

Name _____


Forage Sampling Lab Using GPS Navigation

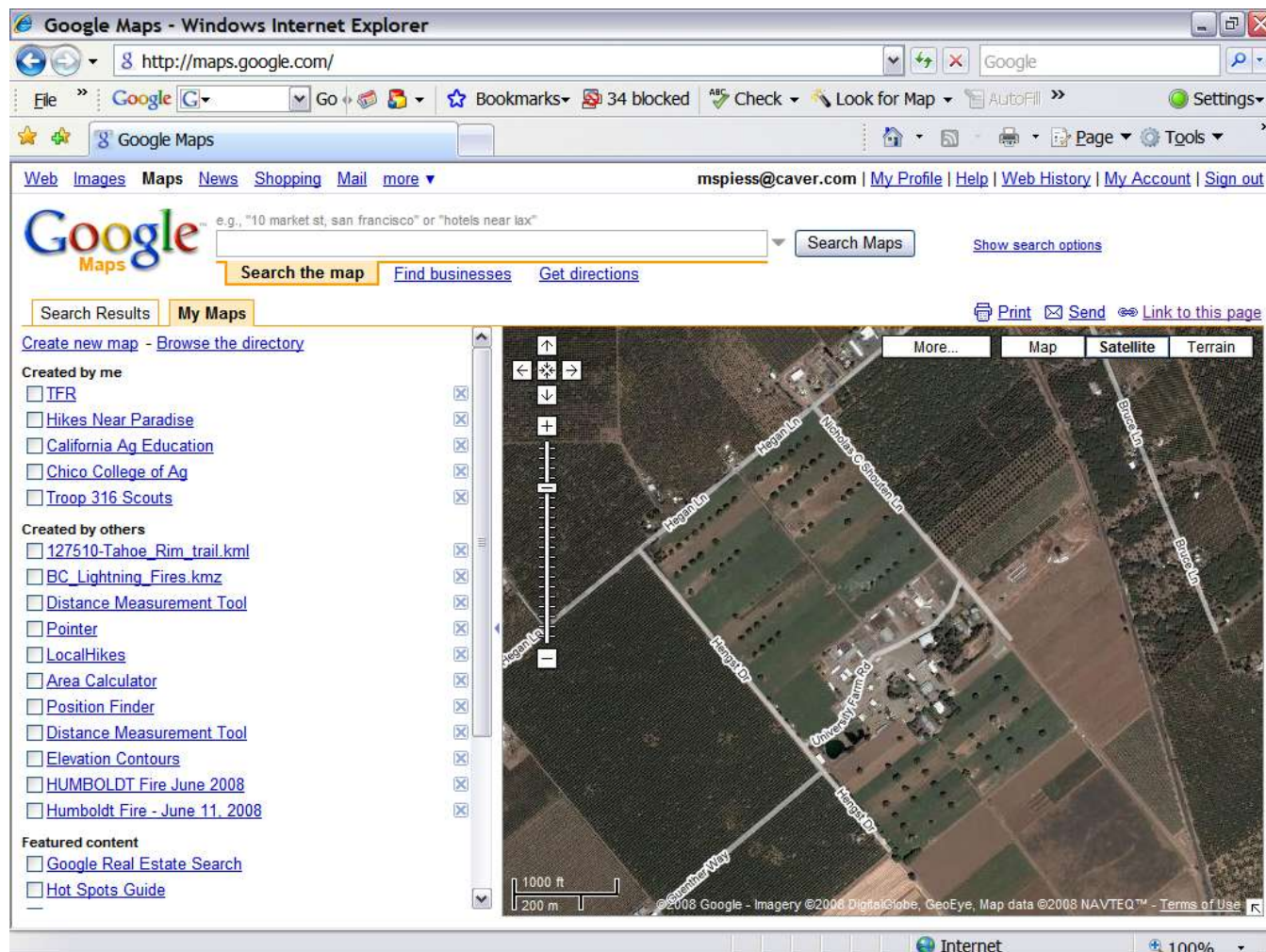
Purpose: To become familiar with GPS units, GPS software and to practice GPS navigation to a sample point. Use these directions in conjunction with your data collection lab.

