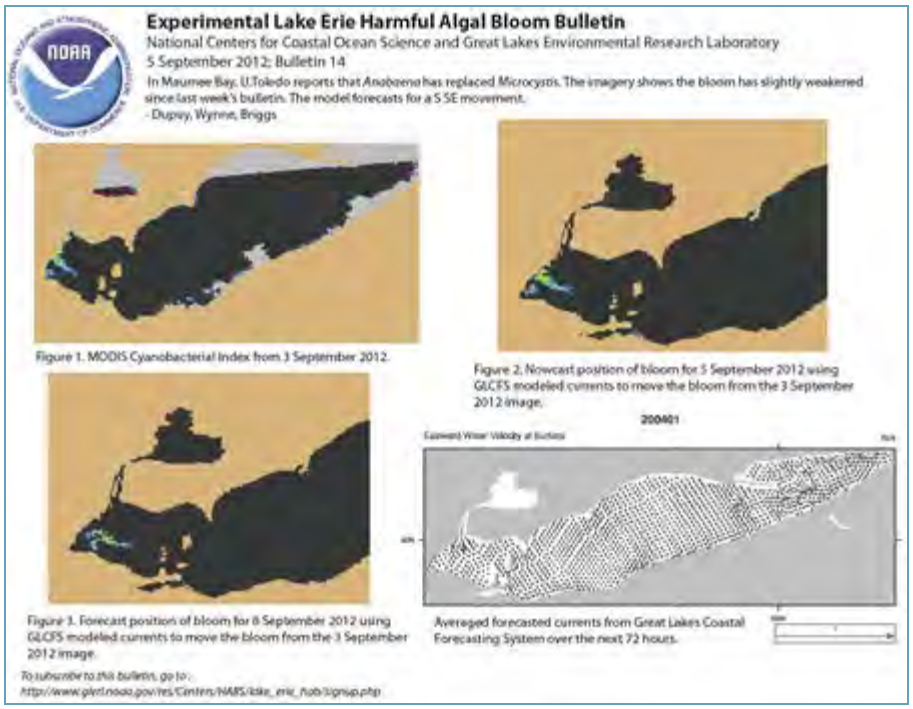
Harmful Algal Blooms in Lake Erie- Experimental HAB Bulletin

An experimental HAB bulletin has been developed to provide a weekly forecast for *Microcystis* blooms in western Lake Erie. When a harmful bloom is detected by the experimental system, scientists will issue the forecast bulletin below. The bulletin depicts the HABs' current location and future movement, as well as categorizes its intensity on a weekly basis.



Experimental Lake Erie Harmful Algal Bloom Bulletin

National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

5 September 2012; Bulletin 14

In Maumee Bay, U.Toledo reports that *Anoboena* has replaced *Microcystis*. The imagery shows the bloom has slightly weakened since last week's bulletin. The model forecasts for a S SE movement.

- Dupuy, Wynne, Briggs

Figure 1. MODIS Cyanobacterial index from 3 September 2012.

Figure 2. Nowcast position of bloom for 5 September 2012 using GLCFS modeled currents to move the bloom from the 3 September 2012 image.

Figure 3. Forecast position of bloom for 8 September 2012 using GLCFS modeled currents to move the bloom from the 3 September 2012 image.

Averaged forecasted currents from Great Lakes Coastal Forecasting System over the next 72 hours.

To subscribe to this bulletin, go to:

http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php

05 September 2012 Bulletin (.pdf)

- **Click here to fill out the Lake Erie Harmful Algal Bloom Forecast Bulletin Feedback Survey**
- Sign up to be e-mailed the Lake Erie HAB Bulletin
- Lake Erie HAB Bulletin Archive
- Microcystin Concentration Sampling Data

For more information, please contact:

(hab-glakes@noaa.gov)

NOAA Center of Excellence for Great Lakes and Human Health (CEGLHH)
4840 S. State Rd., Ann Arbor, MI 48108-9719 (734)741-2283
Contact: Outreach Coordinator: sonia.joseph@noaa.gov
NOAA | DOC

Experimental Lake Erie Harmful Algal Bloom Bulletin

National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

5 September 2012; Bulletin 14

In Maumee Bay, U.Toledo reports that *Anabaena* has replaced *Microcystis*. The imagery shows the bloom has slightly weakened since last week's bulletin. The model forecasts for a S SE movement.

- Dupuy, Wynne, Briggs

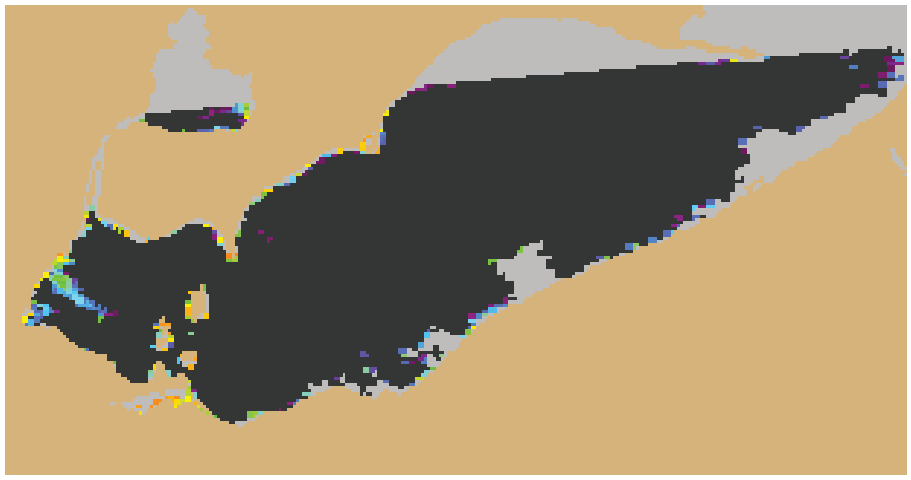


Figure 1. MODIS Cyanobacterial Index from 3 September 2012.

Figure 2. Nowcast position of bloom for 5 September 2012 using GLCFS modeled currents to move the bloom from the 3 September 2012 image.

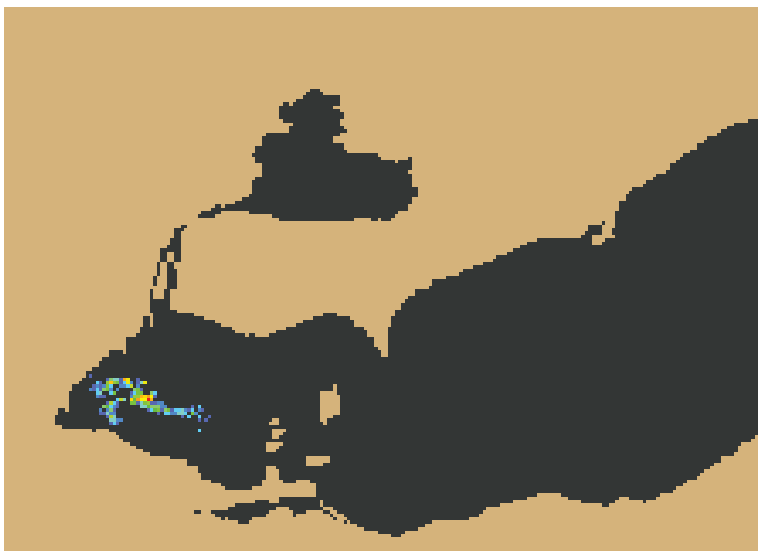
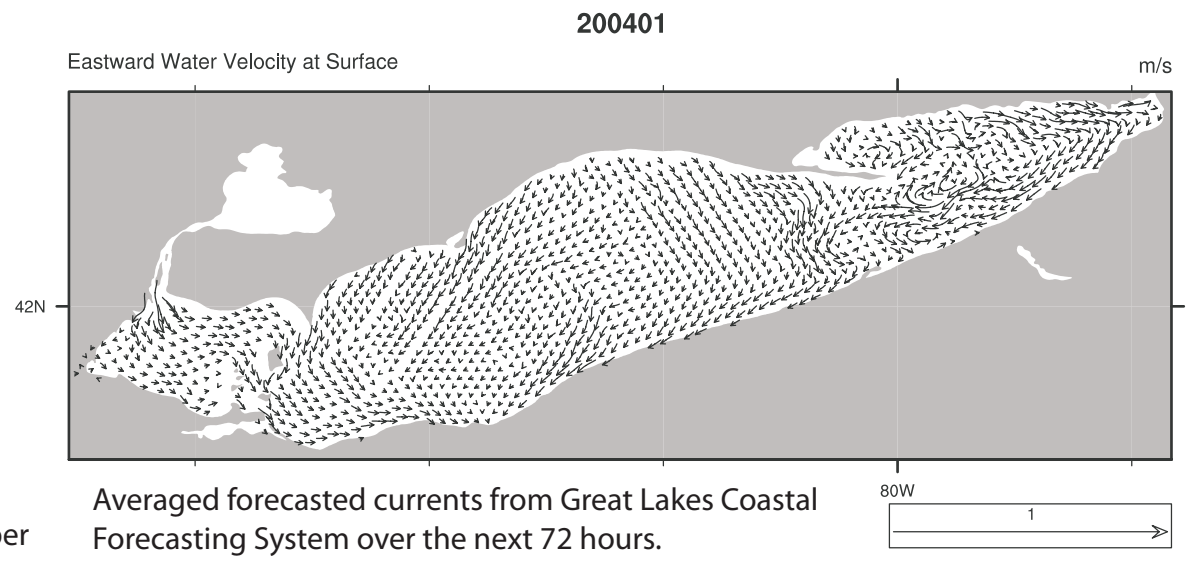
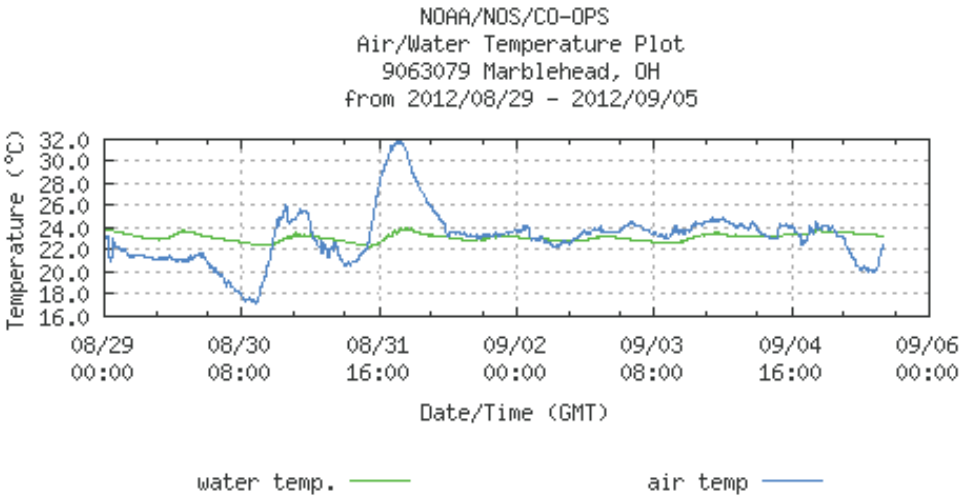


Figure 3. Forecast position of bloom for 8 September 2012 using GLCFS modeled currents to move the bloom from the 3 September 2012 image.

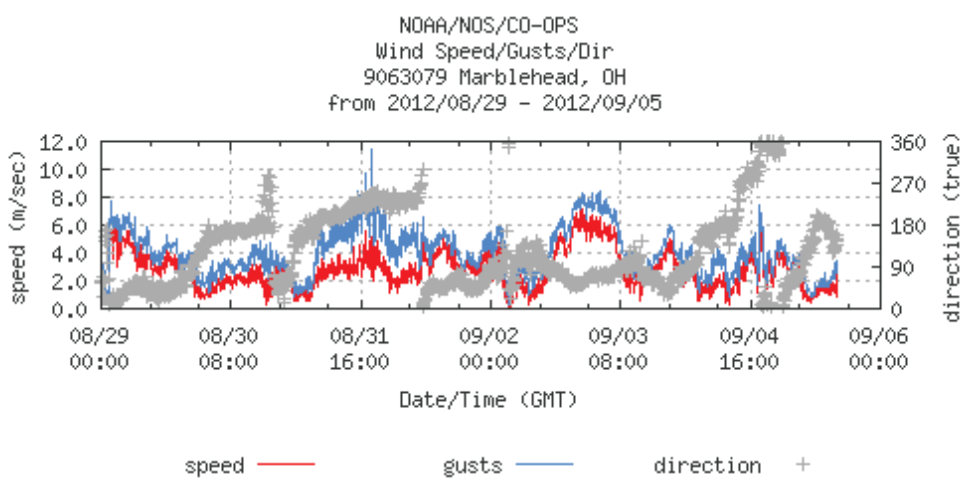


Averaged forecasted currents from Great Lakes Coastal Forecasting System over the next 72 hours.

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php



Air and Water Temperature from Marblehead, OH. From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).



Wind Speed, Gusts and Direction from Marblehead, OH. From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php

Sign up to receive the Lake Erie Experimental HAB Bulletin

Name:

Email: (required field)

Organization/Agency:

State:

Comments:

Subscribe Reset

- Click here to fill out the Lake Erie Harmful Algal Bloom Forecast Bulletin Feedback Survey

NOAA Center of Excellence for Great Lakes and Human Health (CEGLHH)
4840 S. State Rd., Ann Arbor, MI 48108-9719 (734)741-2283
Contact: Outreach Coordinator: sonia.joseph@noaa.gov
NOAA | DOC

Harmful Algal Blooms in Lake Erie - Experimental HAB Bulletin Archive

2012

- 27 August 2012 (.pdf)
- 20 August 2012 (.pdf)
- 16 August 2012 (.pdf)
- 08 August 2012 (.pdf)
- 31 July 2012 (.pdf)
- 26 July 2012 (.pdf)
- 19 July 2012 (.pdf)
- 11 July 2012 (.pdf)
- 03 July 2012 (.pdf)
- 27 June 2012 (.pdf)
- 21 June 2012 (.pdf)
- 12 June 2012 (.pdf)
- 05 June 2012 (.pdf)
- 17 May 2012 (.pdf)

2011

- 01 November 2011 Bulletin (.pdf)
- 27 October 2011 Bulletin (.pdf)
- 20 October 2011 Bulletin (.pdf)
- 13 October 2011 Bulletin (.pdf)
- 06 October 2011 Bulletin (.pdf)
- 29 September 2011 Bulletin (.pdf)
- 22 September 2011 Bulletin (.pdf)
- 15 September 2011 Bulletin (.pdf)
- 08 September 2011 Bulletin (.pdf)

- 01 September 2011 Bulletin (.pdf)
- 25 August 2011 Bulletin (.pdf)
- 18 August 2011 Bulletin (.pdf)
- 11 August 2011 Bulletin (.pdf)
- 04 August 2011 Bulletin (.pdf)
- 28 July 2011 Bulletin (.pdf)
- 22 July 2011 Bulletin (.pdf)
- 14 July 2011 Bulletin (.pdf)
- 07 July 2011 Bulletin (.pdf)
- 30 June 2011 Bulletin (.pdf)
- 23 June 2011 Bulletin (.pdf)
- 16 June 2011 Bulletin (.pdf)
- 09 June 2011 Bulletin (.pdf)

2010

- 14 October 2010 Bulletin (.pdf)
- 07 October 2010 Bulletin (.pdf)
- 30 September 2010 Bulletin (.pdf)
- 23 September 2010 Bulletin (.pdf)
- 17 September 2010 Bulletin (.pdf)
- 13 September 2010 Bulletin (.pdf)
- 02 September 2010 Bulletin (.pdf)
- 26 August 2010 Bulletin (.pdf)
- 19 August 2010 Bulletin (.pdf)
- 12 August 2010 Bulletin (.pdf)
- 05 August 2010 Bulletin (.pdf)
- 29 July 2010 Bulletin (.pdf)
- 22 July 2010 Bulletin (.pdf)
- 15 July 2010 Bulletin (.pdf)
- 08 July 2010 Bulletin (.pdf)
- 01 July 2010 Bulletin (.pdf)
- 25 June 2010 Bulletin (.pdf)
- 17 June 2010 Bulletin (.pdf)

10 June 2010 Bulletin (.pdf)

- 03 June 2010 Bulletin (.pdf)
- 27 May 2010 Bulletin (.pdf)

2009

- 15 October 2009 Bulletin (.pdf)
- 08 October 2009 Bulletin (.pdf)
- 01 October 2009 Bulletin (.pdf)
- 24 September 2009 Bulletin (.pdf)
- 17 September 2009 Bulletin (.pdf)
- 10 September 2009 Bulletin (.pdf)
- 3 September 2009 Bulletin (.pdf)
- 27 August 2009 Bulletin (.pdf)
- 20 August 2009 Bulletin (.pdf)
- 13 August 2009 Bulletin (.pdf)
- 30 July 2009 Bulletin (.pdf)

For more information, please contact:

(hab-glakes@noaa.gov)

NOAA Center of Excellence for Great Lakes and Human Health (CEGLHH)
4840 S. State Rd., Ann Arbor, MI 48108-9719 (734)741-2283
Contact: Outreach Coordinator: sonia.joseph@noaa.gov
NOAA | DOC

Experimental Lake Erie Harmful Algal Bloom Bulletin

National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

27 August 2012; Bulletin 13

In Maumee Bay, U.Toledo reports that *Anabaena* has replaced *Microcystis*. The imagery shows the bloom has weakened in the lake and slightly intensified in Maumee Bay since last week's bulletin. The model forecasts for a S SE movement.

- Dupuy, Wynne, Briggs

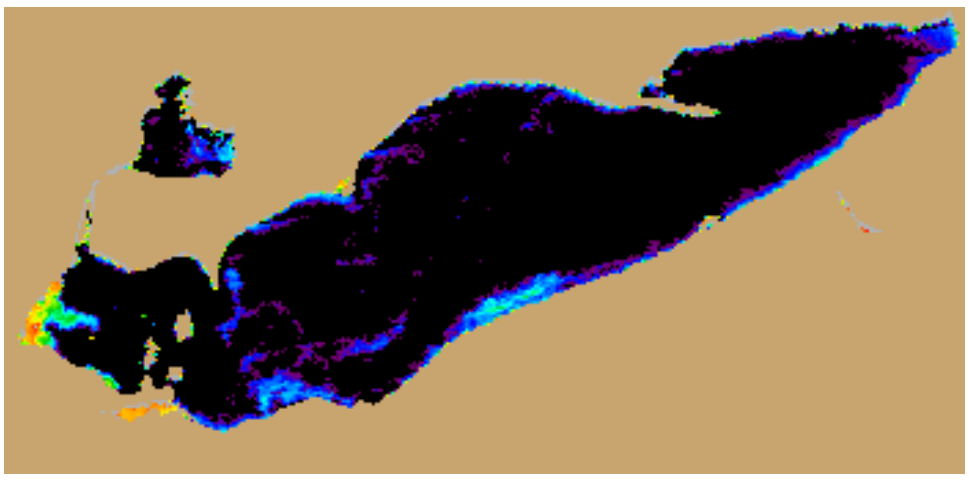
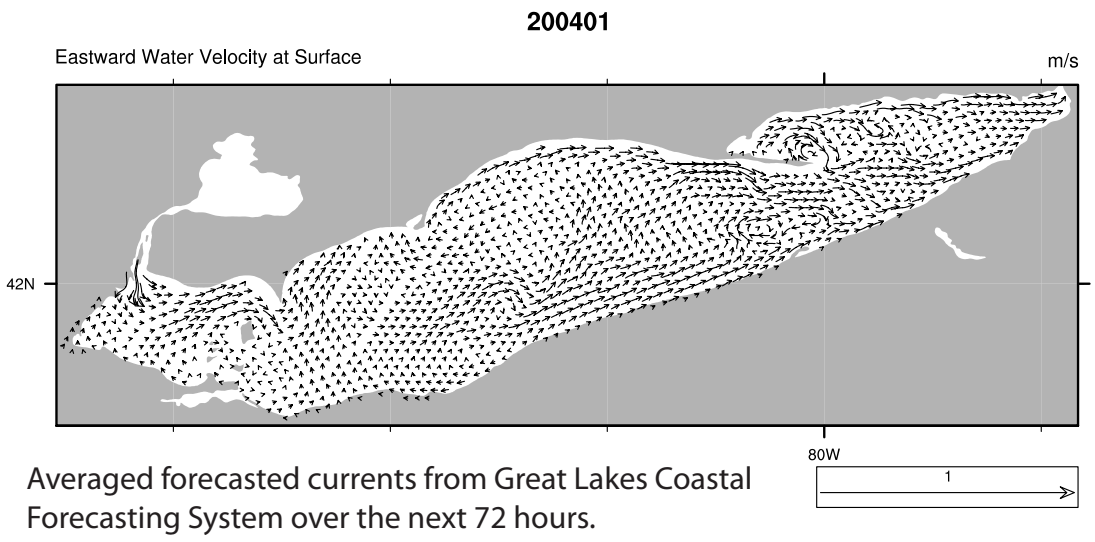


Figure 1. MODIS Cyanobacterial Index from 24 August 2012.

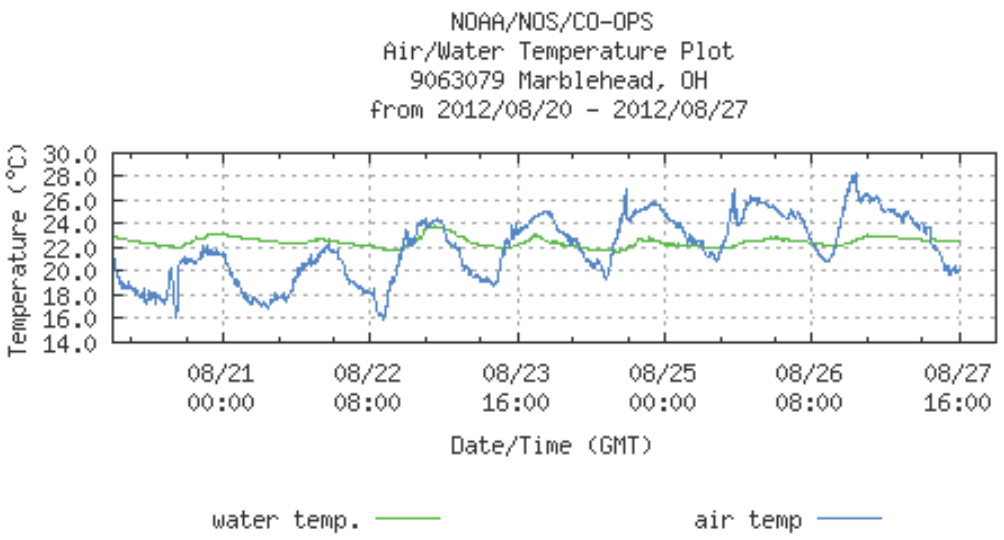
Figure 2. Nowcast position of bloom for 27 August 2012 using GLCFS modeled currents to move the bloom from the 24 August 2012 image.

Figure 3. Forecast position of bloom for 30 August 2012 using GLCFS modeled currents to move the bloom from the 24 August 2012 image.

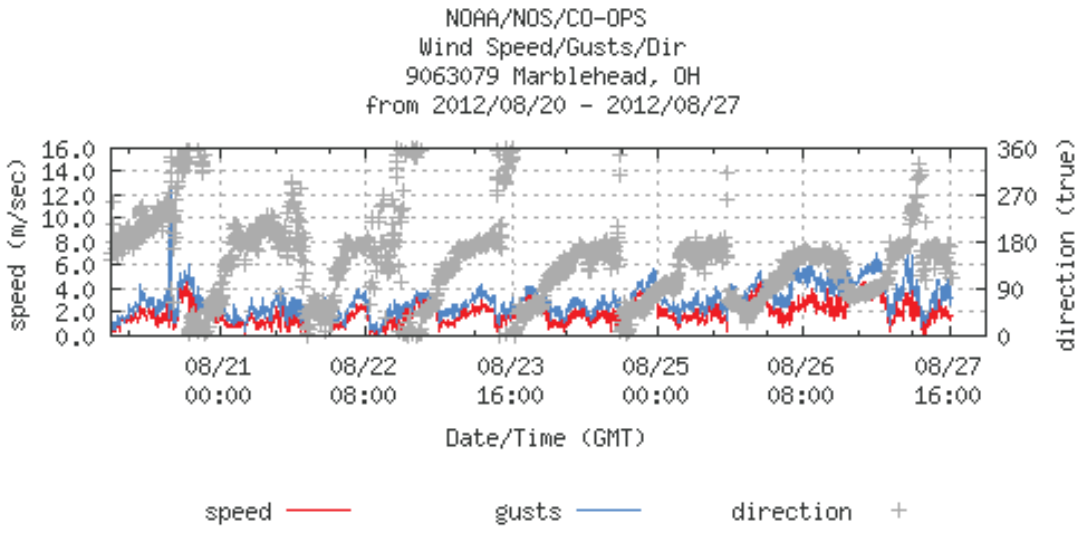


Averaged forecasted currents from Great Lakes Coastal Forecasting System over the next 72 hours.

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php



Air and Water Temperature from Marblehead, OH. From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).



Wind Speed, Gusts and Direction from Marblehead, OH. From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php

Experimental Lake Erie Harmful Algal Bloom Bulletin

National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

20 August 2012; Bulletin 12

The Ohio EPA confirmed the presence of a *Microcystis* bloom in western Lake Erie. The city of Monroe, Michigan reported phycocyanin concentrations of 979 cells/mL last week. The imagery shows slight intesification of the bloom since last week's bulletin. The model forecasts for a slight S SW movement.

- Dupuy, Wynne, Briggs

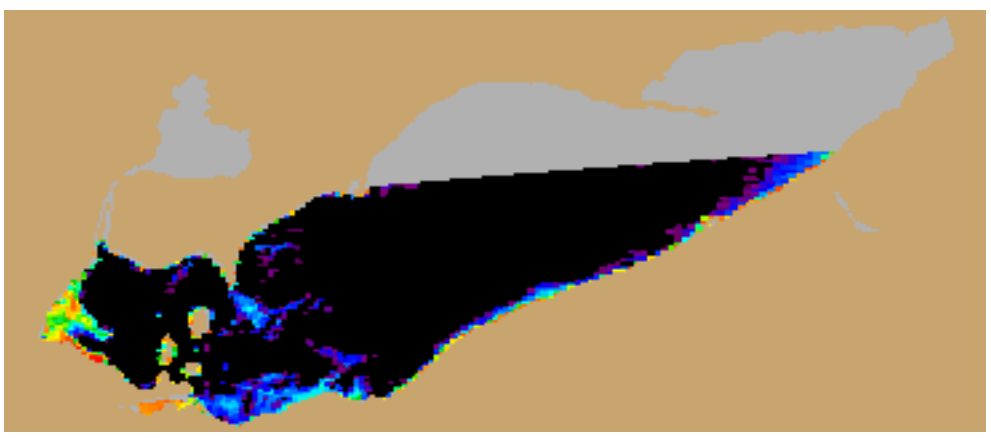
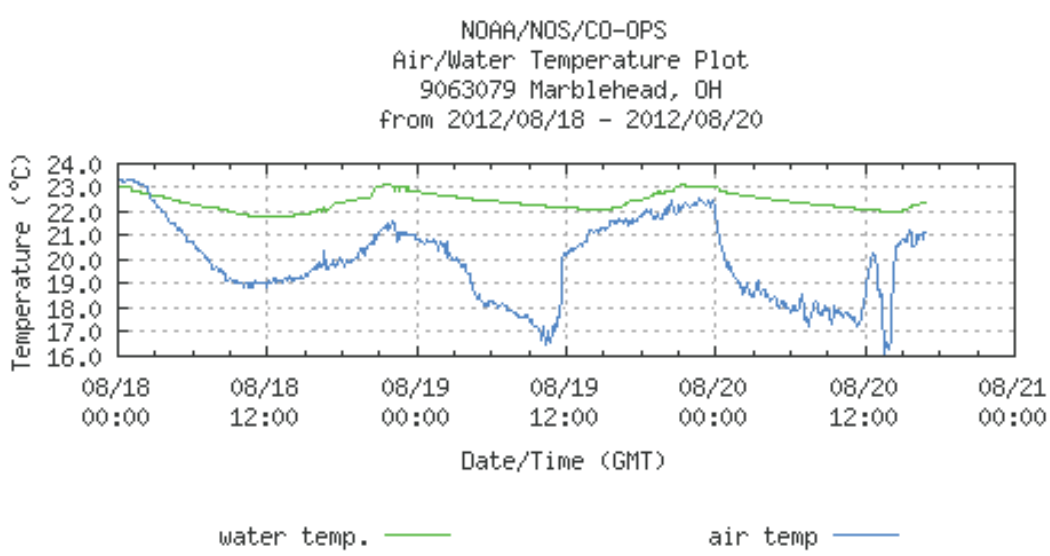


Figure 1. MODIS Cyanobacterial Index from 18 August 2012.

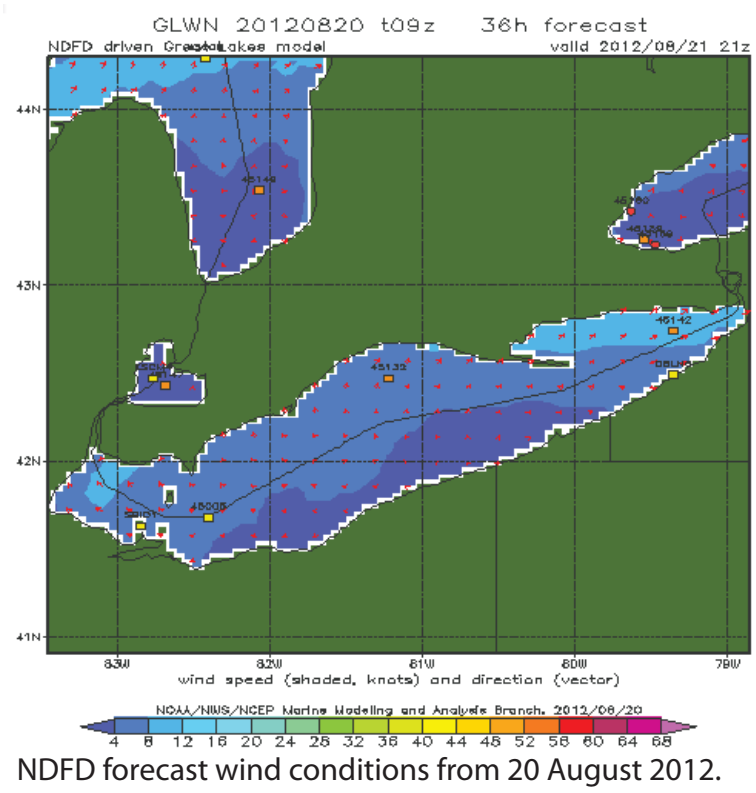
Figure 2. Nowcast postion of bloom for 20 August 2012 using GLCFS modeled currents to move the bloom from the 18 August 2012 image.

Figure 3. Forecast postion of bloom for 23 August 2012 using GLCFS modeled currents to move the bloom from the 18 August 2012 imgage.

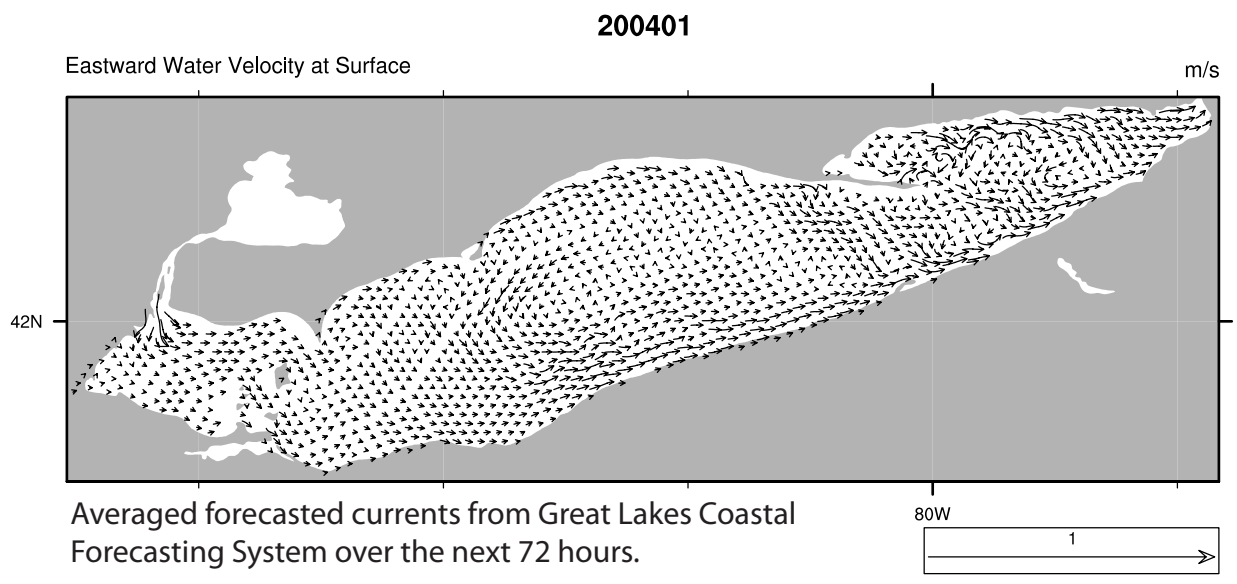


Air and Water Temperature from Marblehead, OH. From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php



NDFD forecast wind conditions from 20 August 2012.
From: NOAA/National Centers for Environmental Prediction (NCEP)



Averaged forecasted currents from Great Lakes Coastal Forecasting System over the next 72 hours.

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php

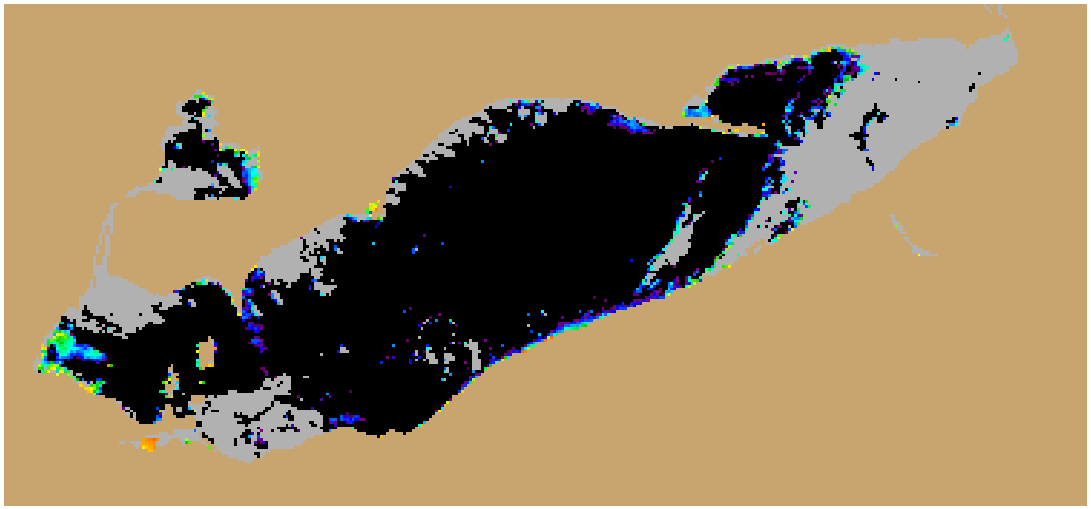
Experimental Lake Erie Harmful Algal Bloom Bulletin

National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

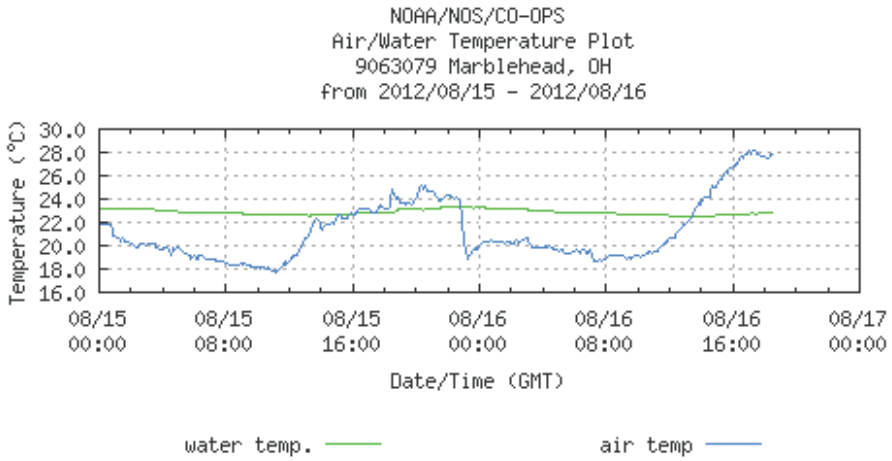
16 August 2012; Bulletin 11

There are no confirmed blooms of cyanobacteria at this time. The water temperature is warming and we are entering the time of year when cyanobacteria blooms generally begin. The features along the western (Michigan) shorline, north of Maumee Bay, seems to have intensified over the past week. The mild intensity area east and north of Sandusky Bay appears to have broken up a bit and transported north. The feature is unconfirmed as cayanobacteria at this time, but looks suspicious.

- Dupuy, Wynne, Briggs

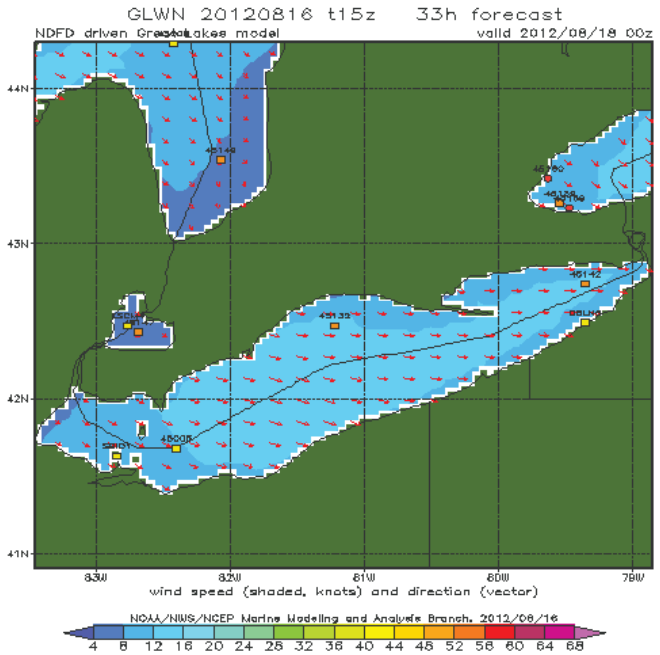


MODIS Cyanobacterial Index from 15 August 2012.



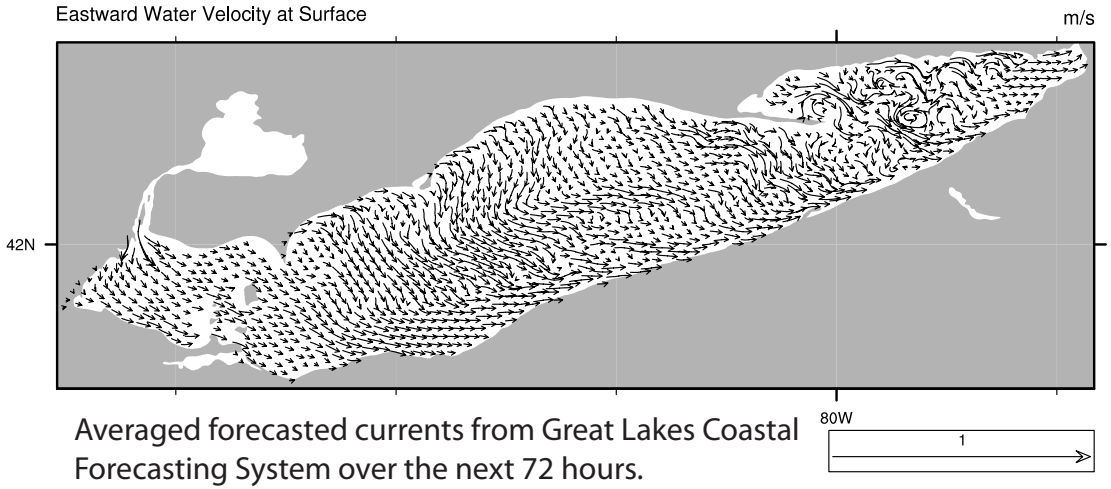
Air and Water Temperature from Marblehead, OH. From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php



NDFD forecast wind conditions from 16 August 2012.
From: NOAA/National Centers for Environmental Prediction (NCEP)

200401



Averaged forecasted currents from Great Lakes Coastal Forecasting System over the next 72 hours.

Experimental Lake Erie Harmful Algal Bloom Bulletin

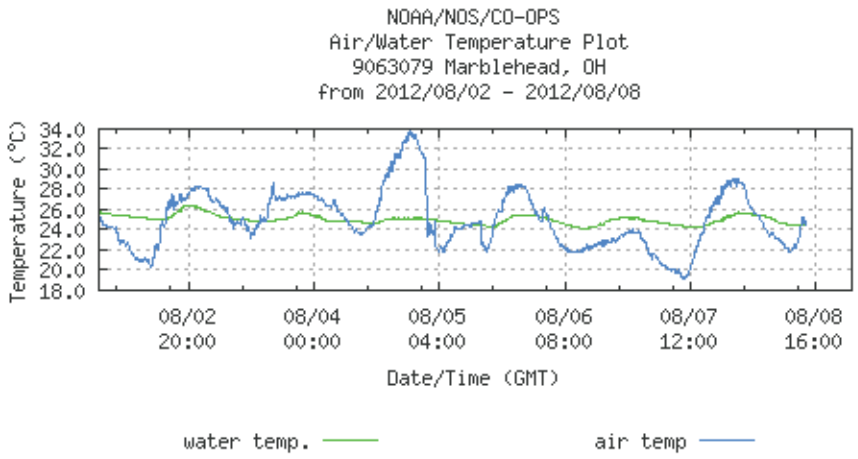
National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

8 August 2012; Bulletin 10

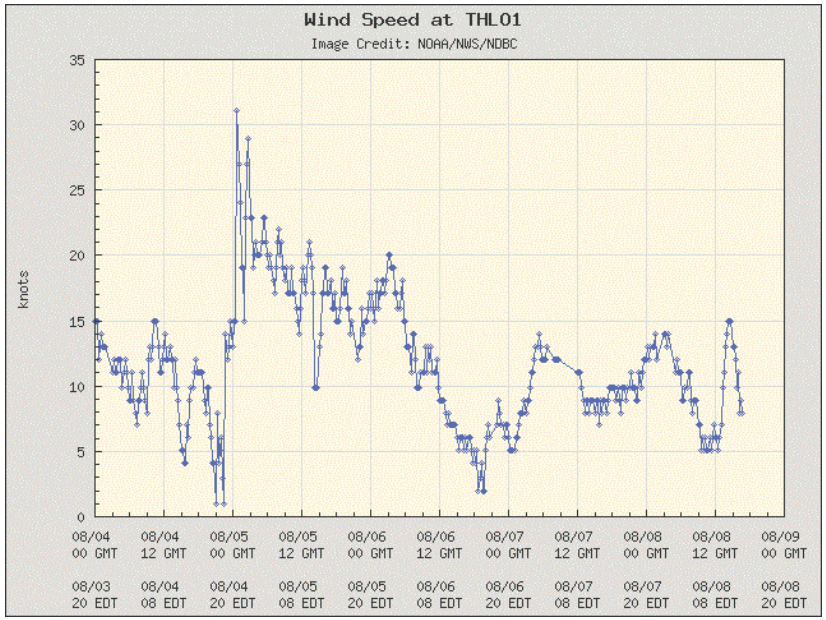
There are no confirmed blooms of cyanobacteria at this time. The water temperature is warming and we are entering the time of year when cyanobacteria blooms generally begin. The features along the western (Michigan) shorline north from Maumee Bay indicate potential cyanobacteria blooms and should be monitored. The mild intensity area east and north of Sandusky Bay is a likely continuation of the feature tracked over the last few weeks. The feature is unconfirmed as cayanobacteria at this time, but looks suspicious.

- Dupuy, Wynne, Briggs

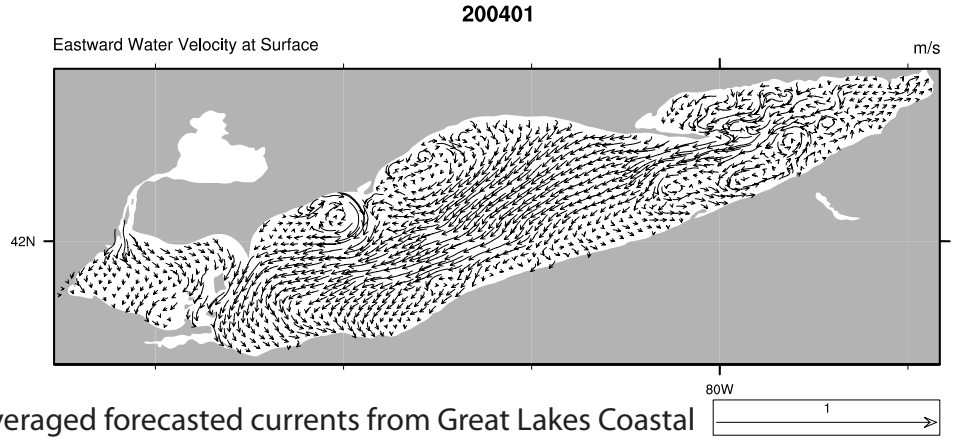
MODIS Cyanobacterial Index from 6 August 2012.



Air and Water Temperature from Marblehead, OH. From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).



NDBC forecast wind conditions from 8 August 2012. Observed from Toledo Light Station (THL01)
From: NOAA/National Data Buoy Center (NDBC)



Averaged forecasted currents from Great Lakes Coastal Forecasting System over the next 72 hours.

