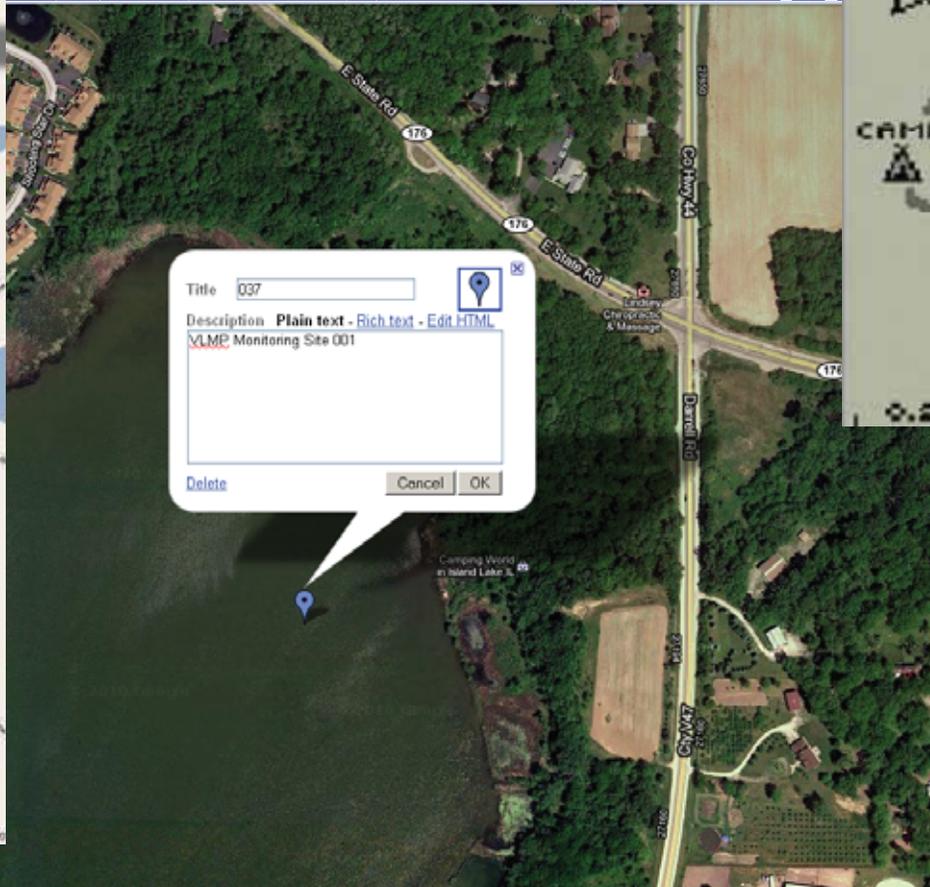
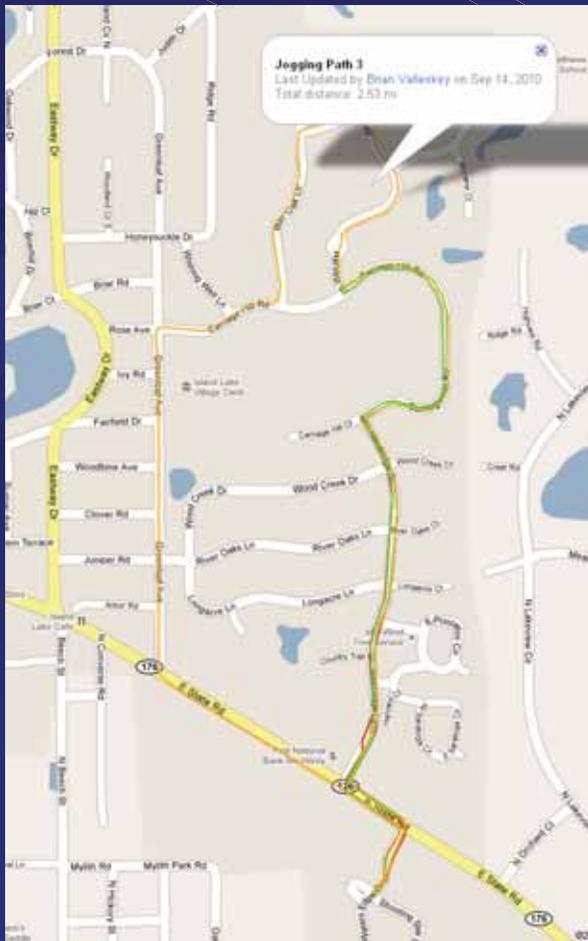


FREE MAPPING RESOURCES TO ENHANCE THE USE OF YOUR GPS



Free Mapping Resources to Enhance the use of your GPS

Workshop Outline

- Introduction
- Freeware data discussion and types (GIS data/GPS data)
- GPS and GPS theory basics
- Freeware internet mapping applications (Google & Bing)
- GPS data capture and downloading (Using Garmin Etrex)
- Case Study – Real World Application (VLMP example)
- Alternative Case Study – Build your own

Free Mapping Resources to Enhance the use of your GPS

Geographic Information Systems (GIS) Input Data

- Aerial Photography
- USGS topographic maps
- Bathymetric lake maps
- Internet base maps

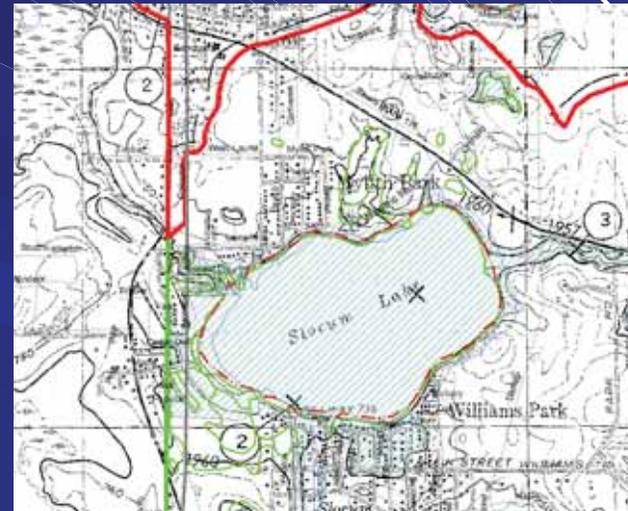
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Image Data Types (Raster)

Aerial & Satellite Imagery



USGS Topographic Maps



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Vector Data Types

Field Collected data (survey/GPS)

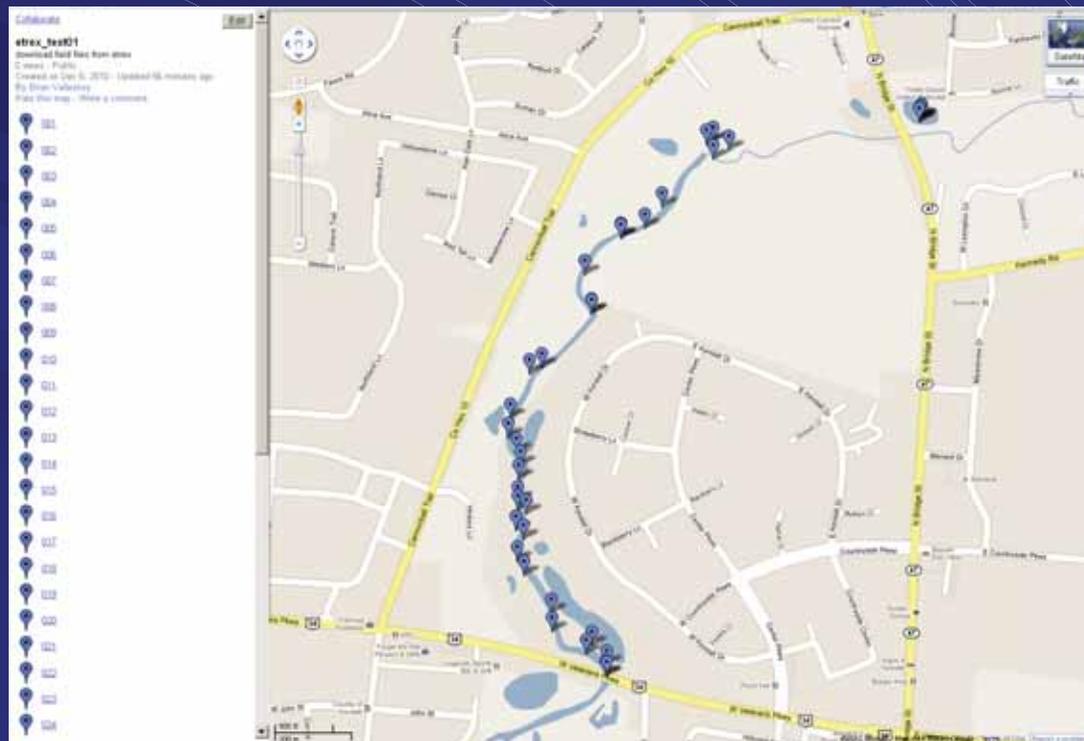


Digitized Map data (roads, streams, etc)



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GPS field data from stream inventory overlain on Google



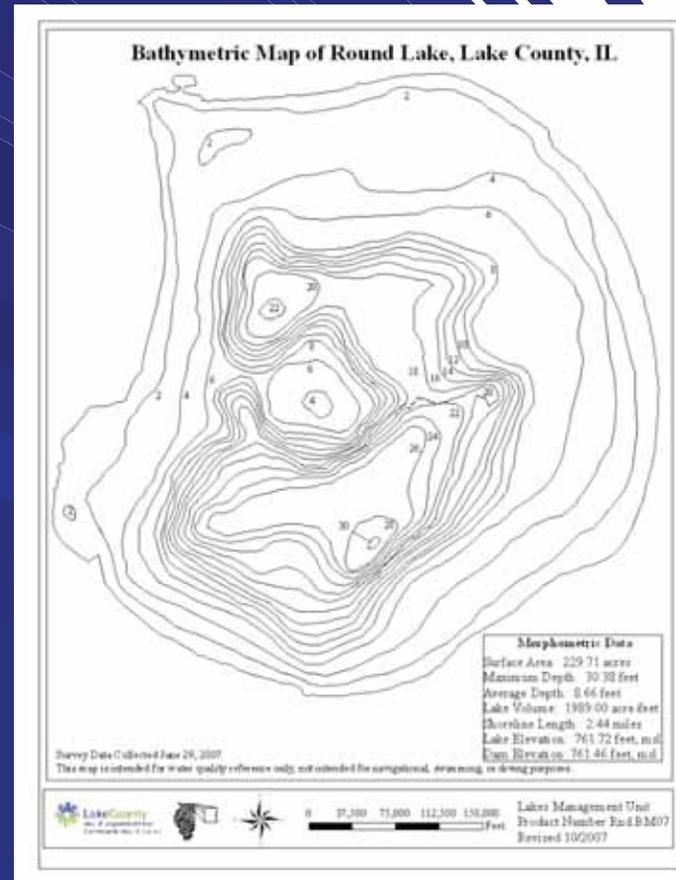
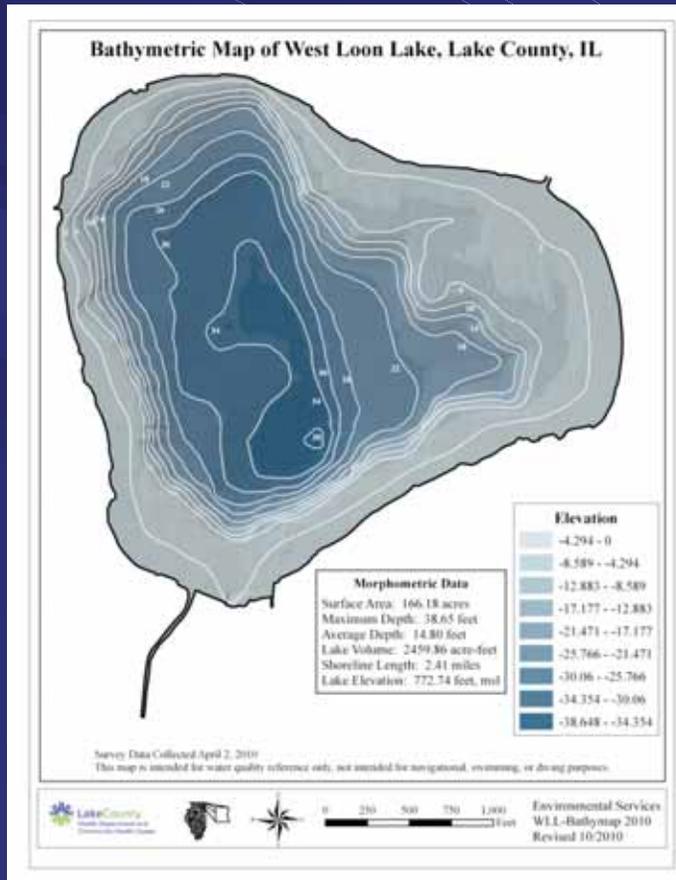
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- How it is used by Lake County
- Free Lake County Assessor's information GIS FROM
- GIS Contour info Collected by LMU
- Natural Resources Inventories
- Existing data sites
 - Illinois Geospatial Data Clearinghouse
 - Greenmapping.org
 - GeoCommunity.com
 - US National Atlas

