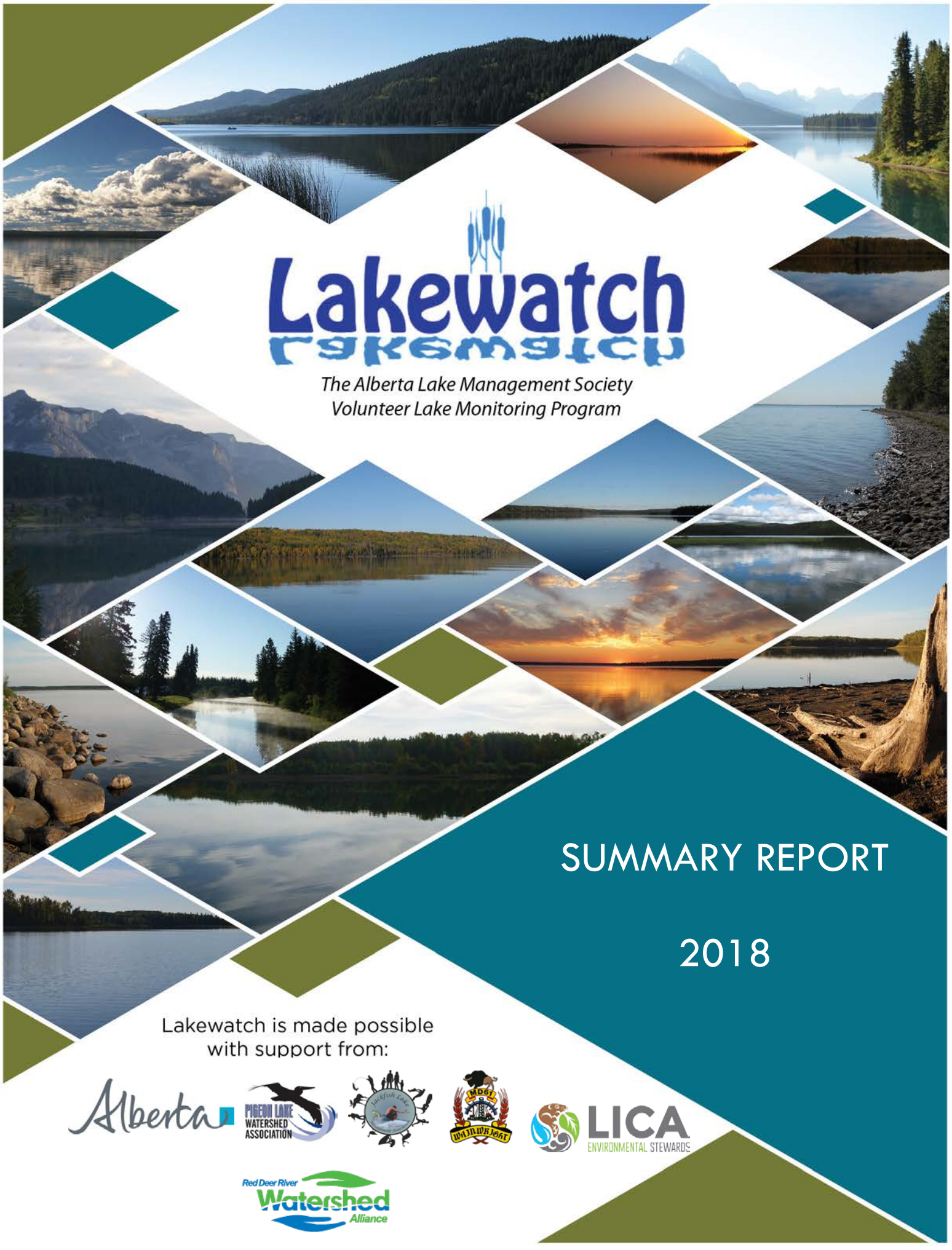


Lakewatch

The Alberta Lake Management Society
Volunteer Lake Monitoring Program

SUMMARY REPORT

2018

Lakewatch is made possible with support from:

Alberta

Pigeon Lake Watershed Association

Jackfish Lake

MD of Wainwright

LICA Environmental Stewards

Red Deer River Watershed Alliance

ALBERTA LAKE MANAGEMENT SOCIETY'S LAKEWATCH PROGRAM

LakeWatch has several important objectives, one of which is to collect and interpret water quality data on Alberta Lakes. Equally important is educating lake users about their aquatic environment, encouraging public involvement in lake management, and facilitating cooperation and partnerships between government, industry, the scientific community and lake users. LakeWatch Reports are designed to summarize basic lake data in understandable terms for a lay audience and are not meant to be a complete synopsis of information about specific lakes. Additional information is available for many lakes that have been included in LakeWatch and readers requiring more information are encouraged to seek those sources.

ALMS would like to thank all who express interest in Alberta's aquatic environments and particularly those who have participated in the LakeWatch program. These leaders in stewardship give us hope that our water resources will not be the limiting factor in the health of our environment.

This report has been prepared with un-validated data.

ACKNOWLEDGEMENTS

The LakeWatch program is made possible through the dedication of its volunteers. We would also like to thank Alanna Robertson, Lindsay Boucher and Shona Derlukewich, who were summer technicians in 2018. Executive Director Bradley Peter and Program Coordinator Laura Redmond were instrumental in planning and organizing the field program. This report was prepared by Caitlin Mader and Bradley Peter.

INTRODUCTION

In 2018, ALMS received funding from the Lakeland Industry and Community Association (LICA), the Red Deer River Watershed Alliance, the Pigeon Lake Watershed Association, the MD of Wainwright, Jackfish Lake Management Association and Alberta Environment and Parks, to conduct LakeWatch, a volunteer based water quality monitoring program. Data presented below has not completed its final validation process.

SAMPLE RECORD

Three summer field technicians (Alanna Roberts, Lindsay Boucher and Shona Derlukewich) were hired in May of 2018 to conduct water quality sampling. ALMS completed a provincial park monitoring program at five lakes and a standard monitoring program at 27 lakes. From June through early October 2018, lakes were visited four or five times each. In 2018, 142 of 149 scheduled trips were completed. This resulted in a completion rate of 95.1% (Table 1). Missed trips were a result of volunteer availability, one boat mechanical issue, and unsafe weather.

VOLUNTEERS

In 2018, ALMS worked with 94 unique volunteers for a total of 625 volunteer hours spent sampling lakes. Each year, ALMS recognizes one volunteer who has shown outstanding dedication and commitment to the LakeWatch program. This year, Anto Davis of Lacombe Lake was presented with the LakeWatch Volunteer of the Year Award.