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php

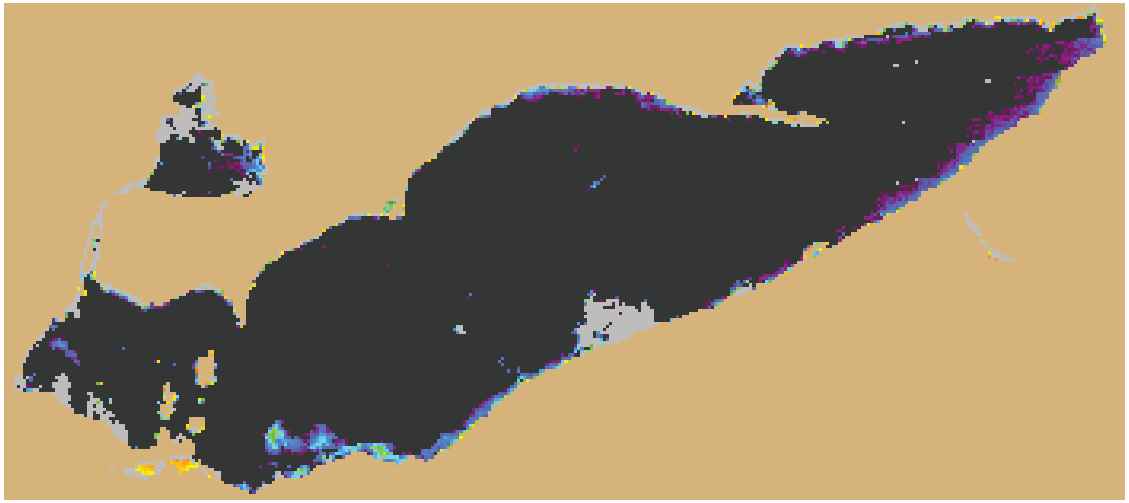
Experimental Lake Erie Harmful Algal Bloom Bulletin

National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

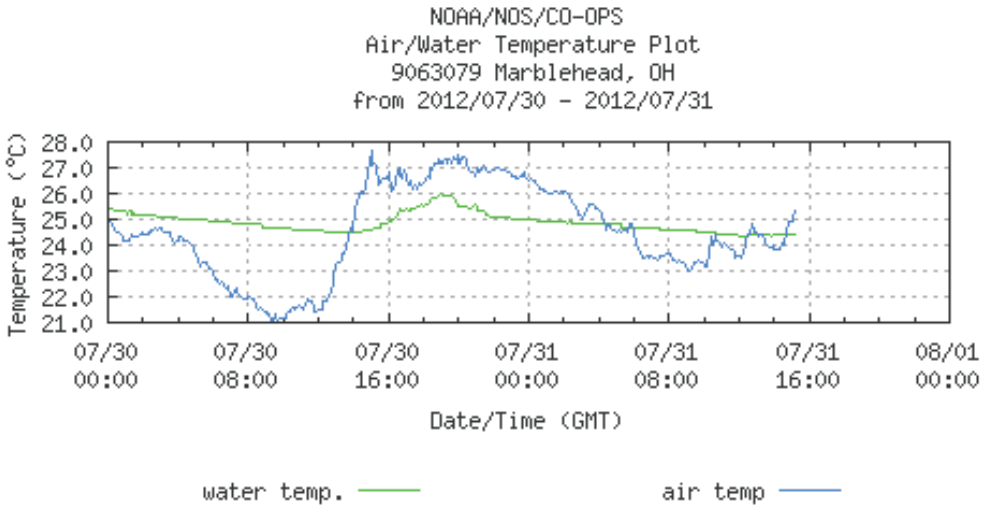
31 July 2012; Bulletin 9

There are no confirmed blooms of cyanobacteria at this time. The water temperature is warming and we are entering the time of year when cyanobacteria blooms generally begin. There is a small feature north of Maumee Bay, which is unconfirmed as cyanobacteria, but looks suspicious. There is a medium sized feature off the southern shore of Lake Erie, NNW of Lorain, OH which is unconfimed as cyanobacteria, but looks suspicious.

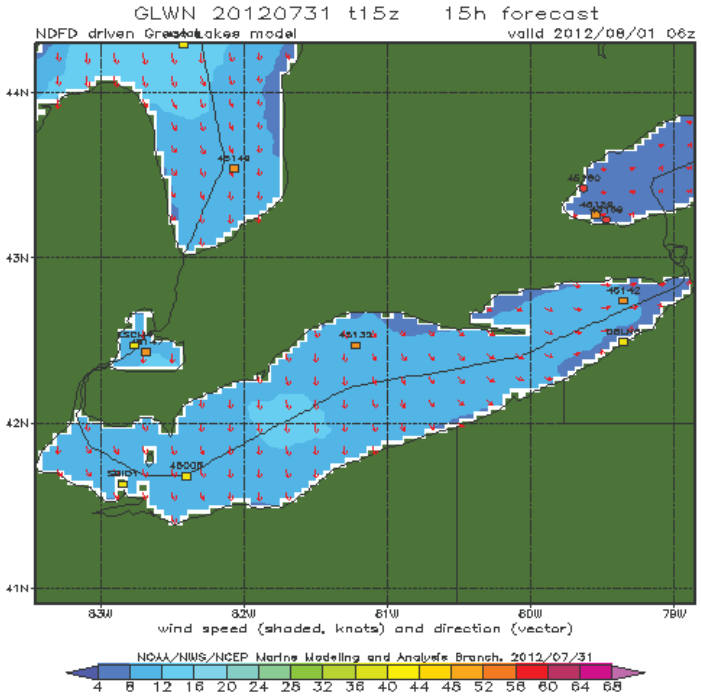
- Dupuy, Wynne, Briggs



MODIS Cyanobacterial Index from 30 July 2012.

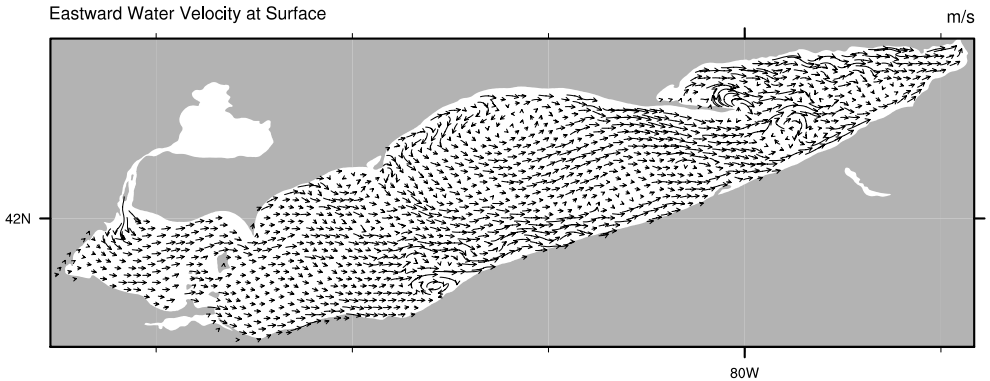


Air and Water Temperature from Marblehead, OH. From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).



NDFD forecast wind conditions from 31 July 2012.
From: NOAA/National Centers for Environmental Prediction (NCEP)

200401



Averaged forecasted currents from Great Lakes Coastal Forecasting System over the next 72 hours.

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php

Experimental Lake Erie Harmful Algal Bloom Bulletin

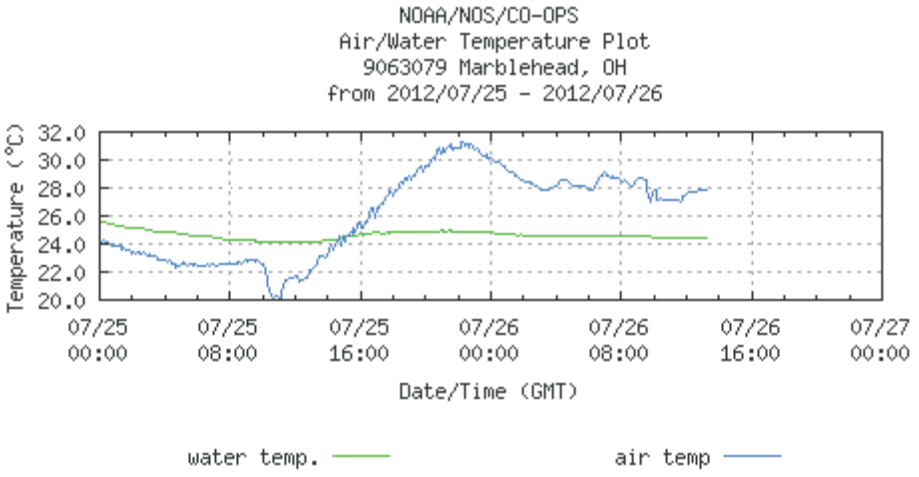
National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

26 July 2012; Bulletin 8

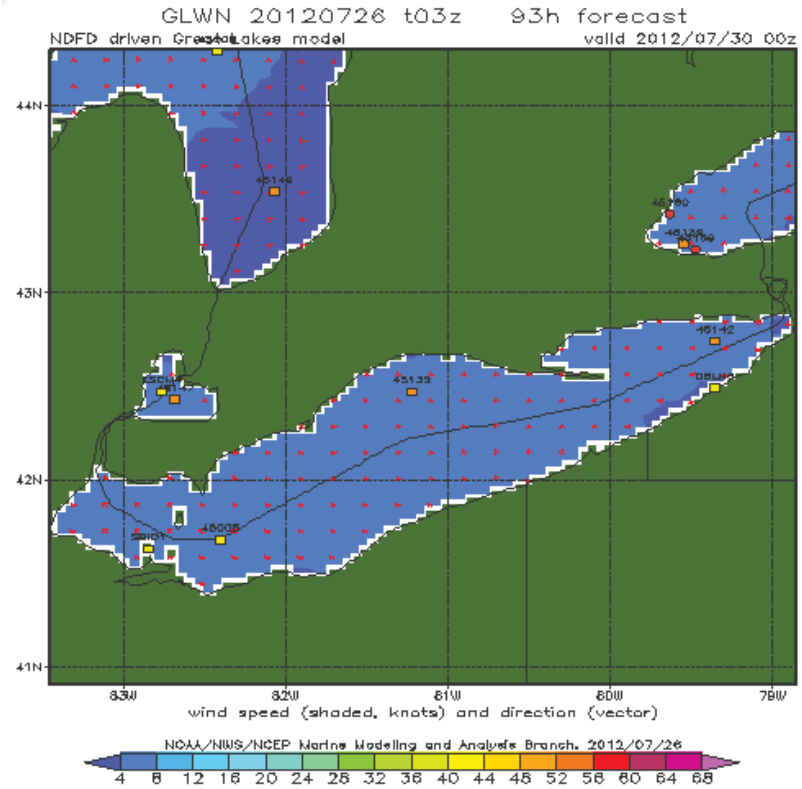
According to the Ohio EPA there have been reports of diverse pyhtoplankton assemblage in the western basin causing taste and odor problems. The four westermost public water systems have tested for Microcystins and so far none has been detected.

- Dupuy, Wynne, Briggs

MODIS Cyanobacterial Index from 23 July 2012.

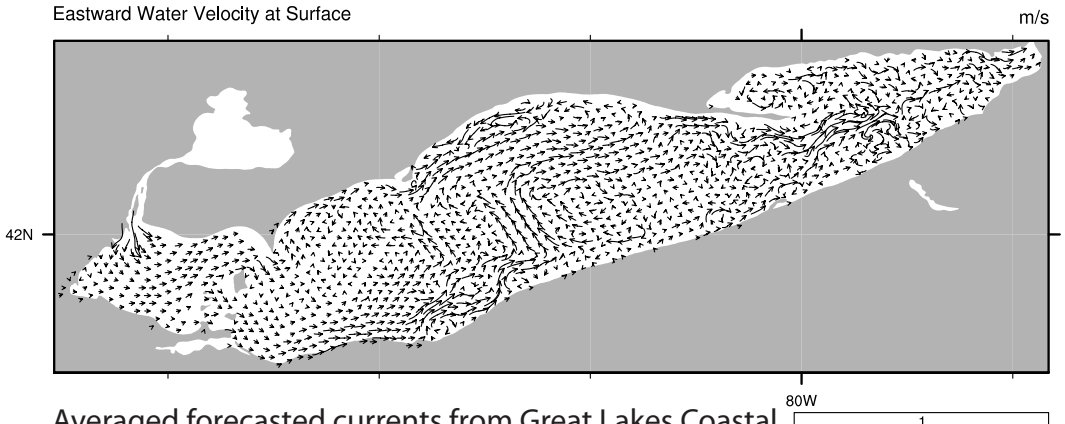


Air and Water Temperature from Marblehead, OH. From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).



NDFD forecast wind conditions from 26 July 2012.
From: NOAA/National Centers for Environmental Prediction (NCEP)

200401



Averaged forecasted currents from Great Lakes Coastal Forecasting System over the next 72 hours.

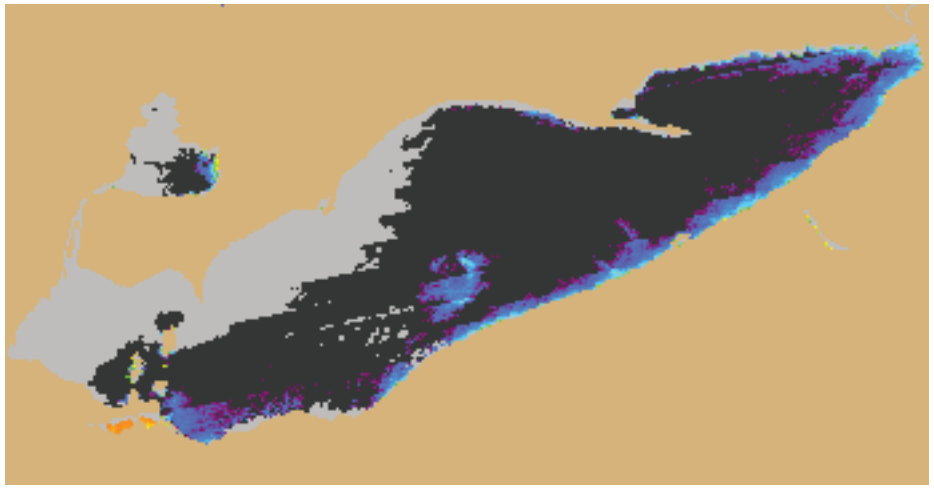
To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php

Experimental Lake Erie Harmful Algal Bloom Bulletin

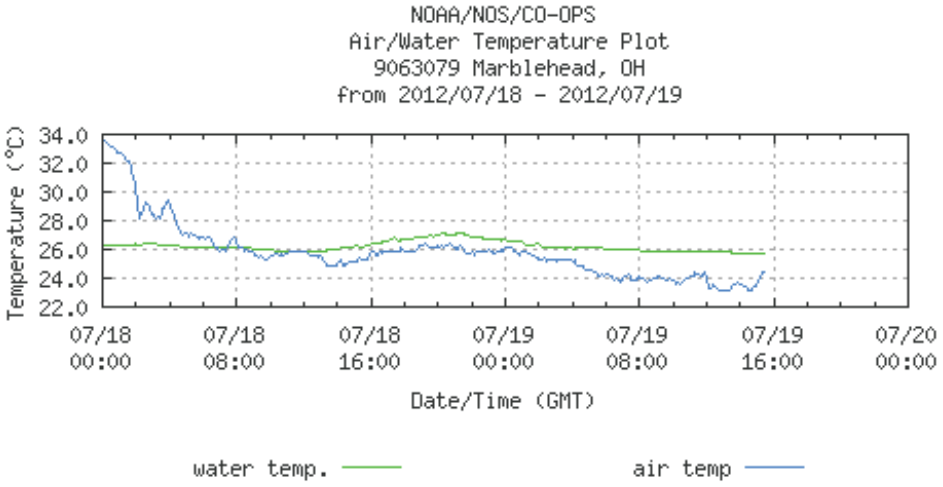
National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

19 July 2012; Bulletin 7

The feature in the central portion of the lake from last week's bulletin seems to have dissiapted. It should be noted that there were lots of marginal images with glint in the western portion of the lake.
- Tim Wynne

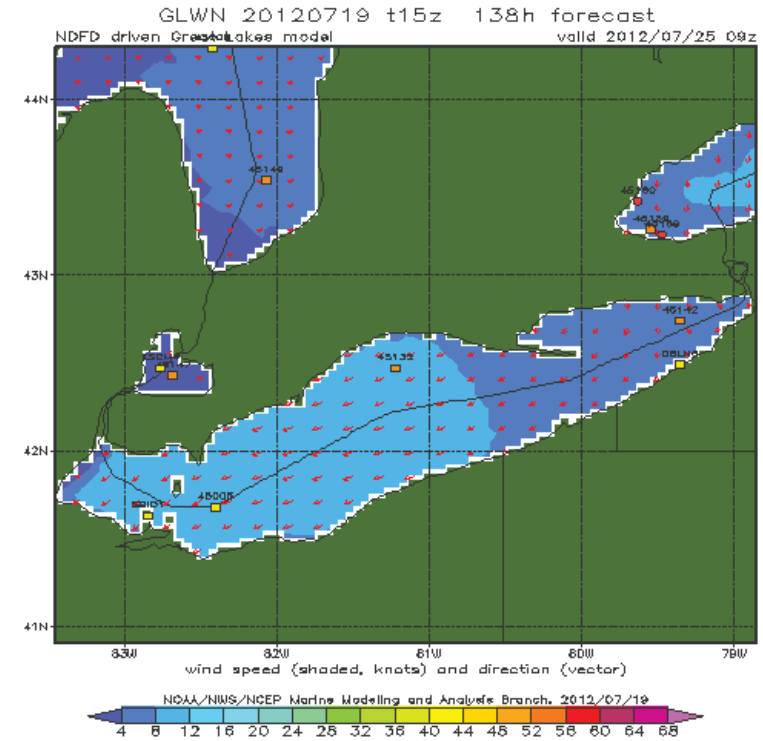


MODIS Cyanobacterial Index from 16 July 2012.



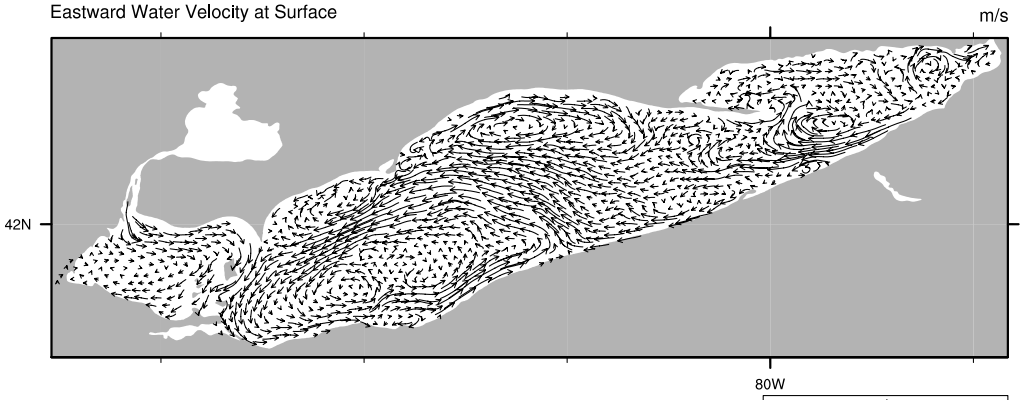
Air and Water Temperature from Marblehead, OH. From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php



NDFD forecast wind conditions from 19 July 2012.
From: NOAA/National Centers for Environmental Prediction (NCEP)

200401



Averaged forecasted currents from Great Lakes Coastal Forecasting System over the next 72 hours.

Experimental Lake Erie Harmful Algal Bloom Bulletin

National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

11 July 2012; Bulletin 6

Imagery and field observances from earlier this week indicate high concentrations of Anabaena and some Miccrocystis in the central basin. Models indicate slight northwest movement over the next three days.

- Dupuy, Briggs, ynne

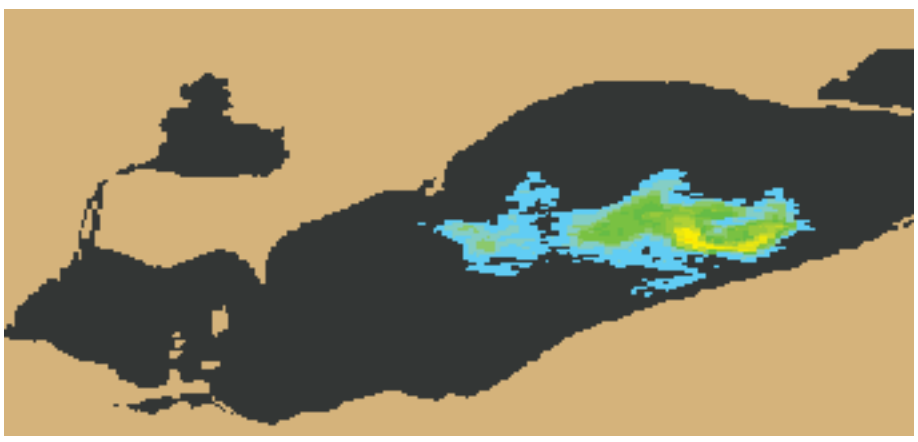


Figure 1. MODIS Cyanobacterial Index from 10 July 2012.

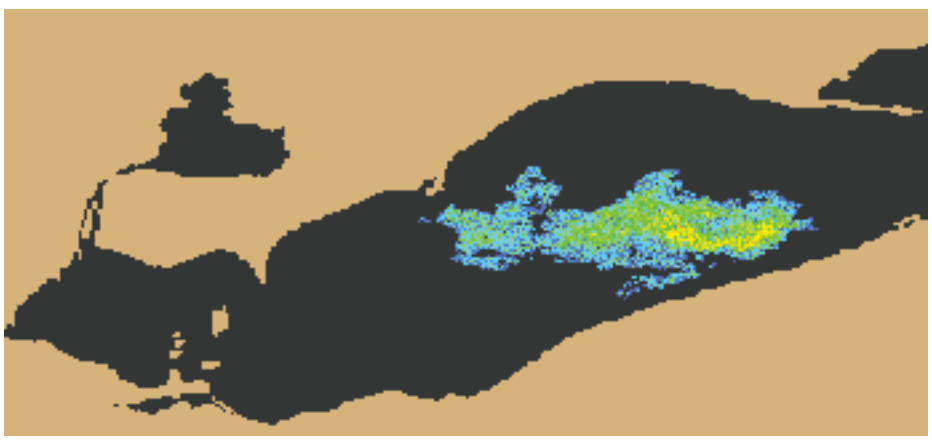


Figure 2. Nowcast postion of bloom for 11 July 2012 using GLCFS modeled currents to move the bloom from the 10 July 2012 imgage.

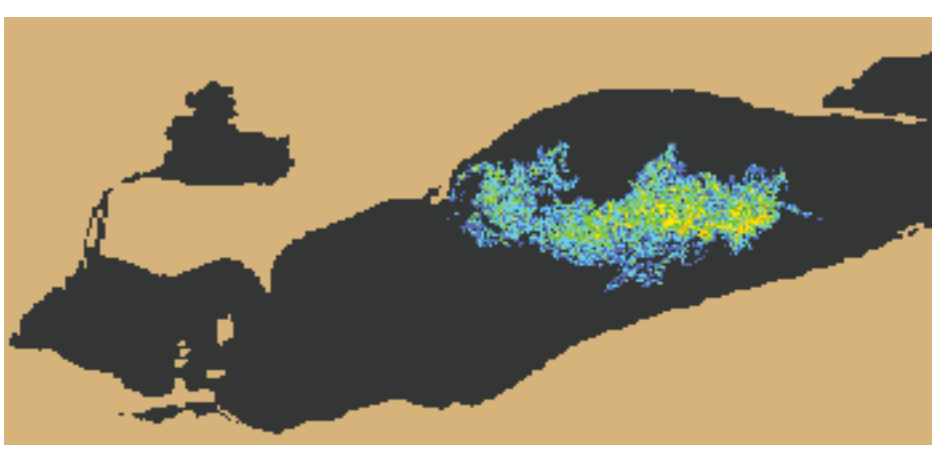
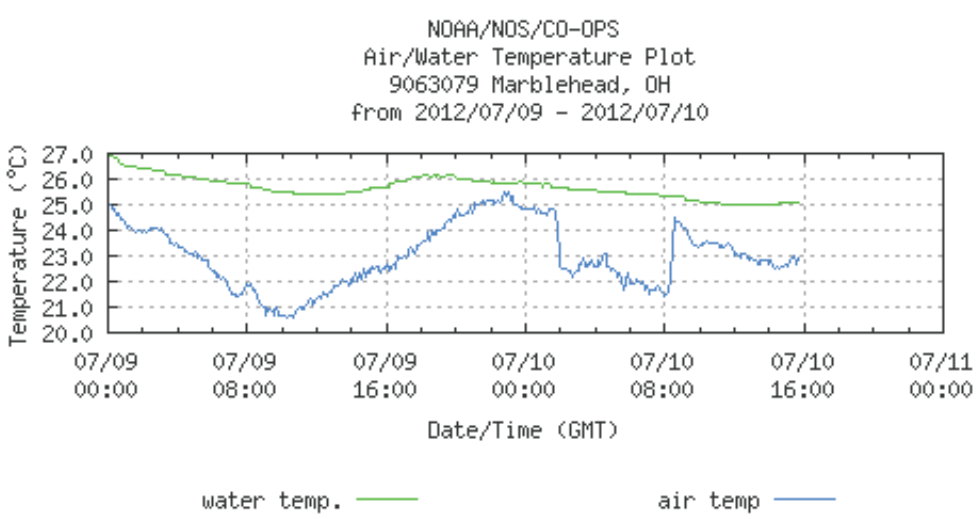
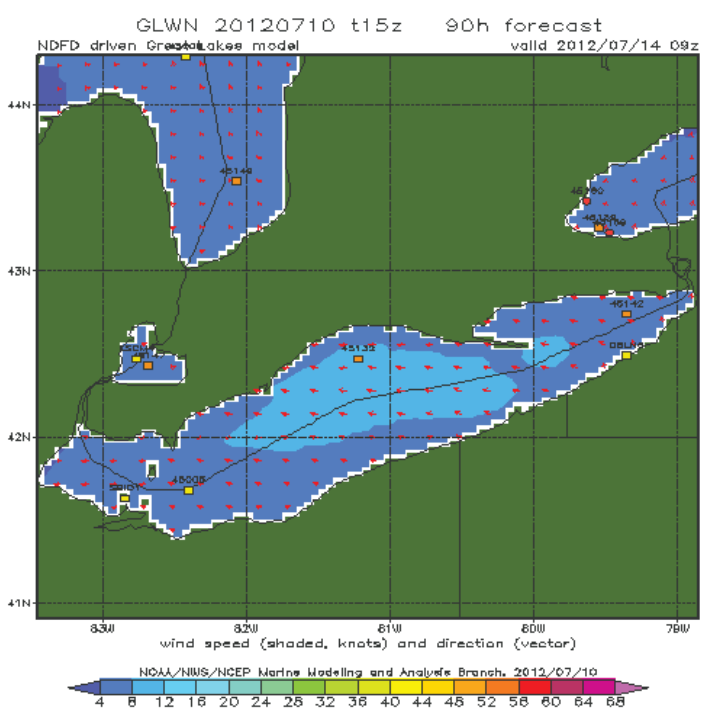


Figure 3. Forecast postiion of bloom for 14 July 2012 using GLCFS modeled currents to move the bloom from the 10 July 2012 imgage.

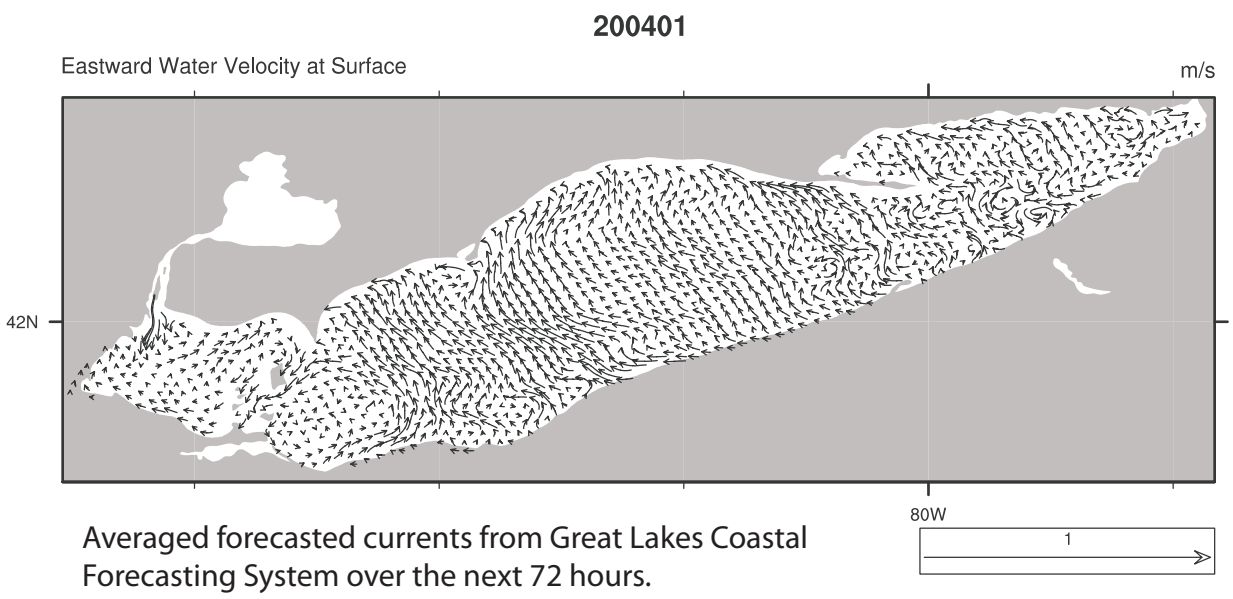


Air and Water Temperature from Marblehead, OH. From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php



NDFD forecast wind conditions from 10 July 2012.
From: NOAA/National Centers for Environmental Prediction (NCEP)



Averaged forecasted currents from Great Lakes Coastal Forecasting System over the next 72 hours.

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php

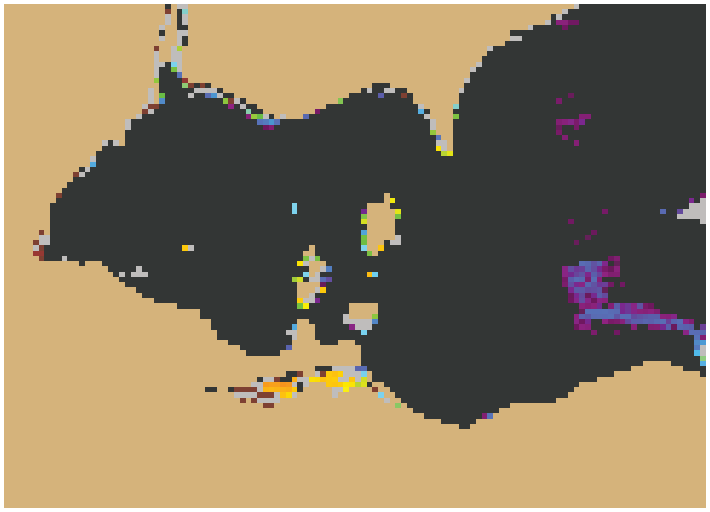
Experimental Lake Erie Harmful Algal Bloom Bulletin

National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

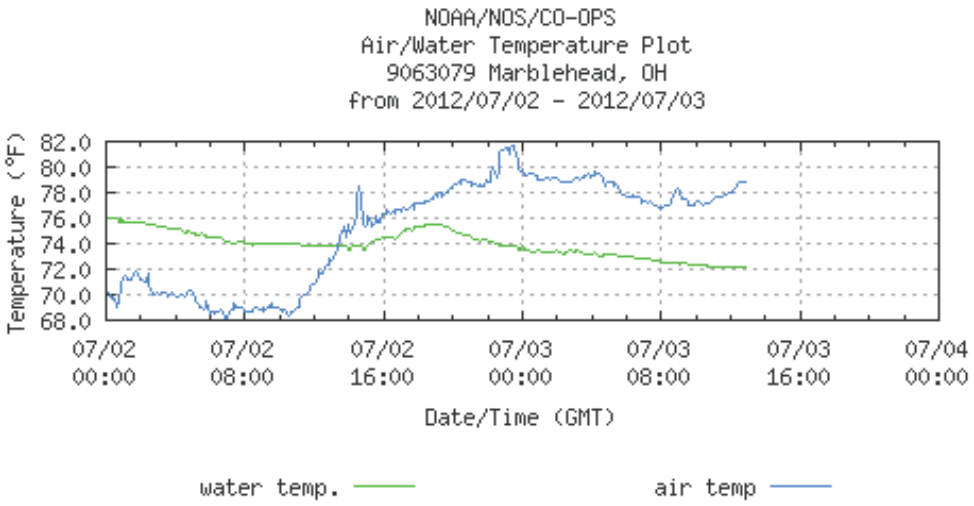
3July 2012; Bulletin 5

There is no reported Harmful Algal Bloom at this time. It is unlikely that one will develop within the next week. The particle tracking forecast will return when there is a feature to forecast in the imagery. Erie County has reported high concentrations of cyanobacteria, mostly Planktothrix in Sandusky Bay.

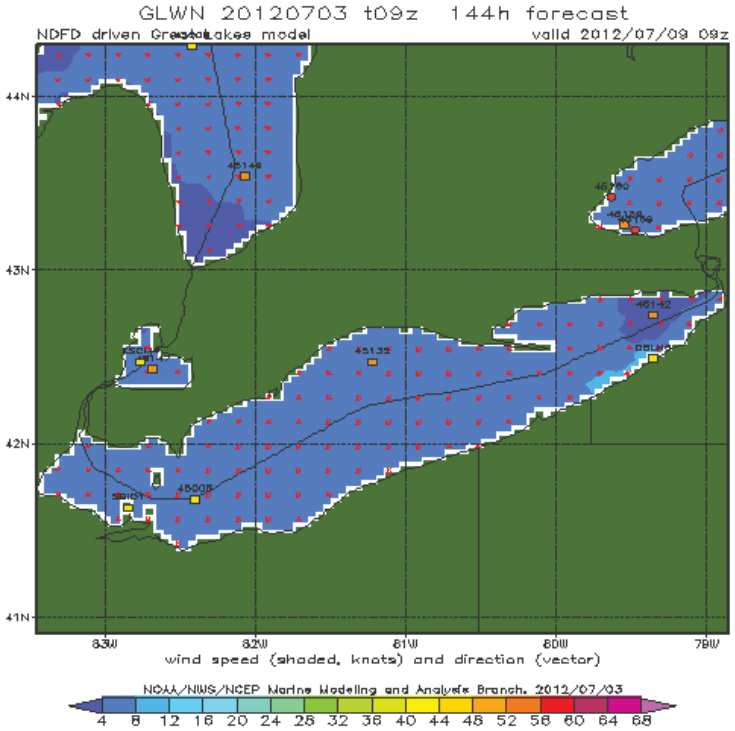
- Tim Wynne



MODIS Cyanobacterial Index from 28 June 2012.



Air and Water Temperature from Marblehead, OH. From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).



NDFD forecast wind conditions from 3 July 2012.

From: NOAA/National Centers for Environmental Prediction (NCEP)

200401

Averaged forecasted currents from Great Lakes Coastal Forecasting System over the next 72 hours.

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php

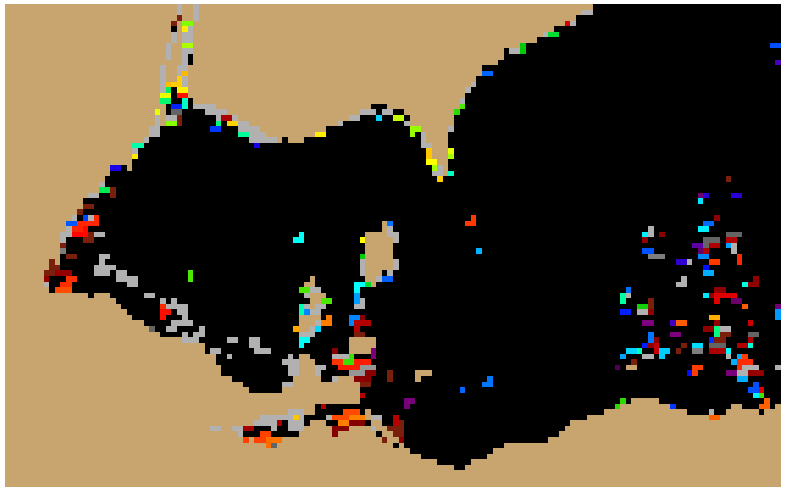
Experimental Lake Erie Harmful Algal Bloom Bulletin

National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

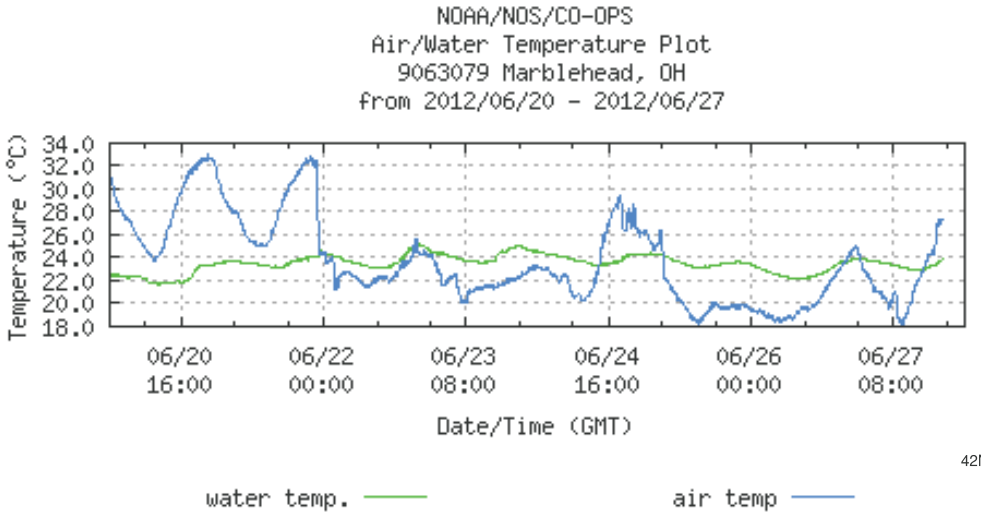
27 June 2012; Bulletin 4

There is no reported Harmful Algal Bloom at this time. It is unlikely that one will develop within the next week. The particle tracking forecast will return when there is a feature to forecast in the imagery. Erie County has reported high concentrations of cyanobacteria, mostly Planktothrix in Sandusky Bay.

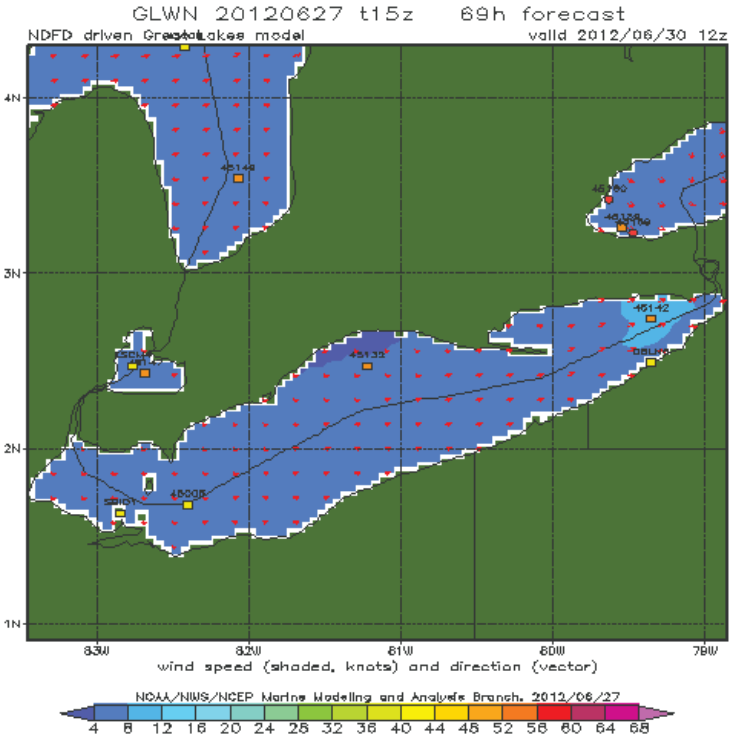
- Tim Wynne



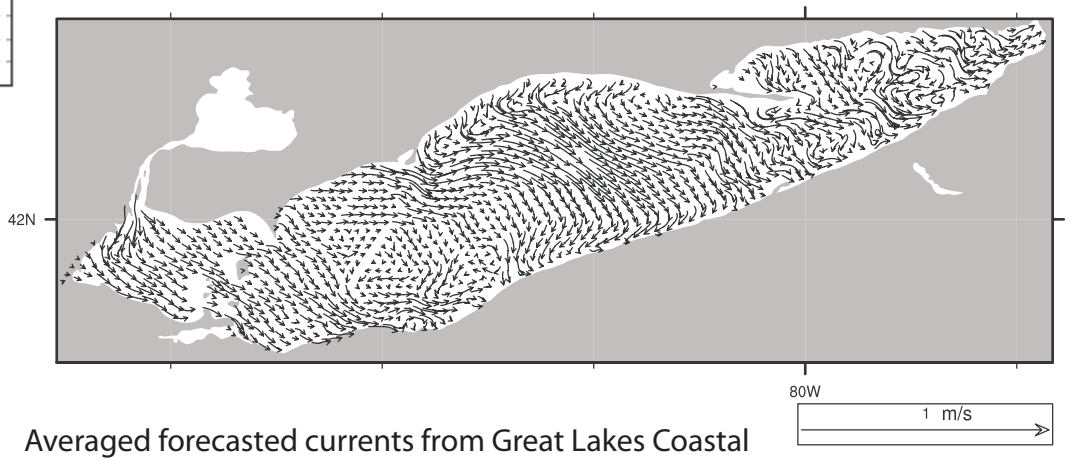
MODIS Cyanobacterial Index from 25 June 2012.



Air and Water Temperature from Marblehead, OH. From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).



NDFD forecast wind conditions from 27 June 2012.
From: NOAA/National Centers for Environmental Prediction (NCEP)



Averaged forecasted currents from Great Lakes Coastal Forecasting System over the next 72 hours.

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php

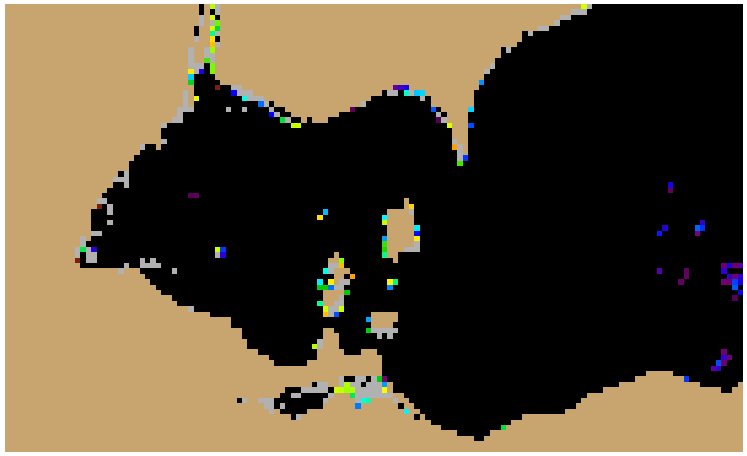
Experimental Lake Erie Harmful Algal Bloom Bulletin

National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

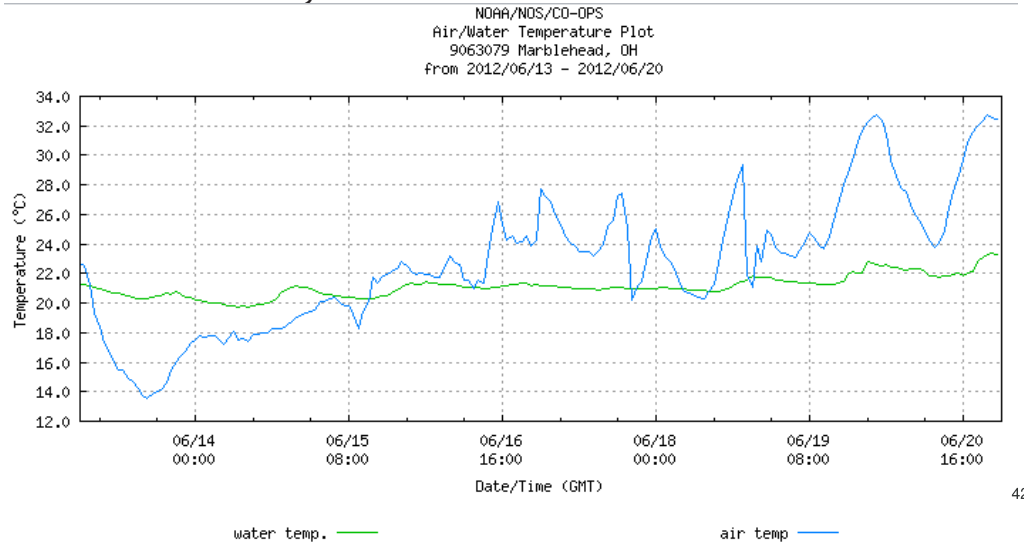
21 June 2012; Bulletin 3

There is no reported Harmful Algal Bloom at this time. It is unlikely that one will develop within the next week. The particle tracking forecast will return when there is a feature to forecast in the imagery. Erie County has reported high concentrations of cyanobacteria, mostly Planktothrix in Sandusky Bay.

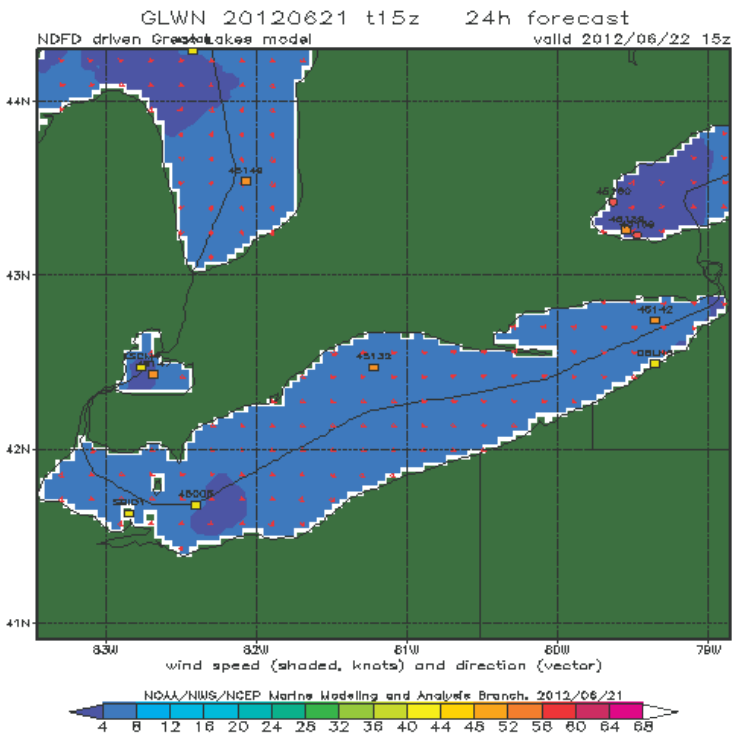
- Tim Wynne



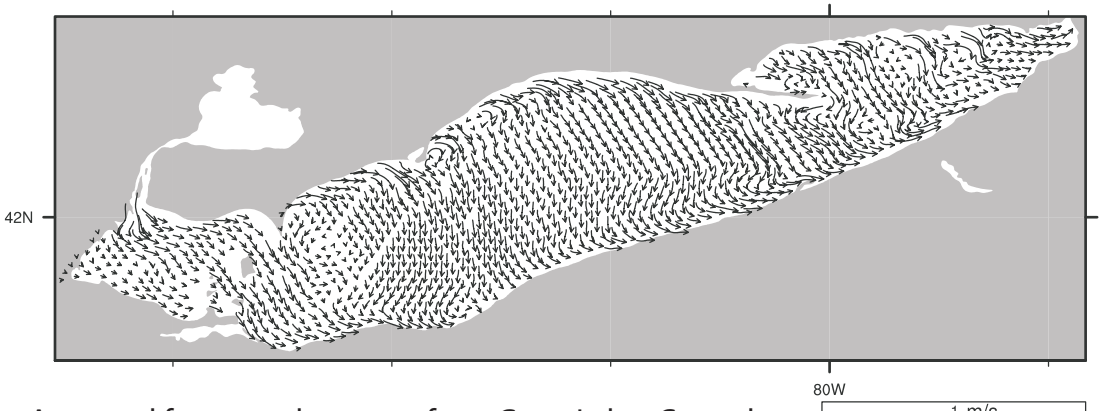
MODIS Cyanobacterial Index from 19 June 2012.



