

**Northern wild rice (*Zizania palustris*)
Bed Mapping Survey
Potato Lake - WBIC: 2714500
Washburn County, Wisconsin**



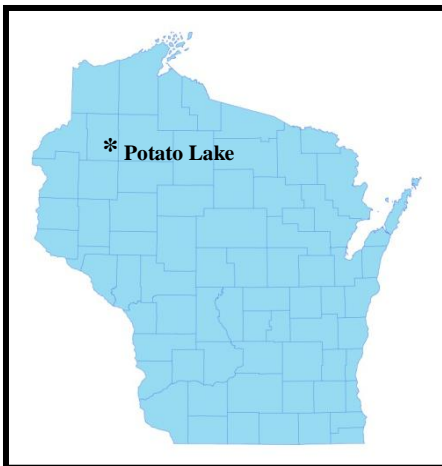
Potato Lake rice beds 8/9/20



Filamentous algae covering few handfuls of rice plants in the south bay 7/13/19

Project Initiated by:

The Potato Lake Association, Lake Education and Planning Services, LLC,
and the Wisconsin Department of Natural Resources (Grant - AEPP 55619)



Moderately dense rice bed with little algae in the south bay 8/9/20

Survey Conducted by and Report Prepared by:

Endangered Resource Services, LLC
Matthew S. Berg, Research Biologist
St. Croix Falls, Wisconsin
August 9, 2020

TABLE OF CONTENTS

	Page
LIST OF FIGURES AND TABLES.....	ii
INTRODUCTION.....	1
BACKGROUND AND STUDY RATIONALE.....	1
METHODS.....	2
RESULTS AND DISCUSSION.....	2
Northwest Bay.....	4
South Bay.....	5
LITERATURE CITED.....	7
APPENDIXES.....	8
I: 2020 Northern Wild Rice Bed Maps.....	8

LIST OF FIGURES AND TABLES

	Page
Figure 1: Potato Lake Bathymetric Map.....	1
Figure 2: Rake Fullness Ratings.....	2
Table 1: Northern Wild Rice Bed Mapping Summary Potato Lake, Washburn County August 9, 2020.....	2
Figure 3: Northern Wild Rice Bed Maps – Potato Lake – 8/9/20.....	3
Figure 4: Maximum Northern Wild Rice Density along the North Shoreline 7/13/19.....	4
Figure 5: Northern Wild Rice in the Northwest Bay Facing North/Northeast – 8/9/20.....	4
Figure 6: Algal Mat in the South Bay Facing South – 7/13/19.....	5
Figure 7: Scattered Northern Wild Rice in the South Bay Facing North – 7/13/19.....	5
Figure 8: Northern Wild Rice Bed in the South Bay Facing South – 8/9/20.....	6
Figure 9: Navigation Channels along the Western Shoreline in the South Bay – 8/9/20.....	6

INTRODUCTION:

Potato Lake (WBIC 2714500) is a 222 acre drainage lake located in the Towns of Crystal and Madge in central/east-central Washburn County (T39N R11W S36 NE NW). It reaches a maximum depth of 20ft in the north-central basin southwest of the east side public boat landing and has an average depth of 11ft (WDNR 2020). The lake is eutrophic in nature with Secchi readings from 1998-2014 (the most recent year data was available) averaging 7.6ft (WDNR 2020). This fair clarity produced a littoral zone that reached approximately 18ft in 2020. The lake's bottom substrate is predominantly organic and sandy muck in the south bay as well as the majority of the main basin with a narrow ring of sand/rock along the north, east and west shorelines (Figure 1) (Bush et al. 1967).