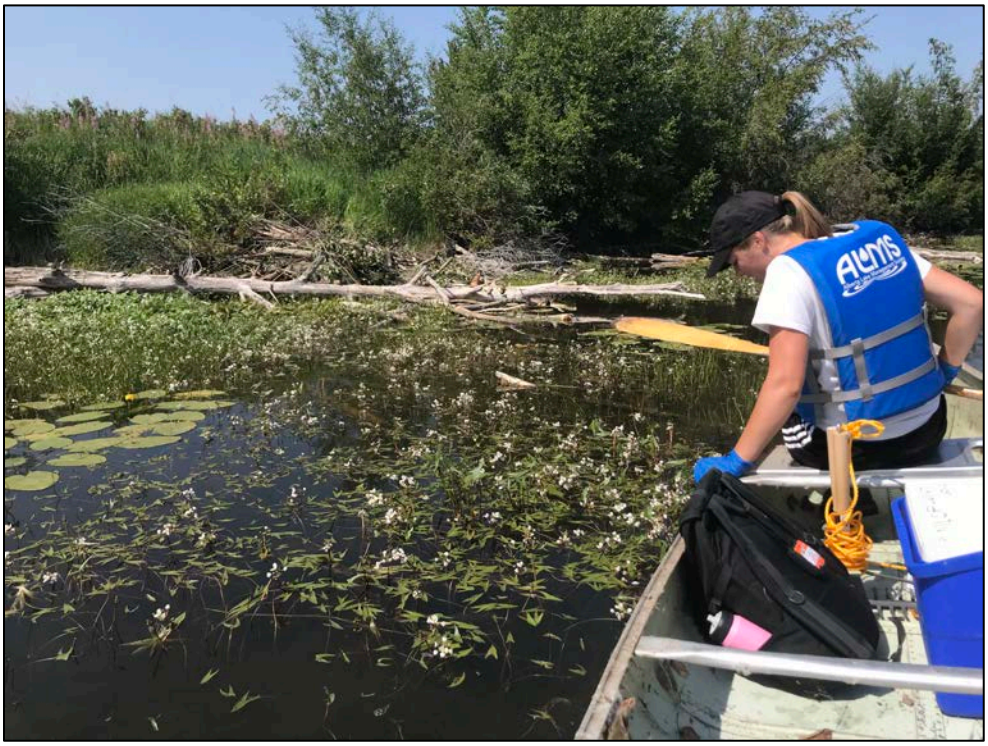
LakeWatch Volunteer of the Year (2018) recipient Anto Davis during a sampling trip on Lacombe Lake.

Table 1- The LakeWatch sample completion record for 2018.

Lake	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5
LICA Lakes					
Beaver	14-Jun	15-Jul	05-Aug	26-Aug	Missed
Crane	18-Jun	13-Jul	06-Aug	21-Aug	14-Sep
Hilda	13-Jun	10-Jul	01-Aug	16-Aug	11-Sep
Jessie	20-Jun	17-Jul	07-Aug	27-Aug	11-Sep
Laurier	3-Jun	9-Jul	30-Jul	21-Aug	5-Sep
Minnie	21-Jun	12-Jul	08-Aug	Missed	6-Sep
Moose	Missed	10-Jul	31-Jul	17-Aug	18-Sep
Skeleton North	5-Jun	16-Jul	11-Aug	25-Aug	10-Sep
Skeleton South	5-Jun	5-Jul	11-Aug	25-Aug	10-Sep
Vincent	15-Jun	6-Jul	31-Jul	17-Aug	8-Sep
Base Lakes					
Calling	15-Jun	9-Jul	16-Aug	Not planned	10-Sep
Half Moon	15-Jun	5-Jul	9-Aug	Not planned	6-Sep
Jackfish	29-Jun	23-Jul	26-Aug	Not planned	Missed
Lac Ste. Anne West	13-Jun	17-Jul	8-Aug	Not planned	5-Sep
Lacombe	8-Jun	11-Jul	29-Aug	Not planned	18-Sep
Little Beaver	26-Jun	27-Jul	21-Aug	Not planned	5-Sep
Long Island	14-Jun	18-Jul	29-Aug	Not planned	2-Sep
Matchayaw	17-Jun	27-Jul	25-Aug	Not planned	14-Sep
Vincent	2-Jun	5-Jul	11-Aug	25-Aug	10-Sep
Wizard	21-Jun	25-Jul	8-Aug	Not planned	6-Sep
Parks Lakes					
McLeod	18-Jun	19-Jul	24-Aug	Not planned	25-Sep
Moonshine	5-Jun	11-Jul	13-Aug	Not planned	18-Sep
Saskatoon	6-Jun	12-Jul	13-Aug	Not planned	Missed
Sturgeon	7-Jun	13-Jul	16-Aug	Not planned	19-Sep
Winagami	7-Jun	10-Jul	15-Aug	Not planned	20-Sep
RDRWA Lakes					
Blackfalds	28-Jun	17-Jul	13-Aug	29-Aug	20-Sep
Buffalo	19-Jun	24-Jul	9-Aug	23-Aug	20-Sep
Burnstick	28-Jun	16-Jul	3-Aug	20-Aug	4-Sep
Medicine	14-Jun	12-Jul	26-Jul	28-Aug	3-Oct
Sylvan	20-Jun	10-Jul	14-Aug	Missed	Missed
Contract Lakes					
Clear	4-Jun	4-Jul	2-Aug	25-Aug	17-Sep
Pigeon	22-Jun	19-Jul	10-Aug	31-Aug	19-Sep

