

GLOS HarborView

A mapping mashup that supports recreational boating on the Great Lakes



David Hart

GIS Specialist

University of Wisconsin Sea Grant Institute

Coastal GeoTools '09

Myrtle Beach, South Carolina

Wednesday, March 4, 2009

Overview of the Presentation



- Overview of Great Lakes Observing System (GLOS) Web Mapping Products
- What is HarborView?
- HarborView Functionality
- Future Directions

GLOS Mapping Products



Great Lakes Observing System

Observational data for
the Great Lakes region

<http://glos.us/>

[data mapping](#) [forecasts](#) [wiki](#) [news](#) [about](#)

Products

Data Mapping:

- >> [harborview](#)
- >> [observations viewer](#)
- >> [station viewer](#)
- >> [get observations](#)

Forecasts:

- >> [hec flows](#)
- >> [weather conditions](#)
- >> [weekly water levels](#)

Offsite Data:

- >> [surface water temps](#)
- >> [more lake conditions](#)

About GLOS

About

- [Current Projects](#)
- [Project History](#)
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- >> [E-newsletter](#)
- >> [User needs survey](#)

GLOS - The Great Lakes node of the national Integrated Ocean Observing System

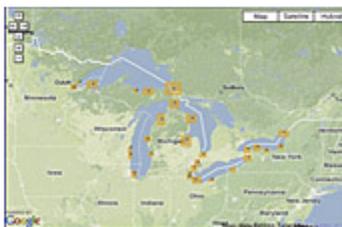
The Great Lakes Observing System (GLOS) is an effort dedicated to providing wide internet access to real-time and historic data on the hydrology, biology, chemistry, geology and cultural resources of the Great Lakes, its interconnecting waterways and the St. Lawrence River. GLOS is a regional node of the U.S. [Integrated Ocean Observing System](#) (IOOS) initiative.

>> Read more [about GLOS](#)

Featured Products

HarborView

Attention, boaters!
Now you can search for local businesses, nearshore currents, winds, waves and weather for selected harbors.



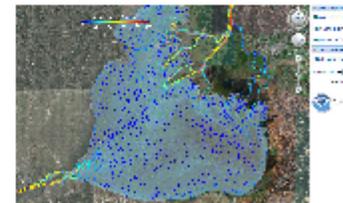
Great Lakes Observations Viewer

Interactive map lets you explore recent conditions by observation type using a Flash application.



Huron-to-Erie Corridor Flows

Use browser-based Google Earth to view water levels and flows in the Huron-to-Erie corridor in 3D. (Plug-in required.)



Great Lakes Station Viewer

View recent conditions by observation station using an OpenLayers application.



GLOS Obs & Station Viewers



- Observations Viewer
 - Flash application
 - Focused on observation type (air pressure, temp,...)
- Station Viewer
 - Open Layers application
 - Focused on the observation source (ASOS, VOS,...)

Great Lakes Observations Viewer

Interactive map lets you explore recent conditions by observation type using a Flash application.



Great Lakes Station Viewer

View recent conditions by observation station using an OpenLayers application.



GLOS Station Viewer



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GLOS - Great Lakes Station Viewer

[Review/Comment](#) [More Information](#)



Base Layer

Google Satellite

Overlays

- Political Boundaries
- ASOS Stations
- Voluntary Ships (VOS)
- Water Level Stations
- Buoys
- C-MAN Stations
- Other Stations

GLOS Observations Viewer



GLIN.net

Great Lakes
Map Explorer

Edwin H. Gott

S 200 B 40

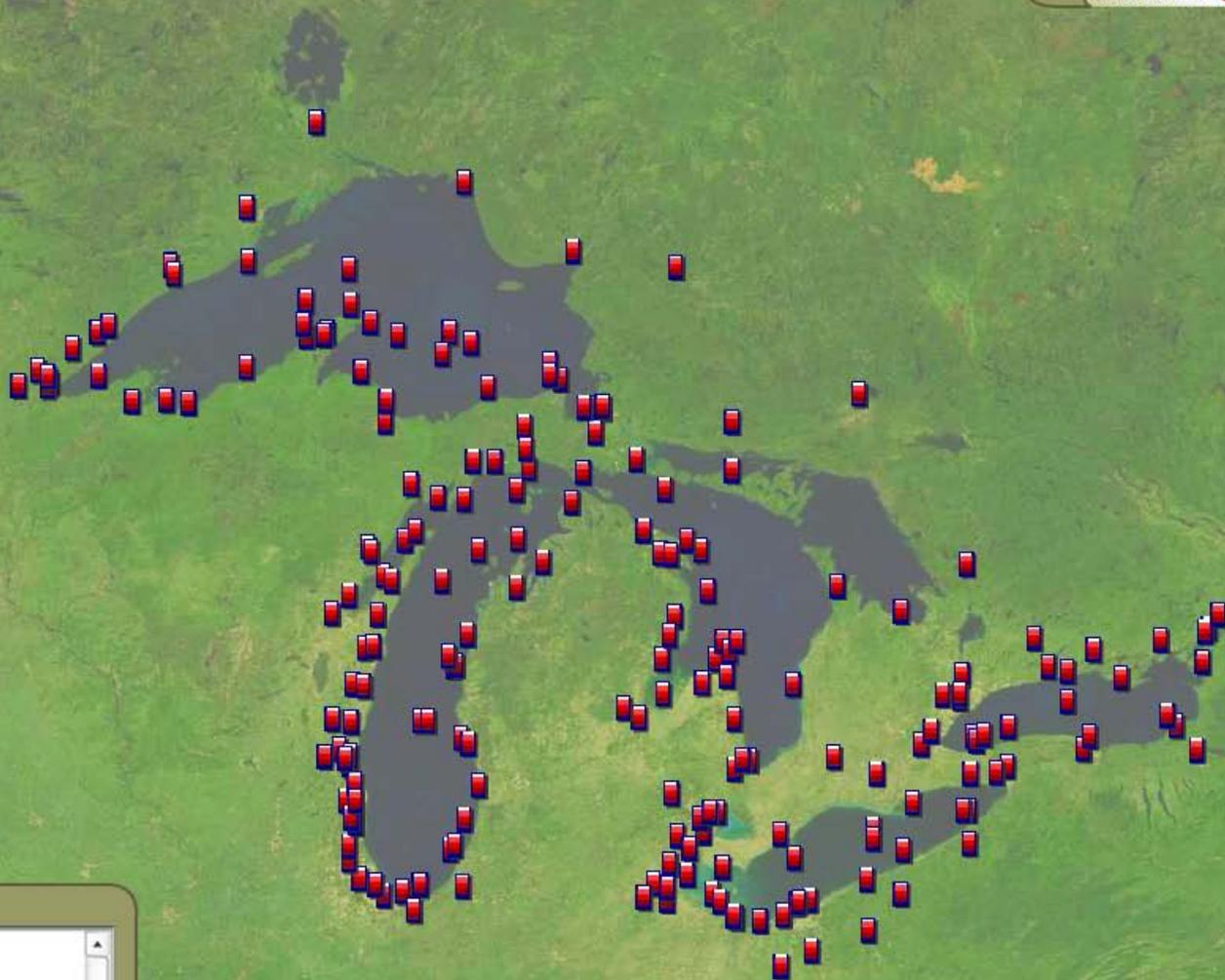
Brightness/
Saturation

WMS LAYERS

Layer Name	Symbol	on/off
AIR PRESSURE		<input type="radio"/>
AIR TEMPERATURE		<input checked="" type="radio"/>
CLOUD COVER		<input type="radio"/>
DEW POINT		<input type="radio"/>
WAVES		<input type="radio"/>
WATER TEMPERATURE		<input type="radio"/>
WINDS		<input type="radio"/>

Base Map: NASA Blue Marble

MAP LAYERS



INFO PANEL

STATION ID: WXQ4511.vos
NAME: Edwin H. Gott
[STATION IMAGE](#)
[STATION URL](#)
LATITUDE: 43.4
LONGITUDE: -86.8
ELEVATION: 0
OWNER: Edwin H. Gott
AIR TEMP.: 111.2deg F
TIME: 2008-04-15T01:00:00-05:00



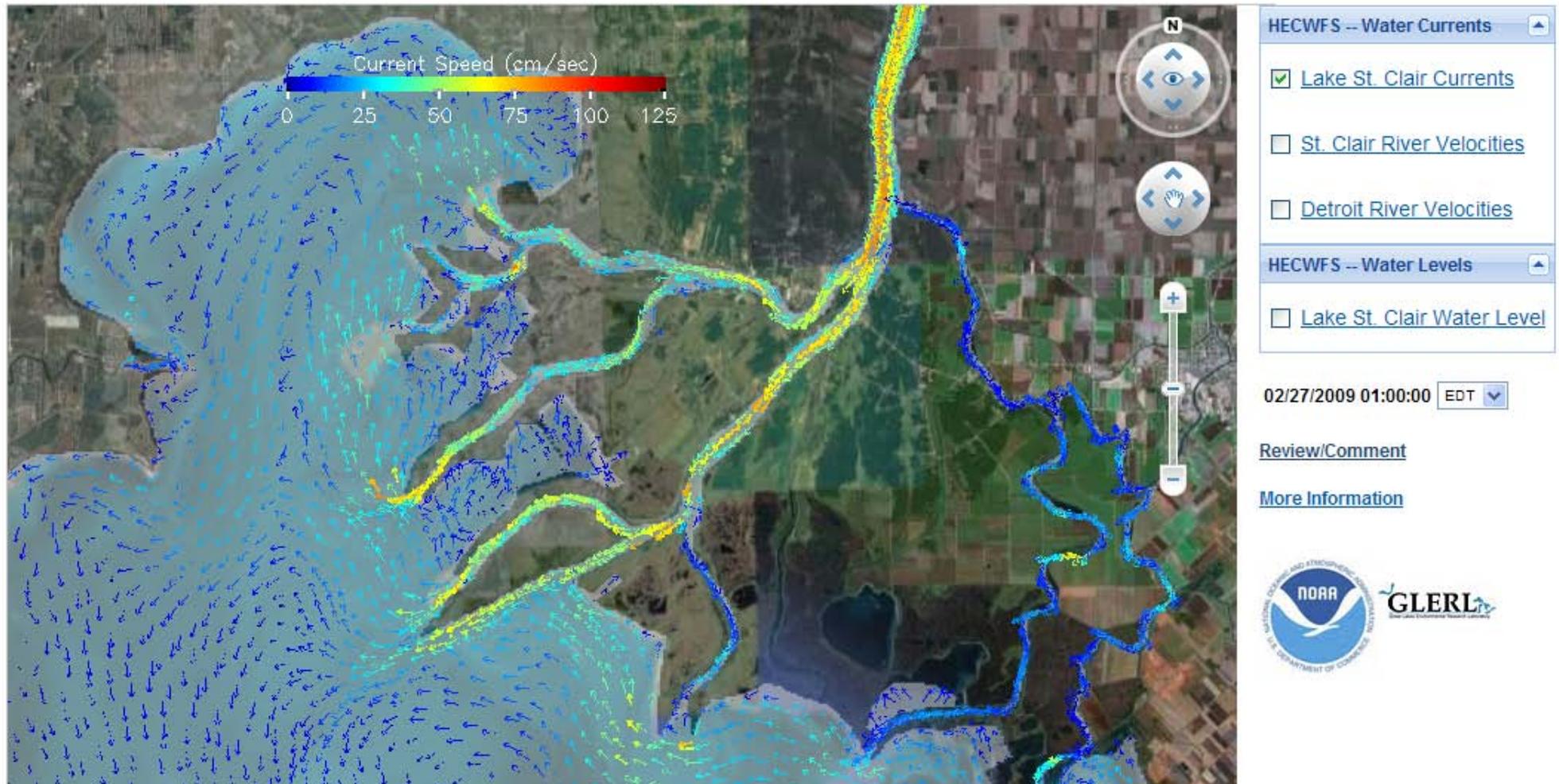
Huron to Erie Corridor Flows



Huron-to-Erie Corridor Flows

Disclaimer: All products published on this website are prototype products and are not intended to be used for legal or regulatory purposes. Due to atmospheric or other conditions, latest data may not always be available. [View full disclaimer.](#)

