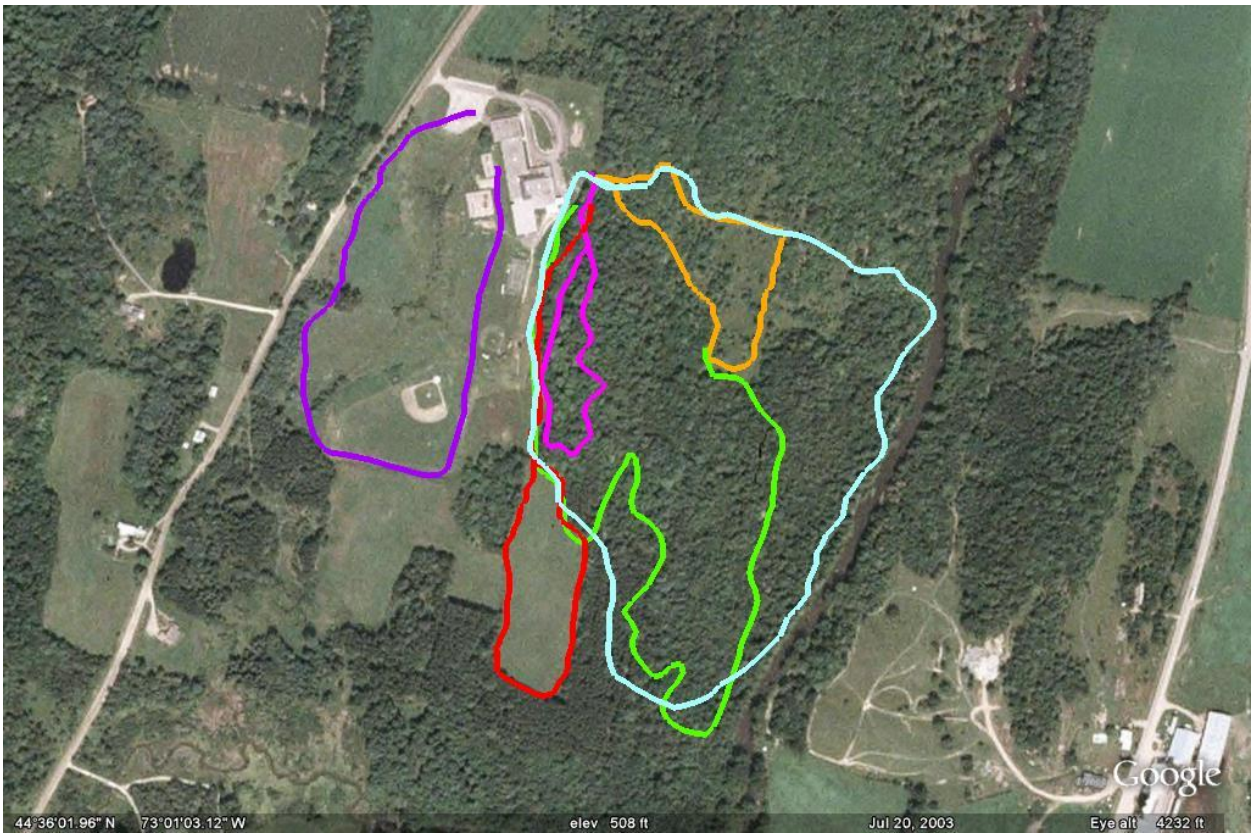
Map Making with Google Earth, Google Map and GPS



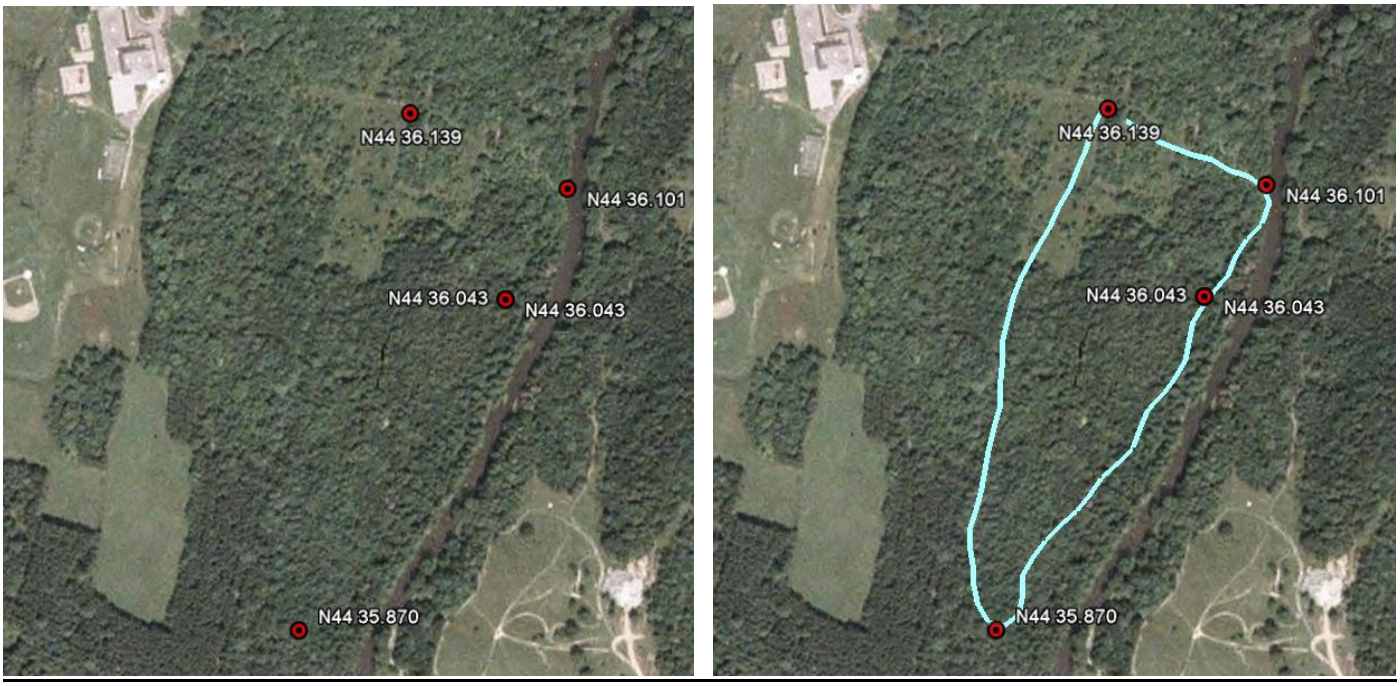
Terminology (*More on Defining Waypoints, Tracks, and Routes*) -

