

Fisheries Management
Lake Name: Kroon
Survey Type: Targeted Survey
DOW Number: 13-0013-00
Survey ID Date: 07/31/2017
Lake Identification

 Alternate Lake Name: N/A
 Primary Lake Class ID: 24

 DNR Sounding Map Number: C1373
 Alternate Lake Class ID: 29

Lake Location

Primary County: Chisago

Nearest Town: Lindstrom

Legal Descriptions

 Lake Center: Township - 33N Range - 20W Section - 9
 PLS Section Lake Center: 3302009

All Legal Descriptions:

Chisago County: Township - 33N Range - 20W Sections - 9, 16

Area Office

 Area Name: Hinckley
 Region Name: Central

 ORG Code: F311
 Region Number: 3

Lake Access

(Information based on Population Assessment dated 06/28/1999)

<u>Station ID</u>	<u>Ownership</u>	<u>Public Use</u>	<u>Type</u>	<u>Location / Comments</u>
AC - 1	DNR	Open to Public use	Concrete	A state-owned public access on the east shore of the lake. Accommodates 10 trailers.

Lake Characteristics

Lake Area (planimetered acres):	192.00	GIS Shoreline Length (miles):	2.41
GIS Lake Area (acres):	193.19	Maximum Fetch (miles):	0.85
DOW Lake Area (acres):	200.00	Fetch Orientation (degrees):	N/A
Littoral Area (acres):	150.00	USGS Quad Map Number:	Q18d
Area in MN (acres):	193.19	USGS Quad 24K GIS Index:	3336
Maximum Depth (feet):	30.0		
Mean Depth (feet):	5.0		

Watershed Characteristics
Major Watershed

 Name: Lower St. Croix River
 Watershed Number: 37
 Watershed size (acres): 585,735

Minor Watershed

 Name: unknown DNR Minor Wshd
 Watershed Number: 42
 Watershed size (acres): 32,608

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Surveys and Investigations

Re-Survey: 06/28/2004, 06/27/1994, 06/25/1984, 08/23/1978.
Population Assessment: 06/22/2009, 06/28/1999, 06/26/1989.
External Management Survey: 06/02/1999.
Standard Survey: 06/26/2017.
Targeted Survey: 07/31/2017, 06/19/2017.

Water Level History - Readings

<u>Station ID</u>	<u>Date</u>	<u>Level</u>	<u>Reading (feet)</u>	<u>Reading Type</u>
GA - 1	06/28/2017	Normal	2.20	Direct Gauge Reading

Water Level History - Station Summary

<u>Station ID</u>	<u>Minimum Level</u>		<u>Maximum Level</u>		<u>Range (feet)</u>	<u>Average Level (feet)</u>	<u>Reading Type (and number of readings)</u>
	<u>Feet</u>	<u>Date</u>	<u>Feet</u>	<u>Date</u>			
GA - 1	2.20	06/28/2017	2.20	06/28/2017	0.00	2.20	Direct Gauge Reading (1)

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Discussion

A point intercept vegetation survey was conducted from July 24-26, 2017, according to survey guidelines by the DNR Division of Ecological and Water Resources (2016). A grid of sample points was generated using ArcMap 10.2 GIS software across the entire lake. Points were spaced at 70 meters apart to ensure an adequate sample size at all depths.

A Garmin Montana GPS unit was used to navigate a boat to each sample point. Vegetation was observed on one side of the boat in an area approximately one meter square. A double headed garden rake was tossed once at each point to sample vegetation that could not be visually identified from the boat. Depth was measured with a depth finder or stadia rod.

Vegetation point data was entered using the DNR Fisheries Lake Survey application. An Excel spreadsheet was generated by the Lake Survey application, listing depth and species present for each point sampled. This spreadsheet was used to calculate frequencies of occurrence for each species.

Beds of floating leaf and emergent vegetation were mapped using an iPad equipped with a Garmin Glo GPS receiver. The Collector for ArcGIS application (ESRI) was used to download a base map, create and classify polygons, and upload them to the DNR central geodatabase (Knopik and Simon 2016). Polygons were edited using ArcMap 10.2.2. Aerial imagery and field notes were used to refine the original field mapping.

Vegetation was abundant in depths down to 10 feet. 13 species of submerged aquatic plants were sampled, with coontail and Robbins' pondweed the most commonly found. A total of 42.3 acres of floating and emergent plants were mapped, consisting of 16.2 acres of emergent and 26.1 acres of floating leaf plant communities.

References

Knopik, J., S. Simon 2016 GIS Manual for Minnesota Lake Plant Surveys, for use by MNDNR Fisheries Section and EWR Lake Habitat Program. Minnesota Department of Natural Resources. Ecological and Water Resources Division. Brainerd, MN. 100 pp.