- Google Earth plug-in
- Model output from GLERL



HarborView



Great Lakes Observing System

Observational data for
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search



Products

Data Mapping:

- >> [harborview](#)
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Forecasts:

- >> [hec flows](#)
- >> [weather conditions](#)
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Offsite Data:

- >> [surface water temps](#)
- >> [more lake conditions](#)

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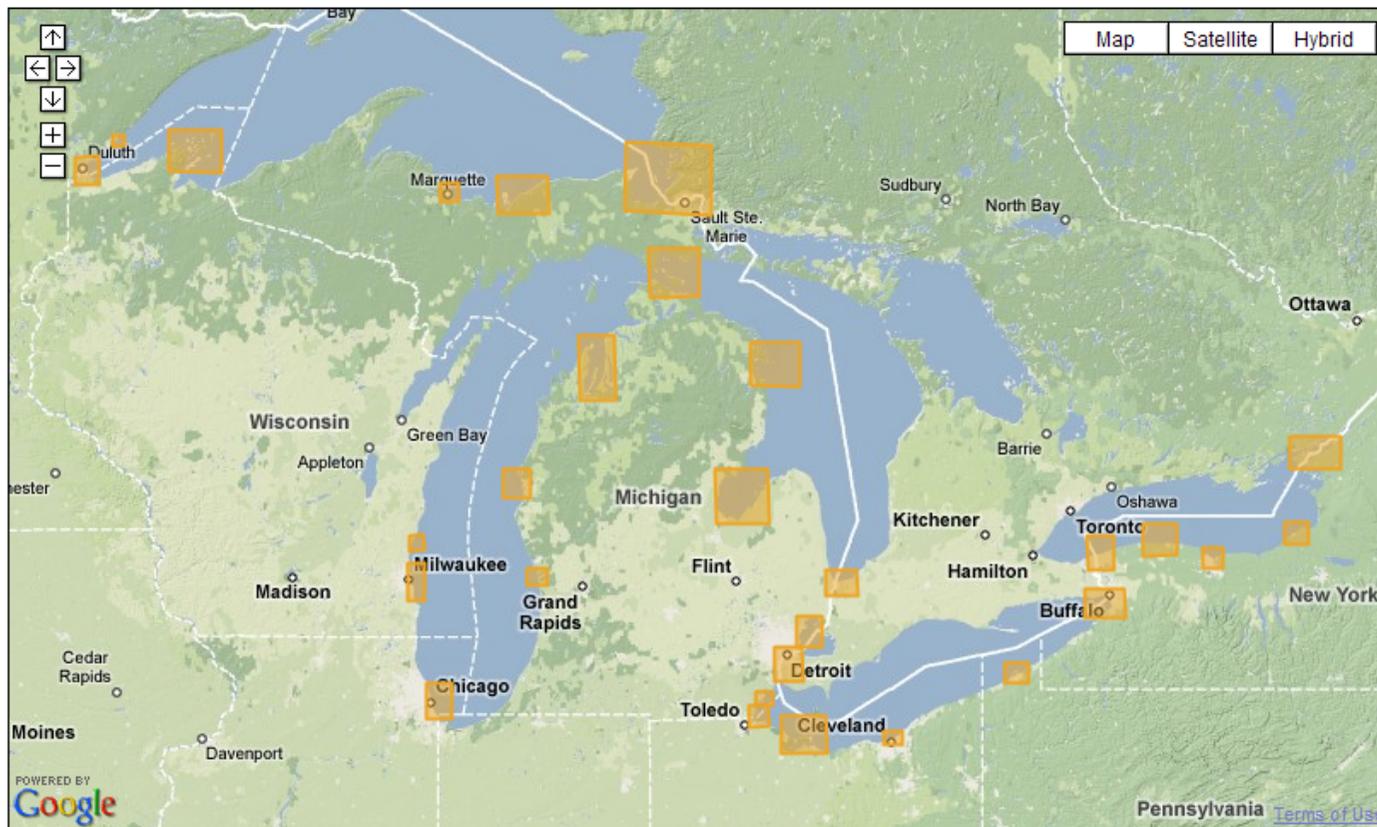
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Make Sure Your Boat
is Safe in the Harbor!
Get an Insurance
Quote Now.
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Ocean Training
Cruise

Norfolk-Bermuda; 700
miles Island Packet

HarborView

Select a harbor to get started:



Map Satellite Hybrid

Layer Control

- ? Description of the layer
- L Legend of the layer
- T Timestamp on the layer

Imagery:

- Latest MODIS ?
- Current Precipitation ?

Model Output:

- Modeled Winds ? L T
- Water Surface Temp ? L T
- Water Current ? L T

Point Observations:

- Latest Observations ?
- Web Cams ?

Wisconsin Coastal Attractions:

- Marinas ?
- Boat Access ?
- Shipwrecks ?
- Parks ?
- Lighthouses ?

User Generated Content:

- Wikipedia ?
- Panoramio ?

Google Local Search:

Navigation arrows

What is HarborView?



- An integrated map viewer intended for over 200 harbors along the Great Lakes
- Support safe and pleasurable recreational boating
 - Integrate observations and recreation/cultural attractions (at a local scale)
- HarborView implementation
 - Basinwide map
 - Highlight 5 harbors on each lake
 - Milwaukee prototype
 - Expand to all the harbors on the lake
- HarborView platforms
 - Initial implementation is Web-based
 - A desire to move to mobile devices

HarborView Scoping



- Discussed several options in Spring 2008
 - OpenLayers
 - Flash
 - Chameleon/MapServer
- Google Maps API looked like a good candidate
 - provided a good base map
 - incorporated distributed data sources (KML...)
 - search capabilities

HarborView Data Categories



- Base Maps
 - nautical charts, orthophotos, topographic maps
- Satellite Imagery
 - MODIS, NEXRAD reflectivity
- Observations
 - water level stations, buoys, met stations, ships
- Model Output
 - wind fields, water level surface, temperature, currents
- Recreation/Cultural Features
 - boat ramps, lighthouses, parks, beaches, shipwrecks
- Other
 - webcams, panorama photos, lightning strikes...

HarborView – Initial Screen



Great Lakes Observing System

Observational data for
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Products

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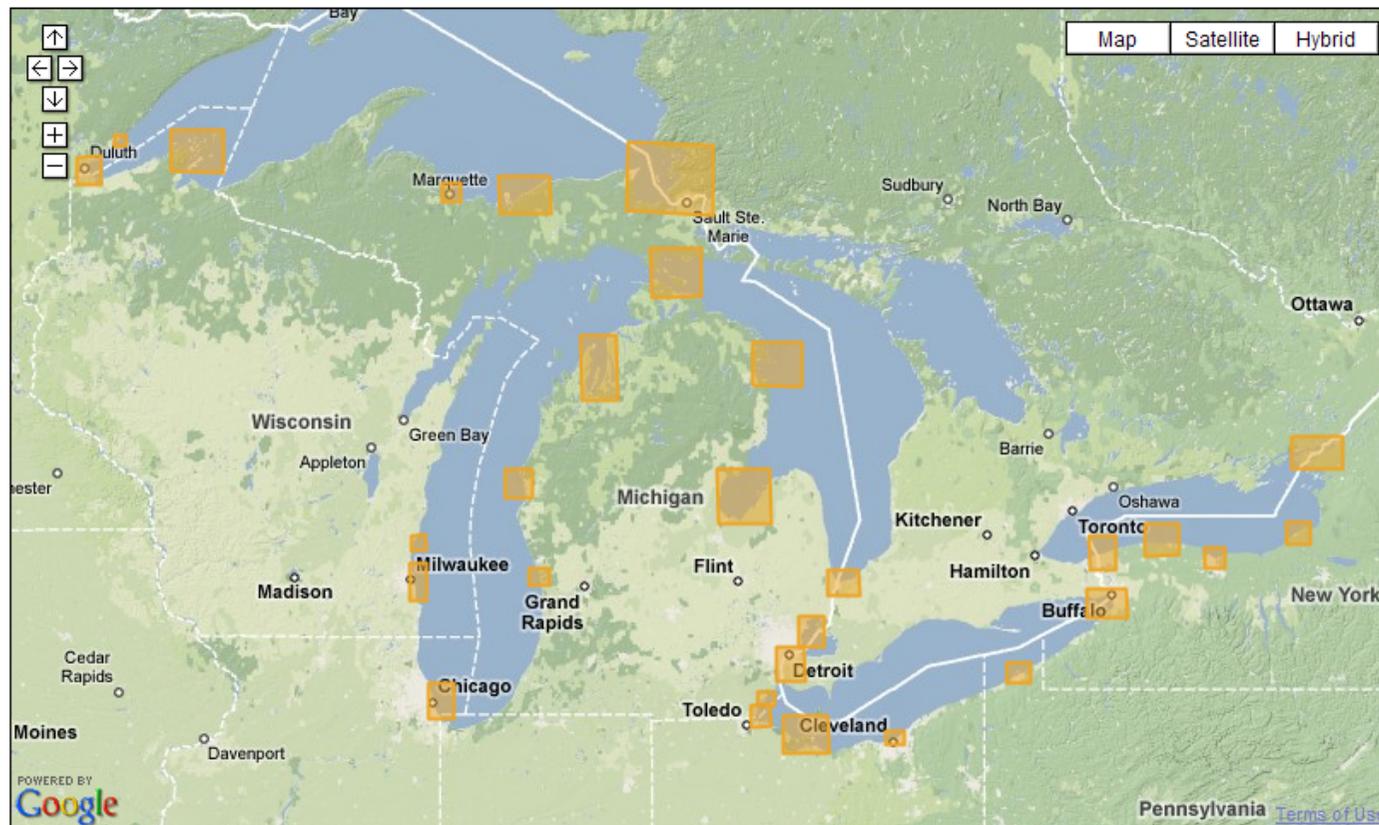
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www.Progressive.com/B

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Norfolk-Bermuda; 700
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- Lighthouses ?

