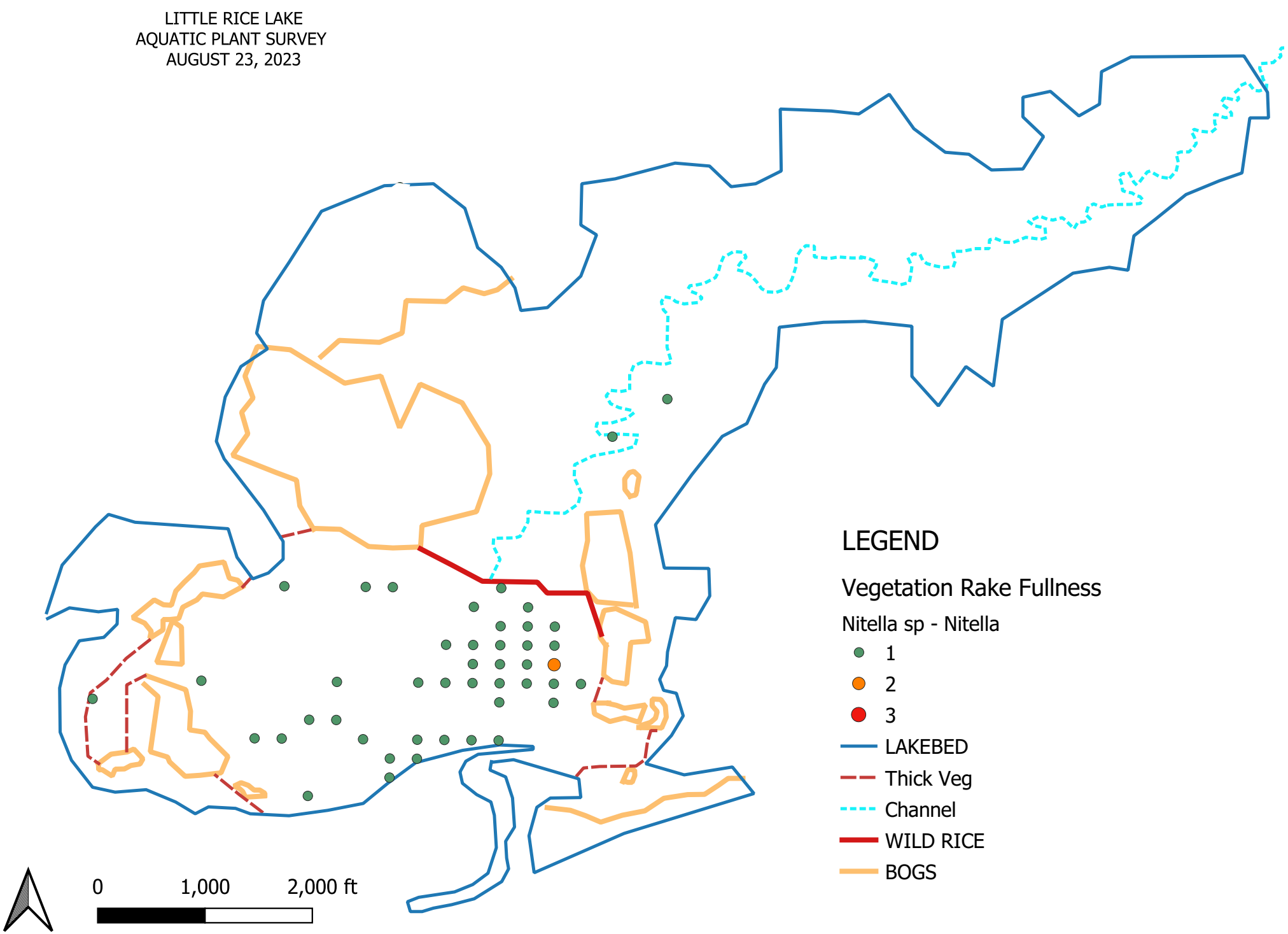



LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023
LEGEND
Vegetation Rake Fullness
Aquatic moss
1
2
3
LAKEBED
Thick Veg
Channel
WILD RICE
BOGS
0
1,000
2,000 ft

