

# EOLakeWatch: Satellite observations for lake monitoring

## 2020 Algal Bloom Report - Lake Winnipeg

Satellite-derived algal bloom indices for Lake Winnipeg have been estimated using data from the European Space Agency's OLCI (Ocean Land Colour Instrument) for 2016 to present, and MERIS (Medium Resolution Imaging Spectrometer) for 2002 to 2011. Daily bloom indices are derived from 14-day rolling-average satellite data products. Annual bloom indices are reported as the averages and maxima over the June to October monitoring period.



For further details, contact us at  
 ec.EOLakeWatch-AttentionLacsOT.ec@canada.ca

**Table 1. Lake Winnipeg algal bloom graphs (June to October)**

Bloom Index	2020 Daily Indices	Annual Indices
Bloom Extent (km <sup>2</sup> ) & (% of lake area)		
Bloom Intensity (µg/L)		
Bloom Severity (µg/L km <sup>2</sup> )		

\*2002 to 2019 average. No data available from 2012 to 2015.

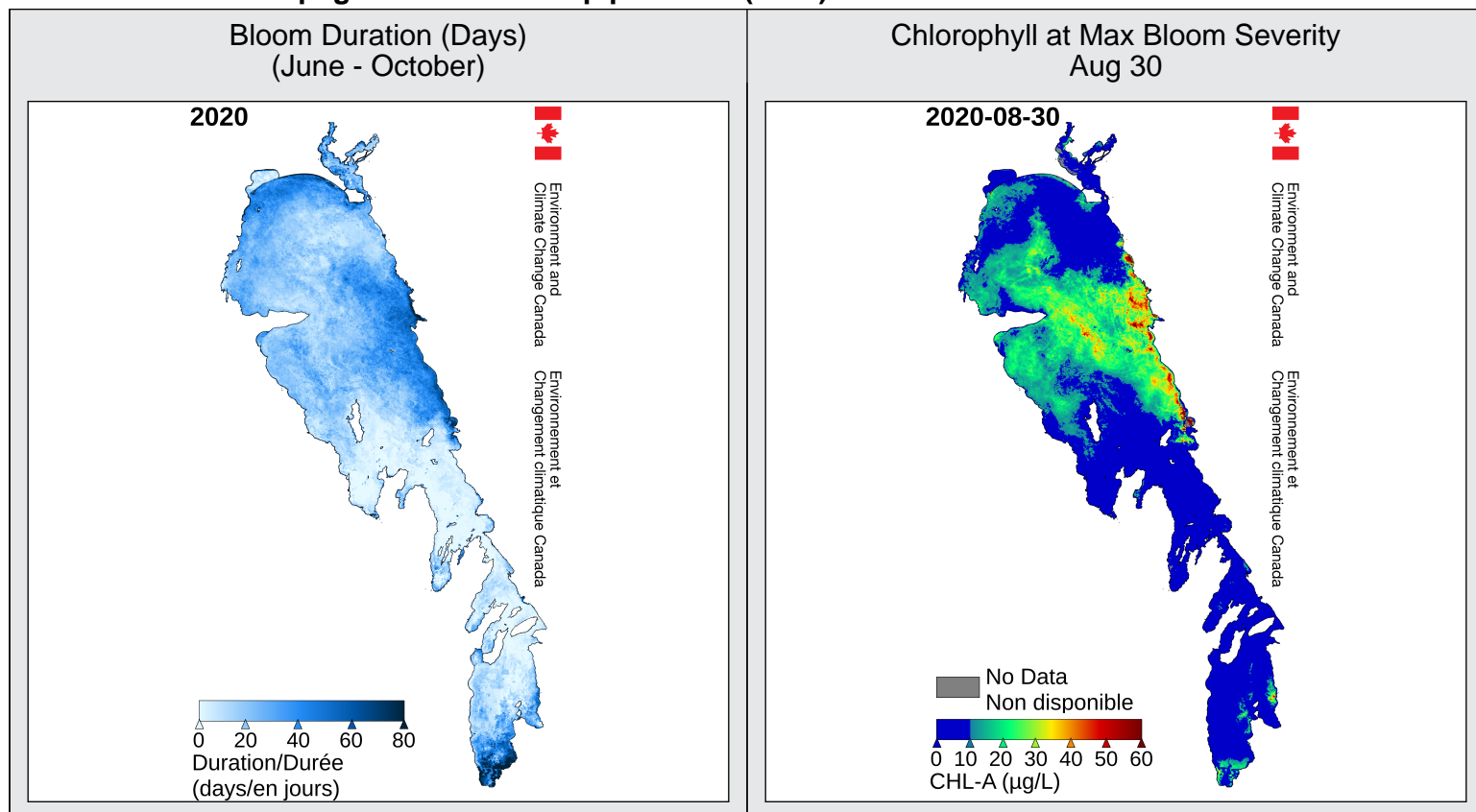
Recommended citation: Environment and Climate Change Canada (2020). *EOLakeWatch 2020 Algal Bloom Report - Lake Winnipeg*.