Waypoints **– "Waypoints stand by themselves - are independent of other points. The user usually creates waypoints either by marking a location with the GPS receiver or by using a map (preferably with mapping software on a computer). Waypoints are shown as a "point" on either the receiver's screen or the computer screen. The "point" can be some sort of symbol (icon) to represent the type of location."**

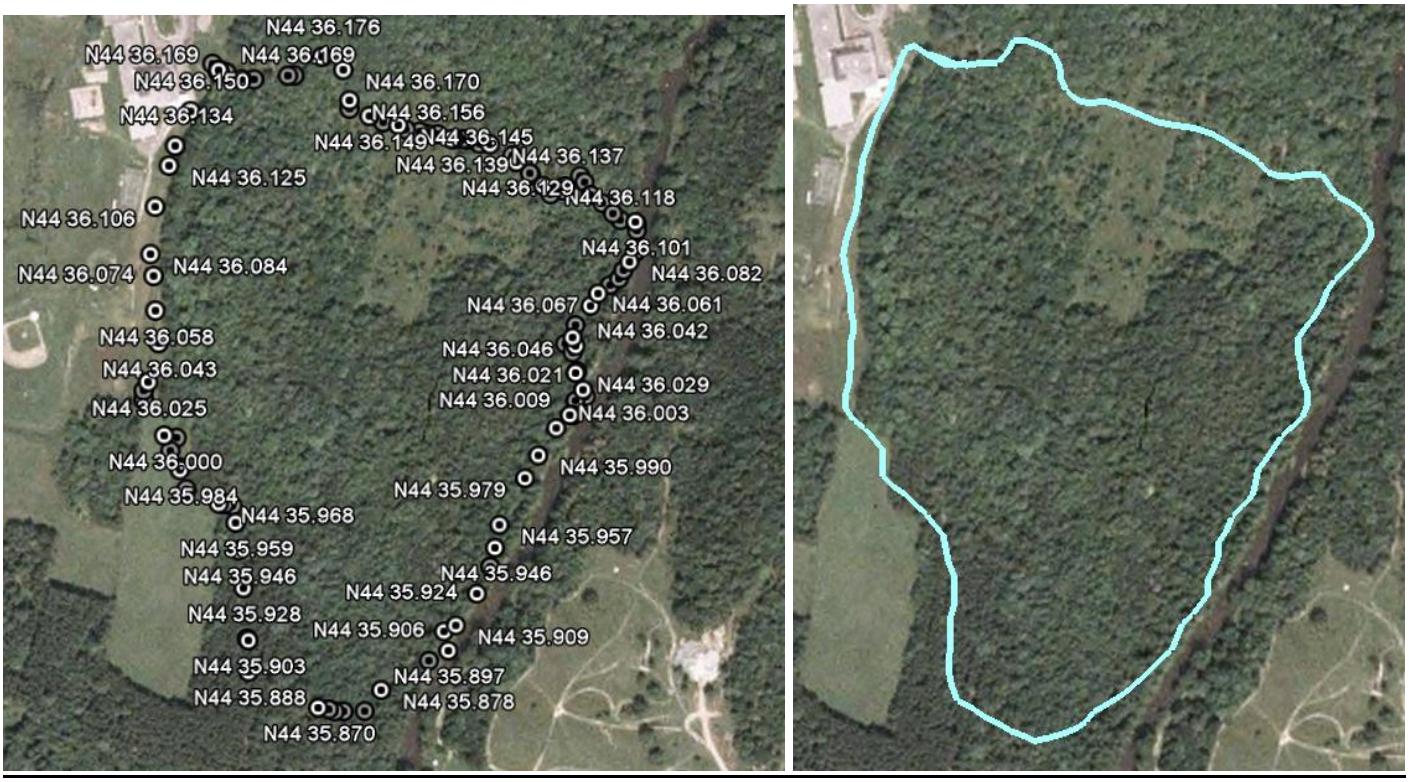
Breadcrumbs/Trackpoints **– "The receiver usually records trackpoints as you travel. The trackpoints define a track formed by connecting the points with lines. The "track" would represent the road, trail, path, etc. that you followed. Curves are formed with short line segments. The GPS receiver draws your track on the map screen with lines defined by the trackpoints and a mapping program (with GPS support) draws your track on the computer screen (with or without background maps). The purpose of trackpoints is to define lines for forming two dimensional ("linear") features. In general trackpoints don't have names or symbols. They may have a date/time stamp that allows the speed to be calculated for the track segment (track leg - line connecting two trackpoints). The distance is calculated from the location coordinates. The elevation is often recorded too so it's possible to get an elevation profile for the track or a 3D view of it along with average speeds, time, and total distance, etc. depending on the computer program or capabilities of the receiver (don't expect much from the receiver)."**

Anderson, D (2006). More on Defining Waypoints, Tracks, and Routes. Retrieved December 11, 2008, from Dan's GPS and Map Potpourri Web site: http://www.gpsmap.net/DefiningPoints.html

