

# EOLakeWatch: Satellite observations for lake monitoring

## 2011 Algal Bloom Report - Lake Erie

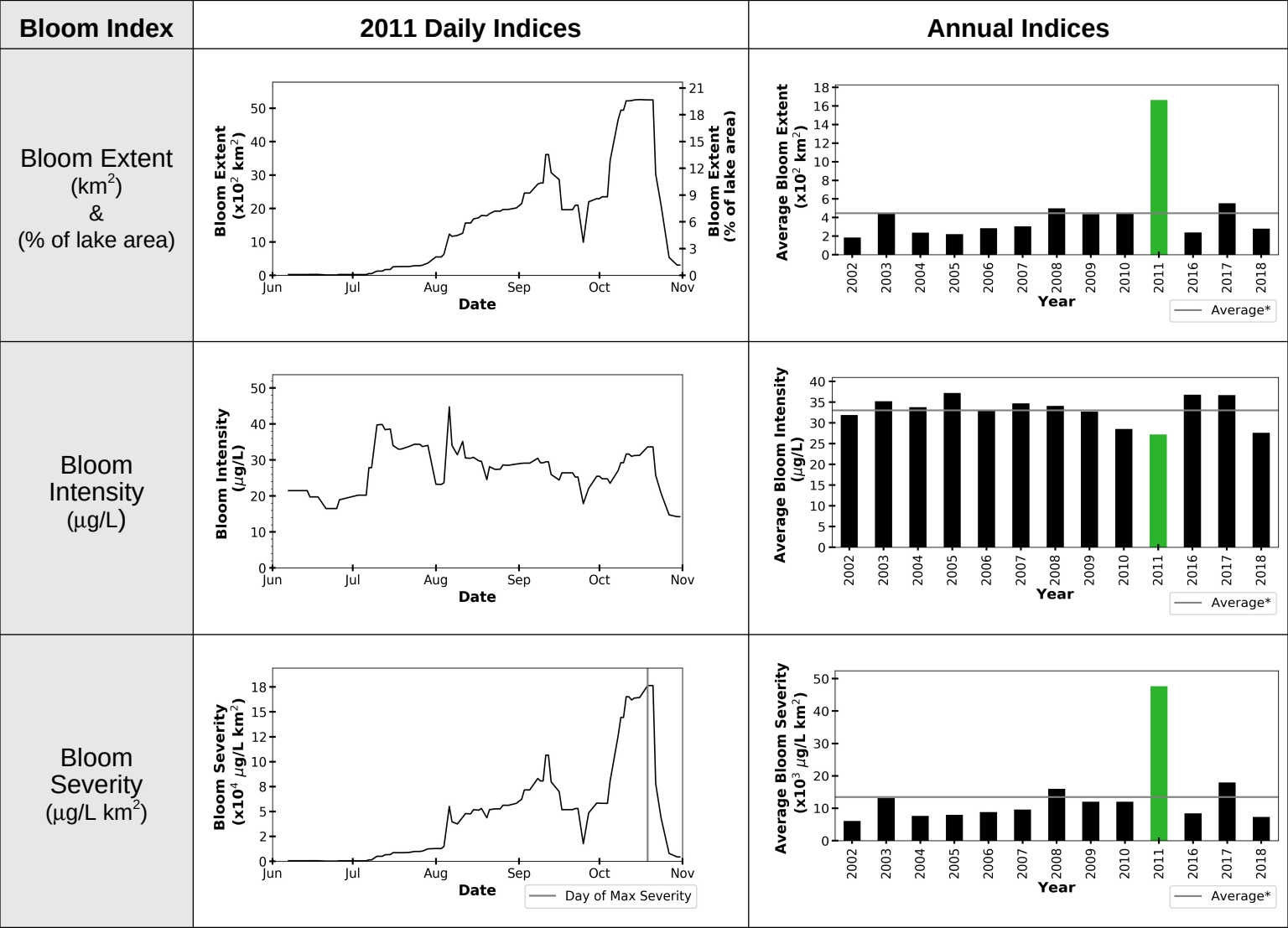
Satellite-derived algal bloom indices for Lake Erie have been estimated using data from the European Space Agency's OLCI (Ocean Land Colour Instrument) for 2016 to present, and MERIS (Medium Resolution Imaging Spectrometer) for 2002 to 2011.

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



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

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Table 2. Lake Erie bloom index map products (2011)