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Google Local Search:

Navigation buttons: back, forward, home, search.

Latest MODIS



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Observational data for
the Great Lakes region

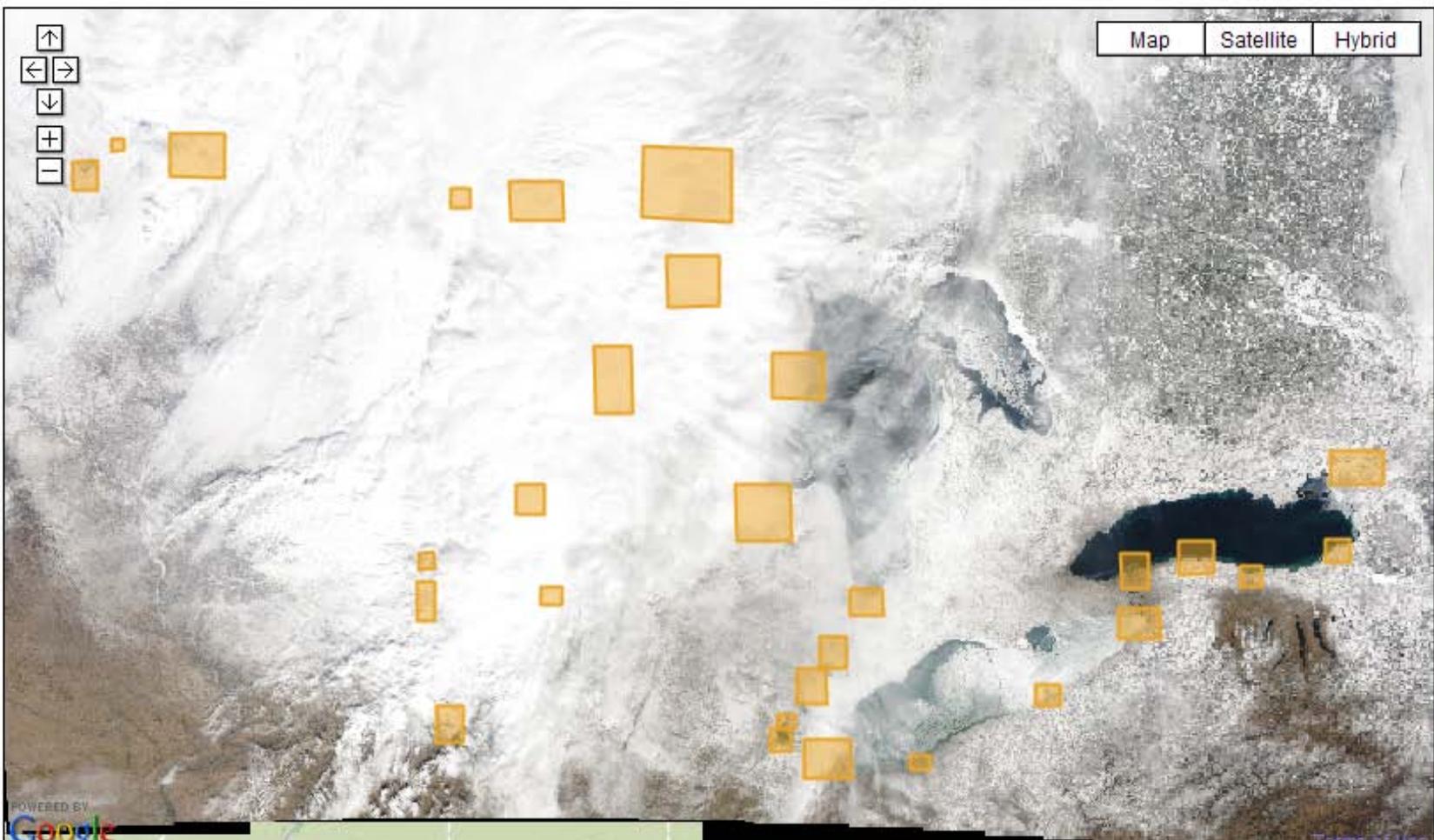


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Search bar with a search icon and the text "se".

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Google Local Search:

Current Precipitation



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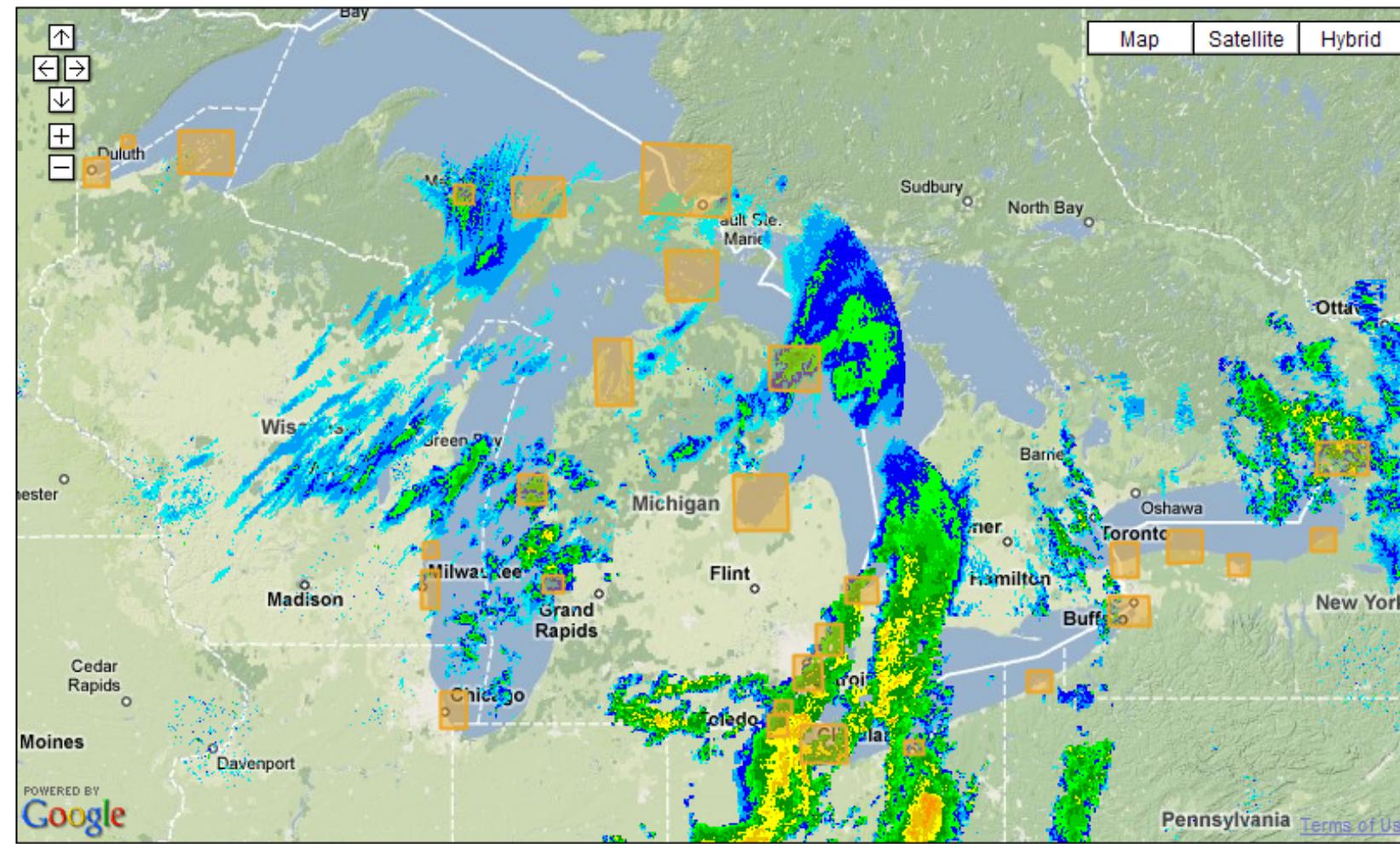


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HarborView

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- Legend of the layer
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Imagery:

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Model Output:

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Point Observations:

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Wisconsin Coastal Attractions:

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User Generated Content:

- Wikipedia
- Panoramio

Google Local Search:

Model Output - Winds



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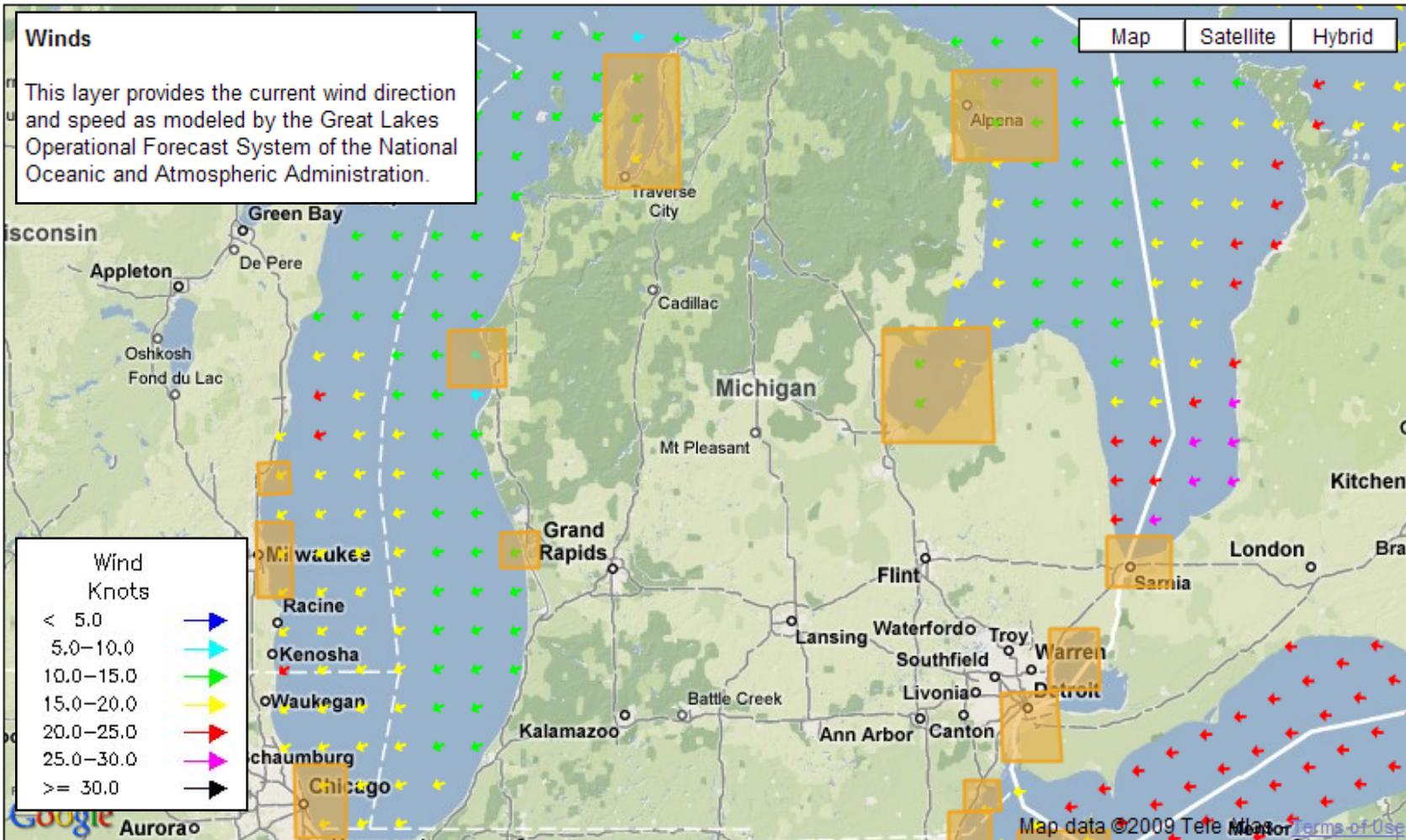
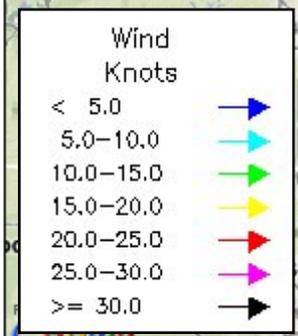