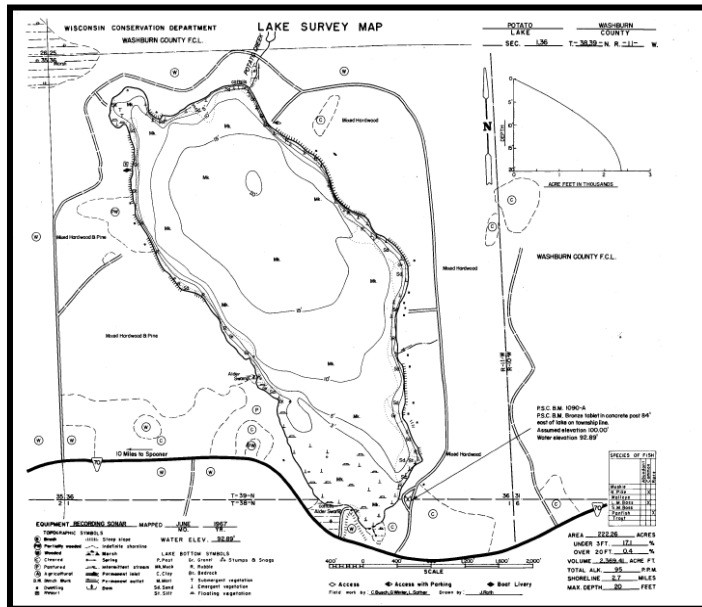


Figure 1: Potato Lake Bathymetric Map

BACKGROUND AND STUDY RATIONALE:

Northern wild rice (*Zizania palustris*), a plant of significant wildlife and cultural value, is present as scattered patches and beds in Potato Lake; especially along the shoreline in the northwest bay and around the spring holes in the south bay. The plant is known to go through dramatic boom and bust population cycles, but the Potato Lake Association (PLA) expressed concern that the rice was generally trending downward beyond these normal expected annual fluctuations. Because of this, the PLA, under the direction of D. Blumer - Lake Education and Planning Services, LLC (LEAPS) and the Wisconsin Department of Natural Resources (WDNR), authorized a 2019 bed mapping survey as part of a series of plant surveys to quantify the lake's native plant community prior to updating the lake's Aquatic Plant Management Plan (APMP) in 2020.

Unfortunately, the 2019 whole lake point-intercept survey found so little rice that there was nothing to map other than a few scattered patches in the northwest bay and scattered plants in the south bay. Because of this, we returned to the lake in 2020 to see if conditions had changed. This report is the summary analysis of that field survey conducted on August 9, 2020.

METHODS:

During the survey, we searched the visible littoral zone of the lake for wild rice beds. Normally, a bed is defined as an area where wild rice makes up greater than 50% of all aquatic plants. However, as one of the goals of the survey was to document presence/absence of rice and because rice density can be extremely variable from year to year, this definition was expanded to include all areas that supported continuous rice plants. Because of this broader definition, we also recorded the range and mean level of rice growth within each area using the WDNR’s standard 1-3 rake fullness scale (Figure 2), estimated its human harvest potential (none/low/moderate/high), and took representative pictures of the rice at each location.

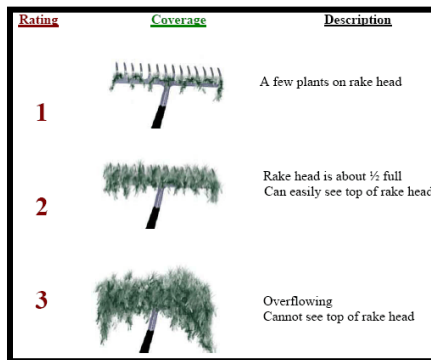


Figure 2: Rake Fullness Ratings (UWEX 2010)

Using a GPS unit (Garmin 76CSx), we recorded a string of waypoints that circled around the edges of the beds. These data were then mapped using ArcMap 9.3.1. We also used the WDNR’s Forestry Tools Extension to determine the acreage of each bed to the nearest hundredth of an acre.

RESULTS AND DISCUSSION:

In August 2020, we mapped three areas with continuous wild rice plants that covered **15.72 acres** (Table 1). This approximated to 7.1% of the lake’s surface area having rice present. Beds 1A and 1B in the northwest bay combined to total just 0.55 acre while the expansive Bed 2 in the south bay covered the remaining 15.17 acres (Figure 3) (Appendix I).

**Table 1: Northern Wild Rice Bed Mapping Summary
Potato Lake, Washburn County
August 9, 2020**

Bed Number	Area in Acres	Rake Fullness Range	Mean Rake Fullness	Human Harvest Potential
1A	0.36	<<1-1	<1	None
1B	0.19	<<1-1	1	None
2	15.17	<<1-3	2	Moderate
Total Rice	15.72			

