1414 West Hamilton Avenue
P.O. Box 8
Eau Claire, WI 54702-0008

October 23, 2013

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

Subject: **2013 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 2013 purple loosestrife monitoring report for the above-referenced hydro projects. The operating license issued by the Federal Energy Regulatory Commission (Commission) 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 and Big Falls continue to remain free of purple loosestrife. Loosestrife populations on Thornapple Flowage showed a modest increase compared to last year while Lake Hayward's population remained relatively stable. White River was not surveyed due to the emergency reservoir drawdown.

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 electronic mail at matthew.j.miller@xcelenergy.com.

Sincerely,

William Zawacki
Director, Hydro Plants

Enclosure: 2013 Purple Loosestrife Report

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

2013 Purple Loosestrife Monitoring Report For Superior Falls Flowage, White River Flowage, Lake Hayward, Big Falls Flowage And Thornapple Flowage.

Xcel Energy

October 23, 2013

2013 Purple Loosestrife Monitoring At Superior Falls Flowage, White River Flowage, Lake Hayward, Big Falls Flowage And Thornapple Flowage.

1.0 INTRODUCTION

The operating licenses for the above-referenced hydro projects directed 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 2013 and includes a comparison with surveys from previous years.

2.0 METHODS

Superior Falls Flowage and Lake Hayward were surveyed on August 13 and 14, 2013, respectively. Project lands immediately downstream of the Hayward Dam were also surveyed. Big Falls and Thornapple flowages were surveyed on August 22, 2013. White River Flowage was not surveyed this year because of an emergency reservoir drawdown which made the shoreline inaccessible. 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 planimeter. 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 the Superior Falls Flowage. The findings are consistent since surveying 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. The flowage was not inspected this year due to an emergency reservoir drawdown. No evidence of purple loosestrife has been found

since monitoring began in 1998. Loosestrife monitoring will resume with the 2014 field season.

3.3 Lake Hayward. The presence and abundance of purple loosestrife on Lake Hayward has been relatively stable over the last several years. This year's survey indicated a slight decrease in areas categorized as present or common. There were no areas classified as abundant this year. Over the last several years, licensee has observed that many of the single plant infestations appear to be sporadic as riparian owners often mow or cut down plants either inadvertently or by design. These single specimens can appear one year and not the next due to the actions of landowners.

Licensee is aware of annual purple loosestrife (and other invasive species) control efforts by the National Park Service (NPS) on Lake Hayward including the project tailwaters. This year's survey documented one individual plant located immediately below the spillway. Two plants were documented in 2012.

Purple loosestrife has historically been most abundant near the Smith Lake Creek inlet. Field observations this year indicate little change from previous years. 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**

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. Their efforts along with the NPS's annual chemical control appear to have been very successful, especially in those areas classified as abundant. Continued monitoring will help evaluate the long-term benefits of these control efforts.

3.4 Big Falls Flowage. There were no purple loosestrife plants found on the shoreline of Big Falls Flowage. Purple loosestrife has not been documented since monitoring began in 1998.

3.5 Thornapple Flowage. The presence of purple loosestrife showed a modest increase compared to 2012. Purple loosestrife was found to be present or common along 1.94 miles of shoreline this year compared to 1.42 miles in 2012. Approximately 0.03 miles of shoreline were categorized as abundant this year which is the same amount in 2012. The wetland areas near the middle of the flowage continue to account for the greatest concentration of loosestrife plants.

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 findings from surveys conducted from 1998-2012 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**

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 documented on Superior Falls Flowage or Big Falls Flowage in 2013. White River Flowage was not surveyed due to the reservoir drawdown. 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, and the NPS's annual control efforts. The presence and abundance of loosestrife now appears to have stabilized over the past few 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. There has been a decline over the last decade, primarily in those areas classified as abundant, on Thornapple Flowage. Some of this is likely attributable to the biological control efforts of 2004. It may have taken several years for the beetle population to become well established, with their impact only now appearing over the last several years. Minor fluctuations in loosestrife presence from year-to-year can be expected due to the natural variability of weather and growing conditions.