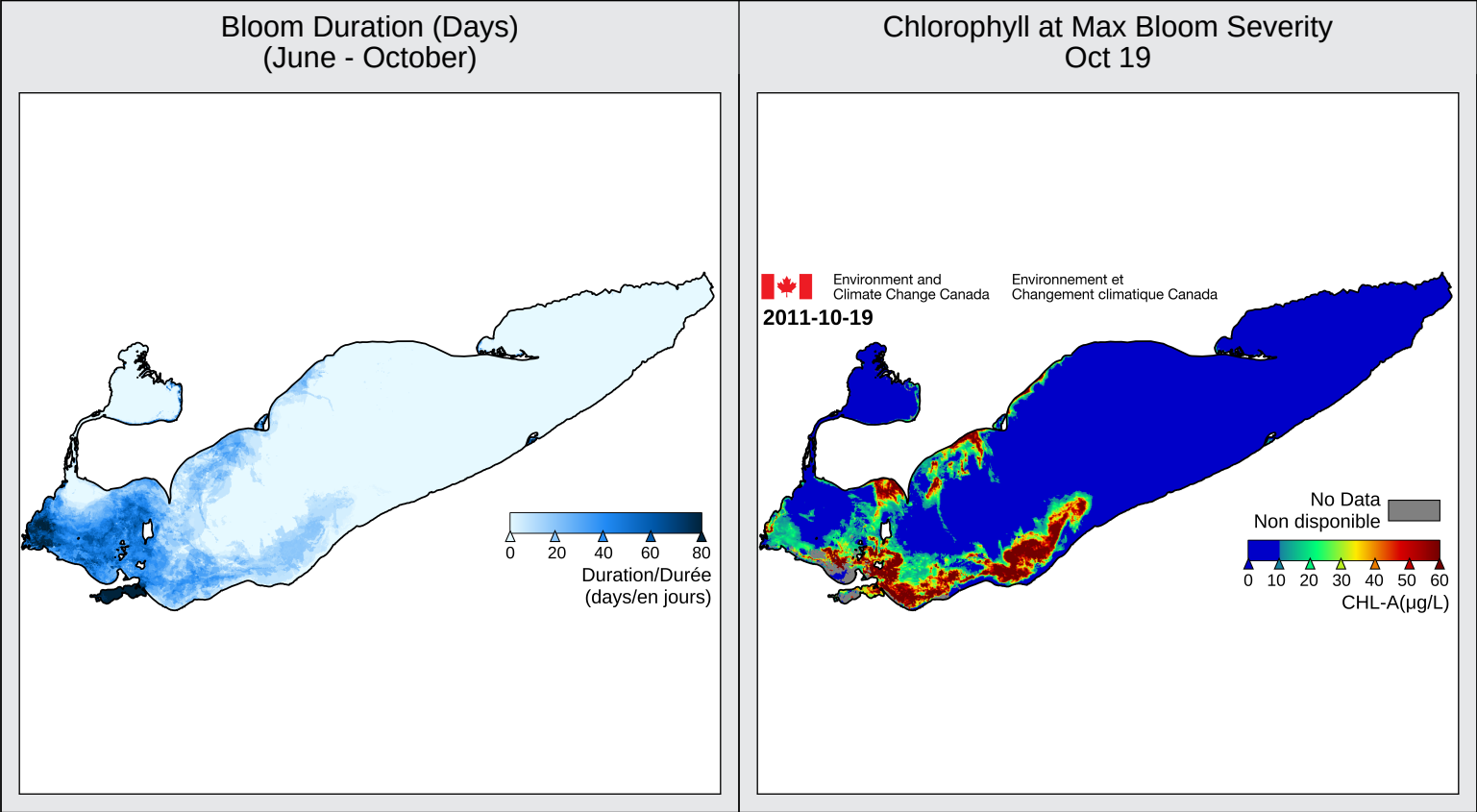


Table 3. Lake Erie 2011 bloom indices (June to October)

| 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 |
| 2011          | 1,663 (6.2)                                   | 27.2              | 47.7                                              | 25               | 5,257 (19.7)                                  | 44.8              | 176.4                                             | Oct 19                    | 146              |
| Avg*          | 446 (1.7)                                     | 33.0              | 13.4                                              | 24               | 1,269 (4.8)                                   | 53.5              | 38.2                                              | Sep 13                    | 146              |

\*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)                         |

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### 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          | 185 (0.7)                                     | 31.9              | 6.1                                               | 29               | 305 (1.1)                                     | 48.2              | 10.4                                              | Aug 29                    | 132              |
| 2003          | 447 (1.7)                                     | 35.2              | 13.2                                              | 28               | 1,401 (5.2)                                   | 58.2              | 33.4                                              | Sep 21                    | 146              |
| 2004          | 236 (0.9)                                     | 33.8              | 7.6                                               | 21               | 455 (1.7)                                     | 53.3              | 14.6                                              | Sep 21                    | 150              |
| 2005          | 221 (0.8)                                     | 37.2              | 8.0                                               | 30               | 419 (1.6)                                     | 54.1              | 12.7                                              | Sep 07                    | 150              |
| 2006          | 285 (1.1)                                     | 32.9              | 8.8                                               | 27               | 711 (2.7)                                     | 52.0              | 21.6                                              | Aug 25                    | 148              |
| 2007          | 305 (1.1)                                     | 34.7              | 9.6                                               | 20               | 638 (2.4)                                     | 53.1              | 14.0                                              | Sep 15                    | 149              |
| 2008          | 499 (1.9)                                     | 34.1              | 16.0                                              | 24               | 1,573 (5.9)                                   | 49.0              | 59.8                                              | Sep 12                    | 150              |
| 2009          | 434 (1.6)                                     | 32.7              | 12.0                                              | 16               | 1,625 (6.1)                                   | 59.9              | 31.9                                              | Sep 07                    | 148              |
| 2010          | 448 (1.7)                                     | 28.5              | 12.0                                              | 22               | 1,207 (4.5)                                   | 42.3              | 34.0                                              | Sep 22                    | 142              |
| 2011          | 1,663 (6.2)                                   | 27.2              | 47.7                                              | 25               | 5,257 (19.7)                                  | 44.8              | 176.4                                             | Oct 19                    | 146              |
| 2016          | 238 (0.9)                                     | 36.8              | 8.4                                               | 24               | 609 (2.3)                                     | 56.6              | 20.6                                              | Aug 23                    | 153              |
| 2017          | 553 (2.1)                                     | 36.7              | 18.0                                              | 21               | 1,725 (6.5)                                   | 65.6              | 55.0                                              | Sep 25                    | 150              |
| 2018          | 279 (1.0)                                     | 27.6              | 7.3                                               | 19               | 572 (2.1)                                     | 59.0              | 12.4                                              | Sep 12                    | 133              |
| Avg*          | 446 (1.7)                                     | 33.0              | 13.4                                              | 24               | 1,269 (4.8)                                   | 53.5              | 38.2                                              | Sep 13                    | 146              |

\*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).