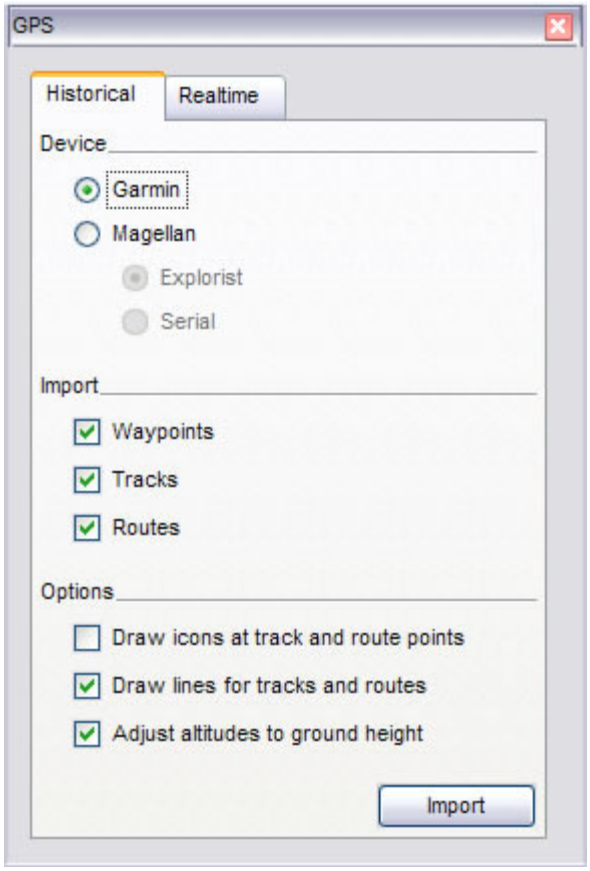
Waypoints Example



Breadcrumb/Trailpoint Example



Bringing GPS data points into Google Earth:



The way it's supposed to work:

1. Sign up and pay for a Google Earth Plus license.
2. Connect your GPS to your computer
3. Bring up this GPS window from the tools menu.
4. Select your device and download options and click import.
5. Your data will appear in the Places panel under the name of your GPS device in Waypoints, Tracks and Routes folders.

Our way:

1. Fail to get your GPS to connect to your PC and go to plan B
2. Download your waypoints and trackpoints to your PC and open them in Excel.
3. Manipulate them into a format acceptable to Google Earth:

Latitude and Longitude values can be set using the following notations:

1. ***Decimal Degrees (DDD) - In this notation, decimal precision is set in the degree coordinate. For example, 49.11675953666N.***
2. ***Degrees, Minutes, and Seconds (DMS) - In this notation, decimal precision is set in the seconds coordinate. For example, 49 7'20.06"N.***
3. ***Degrees, Minutes with Decimal Seconds (DMM) - In this notation, decimal precision is set in the minutes coordinate. For example, 49 7.0055722"N. (Here, 20.06 seconds above is divided by 3600 to get the decimal minute value for 20.06 seconds.)***

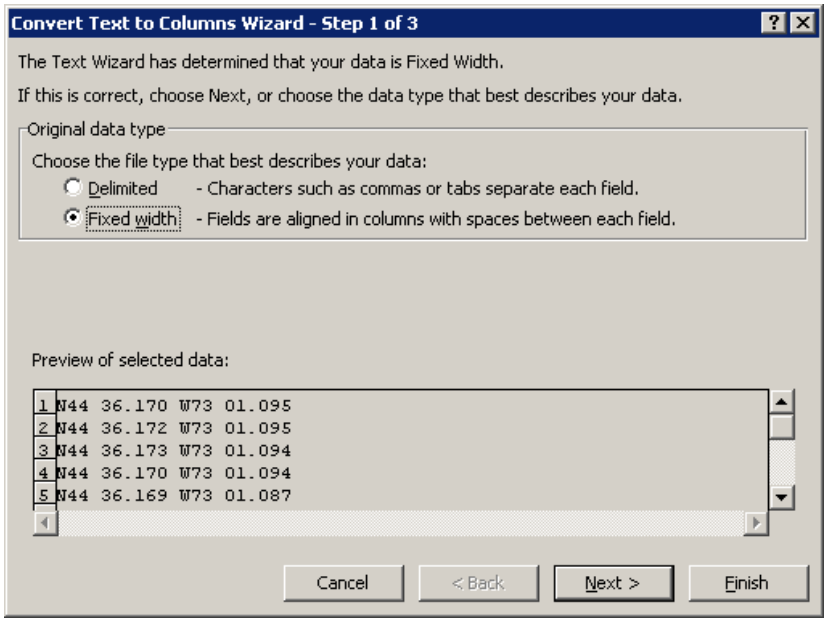
(2008,May 27). Google Earth User Guide. Retrieved December 11, 2008, from Google Earth Web site: http://earth.google.com/userguide/v4/ug_editing.html#entering

To convert this ……to this……use the Excel text to columns wizard

N44 36.170 W73 01.095
N44 36.172 W73 01.095
N44 36.173 W73 01.094
N44 36.170 W73 01.094
N44 36.169 W73 01.087
N44 36.167 W73 01.081
N44 36.167 W73 01.082
N44 36.168 W73 01.082
N44 36.167 W73 01.081
N44 36.167 W73 01.079
N44 36.167 W73 01.077
N44 36.165 W73 01.064

N44 36.170	W73 01.095
N44 36.172	W73 01.095
N44 36.173	W73 01.094
N44 36.170	W73 01.094
N44 36.169	W73 01.087
N44 36.167	W73 01.081
N44 36.167	W73 01.082
N44 36.168	W73 01.082
N44 36.167	W73 01.081
N44 36.167	W73 01.079
N44 36.167	W73 01.077
N44 36.165	W73 01.064

4. Save the spreadsheet as a text file and open with Google Earth Plus.



Matching up waypoints and photographs, notes, etc

Our way:

Record notes as you travel on clipboard and match to waypoints whenever we came to a point of interest, possible confusing intersection in the trail, etc. Match the waypoint numbers with the number of the photo on the camera, comment about that part of the trail, etc.

