Great Lakes Data Integration Demonstration Using Google Earth

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November 29, 2007

Introduction (0:00)

[TITLE SLIDE]

Hello, this is David Hart. I'm the Geographic Information Specialist for the University of Wisconsin Sea Grant Program in Madison, Wisconsin. It's November 29th, 2007. I'll be giving a demonstration of Google Earth and how it can integrate a variety of data sources for the Great Lakes. (0:17) We'll start out assuming we're going to be taking a trip to go boating from the Twin Cities in Minnesota.

Traffic (0:22)

The first thing we will want to do is get an idea of what the traffic conditions might be like. There's a layer in Google Earth that can do that. We'll turn it on and you can see that there are sensors on the road network. Those that are green show that the traffic conditions are moving pretty well, but there are some places that are yellow or red where the traffic is slowing down. We can click on a particular symbol and it will give us an idea of what the traffic conditions – the speeds of the traffic are moving at. You see on I-94 here the traffic is going 22 miles per hour, so it has slowed down quite a bit.

Source: Included as a layer in Google Earth.
Near-real-time traffic sensors on freeways in metropolitan regions. Available as of November 2007 for Milwaukee, Chicago, Grand Rapids, Detroit, Toledo, Cleveland, Akron, and Buffalo in the Great Lakes basin.

Daily MODIS Image (0:55)

Now we get on our way, we might want to get an idea of what weather conditions are like. We're going to click on the NASA MODIS Image Server – Actually I think it is the NOAA MODIS satellite. It goes over twice a day typically and gets information about the conditions – as we zoom out here we can begin to see – this is a composite image and there are very cloudy conditions over the Great Lakes on November 29th.

Source of KML: OnEarth, NASA Jet Propulsion Lab
Daily updated 250m per pixel visual images collected by the AQUA MODIS, images collected the previous day around 2PM local time.
http://OnEarth.jpl.nasa.gov/OnEarth_daily_aqua.kml

GOES Weather Satellite Animation (1:23)

To get a more updated version, we can click on the NOAA GOES satellite and that will give us information in more frequent intervals. We can also animate that. We'll turn this on and get an idea of how the weather is moving over the Great Lakes.

Source of KML: NASA Goddard Space Flight Center
GOES 12 weather satellite animation. Animation at approximately one hour intervals for 12 hours. Images from NASA Goddard Space Flight Center. Data from NOAA GOES 12 East satellite.
http://www.sirvin.com/goes/goeseast_web.kml

Doppler Radar Animation (1:40)

And then finally we might want to get an idea of the precipitation in the area. We can look at the National Weather Service Doppler radar and get an idea also – by animating – turn this on and get an idea of precipitation. We can see that there's probably some lake effect snow going on over near Buffalo as well as some snow probably happening up in the eastern part of Lake Superior.

Source of KML: National Weather Service RIDGE
NWS Radar Animation of base reflectivity for the Central Great Lakes. Animation at ten minute intervals for approximately two hours.
http://radar.weather.gov/ridge/kmzgenerator.php

Lake Superior Circle Tour Route (2:09)

Now we want to get on our trip and one of the things we may want to do is that the Lake Superior Circle Tour route. This will show the Circle Tour designated route around Lake Superior. We can begin to zoom in a little more closely and take a look at the route on the western part of Lake Superior.

Source of KML: Wisconsin Coastal Guide, University of Wisconsin Sea Grant Institute
This version of the Lake Superior Circle Tour route was created in 2007 from the descriptions of the route on various web sites. The dataset was created by downloading TIGER 2000 files from ESRI and the Ontario Road Network from the Geography Network Canada and extracting the Circle Tour route.
http://aqua.wisc.edu/glct/maps/kml/glct-route-17July2007.kml

Boat Access (2:29)

One of the things we may want to look for are boat access points. This information is from the Great Lakes Circle Tour Coastal Access Guide. It was compiled by the Wisconsin Department of Natural Resources and as we zoom in more closely, we can click on this location and see that there is a boat access point at Saxon Harbor in Iron County and it is a ramp.