Free Mapping Resources to Enhance the use of your GPS

Bathymetric Mapping

A service of the Lake County Health Department
Environmental Services



Free Mapping Resources to Enhance the use of your GPS

Equipment Used

BioSonics DTX Echosounder and Software

Laptop Computer

GPS

Boat

ArcMap GIS Software

Surveying equipment



Free Mapping Resources to Enhance the use of your GPS

Field Data Collection



Welcome to the official government site of Lake County, Illinois

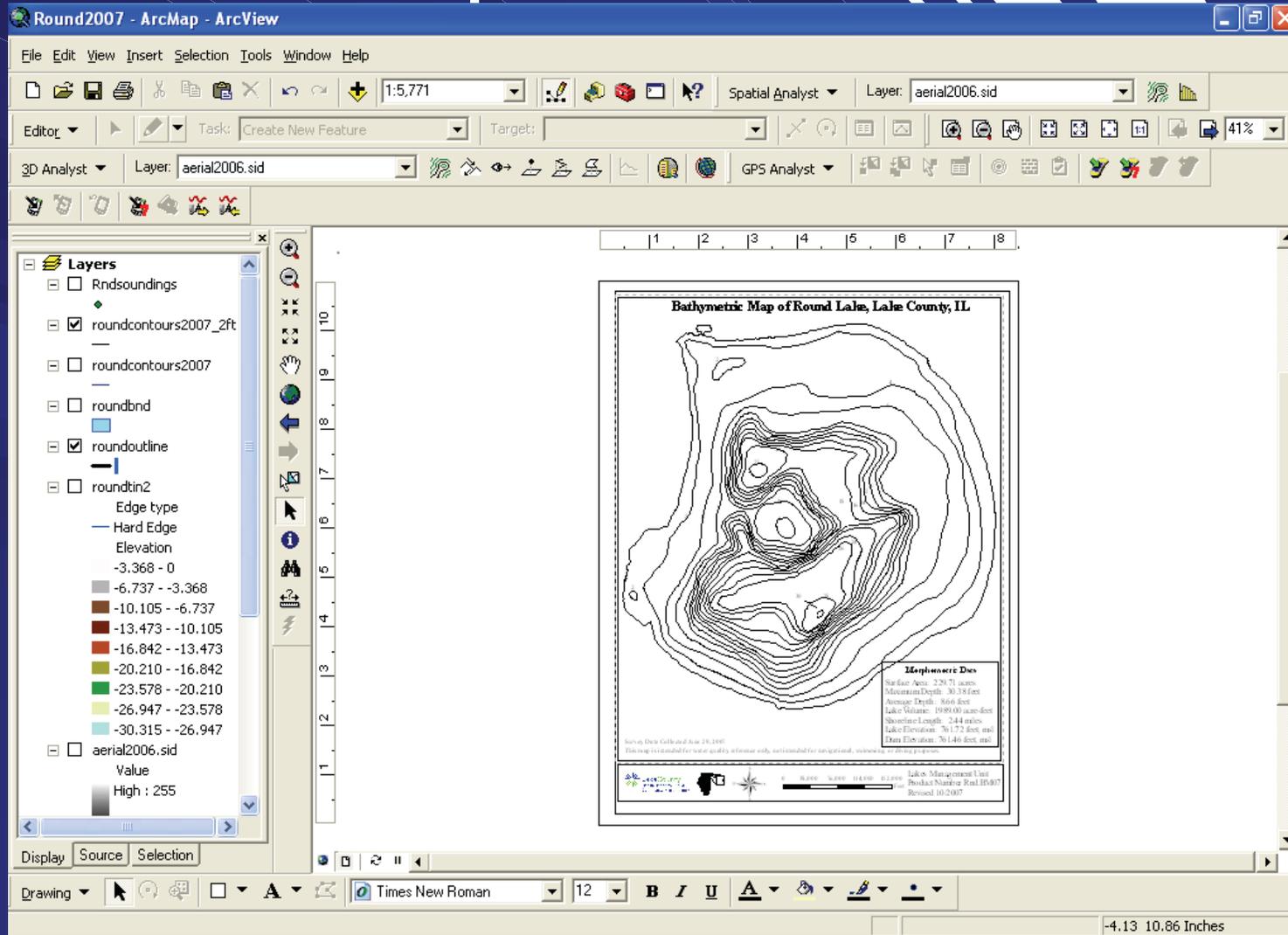


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Map Creation



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Map Creation

2010 Sample Sites - Google Maps - Windows Internet Explorer provided by Lake County

http://maps.google.com/maps?hl=en&tab=wl

File Edit View Favorites Tools Help

2010 Sample Sites - Google Maps

Web Images Videos **Maps** News Shopping Gmail more ▾ Leonard Dane ▾

Google maps Search Maps Show search options

Get Directions My Maps

RSS View in Google Earth Print Send Link

Collaborate Edit

Contours of Round Lake, Lake County, IL

0 views - Public
Created on Feb 22 - Updated < 1 minute ago
By
Rate this map - Write a comment

- 30
- 26
- 22
- 22
- 10
- 6
- 6
- 2
- 0

(2 items remaining)

Internet 100%

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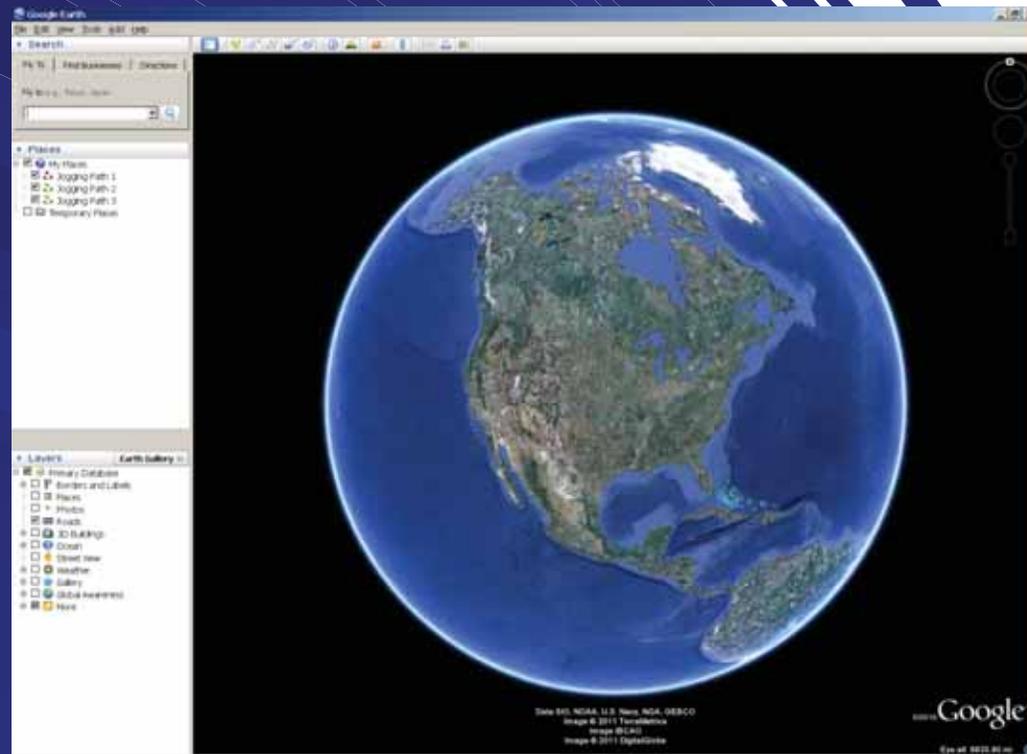
Full Blown Mapping Applications

- ESRI ArcView and ArcINFO
- MapWindow (freeware)
- Grass/QGIS (freeware)
- AutoCAD
- MicroStation

Free Mapping Resources to Enhance the use of your GPS

Internet Mapping- the new revolution

- Google Maps
- Google Earth
- Live Maps
- Bing Maps
- Terra Server
- Map Quest



Free Mapping Resources to Enhance the use of your GPS

Internet Mapping- the new revolution

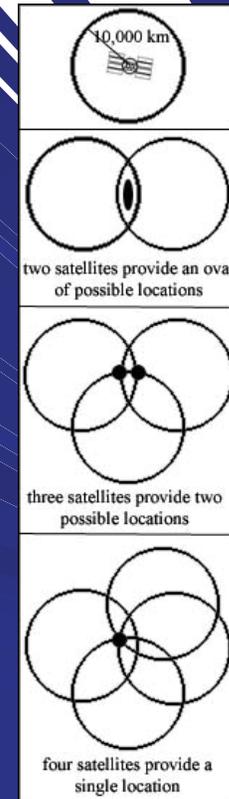
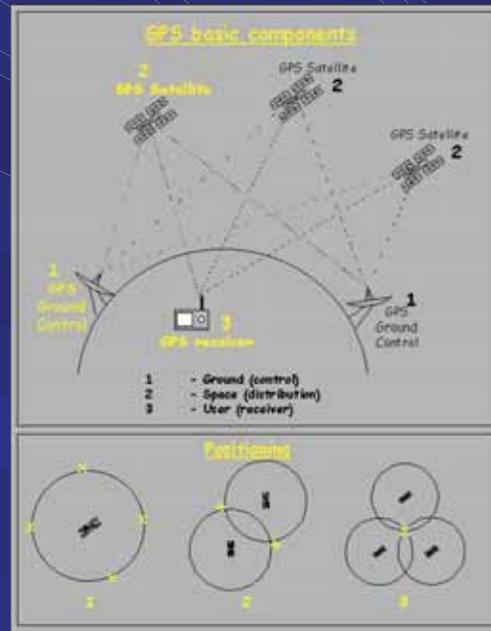
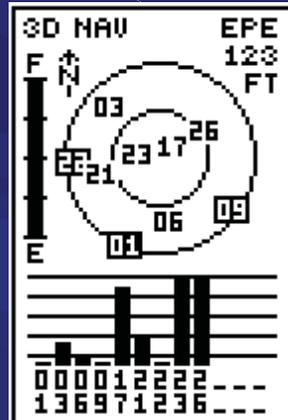
Uses Keyhole Mark-up Language (KML) file structure
post data set onto the internet and share

- Embed in webpages
- Share through email
- Many other various applications

Free Mapping Resources to Enhance the use of your GPS

Geographic Positioning System (GPS)