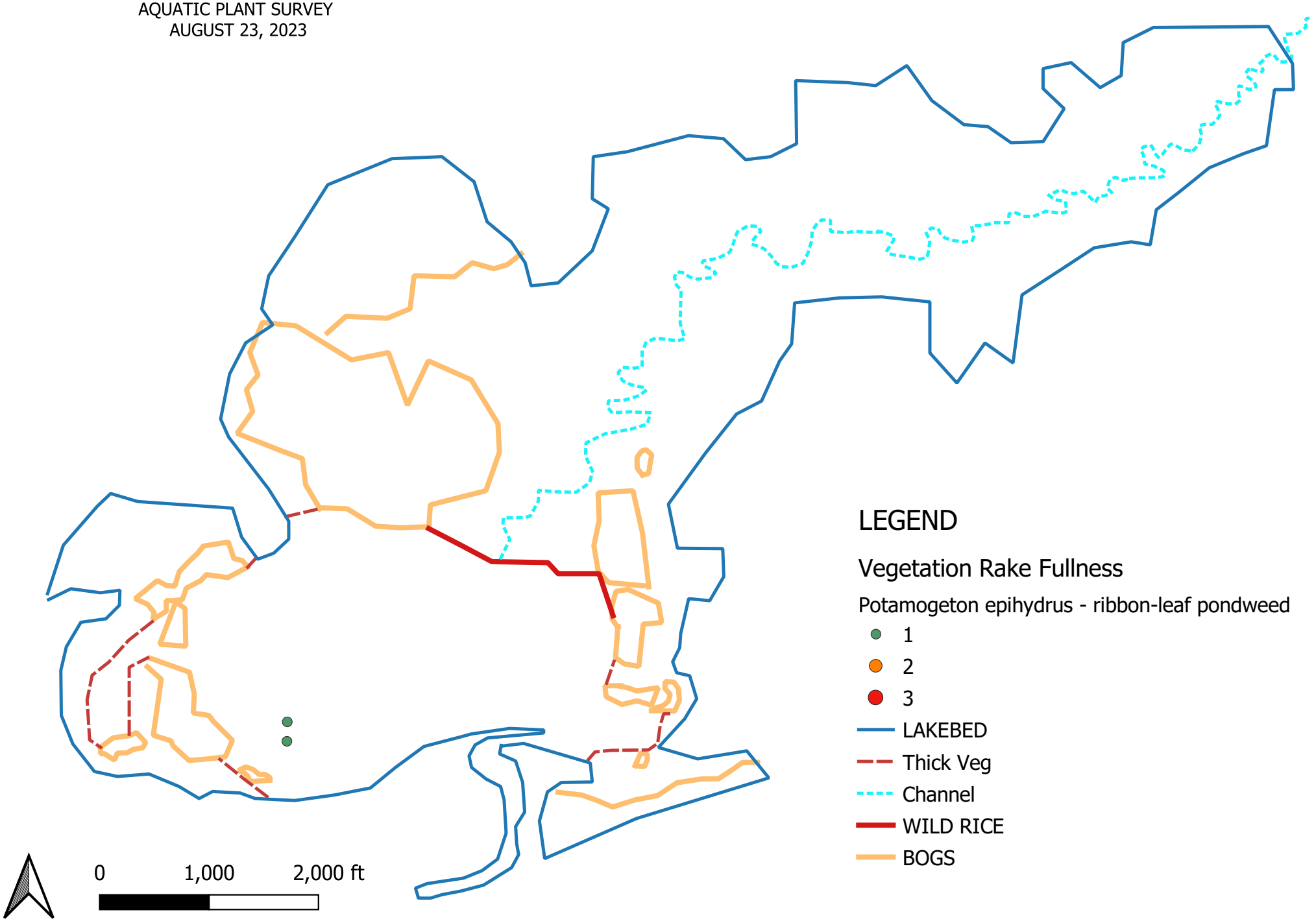
LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023



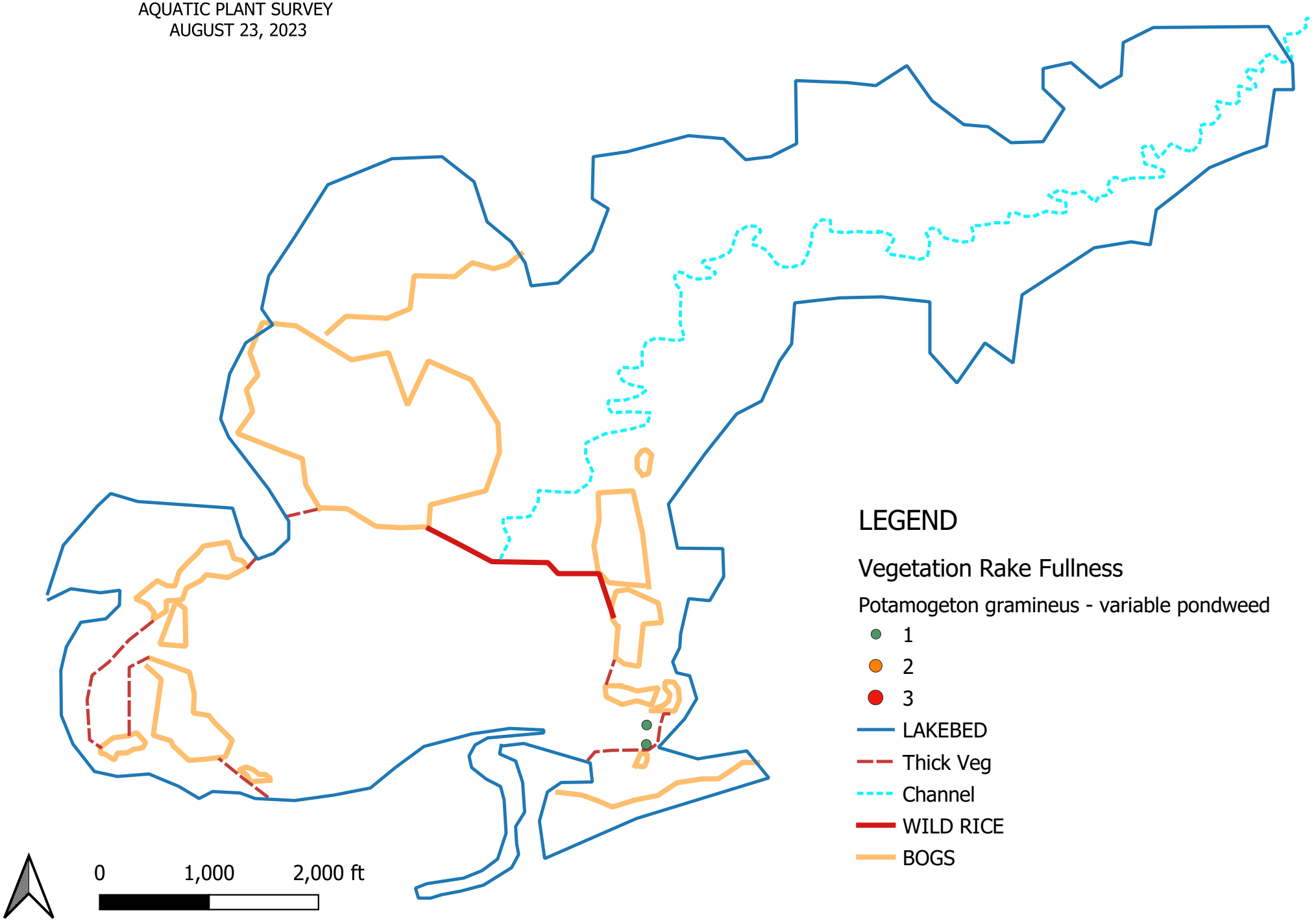

LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023
LEGEND
Vegetation Rake Fullness
Najas flexilis - slender naiad
1
2
3
LAKEBED
Thick Veg
Channel
WILD RICE
BOGS
0
1,000
2,000 ft


LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023
LEGEND
Vegetation Rake Fullness
Nitella sp - Nitella
1
2
3
LAKEBED
Thick Veg
Channel
WILD RICE
BOGS
0
1,000
2,000 ft

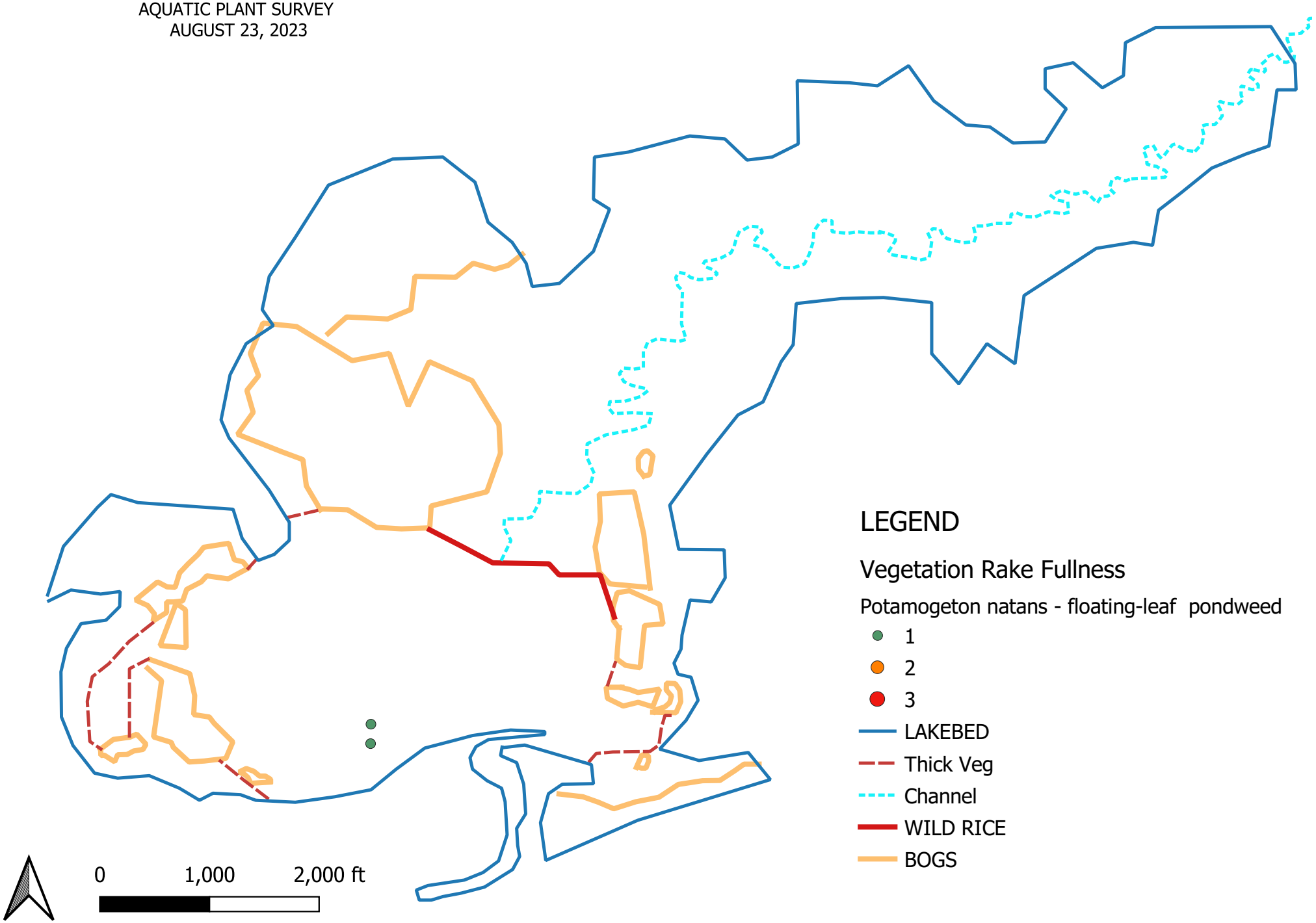
LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023