Equipment:

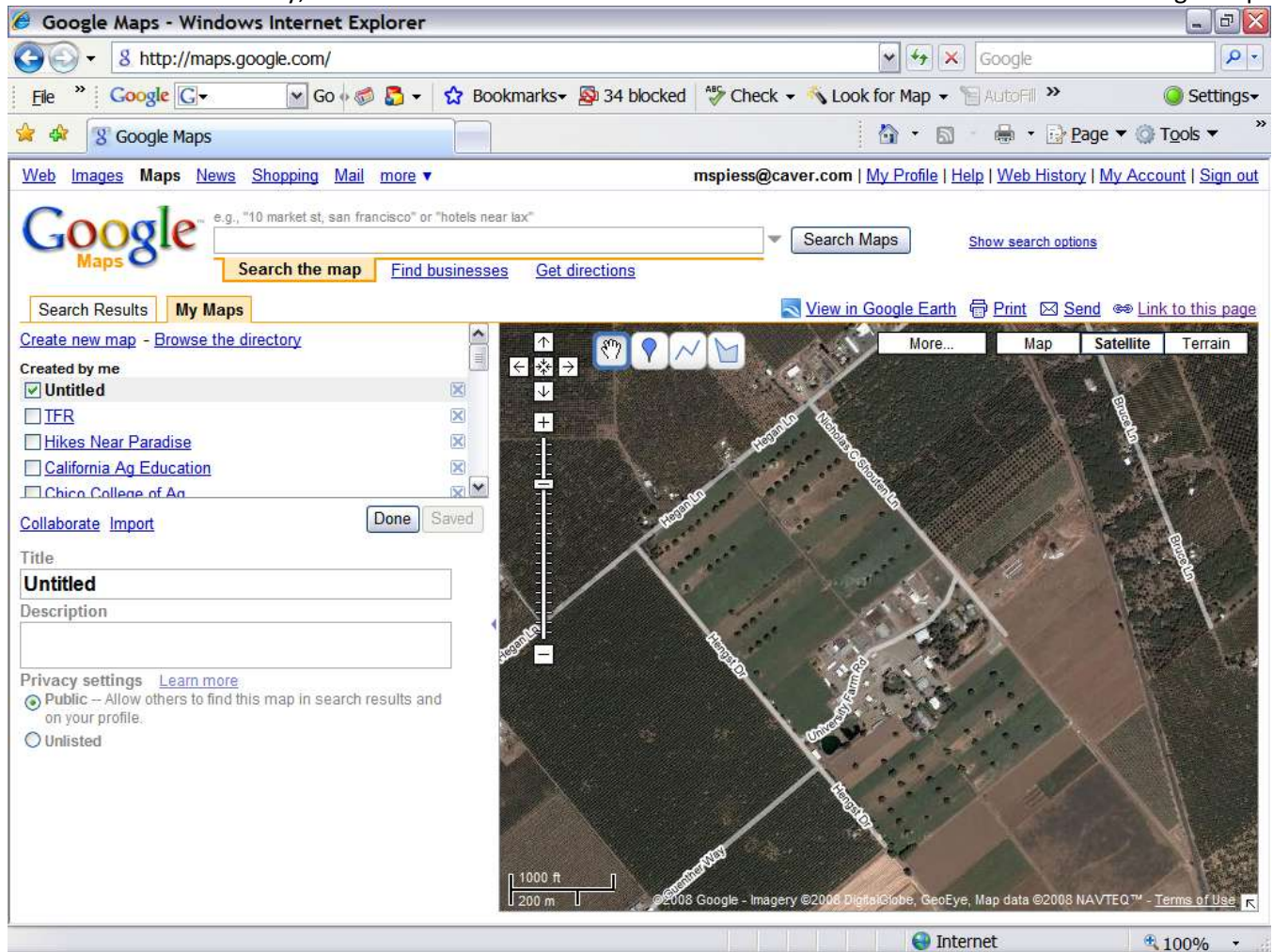
GPS 76
Laptop & Cable
DNR Garmin Software
Maps
Waypoint file