GPS Theory



There are over 8000 satellites currently orbiting the earth

Free Mapping Resources to Enhance the use of your GPS

Common GPS Collection Devices



Free Mapping Resources to Enhance the use of your GPS

Common GPS Collection Devices

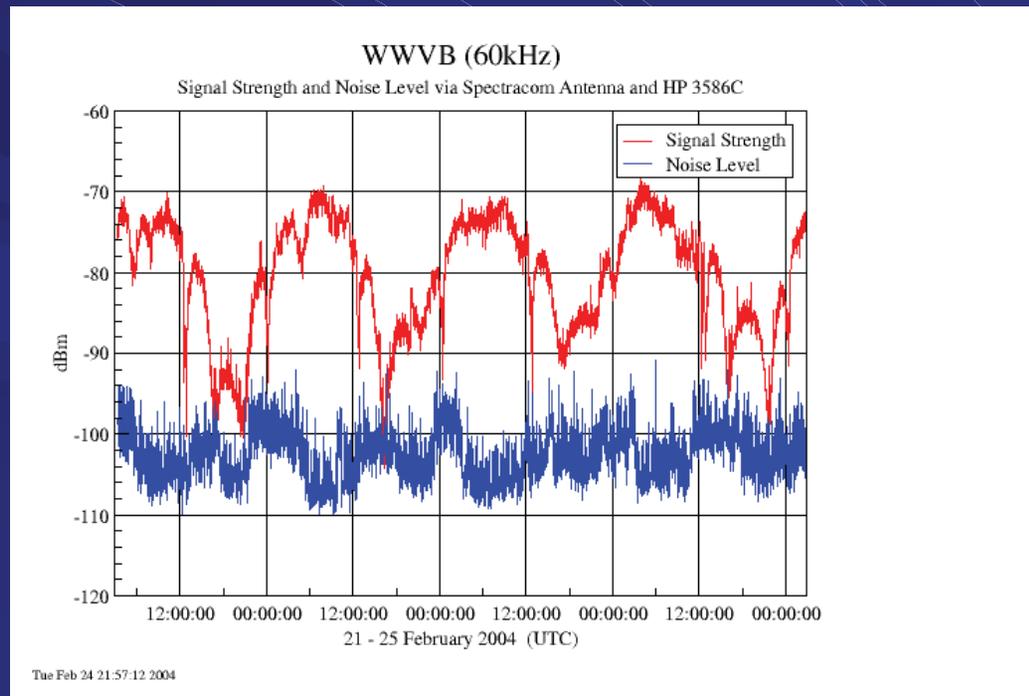


GPS data collection issues – basics

- Signal to Noise Ratio (SNR) – ground Interference that reduces signal strength
- Particle Dilution of Precision (PDOP) – Angle of satellites in relation to receiver impact Accuracy
- Multipath – signal bounce off of adjacent object surfaces

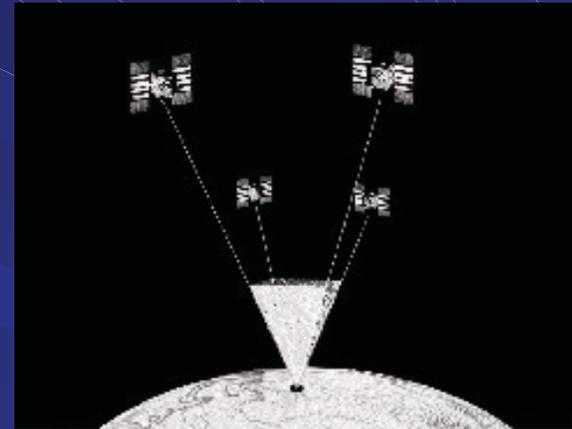
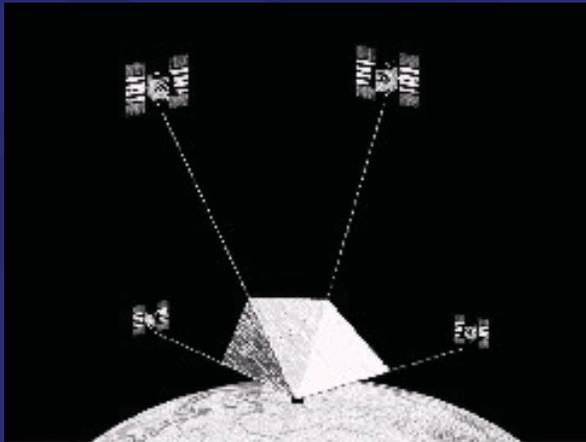
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Signal to Noise Ratio (SNR)



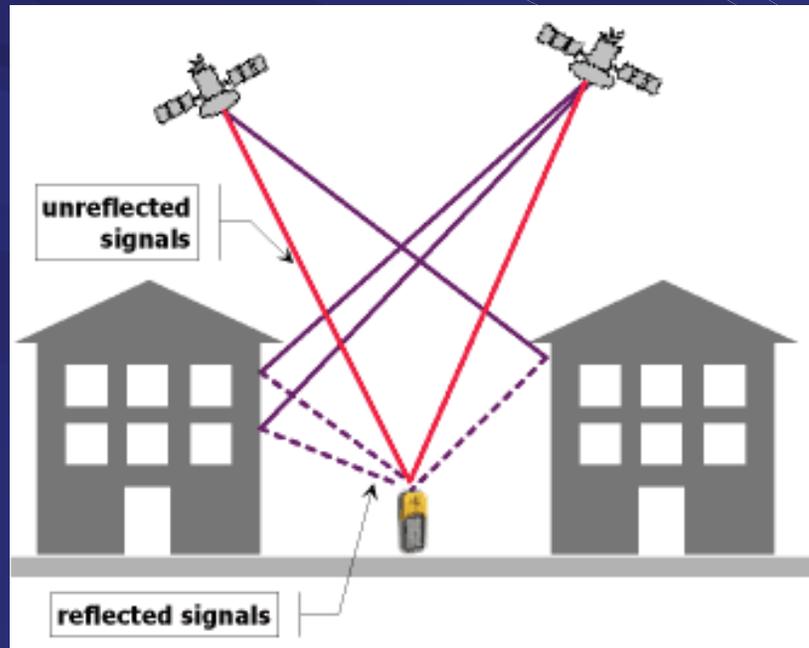
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Particle Dilution of Precision (PDOP) – of satellites in relation to receiver impact accuracy



Free Mapping Resources to Enhance the use of your GPS

Multipath – signal bounce off of adjacent object surfaces



Free Mapping Resources to Enhance the use of your GPS

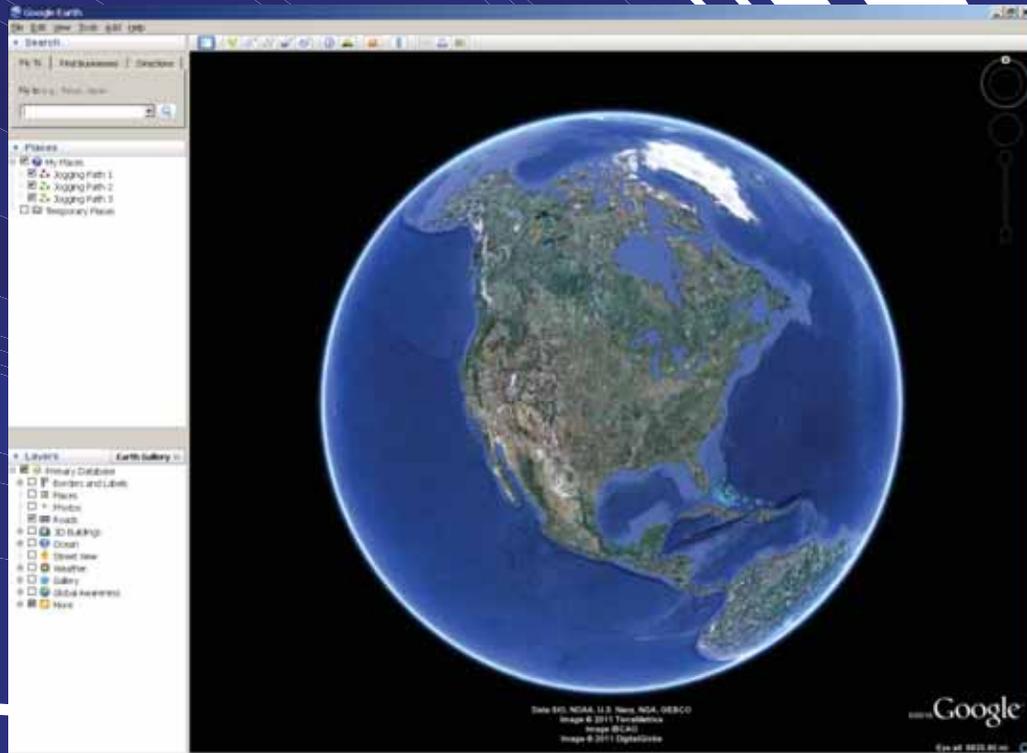
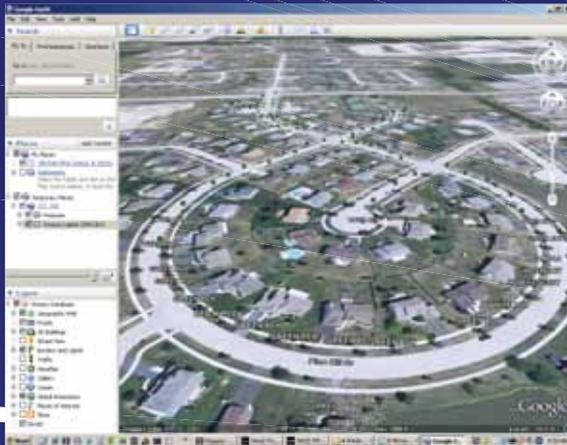
Google Earth, Google Maps, Bing & Others

- Google Earth – Standalone downloadable application
- Google Maps – internet based mapping
- Bing Maps – MSN's answer to Google Maps
- County navigational websites