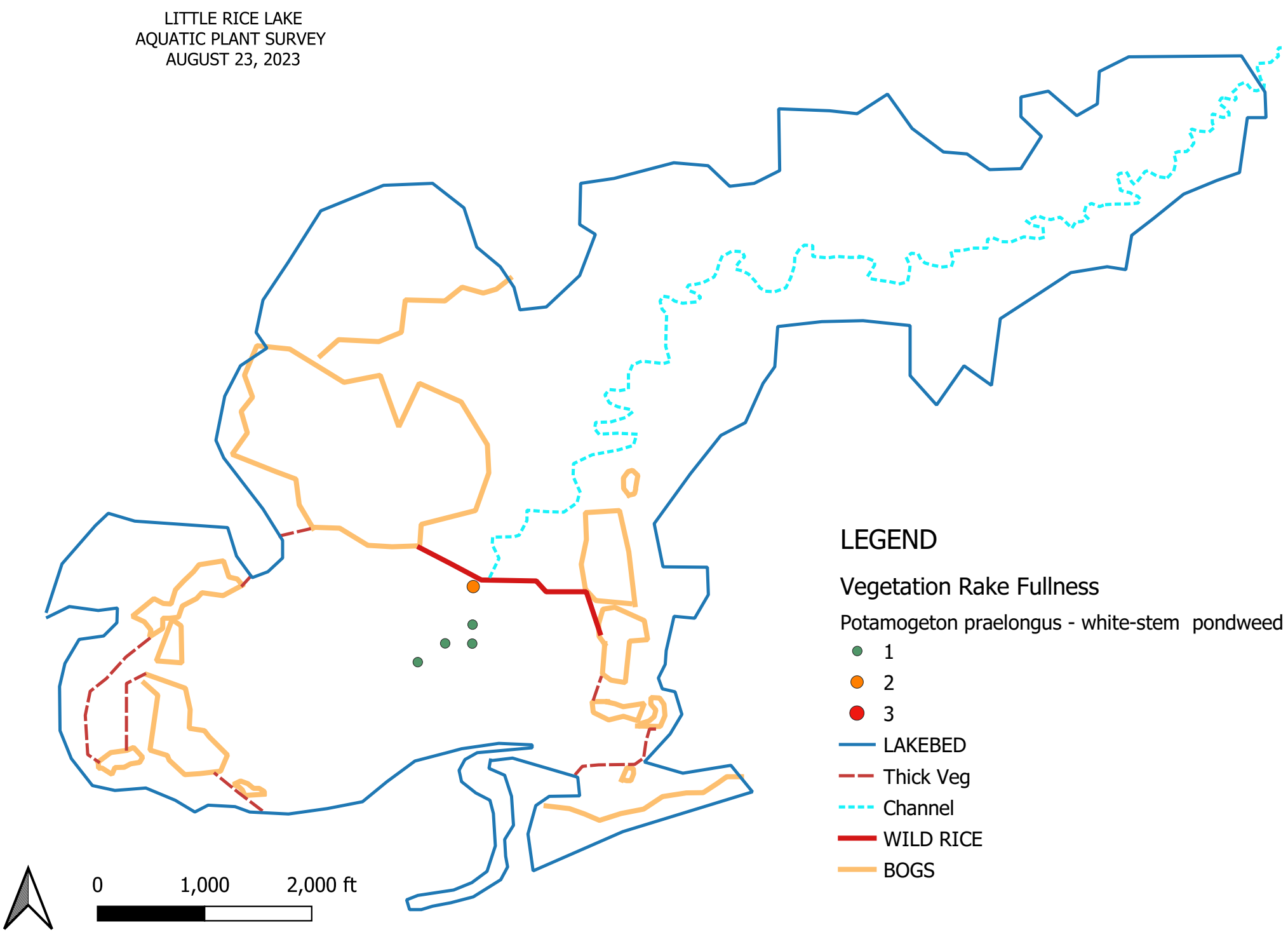


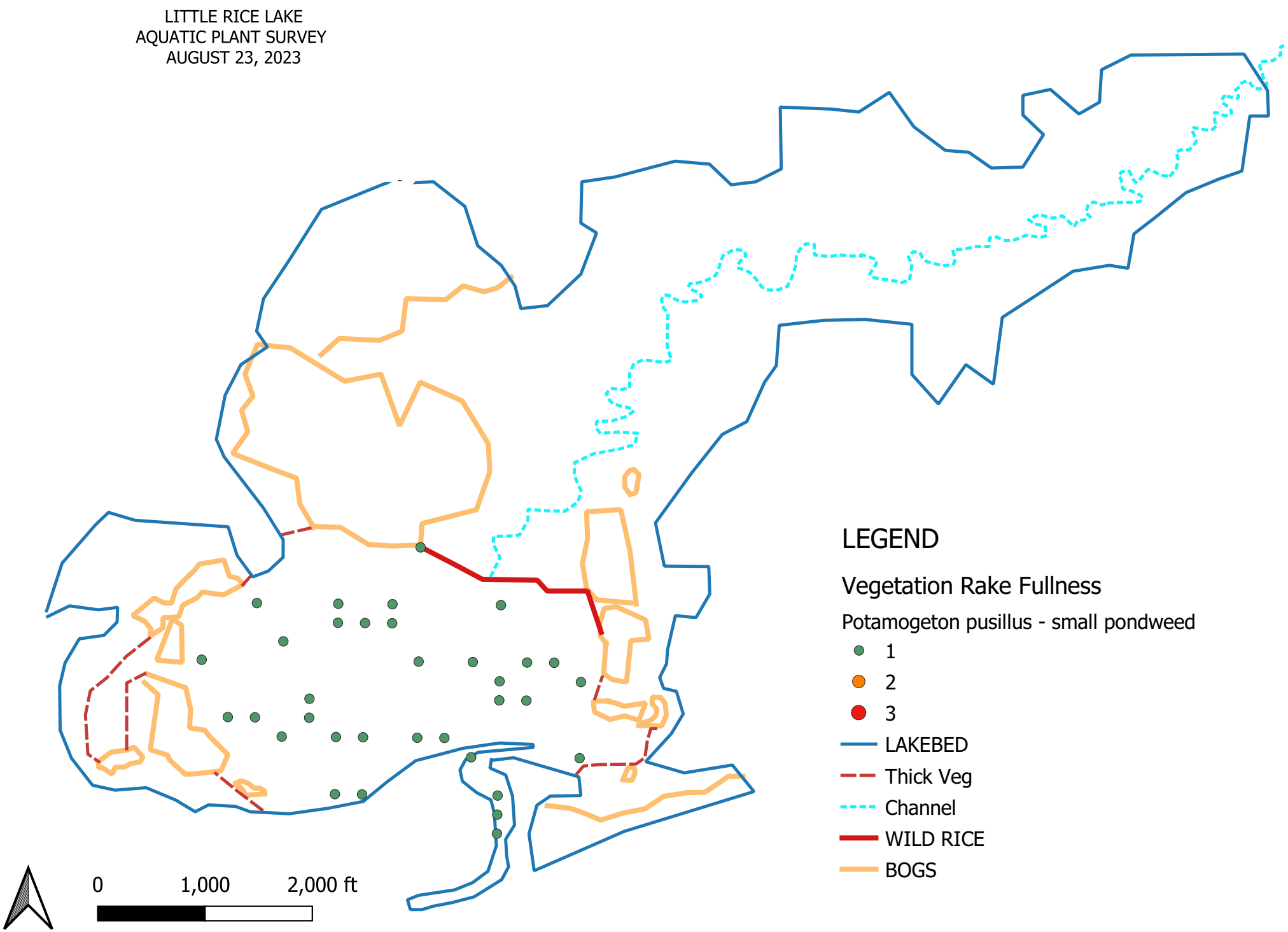
LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023



