

Supplemental Tutorial – Raindrops and Ranges Activity

Purpose

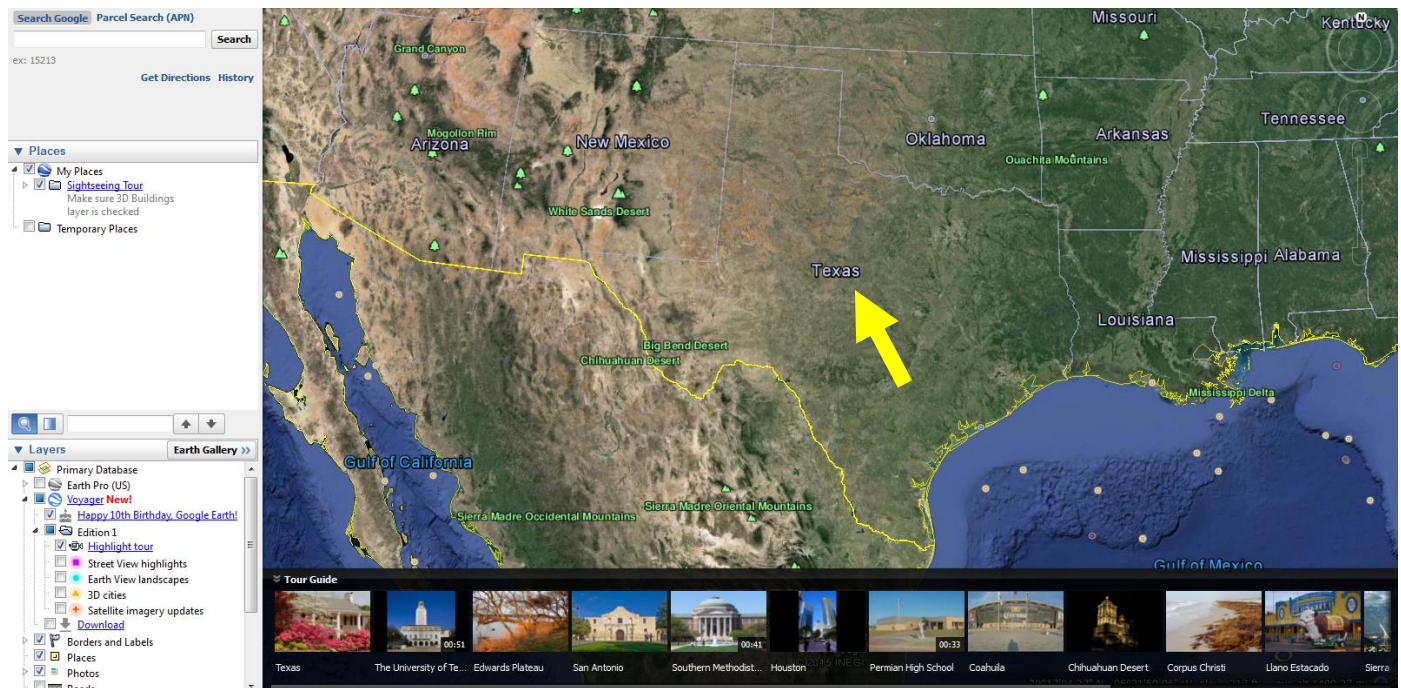
To guide students in how to use Google Earth software to create a digital map containing different layers of data on rainfall, temperature, vegetation, and wildlife ranges.