Procedure:

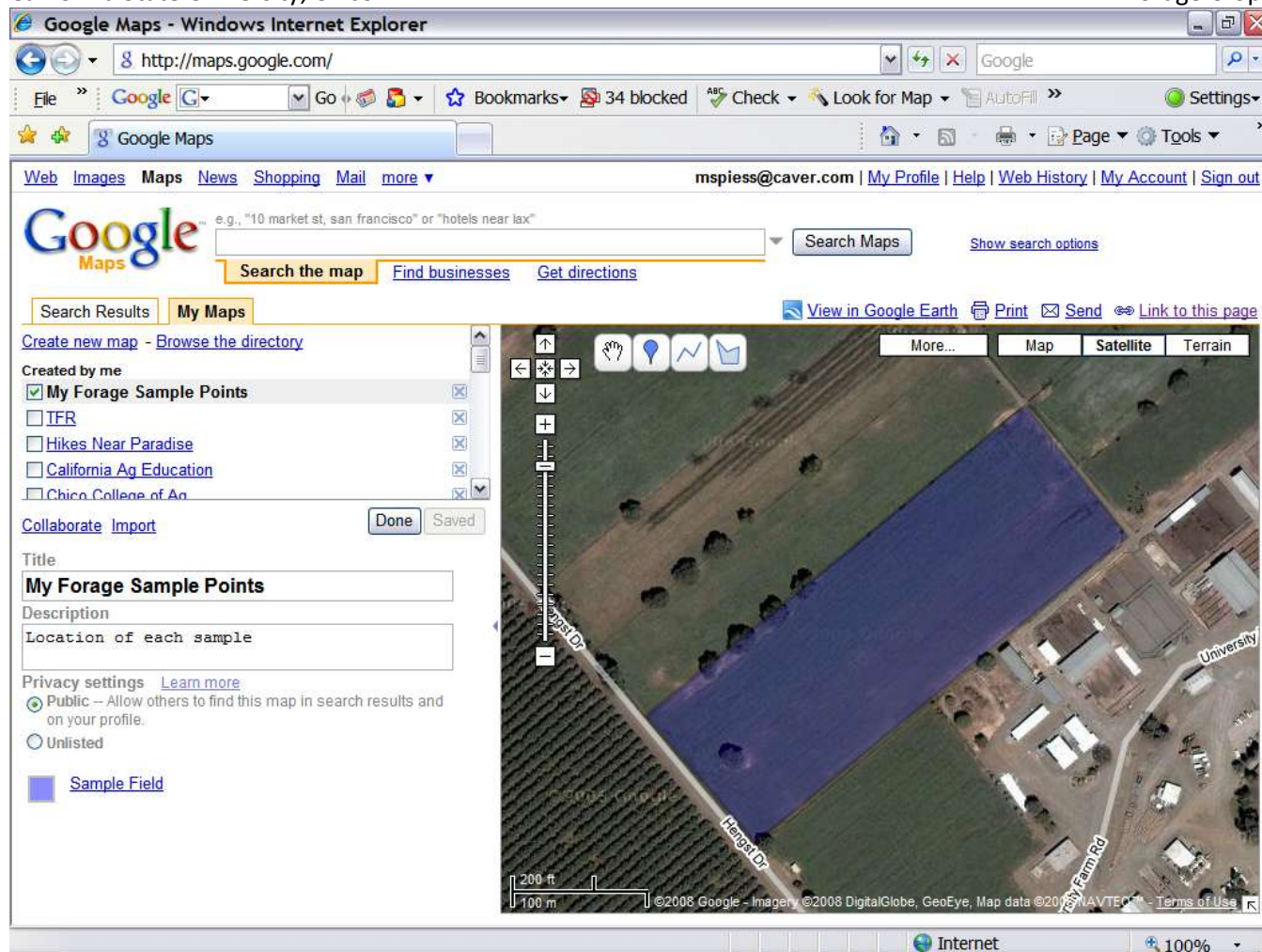
1. Open Google Maps at: <http://maps.google.com>
2. If you don't have a Google Profile create one (see link in upper right) or use the class profile by signing in using: _____ and _____. Creating your own profile is recommended.
3. Review the directions for use using the help link.
4. Select the My Maps Tab. Click on the "Create new map" link. Edit the title and description. SAVE the map. Click on the EDIT button to begin adding data to your map.
5. Use the search tool to find the University Farm by entering the address in the search box.
6. Select the satellite view so you will see the photo.
7. Using the polygon tool  outline the field that you will be sampling. Print a map for use in the field (note that the photo will not print).
8. Using your GPS unit record the location of each sample point by "marking" each sample point. Hint: Allow the reading to stabilize for at least 30 seconds before recording you coordinates.
9. Collect your sample data on the lab sheet. Record the waypoint number on your data sheet.
10. Use DNR Garmin to upload the waypoints from your GPS unit. Save the waypoints as a KML file.
11. Retrieve your Google Map of the field.
 - a. Enter the GPS coordinates of each sample point in the search box and locate the point on the map. Save the point to your "save map". Label the point with the sample number and use the description to describe the sample.
- OR
- b. Use the Insert function to upload the KML file.
12. Print the resulting map for inclusion with your lab report. Note: You may use Prt-Scrn to copy the screen and insert into your report or View you map in Google Earth and use the Copy Image function to copy the map into your report.