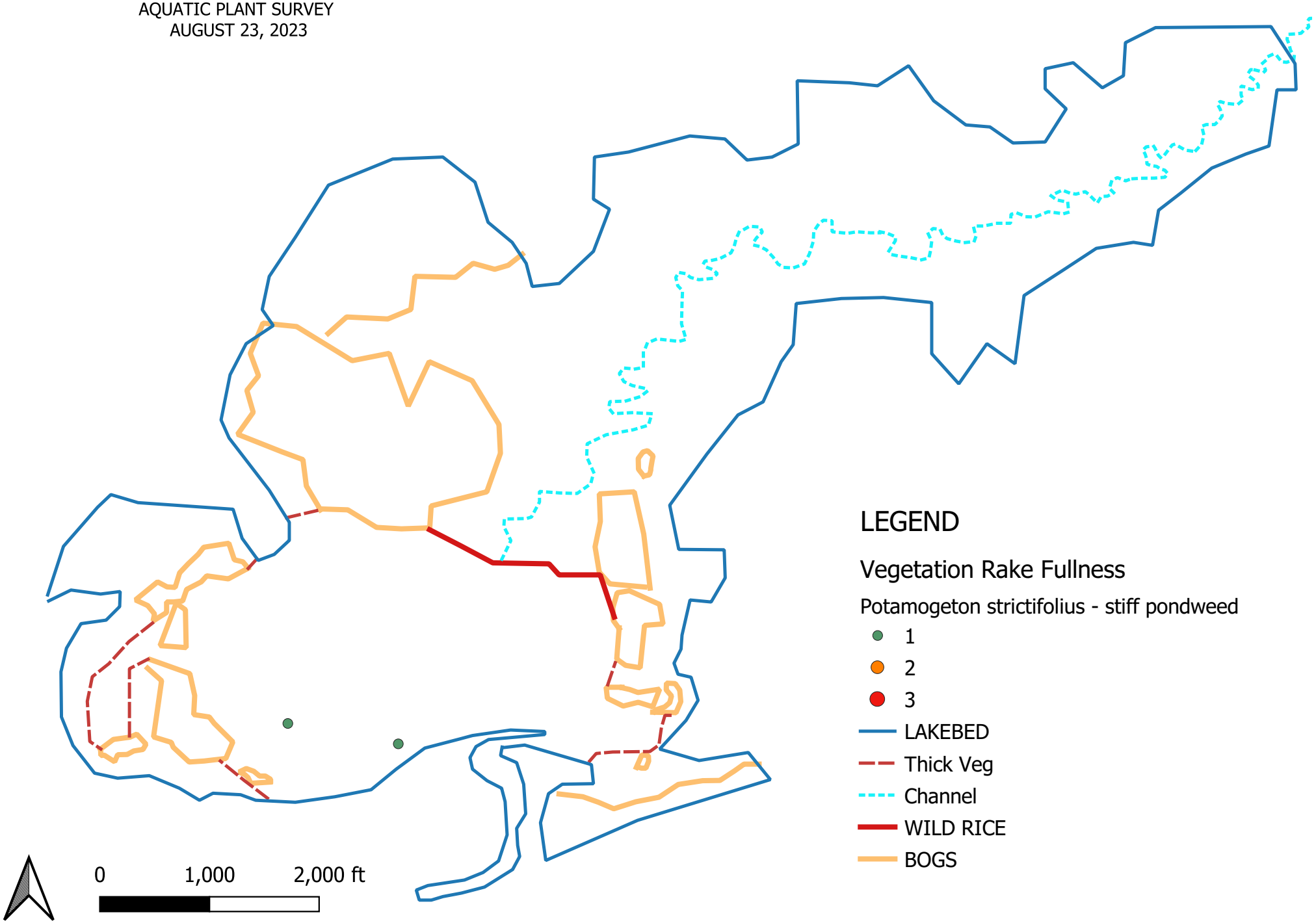
LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023