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HarborView

Select a harbor to get started:

Winds
This layer provides the current wind direction and speed as modeled by the Great Lakes Operational Forecast System of the National Oceanic and Atmospheric Administration.



Map Satellite Hybrid

Layer Control

- Description of the layer
- Legend of the layer
- Timestamp on the layer

Imagery:

- Latest MODIS
- Current Precipitation

Model Output:

- Modeled Winds **2009/3/2 16:00:00 EDT**
- Water Surface Temp
- Water Current

Point Observations:

- Latest Observations
- Web Cams

Wisconsin Coastal Attractions:

- Marinas
- Boat Access
- Shipwrecks
- Parks
- Lighthouses

User Generated Content:

- Wikipedia
- Panoramio

Model Output – WS Temp



Great Lakes Observing System

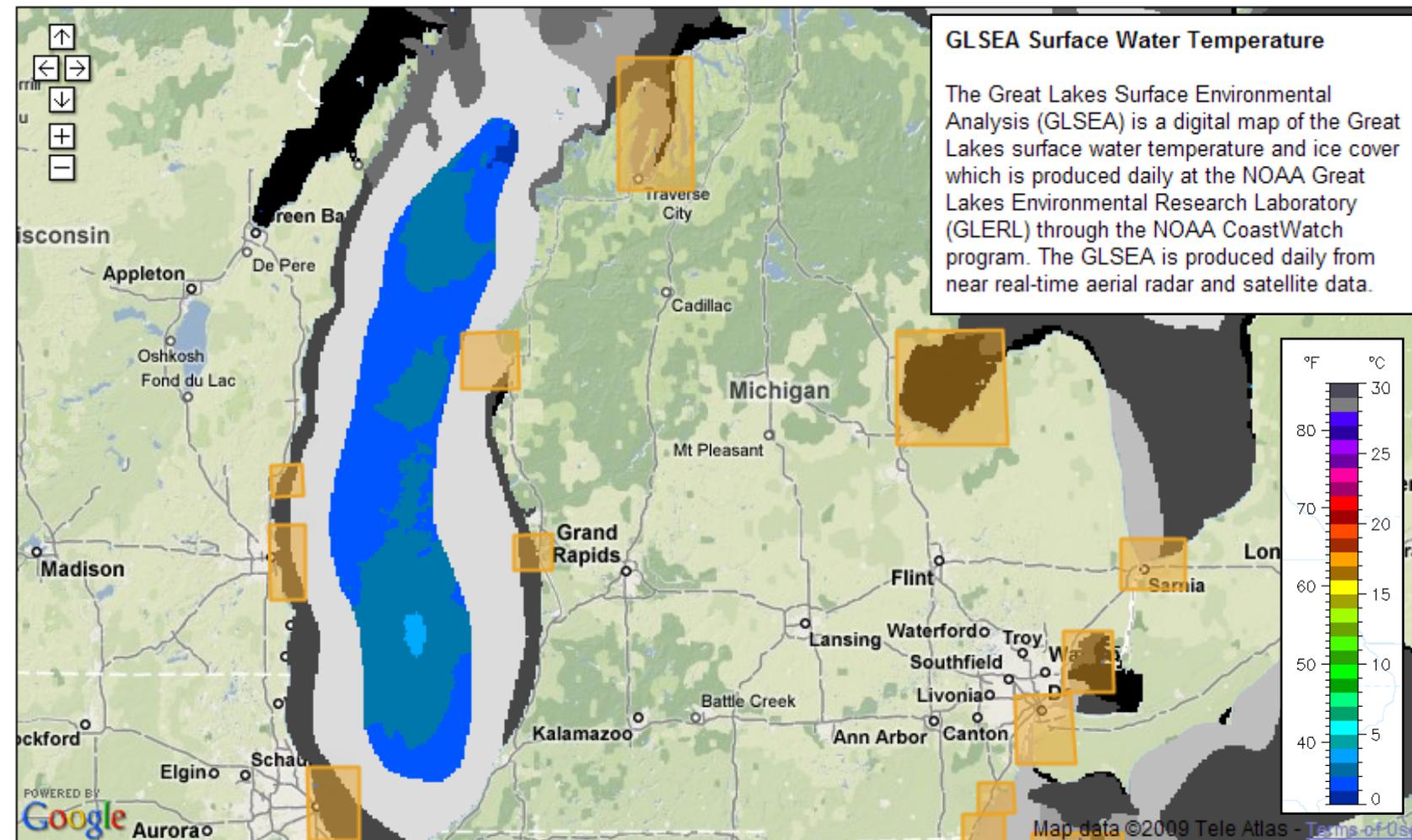
Observational data for
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HarborView

Select a harbor to get started:



Layer Control

- Description of the layer
- Legend of the layer
- Timestamp on the layer

Imagery:

- Latest MODIS
- Current Precipitation

Model Output:

- Modeled Winds
- Water Surface Temp

2009/3/2

- Water Current

Point Observations:

- Latest Observations
- Web Cams

Wisconsin Coastal Attractions:

- Marinas
- Boat Access
- Shipwrecks
- Parks
- Lighthouses

User Generated Content:

- Wikipedia
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Model Output - Currents



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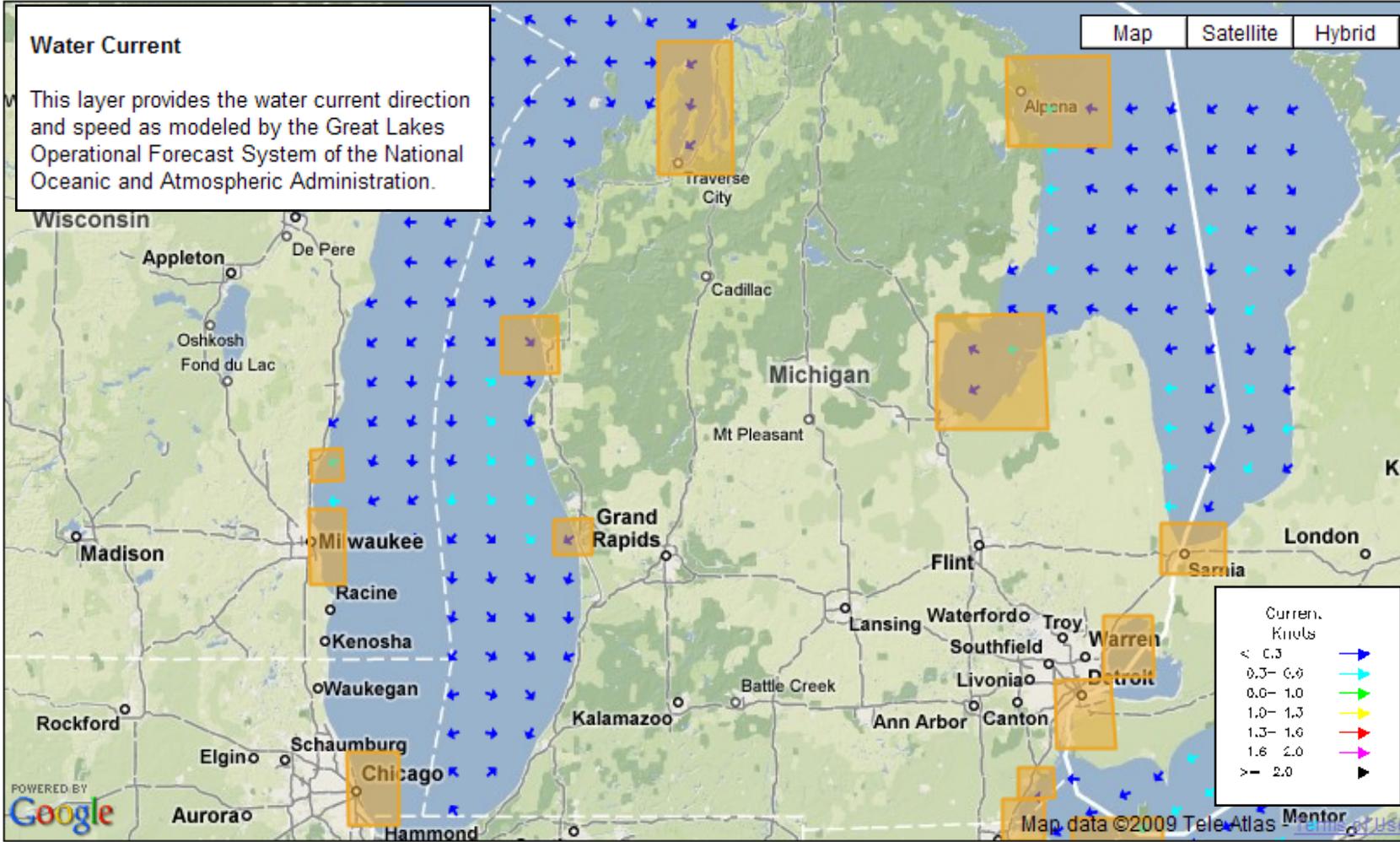
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HarborView

Select a harbor to get started:

Water Current

This layer provides the water current direction and speed as modeled by the Great Lakes Operational Forecast System of the National Oceanic and Atmospheric Administration.