Free Mapping Resources to Enhance the use of your GPS

Google Earth

Outperforms most online mapping programs



<http://www.google.com/earth/download/ge/agree.html>

Free Mapping Resources to Enhance the use of your GPS

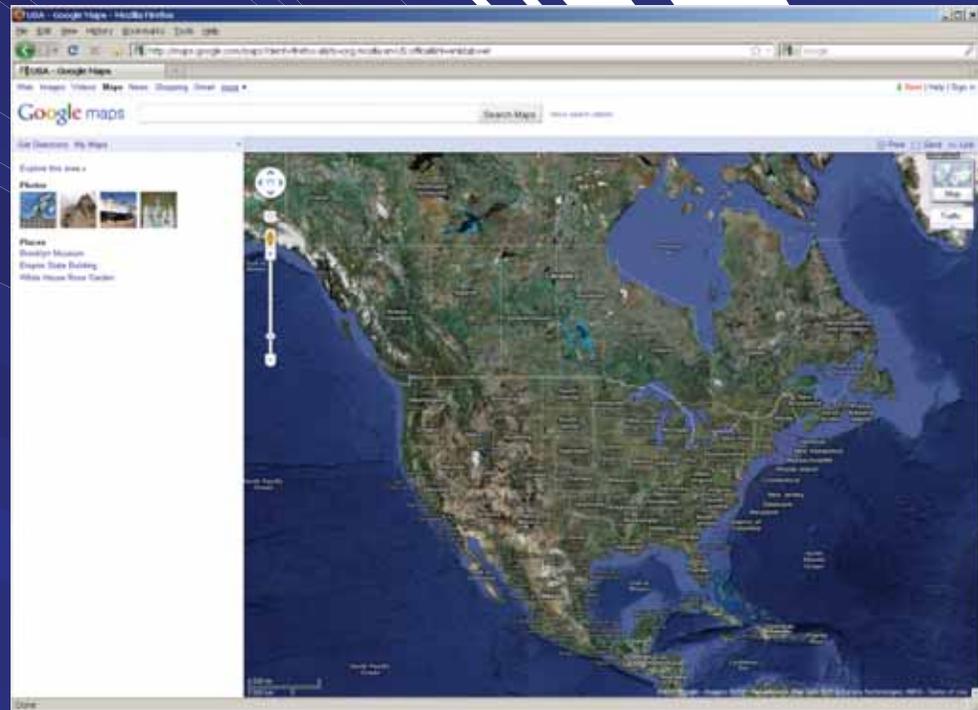
Google Maps

Your basic online – get directions mapping service

Requires a Google Account

Excellent additional map content

<http://maps.google.com/maps>



Free Mapping Resources to Enhance the use of your GPS

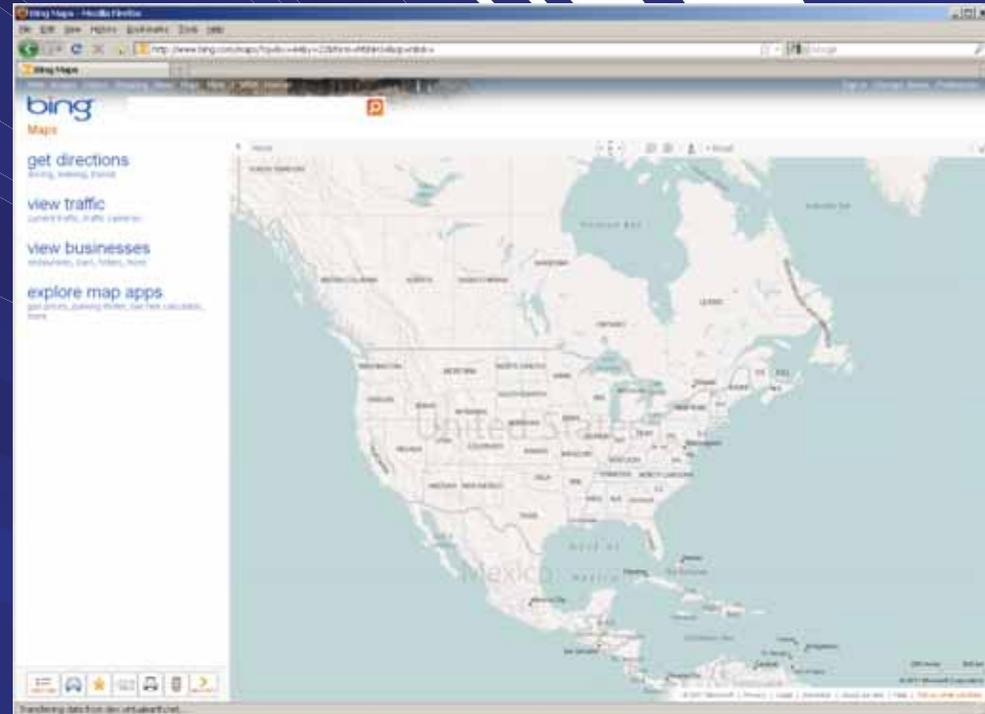
Bing Maps

Another basic online – get directions mapping service

Requires a MSN/Hotmail account

“Bird’s – eye” perspective is a neat additional feature

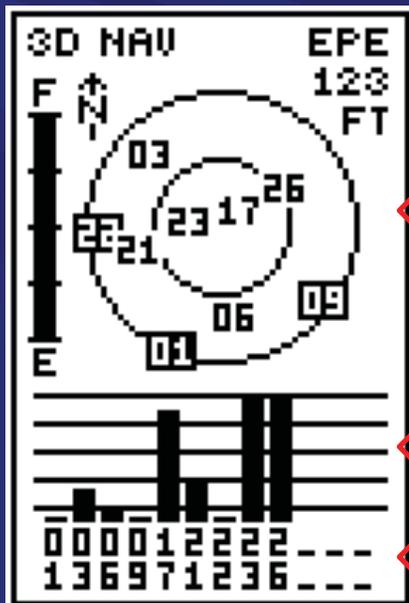
<http://www.bing.com/maps/?FORM=Z9LH9>



Free Mapping Resources to Enhance the use of your GPS

GPS Data Capture & Download Basics

The longer you sit the more accurate the location (typically)



Satellite Constellation

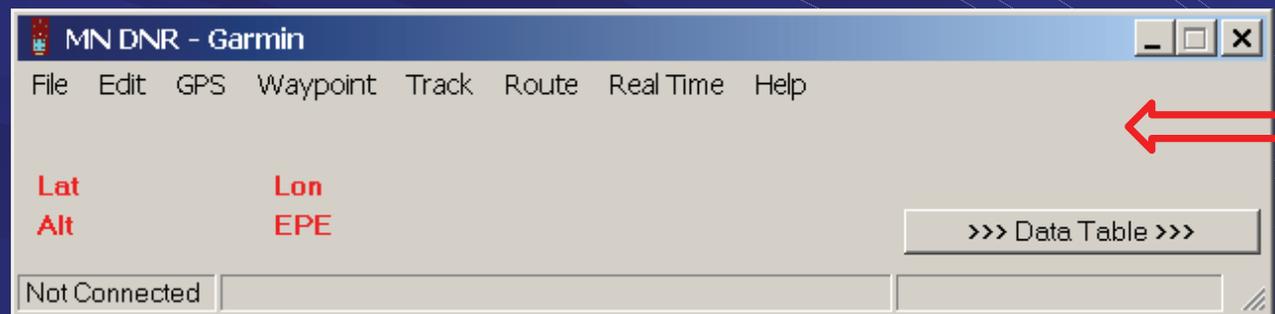
Satellite Signal Strength

Satellite Number

Free Mapping Resources to Enhance the use of your GPS

GPS Interface program

- I recommend one created by Minnesota DNR

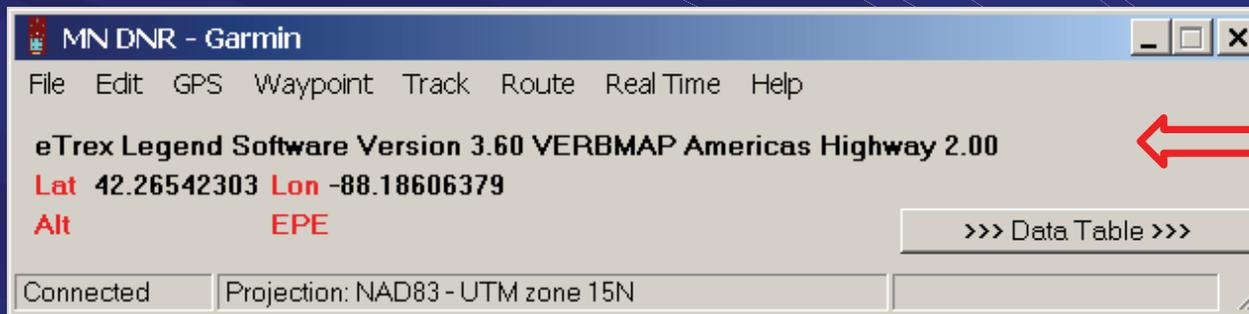


Not connected

<http://www.dnr.state.mn.us/mis/gis/tools/arcview/extensions/DNRGarmin/DNRGarmin.html>

Free Mapping Resources to Enhance the use of your GPS

GPS Interface once plugged into Etrex



Connected

Free Mapping Resources to Enhance the use of your GPS

GPS Interface once plugged into Etrex

The screenshot shows the eTrex Legend Software interface. At the top, it displays "MN DNR - Garmin" and "eTrex Legend Software Version 3.60 VERBMAP Americas Highway 2.00". Below this, it shows the current location: "Lat 42.26542303 Lon -88.18606379" and "Alt EPE". A "Data Table" button is visible. The main area contains a table of waypoints with columns for type, ident, lat, long, and y_proj. A dialog box titled "DNRGarmin" is overlaid on the table, displaying "Received 41 records." and an "OK" button. The status bar at the bottom indicates "Connected" and "0 of 41 Selected".

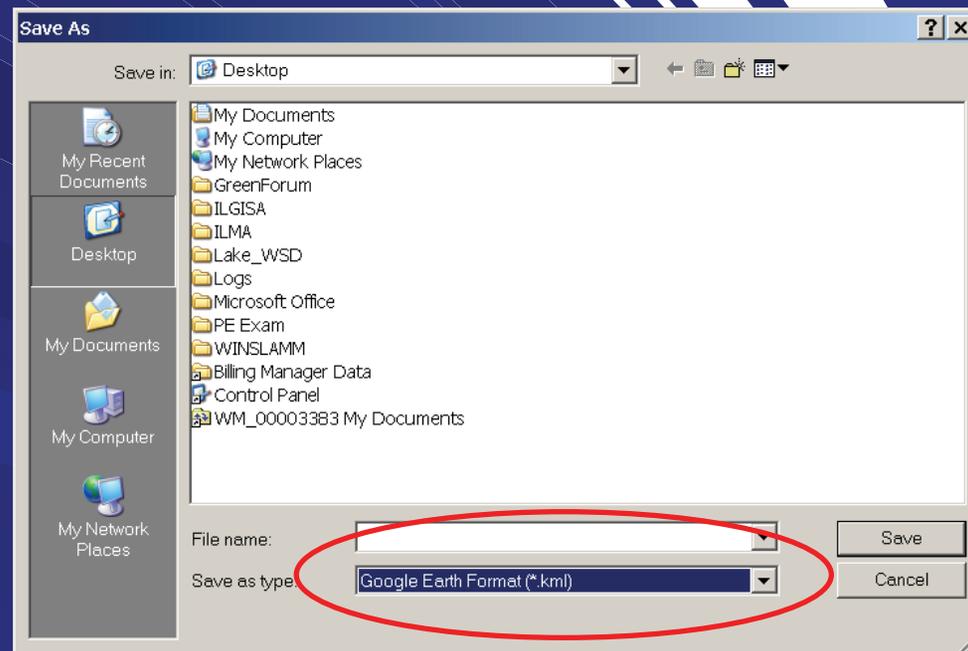
	type	ident	lat	long	y_proj
1	WAYPOINT	001	41.65896174	-88.45209508	4621912.8244974
2	WAYPOINT	002	41.65898379	-88.45209986	4621915.25239016
3	WAYPOINT	003	41.65921857	-88.45209986	4621941.41639958
4	WAYPOINT	004	41.65967831	-88.45209986	4621990.38376539
5	WAYPOINT	005	41.65948268	-88.45209986	4621967.8703821
6	WAYPOINT	006	41.66000328	-88.45209986	4622021.00845333
7	WAYPOINT	007	41.66044635	-88.45209986	4622070.04745063
8	WAYPOINT	008	41.66131672	-88.45209986	4622162.95508638
9	WAYPOINT	009	41.66238240	-88.45209986	4622280.25040591
10	WAYPOINT	010	41.66166298	-88.45488919	4622200.53197277
11	WAYPOINT	011	41.66216556	-88.45469406	4622257.20887089

1. Navigate to "Waypoint" Menu
2. Select "Download"
3. Wait for points to download

Free Mapping Resources to Enhance the use of your GPS

GPS Data Capture & Download Basics

- Menu → Save To → File
- Google Earth Format (*.kml)
- Other options exist for more advanced users
- If Google Earth is on your computer, double clicking the KML will auto-launch Google Earth



Free Mapping Resources to Enhance the use of your GPS

BREAK



Welcome to the official government site of Lake County, Illinois

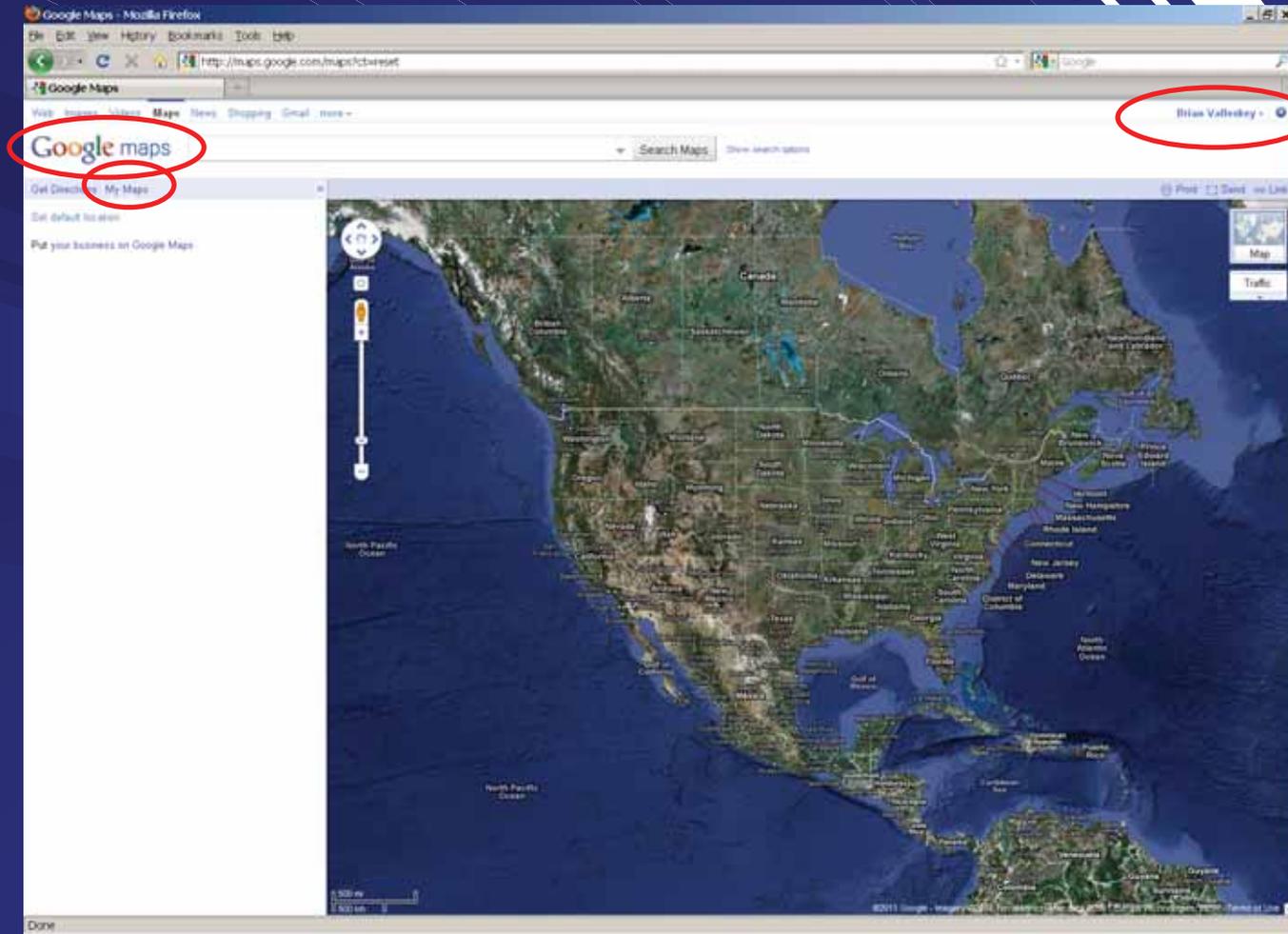


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Free Mapping Resources to Enhance the use of your GPS