Air and Water Temperature from Marblehead, OH. From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).



NDFD forecast wind conditions from 22 June 2012.
From: NOAA/National Centers for Environmental Prediction (NCEP)



Averaged forecasted currents from Great Lakes Coastal Forecasting System over the next 72 hours.

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php

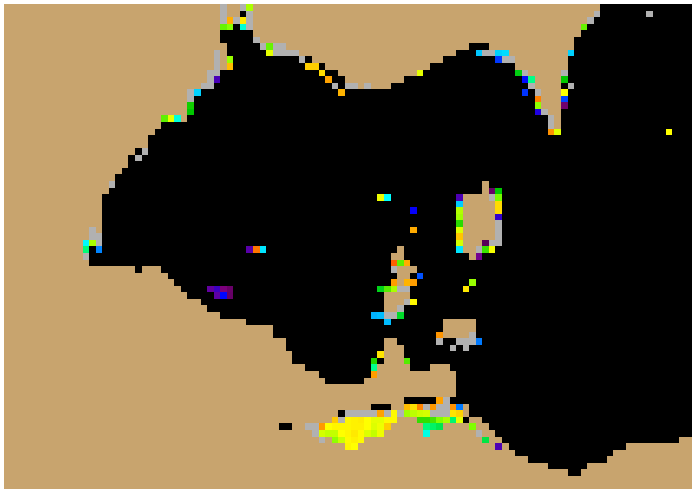
Experimental Lake Erie Harmful Algal Bloom Bulletin

National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

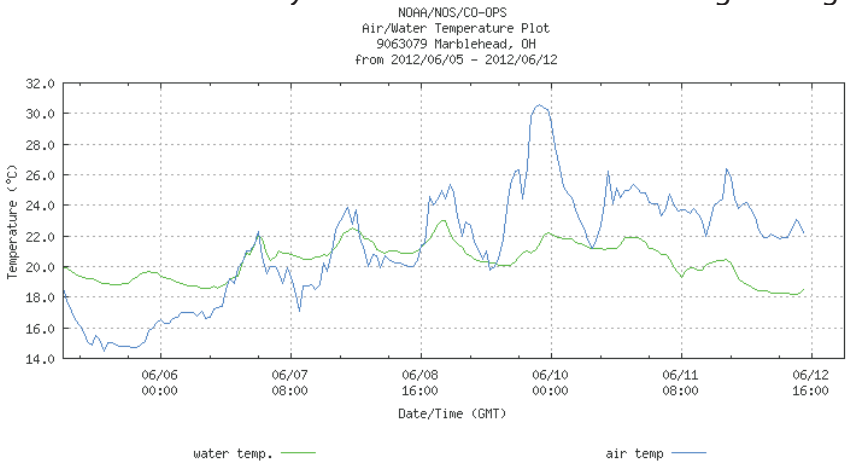
12 June 2012; Bulletin 2

There is no reported Harmful Algal Bloom at this time. It is unlikely that one will develop within the next week. The particle tracking forecast will return when there is a feature to forecast in the imagery. Erie County has reported high concentrations of cyanobacteria, mostly Planktothrix in Sandusky Bay.

- Tim Wynne

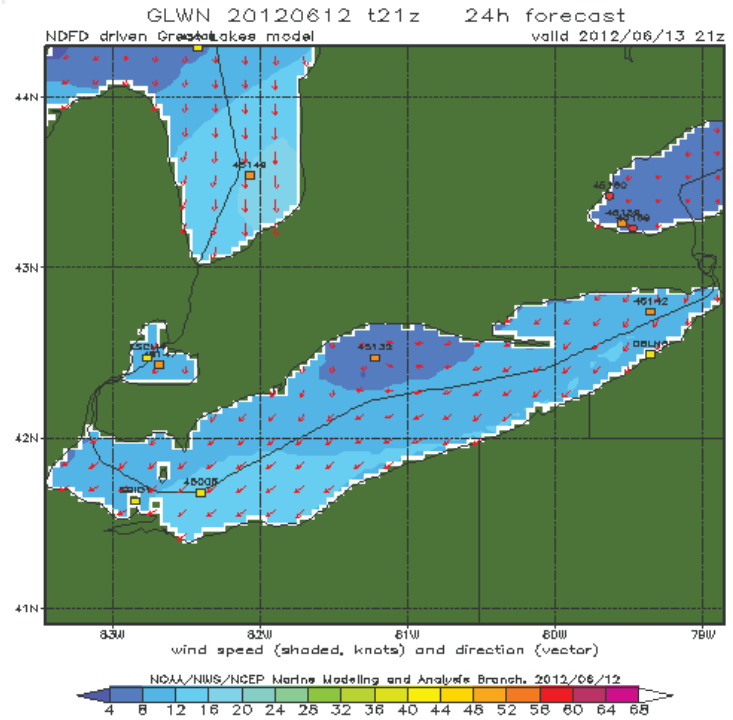


MODIS Cyanobacterial Index from 10 June 2012. Small features may be elevated concentrations of green algae.

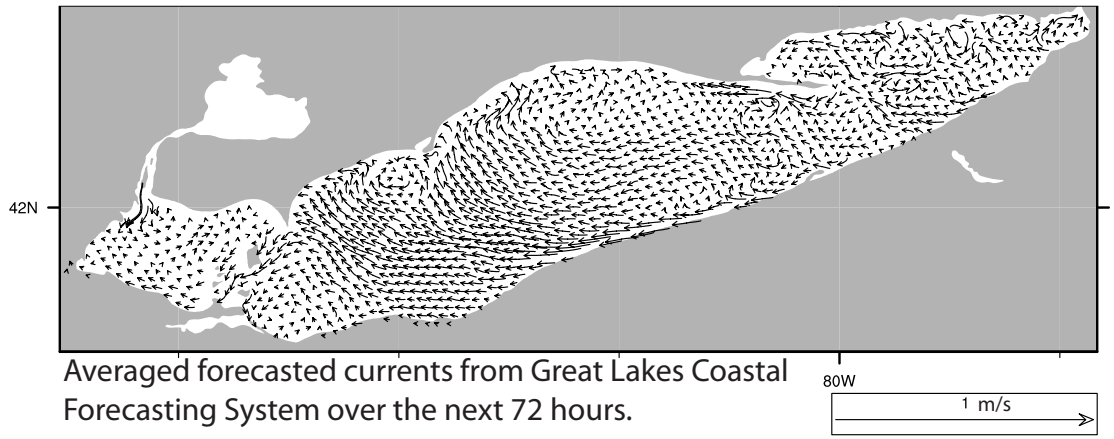


Air and Water Temperature from Marblehead, OH.
From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).

To subscribe to this bulletin, go to :
http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/signup.php



NDFD forecast wind conditions from 13 June 2012.
From: NOAA/National Centers for Environmental Prediction (NCEP)



Averaged forecasted currents from Great Lakes Coastal Forecasting System over the next 72 hours.

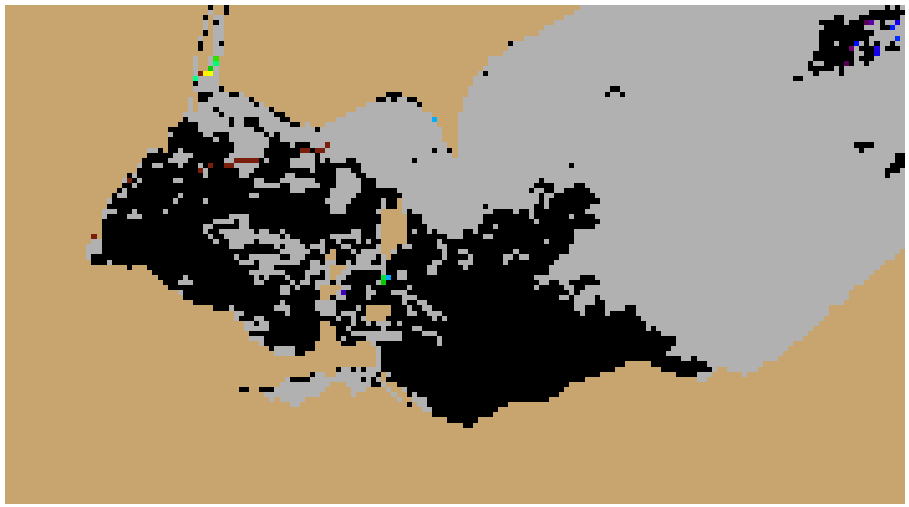
Experimental Lake Erie Harmful Algal Bloom Bulletin

National Centers for Coastal Ocean Science and Great Lakes Environmental Research Laboratory

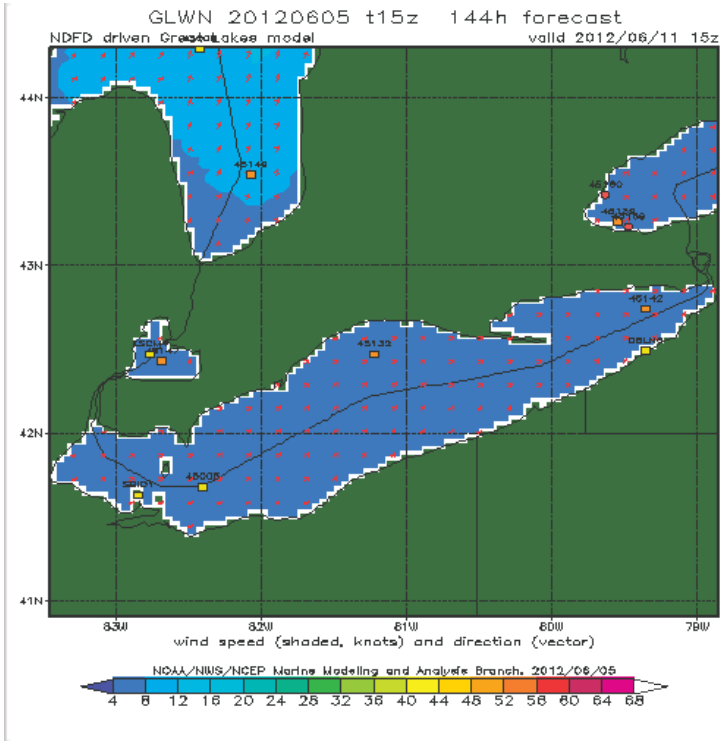
05 June 2012; Bulletin 1

There is no reported Harmful Algal Bloom at this time. It is unlikely that one will develop within the next week. The particle tracking forecast will return when there is a feature to forecast in the imagery.

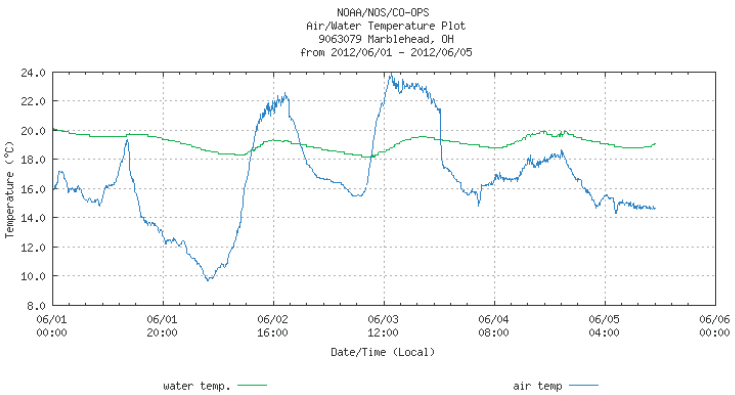
- Tim Wynne



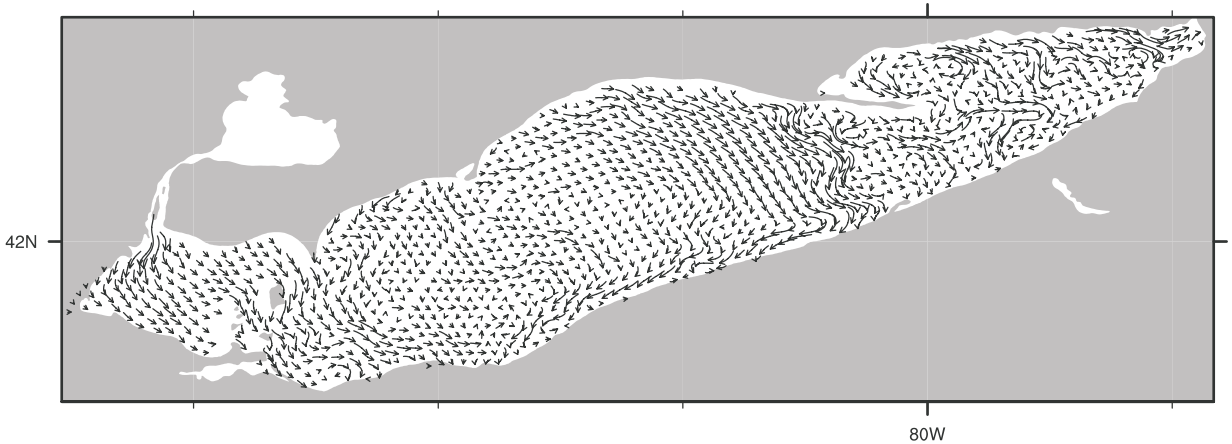
MODIS Cyanobacterial Index from 3 June 2012. Black is unlikely to be a bloom; Gray is clouds



NDFD forecast wind conditions from 11 June 2012.
From: NOAA/National Centers for Environmental Prediction (NCEP)



Air and Water Temperature from Marblehead, OH.
From: NOAA/Center for Operational Oceanographic Products and Services (CO-OPS).



The GLCFS forecasted modeled currents over the next 72 hours.

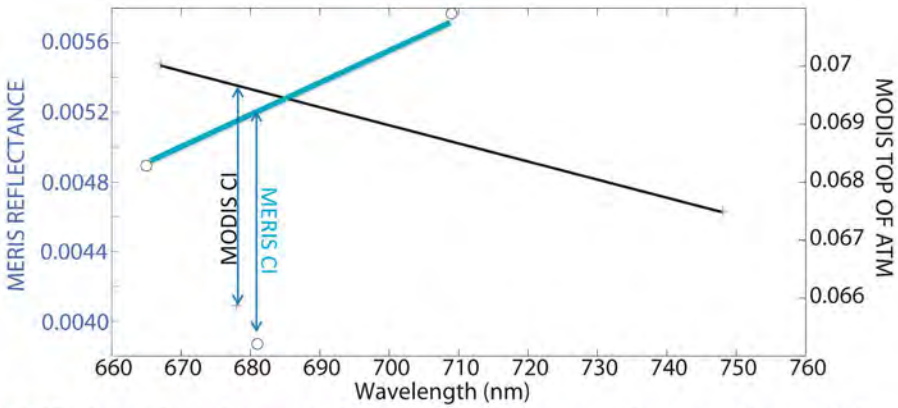
Sumplemental Information on Experimental Lake Erie Harmful Algal Bloom Bulletin

NOS/NCCOS; Great Lakes Environmental Research Laboratory

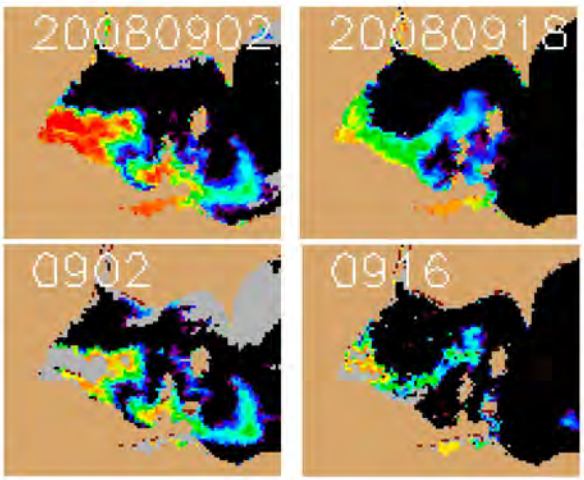
17 May 2012; Bulletin 0

The MERIS Sensor on ENVISAT stopped sending data on April 8, 2012. As a result we will be unable to use MERIS images for the Lake Erie Cyanobacterial Bloom Forecasts. We have applied the equivelent algorithm from MERIS to MODIS. The initial results look acceptable. The data from MODIS uses different wavelengths, but the algorithm seems to detect the optical signature from the cyanobacteria when in low to moderate concentrations. We will use a near-infrared/red ratio to quanitfy high concentrations if the need arises. We aim to start producing weekly bulletins in June and will continue to do so until late October.

-Tim Wynne

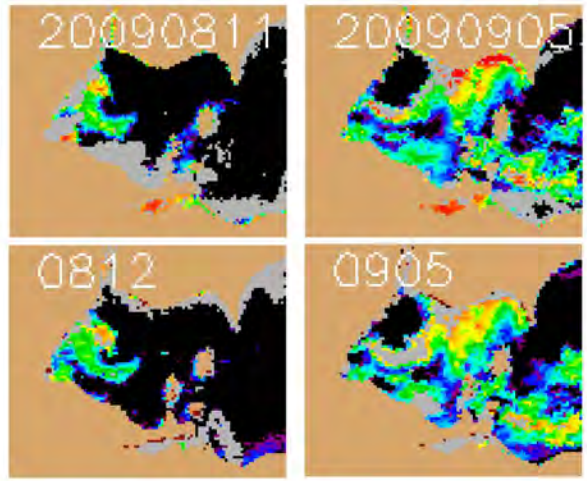


MODIS algorithm shown in black uses three top of atmosphere derived bands. MERIS algorithm shown in blue uses three reflectance derived bands.

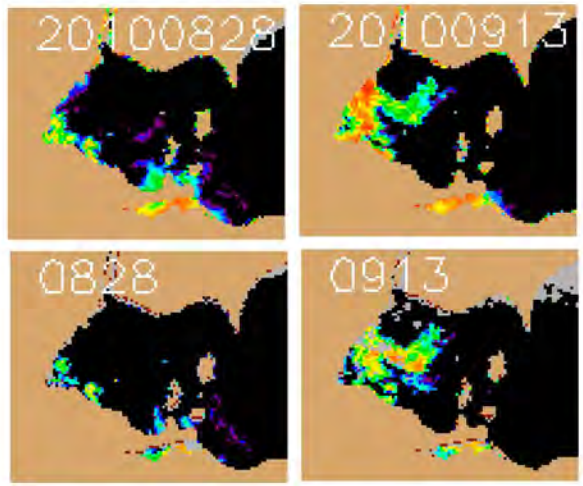


Initial results have been run, and the results from the algorithms seem comparable.
The MODIS images become saturated in high cell concentrations. Basic statistics are shown on Page 2.

MERIS images are on the top row from Sept 2, 2008 and Sept 18, 2008. MODIS images from equivelent dates are on the second row. Data in Maumee Bay from the Sept 2, 2008 MODIS image has become saturated and appears as a cloud.

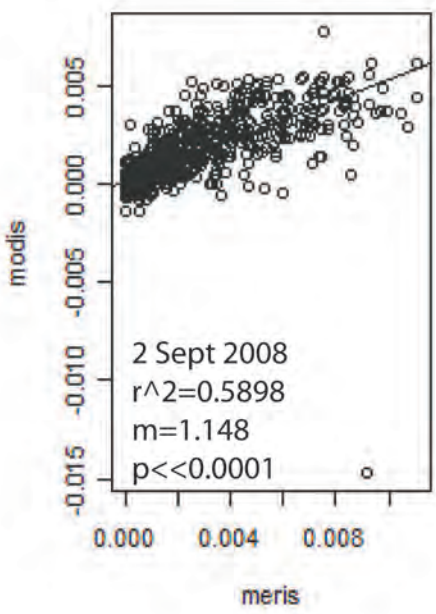


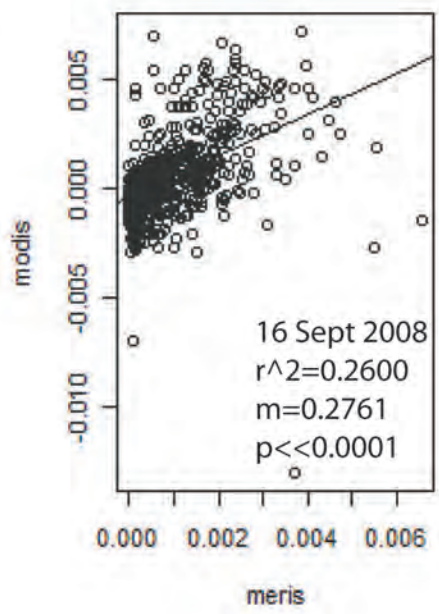
MERIS images on the top row, Aug 11, 2009 and Sep 5, 2009. MODIS images bottom row Aug 12, 2009 and Sept 5, 2009.

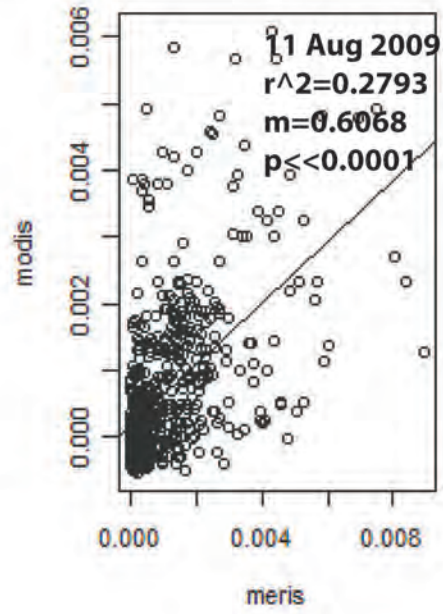


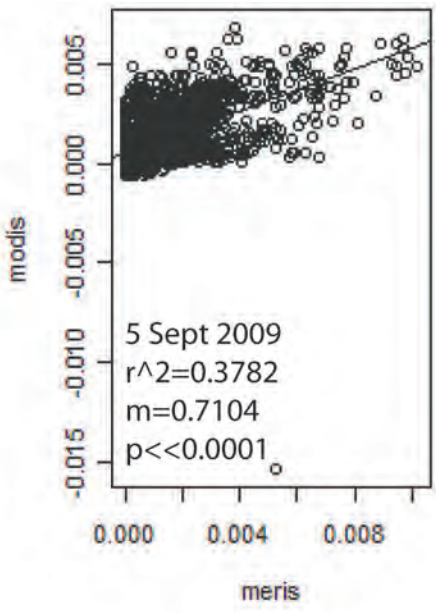
MERIS images on the top row Aug 28, 2010 and Sept 13, 2010 . MODIS images bottom row Aug 28, 2010 and Sept 13, 2010.

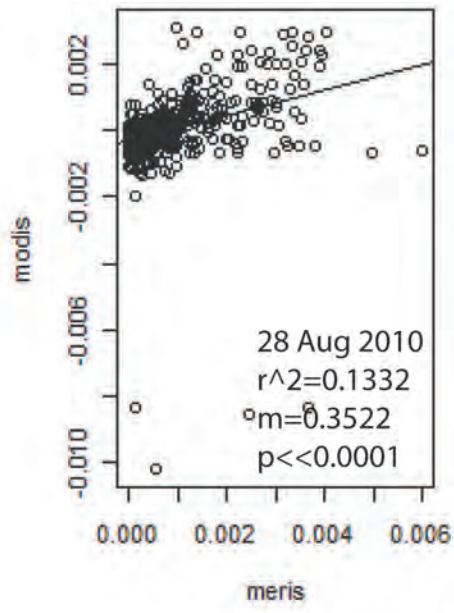
Statistical Comparisons between images shown on Page 1.
No attempt was made to remove outliers.

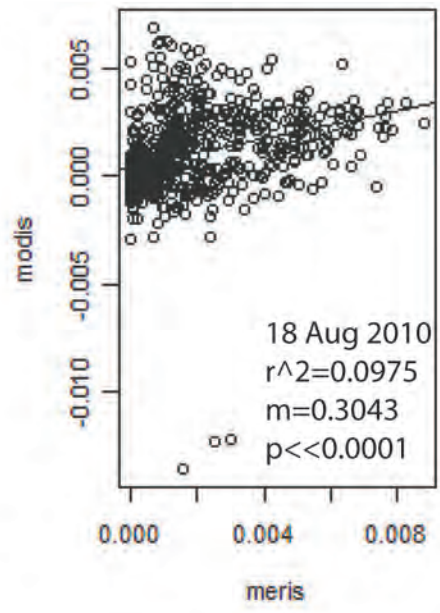












Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-022
01 November 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 27 October 2011

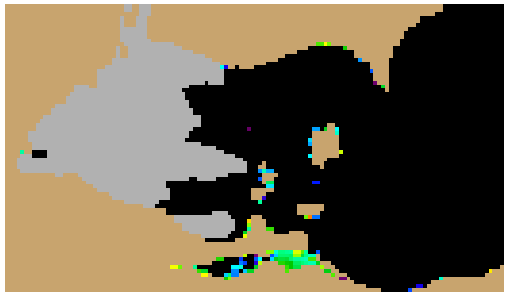


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from October 30, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

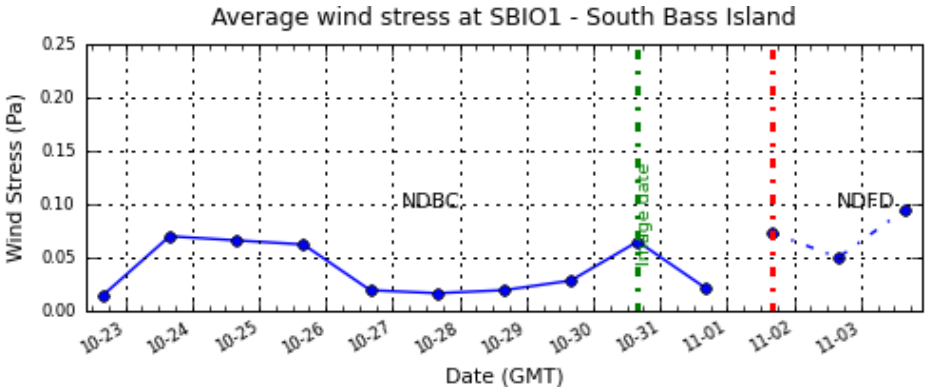
Conditions: There are no harmful algal blooms reported at this time. No impacts are expected.

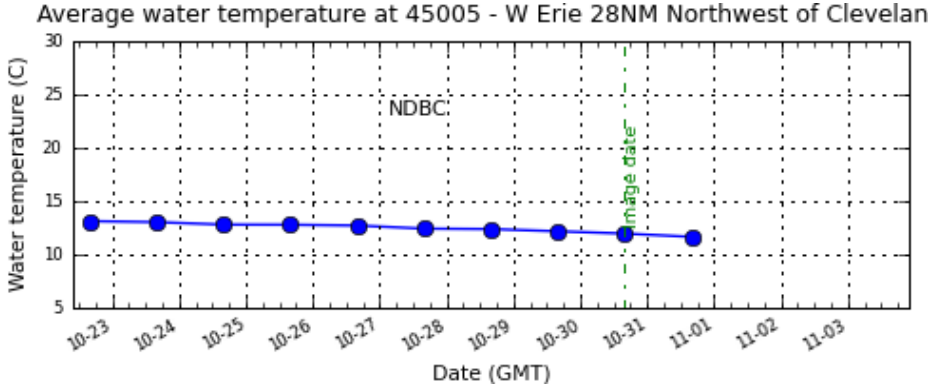
Analysis: This is the final bulletin of the 2011 season. The *Microcystis* bloom in Lake Erie has subsided. There are no further cyanobacterial features expected to develop this year. Water temperatures are low and are forecast to continually decrease.

-Briggs, Tomlinson

Archived Lake Erie HAB Forecast Bulletins are located at (CEGLHH):
http://www.glerl.noaa.gov./res/Centers/HABS/lake_erie_hab/lake_erie_hab.html

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
10-23
10-24
10-25
10-26
10-27
10-28
10-29
10-30
10-31
11-01
11-02
11-03
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
10-23
10-24
10-25
10-26
10-27
10-28
10-29
10-30
10-31
11-01
11-02
11-03
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-021
27 October 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 20 October 2011

Conditions: GLERL HAB Bulletin There still may be a very small bloom of Microcystis in the eastern portion of western Lake Erie, in the vicitity of Lorain, OH.

Analysis: The bloom has mostly dissipated from the lake. There may still be low concentrations NW of Cleveland. Falling water temperatures and forecasted moderate wind speeds will likely further dissipate the remnants of the bloom.

Wynne, Briggs

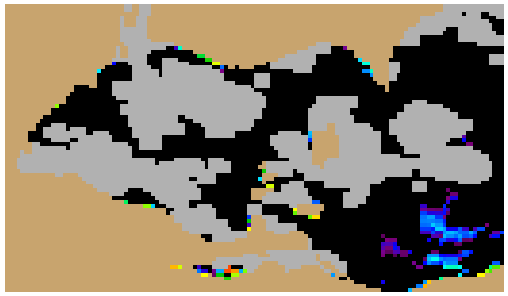


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from October 25, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

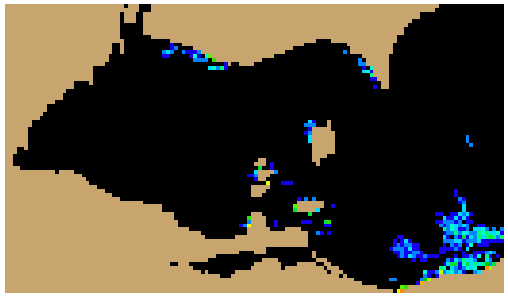


Figure 2. Nowcast position of *Microcystis* spp. bloom for October 27 using GLCFS modeled currents to move the bloom from the October 25 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

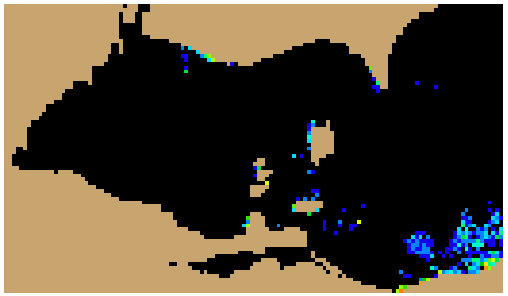
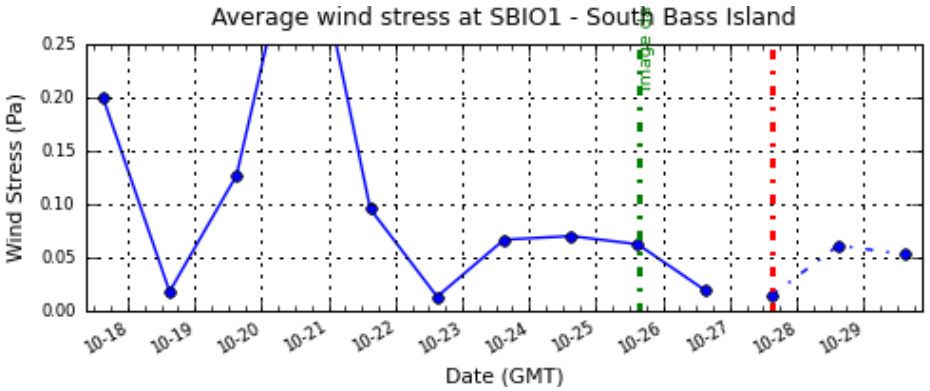
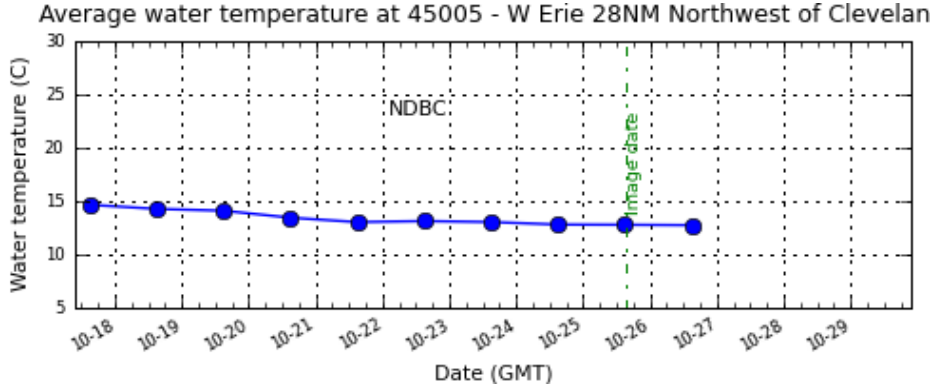


Figure 3. Forecast position of *Microcystis* spp. for October 30 using GLCFS modeled currents to move the bloom from October 25 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
Image date
10-18
10-19
10-20
10-21
10-22
10-23
10-24
10-25
10-26
10-27
10-28
10-29
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
10-18
10-19
10-20
10-21
10-22
10-23
10-24
10-25
10-26
10-27
10-28
10-29
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-020
20 October 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 06 October 2011

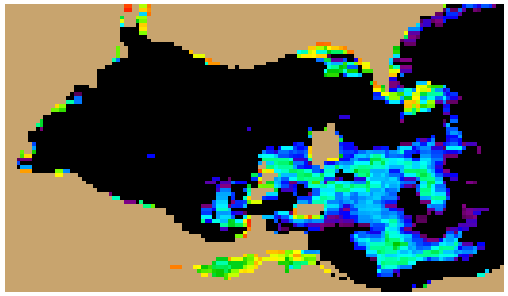


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from October 17, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

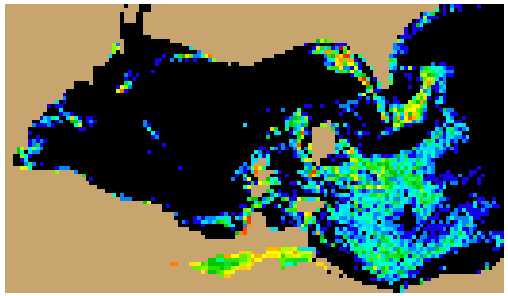


Figure 2. Nowcast position of *Microcystis* spp. bloom for October 20 using GLCFS modeled currents to move the bloom from the October 17 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: A *Microcystis* bloom persists in Lake Erie, extending from the Bass Islands to Cleveland.

Analysis: Imagery indicates that the bloom in western Lake Erie is dying. However the bloom persists around the Bass Islands, Pelee Island, and Kelleys Island extending to Cleveland. The bloom is expected to move east while not going past Cleveland. High winds last week likely stressed and mixed the bloom in the water column. Forecasted winds will most likely continue to stress the bloom. Additionally falling water temperatures this week will contribute to bloom stress and continued weakening. The bloom demise is expected within a week.

-Neff, Wynne

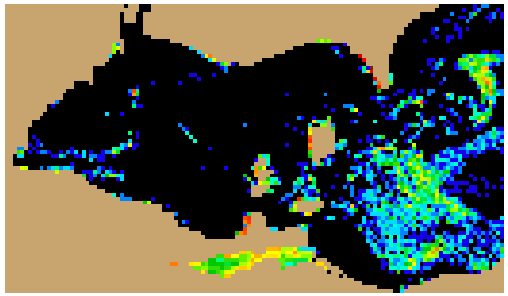
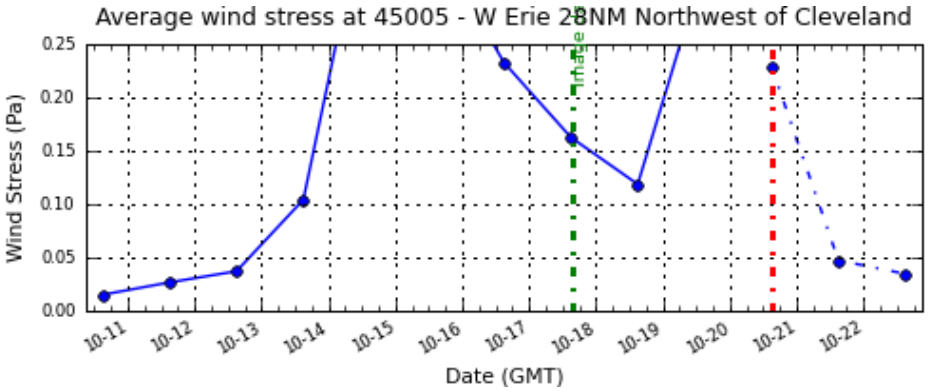
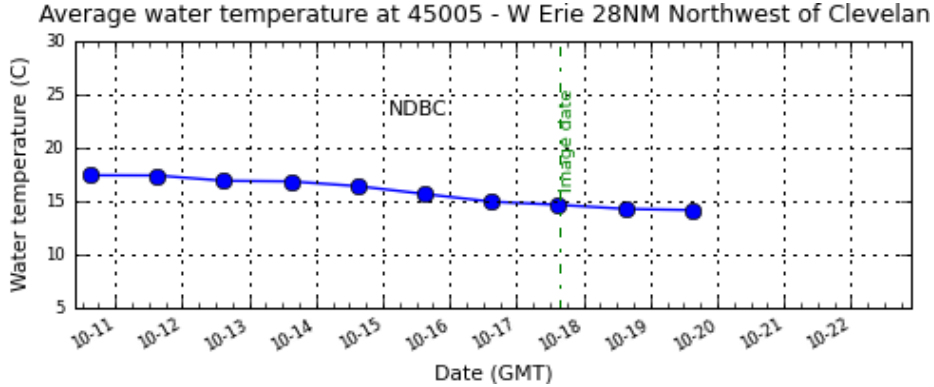


Figure 3. Forecast position of *Microcystis* spp. for October 23 using GLCFS modeled currents to move the bloom from October 17 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at 45005 - W Erie 28NM Northwest of Cleveland
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
10-11
10-12
10-13
10-14
10-15
10-16
10-17
10-18
10-19
10-20
10-21
10-22
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
10-11
10-12
10-13
10-14
10-15
10-16
10-17
10-18
10-19
10-20
10-21
10-22
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-019
13 October 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 29 September 2011

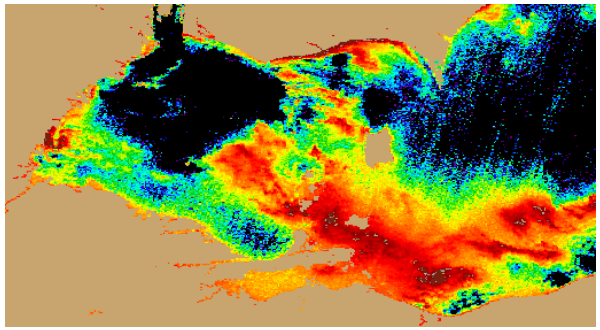


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from October 11, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

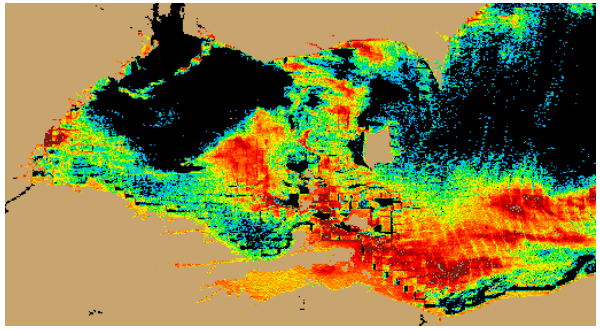


Figure 2. Nowcast position of *Microcystis* spp. bloom for October 13 using GLCFS modeled currents to move the bloom from the October 11 image.

Conditions: A large *Microcystis* bloom persists in Lake Erie, extending well past Cleveland to the east.

Analysis: Satellite imagery from Tuesday (10/11) indicates that the *Microcystis* bloom has now extended well past Cleveland to the east, and remains offshore. The eastern extent is just past Fairport Harbor. The bloom also hugs the northen shore in Ontario, to the Rondeau Provincial Park region. The forecast over the next three days indicates that the bloom will continue moving eastward as far as Geneva on the Lake, but will remain offshore. However, the northern portion of the bloom will dissipate. The wind stress is expected to increase dramatically on Oct 14, and will likely cause the surface bloom to decrease as mixing occurs. Water temperatures continue to remain stable.

NOTE: Please see pages 3 and 4 of this bulletin, as they show the MERIS image from 10/11/2011 (page 3) for the whole lake and the forecast for 10/16/2011 (page 4).

-Tomlinson, Wynne

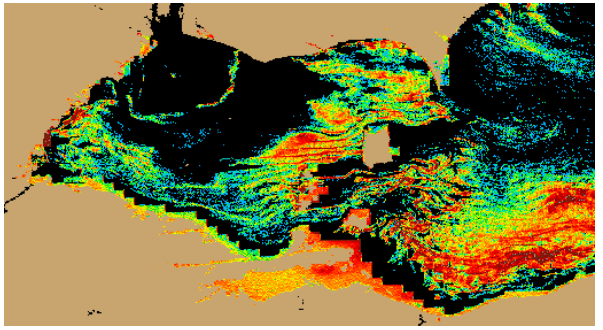
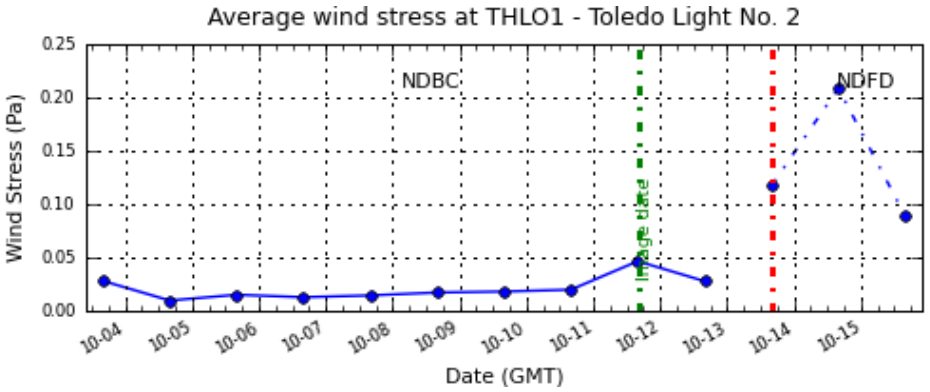
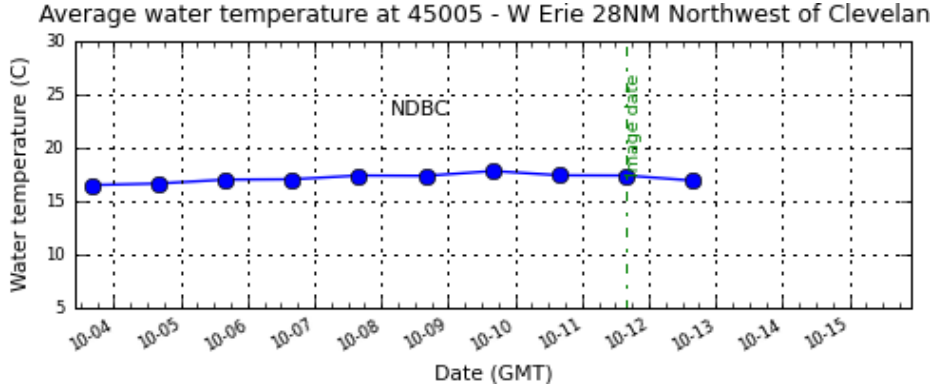
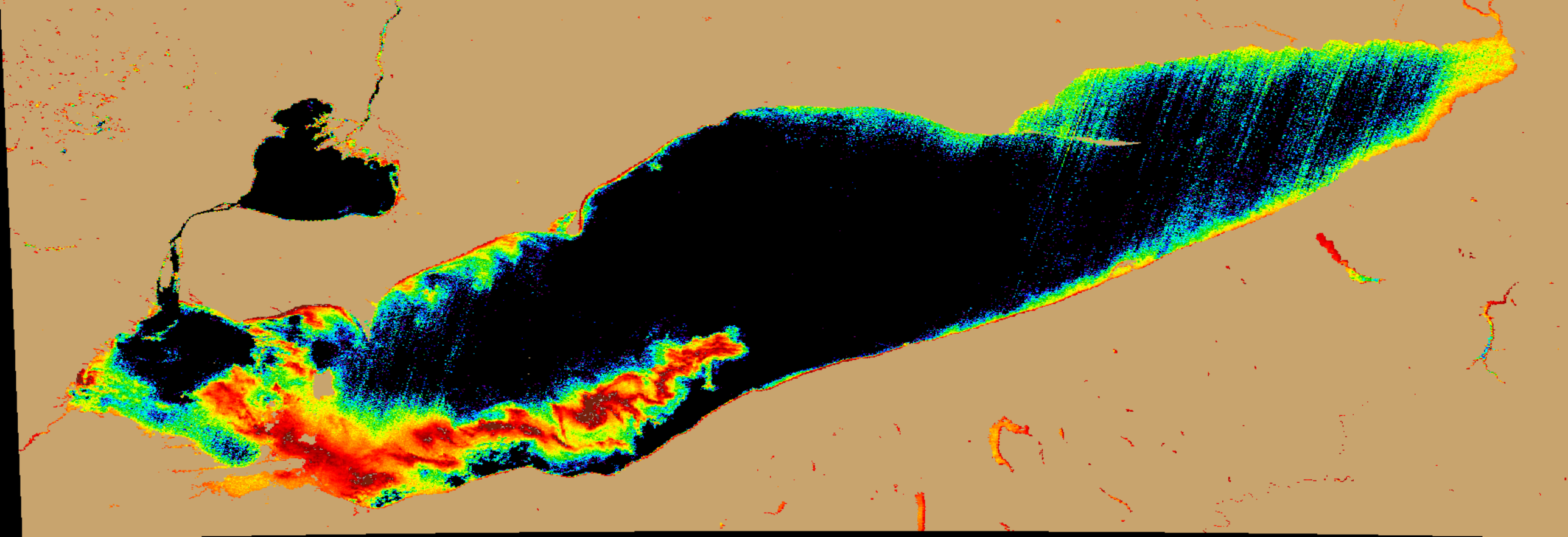


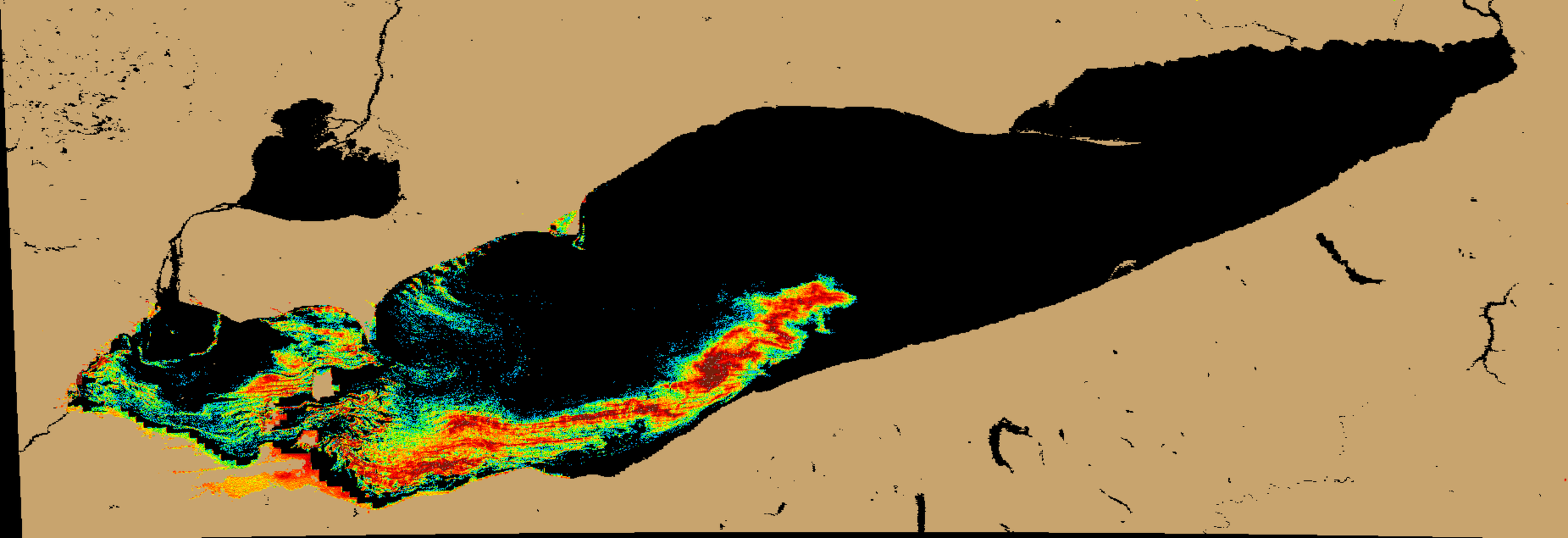
Figure 3. Forecast position of *Microcystis* spp. for October 16 using GLCFS modeled currents to move the bloom from October 11 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
10-04
10-05
10-06
10-07
10-08
10-09
10-10
10-11
10-12
10-13
10-14
10-15
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
10-04
10-05
10-06
10-07
10-08
10-09
10-10
10-11
10-12
10-13
10-14
10-15
Date (GMT)





Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-018
06 October 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 29 September 2011

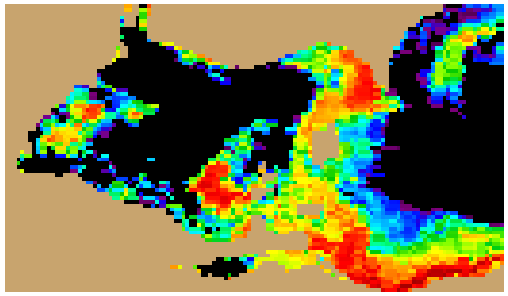


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from October 05, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

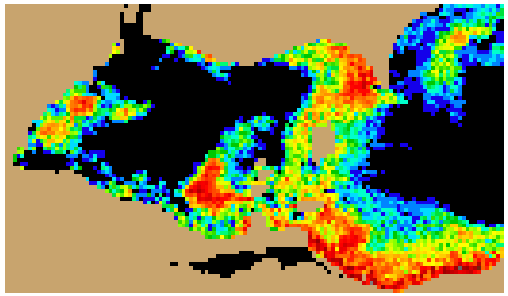


Figure 2. Nowcast position of *Microcystis* spp. bloom for October 06 using GLCFS modeled currents to move the bloom from the October 05 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: A large *Microcystis* bloom persists in Western Lake Erie.