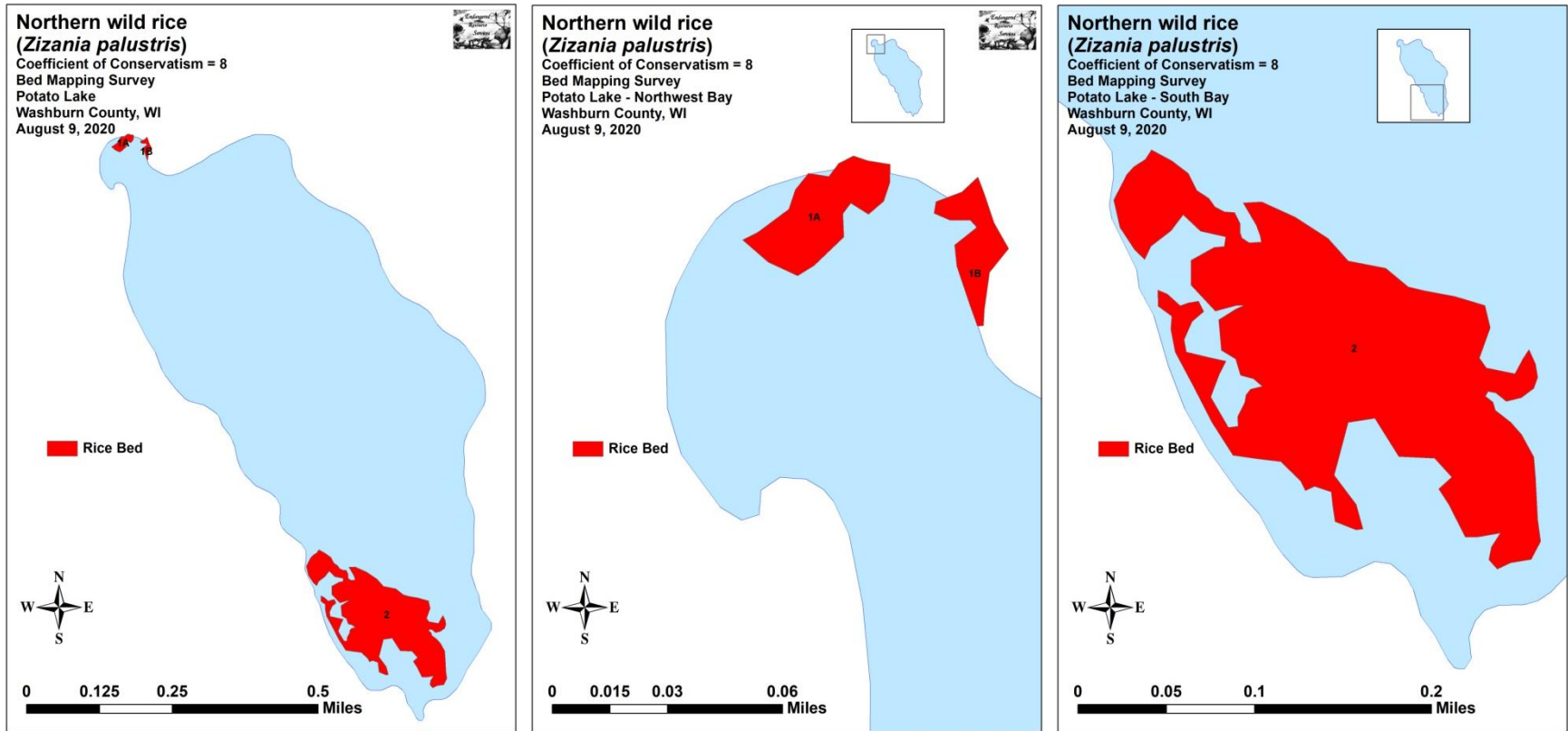


Figure 3: Northern Wild Rice Bed Maps – Potato Lake – 8/9/20

Northwest Bay:

Rice in the northwest bay actually seemed to have been slightly denser in 2019 (Figure 4) than in 2020 (Figure 5). Neither of the areas were suitable for human harvest as rice densities were never greater than a rake fullness of 2 or averaged higher than a rake fullness of 1. Many of the plants had been cropped by geese or other waterfowl, and it seemed unlikely that they would recover enough to set seed. There were four navigation channels through the area with the main one being the large gap with no rice that separated Beds 1A from 1B. Lesser navigation channels with scattered rice were represented on the maps by the indents in each bed.



Figure 4: Maximum Northern Wild Rice Density along the North Shoreline of the Northwest Bay – 7/13/19



Figure 5: Northern Wild Rice in the Northwest Bay Facing North/Northeast - 8/9/20

South Bay:

In 2019, we found thick mats of filamentous algae around the spring holes in the south bay (Figure 6). Perhaps because of this, we estimated there were only a few hundred wild rice plants growing there (Figure 7). The rice was widely-scattered and never bed-forming making it unmappable. Similar to the northwest bay, most plants had also been cropped by waterfowl.