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**Table 2. Lake Winnipeg bloom index map products (2020)**



**Table 3. Lake Winnipeg 2020 bloom indices (June to October)**

Bloom Indices									
Year	Average				Maximum				
	Extent km <sup>2</sup> (% of lake area)	Intensity µg/L	Severity x10 <sup>3</sup> µg/L km <sup>2</sup>	Duration days	Extent km <sup>2</sup> (% of lake area)	Intensity µg/L	Severity x10 <sup>3</sup> µg/L km <sup>2</sup>	Day of Max Severity	Duration days
2020	3,660 (14.9)	16.6	63.1	21	10,503 (42.8)	25.2	198.4	Aug 30	144
Avg*	5,746 (23.4)	23.3	156.8	42	14,296 (58.2)	43.4	546.4	Aug 31	149

\*2002 to 2019 average. No data available from 2012 to 2015.

**Table 4. Terminology**

Bloom Index	Description
Bloom Flag	A per pixel bloom flag is raised when Chlorophyll > 10 µg/L
Bloom Extent	Total area of pixels flagged as bloom (km <sup>2</sup> or % of lake area)
Bloom Intensity	Average chlorophyll concentration within area flagged as bloom (µg/L)
Bloom Severity	Bloom Intensity x Bloom Extent (µg/L km <sup>2</sup> )
Bloom Duration	Number of days a pixel is flagged in bloom (days)

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### Appendix. Annual average and maximum bloom indices (June to October)

Bloom Indices									
Year	Average				Maximum				
	Extent km <sup>2</sup> (% of lake area)	Intensity µg/L	Severity x10 <sup>3</sup> µg/L km <sup>2</sup>	Duration days	Extent km <sup>2</sup> (% of lake area)	Intensity µg/L	Severity x10 <sup>3</sup> µg/L km <sup>2</sup>	Day of Max Severity	Duration days
2002	1,142 (4.6)	20.6	24.0	29	6,016 (24.5)	28.8	136.4	Oct 16	149
2003	4,623 (18.8)	24.2	142.7	35	15,089 (61.4)	46.4	634.7	Aug 01	146
2004	3,557 (14.5)	23.2	88.4	31	7,142 (29.1)	46.3	265.2	Aug 04	147
2005	8,213 (33.4)	25.9	255.2	66	17,462 (71.1)	61.1	954.9	Sep 03	146
2006	6,566 (26.7)	31.1	246.4	52	19,130 (77.9)	54.9	997.1	Sep 16	150
2007	5,467 (22.3)	20.5	134.1	51	17,147 (69.8)	47.1	528.5	Aug 17	151
2008	7,221 (29.4)	23.0	182.9	44	16,441 (67.0)	43.7	682.3	Aug 14	151
2009	4,410 (18.0)	18.9	93.3	28	8,984 (36.6)	33.4	297.1	Sep 19	152
2010	6,752 (27.5)	25.6	198.2	45	15,990 (65.1)	45.4	638.4	Aug 01	142
2011	10,589 (43.1)	26.6	341.6	62	21,641 (88.1)	52.7	1,084.8	Sep 09	148
2016	6,860 (27.9)	18.9	145.7	42	16,182 (65.9)	27.7	430.6	Sep 29	150
2017	5,347 (21.8)	20.5	125.3	39	13,365 (54.4)	35.9	389.9	Aug 17	151
2018	7,058 (28.7)	21.6	147.1	43	17,958 (73.1)	32.6	389.5	Sep 24	153
2019	2,642 (10.8)	25.5	70.5	19	7,598 (30.9)	51.1	219.9	Aug 22	153
<b>2020</b>	<b>3,660 (14.9)</b>	<b>16.6</b>	<b>63.1</b>	<b>21</b>	<b>10,503 (42.8)</b>	<b>25.2</b>	<b>198.4</b>	<b>Aug 30</b>	<b>144</b>
Avg*	5,746 (23.4)	23.3	156.8	42	14,296 (58.2)	43.4	546.4	Aug 31	149

\*2002 to 2019 average. No data available from 2012 to 2015.

ECCC EOLakeWatch algal bloom indices are produced using remote sensing data from the Envisat MERIS and Copernicus Sentinel-3 OLCI missions. Data made available by the European Space Agency (ESA).