Layer Control

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- Timestamp on the layer

Imagery:

- Latest MODIS
- Current Precipitation

Model Output:

- Modeled Winds
- Water Surface Temp
- Water Current

2009/3/3 0:00:00 EDT

Point Observations:

- Latest Observations
- Web Cams

Wisconsin Coastal Attractions:

- Marinas
- Boat Access
- Shipwrecks
- Parks
- Lighthouses

User Generated Content:

- Wikipedia



Map data ©2009 Tele-Atlas

Select a Harbor



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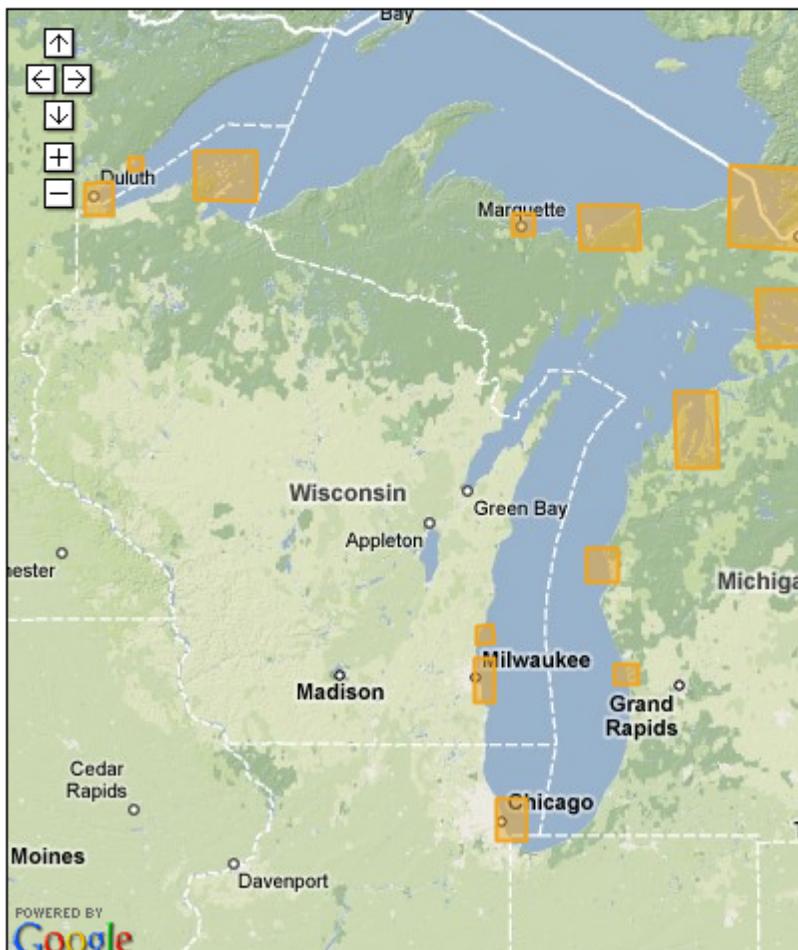
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search

HarborView

Select a harbor to get started:

- Select Harbor
- Milwaukee, WI
- Port Washington, WI
- St. Ignace/Mackinac Island, MI
- Traverse City/Grand Traverse Bay, MI
- Ludington, MI
- Grand Haven, MI
- Chicago, IL
- Sault Ste. Marie, MI
- Munising, MI
- Marquette, MI
- Bayfield/Apostle Islands, WI
- Duluth, MN
- Two Harbors, MN
- Alpena, MI
- Saginaw Bay, MI
- Port Huron, MI
- Saint Clair Shores area, MI
- Detroit, MI
- Monroe, MI
- Toledo, OH
- Port Clinton/Lake Erie Islands, OH
- Cleveland, OH
- Erie/Presque Isle Bay, PA
- Buffalo, NY
- Youngstown, NY
- Oak Orchard, NY
- Rochester, NY
- Oswego, NY
- Clayton, NY
- Select Harbor



Map Satellite Hybrid

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Imagery:

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Model Output:

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Wisconsin Coastal Attractions:

- Marinas
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- Parks
- Lighthouses

User Generated Content:

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Google Local Search:

Point Observations



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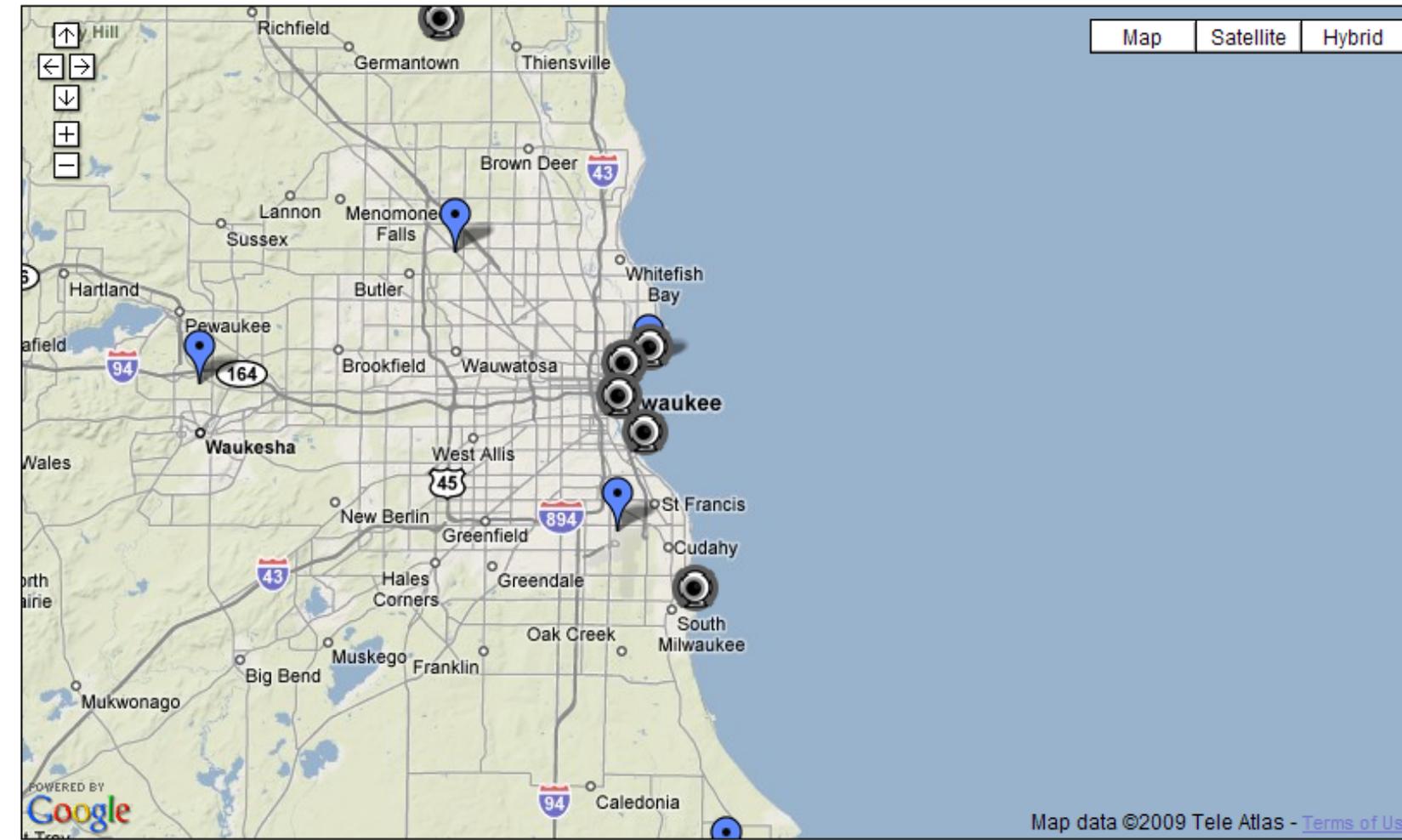


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Google Local Search:

Latest Observations



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Search bar with a search icon and the text 'se'.

HarborView

Select a harbor to get started:

nws.MKE.met

Latest Observation for Milwaukee - General Mitchell International Airport met station (nws.MKE.met)
2009-02-27T03:52:00Z

wind_from_direction	20	deg
wind_speed	19.05	kts
wind_gust	25.08	kts

Logos: NATIONAL WEATHER SERVICE, GLOS, GLIN

Map controls: Map, Satellite, Hybrid

Map data ©2009 Tele Atlas - [Terms of Use](#)

Layer Control

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Google Local Search:

Webcams



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Google Local Search:

GL WATER Institute Webcam



Great Lakes WATER Institute

Wisconsin Aquatic Technology and Environmental Research



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Videos

- ▶ Diver & Mussels
- ▶ Sample Lake Bottom

GLWI Webcam

Looking north into the Milwaukee Inner Harbor



GL WATER Institute Webcam



Time-lapse last 10 days

NEW  [RSS feed of Full Day timelapses](#)

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[Time-lapse archive](#)

[Click Here for the Green Roof Webcam](#)

GREAT LAKES CIRCLE TOUR



Wisconsin coastal guide

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Maps

Get Down to the Water!

[360° Panoramas](#)

The Great Lakes Circle Tour leads you around the largest freshwater system on the planet – but the main route often takes you far from the water's edge. This site shows you where to pull off the highway for a quiet [beach](#), a hidden [lighthouse](#), or a secluded [park](#).

[Beaches](#)

[Lighthouses](#)

[Parks](#)

[Shipwrecks](#)

[Webcams](#)

[Boat Ramps](#)

360° Panoramas

Have a look around. More than two hundred 360° photo panorama places where you can drive or walk down to the water. The links show boat ramps – even lonely fire lanes where there's nothing to do in any direction you are looking as you "turn around."