RESULTS

While ALMS collects a large suite of water chemistry parameters, this report will highlight the variability which exists across only a few of our major parameters: Secchi Depth, Total Phosphorus, Chlorophyll-a, and Microcystin. The variation within these parameters does not necessarily reflect a degree of lake management, for many factors outside of human control also impact lake water quality. The depth of the lake, the size of the drainage basin, lake order, and the composition of bedrock and sediment are just some of the factors which affect lake water quality and should be taken into consideration when reading these results.



Lindsay Boucher sampling Lacombe Lake.

WATER CLARITY AND SECCHI DEPTH

Water clarity is influenced by suspended materials both living and dead, as well as dissolved colored compounds in the water column. During the melting of snow and ice in spring, lake water can become turbid (cloudy) from silt transported into the lake. Lake water usually clears in late spring but then becomes more turbid with increased algal growth as the summer progresses. The easiest and most widely used measure of lake water clarity is the Secchi disk depth. Two times the Secchi disk depth equals the euphotic depth – the depth to which there is enough light for photosynthesis.

Average Secchi depths in 2018 ranged from a minimum of 0.38 m at Half Moon Lake to a maximum of 4.98 m at Burnstick Lake (Figure 1). Water clarity at Half Moon, Little Beaver, Blackfalds and Saskatoon Lakes appears to be negatively impacted by algal blooms, and Secchi depth averages were significantly negatively correlated with average chlorophyll-*a* concentrations across lakes (Kendalls' Tau-b, τ_b= -0.51, *p-value* < 0.001).