Analysis: Satellite imagery from Wednesday (10/05/2011) indicates a large *Microcystis* bloom continues to transport east of Catawba Island and concentrate near the Cleveland shore. Winds are forecast to remain light through the weekend and may favor an intensification of the bloom. This intensification may result from the resurfacing of cells and/or formation of scum. Also, winds are forecast to remain south and southeast through the weekend. This may prevent scum formation along the Cleveland shore and promote scum formation along the south and east coasts of Pelee Island

The overall transport of the bloom is forecast to remain in place, with the possibility of intensification and scum formation, as wind stress remains light and water temperatures remain stable.

-Briggs, Tomlinson, Wynne

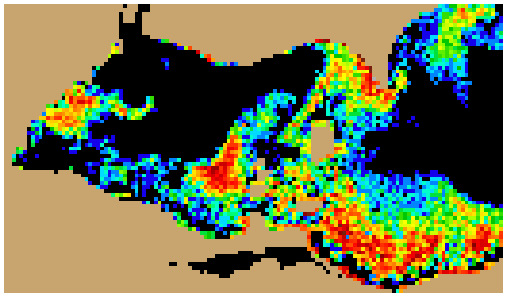
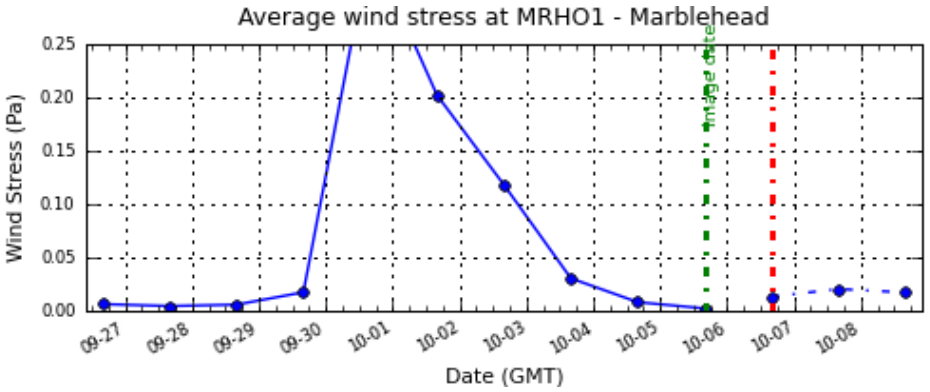
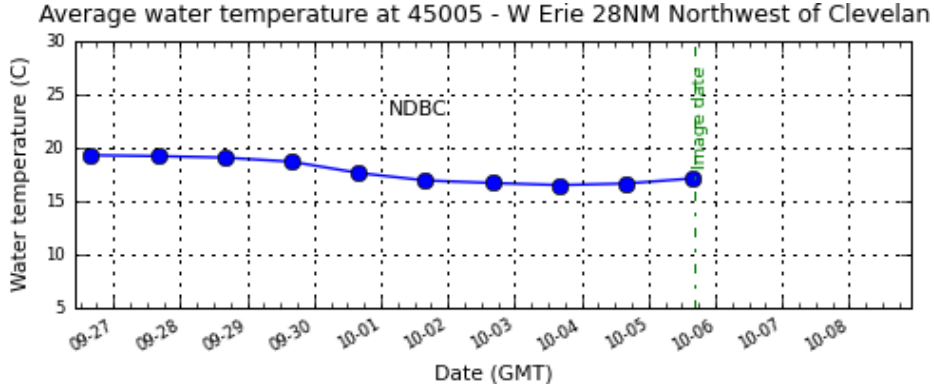


Figure 3. Forecast position of *Microcystis* spp. for October 09 using GLCFS modeled currents to move the bloom from October 05 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at MRHO1 - Marblehead
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
Image date
09-27
09-28
09-29
09-30
10-01
10-02
10-03
10-04
10-05
10-06
10-07
10-08
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
09-27
09-28
09-29
09-30
10-01
10-02
10-03
10-04
10-05
10-06
10-07
10-08
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-017
29 September 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 22 September 2011

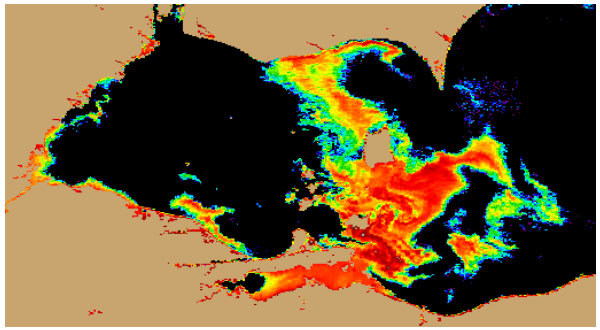


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from September 27, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

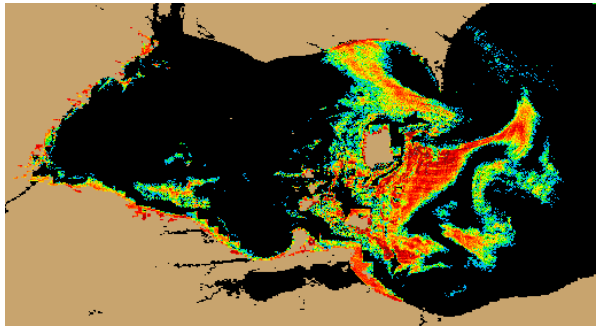


Figure 2. Nowcast position of *Microcystis* spp. bloom for September 29 using GLCFS modeled currents to move the bloom from the September 27 image.

Conditions: A large *Microcystis* bloom persists in Western Lake Erie.

Analysis: Satellite imagery from Tuesday (9/27/2011) indicates a large *Microcystis* bloom continues to transport to the east of Catawba Island and concentrate to the south and east of Pelee Island. An intensification of the bloom has also been remotely observed and may be the result of a sustained low wind stress that allowed for the predicted resurfacing of submerged cells.

The bloom is forecast to continue an eastern transport in to the weekend and may impact the Cleveland shore. Wind stress is forecast to remain at or below 0.10 Pa and subsurface mixing of cells is not predicted to occur. However, water temperature begins to dip below 20 C and may result in a de-intensification of the bloom.

-Briggs, Wynne

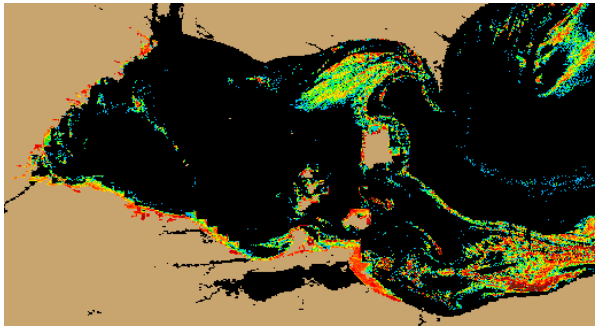
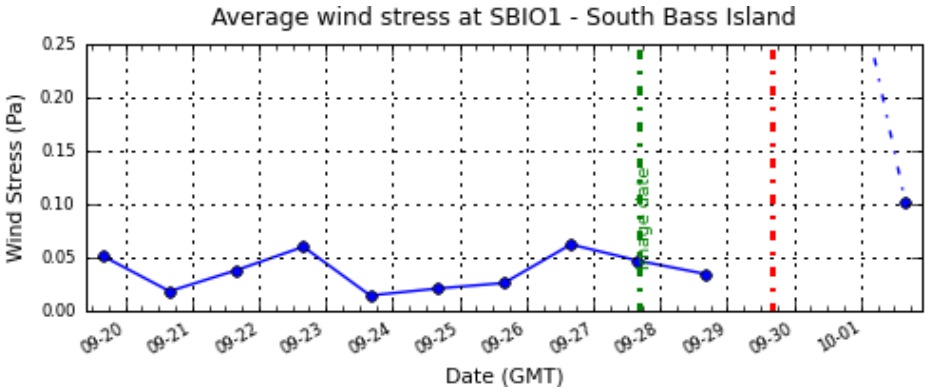
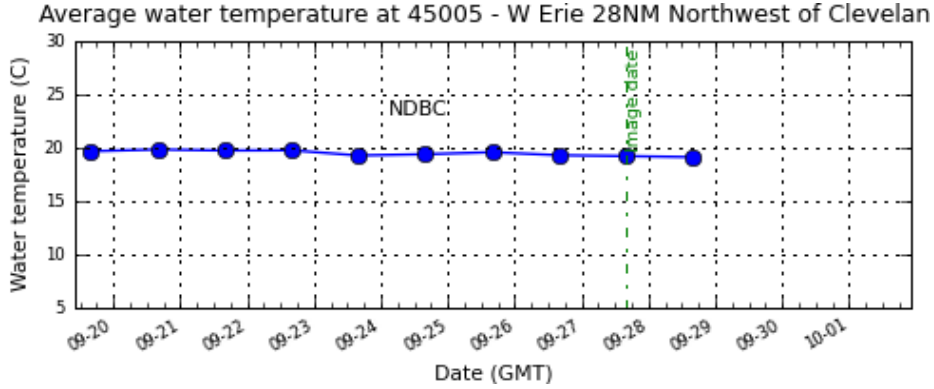


Figure 3. Forecast position of *Microcystis* spp. for October 02 using GLCFS modeled currents to move the bloom from September 27 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
Image date
09-20
09-21
09-22
09-23
09-24
09-25
09-26
09-27
09-28
09-29
09-30
10-01
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
09-20
09-21
09-22
09-23
09-24
09-25
09-26
09-27
09-28
09-29
09-30
10-01
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-016
22 September 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 15 September 2011

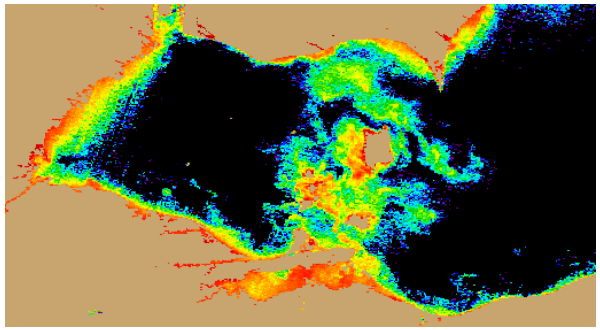


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from September 16, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

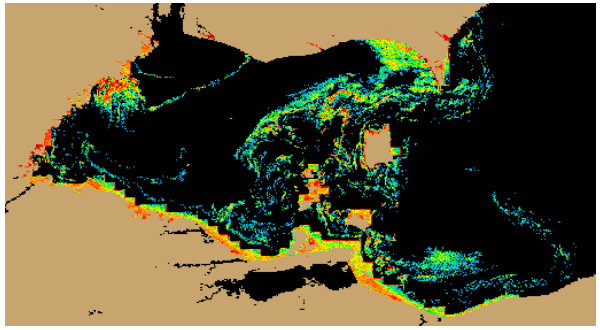


Figure 2. Nowcast position of *Microcystis* spp. bloom for September 22 using GLCFS modeled currents to move the bloom from the September 16 image.

Conditions: A *Microcystis* bloom persists in Western Lake Erie.

Analysis: Winds have transported the bloom up the Michigan Coast. The high winds likely mixed and stressed the bloom. The image shown is appromimately a week old due to persistent cloud cover in the region. It is expected there is additional biomass within the western basin that would likely resurface with low wind stress. Water temperatures remain high enough to allow continued maintenance of the bloom.

-Neff, Wynne

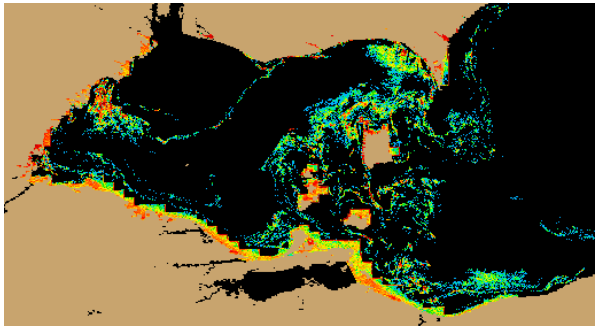
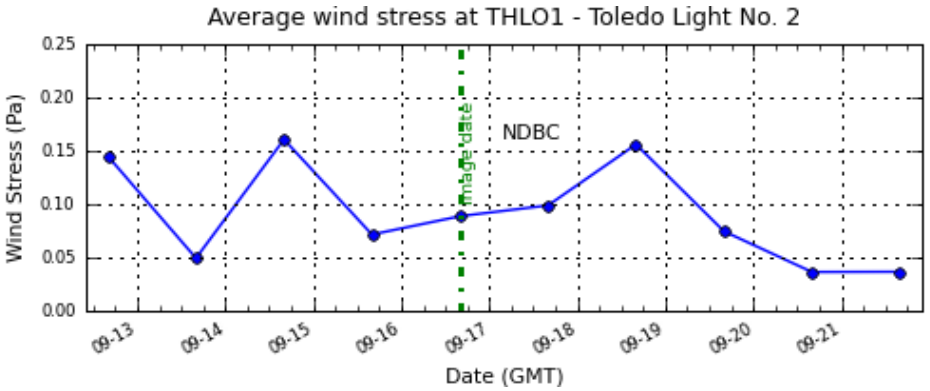
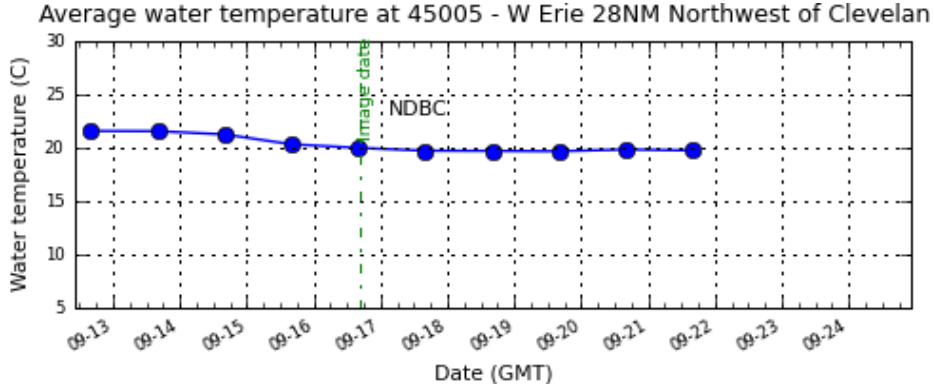


Figure 3. Forecast position of *Microcystis* spp. for September 25 using GLCFS modeled currents to move the bloom from September 16 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
image date
09-13
09-14
09-15
09-16
09-17
09-18
09-19
09-20
09-21
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
image date
09-13
09-14
09-15
09-16
09-17
09-18
09-19
09-20
09-21
09-22
09-23
09-24
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-015
15 September 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 08 September 2011

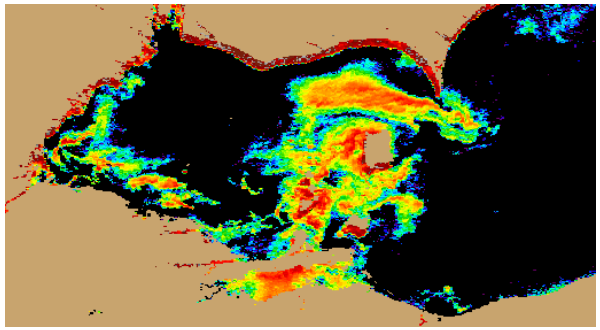


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from September 14, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

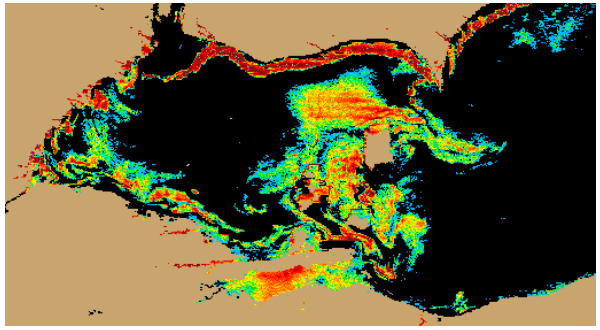


Figure 2. Nowcast position of *Microcystis* spp. bloom for September 15 using GLCFS modeled currents to move the bloom from the September 14 image.

Conditions: There is a bloom of Microsystis.

Analysis: Microcystis is still blooming in Western Lake Erie. The concentrations, particularly on the surface have been greatly reduced since last week. This is most likely as a result of increased wind stress the last few days. The increased wind stress has caused mixing and much of the biomass is likely to be subsurface (> 1 meter) and hence not likely to be visible by satellite. Forecast wind stress is low and water temperatures are still warm, therefore, the bloom biomass is expected to resurface over the weekend.

The forecast is for westward transport, however it is likely that any westward transport will be overwhelmed by resurfacing cells.

-Wynne

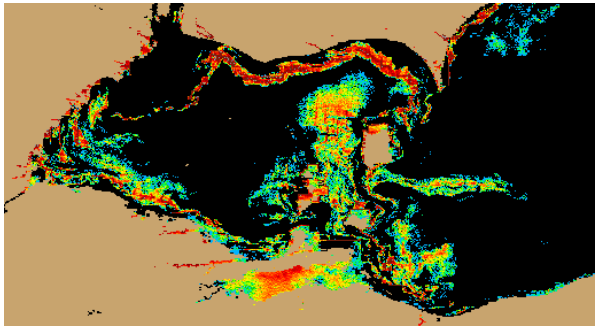
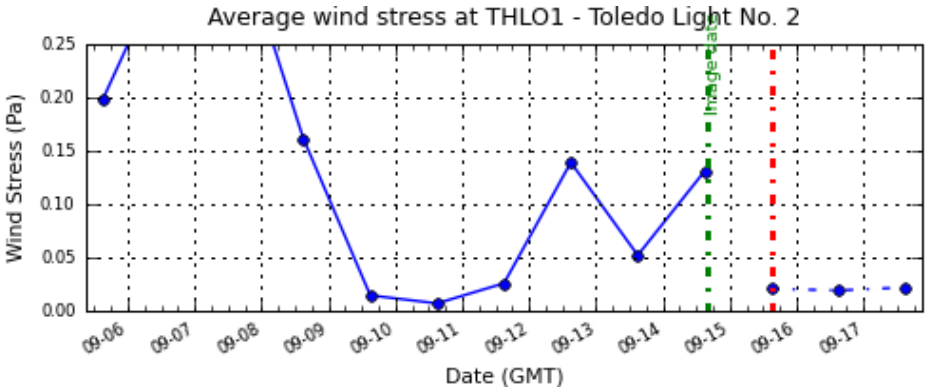
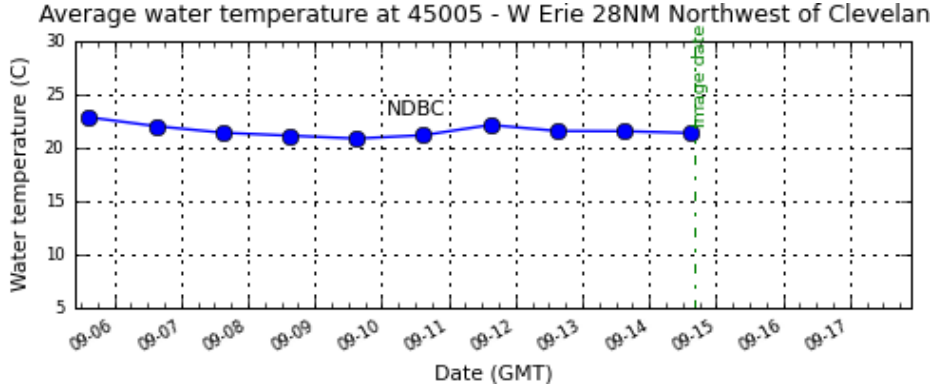


Figure 3. Forecast position of *Microcystis* spp. for September 18 using GLCFS modeled currents to move the bloom from September 14 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
Image date
09-06
09-07
09-08
09-09
09-10
09-11
09-12
09-13
09-14
09-15
09-16
09-17
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
09-06
09-07
09-08
09-09
09-10
09-11
09-12
09-13
09-14
09-15
09-16
09-17
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-014
08 September 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 01 September 2011

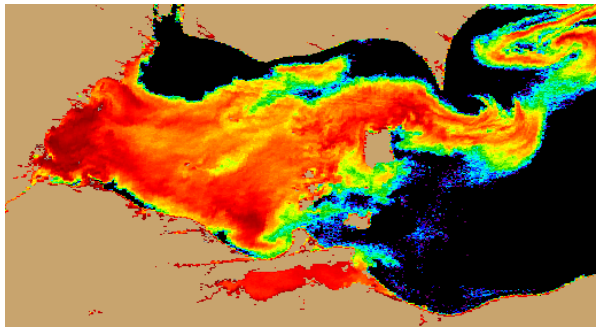


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from September 03, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

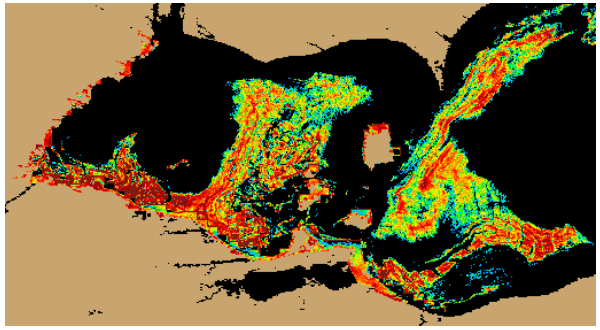


Figure 2. Nowcast position of *Microcystis* spp. bloom for September 08 using GLCFS modeled currents to move the bloom from the September 03 image.

Conditions: A massive *Microcystis* bloom persists throughout most of Lake Erie's Western Basin.

Analysis: As indicated in satellite imagery from Saturday (9/3/2011), an enormous *Microcystis* bloom was present in western Lake Erie. The southern extent of the bloom was remotely observed along the coast of Ohio from Maumee Bay to Catawba Island. The northern extent of the bloom was observed to be consistent along the Michigan coast from Northern Maumee Bay to the mouth of the Detroit River. The eastern-most portion of the bloom was observed past Point Pelee and to the northeast up in to Rondeau Provincial Park.

At the mouth of the Detroit River, a five day nowcast shows a southward suppression of the western-most portions of the bloom. However, the bloom is likely to still persist in much of the Western Basin. The nowcast also suggest the bloom has spread to the east of Sandusky and into the Cleveland area. **(Note: Due to a lack of clear imagery the bloom has not been remotely observed in the Cleveland area.)** A three day forecast also suggests that the bloom will persist to the north of Cleveland through the weekend. Water temperatures remain above 20 degrees Celsius and are forecast to decrease into the weekend; however, conditions remain favorable for bloom growth.

Briggs, Wynne

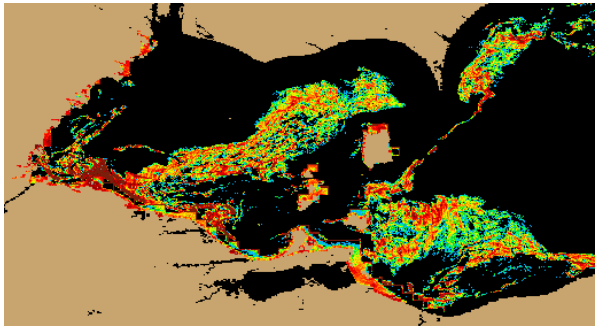
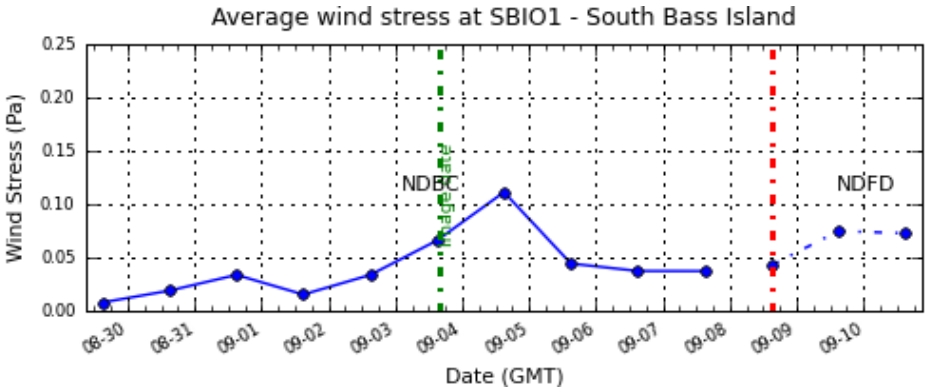
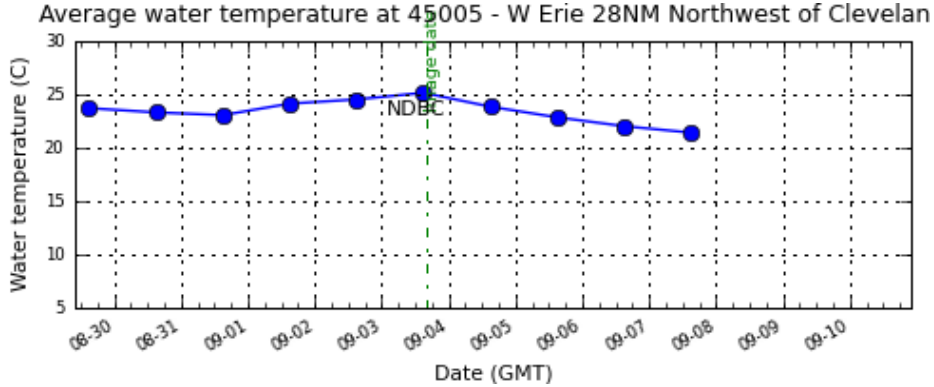


Figure 3. Forecast position of *Microcystis* spp. for September 11 using GLCFS modeled currents to move the bloom from September 03 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Date (GMT)
08-30
08-31
09-01
09-02
09-03
09-04
09-05
09-06
09-07
09-08
09-09
09-10


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Date (GMT)
08-30
08-31
09-01
09-02
09-03
09-04
09-05
09-06
09-07
09-08
09-09
09-10

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-013
01 September 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 25 August 2011

Conditions: A confirmed *Microcystis* bloom persists in Western Lake Erie.

Analysis: The large *Microcystis* bloom continues in Western Lake Erie. Imagery is from August 28 and due to a large cloud present the models do not show the potential full extent of the bloom. Wind conditions and high temperatures are conducive for bloom intensification.

-Neff, Briggs

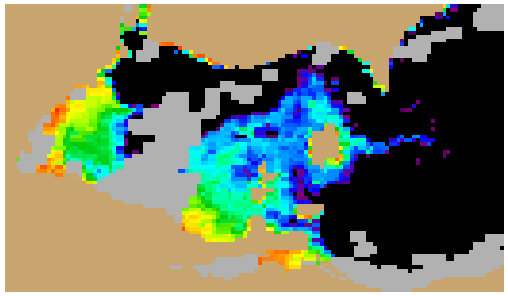


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from August 28, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

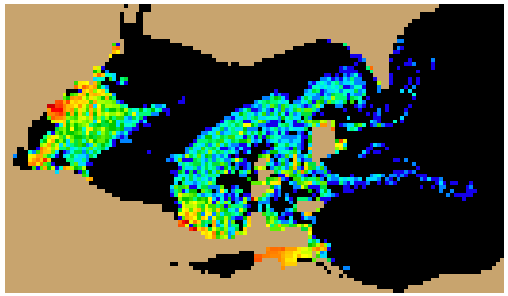


Figure 2. Nowcast position of *Microcystis* spp. bloom for September 01 using GLCFS modeled currents to move the bloom from the August 28 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

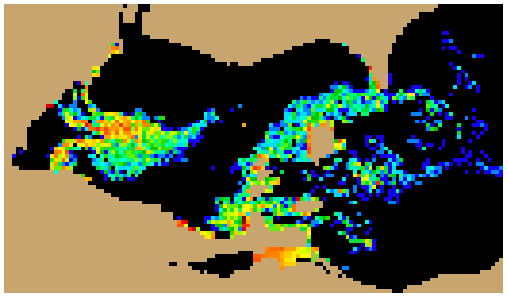
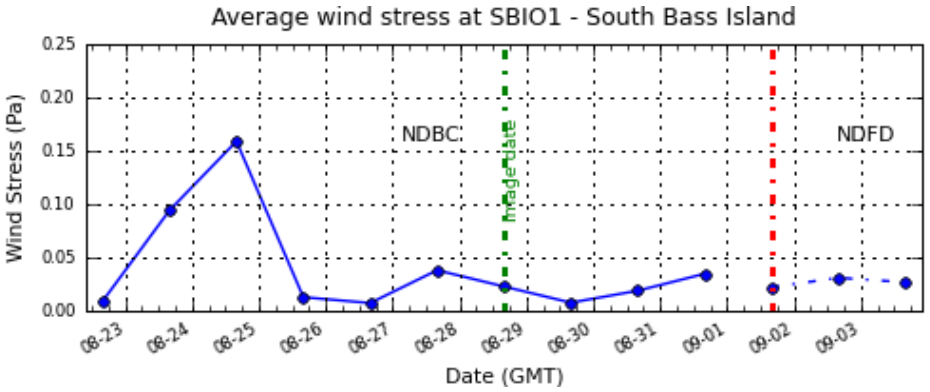
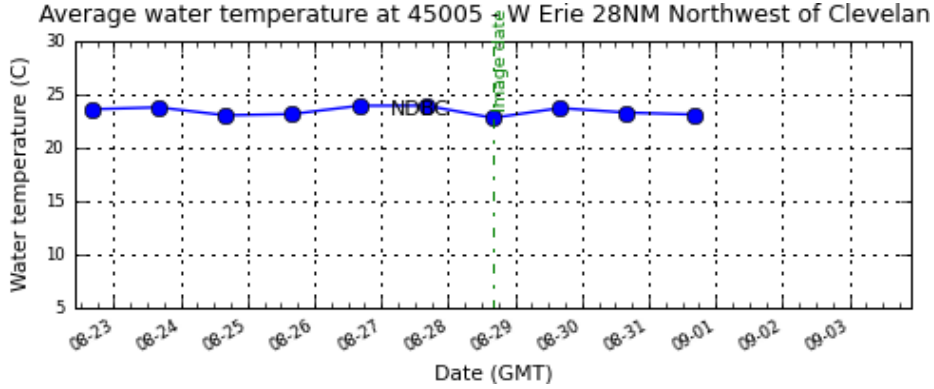


Figure 3. Forecast position of *Microcystis* spp. for September 04 using GLCFS modeled currents to move the bloom from August 28 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
Image date
NDFD
08-23
08-24
08-25
08-26
08-27
08-28
08-29
08-30
08-31
09-01
09-02
09-03
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
08-23
08-24
08-25
08-26
08-27
08-28
08-29
08-30
08-31
09-01
09-02
09-03
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-012
25 August 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 18 August 2011

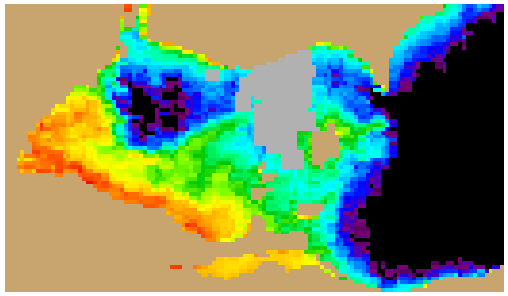


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from August 23, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

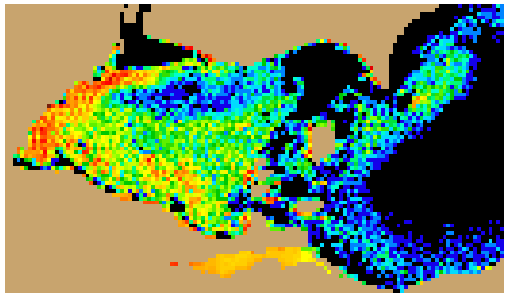


Figure 2. Nowcast position of *Microcystis* spp. bloom for August 25 using GLCFS modeled currents to move the bloom from the August 23 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: A confirmed *Microcystis* bloom persists in Western Lake Erie.

Analysis: A large *Microcystis* bloom has spread throughout the western basin of Lake Erie. Since last Thursday the bloom has moved further North and East and seems to extend past Pelee Point on the north shore, and past Sandusky Bay to the south. Transport over the weekend is expected to move the bloom further to the east. Winds today may cause the surface expression of the bloom to decrease, followed by further intensification over the weekend.

-Tomlinson, Neff

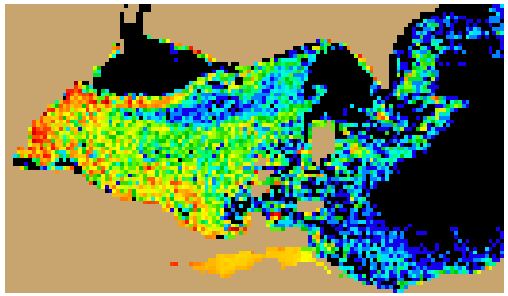
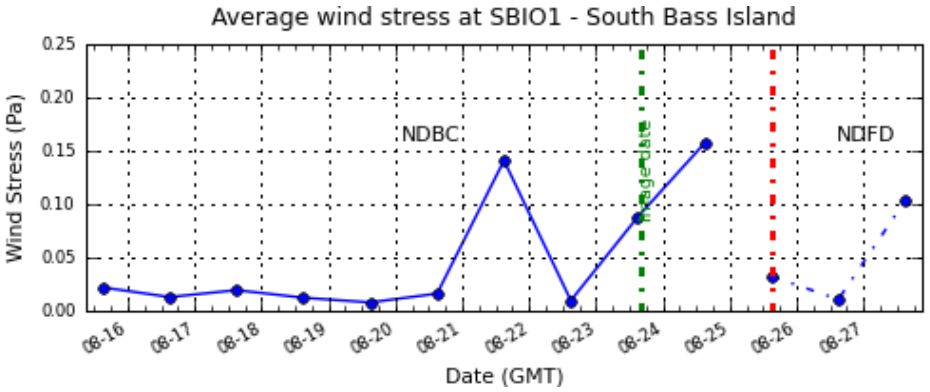
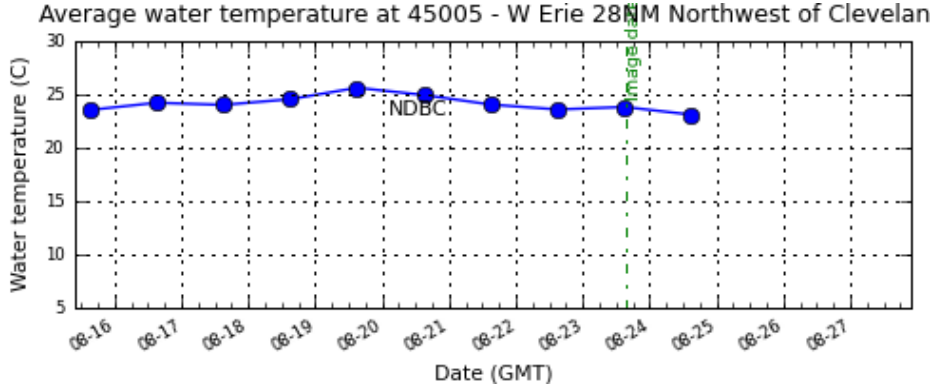


Figure 3. Forecast position of *Microcystis* spp. for August 28 using GLCFS modeled currents to move the bloom from August 23 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
08-16
08-17
08-18
08-19
08-20
08-21
08-22
08-23
08-24
08-25
08-26
08-27
Date (GMT)


Average water temperature at 45005 - W Erie 28 NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
08-16
08-17
08-18
08-19
08-20
08-21
08-22
08-23
08-24
08-25
08-26
08-27
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-011
18 August 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 11 August 2011

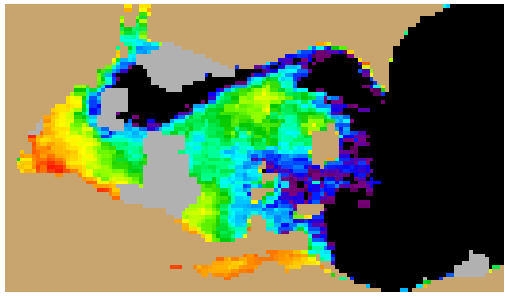


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from August 17, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

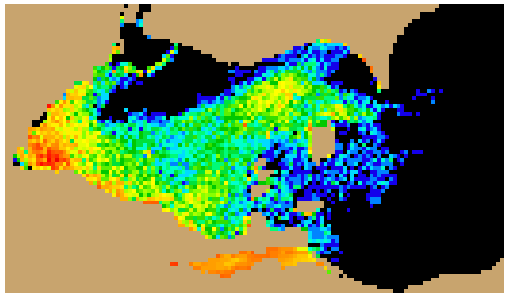


Figure 2. Nowcast position of *Microcystis* spp. bloom for August 18 using GLCFS modeled currents to move the bloom from the August 17 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: A confirmed Microcystis bloom persists in Western Lake Erie.

Analysis: A large Microcystis bloom remains in Western Lake Erie. Model trajectory indicates an easterly transport over the weekend, potentially to Pelee Point by August 21. Recent wind conditions have been relatively low, allowing the biomass to be concentrated in the surface. Low wind stress is predicted over the weekend, so this trend should continue. Water temperatures remain high (nearly 25 C) which should allow the bloom to persist at its present intensities through next week.

-Wynne, Tomlinson

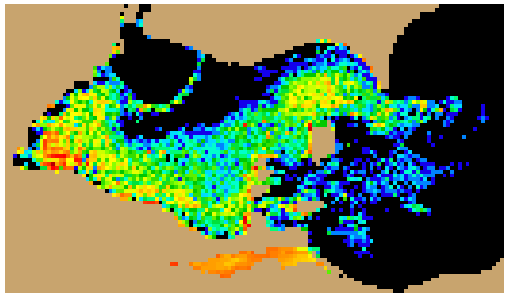
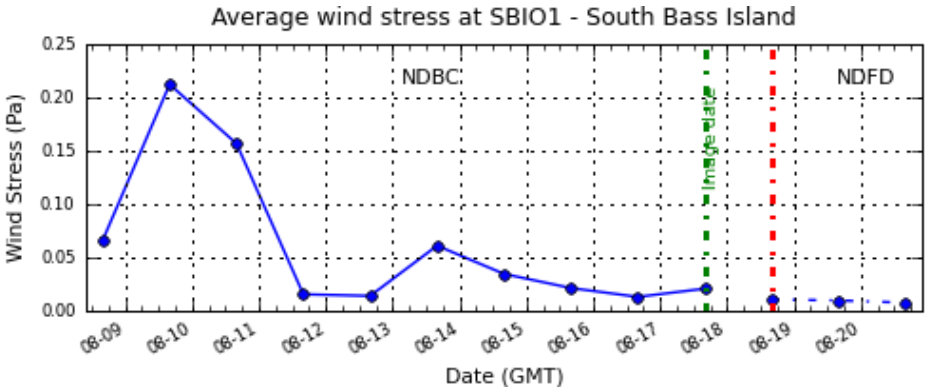
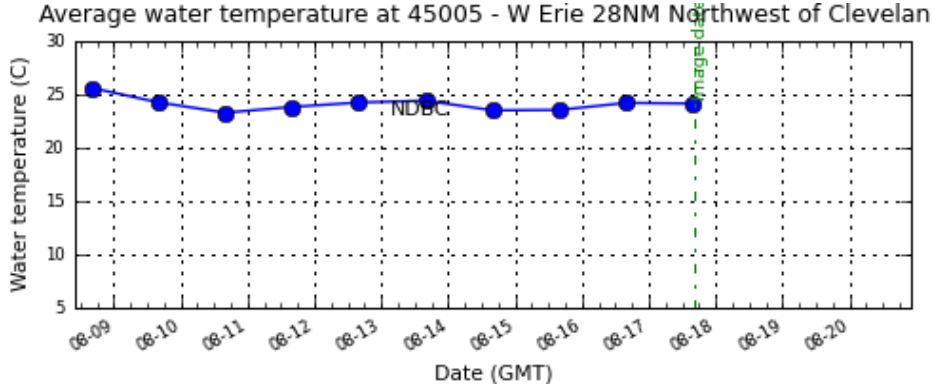


Figure 3. Forecast position of *Microcystis* spp. for August 21 using GLCFS modeled currents to move the bloom from August 17 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
08-09
08-10
08-11
08-12
08-13
08-14
08-15
08-16
08-17
08-18
08-19
08-20
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
08-09
08-10
08-11
08-12
08-13
08-14
08-15
08-16
08-17
08-18
08-19
08-20
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-010
11 August 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 04 August 2011

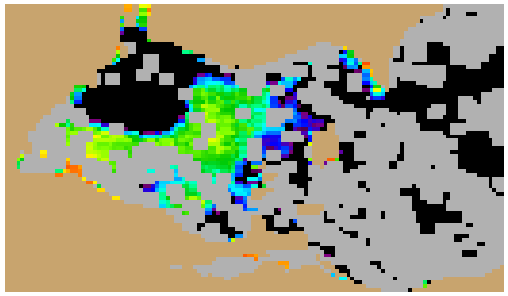


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from August 09, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

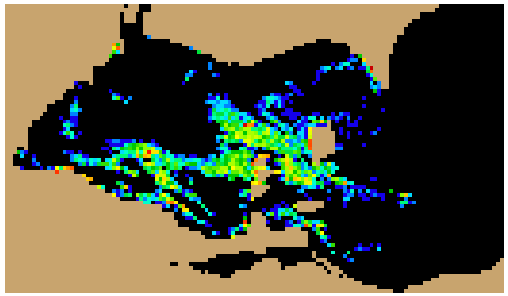


Figure 2. Nowcast position of *Microcystis* spp. bloom for August 11 using GLCFS modeled currents to move the bloom from the August 09 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: A confirmed *Microcystis* bloom persists in Western Lake Erie.

Analysis: A large *Microcystis* bloom remains in Western Lake Erie. Models indicate an east-southeast transport that is likely to affect the Bass and Pelee Islands. Windy conditions over the past three days have likely caused subsurface mixing of the bloom. Water temperatures remain high and conducive to bloom intensification. Due to cloudy weather this week, the nowcast and forecast imagery do not represent the full possible extent of the bloom.