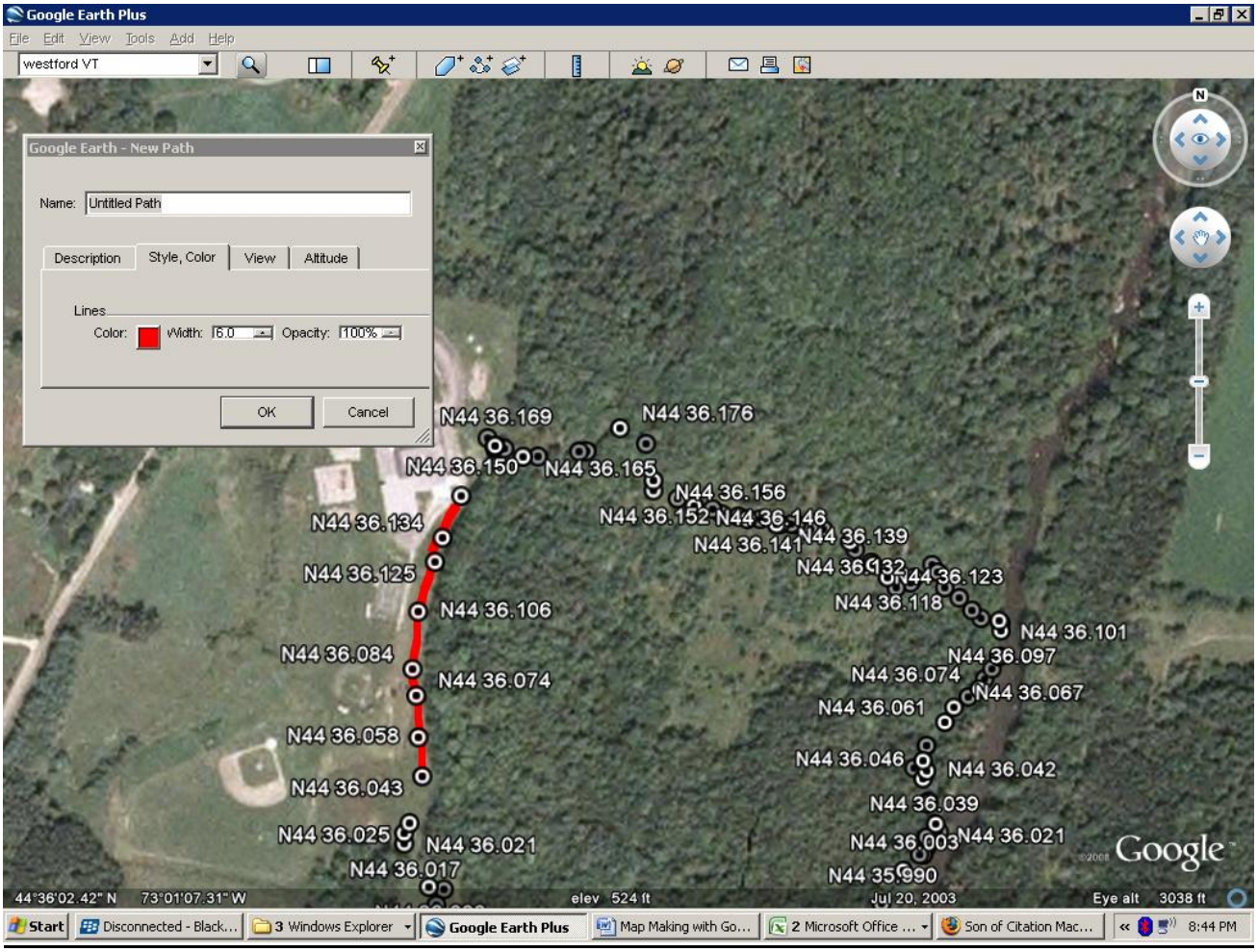
Easier way:

Photos have date and time signatures (if the camera is accurately set to the right date and time) and so do all of the trackpoints:

Name	Size	Type	Date Modified	Date Picture Taken
IMG_1630	3...	JPEG Image	10/23/2008 5:15 PM	7/21/2008 7:17 AM
IMG_1638	3...	JPEG Image	10/23/2008 5:15 PM	7/21/2008 7:19 AM
IMG_1651	3...	JPEG Image	10/23/2008 5:15 PM	8/16/2008 8:14 PM
IMG_1713	3...	JPEG Image	10/23/2008 5:15 PM	10/10/2008 7:56 PM
IMG_1742	2...	JPEG Image	10/23/2008 5:17 PM	10/11/2008 7:13 PM
IMG_1744	2...	JPEG Image	10/23/2008 5:17 PM	10/11/2008 7:14 PM
IMG_1754	5...	JPEG Image	10/23/2008 5:17 PM	10/11/2008 7:57 PM
IMG_1758	4...	JPEG Image	10/23/2008 5:17 PM	10/11/2008 8:03 PM

17	Track Points	
18		
19	Point	Date and
20	Number	Time
21	1	11/5/2008 13:44
22	2	11/5/2008 13:45
23	3	11/5/2008 13:45
24	4	11/5/2008 13:45
25	5	11/5/2008 13:45
26	6	11/5/2008 13:46
27	7	11/5/2008 13:46
28	8	11/5/2008 13:46
29	9	11/5/2008 13:47
30	10	11/5/2008 13:47

After you have created your map by joining your placemarks with a line to show the trail …..



you can enhance your map by adding text, photographs and links to your placemarks.

Code for adding links and images to placemarks in Google Earth:

1. Code for inserting image: where yellow-highlighted code is what is changed and the blue-highlighted is the photo size.