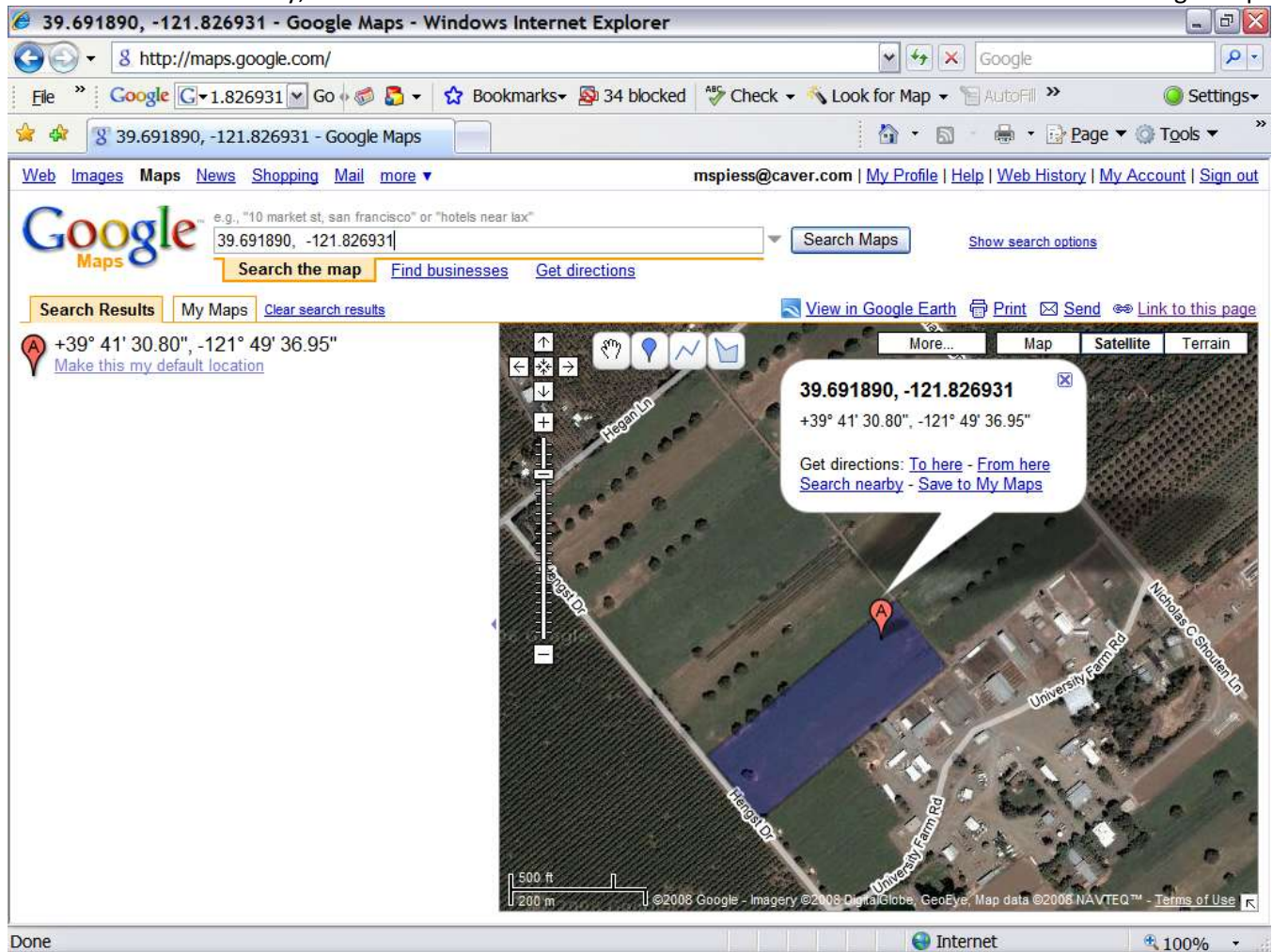
Locating the sample area using the Satellite view.