-Briggs

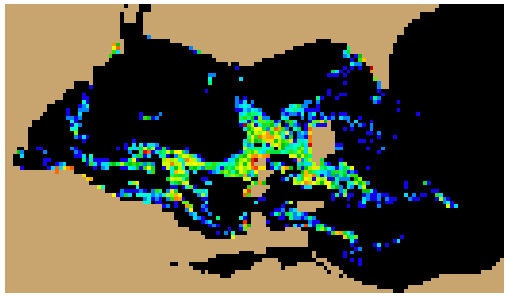
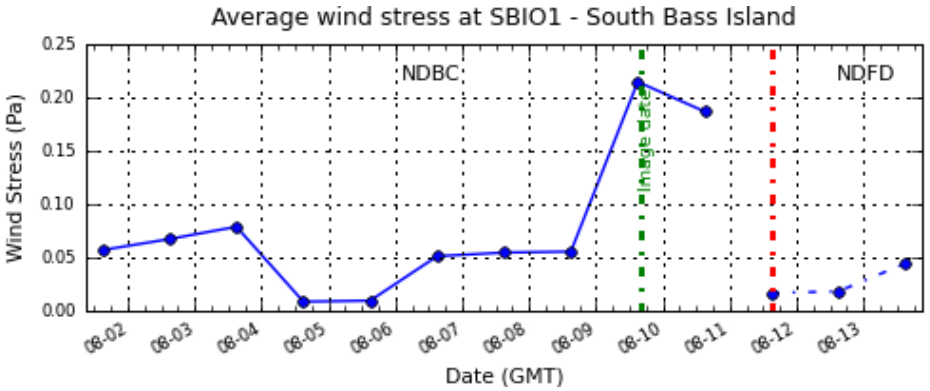
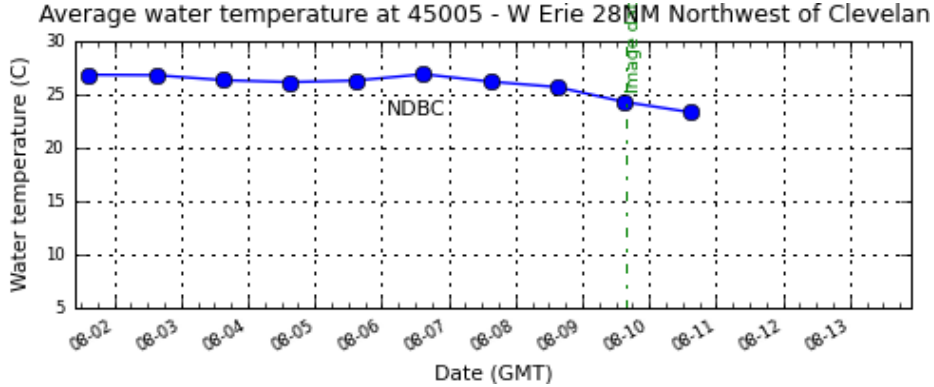


Figure 3. Forecast position of *Microcystis* spp. for August 14 using GLCFS modeled currents to move the bloom from August 09 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
08-02
08-03
08-04
08-05
08-06
08-07
08-08
08-09
08-10
08-11
08-12
08-13
Date (GMT)


Average water temperature at 45005 - W Erie 28 NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
08-02
08-03
08-04
08-05
08-06
08-07
08-08
08-09
08-10
08-11
08-12
08-13
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-009
04 August 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 28 July 2011

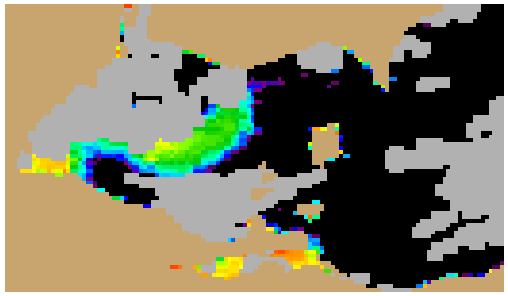


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from August 01, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

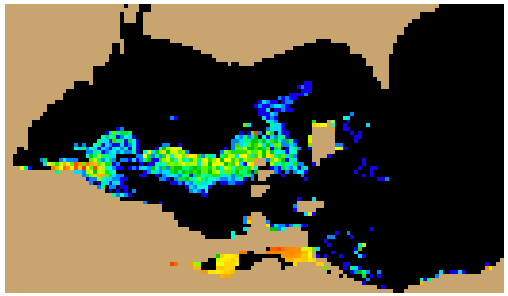


Figure 2. Nowcast position of *Microcystis* spp. bloom for August 04 using GLCFS modeled currents to move the bloom from the August 01 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: A *Microcystis* bloom has been confirmed in Western Lake Erie.

Analysis: In situ validation data collected this week confirm a large bloom of *Microcystis* in the Western Lake Erie basin. Models indicate the bloom will move south and east and will likely affect the Bass Islands this week. Relatively windy conditions may have mixed the bloom subsurface. Warm temperatures are conducive to bloom intensification. Due to cloudy weather this week the nowcast and forecast imagery do not represent the full possible extent of the bloom.

Please Note: Due to a data acquisition problem in the full resolution MERIS image collection, we are using the reduced resolution (1 km) imager for this bulletin.

-Neff, Wynne

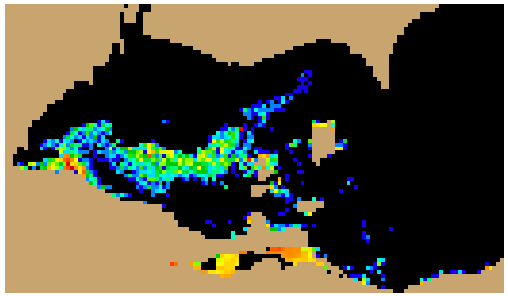
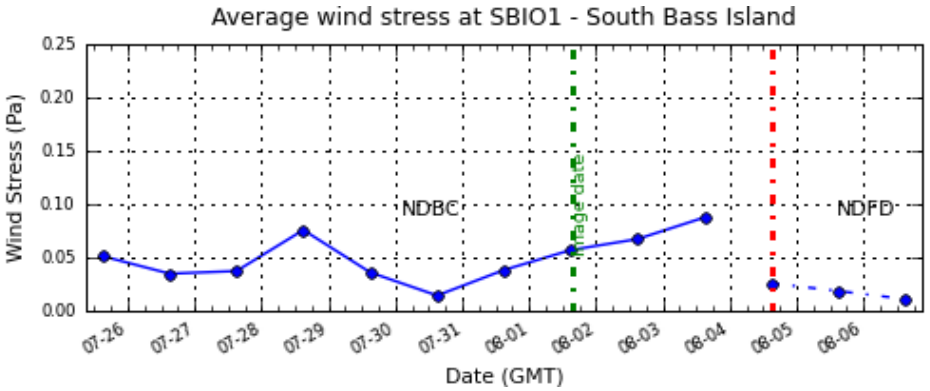


Figure 3. Forecast position of *Microcystis* spp. for August 07 using GLCFS modeled currents to move the bloom from August 01 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
Image date
NDFD
07-26
07-27
07-28
07-29
07-30
07-31
08-01
08-02
08-03
08-04
08-05
08-06
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-008
28 July 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 15 July 2010

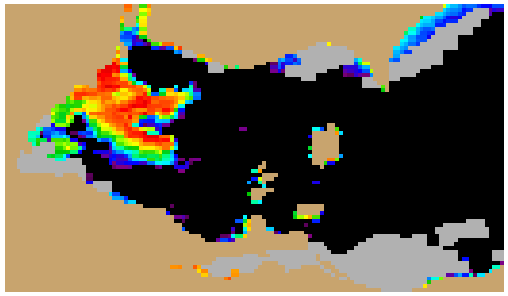


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from July 24, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

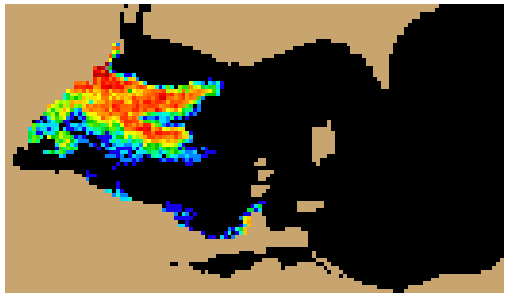


Figure 2. Nowcast position of *Microcystis* spp. bloom for July 28 using GLCFS modeled currents to move the bloom from the July 24 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: A *Microcystis* bloom has been confirmed in western Lake Erie in the vicinity of Toledo Light #2

Analysis: Imagery indicates that a large *Microcystis* bloom is occuring north of the Maumee River mouth and to the east. At this time there is no indication that it has extended to the Bass Islands. A very high level of toxins has been observed near the Toledo Light #2 (>1000 ug/l). The bloom is expected to move east and southward through Sunday, but is not expected to reach the Bass Islands this weekend. The winds and temperature will be conducive to bloom intensification.

Please Note: due to a data acquisition problem in the hi-resolution MERIS image collection, we are using the low resolution (1 km) imagery for this bulletin.

-Tomlinson, Wynne

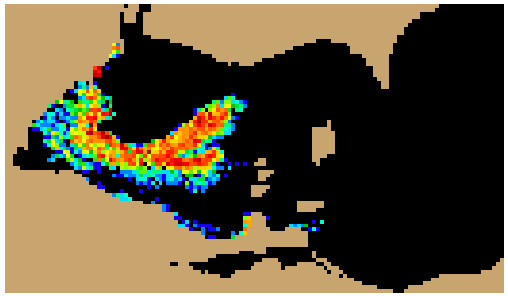
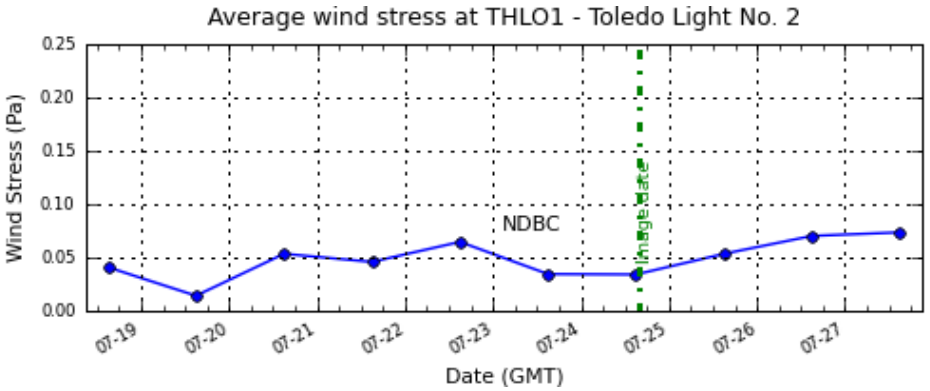
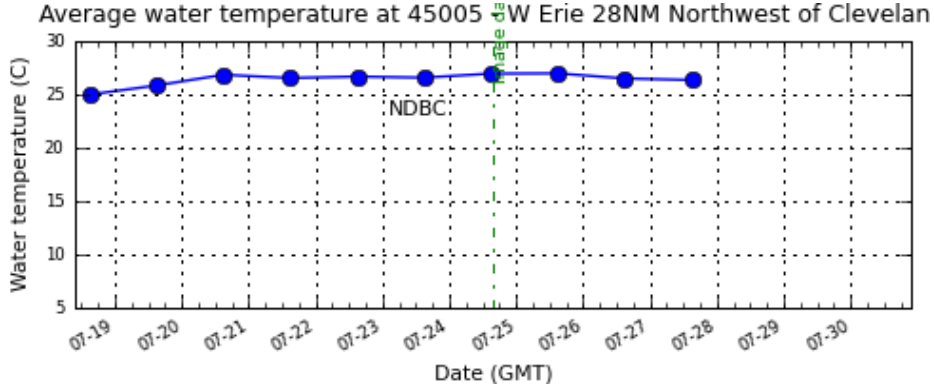


Figure 3. Forecast position of *Microcystis* spp. for July 31 using GLCFS modeled currents to move the bloom from July 24 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
07-19
07-20
07-21
07-22
07-23
07-24
07-25
07-26
07-27
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
07-19
07-20
07-21
07-22
07-23
07-24
07-25
07-26
07-27
07-28
07-29
07-30
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-007
22 July 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 14 July 2011

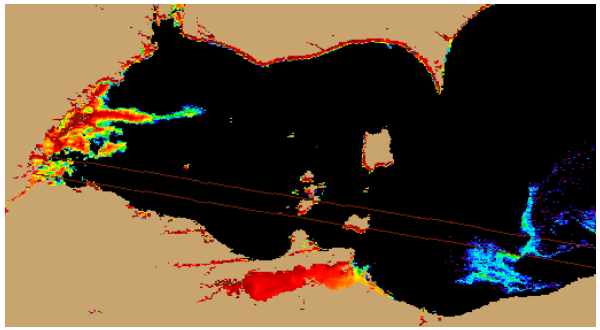


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from July 16, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

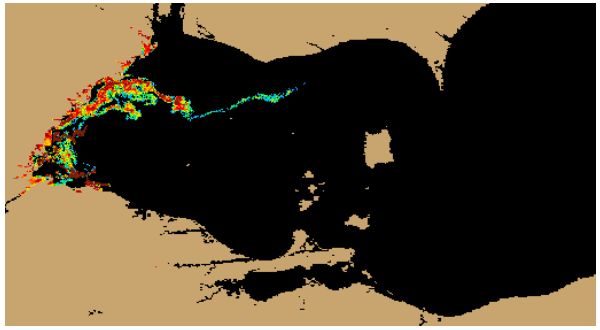


Figure 2. Nowcast position of *Microcystis* spp. bloom for July 22 using GLCFS modeled currents to move the bloom from the July 16 image.

Conditions: There appears to be a bloom of cyanobacteria in western Lake Erie. The bloom has not been validated with in situ sampling.

Analysis: This image is from Saturday. The wind stress has been low and water temperature has been high so the bloom is most likely still at the surface and conditions are favorable to gain biomass. Forecast transport shows a slight NE movement.

-Wynne

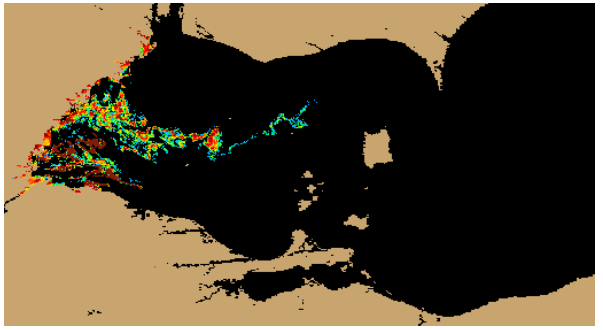
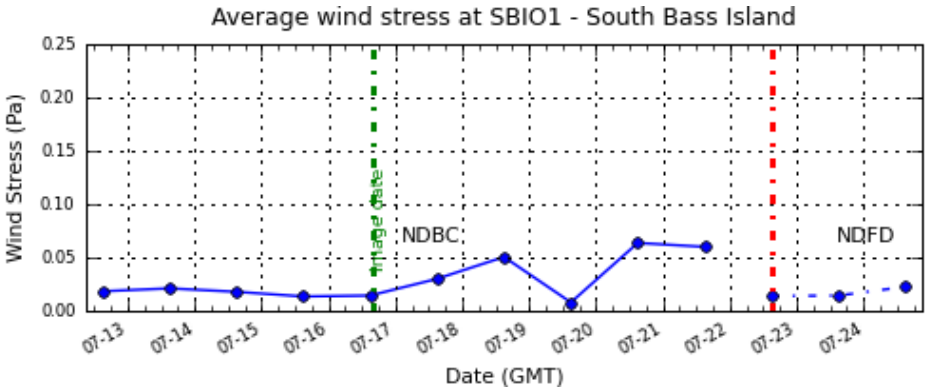
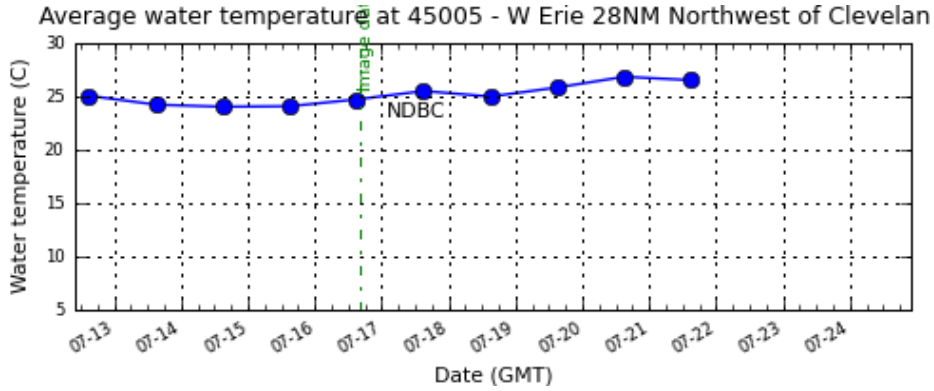


Figure 3. Forecast position of *Microcystis* spp. for July 25 using GLCFS modeled currents to move the bloom from July 16 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
Image date
NDBC
NDFD
07-13
07-14
07-15
07-16
07-17
07-18
07-19
07-20
07-21
07-22
07-23
07-24
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
Image date
NDBC
07-13
07-14
07-15
07-16
07-17
07-18
07-19
07-20
07-21
07-22
07-23
07-24
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-006
14 July 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 07 July 2011

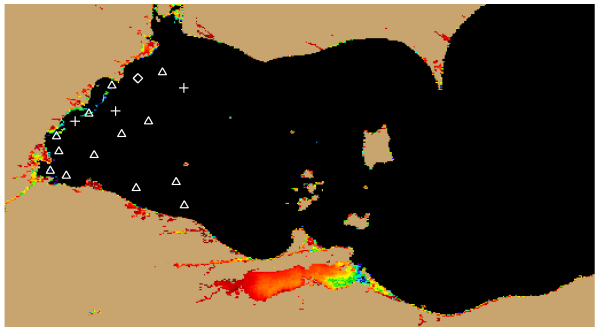


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from July 10, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

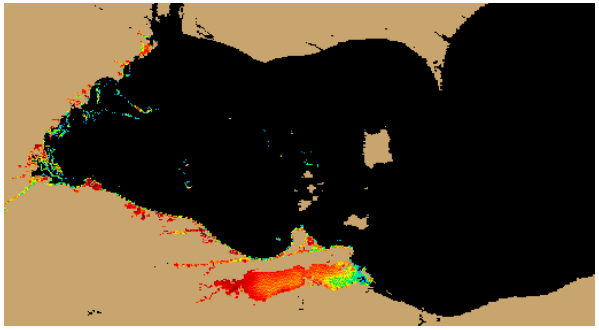


Figure 2. Nowcast position of *Microcystis* spp. bloom for July 14 using GLCFS modeled currents to move the bloom from the July 10 image.

Conditions: There are no harmful algal blooms reported at this time. No impacts expected.

Analysis: There have been no reports of a *Microcystis* bloom at this time. Water temperatures are forecasted to remain near 25 C, which is conducive for a cyanobacterial bloom. Imagery indicates what might be the beginning of a small unidentified bloom just south of Allens Cove. The three day forecast suggests an east-southeast transport of the unidentified feature.

-Briggs, Wynne

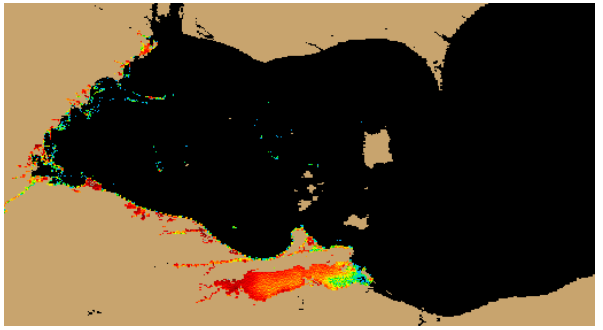
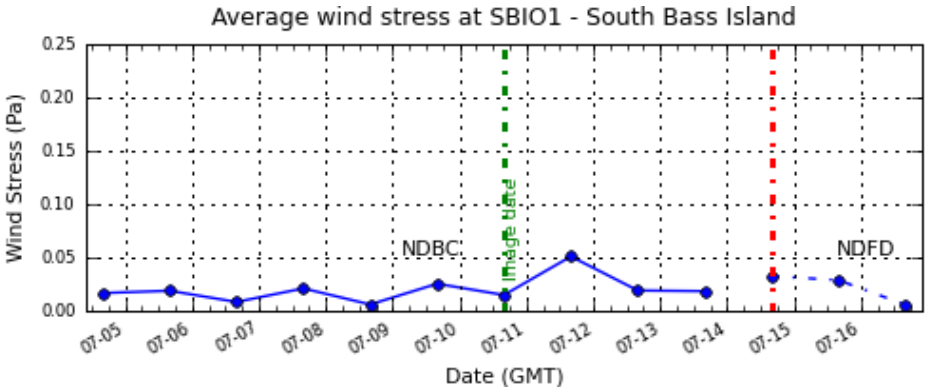
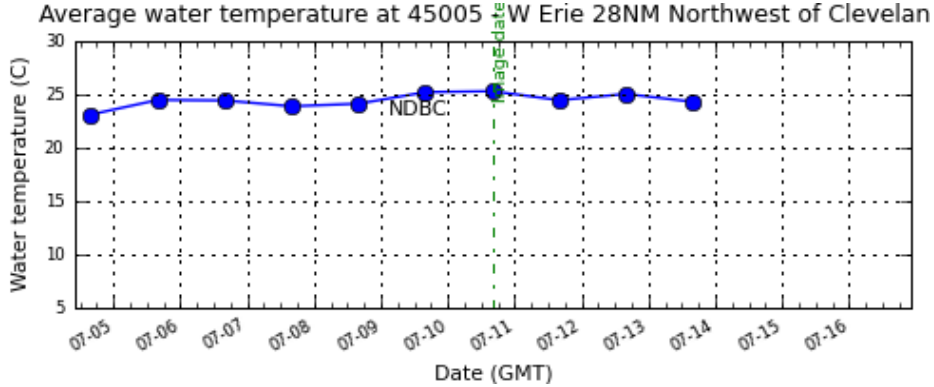


Figure 3. Forecast position of *Microcystis* spp. for July 17 using GLCFS modeled currents to move the bloom from July 10 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
Image date
NDFD
07-05
07-06
07-07
07-08
07-09
07-10
07-11
07-12
07-13
07-14
07-15
07-16
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
07-05
07-06
07-07
07-08
07-09
07-10
07-11
07-12
07-13
07-14
07-15
07-16
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-005
07 July 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 30 June 2011

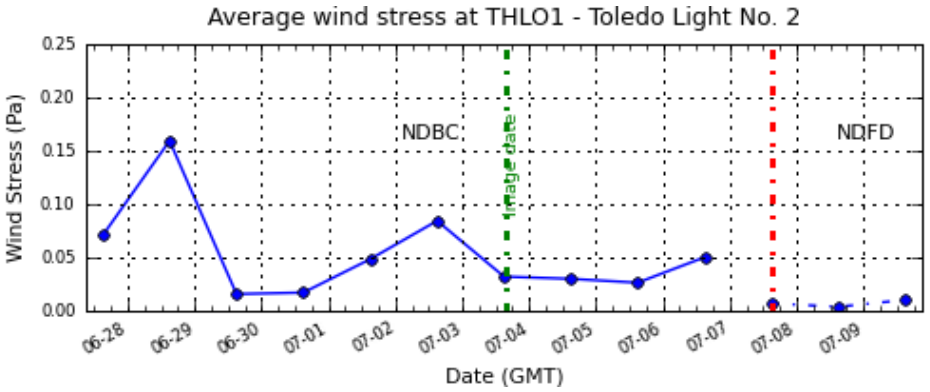
Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from July 03, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

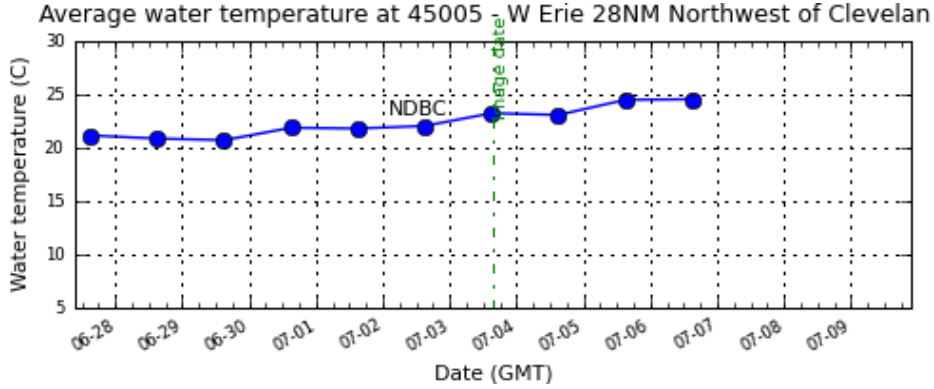
Conditions: There are no harmful algal blooms reported at this time. No impacts are expected.

Analysis: There have been no reports of a *Microcystis* bloom at this time. Water temperatures and forcasted winds are conducive for a cyanobacterial bloom. No new imagery is available since the last bulletin issued on 6/30/2011. The image above does not represent water conditions in the lake.

-Neff, Briggs

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
Image date
NDFD
06-28
06-29
06-30
07-01
07-02
07-03
07-04
07-05
07-06
07-07
07-08
07-09
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
06-28
06-29
06-30
07-01
07-02
07-03
07-04
07-05
07-06
07-07
07-08
07-09
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-004
30 June 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 23 June 2011

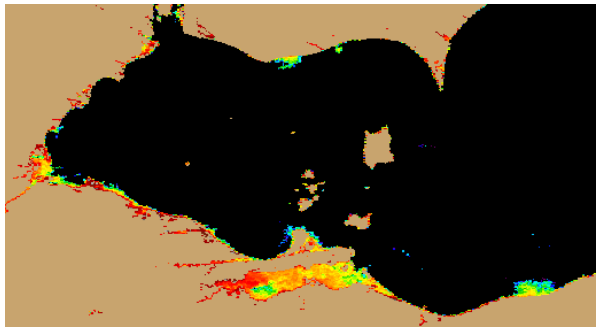


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from June 29, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

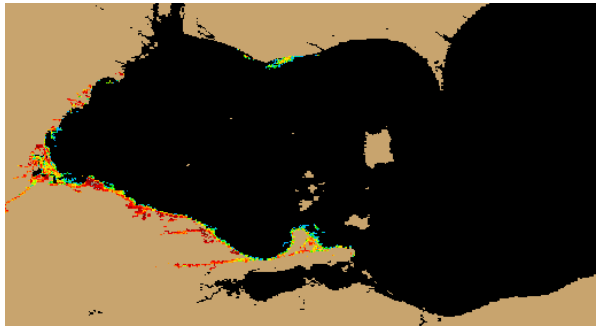


Figure 2. Nowcast position of *Microcystis* spp. bloom for June 30 using GLCFS modeled currents to move the bloom from the June 29 image.

Conditions: There are no harmful algal blooms reported at this time. No impacts are expected.

Analysis: There have been no reports of a *Microcystis* bloom at this time. Water temperatures are continuing to increase and providing conditions conducive for a cyanobacterial bloom. Imagery shows what might be the beginning of an unidentified bloom in Maumee Bay. This unidentified feature is forecasted to undergo an eastward transport through the weekend.

-Briggs, Wynne

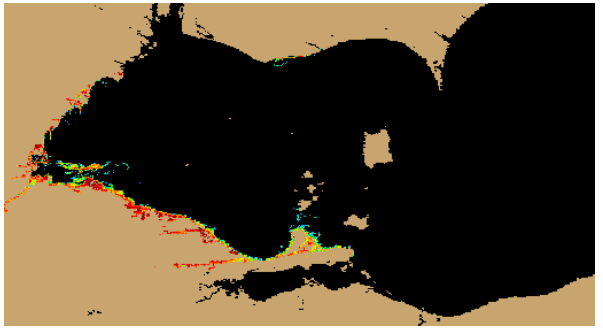
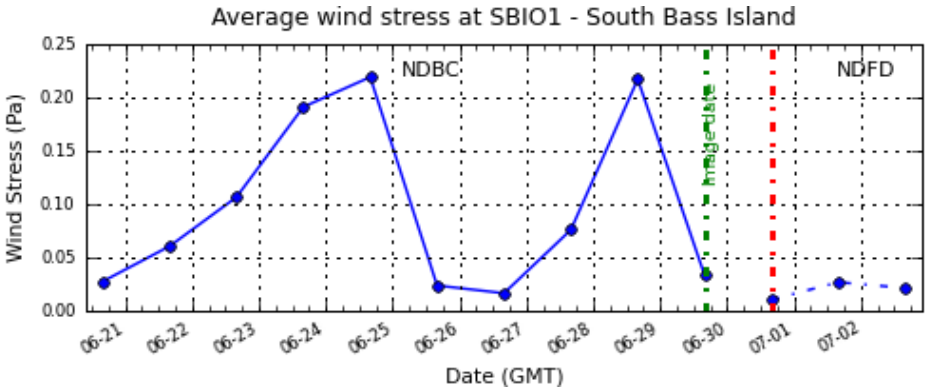
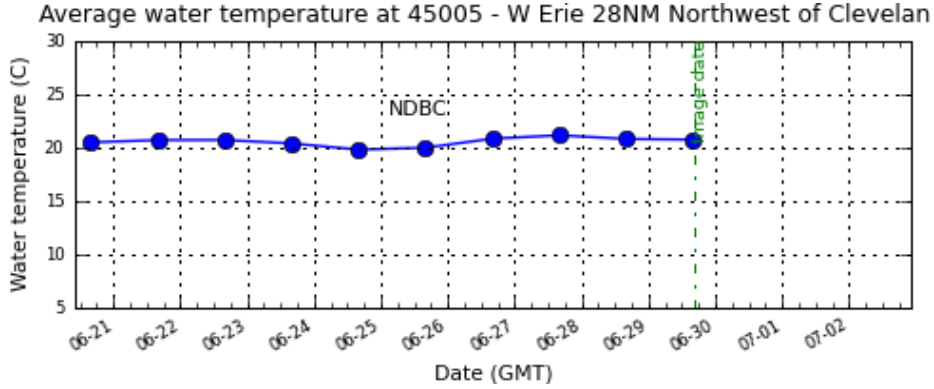


Figure 3. Forecast position of *Microcystis* spp. for July 03 using GLCFS modeled currents to move the bloom from June 29 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
image date
06-21
06-22
06-23
06-24
06-25
06-26
06-27
06-28
06-29
06-30
07-01
07-02
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
image date
06-21
06-22
06-23
06-24
06-25
06-26
06-27
06-28
06-29
06-30
07-01
07-02
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-003
23 June 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 16 June 2011

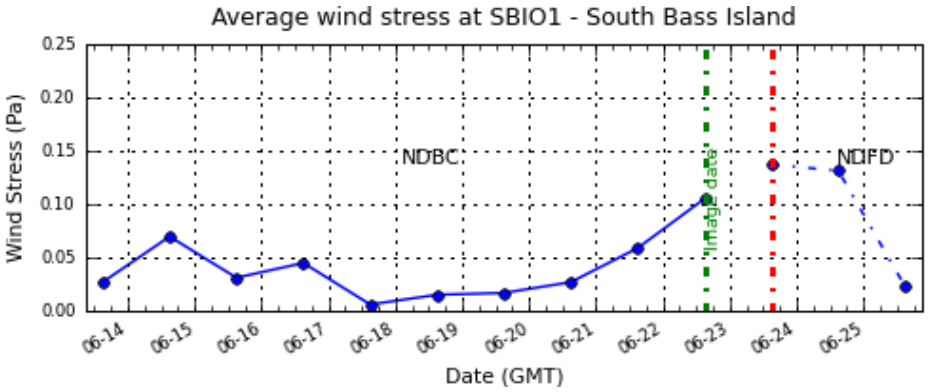
Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from June 22, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

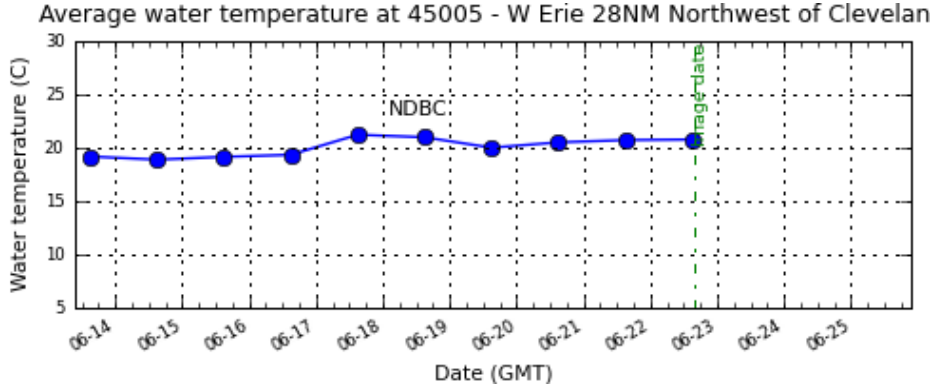
Conditions: There are no harmful algal blooms reported at this time. No impacts are expected.

Analysis: Satellite imagery has been unavailable over the western basin of Lake Erie for over 2 weeks. Therefore, a forecast is impossible at this time. However, sampling around the Bass Islands and Sandusky Bay on Tuesday (6/21/2011) did not indicate the presence of a *Microcystis* bloom at this time. Phytoplankton samples appeared to be dominated by diatoms. Temperatures have increased to approximately 20 degrees C and are conducive for cyanobacteria blooms.

-Tomlinson, Briggs

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
06-14
06-15
06-16
06-17
06-18
06-19
06-20
06-21
06-22
06-23
06-24
06-25
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
06-14
06-15
06-16
06-17
06-18
06-19
06-20
06-21
06-22
06-23
06-24
06-25
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-002
16 June 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 09 June 2011

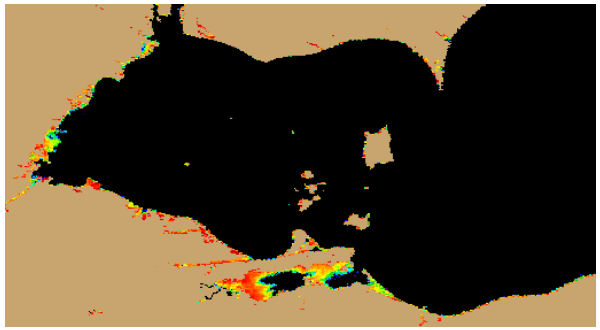


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from June 07, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

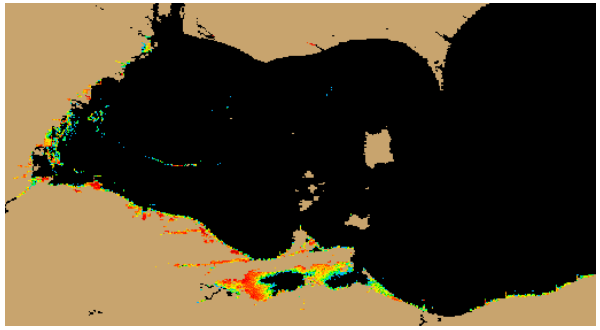


Figure 2. Nowcast position of *Microcystis* spp. bloom for June 16 using GLCFS modeled currents to move the bloom from the June 07 image.

Conditions: There are no harmful algal blooms reported at this time. No impacts are expected.

Analysis: Satellite imagery has been marginal over the western basin of Lake Erie. Imagery used is the same as last week's bulletin accompanied by by a nine day nowcast. Additionally, there are no features in the imagery to suggest a cyanobacterial bloom. Water temperatures are still low, as they increase the chances of cyanobacterial growth also increase.

-Briggs, Wynne

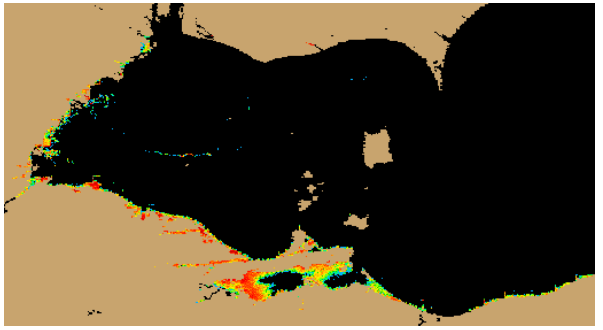
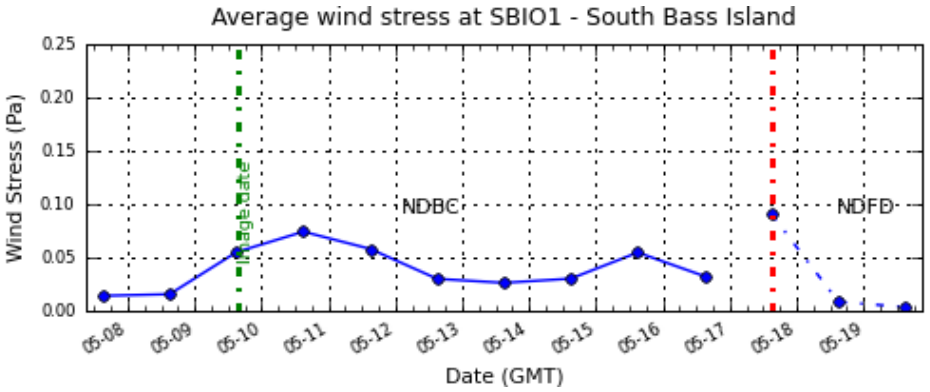
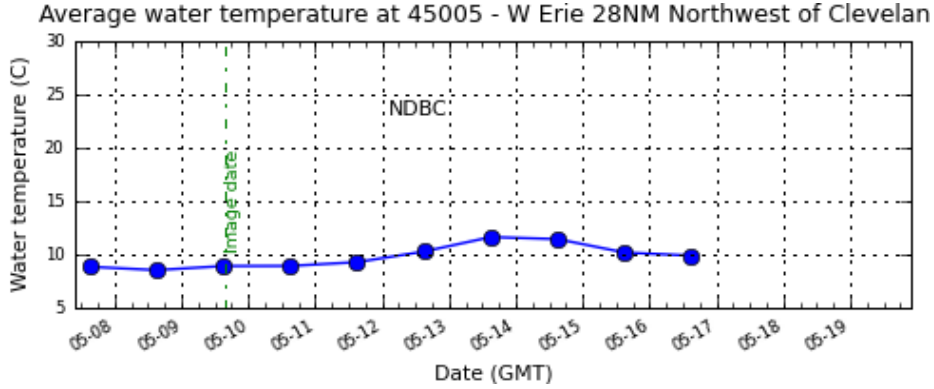


Figure 3. Forecast position of *Microcystis* spp. for June 19 using GLCFS modeled currents to move the bloom from June 07 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
Image date
NDBC
NDFD
05-08
05-09
05-10
05-11
05-12
05-13
05-14
05-15
05-16
05-17
05-18
05-19
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
Image date
NDBC
05-08
05-09
05-10
05-11
05-12
05-13
05-14
05-15
05-16
05-17
05-18
05-19
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2011-001
09 June 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 14 October 2010

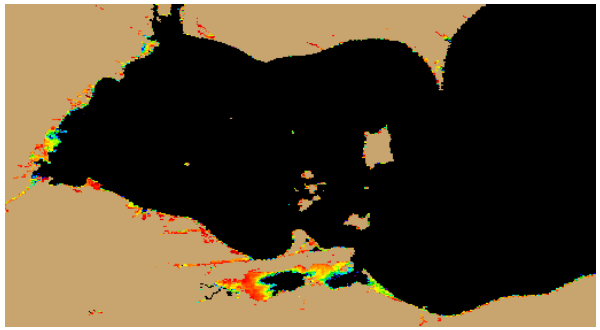


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from June 07, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

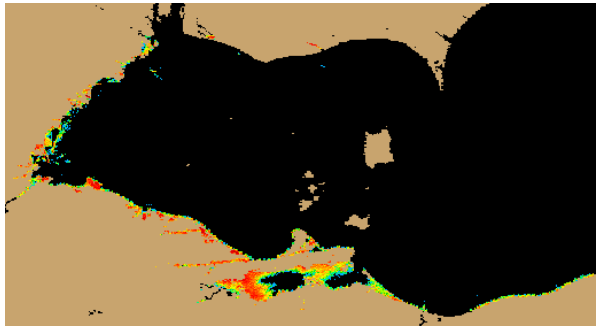


Figure 2. Nowcast position of *Microcystis* spp. bloom for June 09 using GLCFS modeled currents to move the bloom from the June 07 image.

Conditions: There are no harmful algal blooms reported at this time. No impacts are expected.

Analysis: This is the first bulletin of 2011. There are no features in imagery likely to be a cyanobacterial bloom. Water temperatures are still low, as they increase the chances of cyanobacterial growth will increase.

-Wynne, Tomlinson

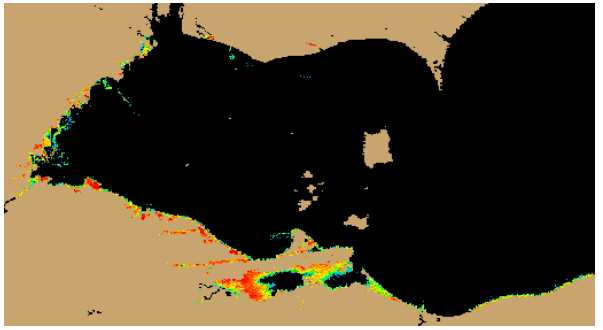
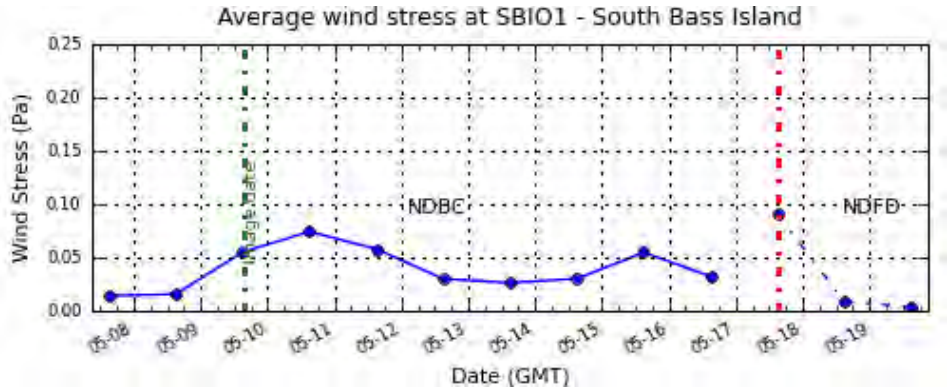
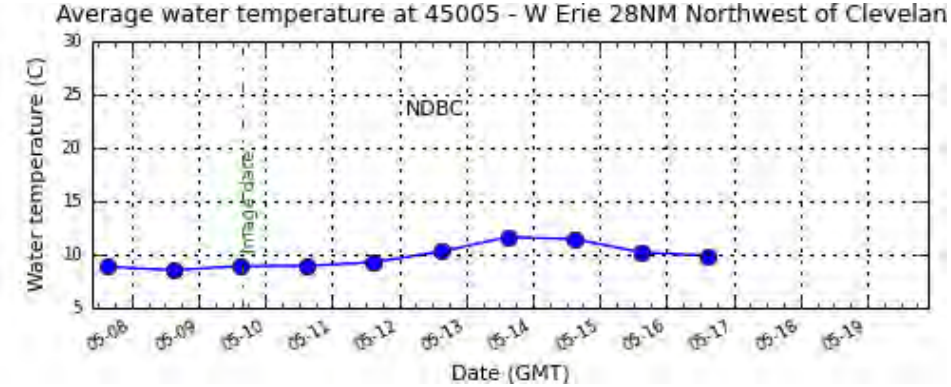


Figure 3. Forecast position of *Microcystis* spp. for June 12 using GLCFS modeled currents to move the bloom from June 07 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
05-08
05-09
05-10
05-11
05-12
05-13
05-14
05-15
05-16
05-17
05-18
05-19
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
05-08
05-09
05-10
05-11
05-12
05-13
05-14
05-15
05-16
05-17
05-18
05-19
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-020
14 October 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 07 October 2010

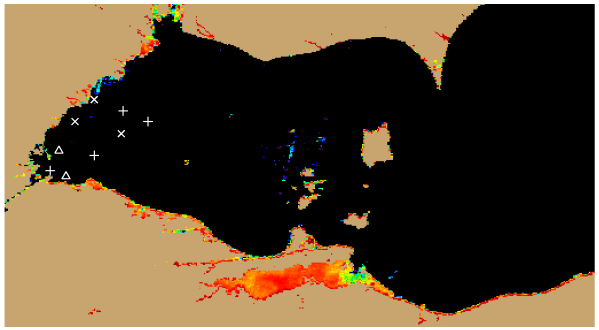


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from October 12, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from October 07 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

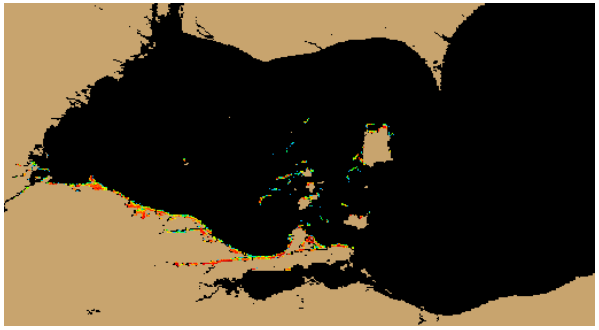


Figure 2. Nowcast position of *Microcystis* spp. bloom for October 14 using GLCFS modeled currents to move the bloom from the October 12 image.

Conditions: The cyanobacterial bloom in western Lake Erie is dissipating.

Analysis: Imagery indicates that the bloom is rapidly dissipating in western Lake Erie. Temperature plots show decreasing temperatures and forecasted consistent temperatures below 15 C indicate the demise of the bloom within the next week.

-Lopez, Neff

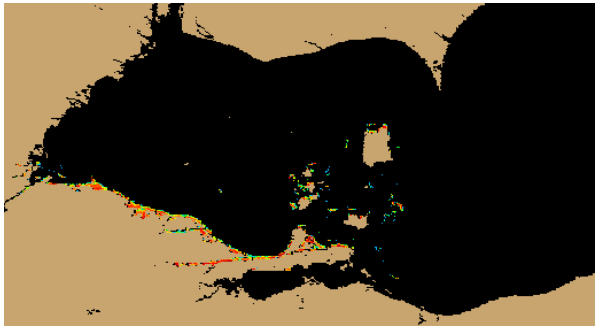
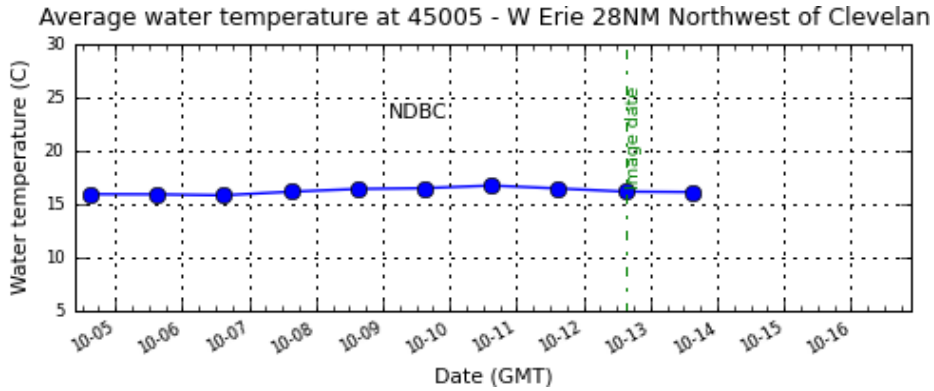
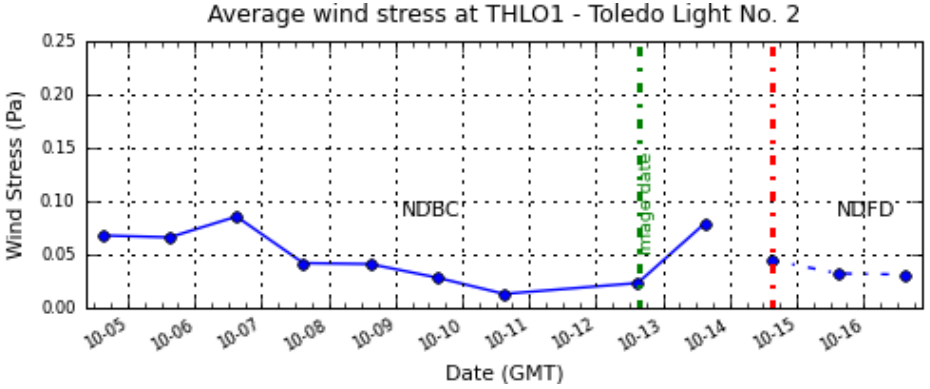


Figure 3. Forecast position of *Microcystis* spp. for October 17 using GLCFS modeled currents to move the bloom from October 12 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Today
10-05
10-06
10-07
10-08
10-09
10-10
10-11
10-12
10-13
10-14
10-15
10-16
Date (GMT)


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
Today
NDFD
10-05
10-06
10-07
10-08
10-09
10-10
10-11
10-12
10-13
10-14
10-15
10-16
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-019
07 October 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 30 September 2010

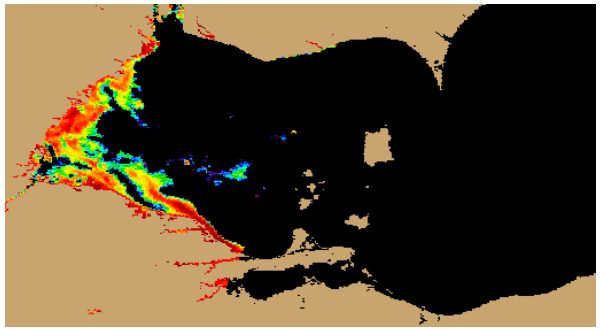


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from October 01, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

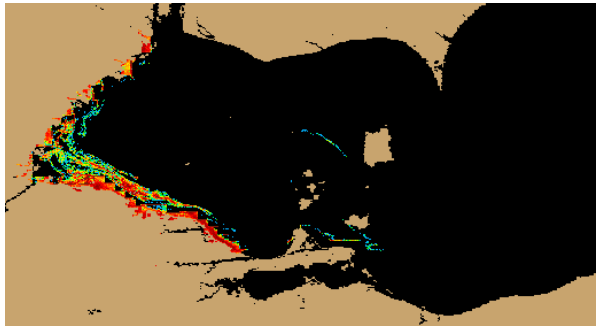


Figure 2. Nowcast position of *Microcystis* spp. bloom for October 07 using GLCFS modeled currents to move the bloom from the October 01 image.

