Xcel Energy®

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October 2, 2015

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: **2015 Purple Loosestrife Monitoring Report**
White River (P-2444), Superior Falls (P-2587), Hayward (P-2417), Big Falls (P-2390-01), and Thornapple (P-2475)

Dear Secretary:

Enclosed is a copy of the 2015 purple loosestrife monitoring report for the above-referenced hydro projects. The license for each project directs Xcel Energy (licensee) to annually monitor project shorelines for purple loosestrife presence. The results are then documented and submitted to the resource agencies and the Commission.

This year's surveys were conducted in August during a period of peak loosestrife flowering. The results were then compared to previous surveys in order to determine any trends. Superior Falls, White River, and Big Falls continue to remain free of purple loosestrife. Loosestrife populations on Thornapple Flowage showed an overall increase while Lake Hayward showed a slight decline.

Should you have any questions regarding this report, please feel free to contact Matthew Miller of this office by telephone at (715) 737-1353 or by e-mail at matthew.j.miller@xcelenergy.com.

Sincerely,

William Zawacki
Director, Hydro Plants

Enclosure: 2015 Purple Loosestrife Report

c: Nick Utrup - U.S. Fish and Wildlife Service (via e-mail)
Cherly Laatsch - Wisconsin DNR (via email)
Project Files

2015 Purple Loosestrife Monitoring Report for Superior Falls Flowage, White River Flowage, Lake Hayward, Big Falls Flowage and Thornapple Flowage

Xcel Energy

October 2, 2015

2015 Purple Loosestrife Monitoring At Superior Falls Flowage, White River Flowage, Lake Hayward, Big Falls Flowage And Thornapple Flowage.

1.0 INTRODUCTION

The FERC licenses for the above-referenced hydro projects direct Xcel Energy (licensee) to develop a purple loosestrife (Lythrum salicaria) monitoring plan for project shorelines. The plans were developed in consultation with the Wisconsin Department of Natural Resources (WDNR), the U.S. Fish and Wildlife Service (USFWS), and the National Park Service (NPS). The plans require licensee to annually monitor project shorelines during the period of peak purple loosestrife biomass (late July through August). The following report is a summary of the surveys that were performed in August 2015 and includes a comparison with surveys from previous years.

2.0 METHODS

Superior Falls Flowage and White River Flowage were surveyed on August 4 and Lake Hayward on August 5, 2015. Project lands immediately downstream of the Hayward Dam were also surveyed. Big Falls and Thornapple flowages were surveyed on August 25, 2015. The survey dates coincided with peak flowering whereby purple loosestrife could easily be identified and documented for relative abundance. Field observations were conducted by boat with the aid of binoculars.

Shorelines infested with purple loosestrife were divided into two classes, either present or common and abundant. Areas categorized as present or common indicated a single plant or a few plants scattered along the shoreline. Those areas categorized as abundant indicated a large concentration of plants approaching a near monotypic stand. The areas of infestation were then documented on a bathymetric map and the length of infested shoreline was calculated with a map wheel. This method has a tendency to overestimate the amount of shoreline that is infested, as a single dot on the map often indicates just one plant. However, it does provide a reliable indication of the relative abundance of purple loosestrife and whether it is increasing or decreasing in coverage from year to year.

3.0 RESULTS

3.1 Superior Falls Flowage. No purple loosestrife was observed on Superior Falls Flowage which is consistent with previous surveys since monitoring began in 1998. A survey of flowage waters was also conducted for Eurasian Water Milfoil (Myriophyllum spicatum) and no plants were found. This is also consistent with past surveys.

3.2 White River Flowage. There was no purple loosestrife observed in 2015. No evidence of purple loosestrife has been found since monitoring began in 1998.

3.3 Lake Hayward. The presence of purple loosestrife on Lake Hayward has been

relatively stable over the last several years. Appendix A includes a survey map of Lake Hayward depicting this year's loosestrife coverage. This year's survey indicated a slight decrease in areas categorized as present or common. There were no areas classified as abundant this year. Of particular note this year was the lack of loosestrife in the vicinity of Smith Creek inlet. This area was virtually absent of loosestrife plants. Over the last several years, licensee has observed that many of the single plant infestations appear to be sporadic in nature as riparian owners often mow or cut down plants either inadvertently or intentionally. These single specimens can appear one year and not the next due to the actions of landowners.

