

# EOLakeWatch: Satellite observations for lake monitoring

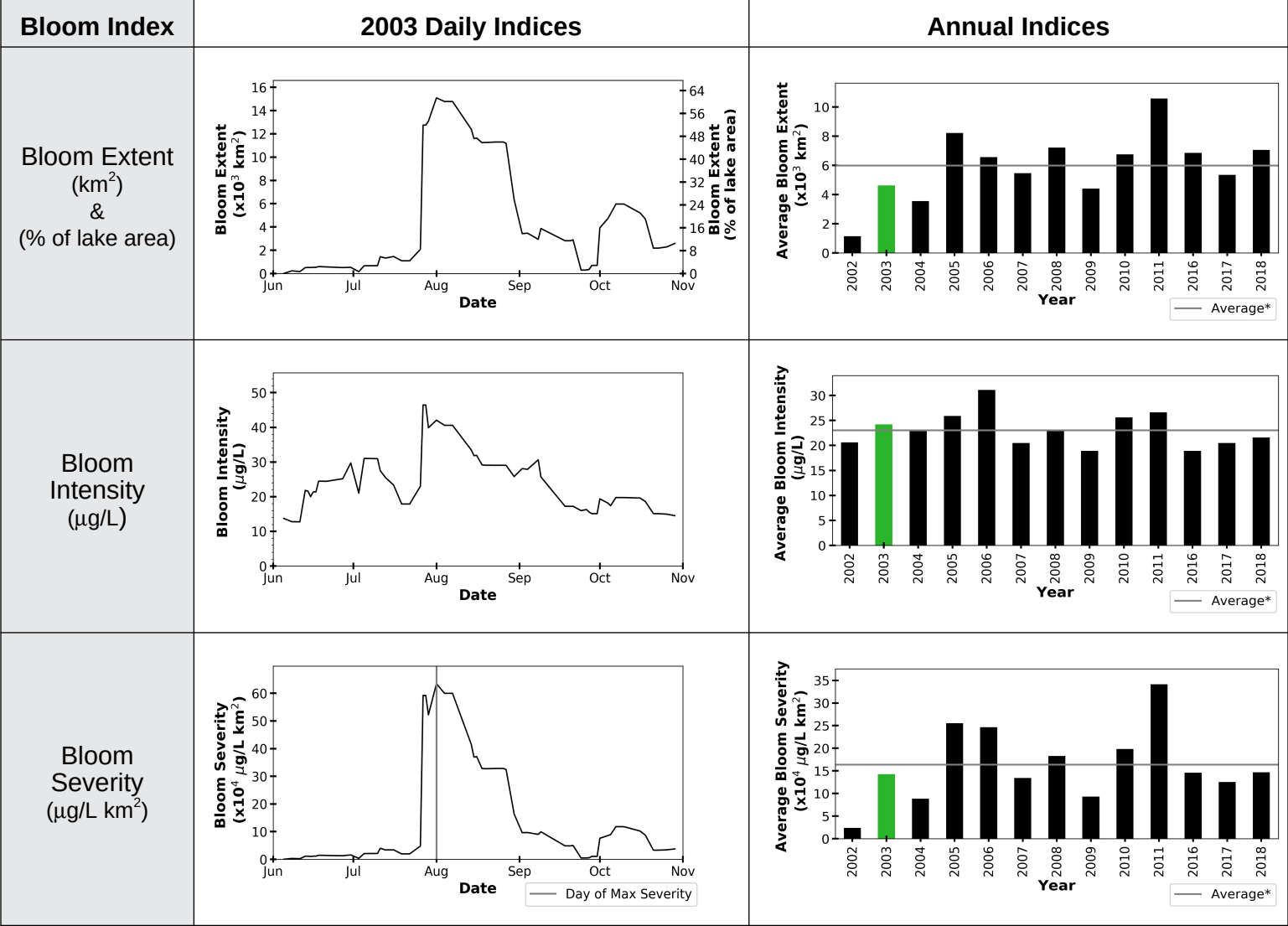
## 2003 Algal Bloom Report - Lake Winnipeg

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)



\*2002 to 2018 average. No data available from 2012 to 2015.

