

About Google Earth (GE)

Google Earth (GE) is a free software package that enables one to view any part of the Earth's surface, along with various kinds of data provided by GE, its advertisers, and other users. All of the extras can be hidden so that the experience can be very uncluttered. Much more than that, it enables users to add their own data, allowing groups with a common interest to share files in a very simple manner. This introduction is primarily aimed at those who wish to use it for displaying their own and other people's data about where our native plants can be found.

Satellite images of the whole earth's surface are superimposed upon a globe and you can zoom and manipulate those in amazing ways. The set of images is constantly evolving as new data are obtained from space. They can be months or years old, depending on the location, and adjacent strips may be from August or February (sometimes a little disconcerting). The image data are sent over the Internet so you normally use the program while on-line, but it's not essential (see p. 4).

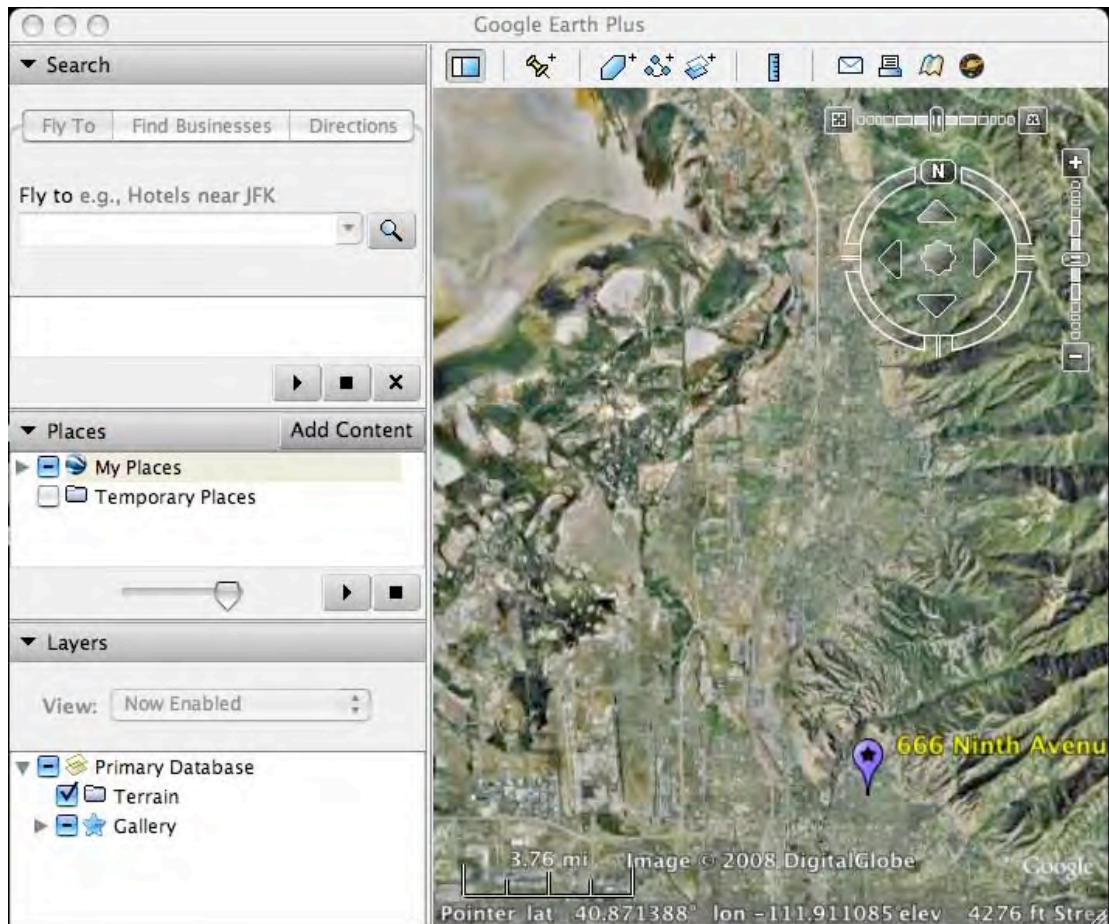
From its inception just a few years ago this looked like a promising way to display our kind of data. However, there were some real limitations and many areas had poor quality images. In a short time it has grown by leaps and bounds, becoming more versatile and enormously improving its image quality. The basic program can be downloaded for free from the Internet (<http://earth.google.com/>).