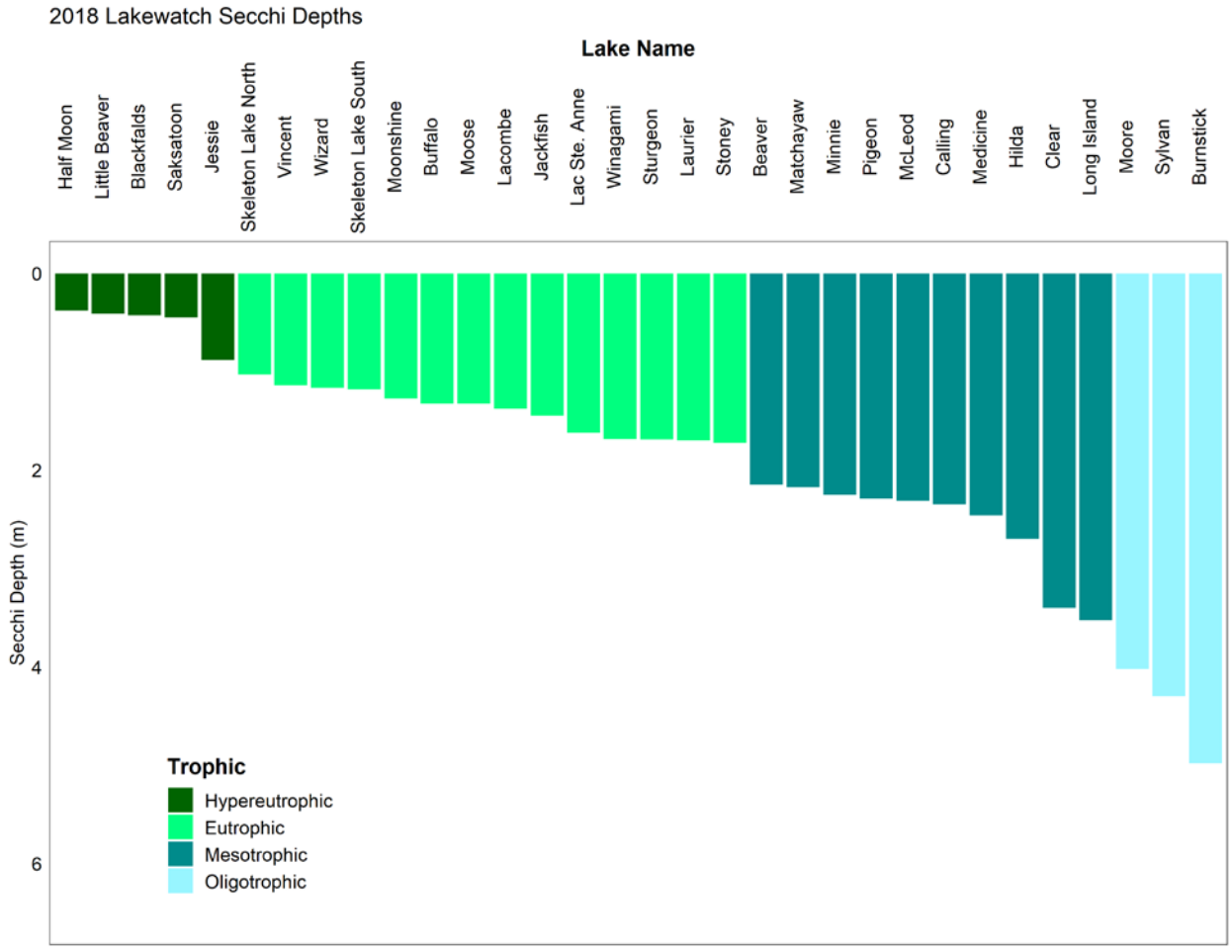


Figure 2*:* Average Secchi disk depth (m) values measured at 32 LakeWatch lakes during the summer of 2018.

WATER CHEMISTRY

ALMS measures a suite of water chemistry parameters. Phosphorus, nitrogen, and chlorophyll-a are important because they are indicators of eutrophication, or excess nutrients, which can lead to harmful algal/cyanobacteria blooms. One direct measure of harmful cyanobacteria blooms are Microcystins, a common group of toxins produced by cyanobacteria.

Average total phosphorus concentrations ranged from a minimum of 1.2 µg/L at Clear Lake to a maximum of 1050 µg/L at Jessie Lake (Figure 3).