AUGUST 14, 2013

PURPLE LOOSESTRIFE MONITORING

ABUNDANT

COMMON OR PRESENT

AREAS OF PURPLE LOOSESTRIFE COMMON OR PRESENT

7.2 CLICKS / 1 MILE = 5.2 CLICKS / X

X = 0.72 MILES = 3813 FEET OR 8.3% OF SHORELINE

AREAS OF PURPLE LOOSESTRIFE ABUNDANT = 0

2.5 CLICKS / 4,000 FT = 0.1 CLICK / X

X = 160 FT = 0.03 MILES OR 0.35% OF SHORELINE

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.

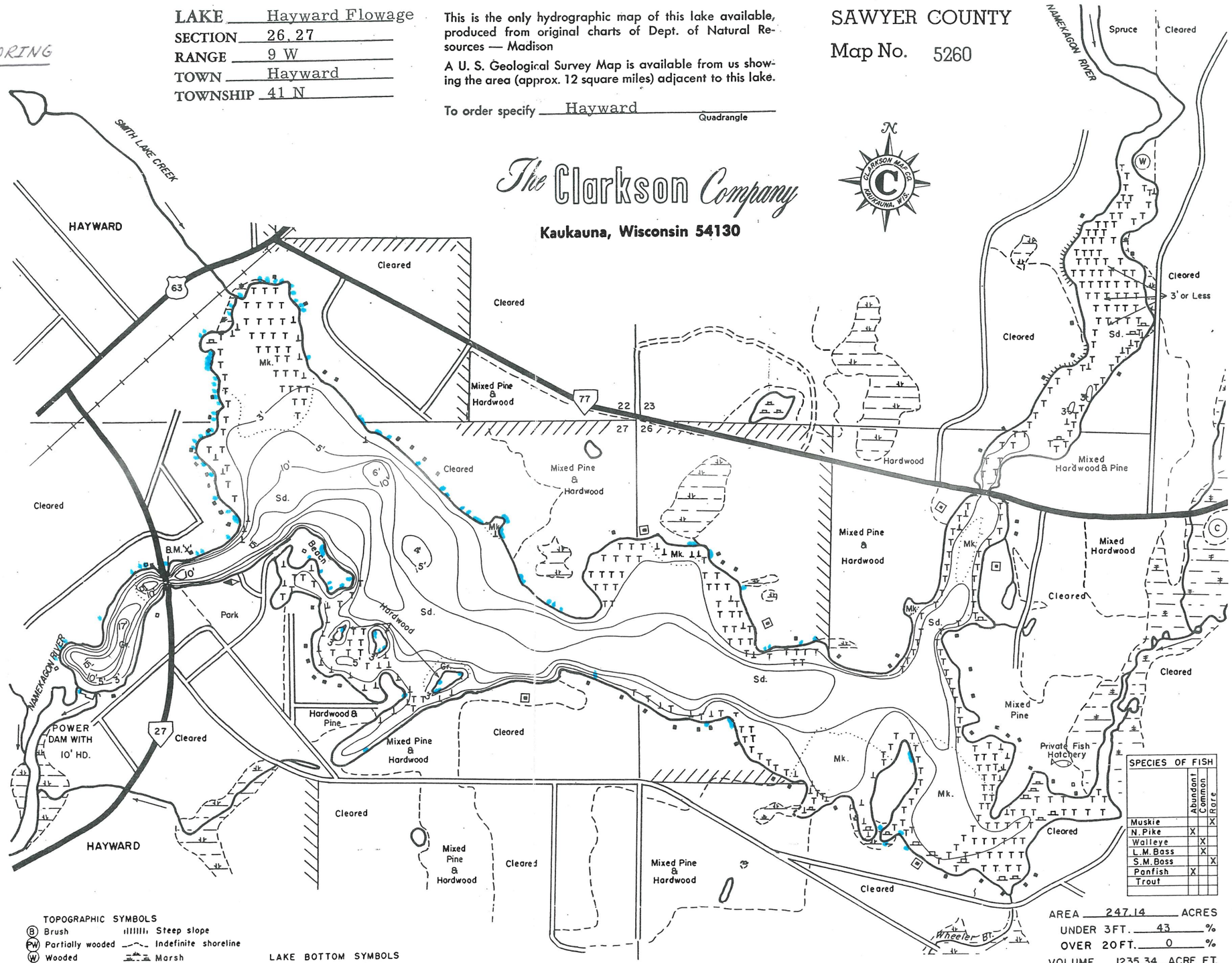
To order specify Hayward Quadrangle

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			

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