Using Google Earth

The basic level of the program (free download) is all you need unless you want to link directly to your GPS unit. In this case a \$20 per year upgrade ("Google Earth Plus") should be purchased. This also provides 'enhanced performance', but I don't know all that that entails. Basic does enable you to create and send displays by email to another person, and to show things sent by them. Otherwise you have to do some translating into the .kml format used by GE, which Garmin and Topo! won't do for you.

Main window:

This consists of a main viewing area '3D Viewer' and 3 panels on left (Search, Places and Layers).



Left panels:

Search Type in a place such as your home address, hit the ▶ button and it zooms there. Anywhere in the world.

Places Two main folders are here. '**My Places**' contains all sorts of files that GE has provided and anything that you have created or imported, and saved. '**Temporary Places**' contains those things you have imported or created in the current session. You can drag them from here to the 'My Places' folder and arrange them as you want – but that is a bit cumbersome, as folders like to pop open. I prefer to save most things in a filing system outside GE and open them as needed. When you close GE you are prompted to save or discard anything from the Temporary Places folder. More about what you can do with the files here later.

Layers Only 2 are shown here, but many more are accessible via the 'View' option, including Roads. **Terrain should be left checked** because it is responsible for the realistic 3D effects when the image is tilted.

3D Viewer and Controls:

Background This is the satellite image of the chosen area. Across the top is the:

Toolbar with features that allow you to:

- open/close the left panel
- add a Placemark
- add Polygons, Tracks or Overlays
- measure distances
- send an email with an enclosed file
- print a map
- see the area in Google Maps, a simplified format focused on streets
- lie down and look at the stars overhead!

Navigation and Display Top right is the driver's seat with

1. Zoom on right – basically, this controls how high your vantage point is above the earth's surface (given in feet or miles as 'Eye altitude' at bottom right: missing from the printed view).
2. Tilt across top. Click right icon to tilt the image away from you and generate 3D effect. Click left icon to tilt back up – double-click to drive it all the way.
3. Steering wheel. Click and drag anywhere on the rim to rotate the image. Double-click the N to restore true north orientation. This can be very useful for viewing images whose lighting angle makes the terrain appear inverted. It automatically rotates when GE is following a path.
4. Cruise arrows in center. Click to drive the image in any direction. Very useful when you are creating paths and polygons, but the 'Hand' cursor is normally more intuitive.

Information on Status Across the bottom is information about the current status of the scene:

1. Lat, Long and elevation at the cursor's position
2. Scale bar for distance
3. Streaming – shows how much of the necessary map data has been received. The last gasp provides the finest detail, so be patient.
4. Eye altitude.

More on the images

It's hard to avoid the feeling that you are actually looking down onto the earth in real time, but you're not. GE obtains images (in strips about 10 miles wide) from other companies and builds them into a seamless display. But those images come from all sorts of times, selected for the quality of surface detail. Zoom out to look at the whole US and see the patchwork.

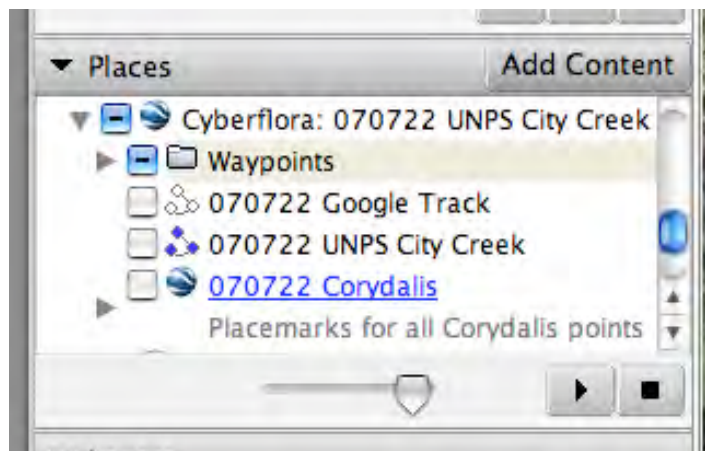
Moving around

The normal cursor is a hand. With it you can drag or even throw the map in any direction you want. If you let go while the cursor is moving the map continues with the same speed and direction. Quite nice to let the scenery drift by sometimes.