Dalrymple Campground



Coastal Attractions



Great Lakes Observing System

Observational data for
the Great Lakes region

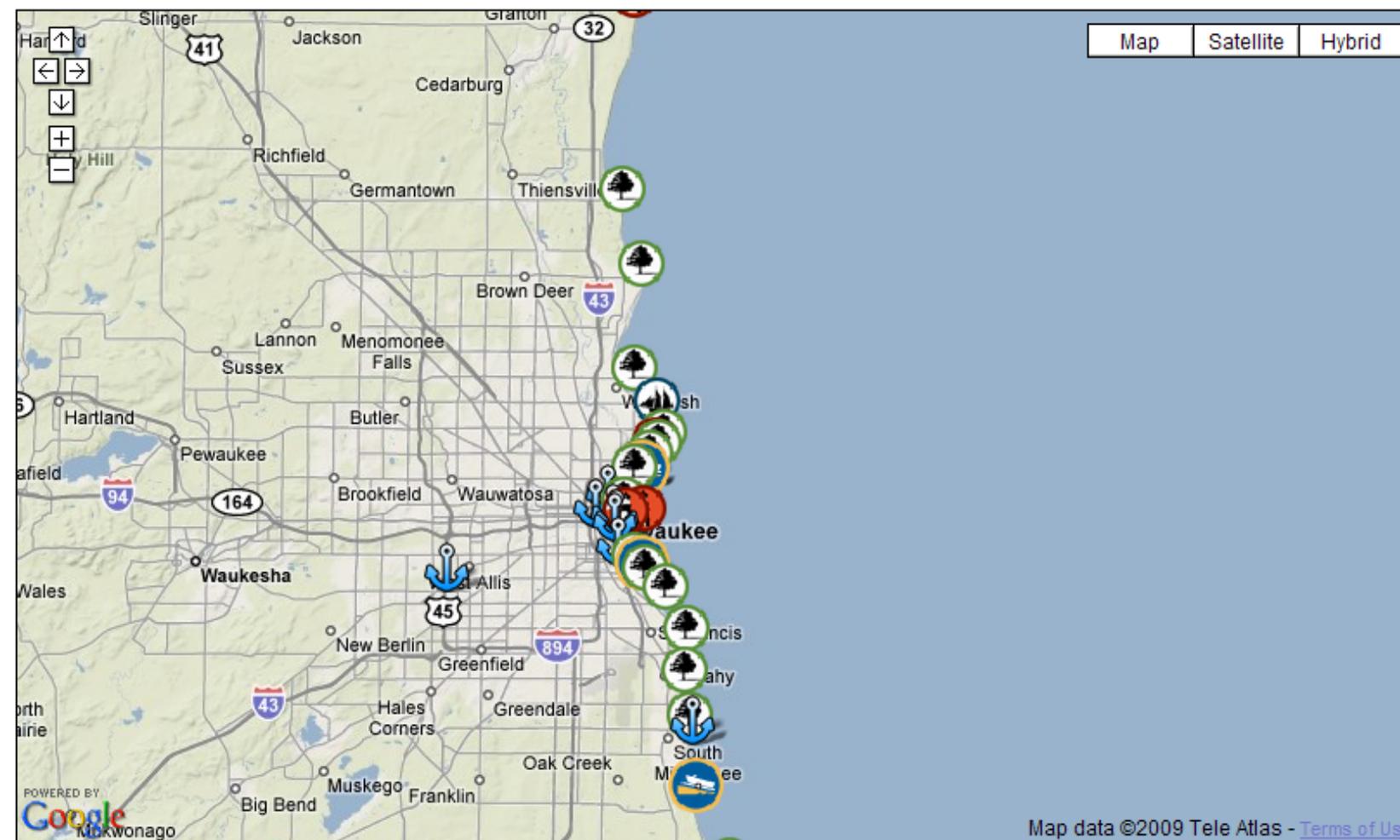


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HarborView

Select a harbor to get started:



Layer Control

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Imagery:

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User Generated Content:

- Wikipedia
- Panoramio

Google Local Search:

Lighthouses



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Search

HarborView

Select a harbor to get started:

Milwaukee Pierhead



Wisconsin
coastal guide

Milwaukee Pierhead

The Milwaukee Pierhead Light was built in 1906 and is currently active. It consists of a 42-foot red steel tower and is managed by the U.S. Coast Guard. It is accessible from shore by walking the pier, but the tower is closed to visitors.

Visit websites with more information about this lighthouse

[Lighthouse Friends](#)

[Terry Pepper](#)

[BoatNerd](#)

www.wisconsincoastalguide.org

Map Satellite Hybrid

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- Panoramio

Google Local Search:

Terry Pepper – Seeing the Light



Milwaukee Pierhead Light

Seeing The Light

Milwaukee, Wisconsin

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Historical Information

Milwaukee traces its history as a Great Lakes port to 1835, when the first commercial cargo vessel stopped at the new village growing at the confluence of Milwaukee, Menomonee and Kinnickinnic rivers.

The first major improvement in converting the harbor from its natural configuration came in 1857, when the "Straight Cut" or new harbor entrance was completed. The major thrust of this project involved the construction of a new outlet a half mile to the north of the natural mouth of the Milwaukee River.

With the new channel, an open-framework pierhead tower was constructed at the end of the new pier that formed the harbor entrance. While to this point we have been unable to locate a photograph of this original structure, it was likely similar to other pierhead lights constructed throughout the Great Lakes during this time period, an example of which can be seen in the drawing to the right.

Because of numerous shipping disasters on Lake Michigan, in 1881, Congress made provision for the creation of a Harbor of Refuge in Milwaukee. This harbor was to be created through the construction of a breakwater across the Bay. With the construction of this Breakwall, and numerous improvements within the harbor, the old



Typical late 1800's wooden pierhead light

User Generated Content



Great Lakes Observing System

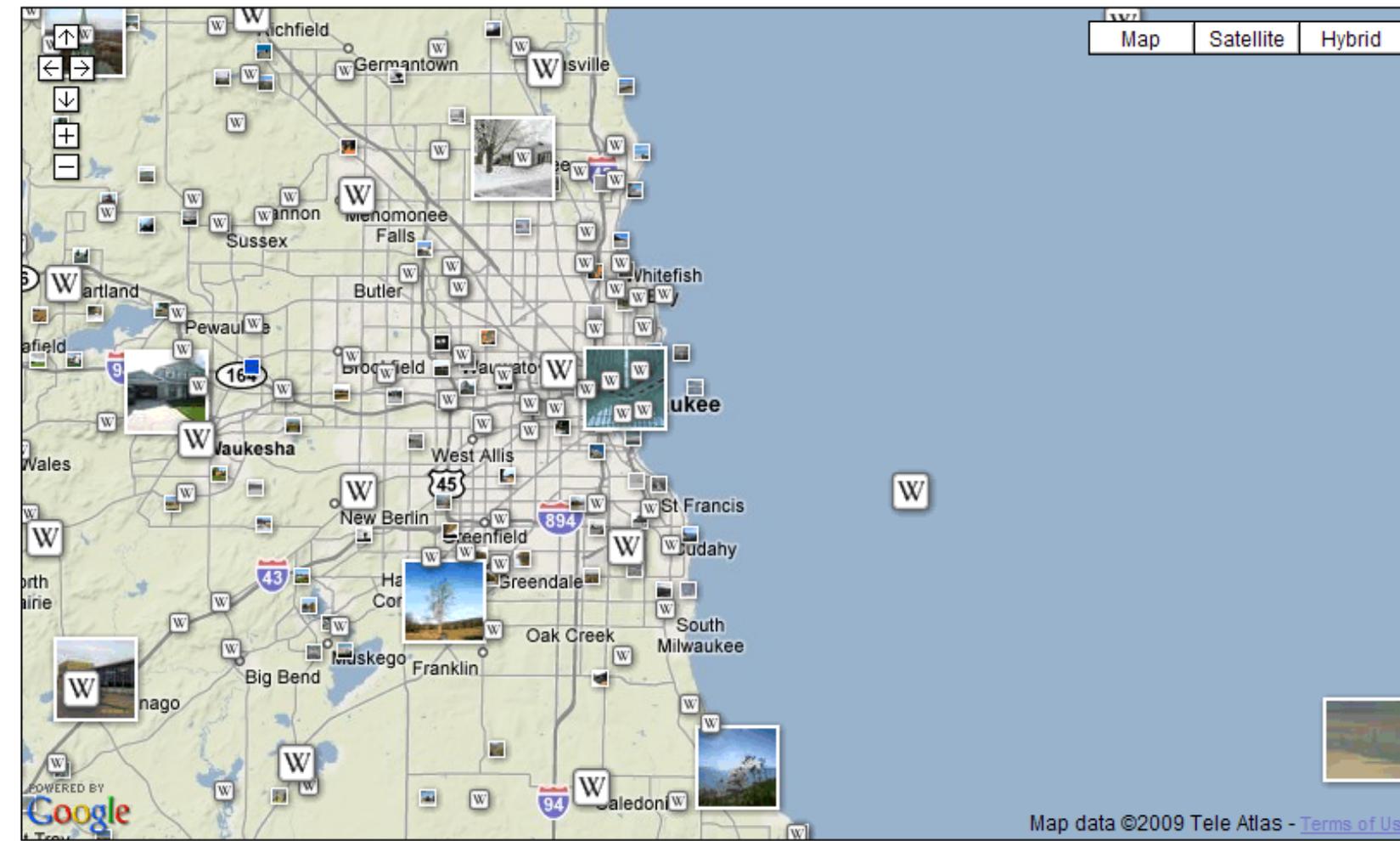
Observational data for
the Great Lakes region



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HarborView

Select a harbor to get started:



Layer Control

- Description of the layer
- Legend of the layer
- Timestamp on the layer

Imagery:

- Latest MODIS
- Current Precipitation

Model Output:

- Modeled Winds
- Water Surface Temp
- Water Current

Point Observations:

- Latest Observations
- Web Cams

Wisconsin Coastal Attractions:

- Marinas
- Boat Access
- Shipwrecks
- Parks
- Lighthouses

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HarborView

Select a harbor to get started:

Appomattox (ship)

The American ship Appomattox was a wooden bulk steamer, and one of the largest wooden ships ever built. The Appomattox had a length of 319 feet (97.2 meters) and a beam of 42 feet (12.8 meters). It was built in 1896 by James Davidson of West Bay City, Michigan. It had a triple expansion steam engine. Because of its immense length, the Appomattox used metallic cross bracing, a metallic keelson, metallic plates, and multiple metallic arches. Several syphons and steam-driven pumps were required to keep the Appomattox afloat. The Appomattox operated mainly on the Great Lakes, carrying Lake Superior iron ore on her eastward voyages, and then returning westward with a load of coal. The ship usually towed the steamer barge Santiago, which had a length of 324 feet (98.8 meters), to increase the amount of cargo carried each trip. The Appomattox alone could carry more than 3000 tons of iron ore, and in combination with the Santiago, the pair had a capacity approaching 8000 tons. The Appomattox went aground in a fog on the Great Lakes in 1905.

[Full article](#)

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Map Satellite Hybrid

Layer Control

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Search bar with a search icon and the text "se".

HarborView

Select a harbor to get started:

The map displays the Milwaukee, WI area with various locations labeled, including Waukesha, West Allis, and Greenfield. A large popup window titled "Lake Michigan" is open, showing a scenic view of the lake with orange flowers in the foreground. The popup includes a close button (X) and a credit line "By bob-b-o".