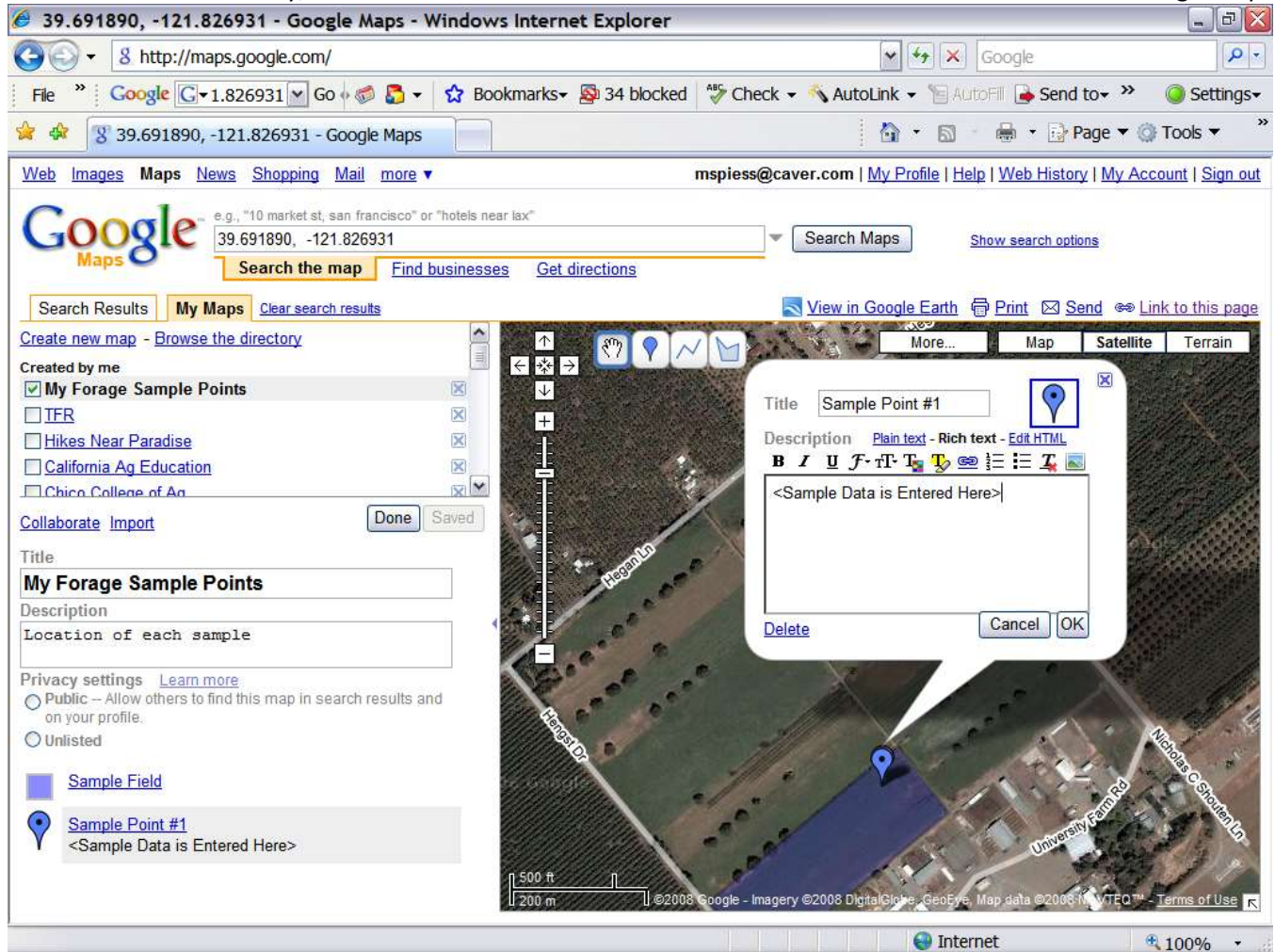
Creating the map.