Real Example: VLMP Mapping

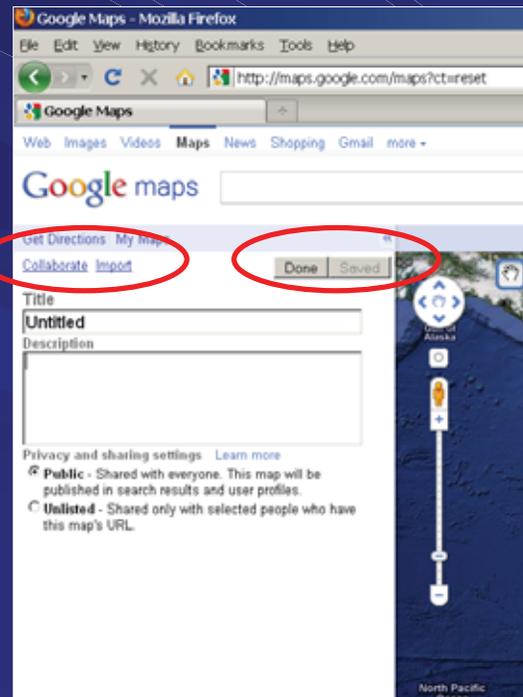
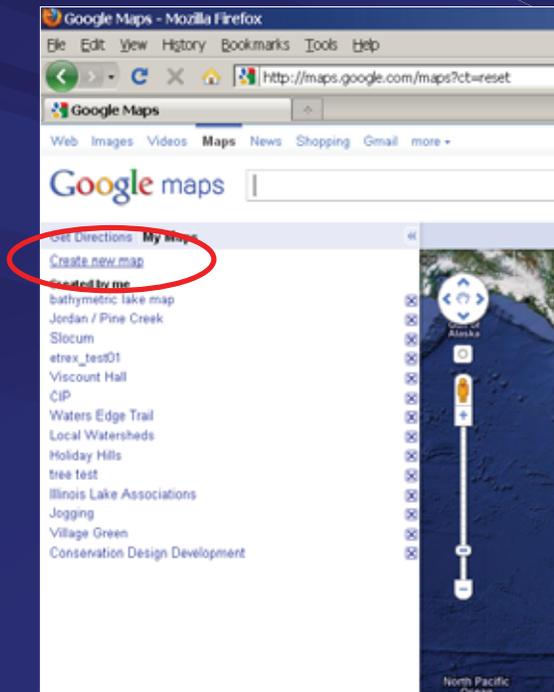


Log in

Click
My Maps

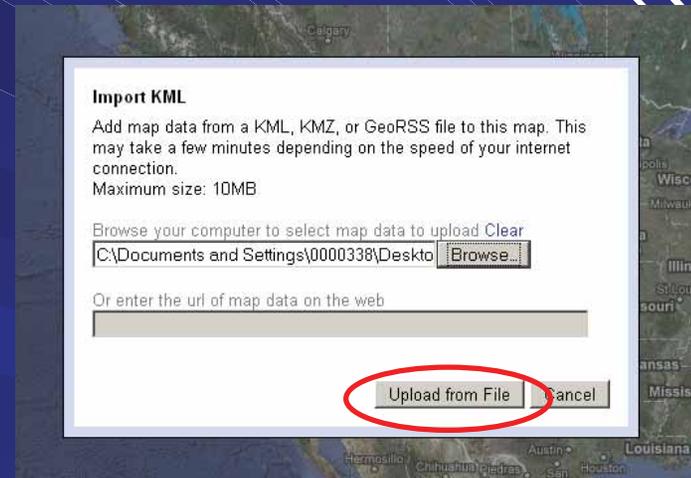
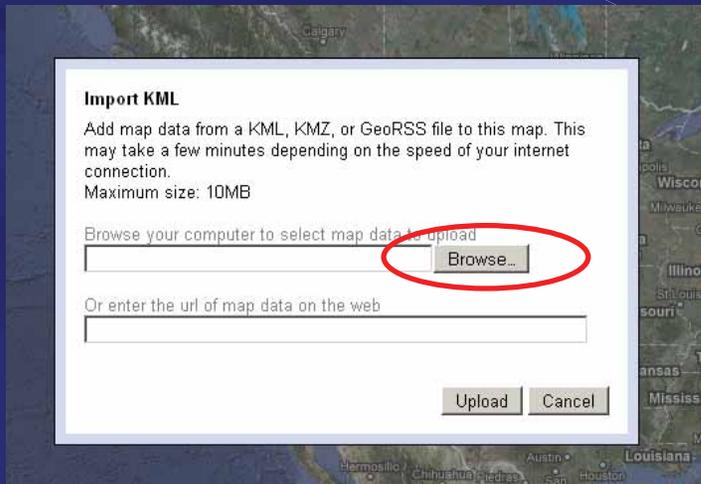
Free Mapping Resources to Enhance the use of your GPS

Define your map, description – note the additional items below My Maps



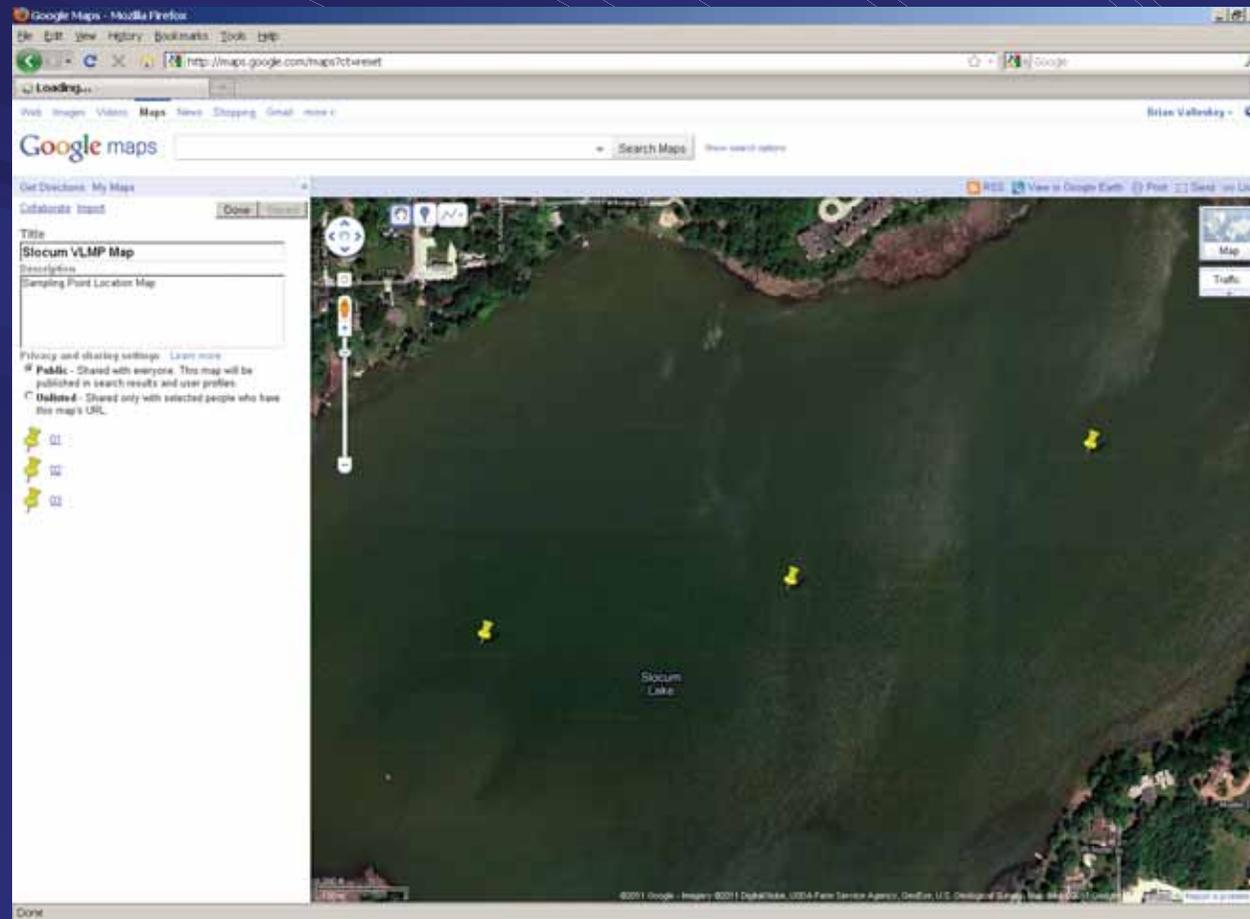
Free Mapping Resources to Enhance the use of your GPS

Navigate to .kml files stored on flash drive – Upload from File



Free Mapping Resources to Enhance the use of your GPS

Will automatically Zoom to the range of your map points

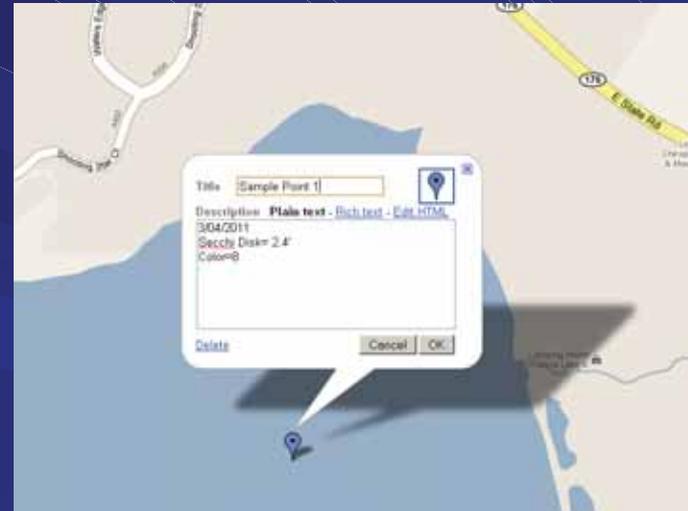
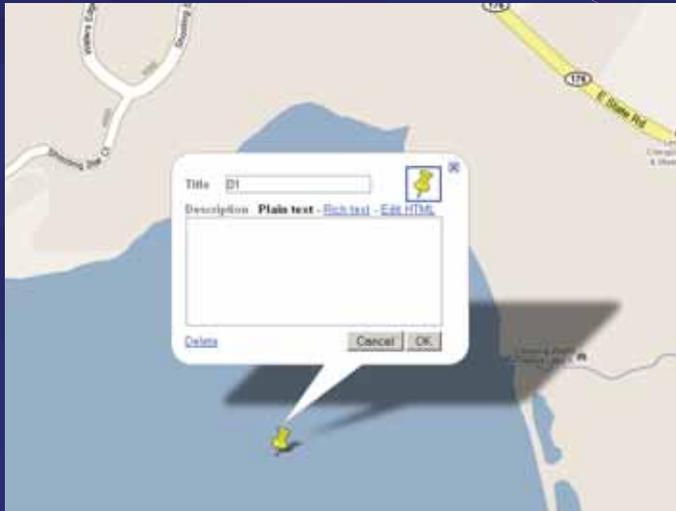