Conditions: A cyanobacterial bloom has been identified in Maumee Bay.

Analysis: Imagery indicates the cyanobacteria bloom in Maumee Bay continues to persist. Previous sampling has indicated the bloom is dominated by *Anabaena* with only low concentrations of *Microcystis*. The eastern extent of the bloom is not known as the eastern edge of the satellite swath for this particular image is around Camp Perry and the eastern tip of Sandusky Bay. Transport shows the bloom concentrating slightly along the shore. However, the image used is several days old and since the date of the image there has been a major wind event (October 3 and 4) that most likely mixed the bloom in the water column. Since then calmer winds may have permitted the bloom to resurface.

-Neff, Lopez, Tomlinson

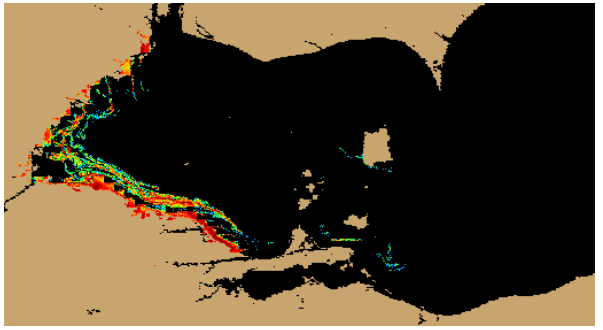
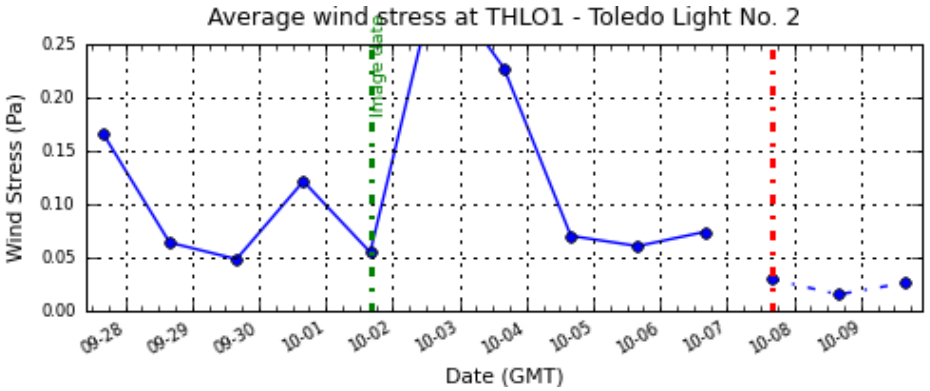
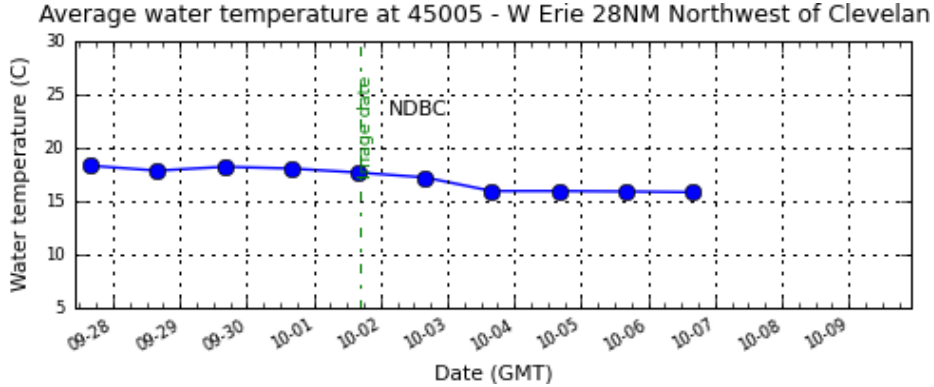


Figure 3. Forecast position of *Microcystis* spp. for October 10 using GLCFS modeled currents to move the bloom from October 01 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
Image date
09-28
09-29
09-30
10-01
10-02
10-03
10-04
10-05
10-06
10-07
10-08
10-09
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
Image date
NDBC
09-28
09-29
09-30
10-01
10-02
10-03
10-04
10-05
10-06
10-07
10-08
10-09
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-018
30 September 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 23 September 2010

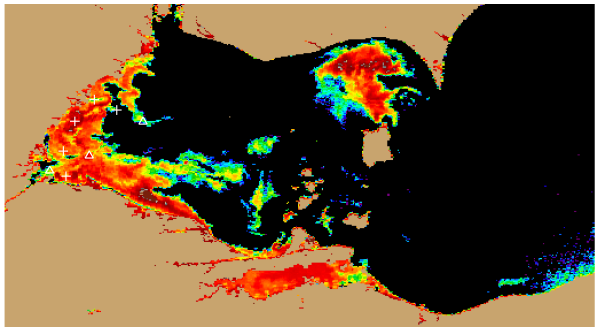


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from September 29, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

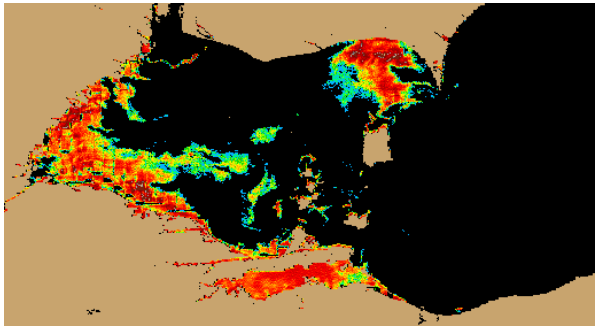


Figure 2. Nowcast position of *Microcystis* spp. bloom for September 30 using GLCFS modeled currents to move the bloom from the September 29 image.

Conditions: A Microcystis bloom has been indentified in Maumee Bay, extending north to Brest Bay

Analysis: Imagery indicates a large cyanobacterial bloom persists in western Lake Erie. Field counts suggest the bloom is dominated by Anabaena with low to very low concentrations of Microcystis present. Strong winds over the past week may account for subsurface mixing of the bloom and some cells may still be submerged and undetectable by satellite. Winds are forecast to increase into the weekend, which may account for further mixing and possible weakening of the bloom. Forecast currents show the bloom transporting slightly west southwest. Current water temperature conditions favor continued growth.

-Briggs, Wynne

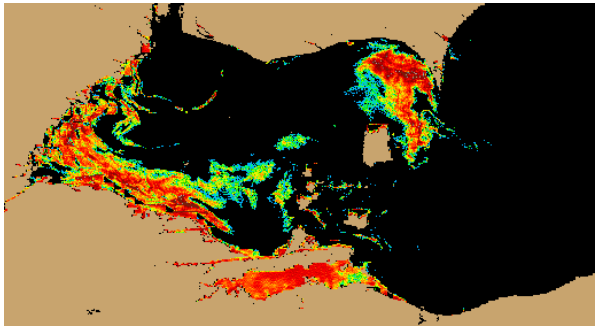
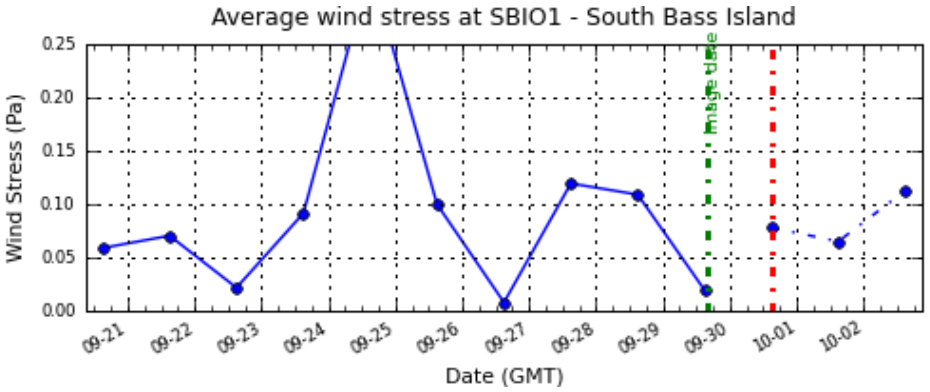
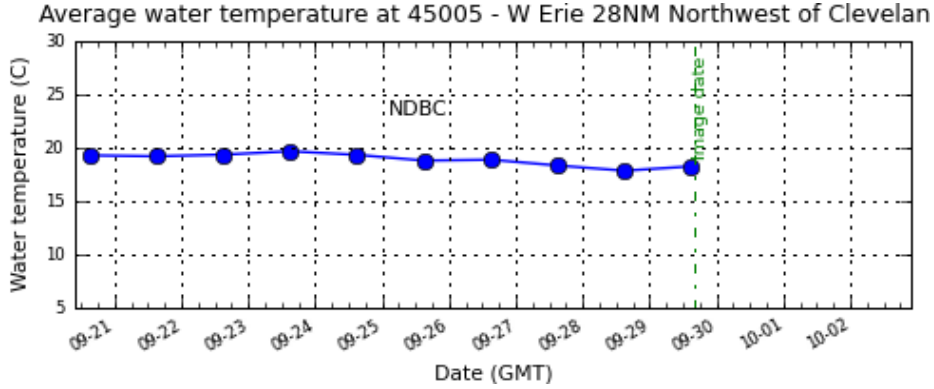


Figure 3. Forecast position of *Microcystis* spp. for October 03 using GLCFS modeled currents to move the bloom from September 29 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
Image date
09-21
09-22
09-23
09-24
09-25
09-26
09-27
09-28
09-29
09-30
10-01
10-02
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
09-21
09-22
09-23
09-24
09-25
09-26
09-27
09-28
09-29
09-30
10-01
10-02
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-017
23 September 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 17 September 2010

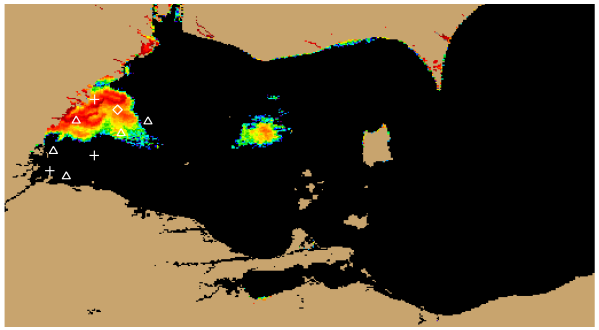


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from September 19, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

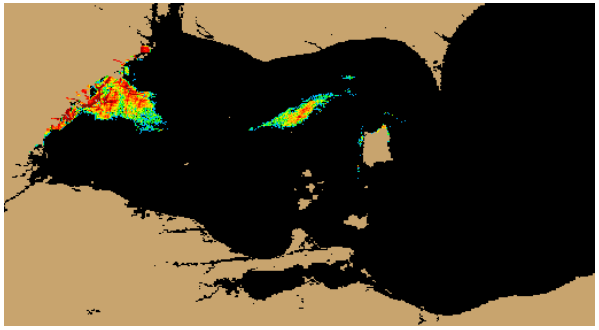


Figure 2. Nowcast position of *Microcystis* spp. bloom for September 23 using GLCFS modeled currents to move the bloom from the September 19 image.

Conditions: A Microcystis bloom has been identified in Maumee Bay, extending north to Brest Bay.

Analysis: Imagery indicates that a large bloom of cyanobacteria still exists in western Lake Erie. The bloom is dominated by Anabaena, with some Microcystis present. The feature is likely larger, than shown in the image due to the presence of clouds (not shown in image). Forecasts show the bloom will likely be transported to the north. Current conditions will favor continued growth. NDFD wind forecasts show expected high windstress this weekend, which may weaken the bloom, and mix it into the water column.

-Wynne, Neff

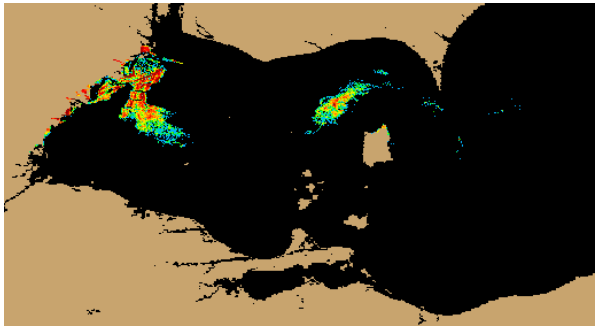
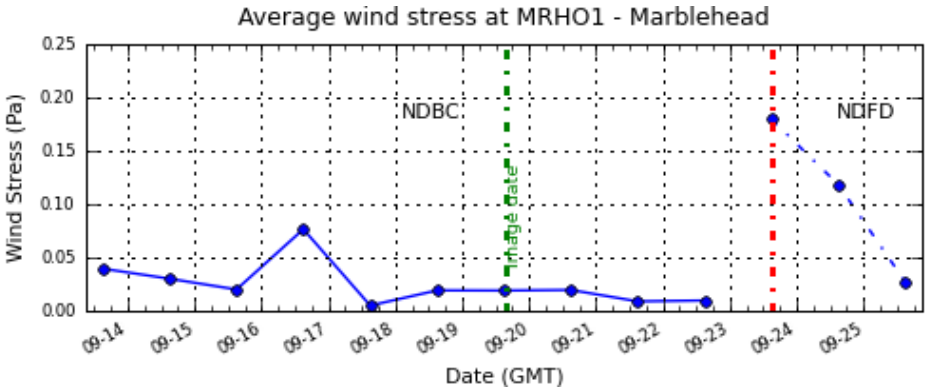
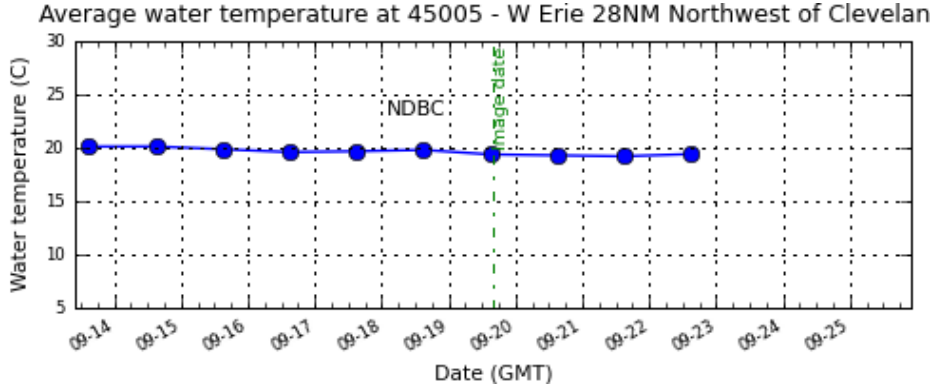


Figure 3. Forecast position of *Microcystis* spp. for September 26 using GLCFS modeled currents to move the bloom from September 19 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at MRHO1 - Marblehead
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
09-14
09-15
09-16
09-17
09-18
09-19
09-20
09-21
09-22
09-23
09-24
09-25
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
09-14
09-15
09-16
09-17
09-18
09-19
09-20
09-21
09-22
09-23
09-24
09-25
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-016
17 September 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 13 September 2010

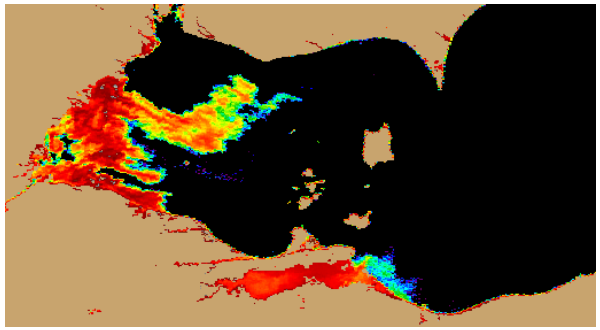


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from September 13, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

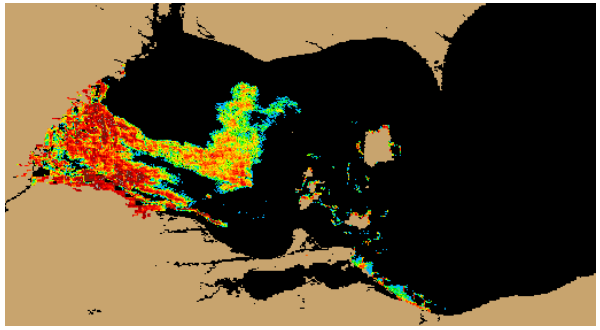


Figure 2. Nowcast position of *Microcystis* spp. bloom for September 17 using GLCFS modeled currents to move the bloom from the September 13 image.

Conditions: A Microcystis bloom has been identified in Maumee Bay and extends north into Brest Bay.

Analysis: Imagery indicates that a bloom still exists in a large portion of western Lake Erie and northward into Brest Bay. A 2nd bloom is also observed just outside of Sandusky Bay. Field samples indicate that Microcystis concentrations range from medium to very low with the highest concentrations right ta the Maumee River mouth. In addition it appears that the bloom is mixed and dominated by Anabaena. As the imagery cannot distinguish between 2 species of cyanobacteria, highlighted regions most likely indicate the presence of both. Transport through September 19 indicates that overall the bloom may move southward and to the east. In particular, the southern portion may extend offshore and east of Locust Point by Sunday. Projected low wind stress should keep concentrations at the surface. Water temperatures are not expected to decrease and are warm enough to support increased concentration levels.

-Tomlinson, Wynne

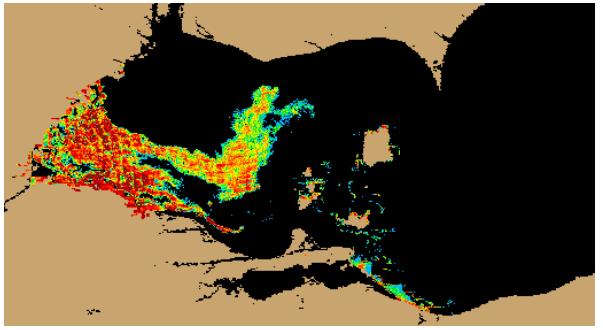
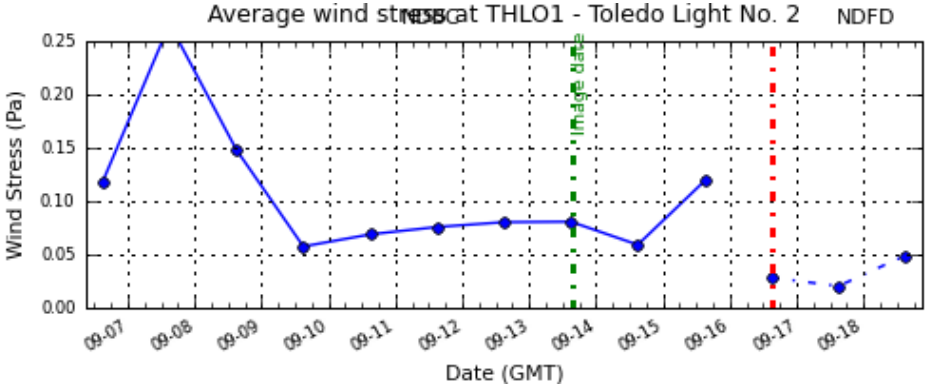
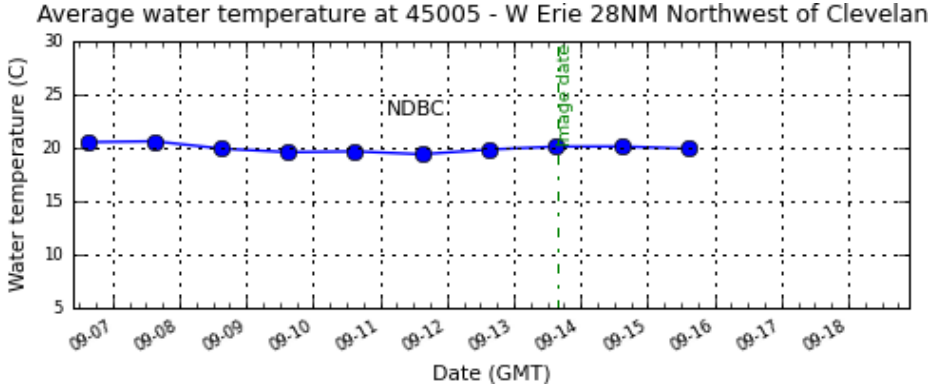


Figure 3. Forecast position of *Microcystis* spp. for September 20 using GLCFS modeled currents to move the bloom from September 13 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
NDBC
NDFD
Image date
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
09-07
09-08
09-09
09-10
09-11
09-12
09-13
09-14
09-15
09-16
09-17
09-18
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
NDBC
Image date
Water temperature (C)
30
25
20
15
10
5
09-07
09-08
09-09
09-10
09-11
09-12
09-13
09-14
09-15
09-16
09-17
09-18
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-015
13 September 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 02 September 2010

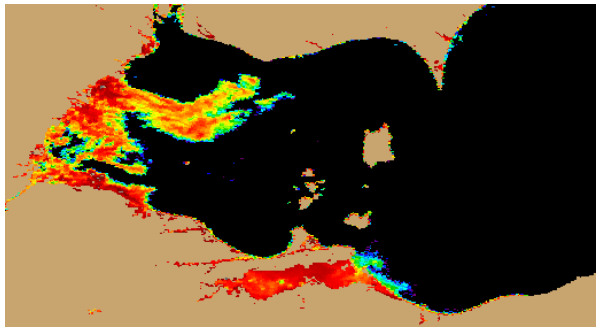


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from September 12, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

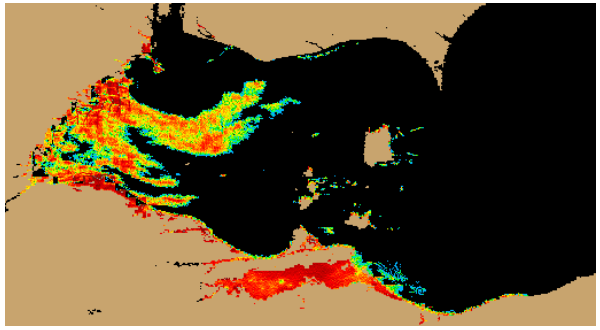


Figure 2. Nowcast position of *Microcystis* spp. bloom for September 13 using GLCFS modeled currents to move the bloom from the September 12 image.

Conditions: A Microcystis bloom has been identified in Maumee Bay and extrends north near Brest Bay.

Analysis: The portion of the bloom along the SW shore of Lake Erie is forecast to expand to the east past Locust Point, with the remainder of the bloom being relatively stationary. No large features are evident in the vicinity of the Bass Islands. Projected low wind stress should keep concentrations near the surface. Water temperatures are still warm enough to support increased concentration levels.

-Wynne, Stumpf

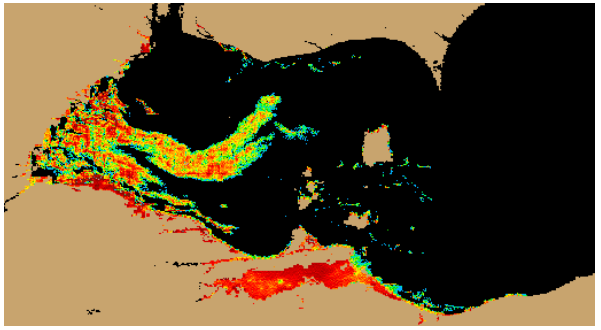
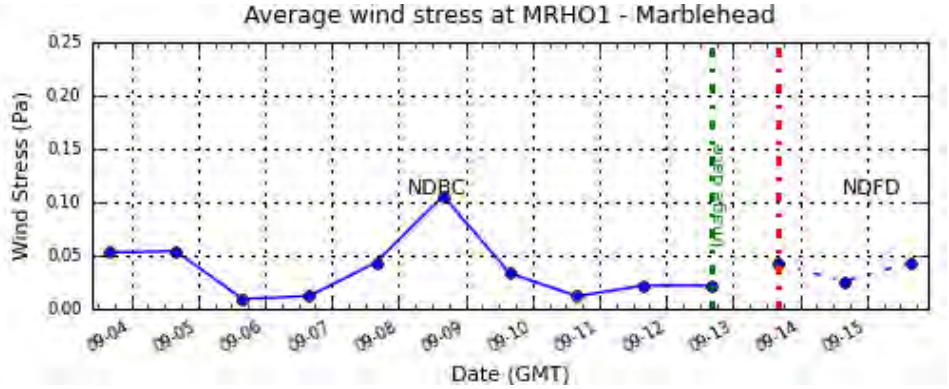
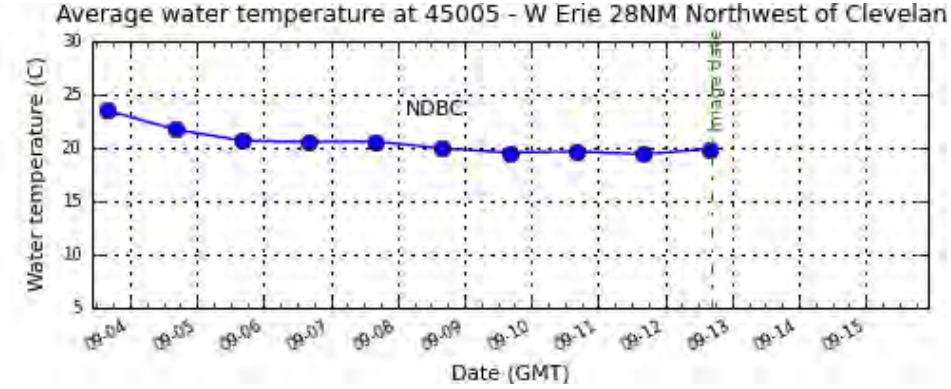


Figure 3. Forecast position of *Microcystis* spp. for September 16 using GLCFS modeled currents to move the bloom from September 12 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at MRHO1 - Marblehead
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
09-04
09-05
09-06
09-07
09-08
09-09
09-10
09-11
09-12
09-13
09-14
09-15
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
09-04
09-05
09-06
09-07
09-08
09-09
09-10
09-11
09-12
09-13
09-14
09-15
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-014
02 September 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 26 August 2010

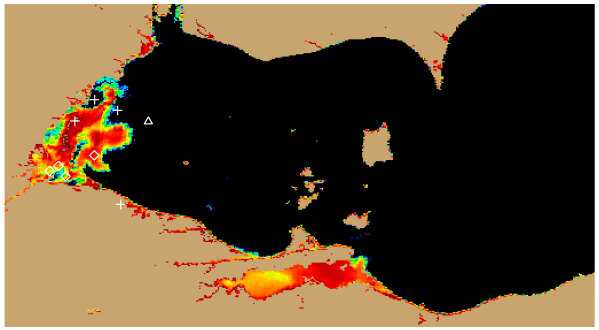


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from August 31, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

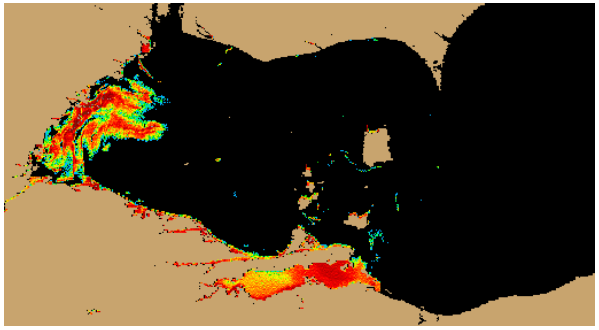


Figure 2. Nowcast position of *Microcystis* spp. bloom for September 02 using GLCFS modeled currents to move the bloom from the August 31 image.

Conditions: A *Microcystis* bloom has been indentified in Maumee Bay and extends north into Brest Bay.

Analysis: Imagery and field samples indicate medium to low concentrations of *Microcystis* in Maumee Bay and extending north into Brest Bay. A large bloom of *Anabaena* was also observed in the western basin and seemed to dominate the phytoplankton community.

The forecast shows offshore eastward transport of the bloom. Additionally, strong winds are forecasted into the weekend and may cause subsurface mixing of the bloom.

-Briggs, Tomlinson

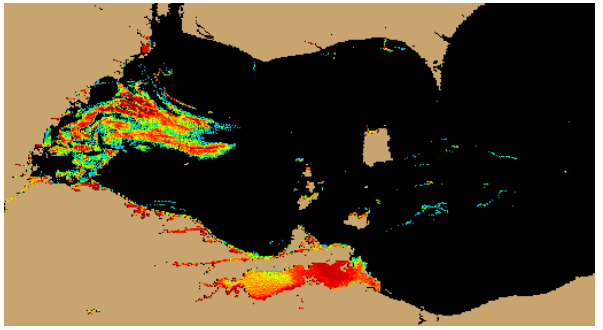
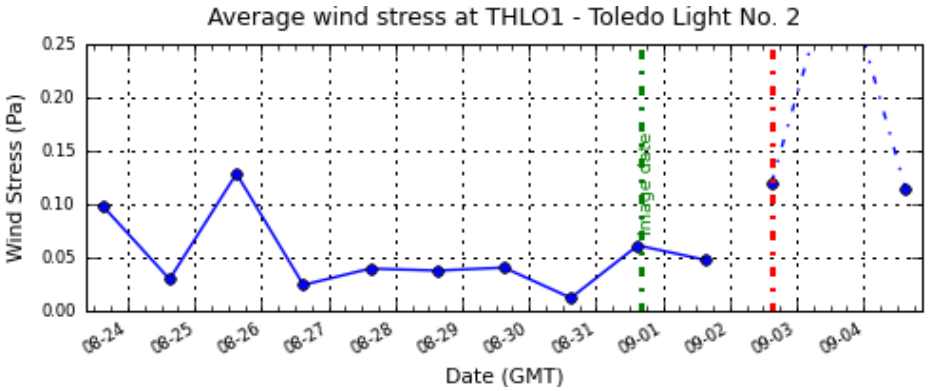
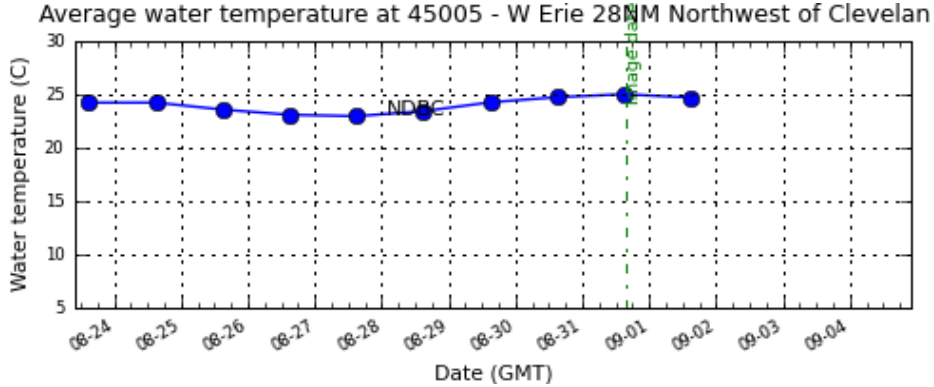


Figure 3. Forecast position of *Microcystis* spp. for September 05 using GLCFS modeled currents to move the bloom from August 31 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
08-24
08-25
08-26
08-27
08-28
08-29
08-30
08-31
09-01
09-02
09-03
09-04
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
08-24
08-25
08-26
08-27
08-28
08-29
08-30
08-31
09-01
09-02
09-03
09-04
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-013
26 August 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 19 August 2010

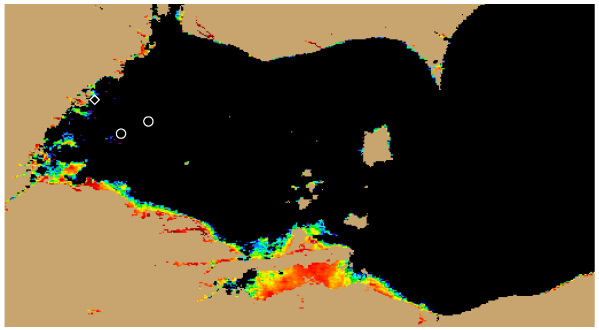


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from August 25, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from August 23 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

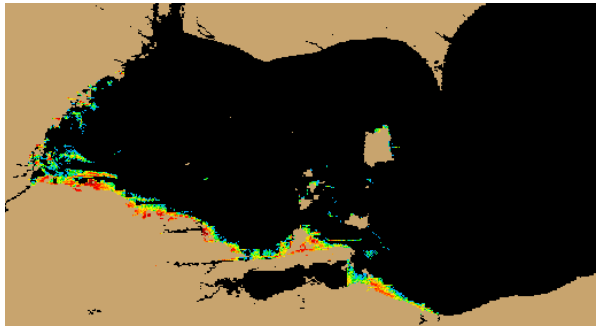


Figure 2. Nowcast position of *Microcystis* spp. bloom for August 26 using GLCFS modeled currents to move the bloom from the August 25 image.

Conditions: A bloom of the cyanobacteria, *Microcystis*, has been identified in Maumee Bay, around Catawba Island and the Bass Islands.

Analysis: Imagery and field observations indicate a large *Microcystis* bloom in western Lake Erie. Field sampling indicates bloom presence extends northeast of Maumee Bay. Imagery identifies the bloom along the southern shore of the western basin as far as Sandusky with an unconfirmed patch east of Sandusky Bay. Prior to August 25, buoy data and field observations show strong winds in the western basin of Lake Erie. These winds may have caused the bloom to mix in the water column. However, data show calmer winds around South Bass Island. High winds today may cause further mixing. Clouds (not shown) prevent analysis of bloom extent on the imagery. Transport shows minimal net movement over the next few days.

-Neff, Briggs

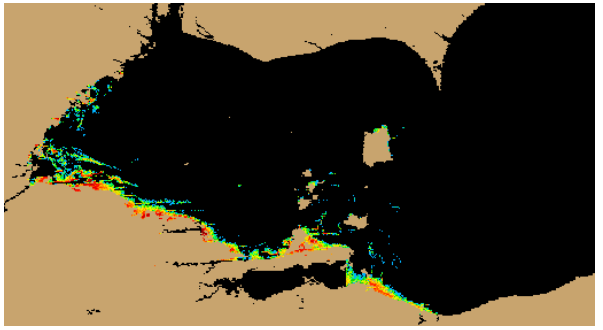
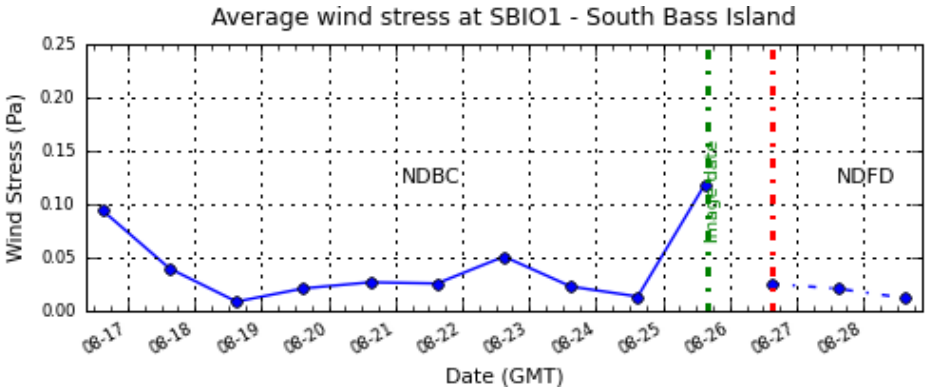
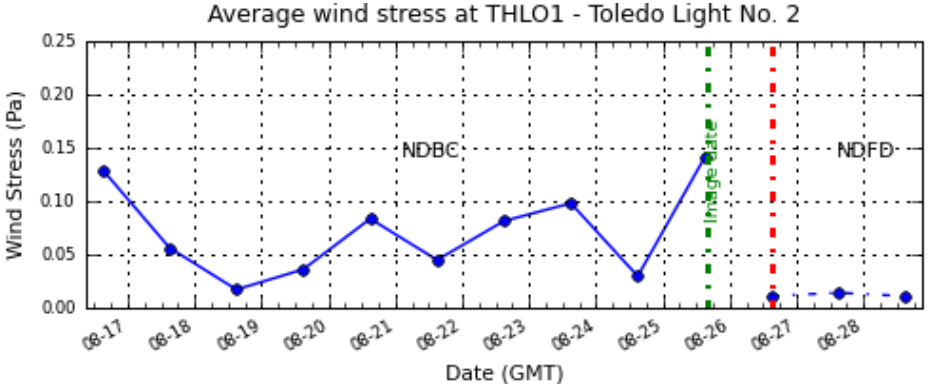


Figure 3. Forecast position of *Microcystis* spp. for August 29 using GLCFS modeled currents to move the bloom from August 25 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
08-17
08-18
08-19
08-20
08-21
08-22
08-23
08-24
08-25
08-26
08-27
08-28
Date (GMT)


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
08-17
08-18
08-19
08-20
08-21
08-22
08-23
08-24
08-25
08-26
08-27
08-28
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-012
19 August 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 12 August 2010

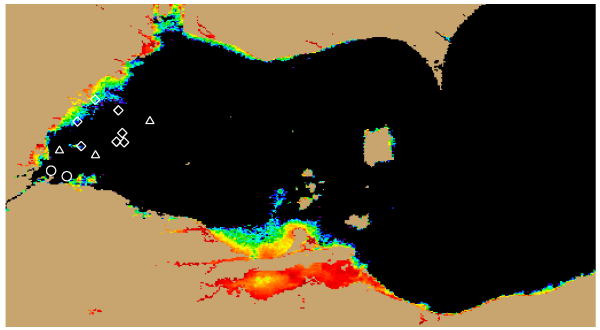


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from August 18, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from August 16 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

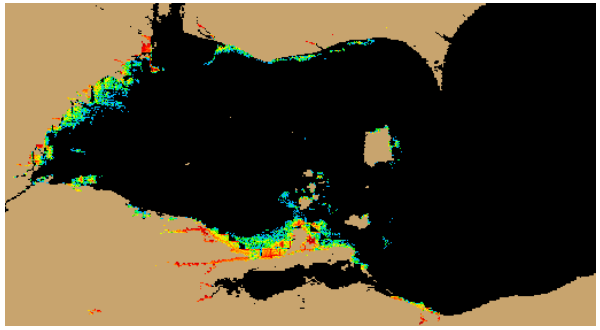


Figure 2. Nowcast position of *Microcystis* spp. bloom for August 19 using GLCFS modeled currents to move the bloom from the August 18 image.

Conditions: A bloom of the cyanobacteria, *Microcystis* has been identified in Maumee Bay, around Catawba Island and the Bass Islands

Analysis: Imagery and field observations indicate a large *Microcystis* bloom in western Lake Erie. According to field samples, low-high concentrations of *Microcystis* were observed throughout the western basin in Maumee Bay and to the northeast. Cloudy imagery (not shown here, but appears black in imagery) prevents an analysis of extent in this region. Another large patch is observed around Catawba Island and to the west to Locust Point, with patchy blooms around the Bass Islands. Imagery is also flagging an area hugging the northwest coast north of Maumee Bay. A single sample indicates medium concentrations and therefore the bloom may extend to this area. Sampling is recommended. Transport indicates that the Catawba bloom may extend further into the lake by August 22, with little eastward movement.

-Tomlinson, Wynne

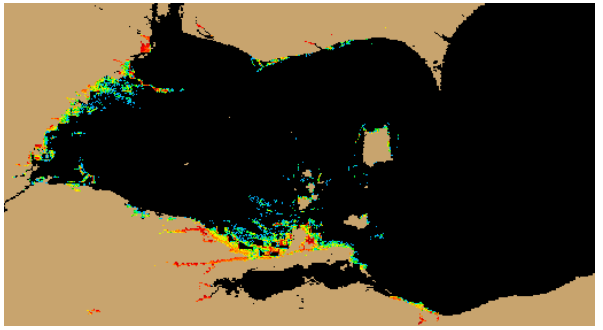
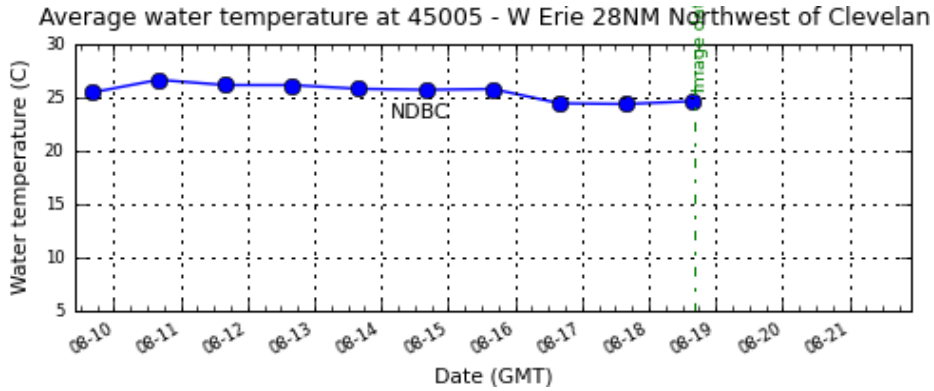
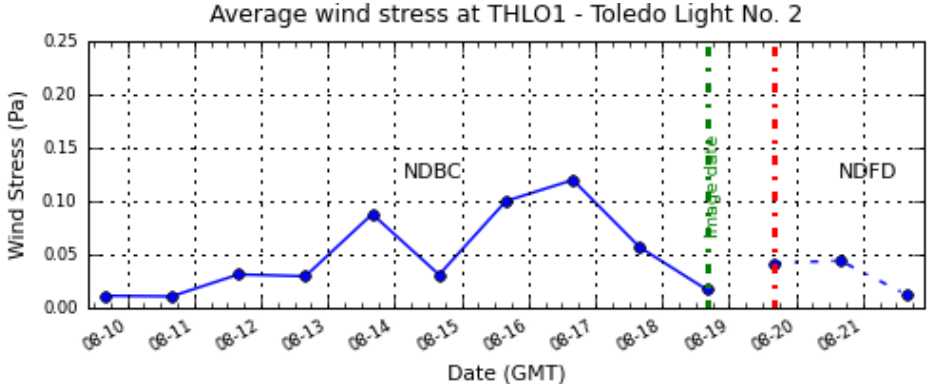


Figure 3. Forecast position of *Microcystis* spp. for August 22 using GLCFS modeled currents to move the bloom from August 18 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
08-10
08-11
08-12
08-13
08-14
08-15
08-16
08-17
08-18
08-19
08-20
08-21
Date (GMT)


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
08-10
08-11
08-12
08-13
08-14
08-15
08-16
08-17
08-18
08-19
08-20
08-21
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-011
12 August 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 12 August 2010

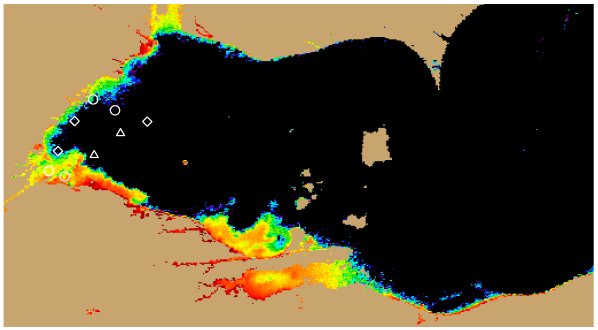


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from August 09, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

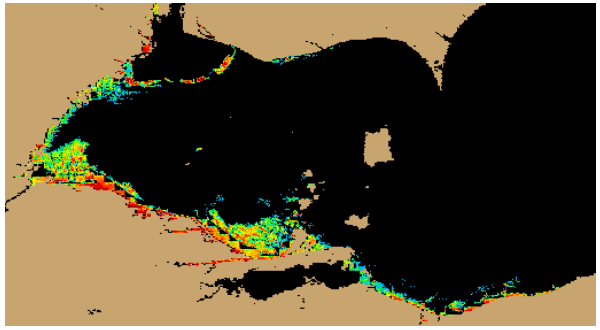


Figure 2. Nowcast position of *Microcystis* spp. bloom for August 12 using GLCFS modeled currents to move the bloom from the August 09 image.

Conditions: A bloom of the cyanobacteria, Microcystis, has been identified in the areas of Maumee Bay and Catawba Island.