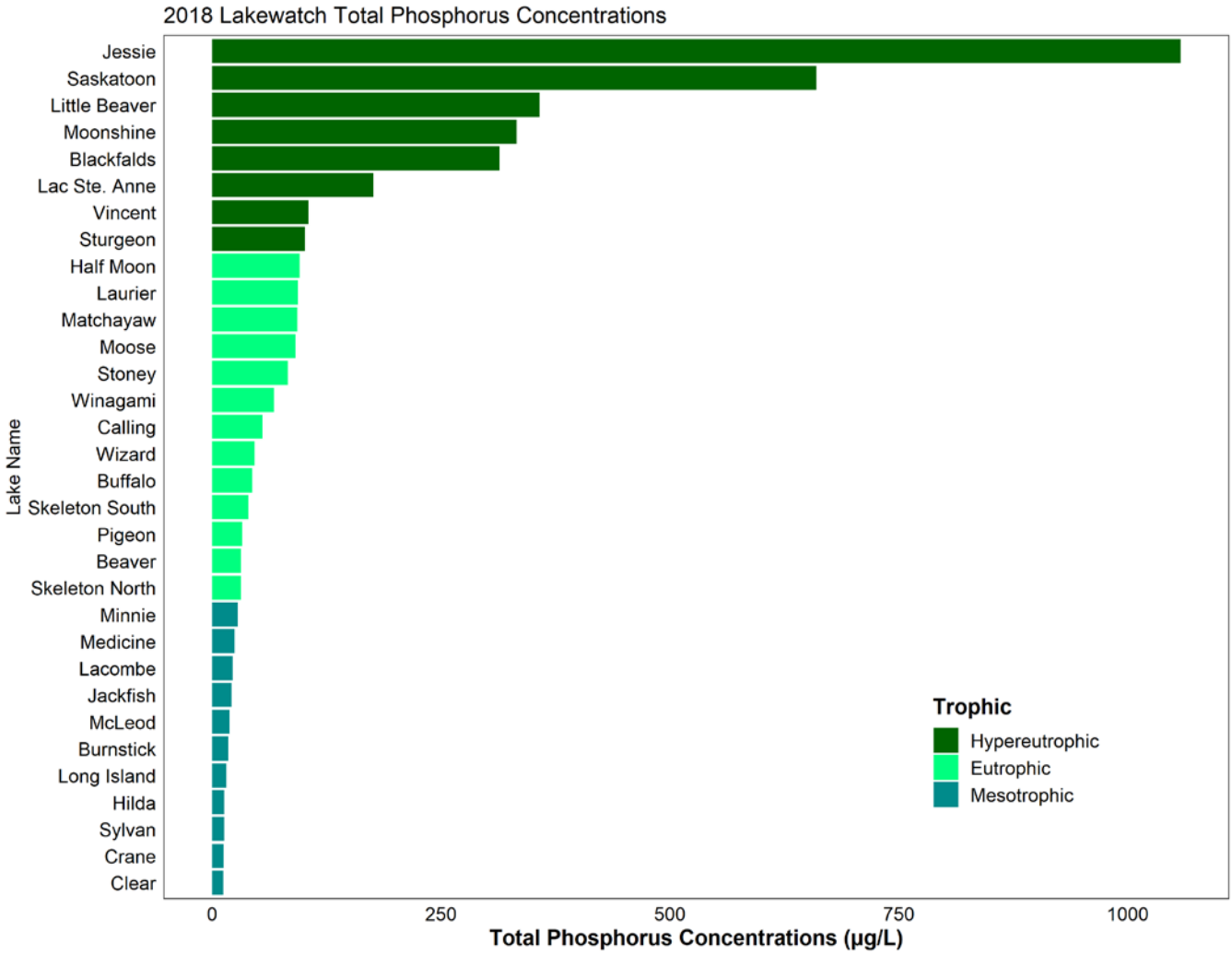


Figure 3: Average total phosphorus (TP) concentrations measured at 32 LakeWatch lakes during the summer of 2018.

CHLOROPHYLL-A

Chlorophyll-a is the green pigment found in plants and algae's that allows them to photosynthesize. Measuring the concentration of chlorophyll-a is a common way of testing how much algae is present in lake water, because any green algae will contain it.

Average chlorophyll-*a* concentrations ranged from a minimum of 2.82 µg /L at Burnstick Lake to a maximum of 197 µg /L at Little Beaver Lake (Figure 4).

Chlorophyll-*a* and TP averages were significantly correlated across lakes (Kendalls' Tau, τ= 0.64, *p-value* < 0.001).