1. Redefine points
2. Zoom in/out
3. Toggle Map/Aerial
4. Draw something
5. Save Map

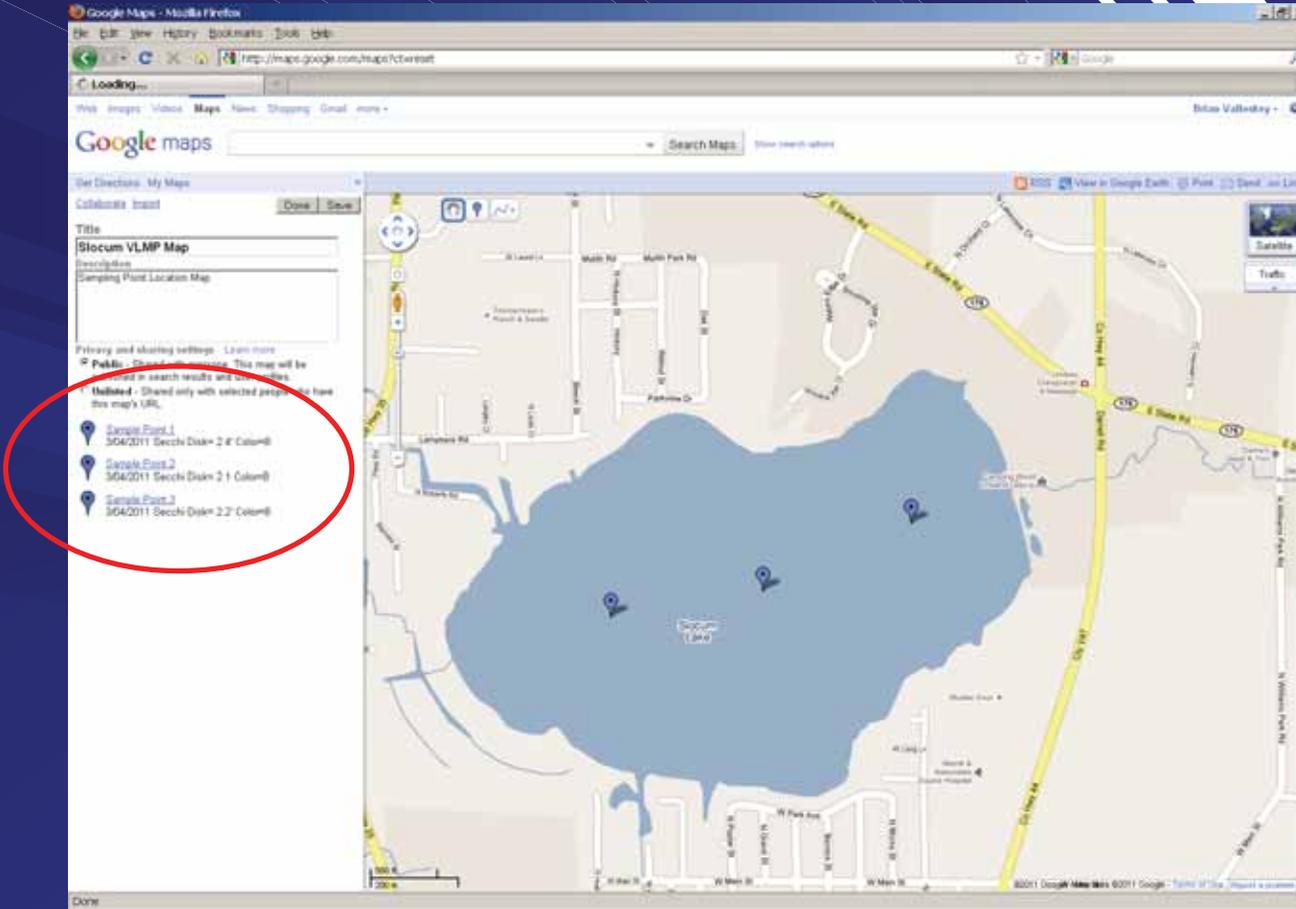
Free Mapping Resources to Enhance the use of your GPS

Toggle to “Earth” View, change symbol, add text

Redefine the remaining two points

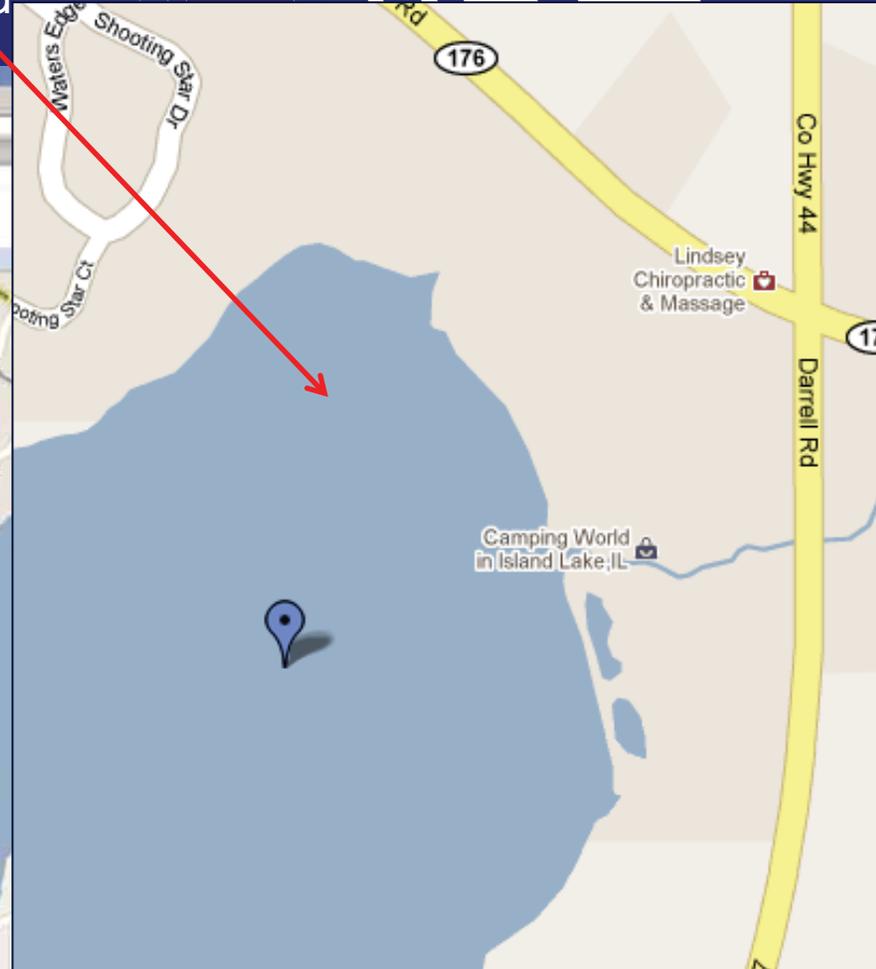
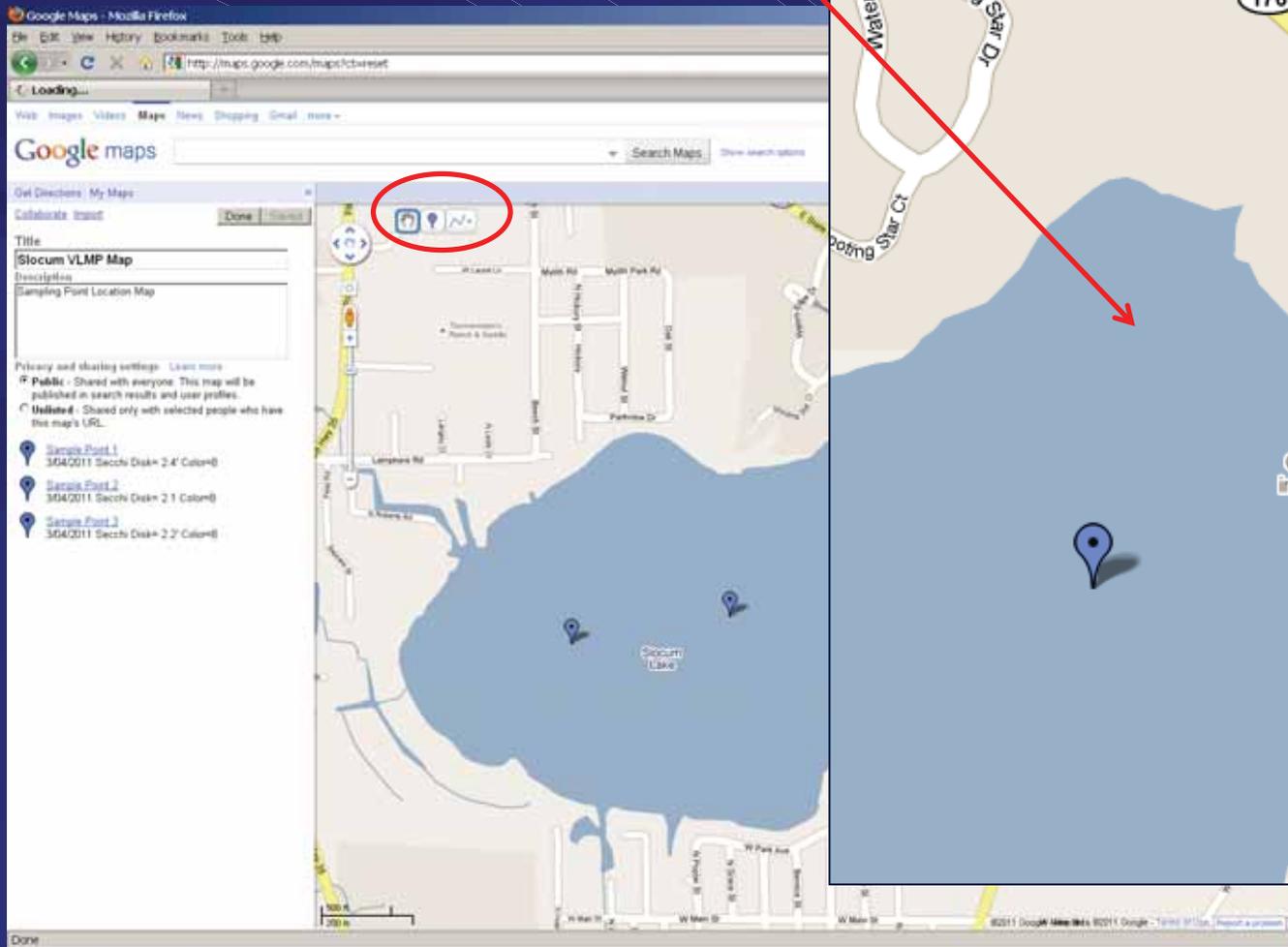