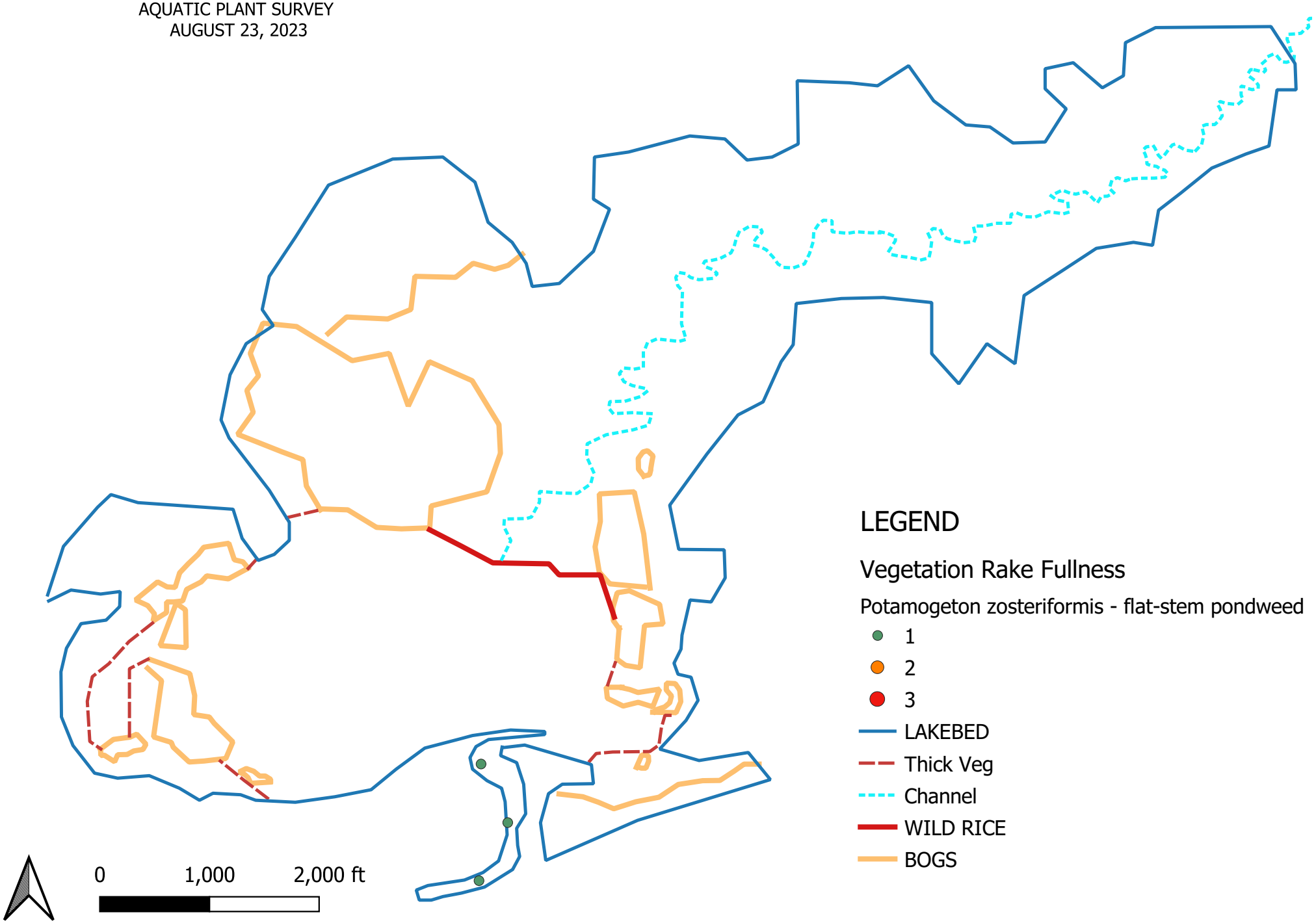

LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023
LEGEND
Vegetation Rake Fullness
Potamogeton praelongus - white-stem pondweed
1
2
3
LAKEBED
Thick Veg
Channel
WILD RICE
BOGS
0
1,000
2,000 ft


LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023
LEGEND
Vegetation Rake Fullness
Potamogeton pusillus - small pondweed
1
2
3
LAKEBED
Thick Veg
Channel
WILD RICE
BOGS
0
1,000
2,000 ft

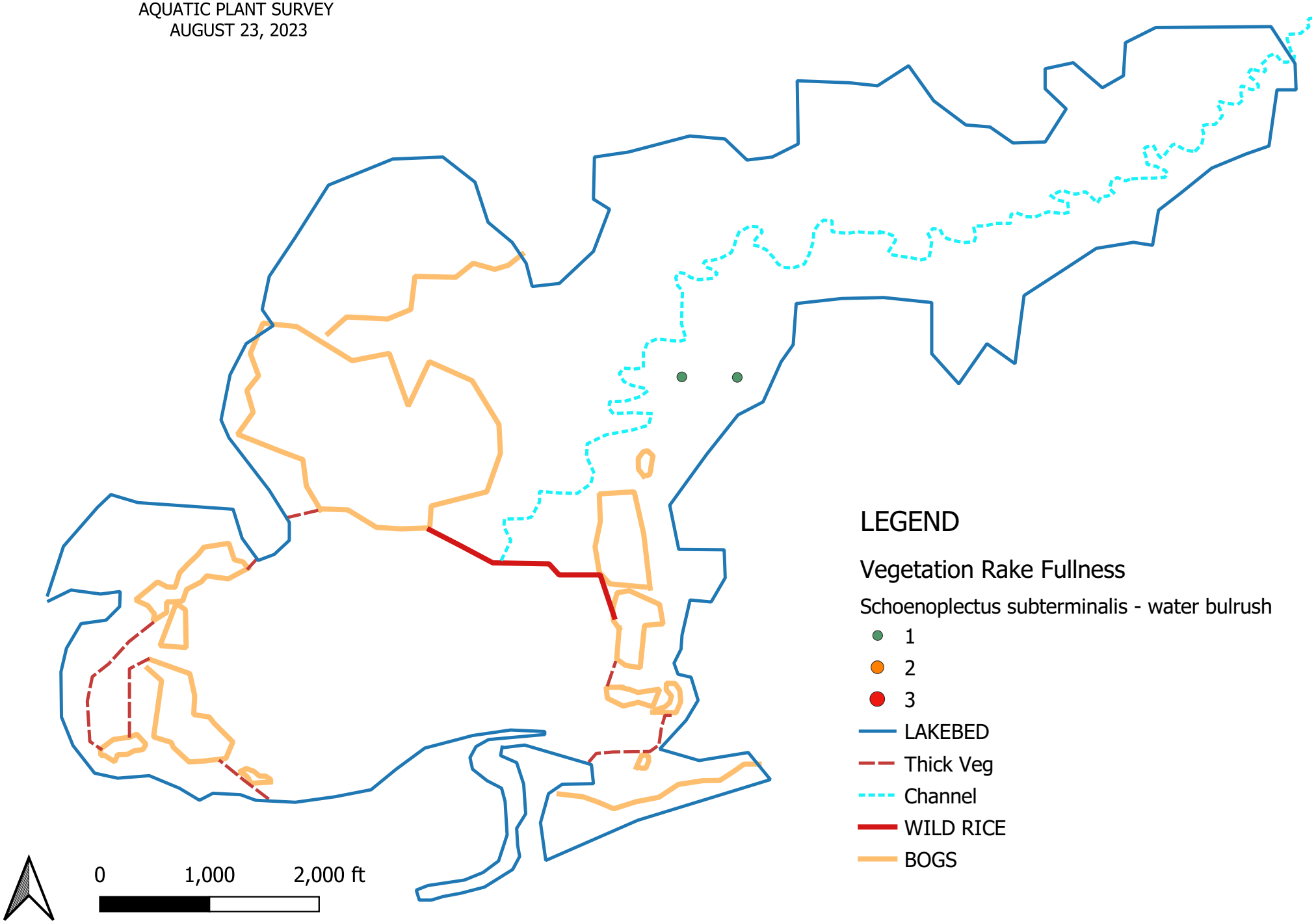
LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023