The field located and marked using the polygon tool.



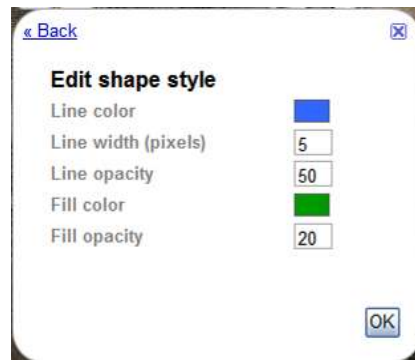
Using the search to locate the sample location from the coordinates. Coordinates can be entered in any of the common degree formats such as those shown above or N39.691890 W121.826931. Google Maps will use the entered coordinates as the title and convert the lat/lon to degrees minutes and seconds as a description. HINT: If your GPS is set to UTM, simply change the location units (under setup) to hddd.ddddd and the waypoints will be displayed in lat/lon format.



Saved Sample Point.



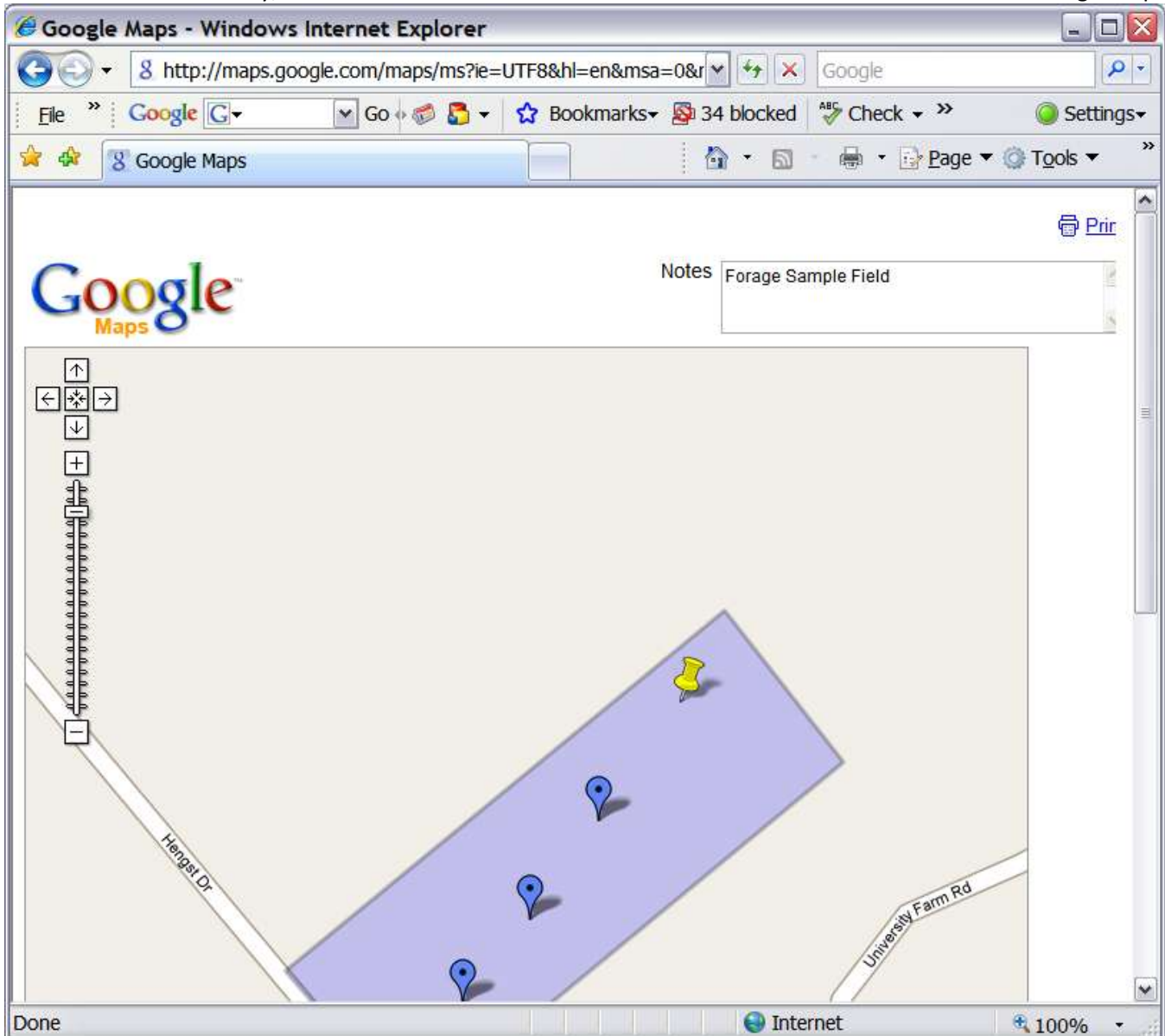
Point Markers (icons)