Map Satellite Hybrid

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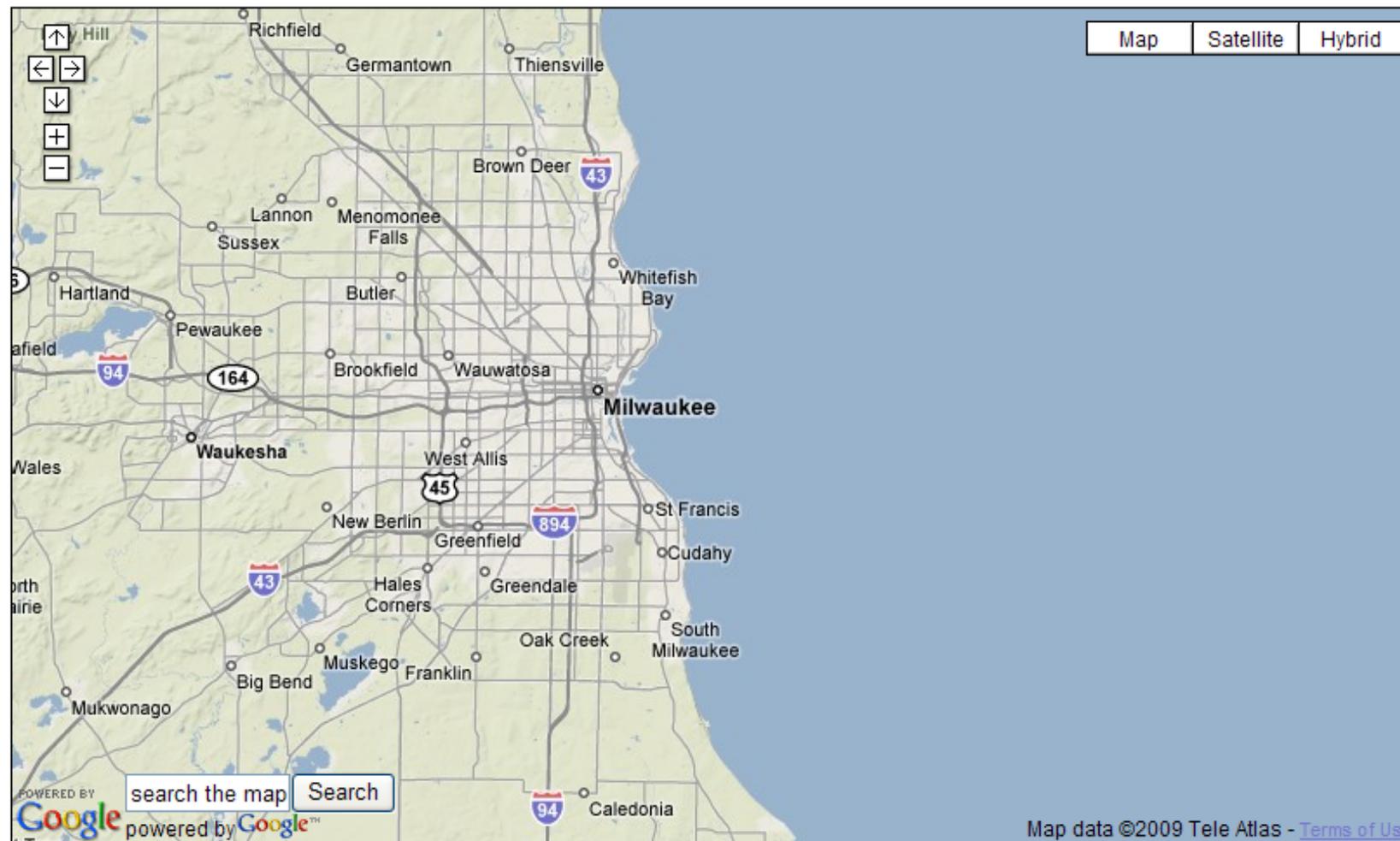


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search

HarborView

Select a harbor to get started:



Latest MODIS ?

Current Precipitation ?

Model Output:

Modeled Winds ? L T

Water Surface Temp ? L T

Water Current ? L T

Point Observations:

Latest Observations ?

Web Cams ?

Wisconsin Coastal Attractions:

Marinas ?

Boat Access ?

Shipwrecks ?

Parks ?

Lighthouses ?

User Generated Content:

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Google Local Search:

Local Search ?

Search box will be shown on the left bottom of the map when you click the "Local Search" checkbox on.

Tackle Shops



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Search box with a search button.

HarborView

Select a harbor to get started:

Reinke Brothers
3144 W Greenfield Ave
Milwaukee, WI
United States
(414) 383-5591
[directions](#)
Get directions:
[To here](#)
-
[From here](#)
[clipped from Google - 2/2009](#)

Map Satellite Hybrid

tackle shops Search

Map data ©2009 Tele Atlas - [Terms of Use](#)

- Latest MODIS ?
- Current Precipitation ?

Model Output:

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- Lighthouses ?

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- Wikipedia ?
- Panoramio ?

Google Local Search:

- Local Search ?

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German Restaurants



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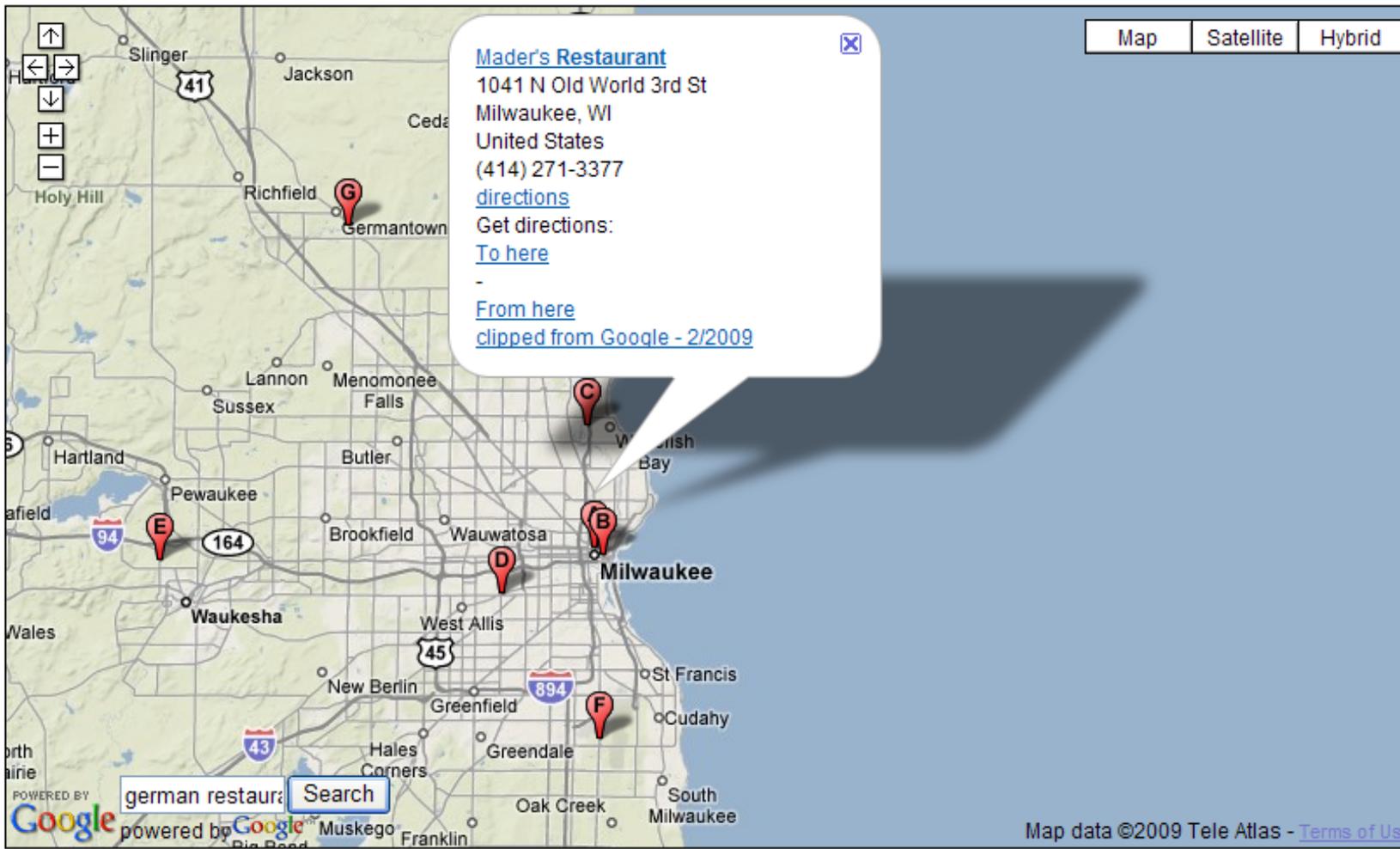


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Search bar with a search icon and the text "search".

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Polish Sausage



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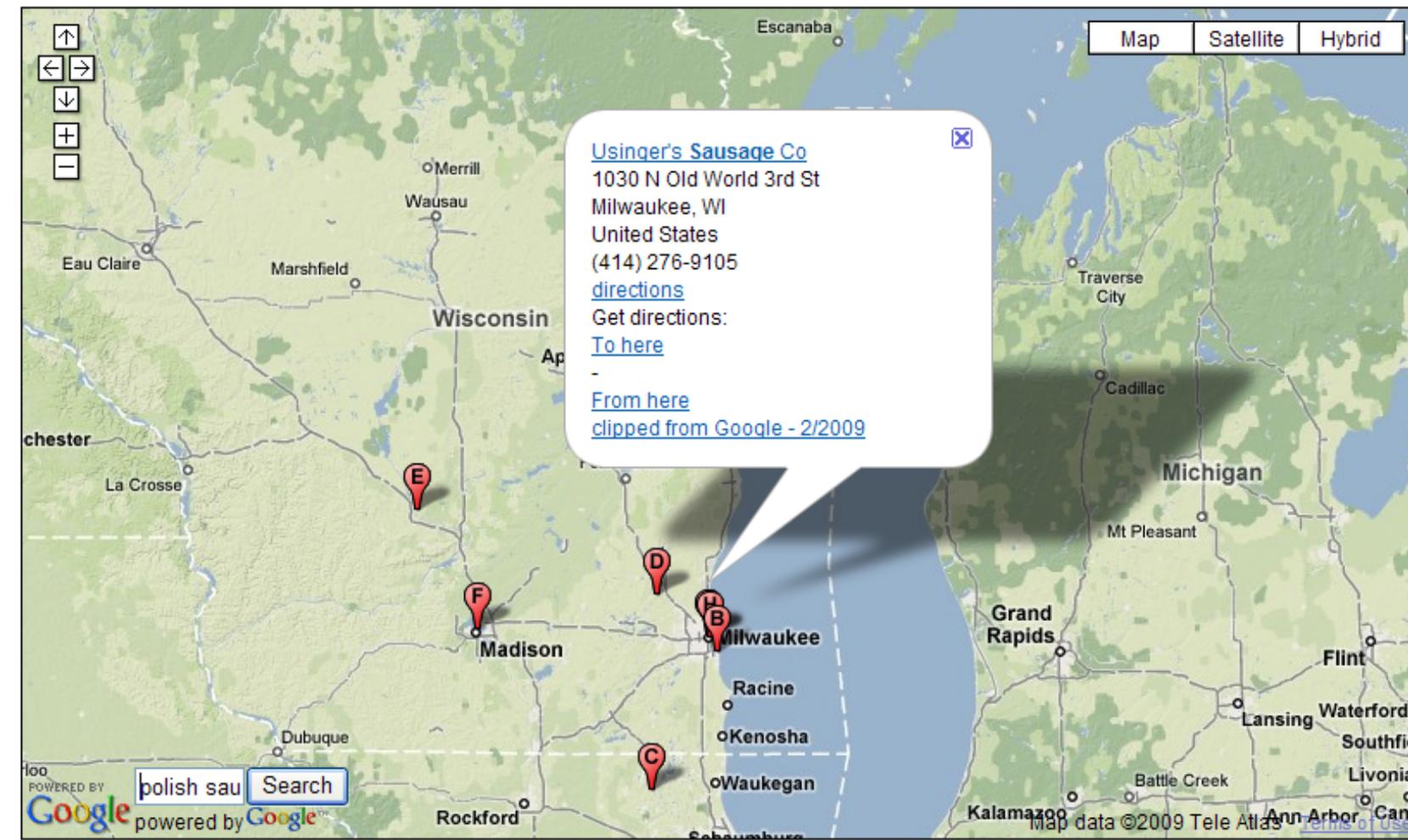