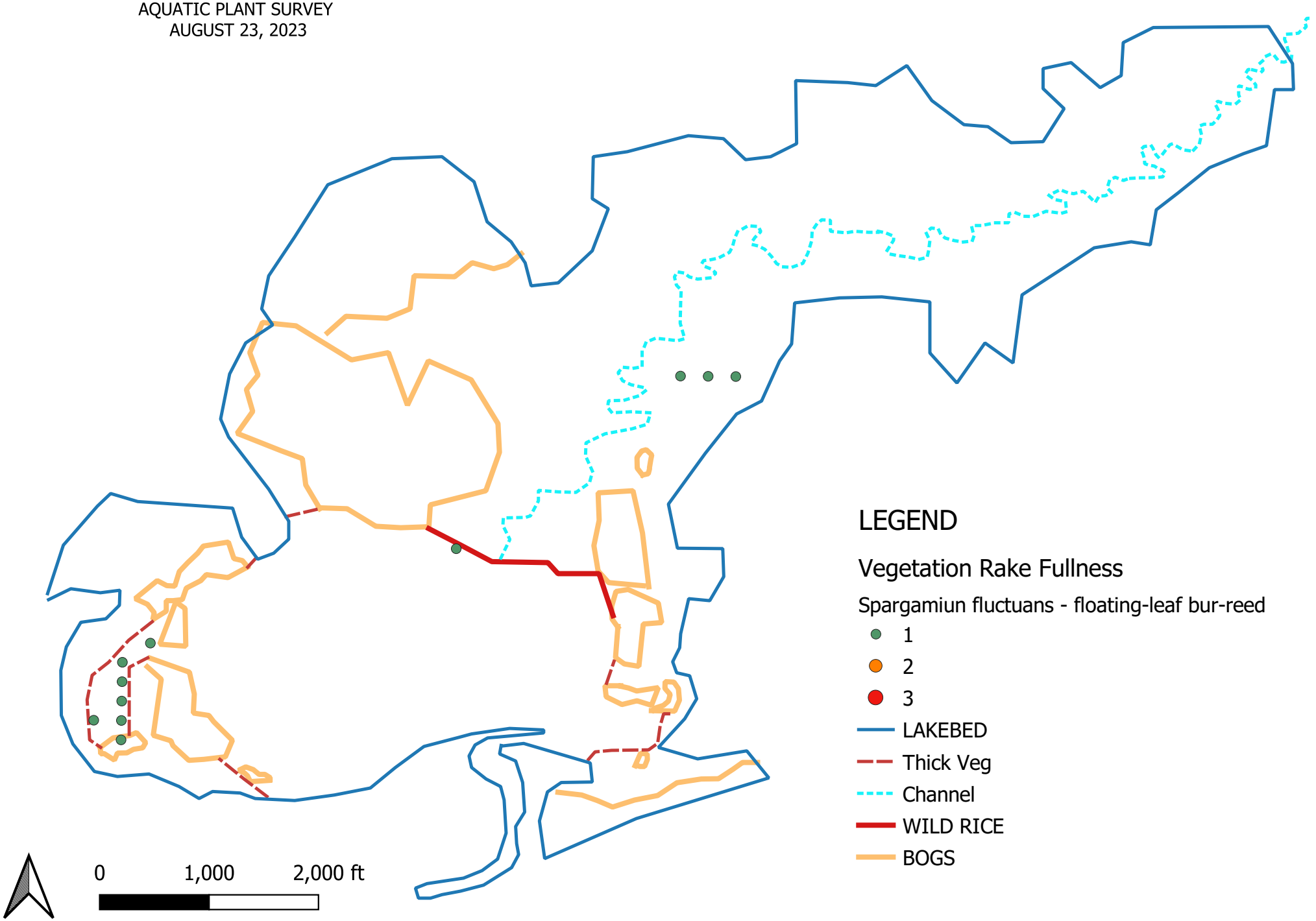
LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023



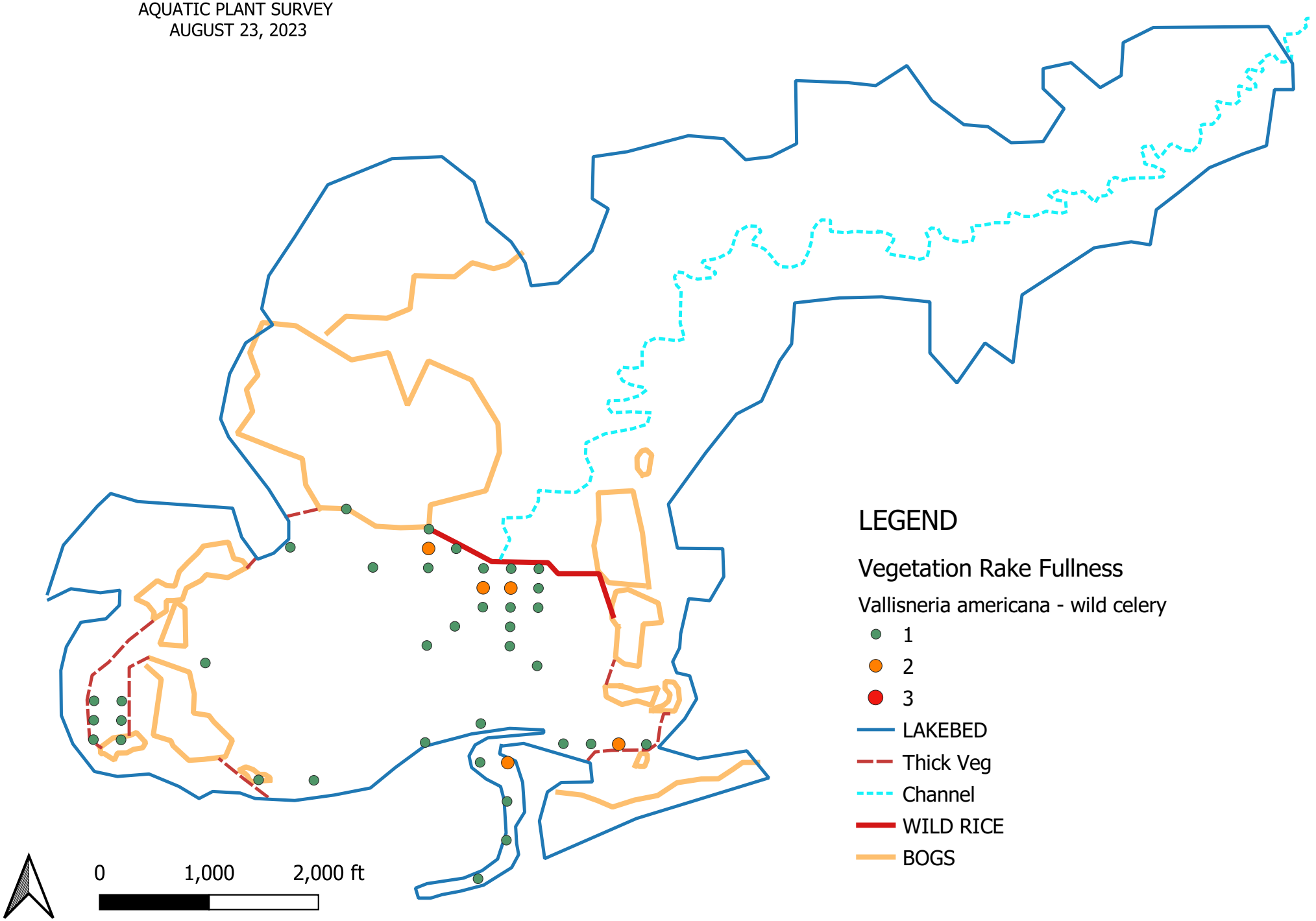
LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023