Polygon (shapes) Settings



Finding Position with Position Finder



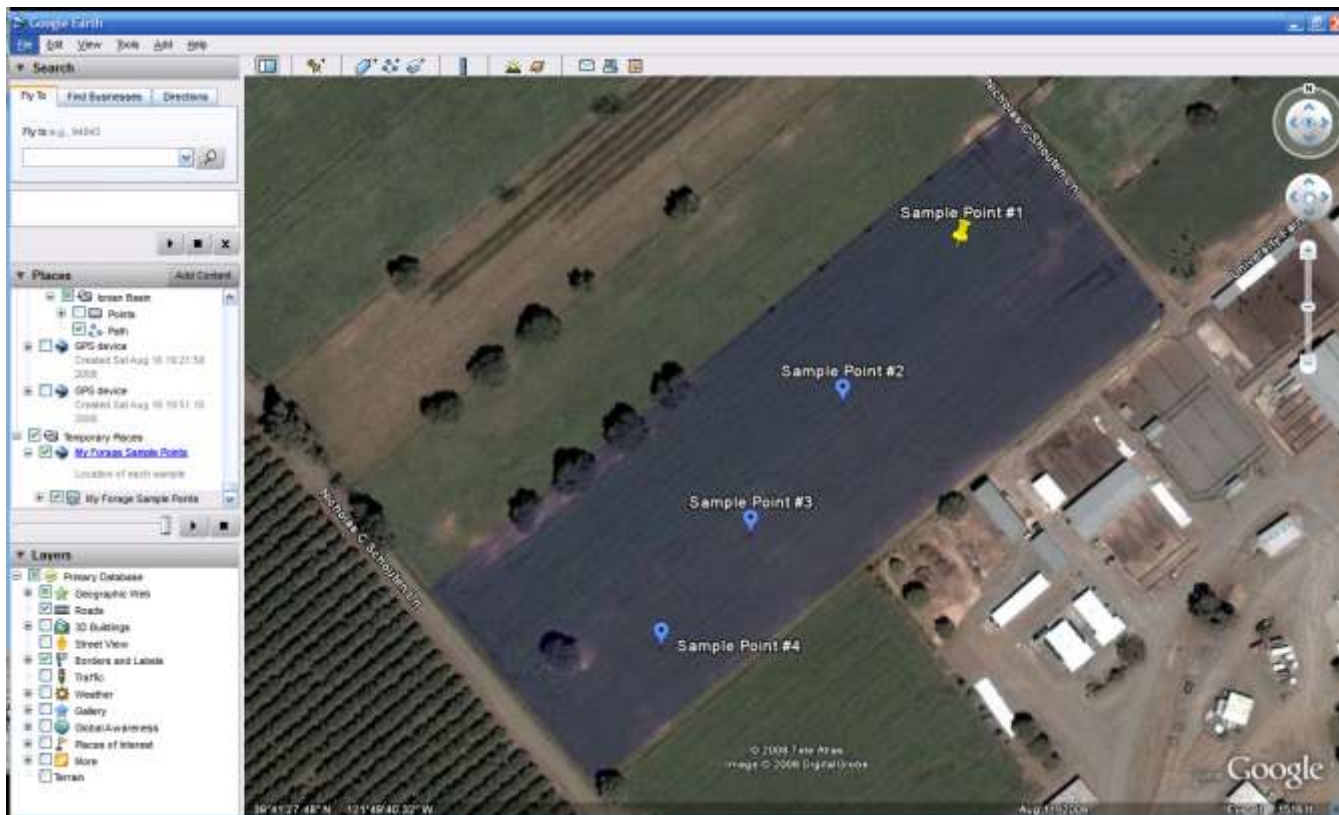
Print Format (note that Google does not support imagery in the print format, either print the Google map page or use Google Earth) .