Materials:

- Computer with Internet access
- Internet browser – Google Chrome recommended
Note: Up-to-date software may be required to properly use the recommended Internet resources. For instance, the interactive maps may require Adobe® Flash to be installed and/or updated.
- Google Earth – desktop software
Note: Google has instructional videos that may help you in working with Google Earth in addition to this tutorial provided by Project WILD. This tutorial is tailored to an activity in the Project WILD guide.
- National Oceanic and Atmospheric Administration (NOAA) – National Centers for Environmental Information <http://gis.ncdc.noaa.gov/map/cag/#app=cdo>
- GAP Land Cover Viewer – http://gis1.usgs.gov/csas/gap/viewer/land_cover/Map.aspx

Procedure

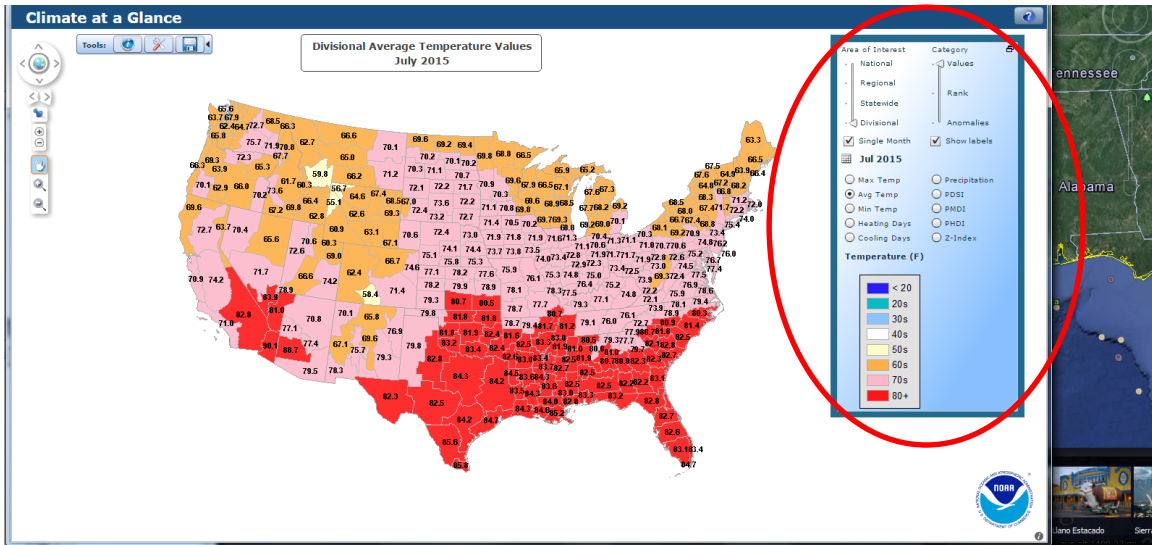
1. Launch the desktop version of Google Earth.



Zoom in on the region/state for which you will be recording data. For this tutorial, we will be focusing on the state of Texas. Other states/regions that may be your focus can be targeted using these resources.