Licensee is aware of annual purple loosestrife monitoring and control efforts by the National Park Service (NPS) in the project's tailwater. This year's survey found no plants immediately below the spillway.

The table below summarizes the results of surveys from Lake Hayward since they began in 1997.

Year	Shoreline Miles (Present or Common)	Shoreline Miles (Abundant)
1997	0.3	0.70
1998	Shoreline coverage not determined	-
1999	1.08	0.25
2000	1.28	0.10
2001	1.13	0.19
2002	0.90	0.07
2003	0.10	0.07
2004	0.54	0.0
2005	0.54	0.0
2006	0.82	0.04
2007	0.80	0.04
2008	0.46	0.07
2009	0.47	0.06
2010	0.57	0.06
2011	0.63	0.06
2012	0.76	0.01
2013	0.72	0.00
2014	0.63	0.00
2015	**0.49**	**0.00**

Licensee donated money to the Hayward High School's Environmental Studies class a number of years ago to initiate a biological control program for purple loosestrife on Lake Hayward. The class cooperated with the WDNR to secure a population of leaf-eating beetles (*Galerucella calmariensis* or *G. pusilla)* which specifically targets purple loosestrife plants. The beetles were then transplanted to those areas with the greatest concentration of plants.

3.4 Big Falls Flowage. There were no purple loosestrife plants found on the shoreline of Big Falls Flowage. Purple loosestrife has never been documented since monitoring began in 1998.

3.5 Thornapple Flowage. The presence of purple loosestrife showed a slight increase compared to 2014. Purple loosestrife was found to be present or common along 1.45 miles of shoreline compared to 1.42 miles in 2014. Approximately 0.12 miles of shoreline was categorized as abundant this year which is an increase from previous years. The wetland areas near the middle of the flowage continue to account for the greatest concentration of loosestrife plants. See Appendix A for a survey map of Thornapple Flowage depicting the results of this year's monitoring.

Significant increases in purple loosestrife are unlikely due to a combination of past bio-control efforts and a lack of available habitat. Shoreline areas where pioneering plants were observed were often the result of a recent disturbance (lawn cutting, brush removal, etc.) along privately developed shorelines. In contrast, single specimens recorded in one year may be absent the next due to lawn mowing and other landscape activities, only to reappear the following year.

The table below summarizes the results from surveys conducted from 1998-2014 on the Thornapple Flowage.

Year	Shoreline Miles (Present)	Shoreline Miles Common	Shoreline Miles (Abundant)
1998	*Shoreline coverage not determined*		
1999	2.36	0.27	0.67
2000	1.64	-	0.70
2001	2.52	-	0.67
2002	2.52	-	0.48
2003	2.10	-	0.48
2004	2.33	-	0.45
2005	2.15	-	0.42
2006	1.76	-	0.39
2007	1.40	-	0.33
2008	1.30	-	0.15
2009	0.45	-	0.06
2010	0.79	-	0.00
2011	1.91	-	0.00
2012	1.42	-	0.03
2013	1.94	-	0.03
2014	1.42	-	0.03
2015	**1.45**	**-**	**0.12**

In July of 2004, licensee cooperated with the Lake Holcombe Improvement Association (LHIA) to introduce a beetle population to the shorelines of the Thornapple Flowage that specifically targets purple loosestrife plants. Approximately 20,000 beetles were introduced in the wetland areas of the flowage where purple loosestrife densities have historically been highest. Earlier introductions of these beetles at licensee's Hayward and Holcombe projects have been met with great success. The overall decline of loosestrife presence and abundance indicates that the beetles have had a significant impact. Future surveys will hopefully continue to document this trend. Licensee will continue to monitor purple loosestrife densities on the flowage throughout the term of

the license.

4.0 CONCLUSION

Purple loosestrife was not observed on Superior Falls Flowage, White River Flowage or Big Falls Flowage in 2015. Lake Hayward has experienced a drastic decline in purple loosestrife since 2000 due to the introduction of a beetle population, which specifically targets the plant. The overall loosestrife population on Lake Hayward has remained stable for the past 5 years.