Exporting your data

Data in a Google map can be exported for use in Google Earth (<http://earth.google.com>) in KML format by using the link "View in Google Earth". KML files can be displayed in Google Earth or converted to GPX files for use in a GPS. A free tool on the web found at: <http://www.gpsvisualizer.com/>

Using GPS data with Google Maps

Inexpensive GPS units can navigate to waypoints and collect waypoints. Free software such as EasyGPS or DNR Garmin can be used to move data between the GPS unit and a PC (usually requires a serial port). Files saved by EasyGPS are in the common GPX format. The files can be converted at the web site: <http://www.gpsvisualizer.com/> to KML and displayed in Google Maps or Points or routes plotted in Google Maps can be converted from KML to GPX and downloaded to the GPS. DNR Garmin can save GPS data in a variety of formats including KML. KML format data can be brought into Google Maps using the Import link



Data displayed in Google Earth.

Tool Summary

Tool	Function	Available at	Cost
EasyGPS	Upload and download GPS data. Data can be saved in GPX format.	http://www.easygps.com	Free
ExpertGPS	Like above, but converts GPX to KML, SHP, etc.	http://www.easygps.com	\$99.95
GPSVisualizer	Online tool to convert GPX to KML, KML to GPX	http://www.gpsvisualizer.com/	Free
DNR Garmin	A utility to upload Garmin GPS data to ArcView	http://www.dnr.state.mn.us/mis/gis/tools/arcview/extensions/DNRGarmin/DNRGarmin.html	Free

	(SHP), GPX, or KML. Data from these formats can also be downloaded to the GPS.		
KML2SHP	A utility to convert KML to SHP files or GPX	http://www.zonums.com/kml2shp.html	Free
ESRI Scripts	A number of ArcView/Arc GIS scripts are available for download that convert KML to SHP format.	http://www.esri.com (See ArcScripts)	Free

Google Map Tools

Google Map also supports tools that add functionality to the product. Find these tools and add to My Maps by using the link "Browse Directory" Some of these that are useful for agricultural related instruction are:

Tool	Function
Position Finder By: thomas.duebendorfer.googlepages.com	Returns coordinates of a point.
Pointer By: www.zonums.com	Returns coordinates of a point.
Area and Distance Calculator By: mikebrewer.co.uk	Calculates area or distance by clicking on the map
Path Profiler By: www.heywhatsthat.com	Develops a profile between two or more points.
Distance Measurement Tool by: www.testshantanu.googlepages.com	Measures distance between points