Figure 6: Algal Mat in the South Bay Facing South - 7/13/19



Figure 7: Scattered Northern Wild Rice in the South Bay Facing North - 7/13/19

Our August 2020 survey found a nearly continuous rice bed dominated the majority of the south bay (Figure 8). Although there were a few high density areas at the core, most of the bed was only moderately dense. On the north end, in water over 4ft deep, the rice became highly fragmented before disappearing altogether in areas over 5ft deep. Within the bed, low density patches and gaps were common. Despite this, at least at the core, the bed appeared to have at least moderate potential for some human harvest. Along the western shoreline, residents were keeping navigation channels open with regular boat traffic (Figure 9).



Figure 8: Northern Wild Rice Bed in the South Bay Facing South - 8/9/20



Figure 9: Navigation Channels along the Western Shoreline in the South Bay - 8/9/20

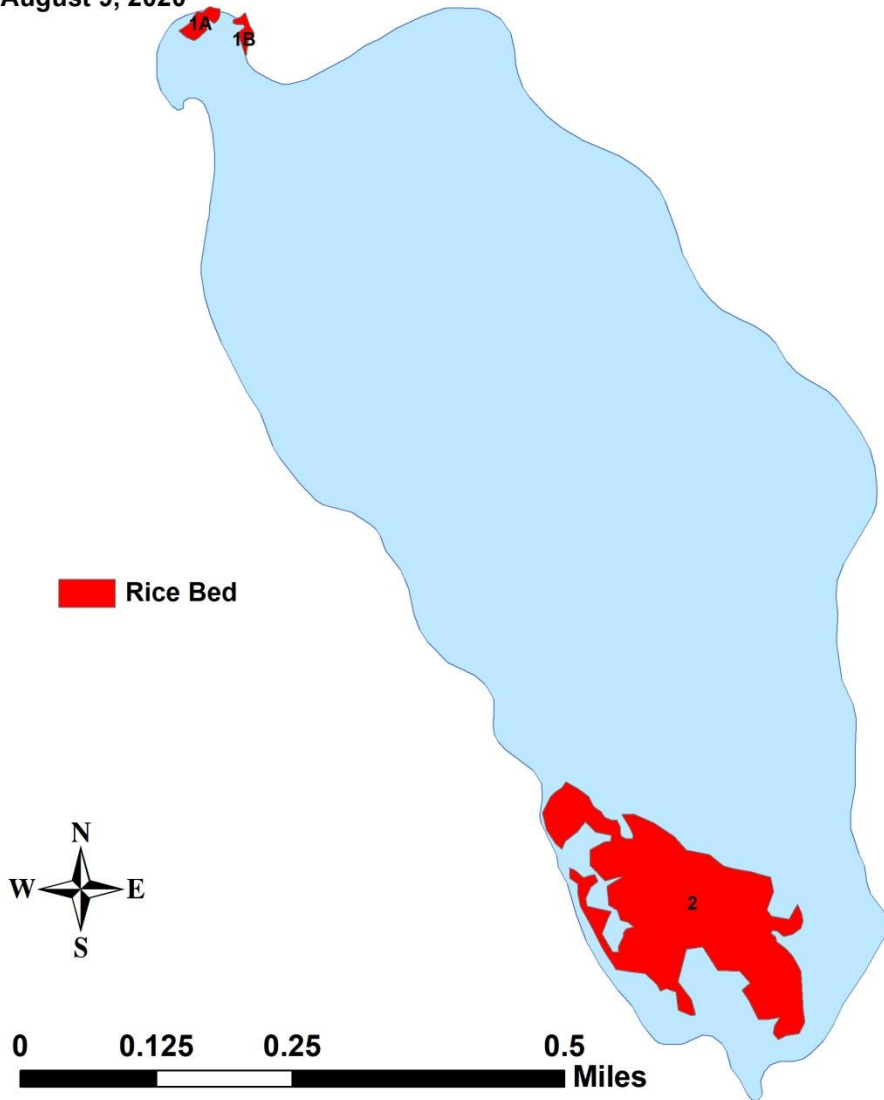
LITERATURE CITED

- Busch, C, G. Winter, L. Sather, and J. Roth. 1967. Potato Lake Map. Available from <https://dnr.wi.gov/lakes/maps/DNR/2714500a.pdf> (2020, August)
- UWEX Lakes Program. [online]. 2010. Pre/Post Herbicide Comparison. Available from <http://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/ecology/Aquatic%20Plants/Appendix-D.pdf> (2019, November).
- Voss, Edward G. 1996. Michigan Flora Vol I-III. Cranbrook Institute of Science and University of Michigan Herbarium.
- WDNR. [online]. 2020. Citizen Lake Monitoring Water Quality Data Report for Potato Lake. <https://dnr.wi.gov/lakes/waterquality/Station.aspx?id=663055> (2020, August)
- WDNR. [online]. 2020. Lake Information Pages for Potato Lake. <https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2714500> (2020, August)