Much of the Thornapple Flowage shoreline is scattered with purple loosestrife plants, with heavier concentrations confined to the wetland areas in the central portion of the impoundment. Shoreline infestations classified as present or common have remained stable over the last several years. Areas classified as having an abundant loosestrife population increased this year when compared to the previous few years, however, they remain well below levels documented in the late 1990's and early 2000's.

APPENDIX A

2015 Purple Loosestrife Survey Maps for Lake Hayward and Thornapple Flowage

PRESENT OR COMMON

ABUNDANT

AUGUST 5, 2015

7.2 CLICKS / 1 MILE = 3.5 CLICKS / X

X = 0.49 MILES = 2587 FT.

OR 5.7% OF SHORELINE

CLASSIFIED AS PRESENT

NO AREAS CLASSIFIED AS ABUNDANT

LAKE Hayward Flowage
SECTION 26, 27
RANGE 9 W
TOWN Hayward
TOWNSHIP 41 N

This is the only hydrographic map of this lake available, produced from original charts of Dept. of Natural Resources — Madison

A U. S. Geological Survey Map is available from us showing the area (approx. 12 square miles) adjacent to this lake.

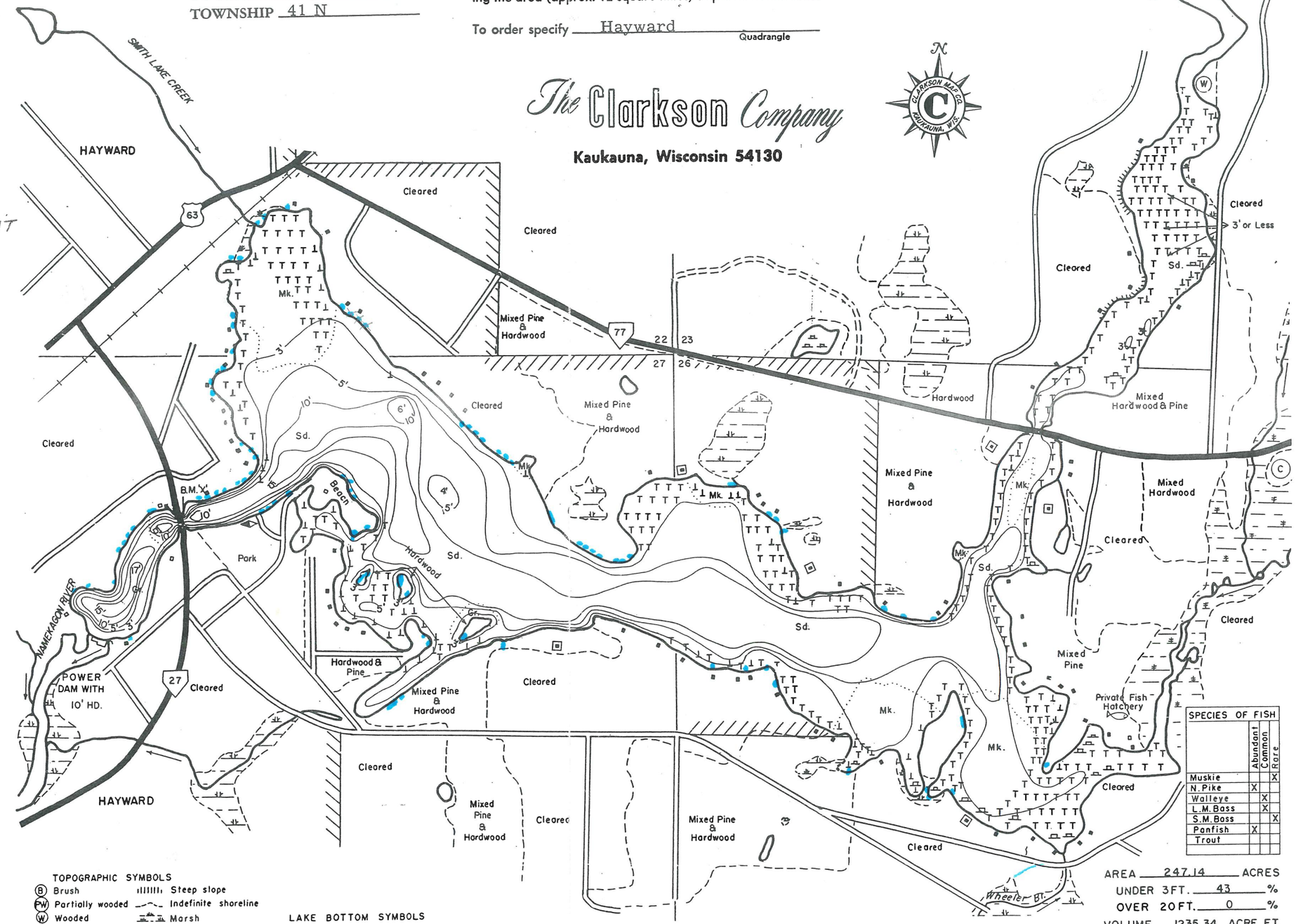
To order specify Hayward Quadrangle

SAWYER COUNTY

Map No. 5260

The Clarkson Company

Kaukauna, Wisconsin 54130



SPECIES OF FISH	Abundant	Common	Rare
Muskie			X
N. Pike	X		
Walleye		X	
L.M. Bass		X	
S.M. Bass			X
Panfish	X		
Trout			

AREA 247.14 ACRES
UNDER 3FT. 43 %