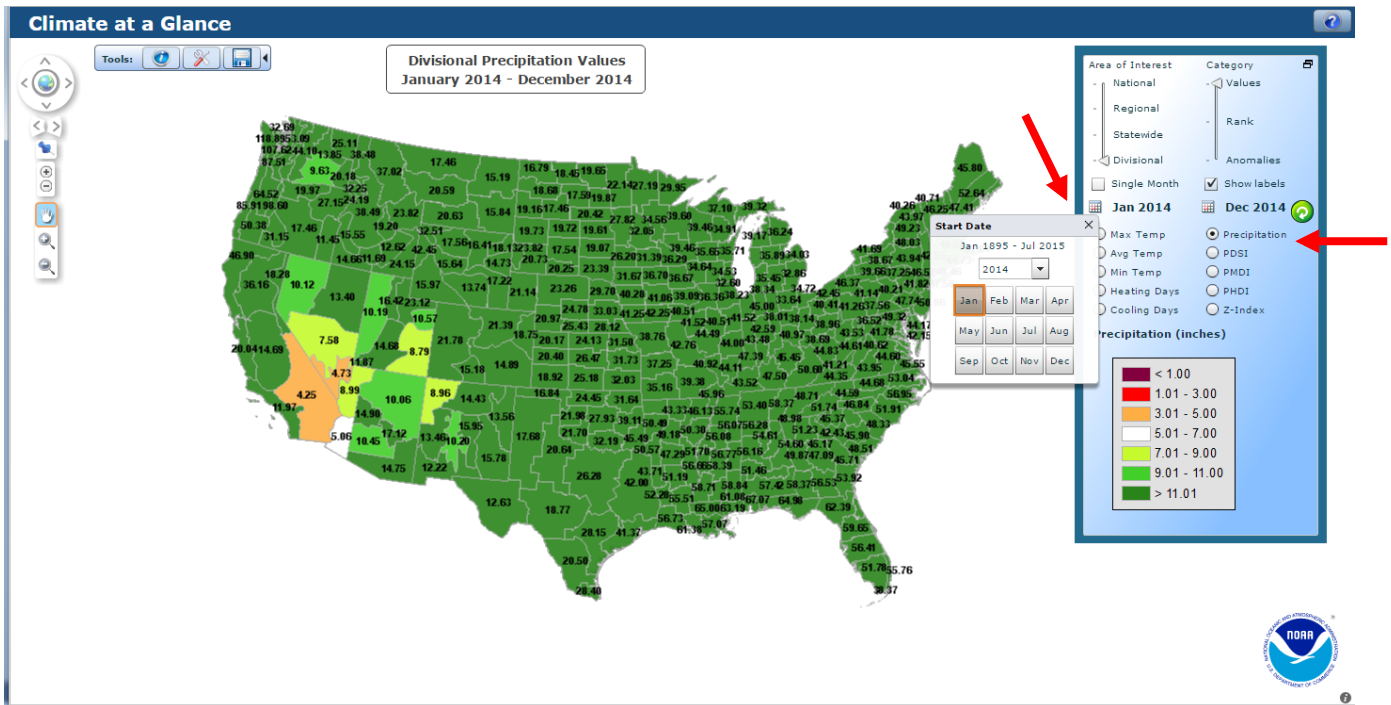
Note: Keep in mind that gathering data for a larger region may reap better results when using this technique, especially for those from smaller states where differences in climate and habitat may not be as noticeable on a small scale.

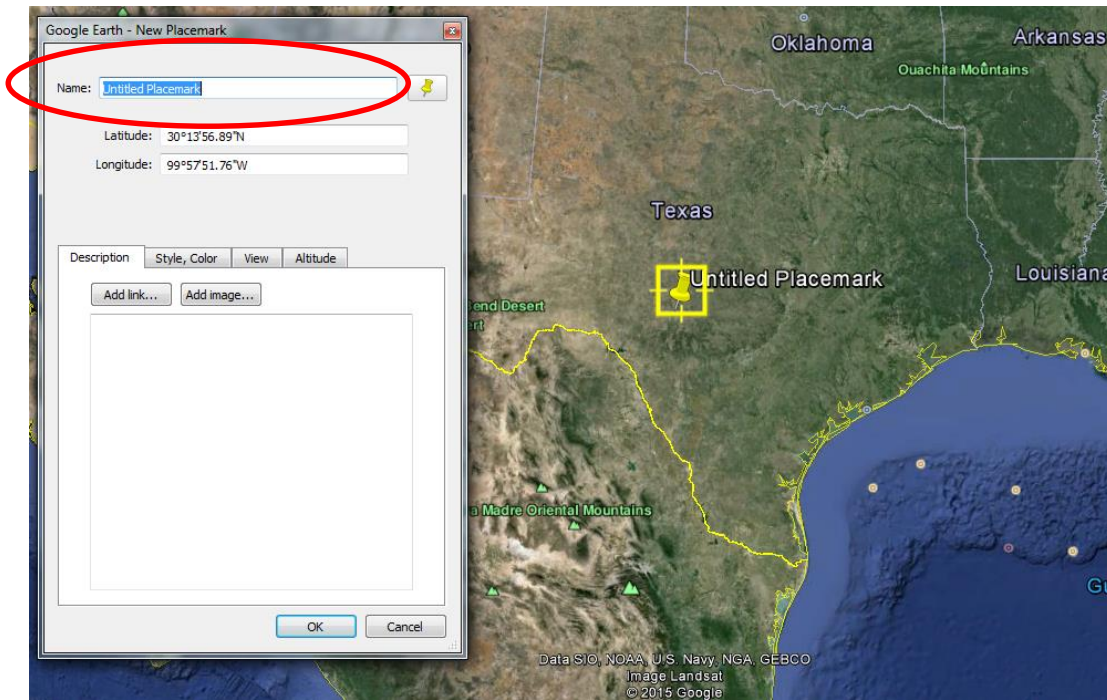
2. Now open a web browser to find database(s) on rainfall and temperature. Recommended site for use in this tutorial – <http://gis.ncdc.noaa.gov/map/cag/#app=cdo> .