Appendix I: 2020 Northern Wild Rice Bed Maps

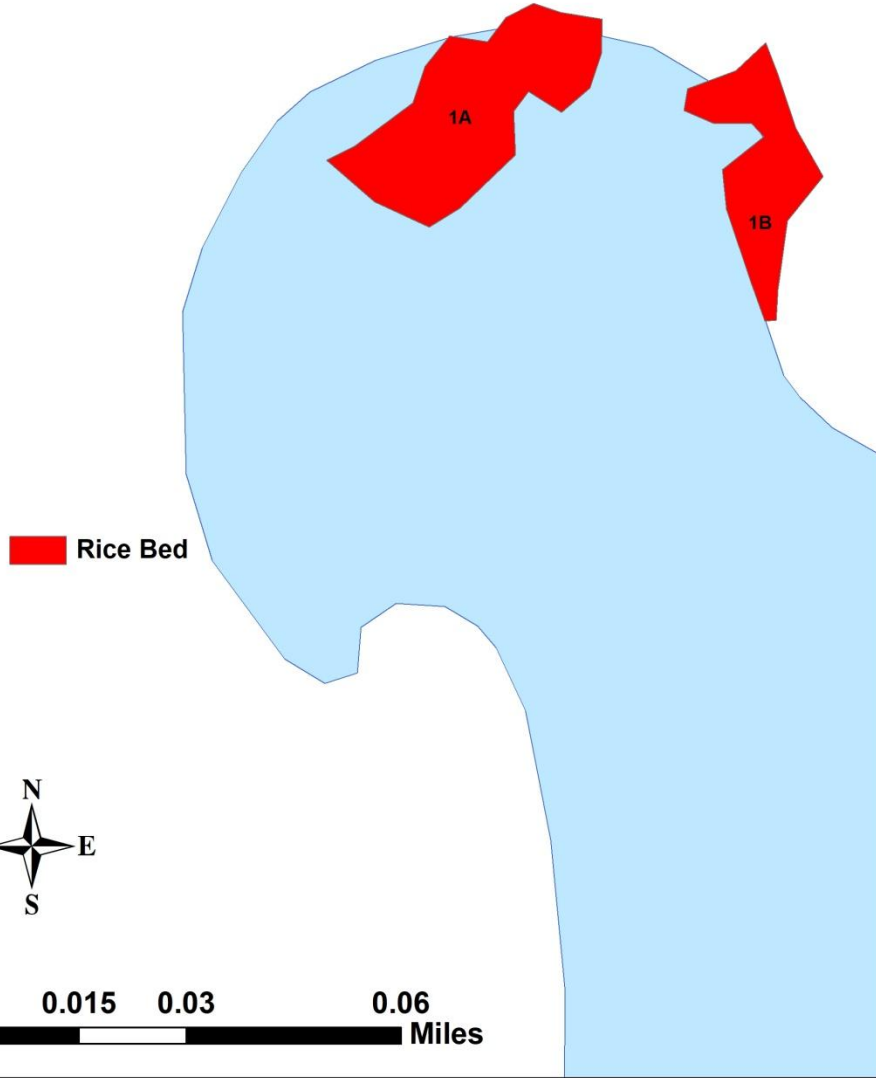
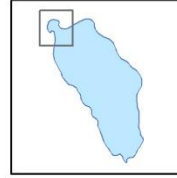
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(*Zizania palustris*)**

Coefficient of Conservatism = 8
Bed Mapping Survey
Potato Lake
Washburn County, WI
August 9, 2020



**Northern wild rice
(*Zizania palustris*)**

Coefficient of Conservatism = 8
Bed Mapping Survey
Potato Lake - Northwest Bay
Washburn County, WI
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Northern wild rice
(*Zizania palustris*)
Coefficient of Conservatism = 8
Bed Mapping Survey
Potato Lake - South Bay
Washburn County, WI
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 Rice Bed



0 0.05 0.1 0.2 Miles