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

PURPLE LOOSESTRIFE MONITORING

AUGUST 22, 2013

ABUNDANT

COMMON OR PRESENT

(1) AREAS OF PURPLE LOOSESTRIFE COMMON OR PRESENT

$\frac{2.5 \text{ CLICKS}}{4000 \text{ FT}} = \frac{6.4 \text{ CLICKS}}{X}$

$X = 10{,}240 \text{ FEET} = 1.94 \text{ MILES}$

OR 25.5% OF SHORELINE

(2) AREAS OF PURPLE LOOSESTRIFE

ABUNDANT = 0

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

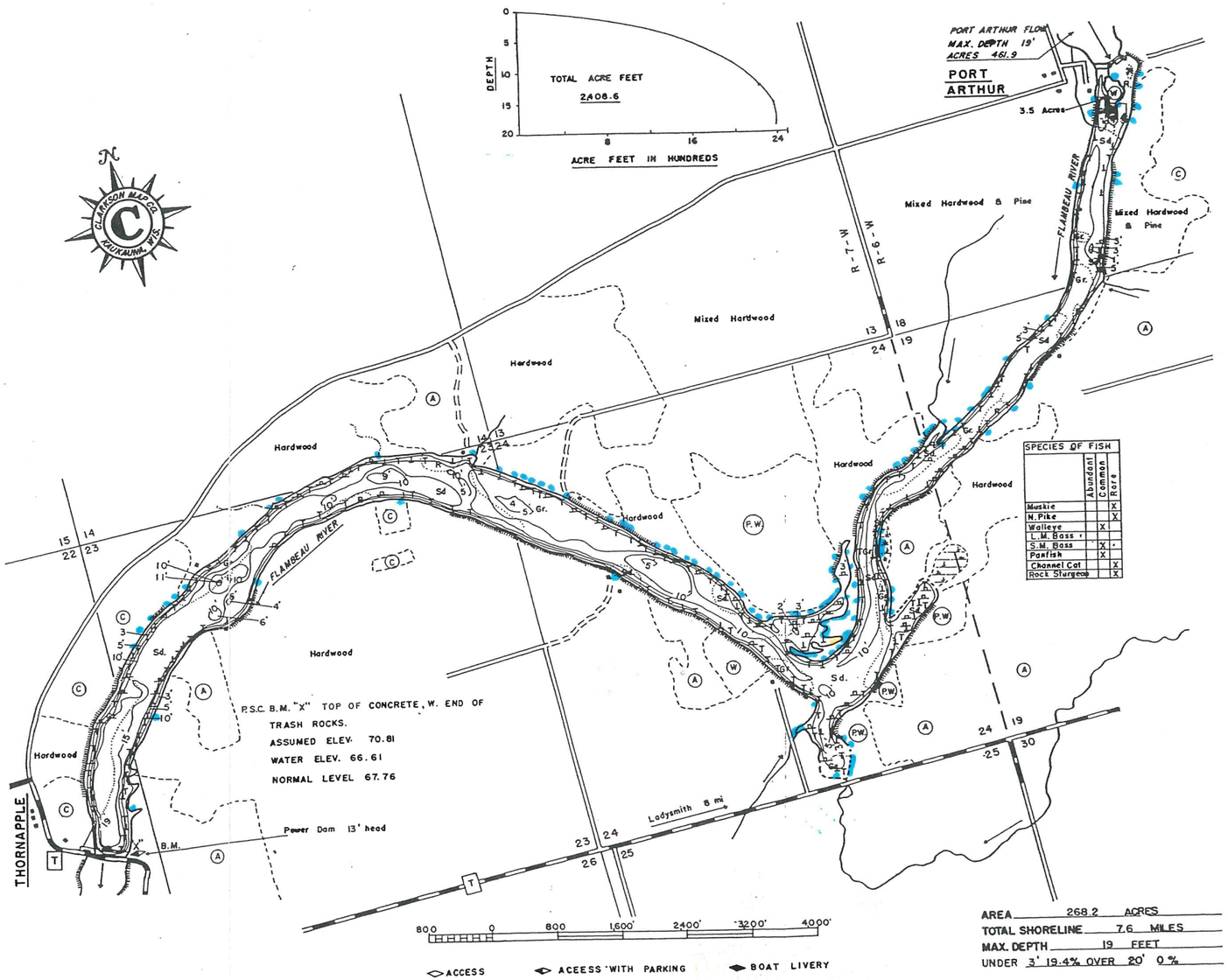
LEGEND

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

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