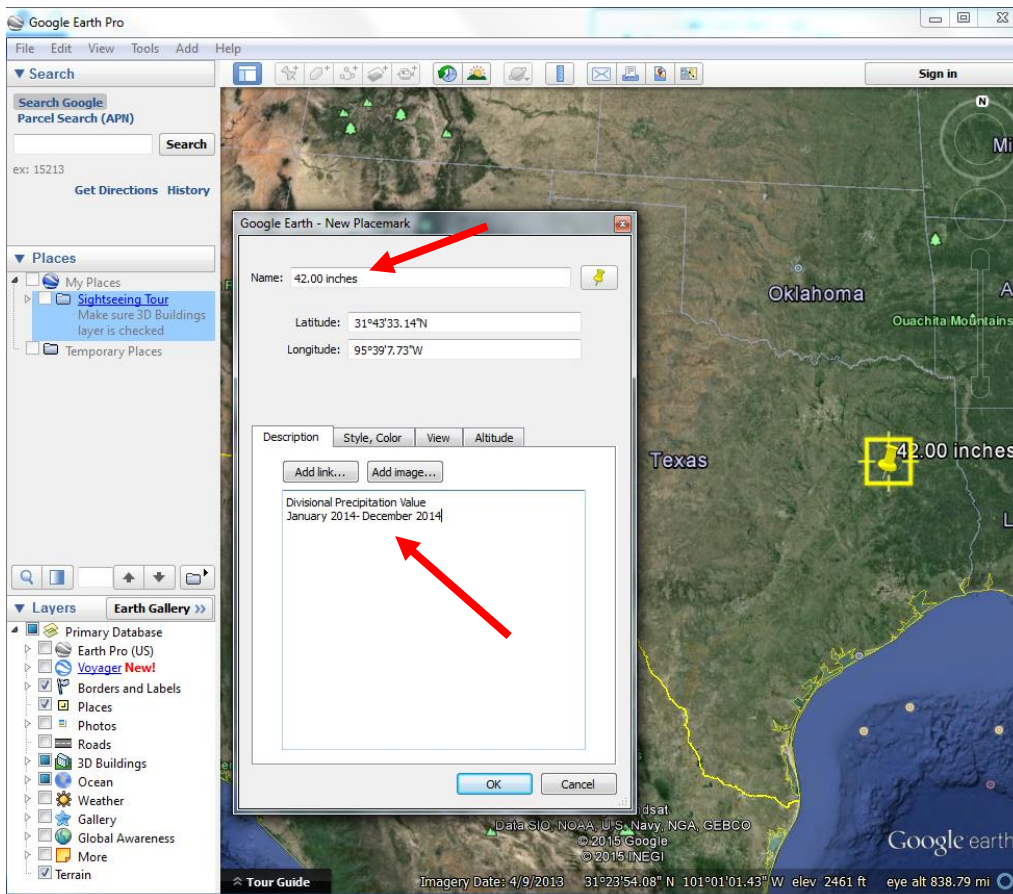
The “Climate at a Glance” map will be used in this tutorial for both average temperature and precipitation. The dates and other features can be adjusted to fit the user’s needs.