<img src="http://www.ccsuvt.org/westford/images/7.jpg" width=50>

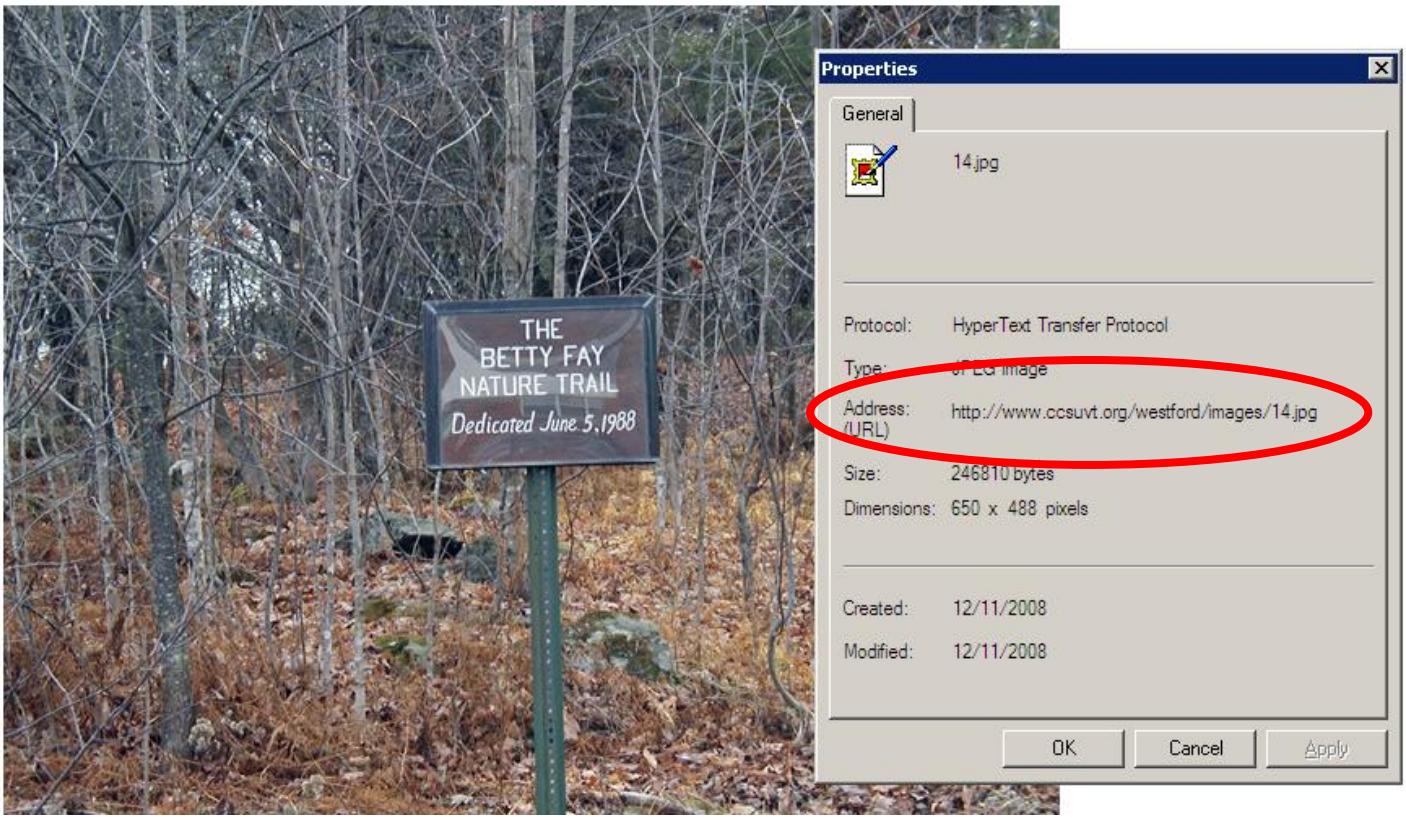
2. Code for inserting hyperlink: where the yellow-highlighted is Web Address, and blue-highlighted is the link text that is displayed