Source of KML: Wisconsin Coastal Guide, University of Wisconsin Sea Grant Institute Launch points for boats on the Great Lakes coasts in Wisconsin as compiled by the Wisconsin Department of Natural Resources.
(not on-line yet)

Panorama Photos (2:49)

We may want to get an idea of what it looks like so we'll click on the panorama photos from the Circle Tour Coastal Access Guide. As we zoom in a little more closely, we can click on the one for Saxon Harbor. It'll jump us to a page where there is a 360 degree panorama photo linked to a vicinity map. These were taken last fall and you can get an idea by rotating around – what the area looks like. You can see that this cone of view changes in the map. You can use that to look around. You can also zoom in and you can see that the cone of view narrows. Now we can get a close idea of what the ramp looks like and take a look also at some of the other areas around the boat launch

Source of KML: Wisconsin Coastal Guide, University of Wisconsin Sea Grant Institute Panorama photos with a 360 degree view of the Great Lakes coast of Wisconsin. The photos are linked to a vicinity map.
http://aqua.wisc.edu/glct/maps/kml/glct-panoramas-21Dec06.kml

Wind Speed (3:37)

Now that we're at the lake, we want to get an idea of what the current conditions are. For that we'll go to the Great Lakes Coastal Forecasting System. This is operated by the Great Lakes Environmental Research Lab in Ann Arbor. One of the things we can do first of all is get information about wind conditions. We'll need to zoom out to be able to see those. As we get a little broader perspective of the lake, we can see that over on the eastern part of the lake there are some areas where the wind is modeled at 40 to 50 knots – so quite high.

Source of KML: Great Lakes Coastal Forecasting System, NOAA Great lakes Environmental Research Lab
Great Lakes Nowcast Winds (knots). Nowcast simulations are generally posted by about 0230, 0830, 1430, and 2030 EST daily.
http://www.glerl.noaa.gov/res/glcfs/

Wave Height (4:12)
[IMAGE DID NOT WORK]
We can also turn on the wave conditions. I've had some trouble with this and we'll see whether or not it comes in this time. I'll wait for just a second or so… and it looks like it's not going to be working for us here as well…

Source of KML: Great Lakes Coastal Forecasting System, NOAA Great lakes Environmental Research Lab
Great Lakes Nowcast Wave Heights (meters). Nowcast simulations are generally posted by about 0230, 0830, 1430, and 2030 EST daily.
http://www.glerl.noaa.gov/res/glcfs/

Surface Currents (4:24)
But if we turn on the current information, we can see that there are some very strong currents over on the eastern part of Lake Superior.

Source of KML: Great Lakes Coastal Forecasting System, NOAA Great lakes Environmental Research Lab
Great Lakes Nowcast Surface Currents (cm/sec). Nowcast simulations are generally posted by about 0230, 0830, 1430, and 2030 EST daily.
http://www.glerl.noaa.gov/res/glcfs/

WebCams (4:35)
We may want to get an idea of what some of those conditions look like. So I'll turn off some of these conditions and zoom in a little bit more. We have a collection of web cams that we have gathered that focus on the lake. There are about 133 of them and one of the ones that we can see is at Montreal Harbor up in Canada. We can click on that web link and it will jump us over – it is actually dark when I am doing this demonstration, but you can see some of the more recent web cams and we can see that, indeed, that the weather conditions were very choppy over on the eastern shore of Lake Superior

Source of KML: GLOS Education and Outreach, University of Wisconsin Sea Grant Institute
Access to 132 webcams focused on the Great Lakes in Canada and the United States.
http://aqua.wisc.edu/glct/maps/kml/gl_webcams_15Nov07.kmz

Surface Temperature (5:18)

And we may want to also get some other information about Great Lakes sea surface temperature. As we see here if we look at Lake Superior we can see that as typical it is very cold, but if we go look at more closely at the northern part of Lake Michigan we can see that there are some areas that are between 10 and 15 degrees Celsius and some areas where there are some sharp changes. Those are often places where fish like to congregate. It might help us.

Source of KML: Great Lakes Coastal Forecasting System, NOAA Great lakes Environmental Research Lab
Great Lakes Nowcast Surface Temperature (Celsius). Nowcast simulations are generally posted by about 0230, 0830, 1430, and 2030 EST daily.
http://www.glerl.noaa.gov/res/glcfs/

Coho Salmon (5:46)

And then finally, we can look at a data set from the Great Lakes Information Network GIS on historical locations for Coho Salmon. That might give us an idea of where we might want to fish

Source of KML: Great Lakes Information System GIS, Great Lakes Commission
Point locations for collections of Michigan fish in the Lake Michigan basin as compiled by the Michigan Department of Natural Resources, Institute for Fisheries Research.
http://gis.glin.net/ogc/services.php?by=topic
lm_coho_locs_mfa.kmz

Conclusion (5:58)

So that's this demonstration for today. I hope you find this useful.

END (6:05)