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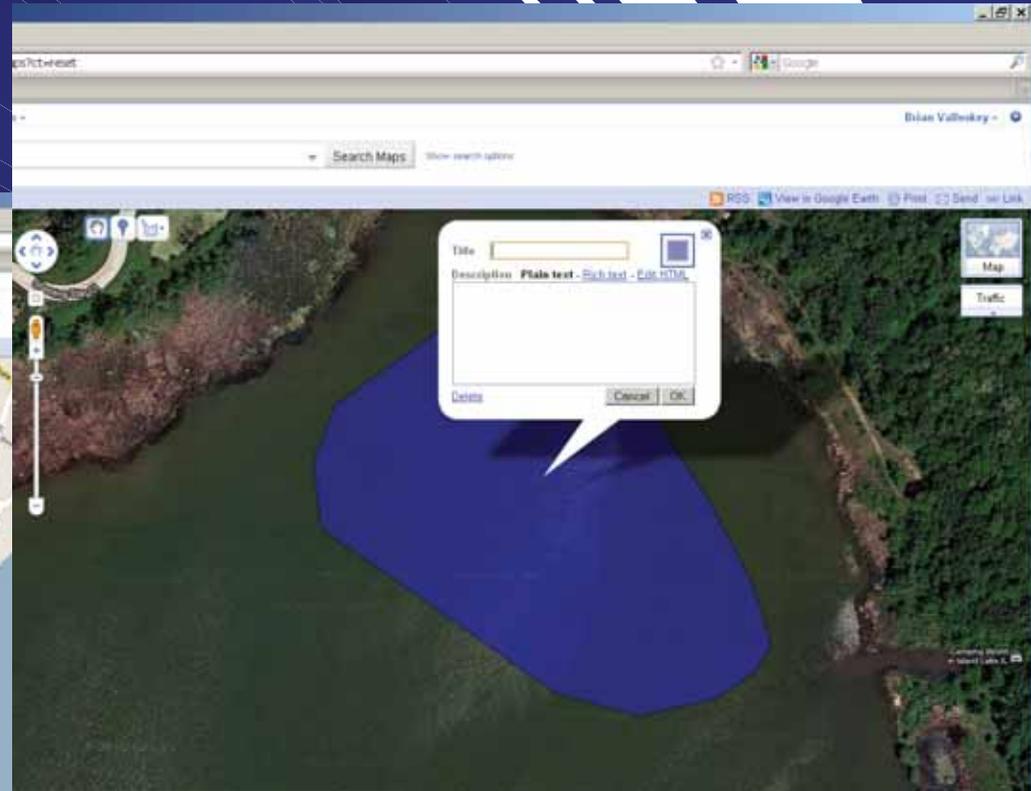
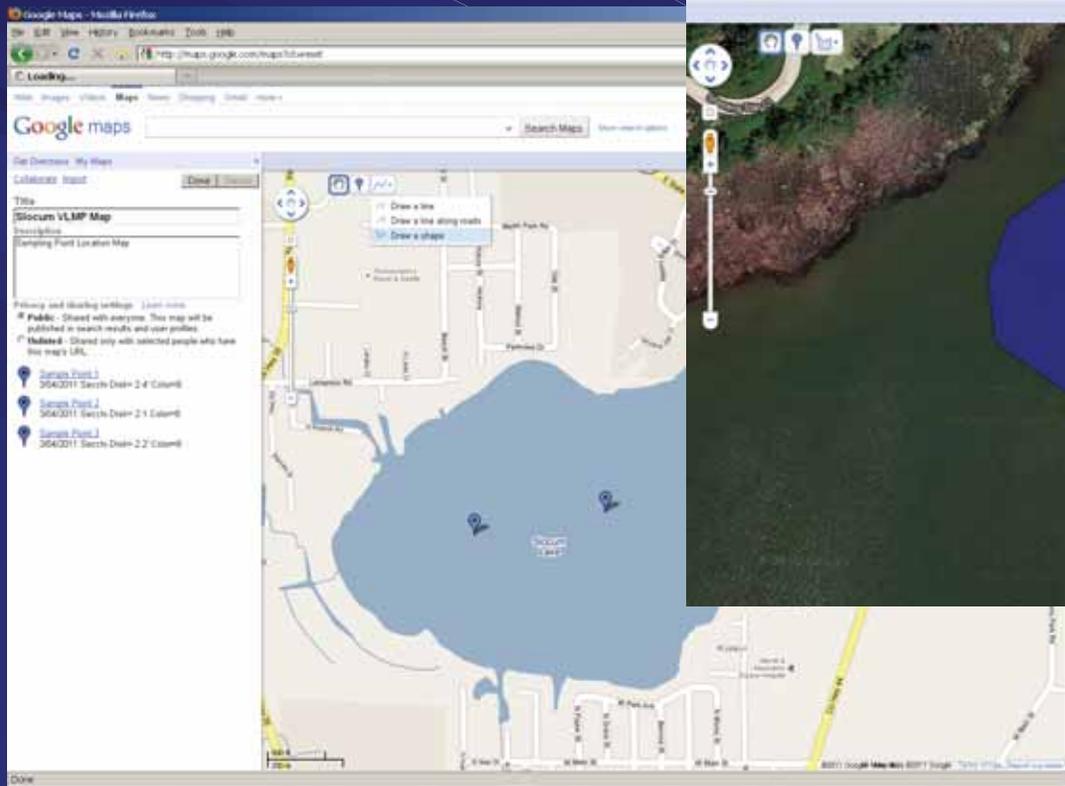
Free Mapping Resources to Enhance the use of your GPS

Use drawing tools to create a weed bed



Free Mapping Resources to Enhance the use of your GPS

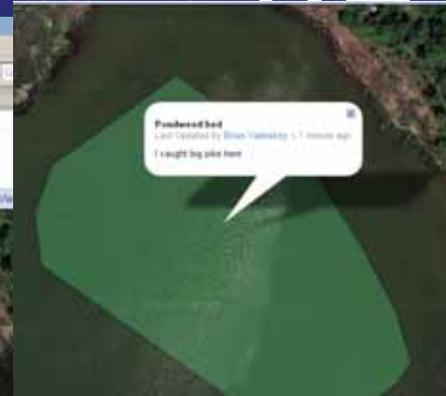
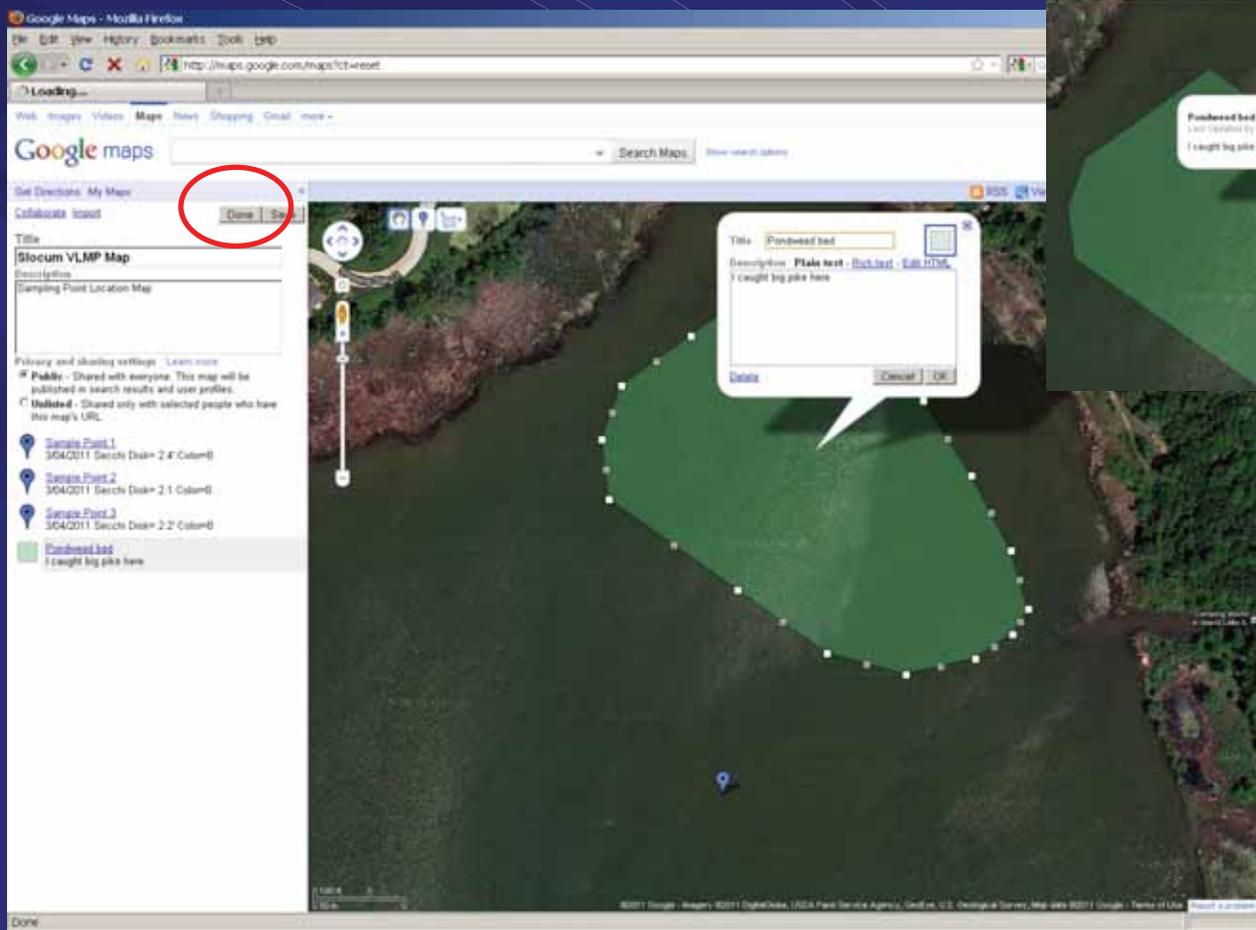
Drawing the polygon



Prompts the dialogue box

Free Mapping Resources to Enhance the use of your GPS

Click on "Done" to save your map, you can always make more changes



Note how dialogue Bubble changes

Free Mapping Resources to Enhance the use of your GPS

Email the Map using Link or Send

The screenshot displays the Google Maps web interface in Mozilla Firefox. The map shows Stocum Lake with several sampling points marked. A red circle highlights the 'Send' button in the top right corner of the map area. An inset window shows the 'Send' dialog box with the following options:

- Link**: Paste link in email or IM: <http://maps.google.com/maps/ms?hl=en&msa=0&msr=1>
- HTML**: Paste HTML to embed in website: `<iframe width="425" height="350" frameborder="0" scrolling="no" Customise and preview embedded map`

Another inset window shows the 'Email' form with the following fields:

- To:** [Date, Leonard R. <LDave@lakacountyil.gov>] Contacts
- From:** "Brian Valleskey" <crusers0@gmail.com>
- Subject:** A Maps link
- Message:** I want to send this to you because you are a horrible schemer!

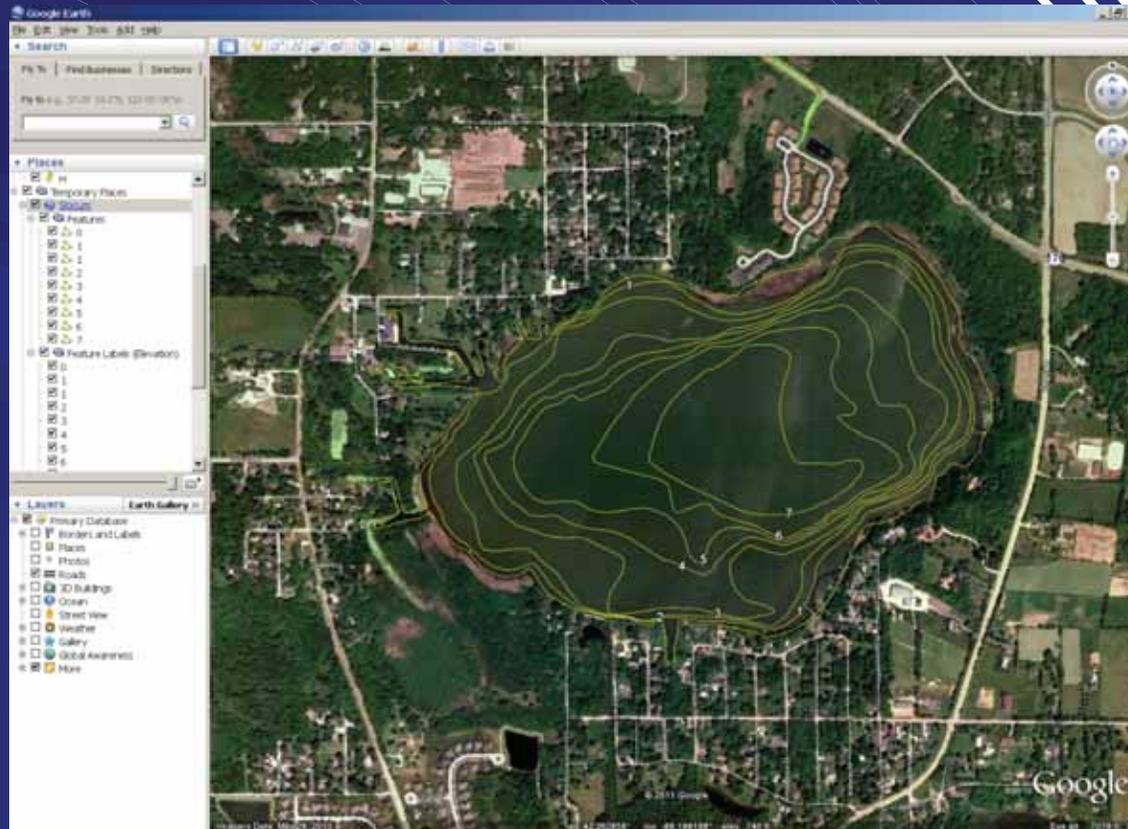
At the bottom of the email form, there is a pre-written message:

Hi, I'd like to share a Google Maps link with you. Link: <http://maps.google.com/maps/ms?hl=en&msa=0&msr=1>