Perleberg, D., P. Radomski, S. Simon, K. Carlson, and J. Knopik. 2016. Minnesota Lake Plant Survey Manual, for use by MNDNR Fisheries Section and EWR Lake Habitat Program. Minnesota Department of Natural Resources. Ecological and Water Resources Division. Brainerd, MN. 79 pp. and Appendices A-E.

LAKE SURVEY REPORT
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Survey Attachments

Attachment #1: Photo **Title:** species table

Table 1. List of aquatic plant species that have been recorded in Kroon Lake

Common name	Scientific name	Survey years
Emergent species (7 total)		
Broad leaved arrowhead	<i>Sagittaria latifolia</i>	A, B, C, D
Cattail	<i>Typha sp.</i>	A, B, C, D, E
Giant burreed	<i>Sparganium eurycarpum</i>	A, B, C
Hardstem bulrush	<i>Schaenoplectus acutus</i>	A, B, C, D
Sedge	<i>Carex or Cyperaceae</i>	A, B, C
Sessile fruited arrowhead (stiff wapato)	<i>Sagittaria rigida</i>	E
Spikerush	<i>Eleocharis palustris</i>	A, B, C
Submerged and floating leaf species (17 total)		
Bushy pondweed	<i>Najas flexilis</i>	D, E
Canada waterweed	<i>Elodea canadensis</i>	D, E
Coontail	<i>Ceratophyllum demersum</i>	A, B, C, D, E
Curlyleaf pondweed	<i>Potamogeton crispus</i>	D, E
Flatstem pondweed	<i>Potamogeton zosteriformis</i>	A, B, C, D, E
Floatingleaf pondweed	<i>Potamogeton natans</i>	D
Largeleaf pondweed	<i>Potamogeton amplifolius</i>	A, B, C, D, E
Muskgrass	<i>Chara sp.</i>	D, E
Narrow-leaf pondweed	<i>Potamogeton sp.</i>	D, E
Northern watermilfoil	<i>Myriophyllum sibiricum (exalbescens)</i>	A, B, C, D, E
Robbins' pondweed	<i>Potamogeton Robbinsii</i>	A, B, C, D, E
Sago pondweed	<i>Stuckenia pectinata</i>	D, E
Variable pondweed	<i>Potamogeton gramineus</i>	A, B, C, D
White waterlily	<i>Nymphaea odorata</i>	A, B, C, D
White-stemmed pondweed	<i>Potamogeton praelongus</i>	D, E
Water celery	<i>Vallisneria americana</i>	A, B, C, D, E
Yellow waterlily	<i>Nuphar variegatum</i>	A, B, C, D

A) 1962 Fisheries lake survey; B) 1978 Fisheries lake survey; C) 1984 Fisheries lake survey; D) 2004 Fisheries lake survey; E) 2017 Fisheries vegetation survey

File Name: species table.JPG

UTM Easting: -
UTM Northing: -

Date: 02/09/2018
Time: 1:37 pm

Notes: -

LAKE SURVEY REPORT
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Survey Attachments (Continued)

Attachment #2: Photo **Title:** frequency table

Table 2. Aquatic plants sampled in the 2017 point intercept survey on Kroon Lake.

type	Common name	Scientific name	Frequency (%)
submerged	Coontail	<i>Ceratophyllum demersum</i>	76.0
	Robbins' pondweed	<i>Potamogeton Robbinsii</i>	41.1
	Largeleaf pondweed	<i>Potamogeton amplifolius</i>	14.9
	Muskgrass	<i>Chara sp.</i>	11.4
	Flatstem pondweed	<i>Potamogeton zosteriformis</i>	10.3
	Northern watermilfoil	<i>Myriophyllum sibiricum</i>	9.7
	Filamentous algae		8.0
	Canada waterweed	<i>Elodea canadensis</i>	6.9
	Water celery	<i>Vallisneria americana</i>	5.7
	White-stemmed pondweed	<i>Potamogeton praelongus</i>	5.1
	Bushy pondweed	<i>Najas flexilis</i>	1.7
	Curlyleaf pondweed	<i>Potamogeton crispus</i>	1.1
	Narrowleaf pondweed	<i>Potamogeton sp.</i>	0.6
Sago pondweed	<i>Stuckenia pectinata</i>	0.6	
floatingleaf	White waterlily	<i>Nymphaea sp.</i>	11.4
	Little yellow waterlily	<i>Nuphar microphyllum</i>	4.0
	Yellow waterlily	<i>Nuphar variegatum</i>	3.4
	Star duckweed	<i>Lemna trisulca</i>	1.7
Emergent	Cattail	<i>Typha sp.</i>	4.6
	Sessile fruited arrowhead	<i>Sagittaria rigida</i>	1.1

Percent of points with vegetation: 90.3
 Mean number of species at each point: 2.19
 Maximum depth of vegetation growth: 9.8 feet

File Name: frequency table.JPG

UTM Easting: -
UTM Northing: -

Date: 02/09/2018
Time: 1:38 pm

Notes: -

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Survey Attachments (Continued)

Attachment #3: Photo **Title:** FLEM table

Table 3. Summary of floating-leaf and emergent vegetation mapping on Kroon Lake, 2017.