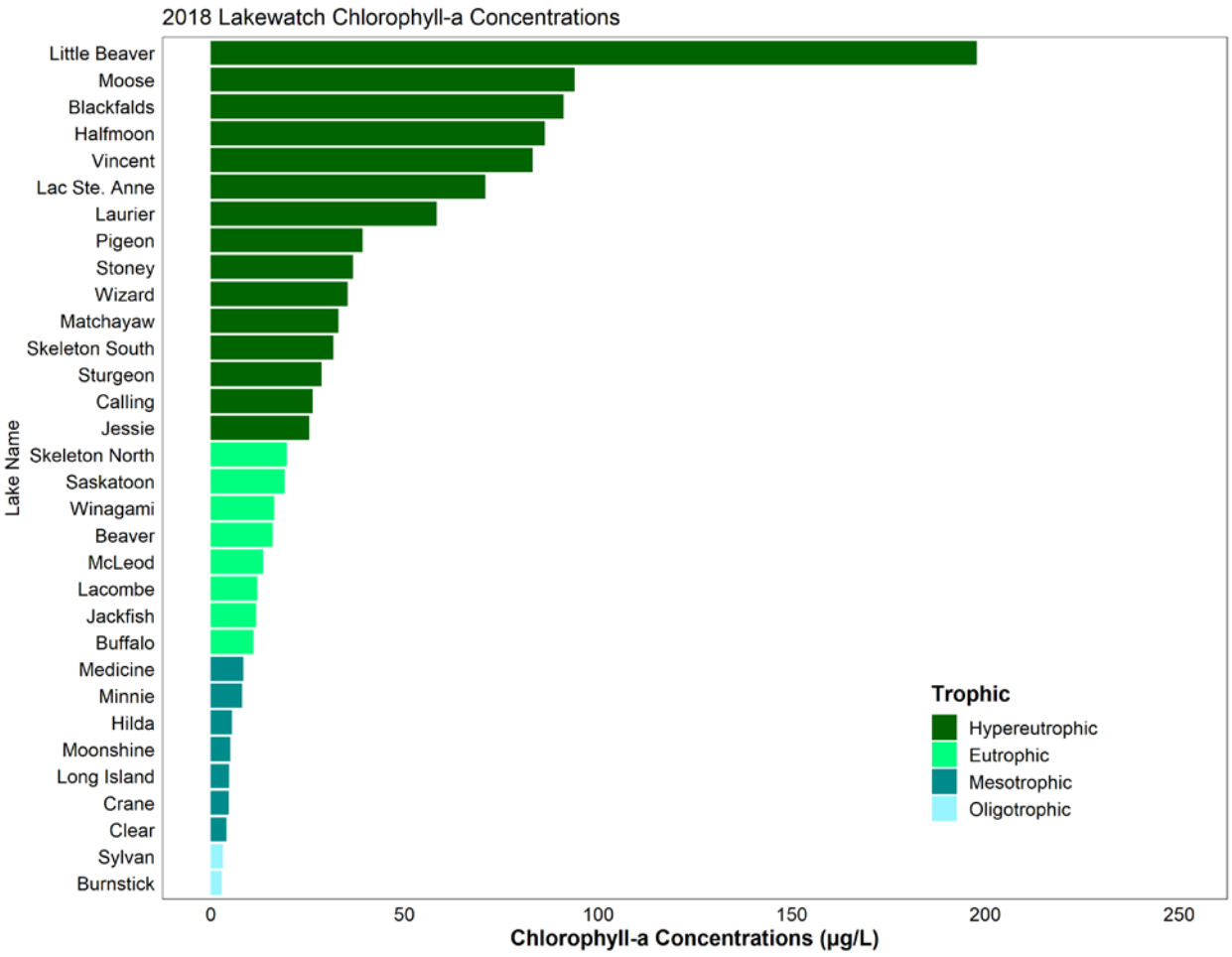


Figure 4: Average chlorophyll-*a* values measured at 32 LakeWatch lakes during the summer of 2018.

MICROCYSTIN

Microcystins are toxins produced by cyanobacteria (blue-green algae) which, when ingested, can cause severe liver damage. Microcystins are produced by many species of cyanobacteria which are common to Alberta's Lakes, and are thought to be the one of the most common cyanobacteria toxins. In Alberta, recreational guidelines for microcystin are set at 20 µg/L.

Average microcystin concentrations fell below the minimum detection limit of 0.1 µg/L at Long Island Lake (Figure 5). Microcystin was detected at every other lake, with the highest average concentration observed at Little Beaver Lake, measuring 14.5 µg /L. None of the lakes sampled measured higher than the recreational guideline of 20 µg /L at any time throughout the summer of 2018. However, samples from individual locations may display toxin concentrations higher than the recreational guidelines, and caution should be observed when recreating in or around cyanobacteria.