Analysis: Imagery and field observations from earlier this week indicate high concentrations of Microcystis in Maumee Bay and in the area of Catawba Island and South Bass Island. Field observations showed the highest densities of Microcystis just east of Catawba Island and in Put-in-Bay. Models indicate slight offshore and eastward transport over the next three days. Winds are forecasted to increase slightly but remain relatively low over the weekend. -Lopez, Briggs

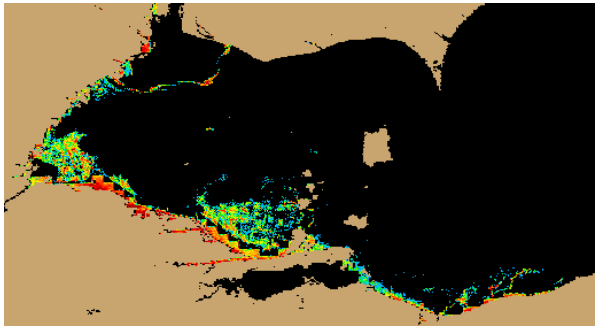
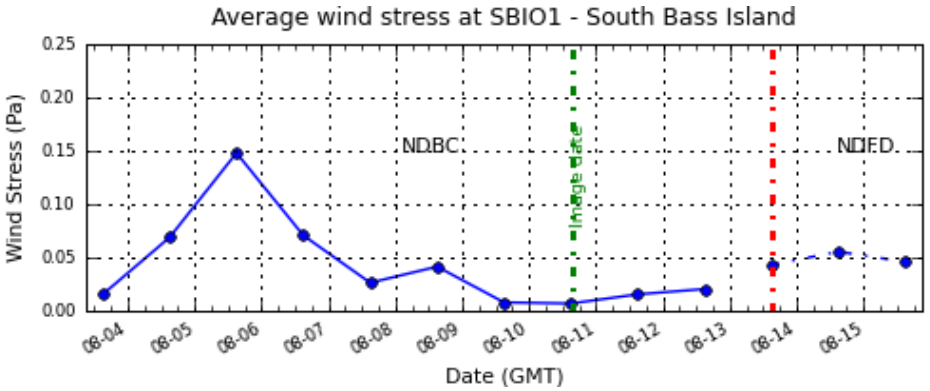
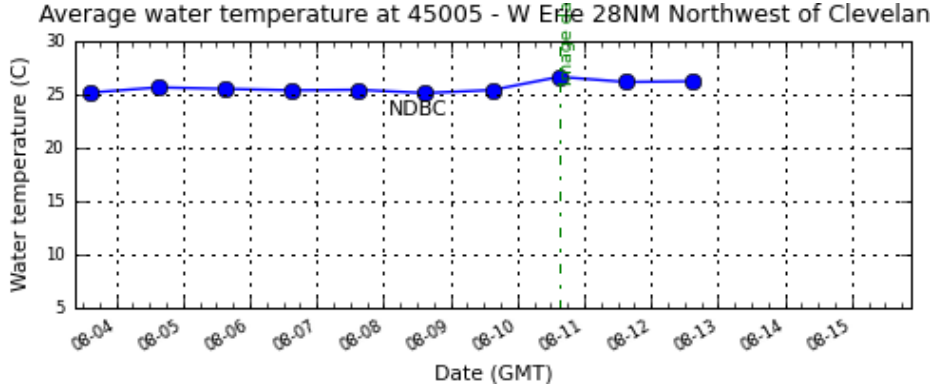


Figure 3. Forecast position of *Microcystis* spp. for August 15 using GLCFS modeled currents to move the bloom from August 09 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
Image date
NDFD
08-04
08-05
08-06
08-07
08-08
08-09
08-10
08-11
08-12
08-13
08-14
08-15
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
08-04
08-05
08-06
08-07
08-08
08-09
08-10
08-11
08-12
08-13
08-14
08-15
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-009
05 August 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 29 July 2010

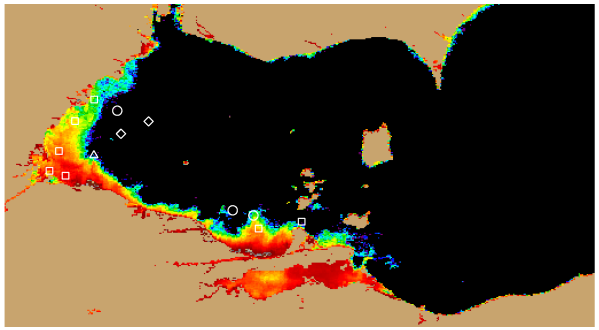


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from July 30, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

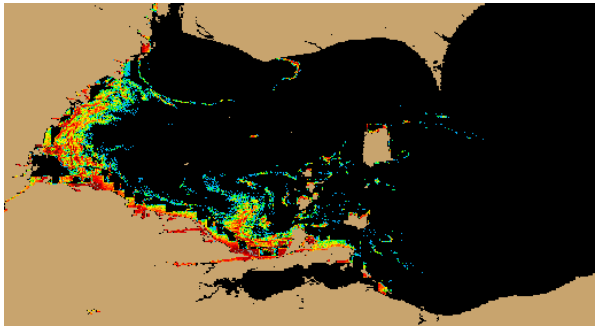


Figure 2. Nowcast position of *Microcystis* spp. bloom for August 05 using GLCFS modeled currents to move the bloom from the July 30 image.

Conditions: A bloom of Microcystis cyanobacteria has been identified from Maumee Bay to Catawba Island.

Analysis: Imagery and field samples indicate very high concentrations of Microcystis in Maumee Bay and north along the coast to La Plaisance Bay. Very high concentrations of Microcystis are also present east of Catawba Island. Models indicate an eastward offshore transport of the bloom area north of Maumee Bay. Additionally, no transport is predicted for the area east of Catawba Island. Winds are forecasted to decrease into the weekend.

-Briggs

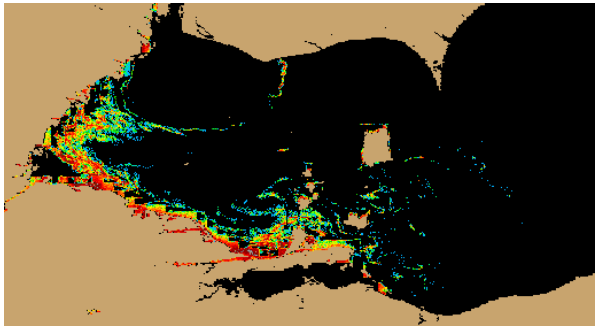
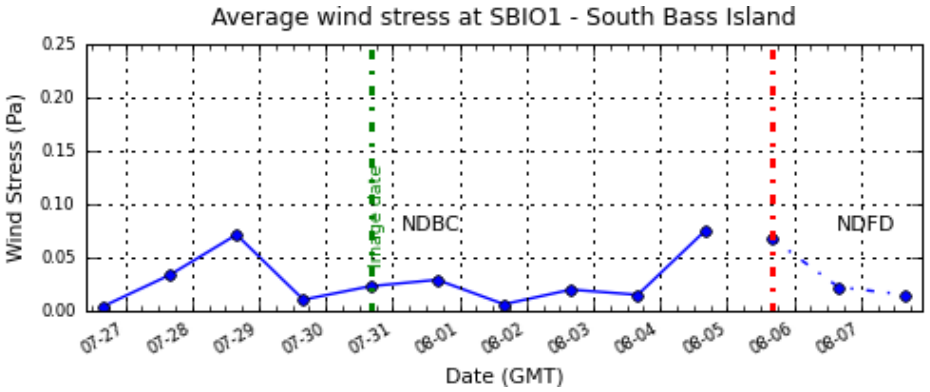
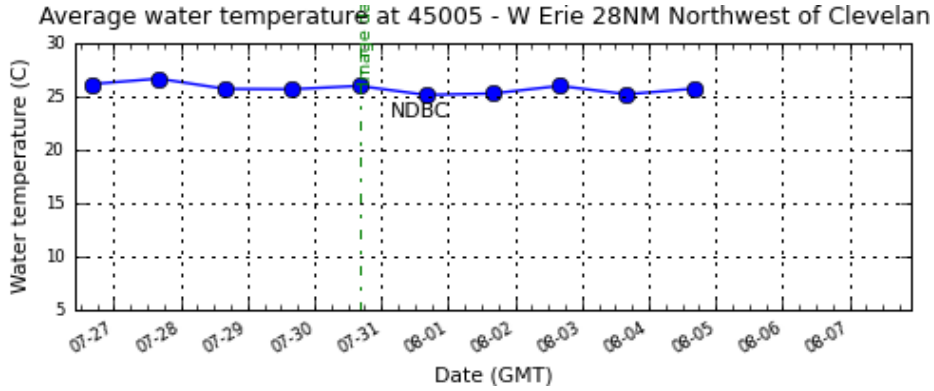


Figure 3. Forecast position of *Microcystis* spp. for August 08 using GLCFS modeled currents to move the bloom from July 30 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
Image date
NDBC
NDFD
07-27
07-28
07-29
07-30
07-31
08-01
08-02
08-03
08-04
08-05
08-06
08-07
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
Image date
NDBC
07-27
07-28
07-29
07-30
07-31
08-01
08-02
08-03
08-04
08-05
08-06
08-07
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-008
29 July 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 22 July 2010

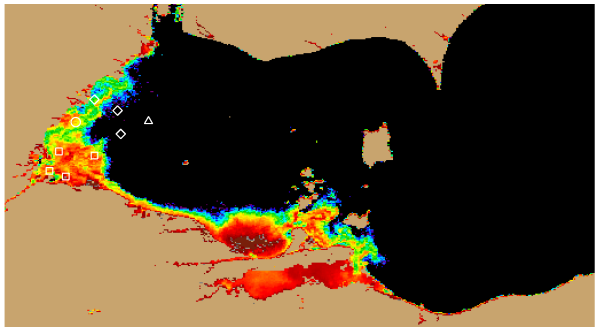


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from July 27, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from July 26 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

Conditions: A bloom of *Microcystis* cyanobacteria has been identified in from Maumee Bay to Catawba Island. A *Planktothrix* cyanobacteria bloom is also occuring in Sandusky Bay.

Analysis: Imagery and field samples indicate high concentrations of *Microcystis* in Maumee Bay with low to medium concentrations to the north and further offshore. Imagery also indicates the bloom continuing along the southern coast to Catawba Island. The largest bloom area appears to be occuring from Port Clinton to Catawba Island. Image analysis has also identified a large scum patch off of Port Clinton (centered at 41 32' 50"N, 82 56' 10"W) and a smaller patch halfway between Toledo and Cedar Point (centered at 41 41' 56"N, 83 23' 37"W). Although unconfirmed, imagery indicates that the *Microcystis* bloom may extend east of Sandusky. Additionally, models indicate the bloom area east of Sandusky Bay will be transported eastward and offshore parallel to the coast as far as 41 25.62'N, 82 32.98'W. A *Planktothrix* cyanobacteria bloom is also occuring in Sandusky Bay. Moderate winds over the weekend may mix portions of the bloom subsurface.

-Neff, Tomlinson

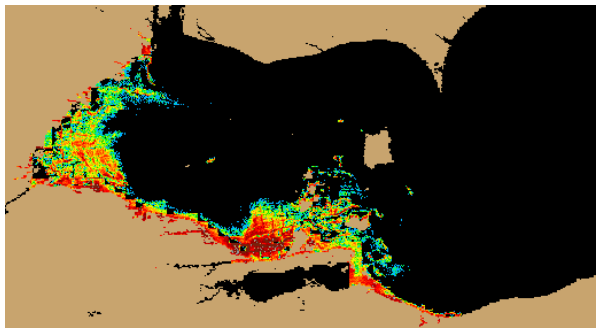


Figure 2. Nowcast position of *Microcystis* spp. bloom for July 29 using GLCFS modeled currents to move the bloom from the July 27 image.

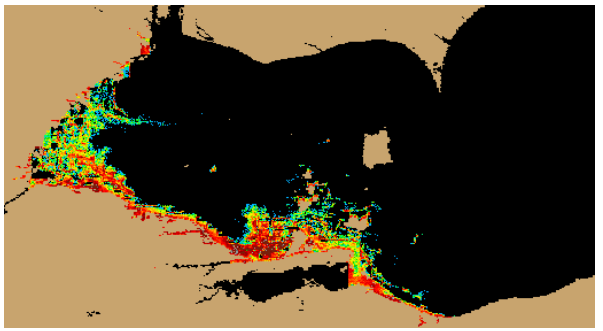
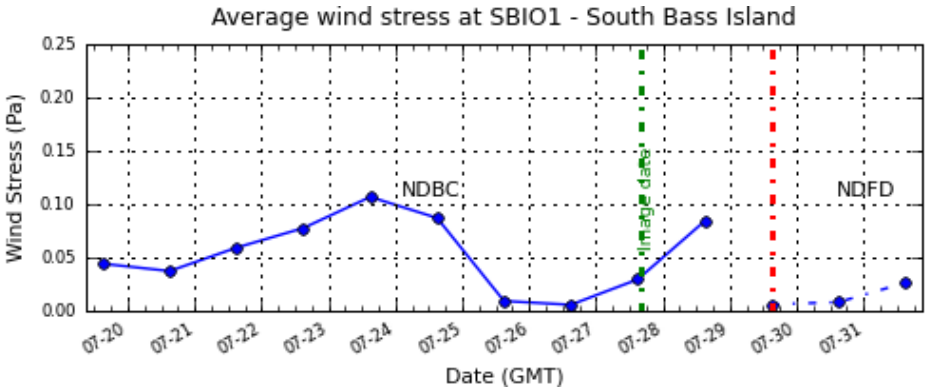
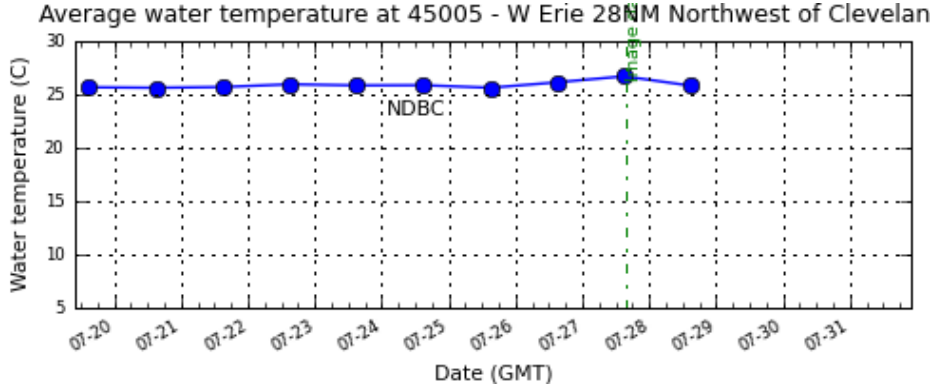


Figure 3. Forecast position of *Microcystis* spp. for August 01 using GLCFS modeled currents to move the bloom from July 27 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
07-20
07-21
07-22
07-23
07-24
07-25
07-26
07-27
07-28
07-29
07-30
07-31
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
07-20
07-21
07-22
07-23
07-24
07-25
07-26
07-27
07-28
07-29
07-30
07-31
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-007
22 July 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 08 July 2010

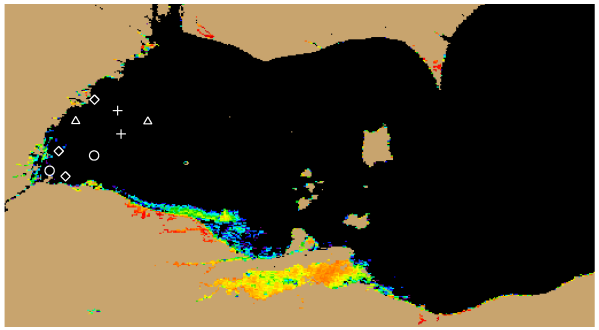


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from July 20, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

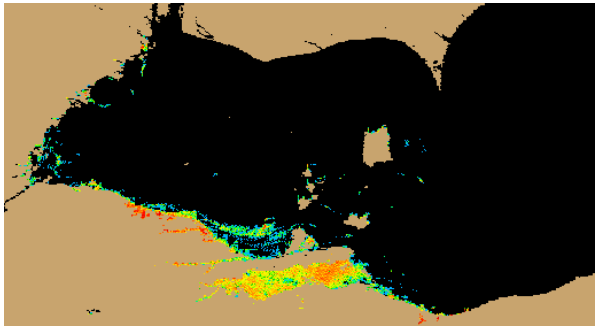


Figure 2. Nowcast position of *Microcystis* spp. bloom for July 22 using GLCFS modeled currents to move the bloom from the July 20 image.

Conditions: There have been recent reports of low-very high concentrations of Microcystis this week in Western Lake Erie.

Analysis: The image shown is from July 20. There were winds causing a wind stress of ~0.1 Pa the previous day. This is the threshold where complete mixing of the lake generally occurs. This very well may have caused the cells to be homogeneously mixed throughout the water column, causing apparently low surface concentrations in the image. It is likely that the bloom will resurface if windstress remains low (>0.05 Pa). Water temperature is high, which may cause increased concentrations of Microcystis. However, forecasted windstress by the NDFD calls for moderate mixing in the lake, which should prevent the formation of surface scum. Continued sampling is recommended.

-Wynne, Briggs

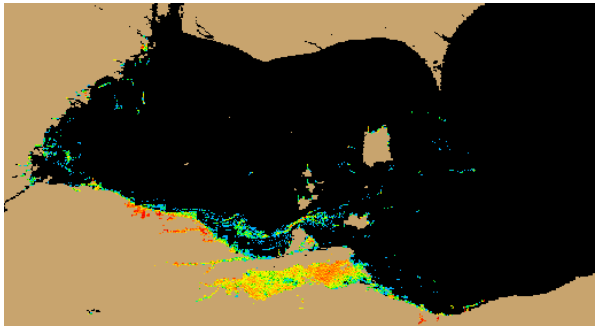
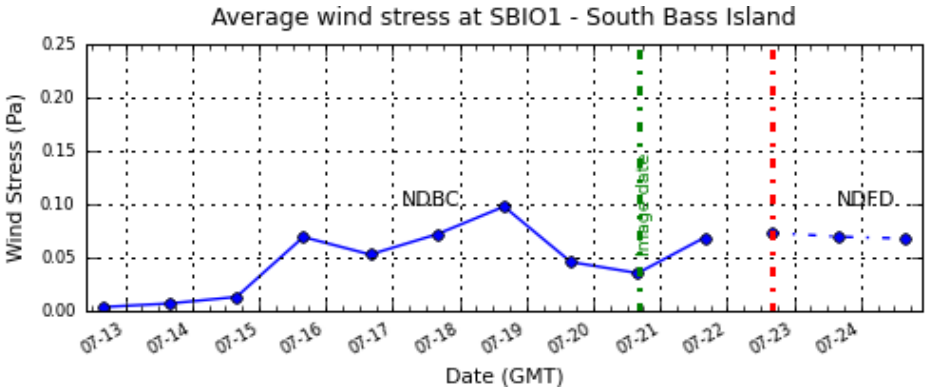
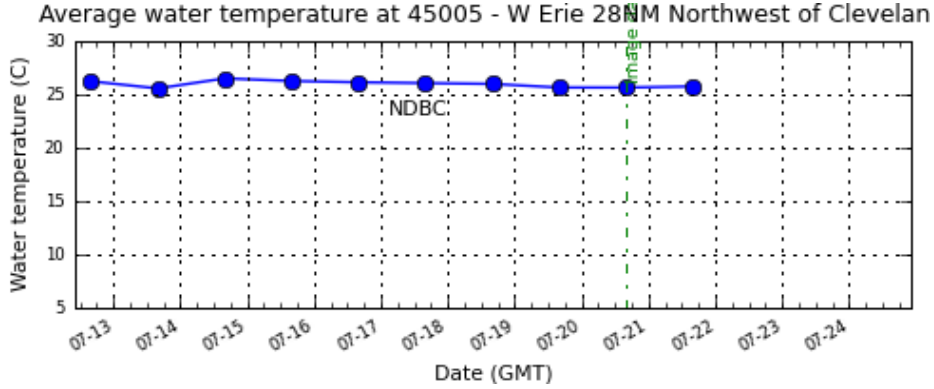


Figure 3. Forecast position of *Microcystis* spp. for July 25 using GLCFS modeled currents to move the bloom from July 20 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
07-13
07-14
07-15
07-16
07-17
07-18
07-19
07-20
07-21
07-22
07-23
07-24
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
30
25
20
15
10
5
NDBC
Image date
07-13
07-14
07-15
07-16
07-17
07-18
07-19
07-20
07-21
07-22
07-23
07-24
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-004
15 July 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 25 June 2010

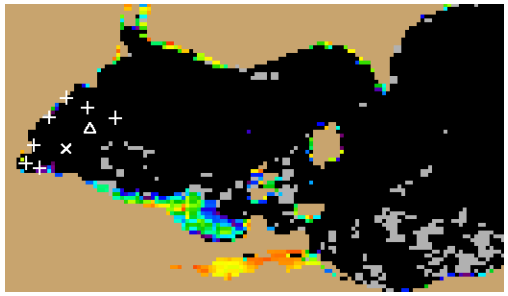


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from July 14, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from July 12 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

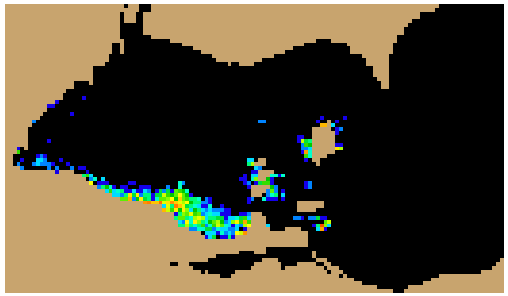


Figure 2. Nowcast position of *Microcystis* spp. bloom for July 15 using GLCFS modeled currents to move the bloom from the July 14 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: There have been recent reports of patchy low to very low concentrations of *Microcystis* this week in the western basin of Lake Erie.

Analysis: Imagery shows a persistent bloom along the south shore of the western basin, from Cedar Point to Catawba Island. Cell counts provided by GLERL show patchy low to very low concentrations of *Microcystis* north of Cedar Point, however, samples have not confirmed a bloom within the area highlighted in the imagery. Patchy features are also indicated around the Bass Islands and Kelleys Island. Researchers at the University of Toledo have indicated, based on visual observations, that these features may likely be *Microcystis*. Therefore, sampling is recommended. The forecast indicates that the bloom will move further eastward over the weekend and may move to the eastern side of Catawba Island by Sunday.

-Tomlinson, Wynne

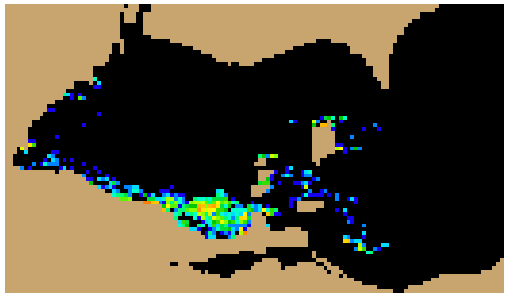
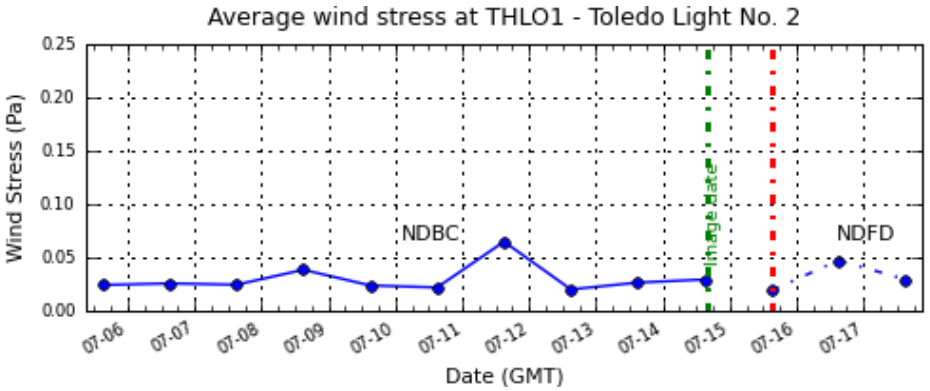


Figure 3. Forecast position of *Microcystis* spp. for July 18 using GLCFS modeled currents to move the bloom from July 14 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image Date
07-06
07-07
07-08
07-09
07-10
07-11
07-12
07-13
07-14
07-15
07-16
07-17
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-006
08 July 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 01 July 2010

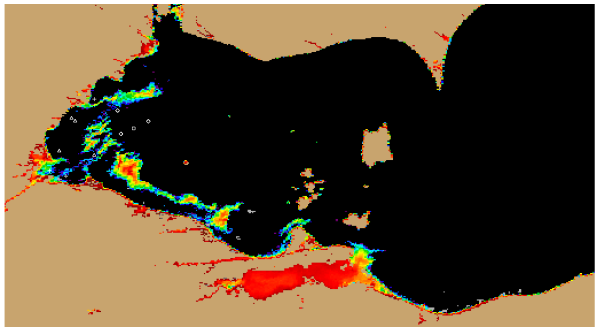


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from July 05, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

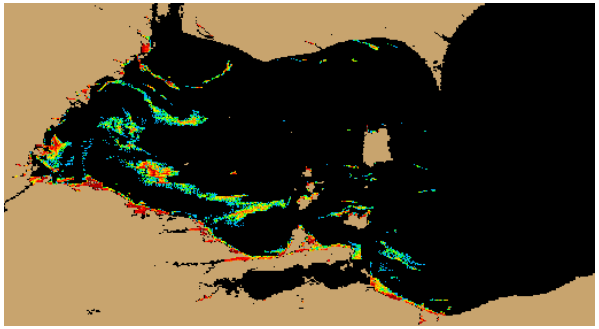


Figure 2. Nowcast position of *Microcystis* spp. bloom for July 08 using GLCFS modeled currents to move the bloom from the July 05 image.

Conditions: There have been recent reports of patchy low to very high concentrations of Microcystis this week west of West Sister Island.

Analysis: Imagery shows a feature that is indicative of elevated cyanobacterial concentrations. The feature is patchy and extends from north of Cedar Point to east of Locust Point. The three day forecast projects that the feature will be trasported slightly more offshore and east, moving past Catawba Island towards South Bass Island. Forecasted wind stress and water temperature are conducive to further bloom development. Sampling is recommended. -Briggs, Lopez

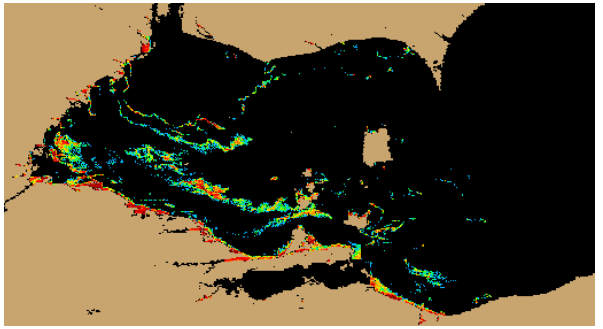
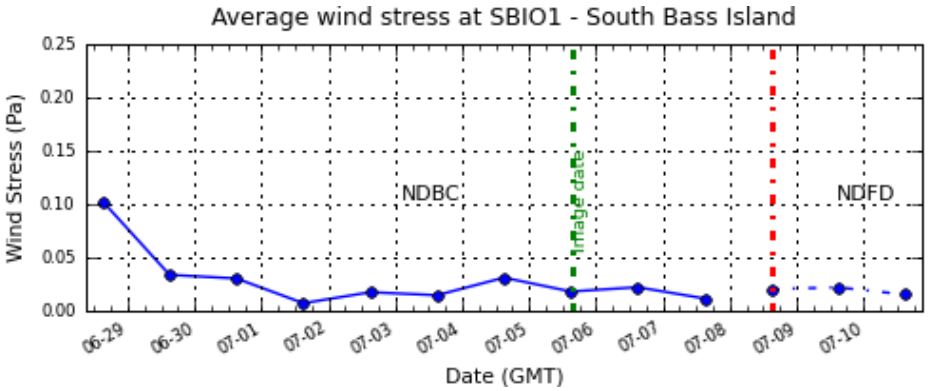
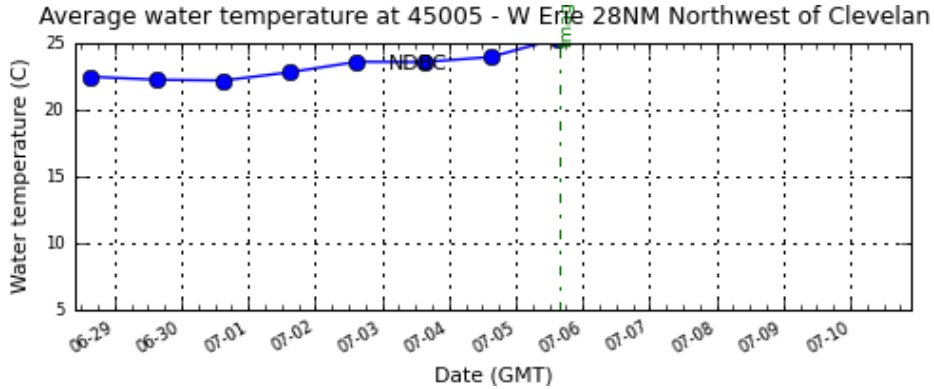


Figure 3. Forecast position of *Microcystis* spp. for July 11 using GLCFS modeled currents to move the bloom from July 05 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
Image date
NDFD
06-29
06-30
07-01
07-02
07-03
07-04
07-05
07-06
07-07
07-08
07-09
07-10
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
25
20
15
10
5
NDBC
Image date
06-29
06-30
07-01
07-02
07-03
07-04
07-05
07-06
07-07
07-08
07-09
07-10
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-005
01 July 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 01 July 2010

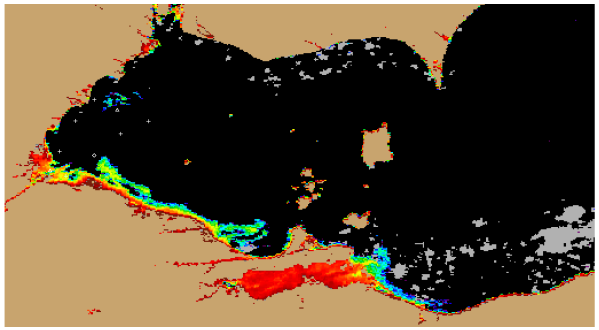


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from June 29, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from June 28 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

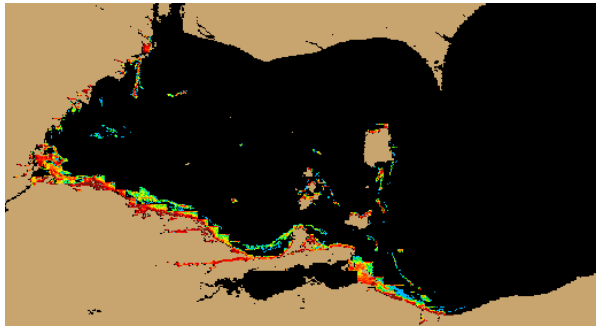


Figure 2. Nowcast position of *Microcystis* spp. bloom for July 01 using GLCFS modeled currents to move the bloom from the June 29 image.

Conditions: There have been recent reports of patchy low to medium concentrations of Microcystis this week offshore Cedar Point near the Toledo Harbor Light.

Analysis: Imagery shows a feature that is indicative of elevated cyanobacterial concentrations. The feature extends along the southern shore from Maumee Bay to west of Catawba Island. Forecast calls for the feature to stay in the southern portion of the lake and likely transporting east to Catawba Island. Forecasted wind stress and water temperature are conducive to futher bloom development. Sampling is recommended.
-Briggs, Wynne

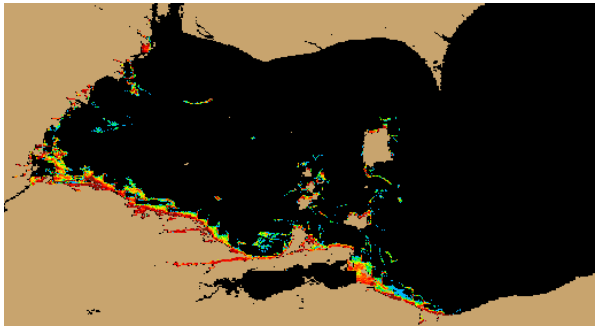
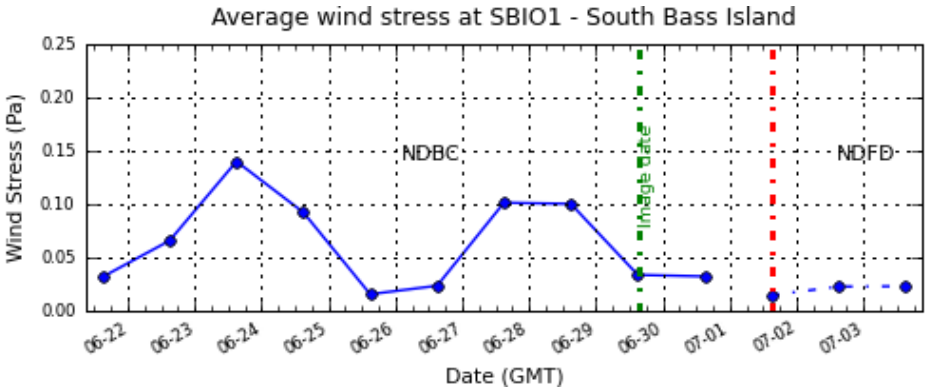
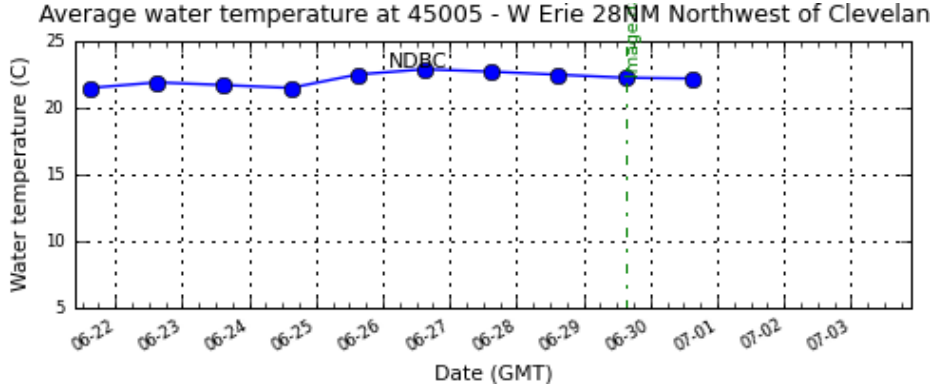


Figure 3. Forecast position of *Microcystis* spp. for July 04 using GLCFS modeled currents to move the bloom from June 29 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
06-22
06-23
06-24
06-25
06-26
06-27
06-28
06-29
06-30
07-01
07-02
07-03
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
25
20
15
10
5
NDBC
Image date
06-22
06-23
06-24
06-25
06-26
06-27
06-28
06-29
06-30
07-01
07-02
07-03
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-003
25 June 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 03 June 2010

Conditions: There are no confirmed reports of Microcystis at this time.

Analysis: Imagery shows an anomaly northeast of Maumee Bay and another east of Sandusky Bay. Sampling is recommended. Note, due to software problems imagery has 1km resolution. -Neff

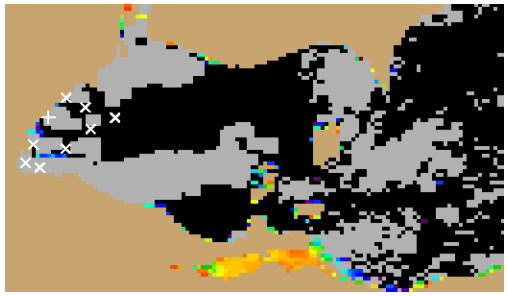


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from June 22, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from June 21 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

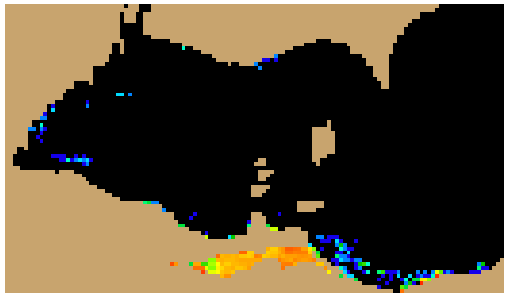


Figure 2. Nowcast position of *Microcystis* spp. bloom for June 25 using GLCFS modeled currents to move the bloom from the June 22 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

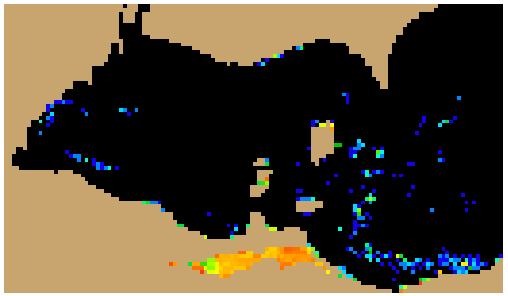
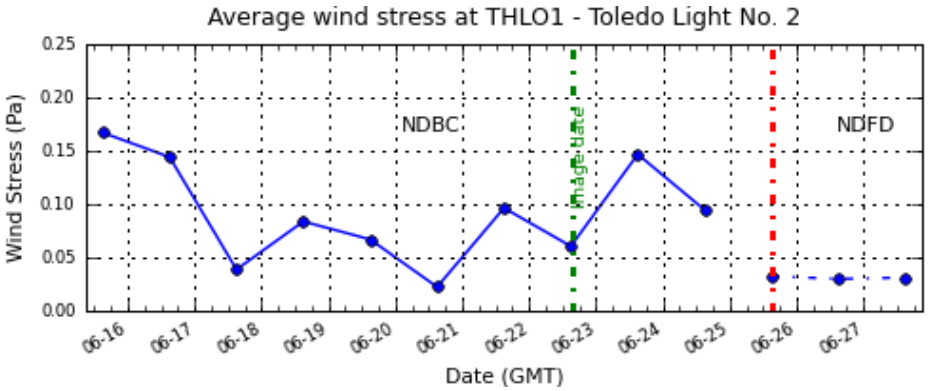


Figure 3. Forecast position of *Microcystis* spp. for June 28 using GLCFS modeled currents to move the bloom from June 22 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image time
06-16
06-17
06-18
06-19
06-20
06-21
06-22
06-23
06-24
06-25
06-26
06-27
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-002
17 June 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 10 June 2010

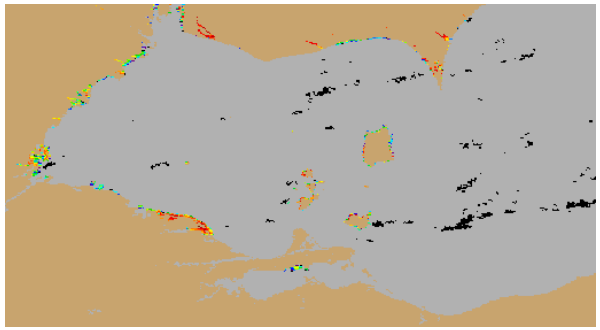


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from June 13, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present).

Figure 2. Nowcast position of *Microcystis* spp. bloom for June 17 using GLCFS modeled currents to move the bloom from the June 13 image.

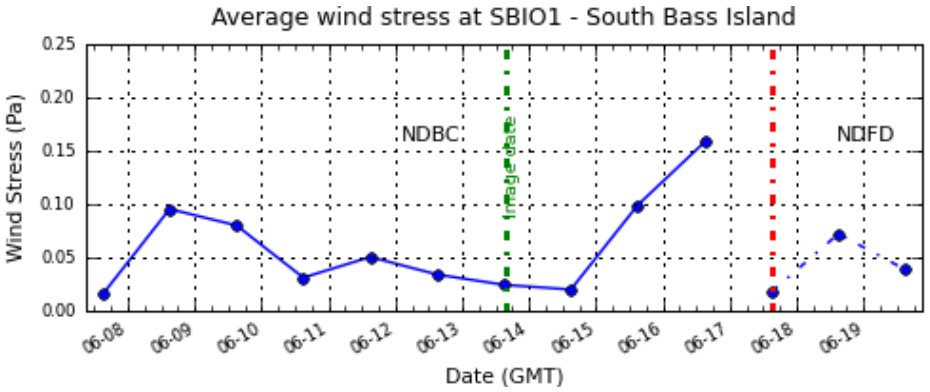
Conditions: There are no confirmed harmful algal blooms at this time. No impacts are expected.

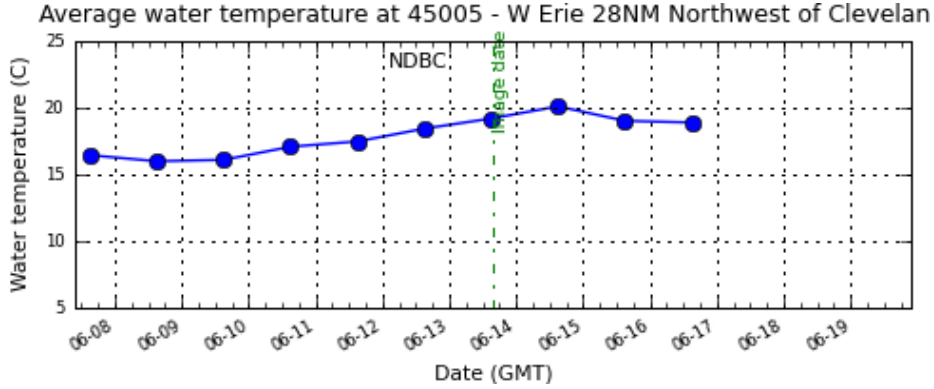
Analysis: Microcystis continues to be present in very low concentrations in the vicinity of Maumee Bay (~-83.38,41.72). Strong winds that have occured since the image date would not favor bloom development. Current imagery also no signs of a bloom.

-Wynne, Manuar

Figure 3. Forecast position of *Microcystis* spp. for June 20 using GLCFS modeled currents to move the bloom from June 13 image.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
Image date
NDFD
06-08
06-09
06-10
06-11
06-12
06-13
06-14
06-15
06-16
06-17
06-18
06-19
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
25
20
15
10
5
NDBC
Image date
06-08
06-09
06-10
06-11
06-12
06-13
06-14
06-15
06-16
06-17
06-18
06-19
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-001
10 June 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 16 October 2008

Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from June 06, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from June 08 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

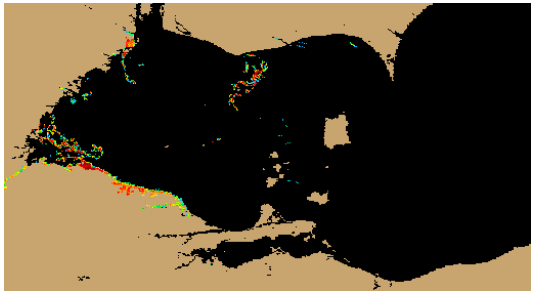


Figure 2. Nowcast position of *Microcystis* spp. bloom for June 10 using GLCFS modeled currents to move the bloom from the June 06 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: There are no confirmed harmful algal blooms at this time. No impacts are expected.

Analysis: Imagery has been cloudy over the past week. A potential patch of *Microcystis* may be located hugging the south shore of western Lake Erie (southeast of the Maumee River mouth) however, given the poor image quality this analysis may be unreliable. Cell count data collected on 6/8/2010 shows very low concentrations of *Microcystis* at the Maumee River mouth and to the southeast (at two stations located at 83d 15.362', 41d48.262' and 83d23.171' 41d423.269') and one station further northeast (83d25.426' 41d43.059') and warrants monitoring. Periods of strong wind over the past week may have prevented a bloom from forming. Forecasted winds continue to be variable and should prevent the development of a bloom over the weekend.

-Tomlinson, Wynne

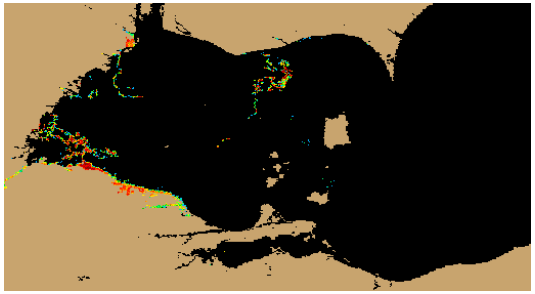
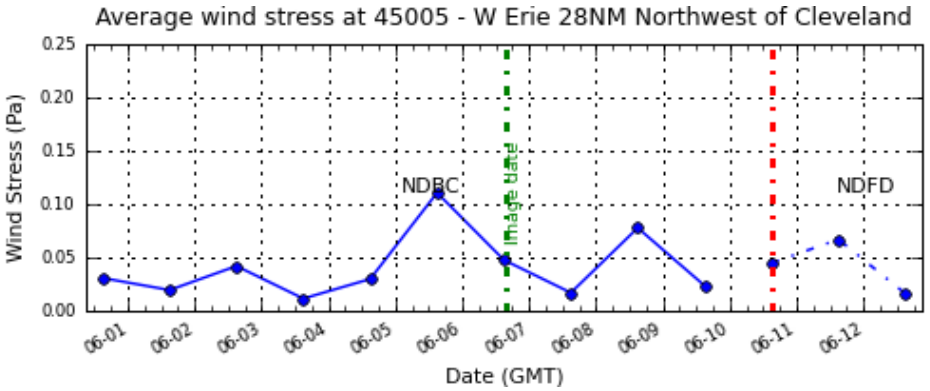


Figure 3. Forecast position of *Microcystis* spp. for June 13 using GLCFS modeled currents to move the bloom from June 06 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- http://www.glerl.noaa.gov/res/Centers/HABS/lake_erie_hab/lake_erie_hab.html
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at 45005 - W Erie 28NM Northwest of Cleveland
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
Image date
NDFD
06-01
06-02
06-03
06-04
06-05
06-06
06-07
06-08
06-09
06-10
06-11
06-12
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-002
03 June 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 27 May 2010

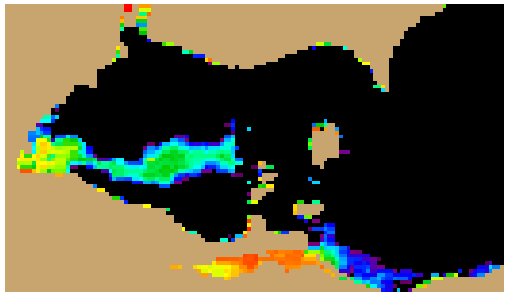


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from May 28, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

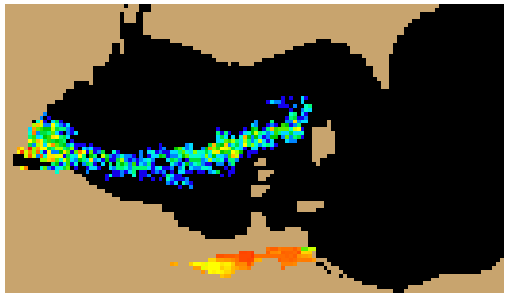


Figure 2. Nowcast position of *Microcystis* spp. bloom for June 03 using GLCFS modeled currents to move the bloom from the May 28 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: There are no confirmed reports of a cyanobacterial bloom in western Lake Erie at this time.

Analysis: Satellite imagery is 6 days old. There has been a feature in the western portion of Lake Erie that is optically consistent to a cyanobacterial bloom. It has not been confirmed. Recent windstress have mixed the suspected feature to a depth undetectable by satellite (>1 meter). Sampling in the area is recommended. The forecasted bloom trajectory is the shape of an arc. The western point in the vicinity of Maumee Bay is at -83.37, 41.78. The midpoint is approximately at -83.09, 41.68. The eastern point in the vicinity of the Bass Islands is -82.84, 41.71.