Category	Number of Stands	Total (Acres)	Mean Acres (1 SE)
Combined Total	37	42.4	1.1 (+/-0.4)
Emergent	21	16.2	0.8 (+/-0.4)
Cattail	18	15.7	0.9 (+/-0.4)
Rushes	1	0.2	0.2 (+/-0.0)
Rushes and Others	2	0.3	0.2 (+/-0.0)
Floating	16	26.1	1.6 (+/-0.8)
Other Floating	1	0.1	0.1 (+/-0.0)
Waterlilies	13	25.3	1.9 (+/-1.0)
Waterlilies and Others	2	0.7	0.3 (+/-0.2)

File Name: mapping summary table.JPG

UTM Easting: -
UTM Northing: -

Date: 02/09/2018
Time: 1:39 pm

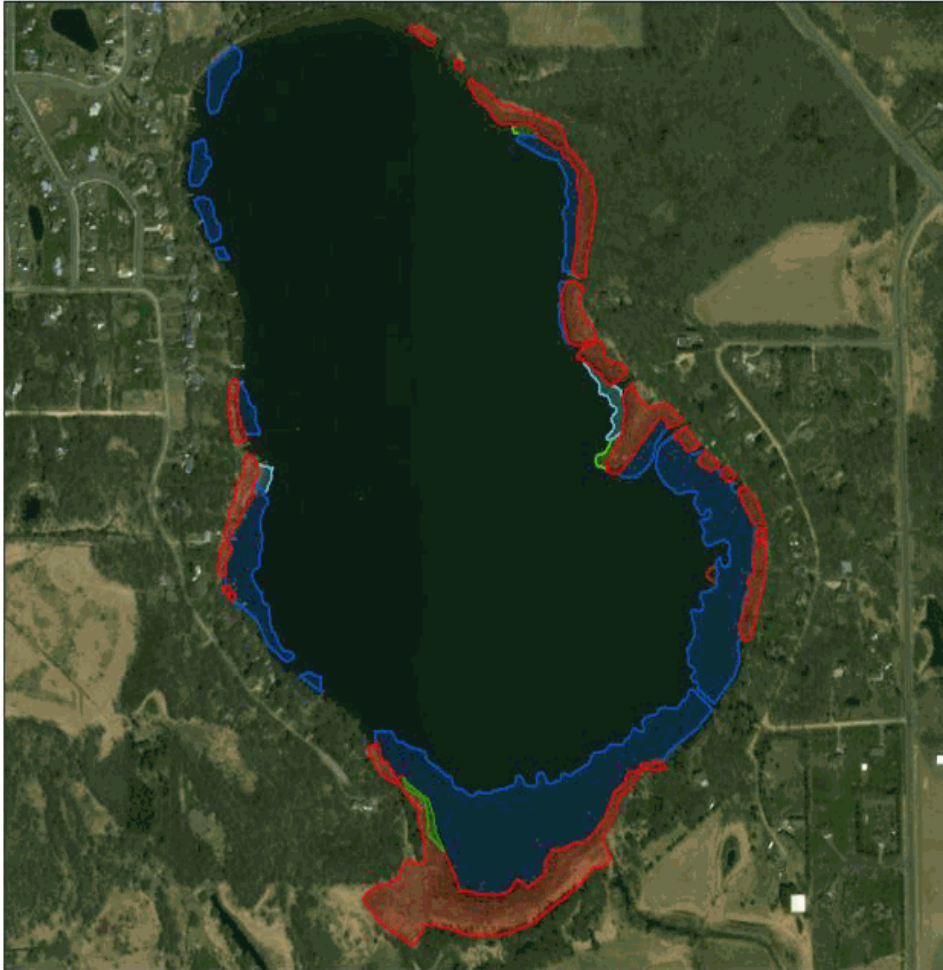
Notes: -

Survey Attachments (Continued)

Attachment #4: Photo

Title: FLEM map

Kroon Lake floating and emergent vegetation



File Name: FLEM
map.JPG

UTM Easting: -
UTM Northing: -

Date: 02/09/2018
Time: 9:49 am

Notes: -

Zoomed to Data Extent

Plant Class

- | | | | |
|---|------------------|---|-----------------------|
|  | Rushes |  | Waterlilies and Other |
|  | Rushes and Other |  | Other Floating |
|  | Waterlilies |  | Cattail |



Approval Dates And Notices

Date Approved By Hinckley Area Fisheries Supervisor: 02/09/2018

Date Approved By Central Region Fisheries Manager: _____



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Lake Survey Report revision: 20170426-RJE. Data Date: 02/23/2018 at 1:44 pm .