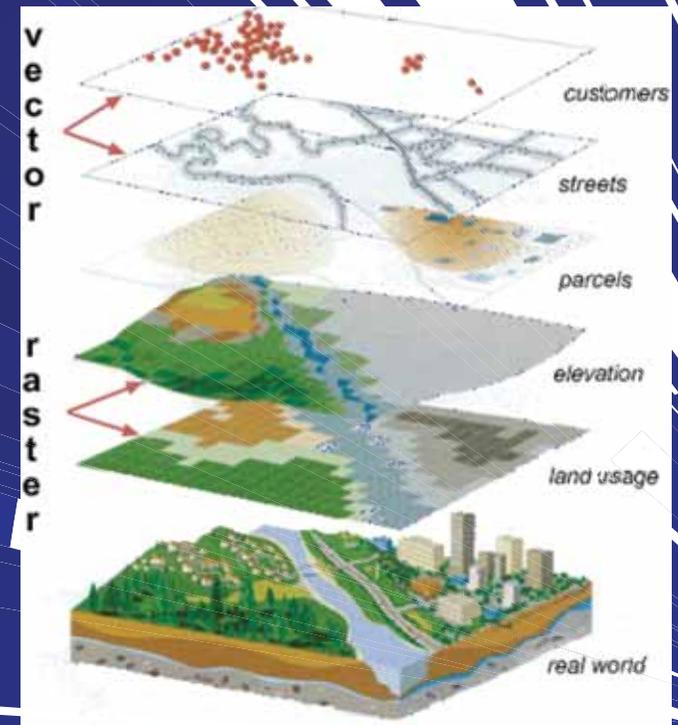
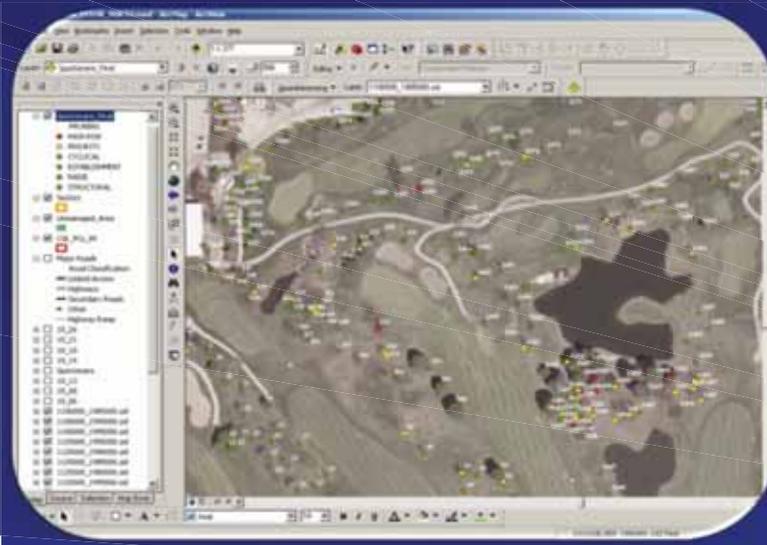
Buttons for 'Send' and 'Cancel' are visible at the bottom of the email form.

Free Mapping Resources to Enhance the use of your GPS

Example of converted GIS data imported into Google Earth

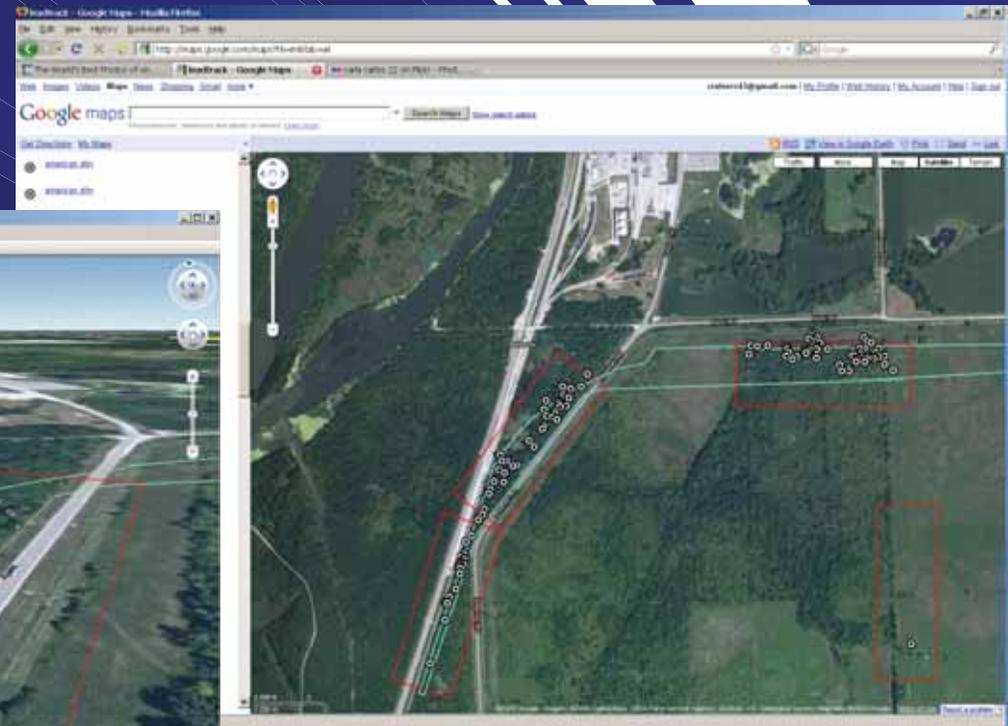
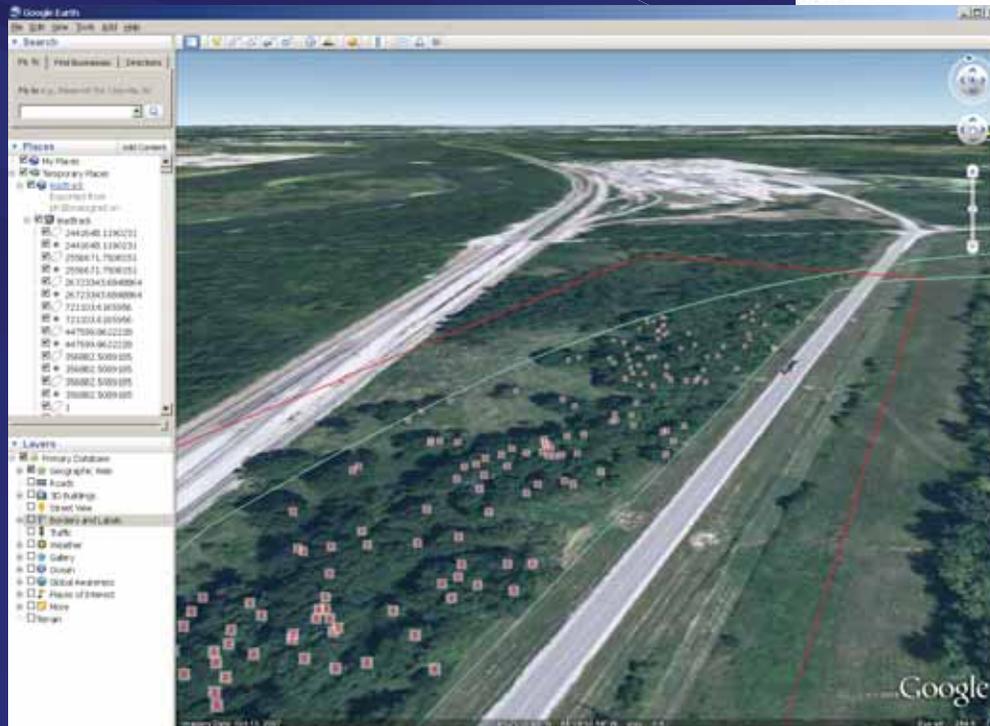


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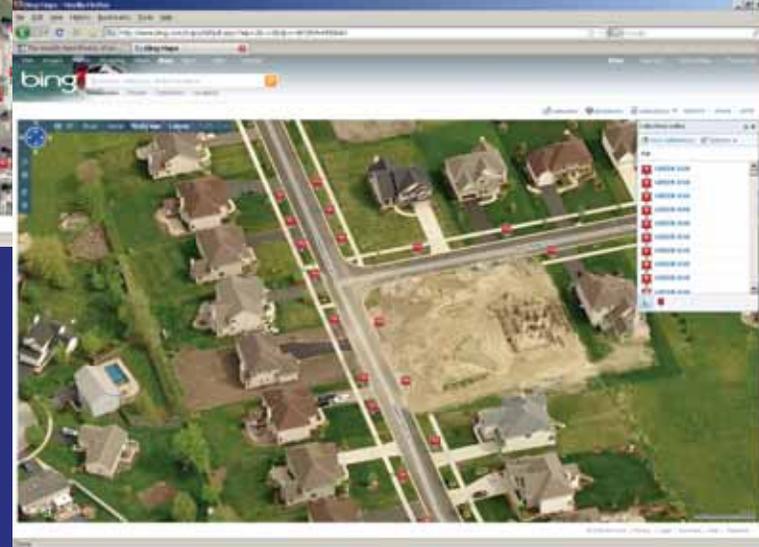
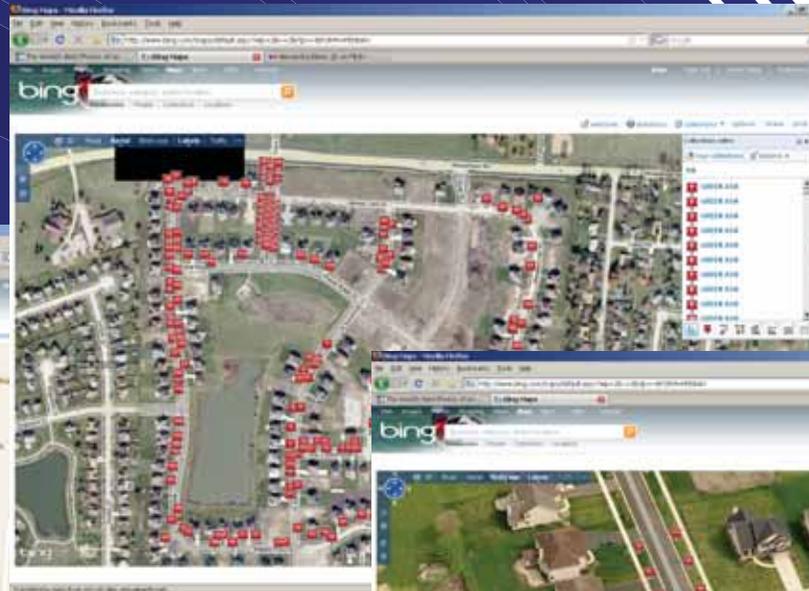
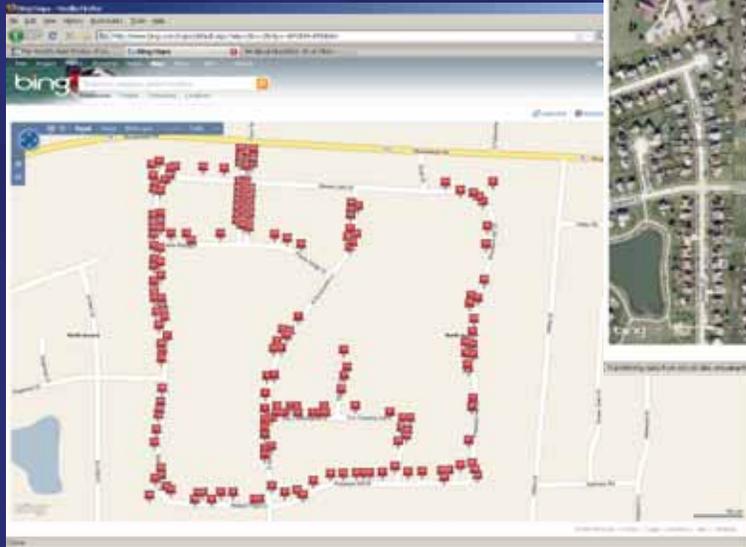
Free Mapping Resources to Enhance the use of your GPS

- Google Earth
- Google Maps



Free Mapping Resources to Enhance the use of your GPS

- Bing Maps
- Live Maps



Free Mapping Resources to Enhance the use of your GPS

QUESTIONS!



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