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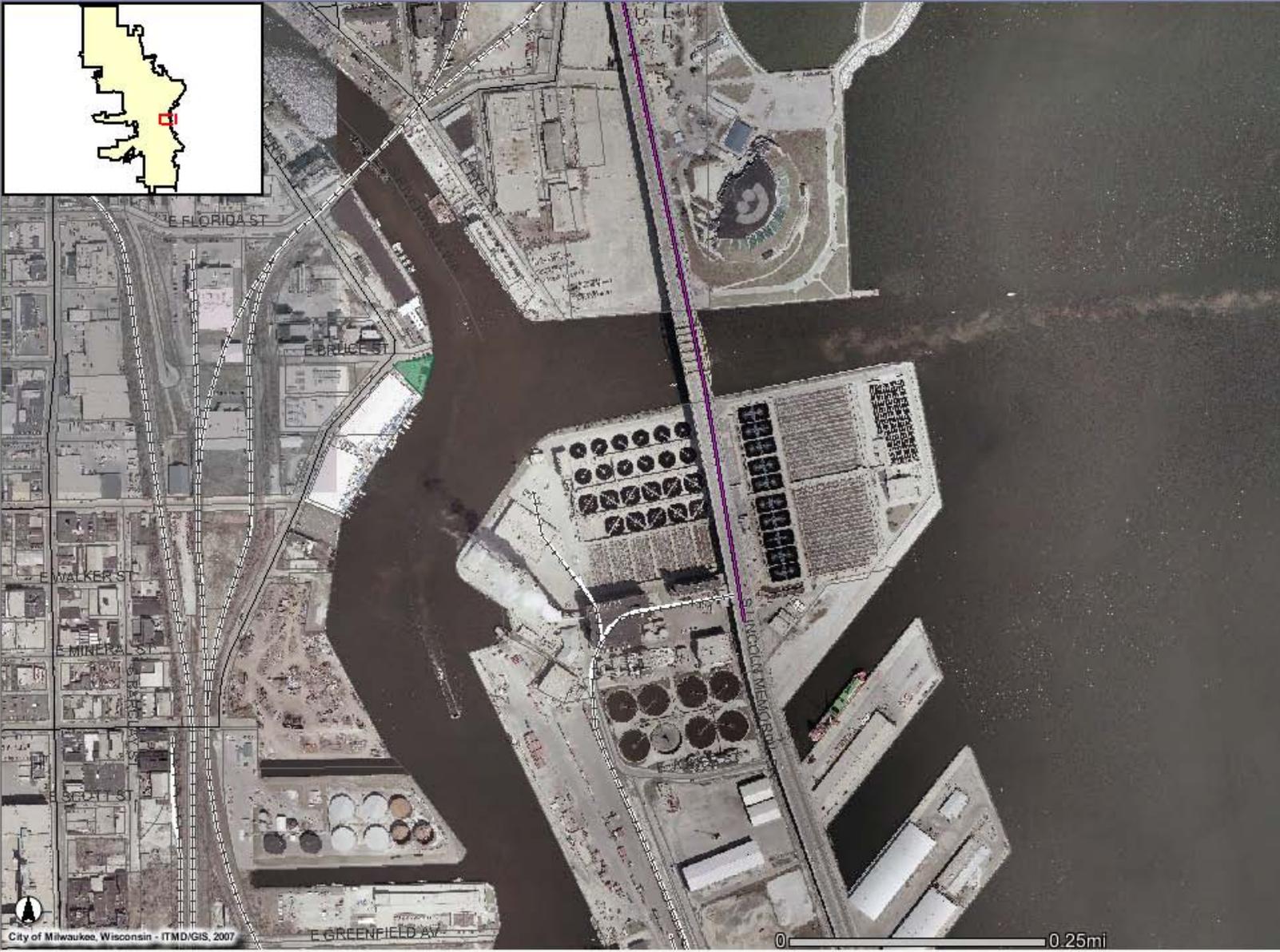
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Data Sources in the Works



- Marinas
 - include oblique photos of the harbor entrance
- Oblique photos
- Panorama photos of public access sites
- County and city web mapping sites
- GeoRSS of cultural events in coastal communities
- Historic sites
- Local observatories

- Legend/Layers
- Overview Map
- Zoom In**
- Zoom Out
- Full Extent
- Last Extent
- Pan
- Identify
- Query
- Search
- Locate
- Measure
- Clear
- Print



- ### LAYERS
- All Layers
 - Points of Interest
 - Fire Houses
 - Police Stations
 - Hospitals
 - Libraries
 - Liquor Licenses
 - Liquor Licenses
 - Liquor License Bufl
 - Bikeways
 - On-Street Bikeway
 - Planned/Proposed
 - Other Trails
 - Oak Leaf Trail
 - Transportation/Infrastru
 - Street Paving Prog
 - Freeways
 - Major Streets
 - Streets
 - Railroads
 - Airports
 - General Reference
 - Land Use Symbols
 - Parcels (Outline)
 - Waterways
 - Parks and Parkway
 - Schools
 - Schools
 - MPS High School D
 - MPS Middle School
 - MPS Elementary S
 - School Board Distri
 - Election Info
 - Polling Places
 - Voting Wards
 - Aldermanic District
 - County Supervisor
 - Property and Zoning Dat
 - Tax Delinquent Pr
 - Property Violations
 - Property Permits
 - Property Services I
 - Land Use
 - Parcels
 - Residential Assessr
 - Apartment Assessr
 - Commercial Assess
 - Historic Areas
 - Business Improven

Zoom In

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Identify

Query

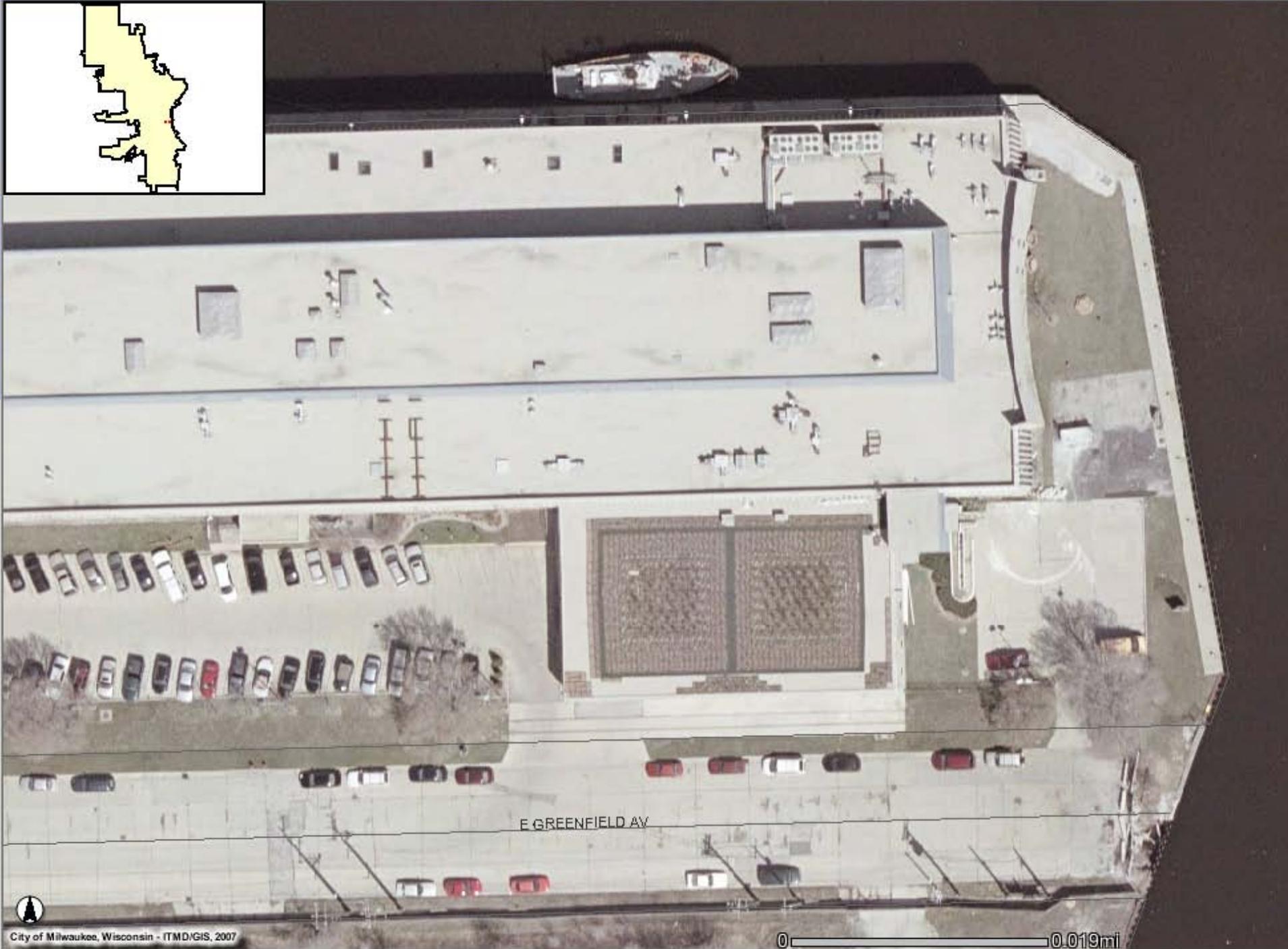
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Future Directions



- Incremental development
 - bug fixes and performance enhancements
 - scale thresholds and selecting harbors
 - animations
- Milwaukee prototype
 - usability testing among recreational boaters
- GLOS awareness and needs survey
 - mapping mashup workshop on each of the lakes
- Data custodians
 - coastal attractions outside Wisconsin
- Mobile devices??

<http://glos.us/>

Questions?

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<http://www.seagrant.wisc.edu/gis/>

<http://coastal.lic.wisc.edu/>

Great Lakes Observing System

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Jennifer Read, Director

Great Lakes Commission staff

Roger Gauthier

Christine Manninen

Guan Wang

Devra Polack (Spinster Design)

Pete Giencke (now at Google)

UW-Madison student

Ben Coakley

Water is the most critical resource issue of our lifetime
and our children's lifetime.

The health of our waters is the principal measure
of how we live on the land.

-Luna Leopold