-Wynne, Stumpf

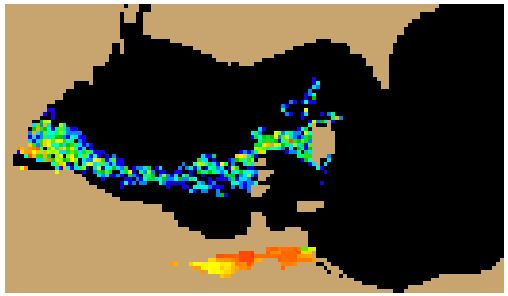
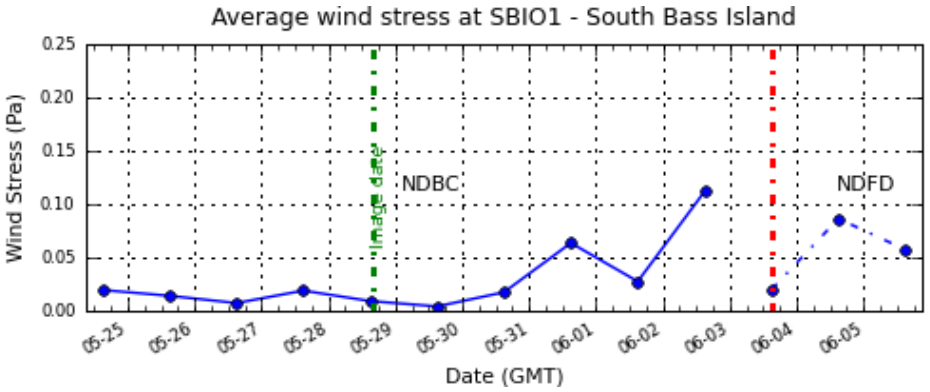
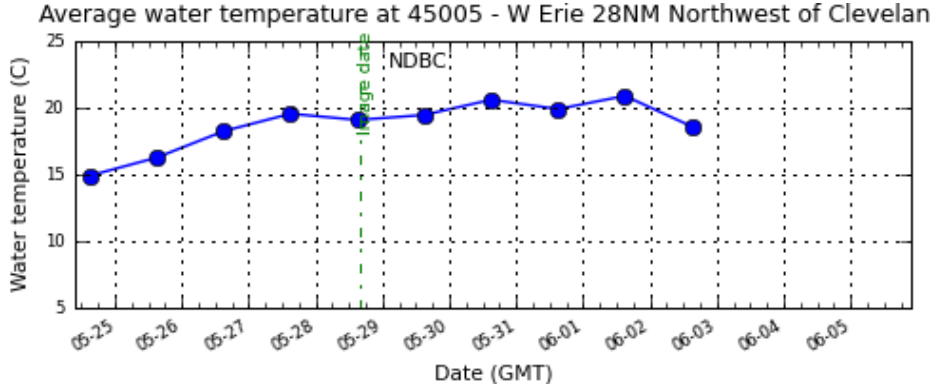


Figure 3. Forecast position of *Microcystis* spp. for June 06 using GLCFS modeled currents to move the bloom from May 28 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
05-25
05-26
05-27
05-28
05-29
05-30
05-31
06-01
06-02
06-03
06-04
06-05
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
25
20
15
10
5
NDBC
Image date
05-25
05-26
05-27
05-28
05-29
05-30
05-31
06-01
06-02
06-03
06-04
06-05
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2010-001
27 May 2010
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 15 October 2009

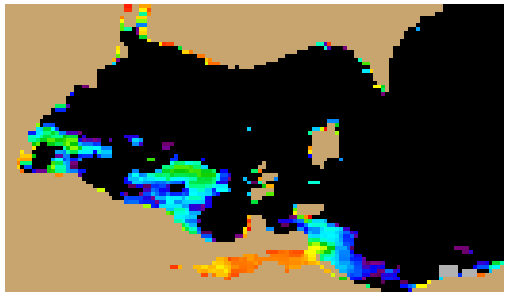


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from May 25, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

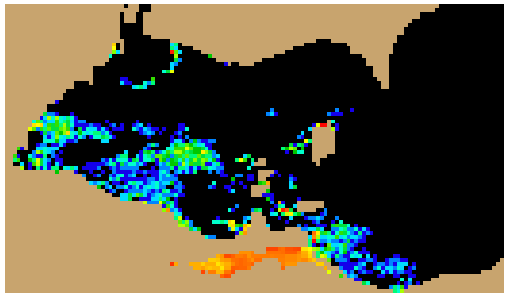


Figure 2. Nowcast position of *Microcystis* spp. bloom for May 27 using GLCFS modeled currents to move the bloom from the May 25 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: There are no confirmed reports of a bloom at this time.

Analysis: Satellite imagery indicates that there is a potential bloom in the western basin of Lake Erie with patches near Maumee Bay as well as east of Sandusky Bay. Forecasts move the bloom south. Winds are not expected to mix the bloom vertically within the model timeframe. Imagery puts the patches at roughly 83d18'31.4593"W, 41d43'54.9435"N, and 83d05'27.3772"W, 41d38'34.1835"N, and 82d39'54.8573"W, 41d32'37.7835"N.

-Neff, Wynne, Tomlinson

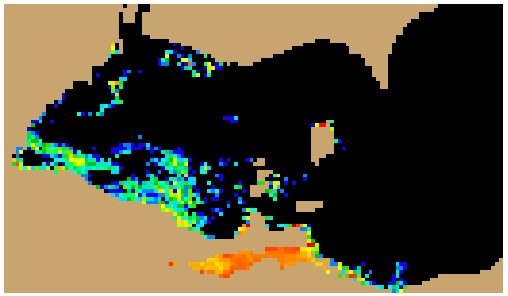
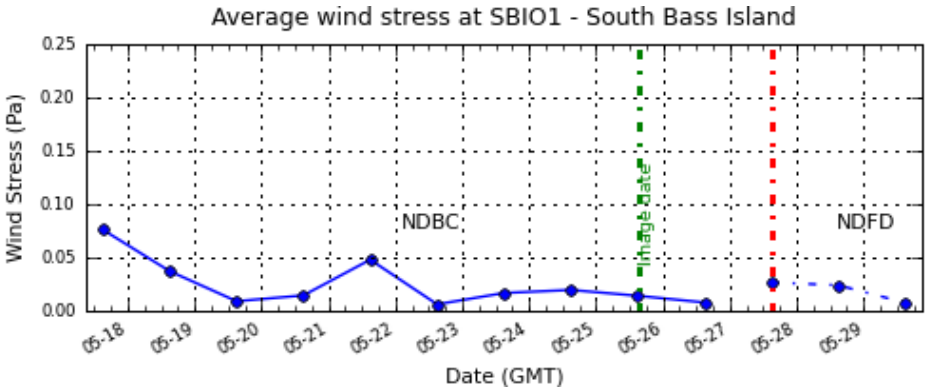


Figure 3. Forecast position of *Microcystis* spp. for May 30 using GLCFS modeled currents to move the bloom from May 25 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
NDBC
Image date
NDFD
05-18
05-19
05-20
05-21
05-22
05-23
05-24
05-25
05-26
05-27
05-28
05-29
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2009-013
15 October 2009
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 08 October 2009

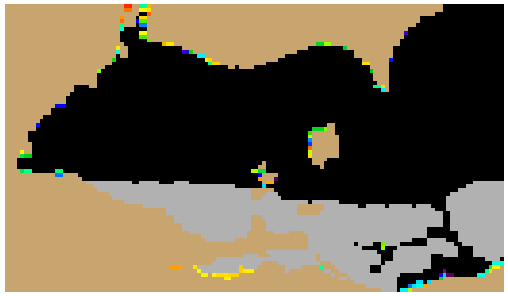


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from October 11, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: The *Microcystis* spp. bloom in the western basin of Lake Erie has dissipated.

Analysis: Imagery indicates that the *Microcystis* spp. bloom in western Lake Erie has dissipated. A combination of strong winds and declining temperatures has most likely caused the decline of the bloom. As water temperatures have now reached 15 C we do not expect a resurgence of the bloom. Therefore this will be the last forecast for the season. -Neff, Tomlinson

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2009-012
08 October 2009
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 01 October 2009

Conditions: A *Microcystis* spp. bloom is present in the western basin of Lake Erie. A mixed cyanobacterial bloom is also present in Sandusky Bay.

Analysis: Imagery is a week old due to recent cloudy weather. Continued strong winds have caused further mixing and stress of the bloom. In addition, forecasted decreasing water temperatures indicate the demise of the bloom is approaching within the next week or two. -Neff, Tomlinson

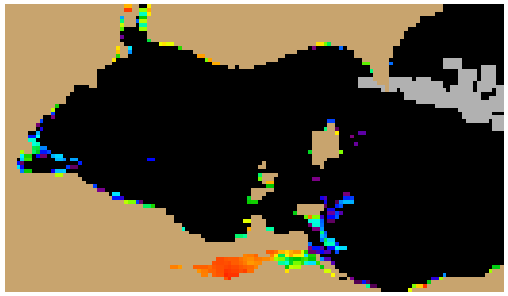


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from October 01, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

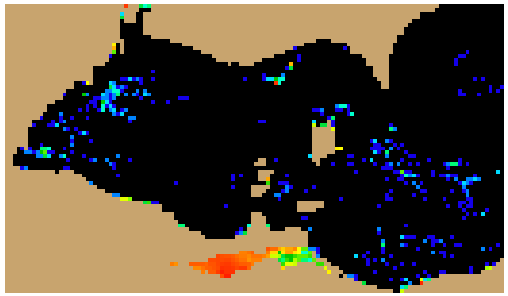


Figure 2. Nowcast position of *Microcystis* spp. bloom for October 08 using GLCFS modeled currents to move the bloom from the October 01 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

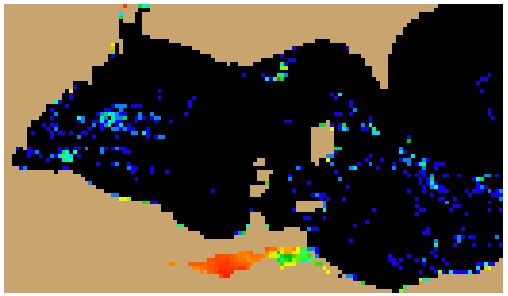
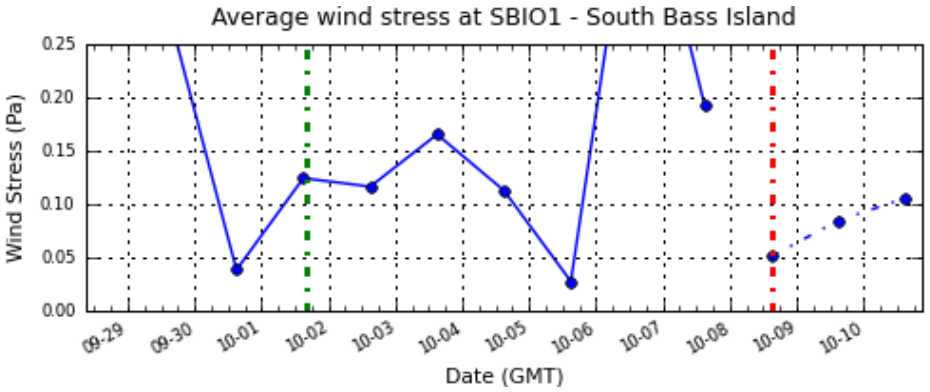
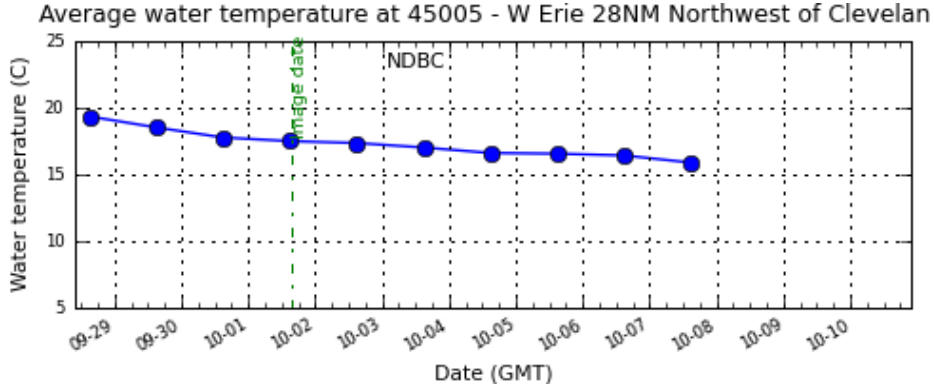


Figure 3. Forecast position of *Microcystis* spp. for October 11 using GLCFS modeled currents to move the bloom from October 01 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
09-29
09-30
10-01
10-02
10-03
10-04
10-05
10-06
10-07
10-08
10-09
10-10
Date (GMT)


Average water temperature at 45005 - W Erie 28NM Northwest of Clevelan
Water temperature (C)
25
20
15
10
5
NDBC
Image date
09-29
09-30
10-01
10-02
10-03
10-04
10-05
10-06
10-07
10-08
10-09
10-10
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2009-011
01 October 2009
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 24 September 2009

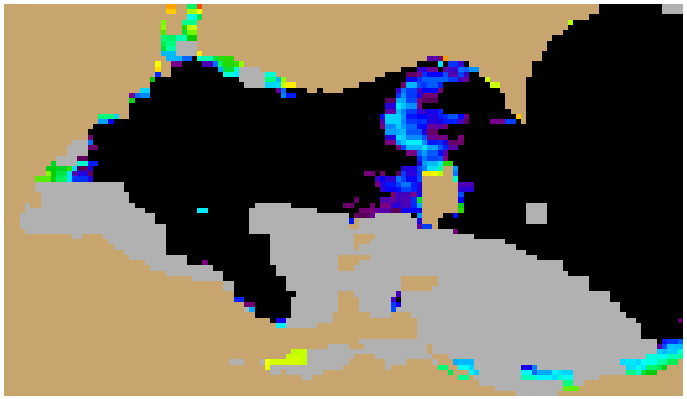


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from September 25, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration).

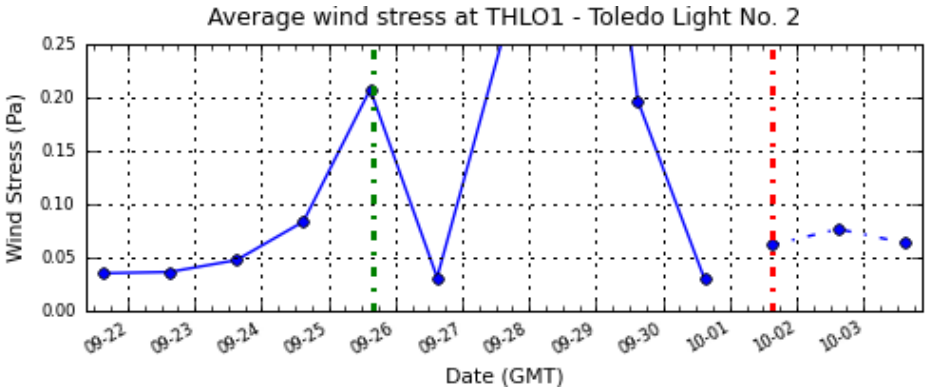
Conditions: A *Microcystis* spp. bloom is present in the western basin of Lake Erie.

Analysis: Please note: Due to a lack of recent imagery and/or *Microcystis* spp. cell count data, a nowcast and forecast were not produced.

Imagery from last Friday (9/25) indicates that the bloom is well mixed as a result of high wind stress. Extremely high winds and storm conditions over the past week, have caused continued mixing and may have resulted in stressing the bloom. High wind stress is forecasted through the weekend, further mixing the bloom. However, water temperatures remain above 15 deg C, and do not indicate the demise of the bloom.

-Tomlinson, Neff

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.25
0.20
0.15
0.10
0.05
0.00
09-22
09-23
09-24
09-25
09-26
09-27
09-28
09-29
09-30
10-01
10-02
10-03
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2009-010
24 September 2009
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 17 September 2009

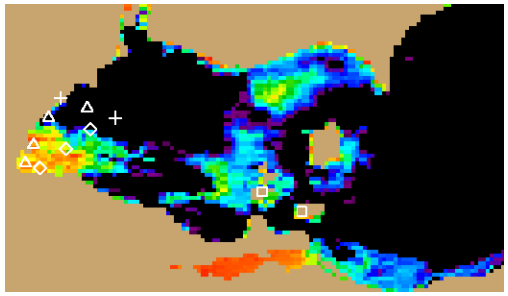


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from September 18, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from September 22 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

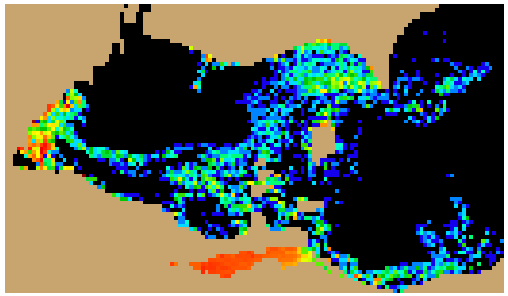


Figure 2. Nowcast position of *Microcystis* spp. bloom for September 24 using GLCFS modeled currents to move the bloom from the September 18 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: A *Microcystis* spp. bloom is present in much of the western basin of Lake Erie. A mixed cyanobacterial bloom is also present in Sandusky Bay.

Analysis: Imagery is 6 days old, as recent imagery has been cloudy. The bloom is still present in the western basin of the lake. It is expected to persist until water temperatures drop below 15 degrees C. If there is a better image tomorrow, the forecast will be reissued.

-Wynne, Neff

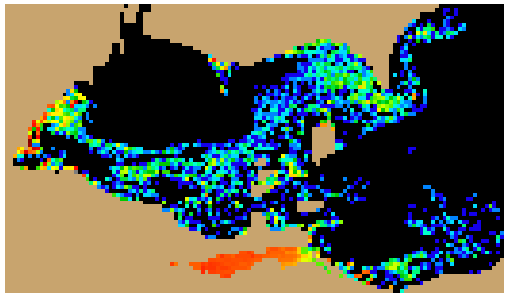
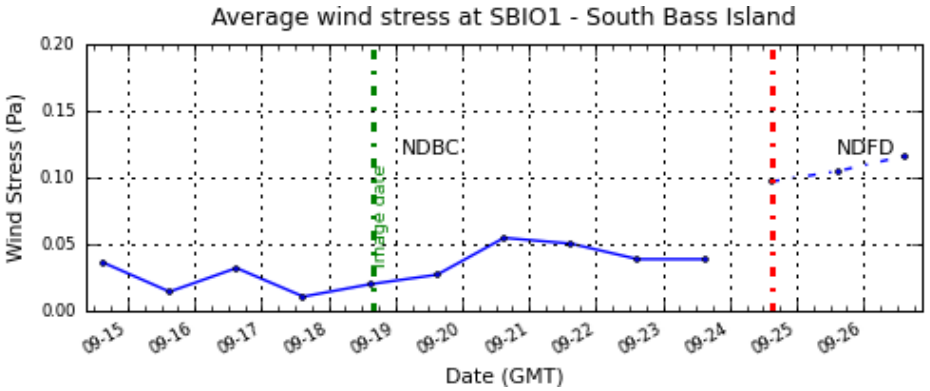


Figure 3. Forecast position of *Microcystis* spp. for September 27 using GLCFS modeled currents to move the bloom from September 18 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
09-15
09-16
09-17
09-18
09-19
09-20
09-21
09-22
09-23
09-24
09-25
09-26
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2009-009
17 September 2009
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 10 September 2009

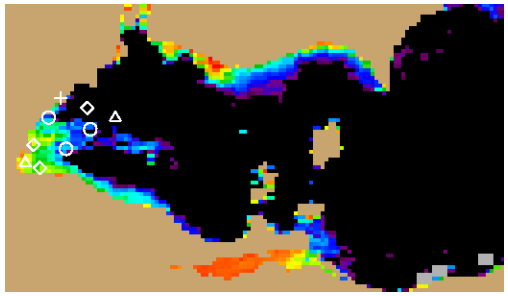


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from September 12, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from September 14 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

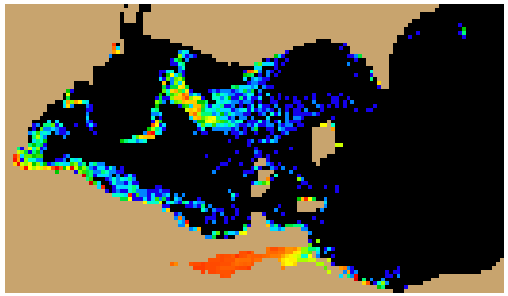


Figure 2. Nowcast position of *Microcystis* spp. bloom for September 17 using GLCFS modeled currents to move the bloom from the September 12 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: A *Microcystis* spp. bloom is present in much of the western basin of Lake Erie, Maumee Bay and adjacent waters. A mixed cyanobacterial bloom is also present in Sandusky Bay.

Analysis: Imagery from September 12 indicates that the bloom continues in Maumee Bay and along the south shore of western Lake Erie. Although the the surface appearance of the bloom seems to have decreased, wind data indicates that it is most likely mixed into the water comlumn. Forecasts indicate that the bloom position should not change substantially over the weekend. Strong wind conditions today may further mix the bloom into the water column. In addition, a large feature extends along the entire north shore east of the Detroit River. Based on nowcast/forecast information this feature may have moved into the middle of the Lake northwest of the Bass Islands. Sampling is recommended.

-Tomlinson, Wynne

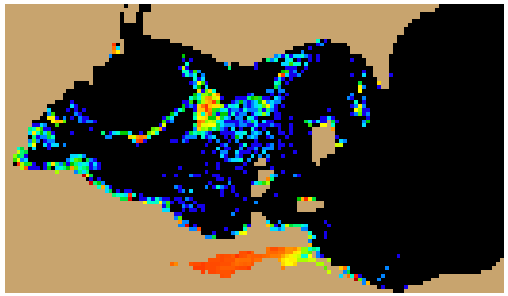
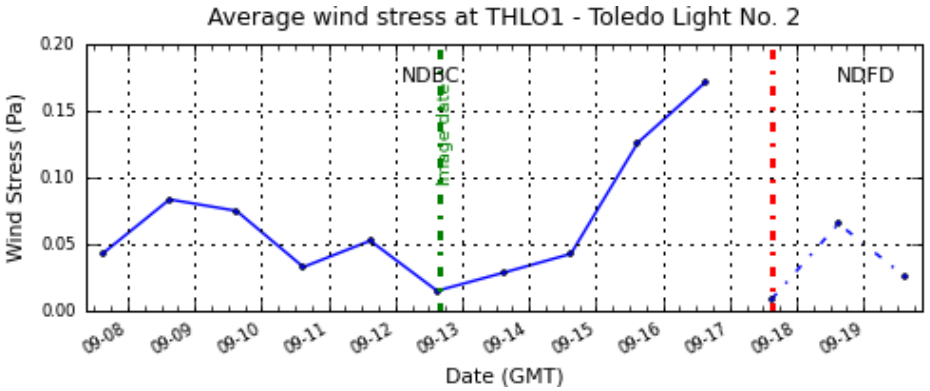


Figure 3. Forecast position of *Microcystis* spp. for September 20 using GLCFS modeled currents to move the bloom from September 12 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.20
0.15
0.10
0.05
0.00
NDBC
Image date
NDFD
09-08
09-09
09-10
09-11
09-12
09-13
09-14
09-15
09-16
09-17
09-18
09-19
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2009-008
10 September 2009
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 03 September 2009

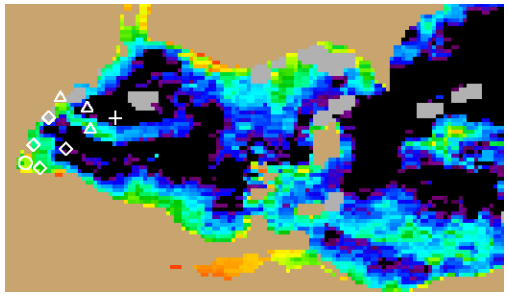


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from September 06, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from September 08 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

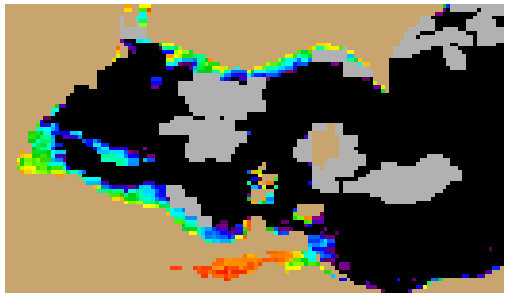


Figure2. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from September 9, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration).

Conditions: A *Microcystis* spp. bloom is present in much of the western basin of Lake Erie, Maumee Bay and adjacent waters. A mixed cyanobacterial bloom is also present in Sandusky Bay.

Analysis: The image from September 6 shows a fairly extensive cyanobacterial bloom through much of Lake Erie. Recent weather conditions have been windy, which has casued the bloom to be mixed throughout the water column, as seen in the image in Figure 2, which is from September 9. The modeled forecast position likely represents the location and concentration present in the integrated water column, although not representive of the surface locations and concentrations.

-Wynne, Tomlinson

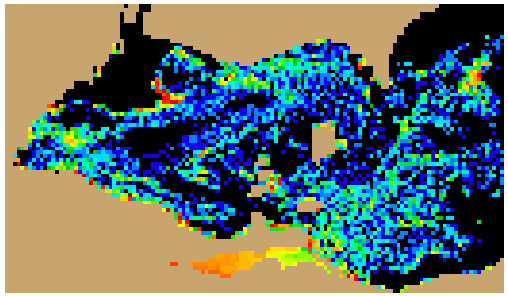
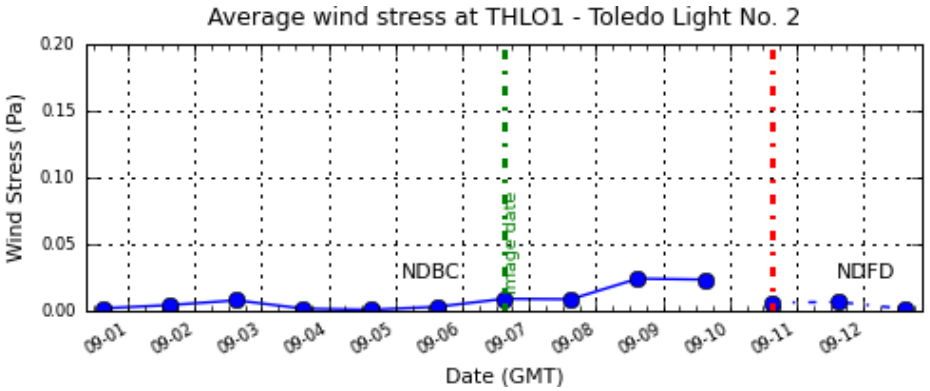


Figure 3. Forecast position of *Microcystis* spp. for September 13 using GLCFS modeled currents to move the bloom from September 06 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.20
0.15
0.10
0.05
0.00
NDBC
Image date
NDFD
09-01
09-02
09-03
09-04
09-05
09-06
09-07
09-08
09-09
09-10
09-11
09-12
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2009-007
03 September 2009
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 27 August 2009

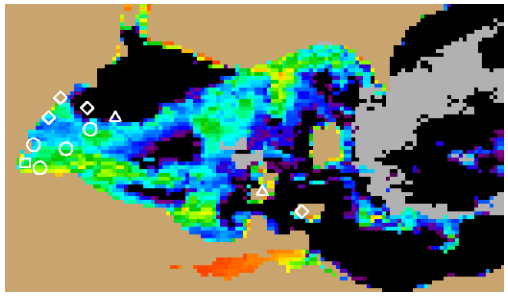


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from September 02, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from September 01 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

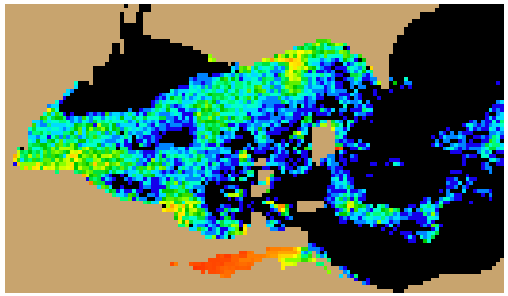


Figure 2. Nowcast position of *Microcystis* spp. bloom for September 03 using GLCFS modeled currents to move the bloom from the September 02 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: A *Microcystis* spp. bloom is present in much of the westen basin of Lake Erie, Maumee Bay, and adjacent waters. A mixed cyanobacterial bloom is also present in Sandusky Bay. Moderate taste and odor issues may be observed as a result of the bloom.

Analysis: Imagery indicates that the *Microcystis* spp. bloom has intensified and extends into most of the western basin west of Kellys Island. *Microcystis* spp. cells may be found east of Kellys Island, however, at lower concentrations. From imagery, an area just northwest of Kellys Island (approximately 41d57'01"N, 82d46'36"W) indicates a relatively high abundance of *Microcystis* spp. and sampling is recommended. Modeled transport indicates that little movement of the bloom is expected over through 9/16, however, intensification is possible due to low wind stress.

-Tomlinson, Wynne

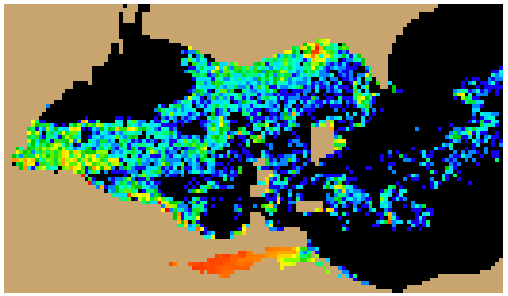
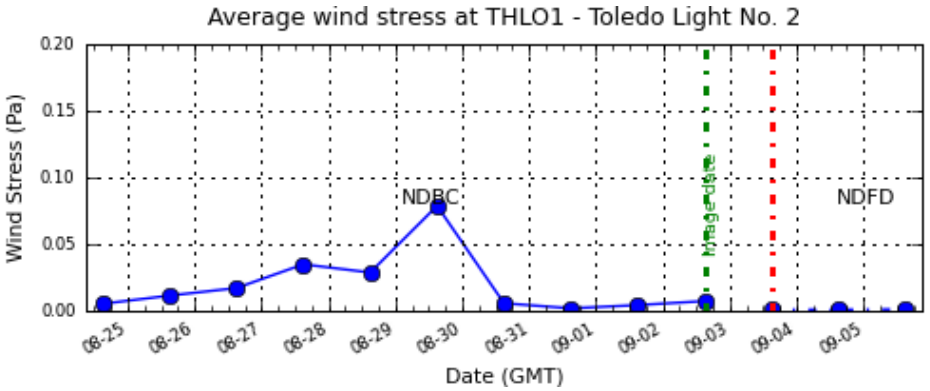


Figure 3. Forecast position of *Microcystis* spp. for September 06 using GLCFS modeled currents to move the bloom from September 02 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
08-25
08-26
08-27
08-28
08-29
08-30
08-31
09-01
09-02
09-03
09-04
09-05
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2009-006
27 August 2009
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 20 August 2009

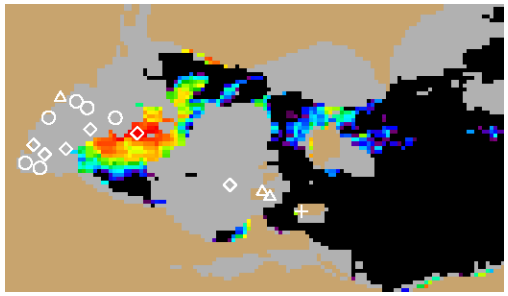


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from August 24, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from August 25 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

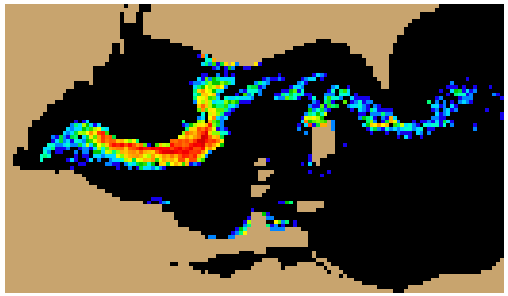


Figure 2. Nowcast position of *Microcystis* spp. bloom for August 27 using GLCFS modeled currents to move the bloom from the August 24 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: a *Microcystis* spp. bloom is present in much of the western basin of Lake Erie, Maumee Bay and the adjacent waters to the north. The bloom may be visible from shore, or nearshore areas outside of Maumee Bay and to the north, where the cell abundances are high. A mixed cyanobacterial bloom is also present in Sandusky Bay. Moderate taste and odor issues may be observed as a result of the bloom.

Analysis: The *Microcystis* spp. bloom in the western basin of Lake Erie has resurfaced and intensified, now encompassing much of the area west of the Bass Islands. Cloudy imagery prevents an analysis of the extent of the bloom. However, cell abundances range from high at the mouth of the Maumee Bay, with medium to low levels around the Bass Islands and very low levels on the southwest corner of Kellys Island. Due to the extent of the coulds in the imagery over the past several days, modeled nowcast and forecast positions underestimate the extent of the bloom. However, forecasts indicate that the bloom will move eastward over the next three days and out into the mid-basin. A decrease in wind stress could also intensify the bloom.

-Tomlinson ,Wynne

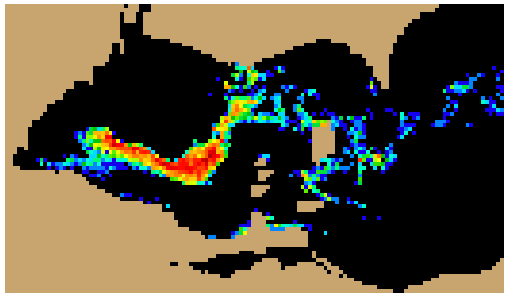
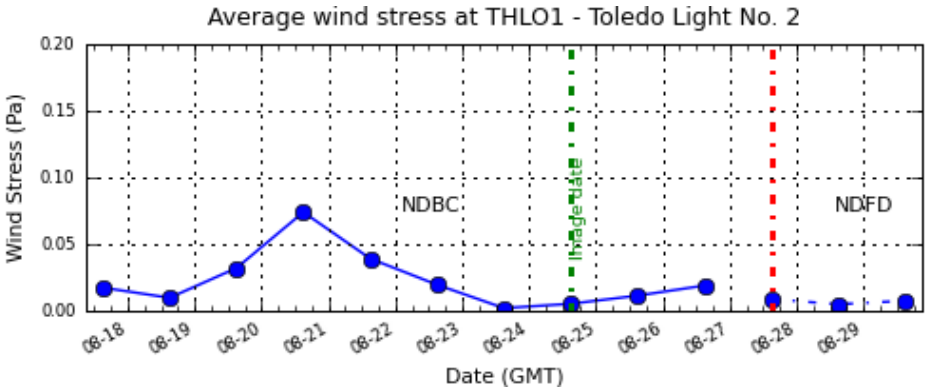


Figure 3. Forecast position of *Microcystis* spp. for August 30 using GLCFS modeled currents to move the bloom from August 24 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.20
0.15
0.10
0.05
0.00
NDBC
Image date
NDFD
08-18
08-19
08-20
08-21
08-22
08-23
08-24
08-25
08-26
08-27
08-28
08-29
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2009-005
20 August 2009
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 13 August 2009

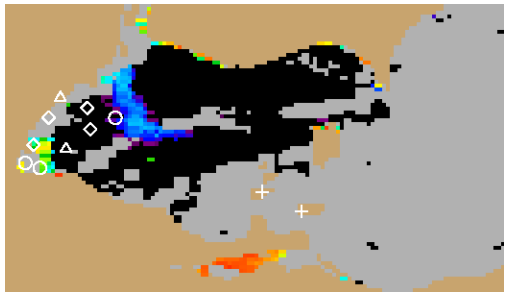


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from August 18, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from August 19 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

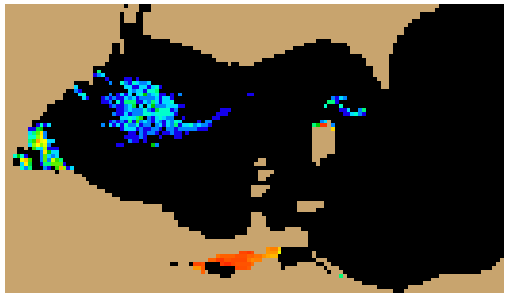


Figure 2. Nowcast position of *Microcystis* spp. bloom for August 20 using GLCFS modeled currents to move the bloom from the August 18 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: A *Microcystis* spp. bloom has been identified in the western basin of Lake Erie, Maumee Bay and the adjacent waters to the northeast. The bloom may be visible from the shore, or nearshore areas outside of Maumee Bay and to the north, where cell abundances are high. A mixed cyanobacterial bloom is also present in Sandusky. Moderate taste and odor issues have been observed and may continue in Sandusky Bay as a result of the bloom.

Analysis: The *Microcystis* spp. bloom in the western basin is still prevalent in the western basin of Lake Erie, and to the north. Cell abundances are high. Although satellite imagery indicates the bloom may be decreasing, high wind gusts (not apparent on wind stress plot due to daily averaging) and storms most likely mixed the bloom subsurface preventing satellite detection. High winds over the next few days will likely continue to mix the bloom, however, due to warm water temperatures it is unlikely to subside. The forecast indicates transport of the bloom eastward, to the north of the Bass Islands.

-Tomlinson, Wynne

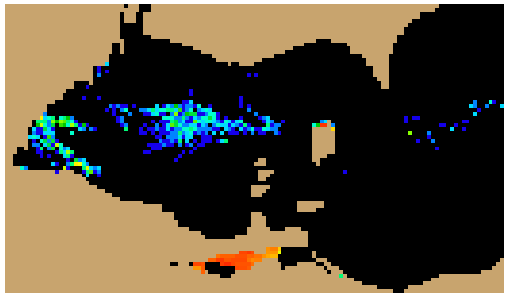
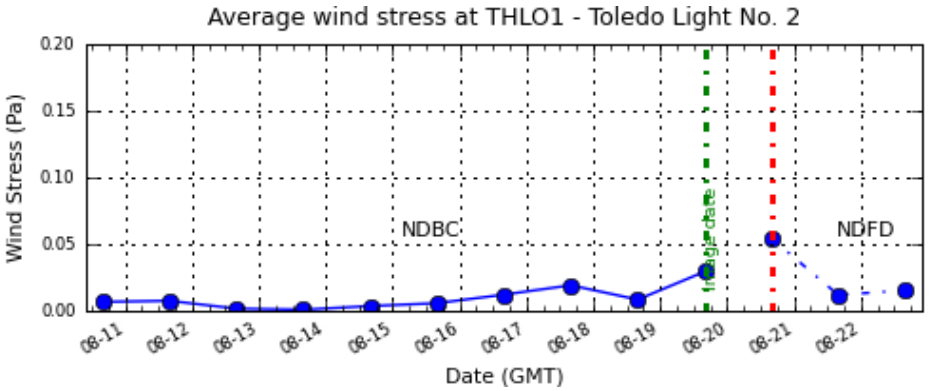


Figure 3. Forecast position of *Microcystis* spp. for August 23 using GLCFS modeled currents to move the bloom from August 18 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at THLO1 - Toledo Light No. 2
Wind Stress (Pa)
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
image date
08-11
08-12
08-13
08-14
08-15
08-16
08-17
08-18
08-19
08-20
08-21
08-22
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2009-004
13 August 2009
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 06 August 2009

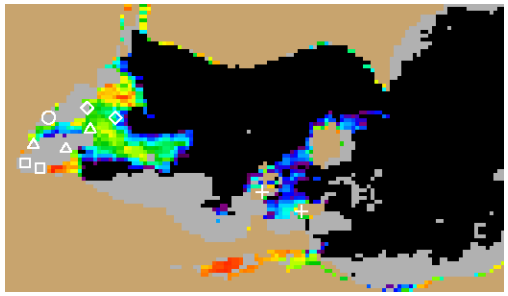


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from August 11, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from August 11 shown as white squares (very high), circles (high), diamonds (medium), triangles (low) , + (very low) and X (not present). Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

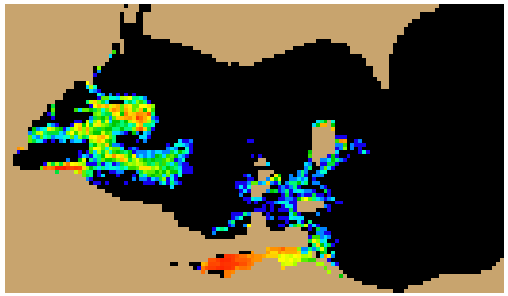


Figure 2. Nowcast position of *Microcystis* spp. bloom for August 13 using GLCFS modeled currents to move the bloom from the August 11 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: A *Microcystis* spp. bloom has been identified in Maumee Bay and the adjacent waters to the northeast. The bloom may be visible from the shore, or near shore areas outside of Maumee Bay. A mixed cyanobacterial bloom is also present in Sandusky Bay. Moderate taste and odor issues have been observed and may continue to persist as a result of the bloom.

Analysis: The *Microcystis* spp. bloom in Western Lake Erie continues to persist and increase in both area and concentration. The bloom in Sandusky Bay is a mixed bloom dominated by *Planktothrix* spp. Wind stress is expected to be low for the next several days, which may intensify the bloom. The bloom is forecasted to remain relatively stationary, with a tendency to drift slightly to the NE. The feature present around the South Bass Islands has been identified as having very low concentrations of *Microcystis*. The feature has spread in area since last week's bulletin and may continue to spread. It should be noted that clouds covered Maumee Bay (gray pixels in the observed imagery). As a result of these clouds, the nowcast and forecast show no (or very little) concentration in Maumee Bay.

-Wynne, Dyble, Meredith

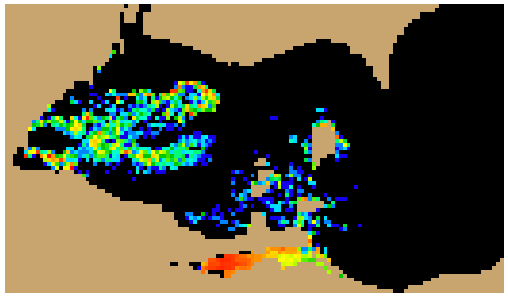
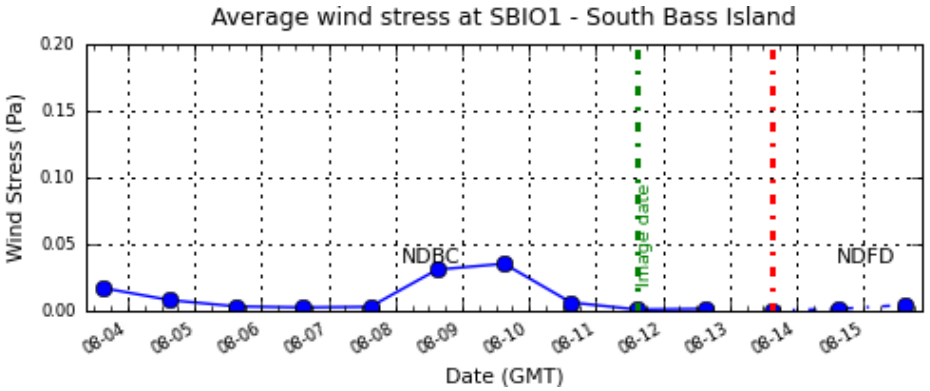


Figure 3. Forecast position of *Microcystis* spp. for August 16 using GLCFS modeled currents to move the bloom from August 11 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
Image date
08-04
08-05
08-06
08-07
08-08
08-09
08-10
08-11
08-12
08-13
08-14
08-15
Date (GMT)

Experimental
Lake Erie Harmful Algal Bloom Bulletin

2009-002
30 July 2009
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 23 July 2009

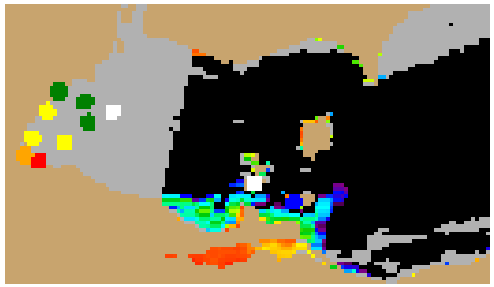


Figure 1. MERIS image from the European Space Agency. Imagery shows the spectral shape at 681 nm from July 27, where colored pixels indicate the likelihood of the last known position of the *Microcystis* spp. bloom (with red being the highest concentration). *Microcystis* spp. abundance data from July 27 shown as red (very high), orange (high), yellow (medium), green (low) , blue (very low) and white (not present) circles. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

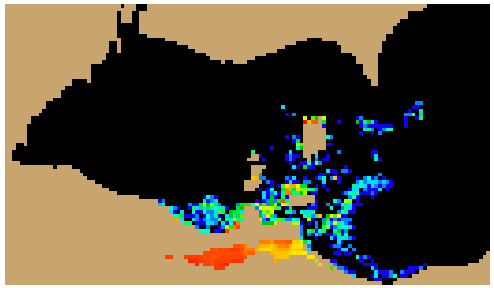


Figure 2. Nowcast position of *Microcystis* spp. bloom for July 30 using GLCFS modeled currents to move the bloom from the July 27 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Conditions: A *Microcystis* spp. bloom has been identified in the western basin of Lake Erie, and along the south shore just north of Sandusky Bay. The bloom may be visible (green) from the shore or in nearshore areas outside of Maumee Bay to the east, where cell abundances are high. Scum development is possible. A mixed bloom is also present in Sandusky Bay. Moderate taste and odor issues have been observed and may continue in Sandusky Bay as a result of the bloom.

Analysis: The *Microcystis* spp. bloom in the western basin and southern shore of western Lake Erie is enhancing. Imagery is obscured by clouds in the western basin, however cell abundance data indicate that it has intensified and moved further out into the Lake. In addition, a mixed bloom dominated by *Planktothrix* spp. has been observed in Sandusky Bay and moderate taste and odor problems have been observed. Extremely low wind stress over the weekend will most likely intensify the bloom, however transport will be minimal. Cells may be observed as far west as 82d31'W and 41d37'18"N.

-Tomlinson, Wynne, Dyble

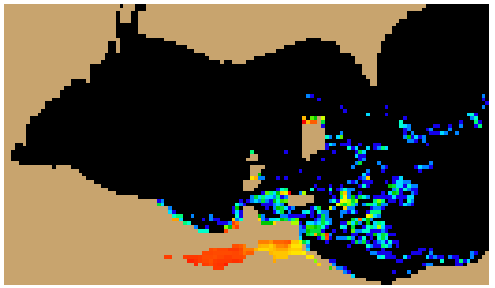
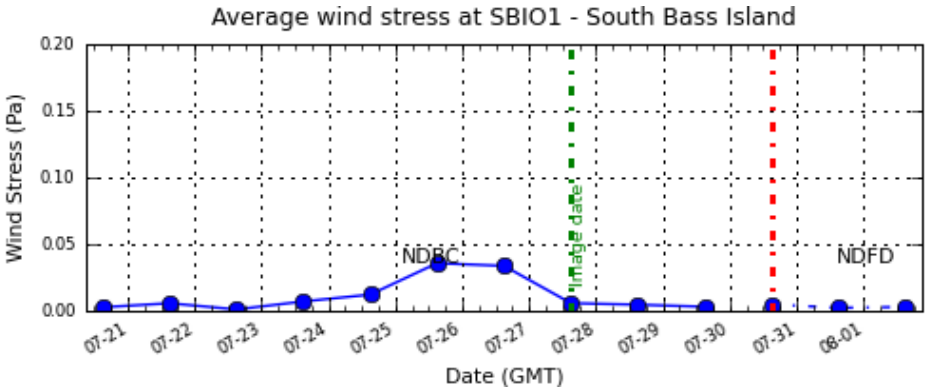


Figure 3. Forecast position of *Microcystis* spp. for August 02 using GLCFS modeled currents to move the bloom from July 27 image. Please note: Colored pixels in Sandusky Bay are due to a mixed bloom dominated by *Planktothrix* spp.

Please note:
- MERIS imagery was distributed by the NOAA CoastWatch Program and provided by the European Space Agency
- Cell counts were collected by the Great Lakes Environmental Research Laboratory
- The wind data is available through the National Data Buoy Center and the National Weather Service
- Modeled currents were provided through the Great Lakes Coastal Forecasting System


Average wind stress at SBIO1 - South Bass Island
Wind Stress (Pa)
0.20
0.15
0.10
0.05
0.00
NDBC
NDFD
landfall date
07-21
07-22
07-23
07-24
07-25
07-26
07-27
07-28
07-29
07-30
07-31
08-01
Date (GMT)