OVER 20FT. 0 %
VOLUME 1235.34 ACRE FT.
TOTAL ALK. 69 P.P.M.
SHORELINE 8.64 MILES
MAX. DEPTH 17 FEET

TOPOGRAPHIC SYMBOLS

- (B) Brush
- (PW) Partially wooded
- (W) Wooded
- (C) Cleared
- (P) Pastured
- (A) Agricultural
- B.M. Bench Mark
- Dwelling
- Resort
- Steep slope
- Indefinite shoreline
- Marsh
- Spring
- Intermittent stream
- Permanent inlet
- Permanent outlet
- Dam

LAKE BOTTOM SYMBOLS

- P. Peat
- Mk. Muck
- C. Clay
- M. Marl
- Sd. Sand
- St. Silt
- Gr. Gravel
- R. Rubble
- Br. Bedrock
- T Submergent vegetation
- ⊥ Emergent vegetation
- Floating vegetation

◇ Access ◆ Access with Parking ◆ Boat Livery

PURPLE LOOSESTRIFE MONITORING

AUGUST 25, 2015

ABUNDANT

COMMON

AREAS OF PURPLE LOOSESTRIFE COMMON OR PRESENT

$\frac{2.5 \text{ CLICKS}}{4000 \text{ FT}} = \frac{4.8 \text{ CLICKS}}{X}$

X = 7680 FT = 1.45 MILES

OR 19.1% OF SHORELINE

AREAS OF PURPLE LOOSESTRIFE ABUNDANT

$\frac{2.5 \text{ CLICKS}}{4000 \text{ FT}} = \frac{0.4}{X}$

X = 640 FT = 0.12 MILES

OR 1.6% OF SHORELINE

LAKE Thornapple Flow
SECTION 18, 19, 22, 23, 24
RANGE 6, 7 W
TOWN Thornapple
TOWNSHIP 34 N

This is the only hydrographic map of this lake available, produced from original charts of Dept. of Natural Resources — Madison

A U. S. Geological Survey Map is available from us showing the area (approx. 12 square miles) adjacent to this lake.

To order specify Thornapple Quadrangle

RUSK COUNTY

MAP NO.