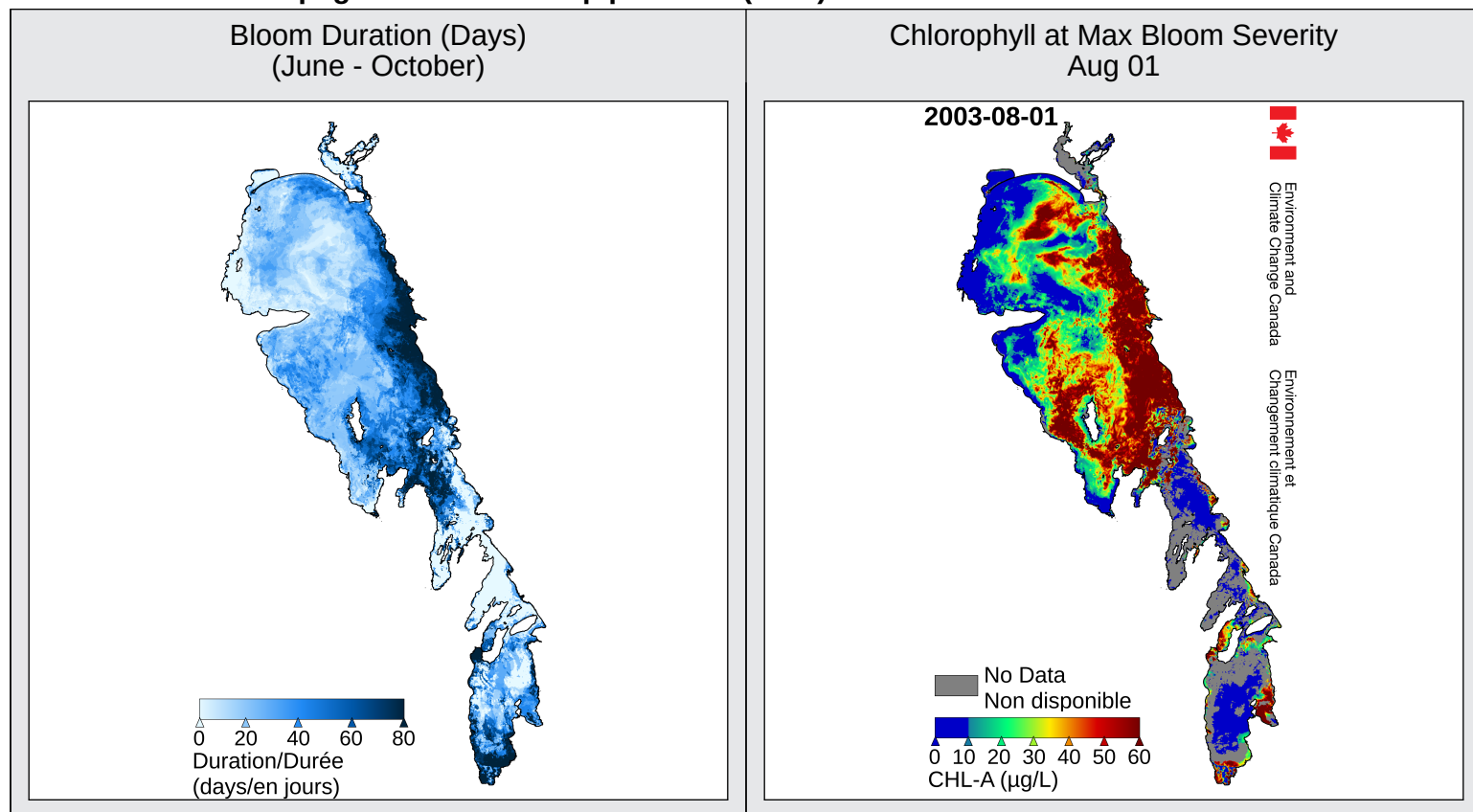
Recommended citation: Environment and Climate Change Canada (2019). *EOLakeWatch 2003 Algal Bloom Report - Lake Winnipeg*.



# EOLakeWatch: Satellite observations for lake monitoring

## 2003 Algal Bloom Report - Lake Winnipeg

**Table 2. Lake Winnipeg bloom index map products (2003)**



**Table 3. Lake Winnipeg 2003 bloom indices (June to October)**

| Bloom Indices |                                               |                   |                                                   |                  |                                               |                   |                                                   |                           |                  |
|---------------|-----------------------------------------------|-------------------|---------------------------------------------------|------------------|-----------------------------------------------|-------------------|---------------------------------------------------|---------------------------|------------------|
| Year          | Average                                       |                   |                                                   |                  | Maximum                                       |                   |                                                   |                           |                  |
|               | Extent<br>km <sup>2</sup><br>(% of lake area) | Intensity<br>µg/L | Severity<br>x10 <sup>3</sup> µg/L km <sup>2</sup> | Duration<br>days | Extent<br>km <sup>2</sup><br>(% of lake area) | Intensity<br>µg/L | Severity<br>x10 <sup>3</sup> µg/L km <sup>2</sup> | Day of<br>Max<br>Severity | Duration<br>days |
| 2003          | 4,623 (18.8)                                  | 24.2              | 142.7                                             | 35               | 15,089 (61.4)                                 | 46.4              | 634.7                                             | Aug 01                    | 146              |
| Avg*          | 5,985 (24.4)                                  | 23.1              | 163.5                                             | 44               | 14,811 (60.3)                                 | 42.8              | 571.5                                             | Sep 01                    | 149              |

\*2002 to 2018 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)                         |



# EOLakeWatch: Satellite observations for lake monitoring

## 2003 Algal Bloom Report - Lake Winnipeg

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

| Bloom Indices |                                               |                   |                                                   |                  |                                               |                   |                                                   |                           |                  |
|---------------|-----------------------------------------------|-------------------|---------------------------------------------------|------------------|-----------------------------------------------|-------------------|---------------------------------------------------|---------------------------|------------------|
| Year          | Average                                       |                   |                                                   |                  | Maximum                                       |                   |                                                   |                           |                  |
|               | Extent<br>km <sup>2</sup><br>(% of lake area) | Intensity<br>µg/L | Severity<br>x10 <sup>3</sup> µg/L km <sup>2</sup> | Duration<br>days | Extent<br>km <sup>2</sup><br>(% of lake area) | Intensity<br>µg/L | Severity<br>x10 <sup>3</sup> µg/L km <sup>2</sup> | Day of<br>Max<br>Severity | Duration<br>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              |
| Avg*          | 5,985 (24.4)                                  | 23.1              | 163.5                                             | 44               | 14,811 (60.3)                                 | 42.8              | 571.5                                             | Sep 01                    | 149              |

\*2002 to 2018 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).