My Places

This is the meat of it as far as sharing data is concerned. The My Places folder contains items such as this record of a visit to upper City Creek Canyon in July 07 (download from: [070722 Upper City Creek](#)) :

The Cyberflora folder contains 4 items:



1. a folder of waypoints created in GE to mark points of interest
2. a track hand drawn in GE to define a travel route
3. the actual GPS record of our hike and a bit of the preceding drive, downloaded from the GPS, stored in Filemaker, and exported for GE
4. a folder with all points where *Corydalis caseana* was found; exported from Filemaker

Checkboxes indicate whether the item(s) are visible on the display (✓ = all; - = some; blank = none). Turn on and off here, or open folders and check individual points.

Double-click an item: the view zooms to center on the whole group of objects, and a folder opens to show the contents.

Right-click an item and a menu appears allowing you various options such as deleting, emailing, or viewing information about the item. If you right-click a folder and choose 'email' you can send the entire thing as a zipped file. The same functions are available if you click on a placemark icon on the map (see below).

Controls at the bottom of 'My Places' include a **slider** that controls how strongly the added feature shows up against the background image. This is useful for tracks but not for placemarks. The triangle ▶ allows you to play a tour of any item selected within 'My Places'. If you select a folder of placemarks the tour will take you from one to the next, pausing to show each. If you select a track or path the tour will fly smoothly along the route, often with very realistic 3D effects. In Google Earth/Preferences you can vary the tour conditions such as height or speed. They still need to work on this to get it more intuitive, and to allow you to pause and resume tours smoothly.

Placemarks These consist minimally of a paddle or pushpin linked to a pair of coordinates. Usually it highlights when the cursor is moved over it. When clicked it changes to a display box showing information that the user has supplied, such as date, comments, plant id, etc. It can also contain images, links to photos and other things. A very nice feature in recent versions is that the cursor changes to a plus sign when it crosses a point where placemarks are superimposed: click and it then shows the placemarks spread out cleanly. Try this after zooming out so the various pushpins overlap. Reduce clutter by keeping placemark names to a minimum, or omitting them. In Filemaker exports I give them a three-digit number based on how you sorted them.

Placemarks can be created directly in GE by selecting the yellow pushpin in the tools menu, or imported in files created elsewhere. Both kinds are represented here.

Waypoints were made directly and are displayed as pink paddles. To create one click the pushpin icon at top left. A flashing yellow pushpin appears at the center of the screen, accompanied by a dialog box. Drag the pushpin to where you want it, give it a name and add any other information. Right next to the Name box is a small icon: click it to see a choice of available styles for the placemark icon. Choose one, click OK, close the dialog box and the job is done.

Plant Points are essentially no different, except that they were created within Filemaker and exported. Here they are represented by yellow pushpins but could be anything. These were all recorded on a single trip, but could just as well have been collected from every place I had seen *Corydalis*: the selection process is up to the user. I am still working on the most effective way of exporting these data and attaching photos to the placemarks.

Tracks and paths These are collections of points that represent some kind of sequential path. Again, they can be drawn directly in GE using the 'Add Path' tool near top left: just build a path by clicking successive points along the way (070722 Google Track in the example file). An exported path is that shown as 070722 UNPS City Creek, which is the actual record of our hike at 30 second intervals. Stops and detours show up nicely. In terms of recording plant survey data these are invaluable because they show exactly where you were, and potentially indicating where plants were **absent** – information that is hard to summarize if you are just recording where you found a plant. The slider control allows you to fade these in and out as convenient, and the tour lets you fly along the path. Caution: it may take forever to fly along a track if it's more than a few miles. That's where it can be better to make a separate Google track to cover just the part of interest.

Using Google Earth off-line. Although you will normally use it on-line and get the data fresh from GE, you can also use it away from the Internet. As GE receives maps and other data it stores them in a temporary location on your computer, overwriting when the space becomes full. This '**Cache**' can hold large amounts of information for use when you are no longer connected to the Internet. By default it is set to 500 megabytes (less than a CD-rom). You can change that up to 2 gigabytes in the GE preferences menu. Before going on a trip slowly cruise the area of interest, allowing time for GE to fully download all the details. Watch that the "Streaming" indicator (p.2) stays near 100 %, or go back over the place. Two gigabytes is a very useful amount of information that can cover a good area. So think ahead a little when you take off for southern Utah with your laptop.