5129

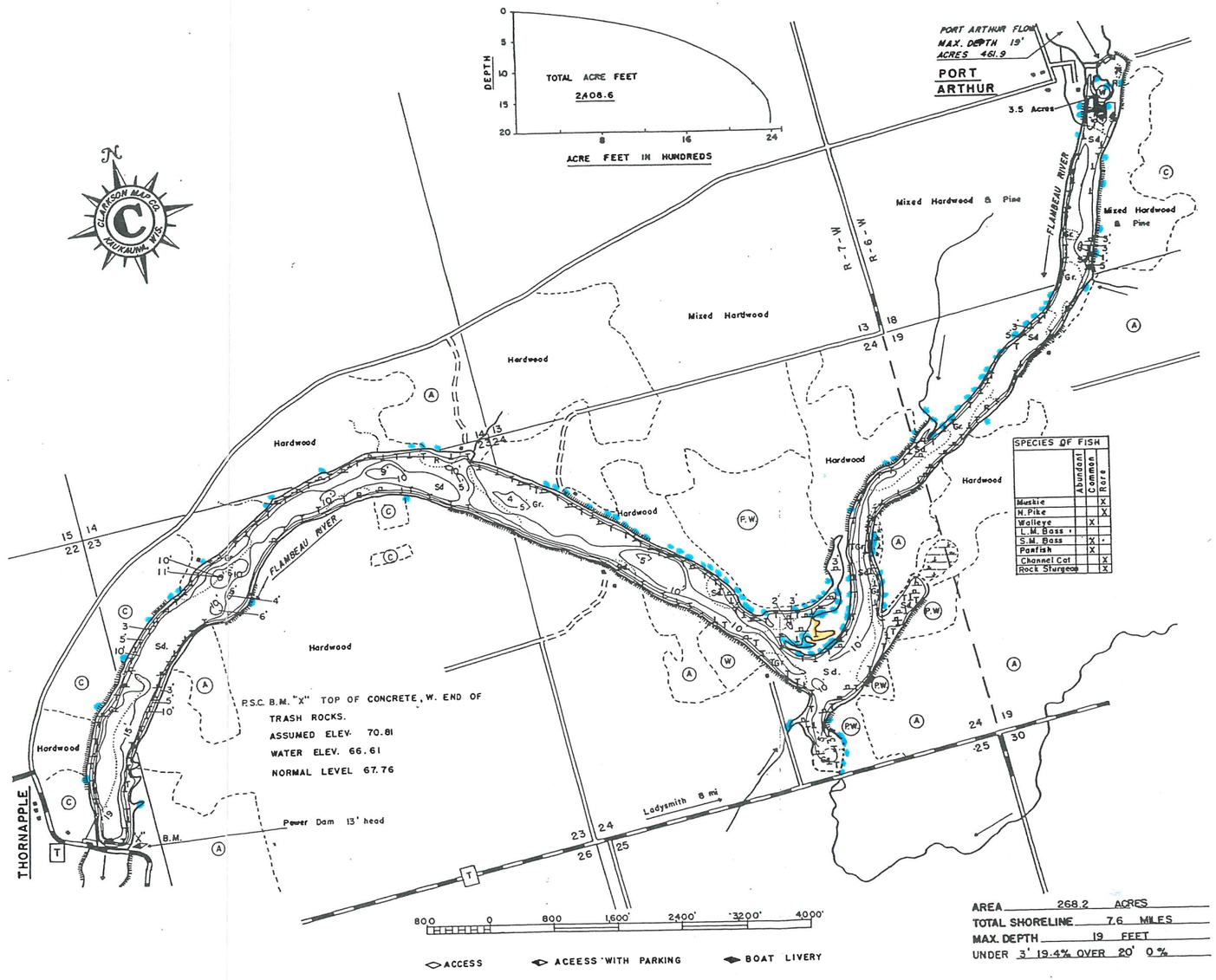
LEGEND

TOPOGRAPHIC SYMBOLS

- BRUSH REFUGE
- SAPLING TANGLE
- SPAWNING BOX
- MINNOW SPAWNER
- WEED BED
- ROCKY SHOAL
- DWELLING
- ABANDONED DWELLING
- RESORT
- STEEP SLOPE
- SPRING
- INTERMITTENT INLET
- BRUSH
- WOODED (W)
- PASTURED (P)
- CULTIVATED (C)
- ENCROACH. SHORE.
- PERMANENT INLET
- PERMANENT OUTLET
- MARSH
- PARTIALLY WOODED (PW)
- CLEARED (C)
- BENCH MARK B.M.

LAKE BOTTOM SYMBOLS

- PULPY PEAT P
- MUCK K
- CLAY C
- SAND S
- RUBBLE R
- EMERGENT VEGET. ⊥
- FIBROUS PEAT F
- DETRITUS D
- MARL M
- GRAVEL G
- BEDROCK Br.
- SUBMERGENT VEGET. T



AREA 268.2 ACRES
TOTAL SHORELINE 7.6 MILES
MAX. DEPTH 19 FEET
UNDER 3' 19.4% OVER 20' 0%

CLARKSON MAP CO.
724 DESNOYER STREET
Kaukauna, Wisconsin 54130