*** Click here to see an important trail marker ***

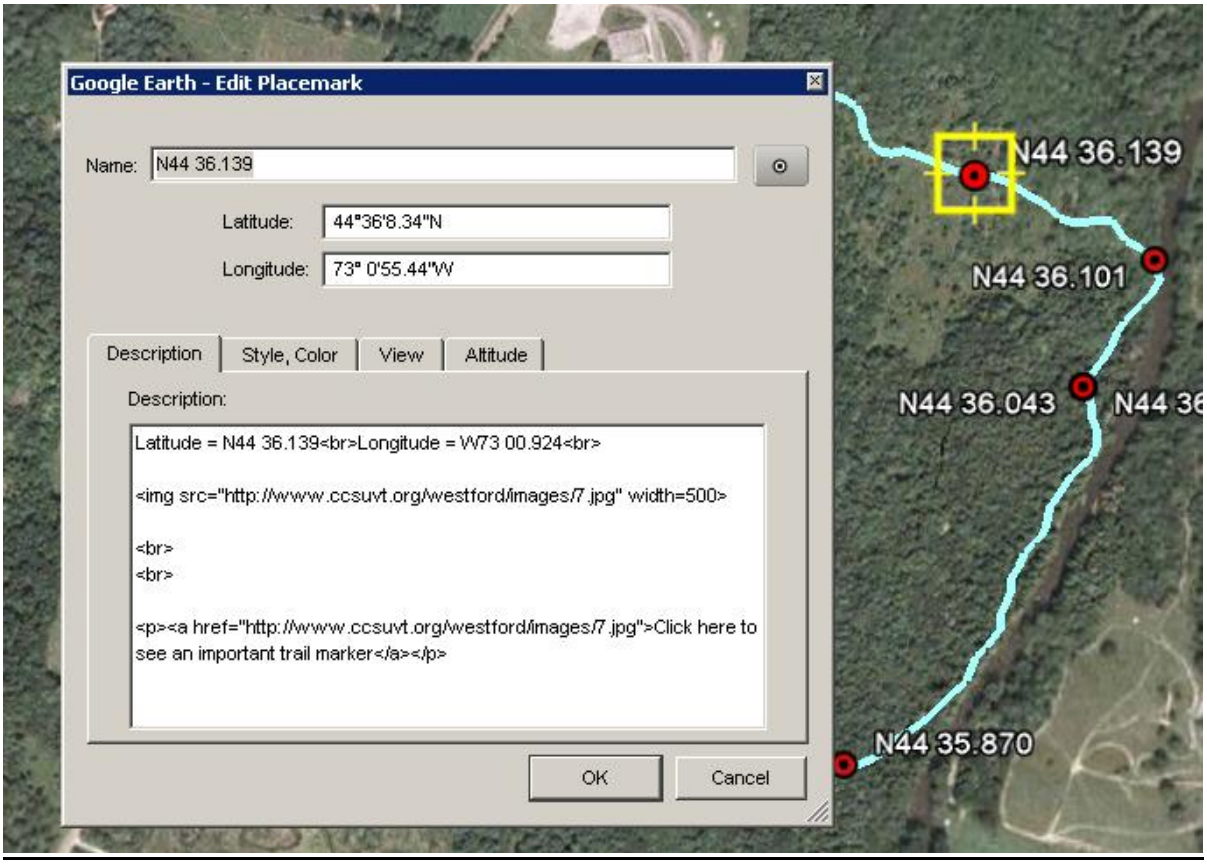
***3. For adding spaces, use:
***

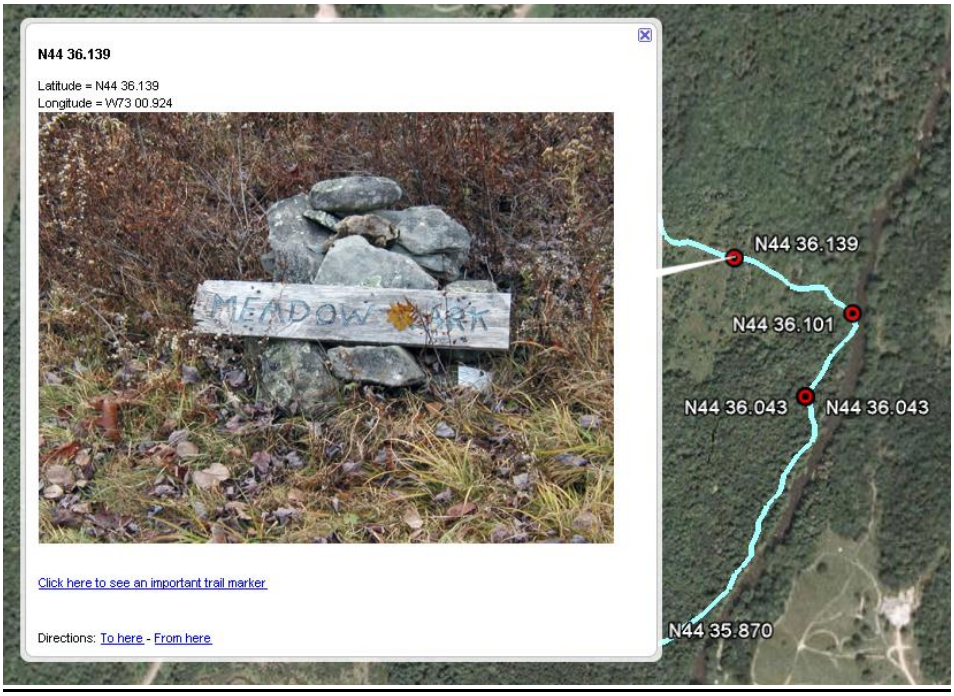
Jakes, D (2007 December 3). New Tools for Schools - Code. Retrieved December 11, 2008, from New Tools for Schools Web site: http://newtools.pbwiki.com/code

Photograph URL:



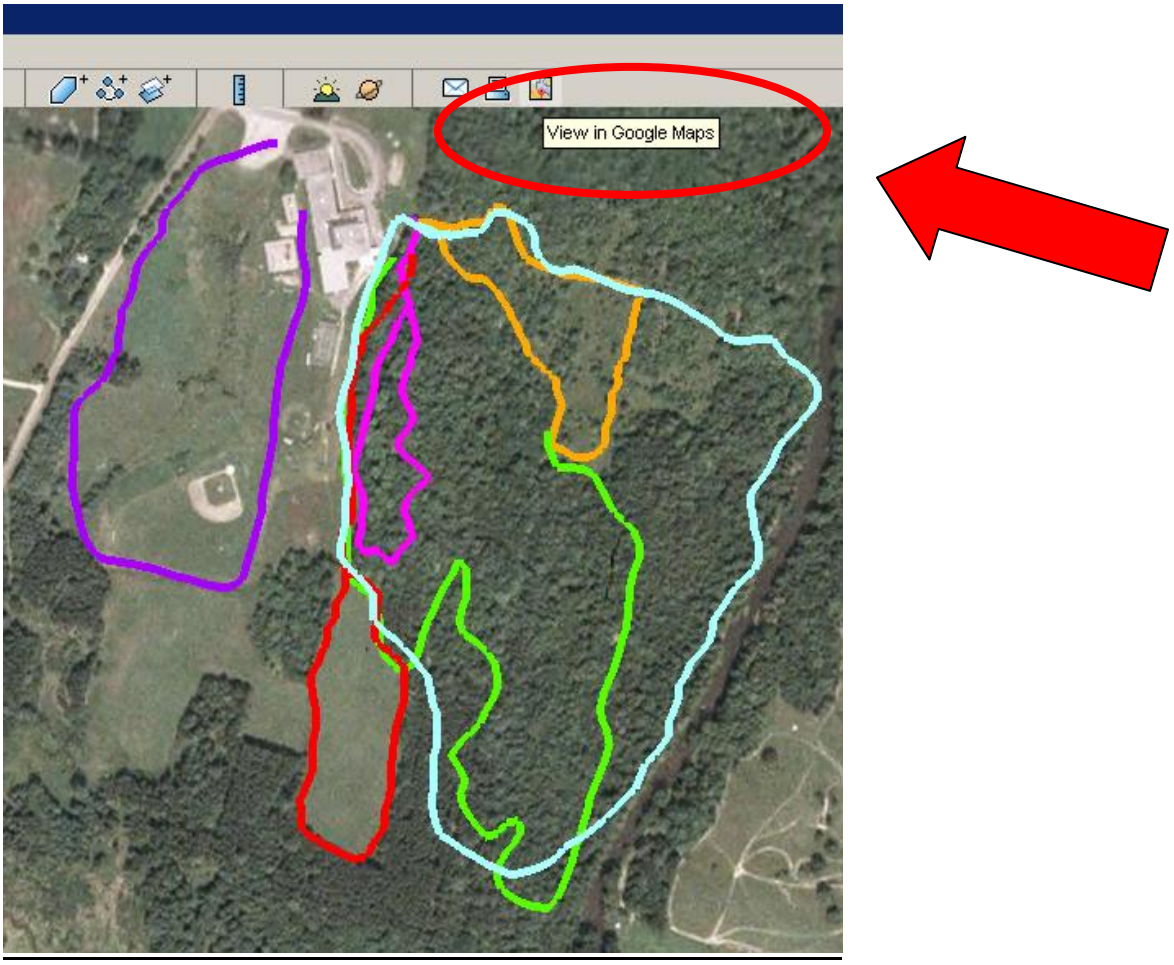
Insert code into a placemark's properties:





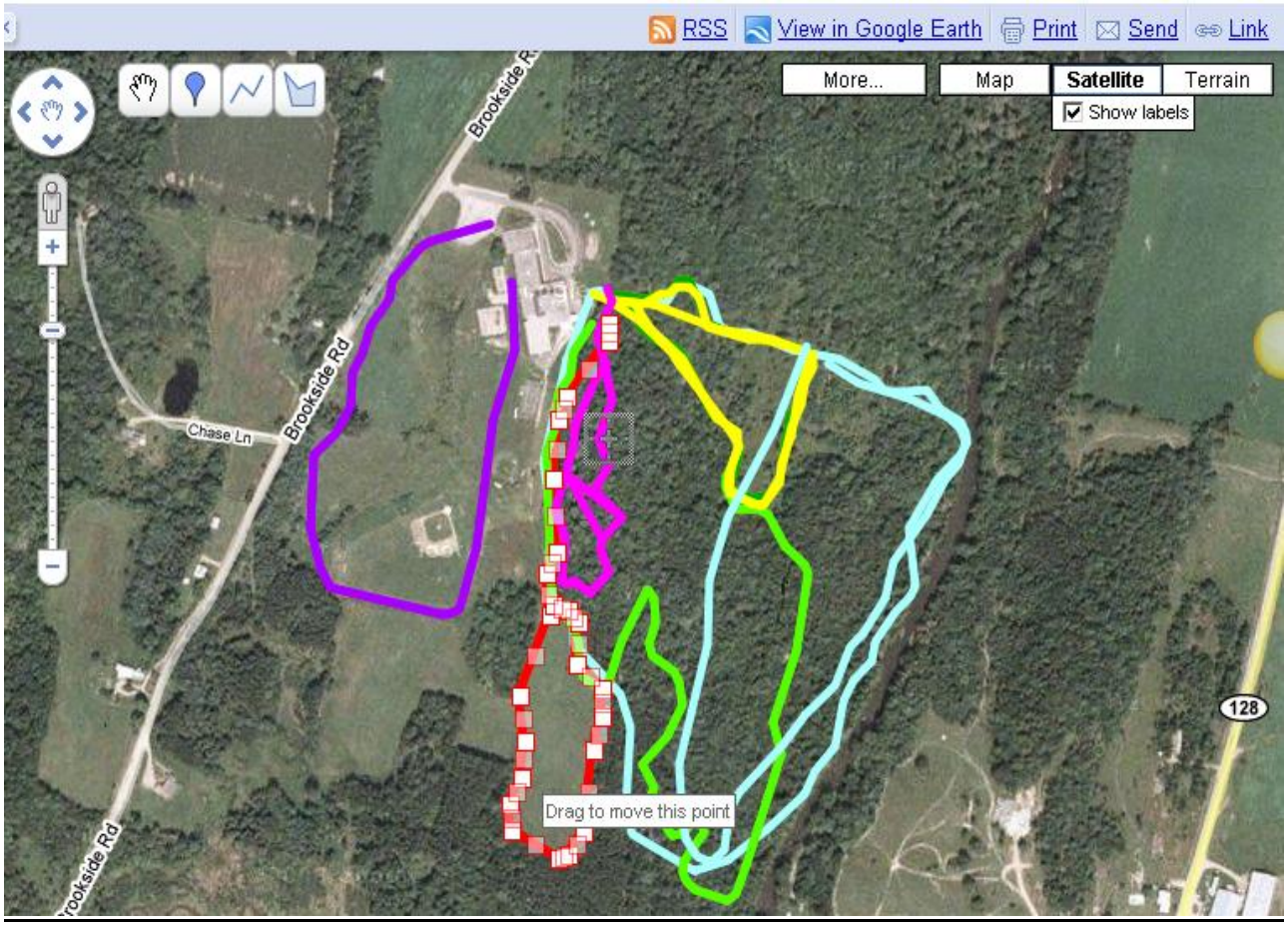
In Google Maps you can enhance your map without using any html code:

Click here to see the Google Maps version of the Westford School Trails

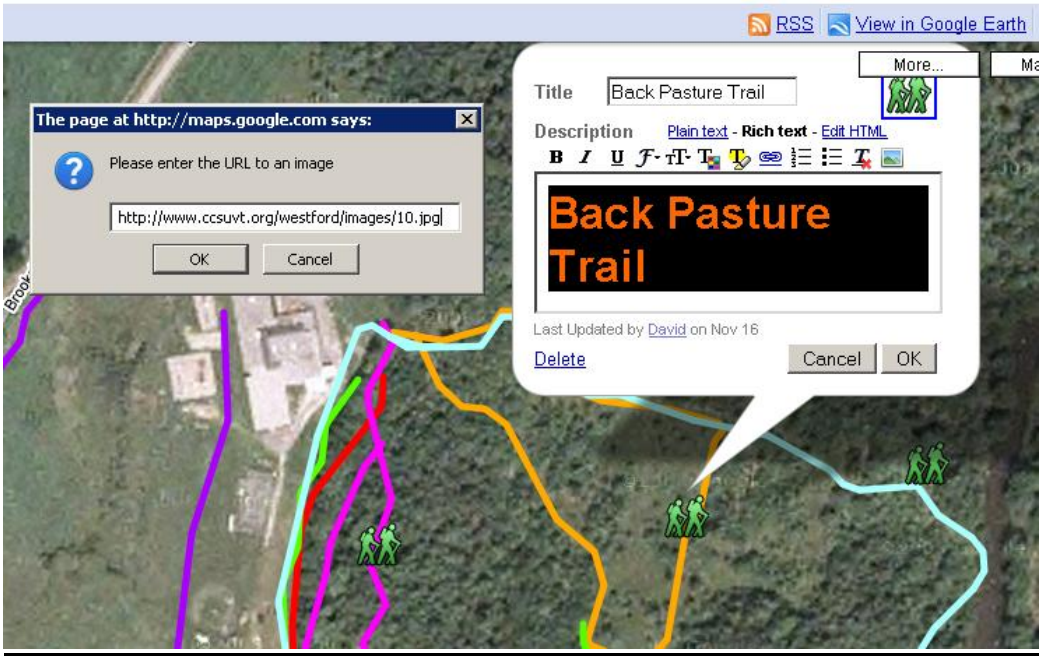


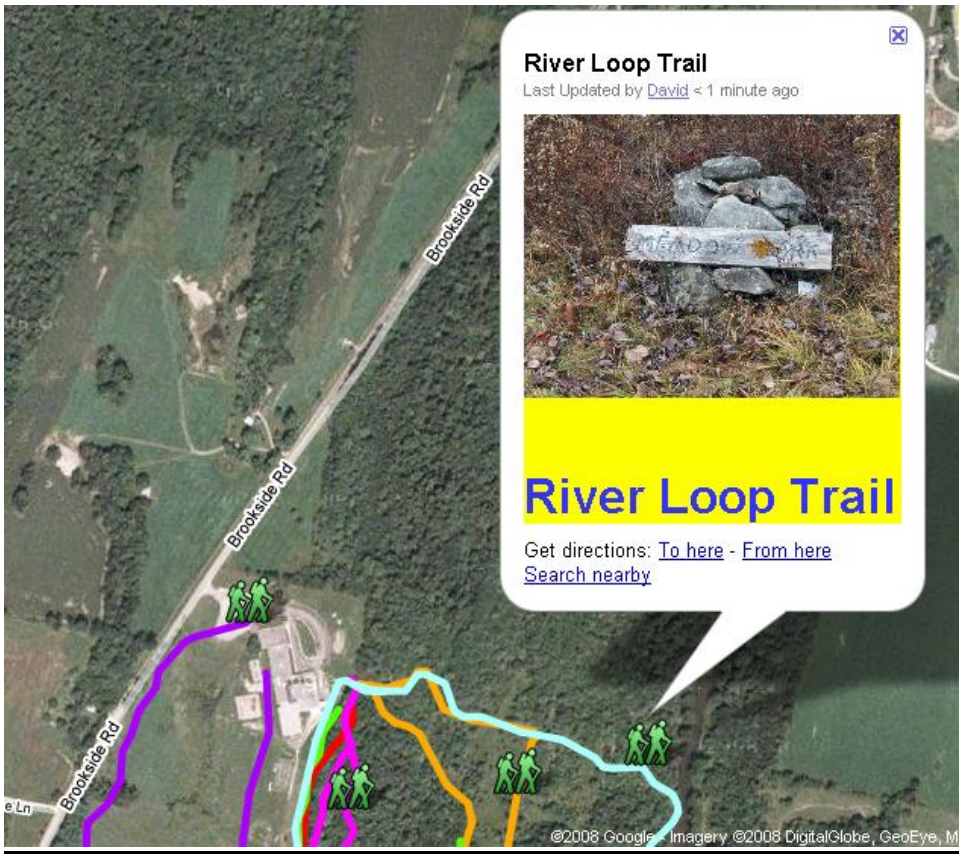
Or save as a KMZ file and open in Google Maps

You need to register and log-into Google maps in order to edit a map.



<u>Editing your map by adding information to placemarks is now much easier:</u>





Additional Resources:

- Using GPS Devices with Google Earth – a Tutorial form Google Earth
- David Jakes 21st Century Cartography Resources - Web Site, Wiki , and Podcast
  - Google Earth vs. Google Maps
  - Google Earth Cut and Paste Code
  - KML vs. KMZ
  - How to Embed Maps
- Google Earth User Guide
- Google for Educators - Educator Activities
- Google Earth Tour – YouTube video- new features
- Educational Resource for Teachers - Google Earth Lessons
- Google Maps Mania - "This is a blog that covers all the cool new Google Maps mashups, tools and applications being created by people all over the world. Posts also cover features and additions to Google Maps itself such new mapping data being added, new features and so on." - from the Google Maps Mania Welcome Page
- 100 Things to do with Google Maps Mashups
- Cool Google Maps - Who knew maps could be fun?
- The Five Best Things About Google Maps
- Google Maps Rolls Out Spanking New Features
- 7 Things You Should Know about Mapping Mashups
- Use Google Maps Mashups in K-12 Education
- Google Earth vs. Google Maps - The differences between the two services