First, we will look at average annual precipitation values. Click on the “Precipitation” feature in the pane on the right. We will use data from January 2014 through December 2014. Uncheck the box in the pane on the right for “Single Month” (if it is checked when the page opens). Click on the calendar button to select the desired range of dates. (User may have to refresh the map after selecting the date range by clicking on the green circular arrow icon that appears next to the dates.) The “Area of Interest” will be set at “Divisional” in order to see more data points.

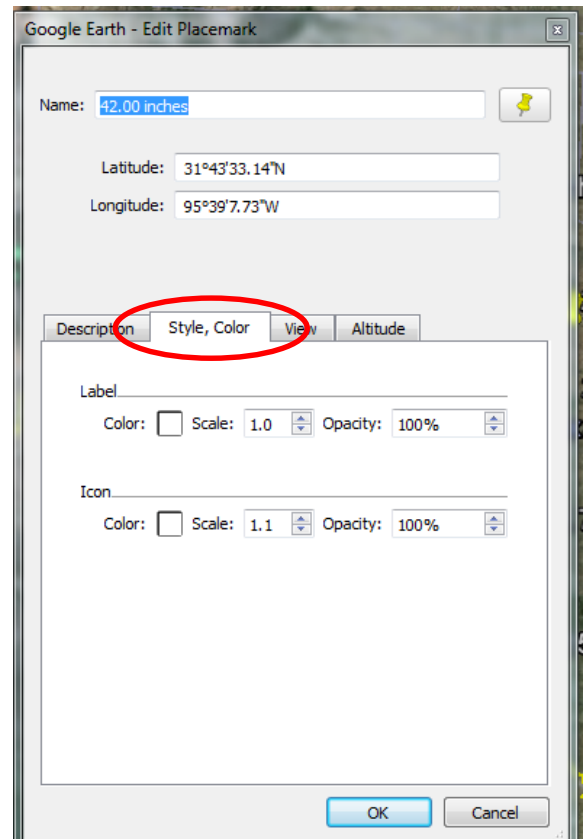
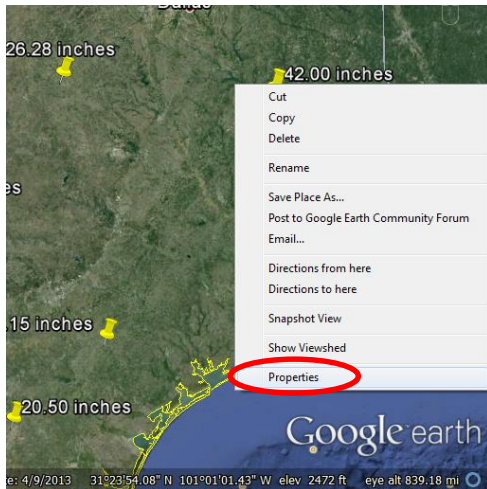