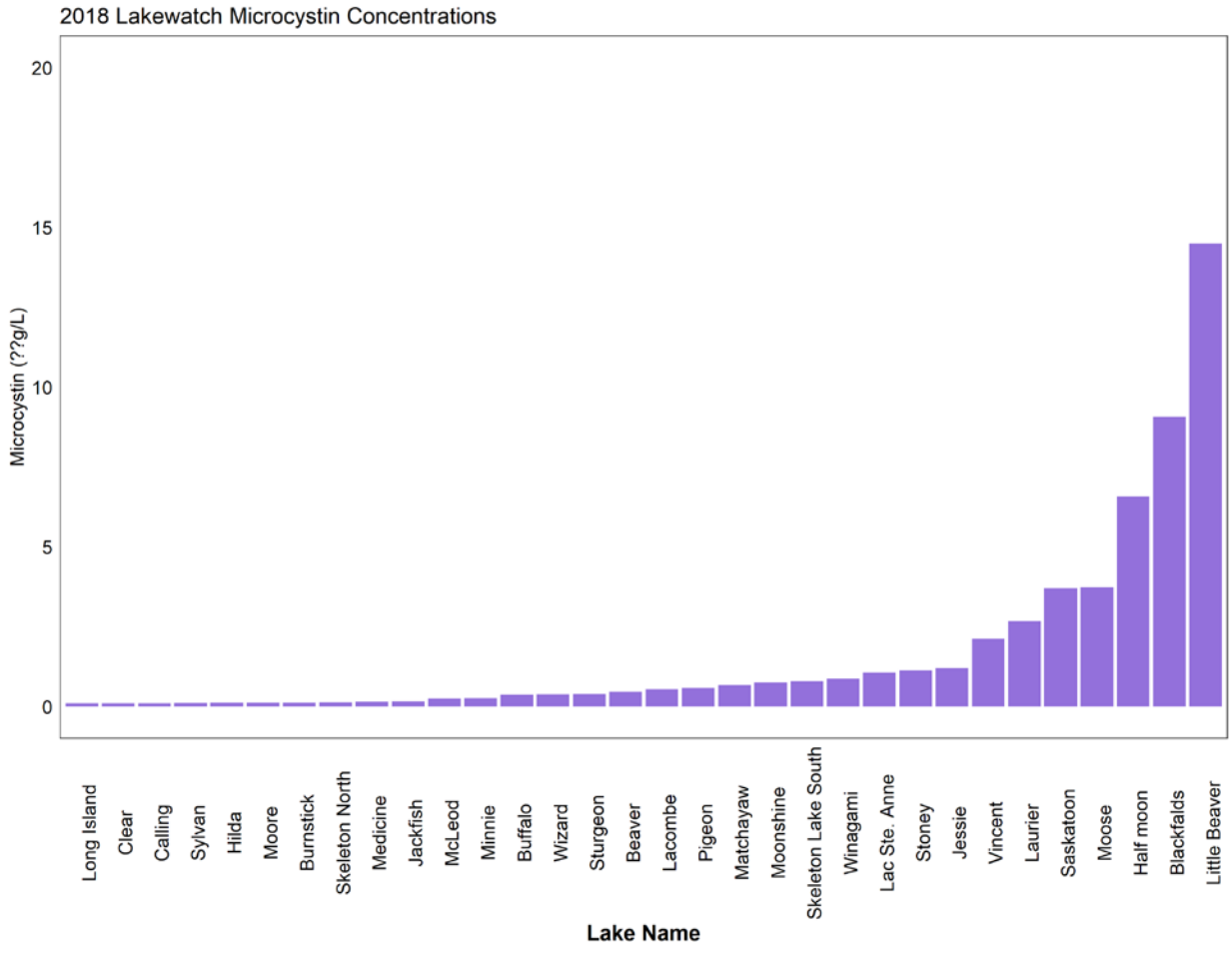


Figure 5: Average microcystin concentrations measured at 32 LakeWatch lakes during the summer of 2018.