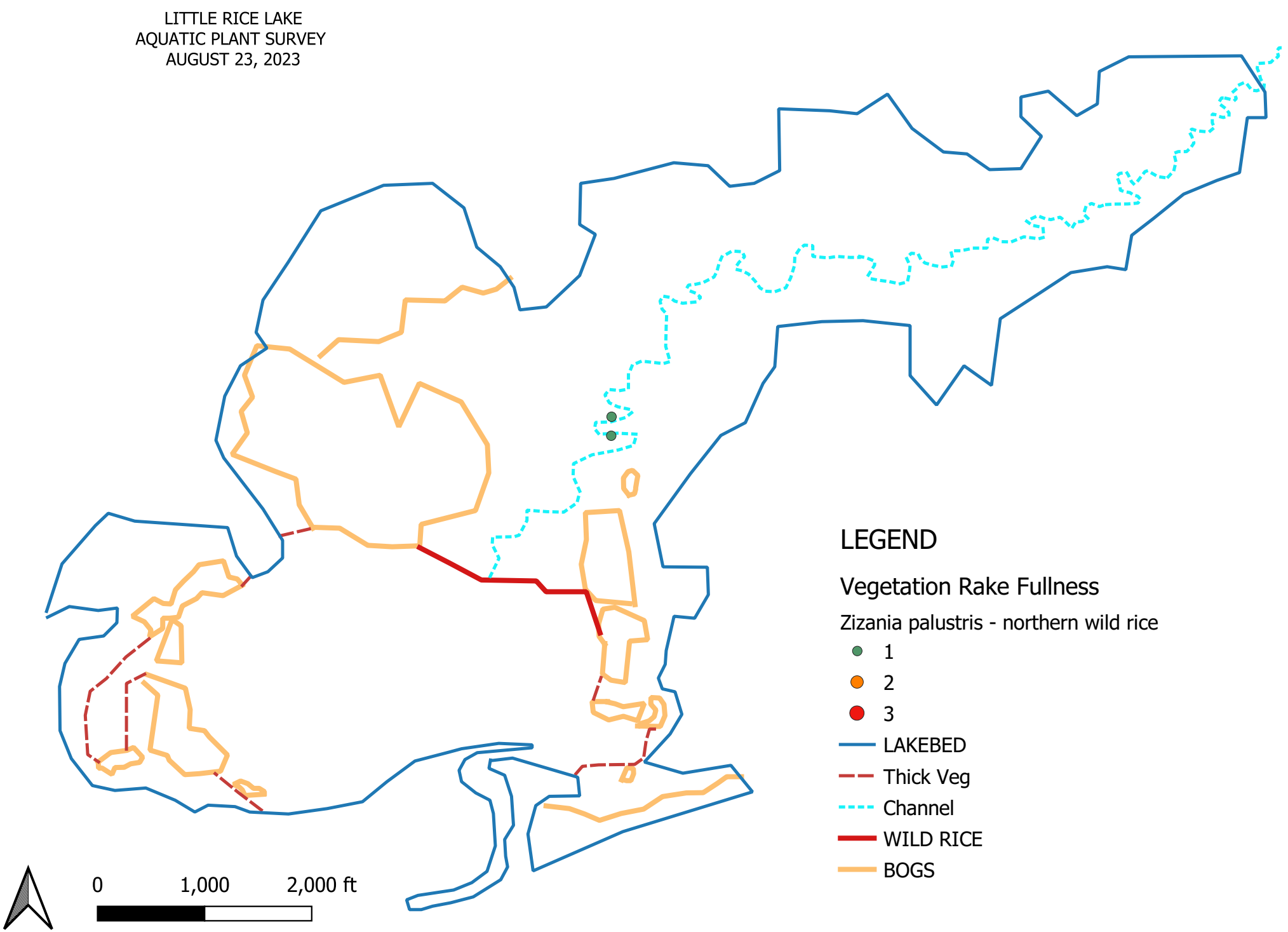


LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023



LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023




LITTLE RICE LAKE
AQUATIC PLANT SURVEY
AUGUST 23, 2023
LEGEND
Vegetation Rake Fullness
Zizania palustris - northern wild rice
1
2
3
LAKEBED
Thick Veg
Channel
WILD RICE
BOGS
0
1,000
2,000 ft