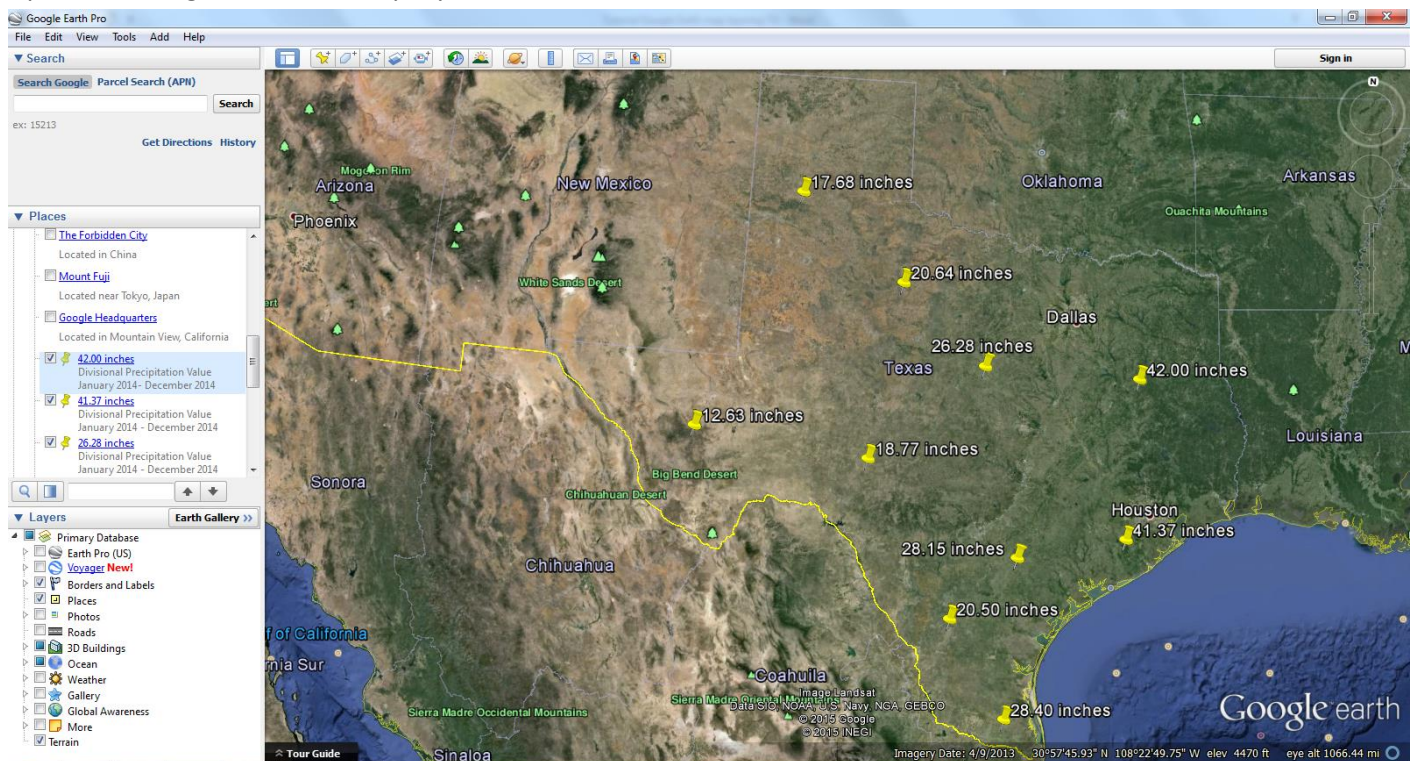
In the “Name” area of the window for the placemark, type in the data you would like to record. In the image below, you can see that the 2014 precipitation level of 42.00 inches was added to the eastern area of Texas. In the “Description” box, more detailed information can be added, such as “Average Temperature Jan. 2014-Dec. 2014.”



Note: By clicking on the “Style, Color” tab in the window for the new placemark, you may customize the colors for each placemark as they are added. Also, to edit the information of a placemark after it is set, simply right-click on the placemark directly (or in the “Places” area in the left pane on screen) and click on “Properties” listed in the menu that appears.



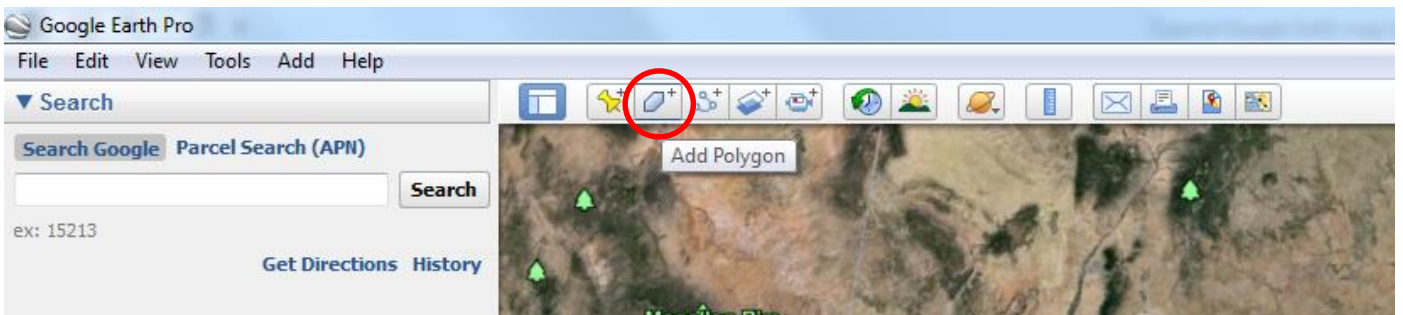
4. Proceed to do the same steps to continue adding the data points to your map. The image below shows data points added for precipitation. Note – these data points are all from the 2014 range. To help with analyzing the map later, adding data from multiple years is advised.



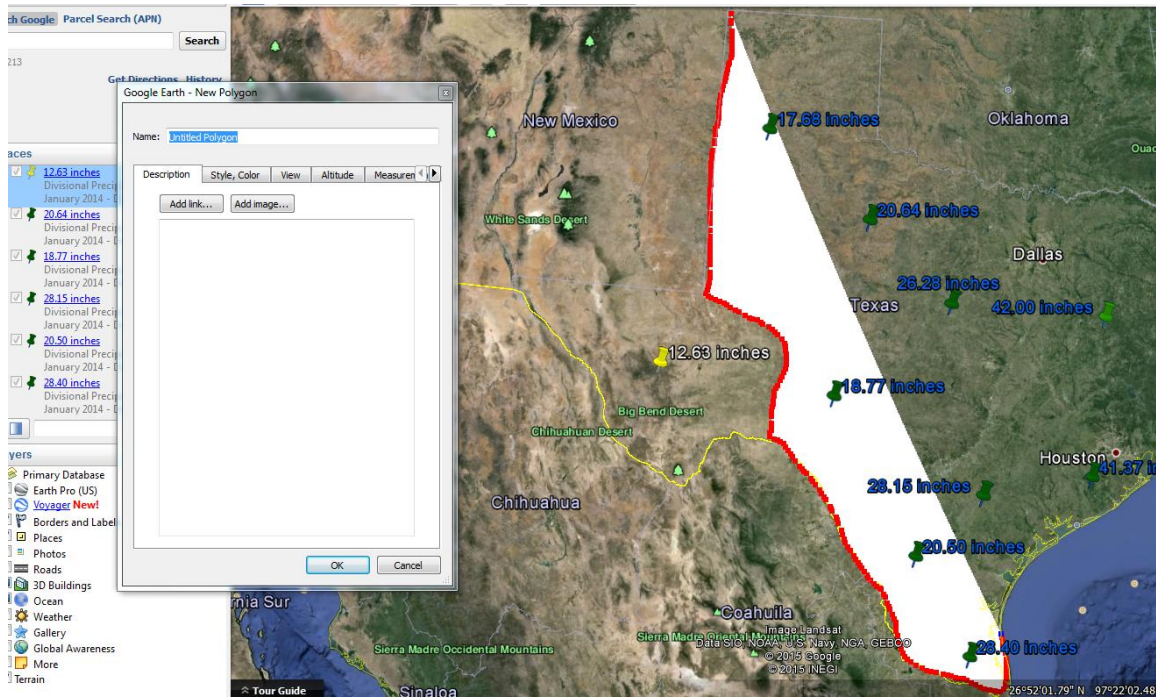
- Once all the precipitation data has been added to the map, create categories for rainfall-level groups. We will use the categories 0-5", 5.1-10", 10.1-15", and 15.1" plus (The teacher or students may decide on other rainfall-level categories). Color code the placemarkers based on the rainfall-level groups to be used. In the map below, see that all the data values that fall into the 15.1" plus category have been colored green/blue and the one data value that falls into the 10.1-15" category is yellow/white.



- Now layers (polygons) will be added to the map to illustrate the category range levels (decided by teacher or students) for the data to help visualize the variation in areas (e.g., Shading the color blue for areas in the rainfall-level 15" plus category). To do this, find the icon next to the placemark icon, which says "Add Polygon" when the cursor hovers over it (as seen in the image below).

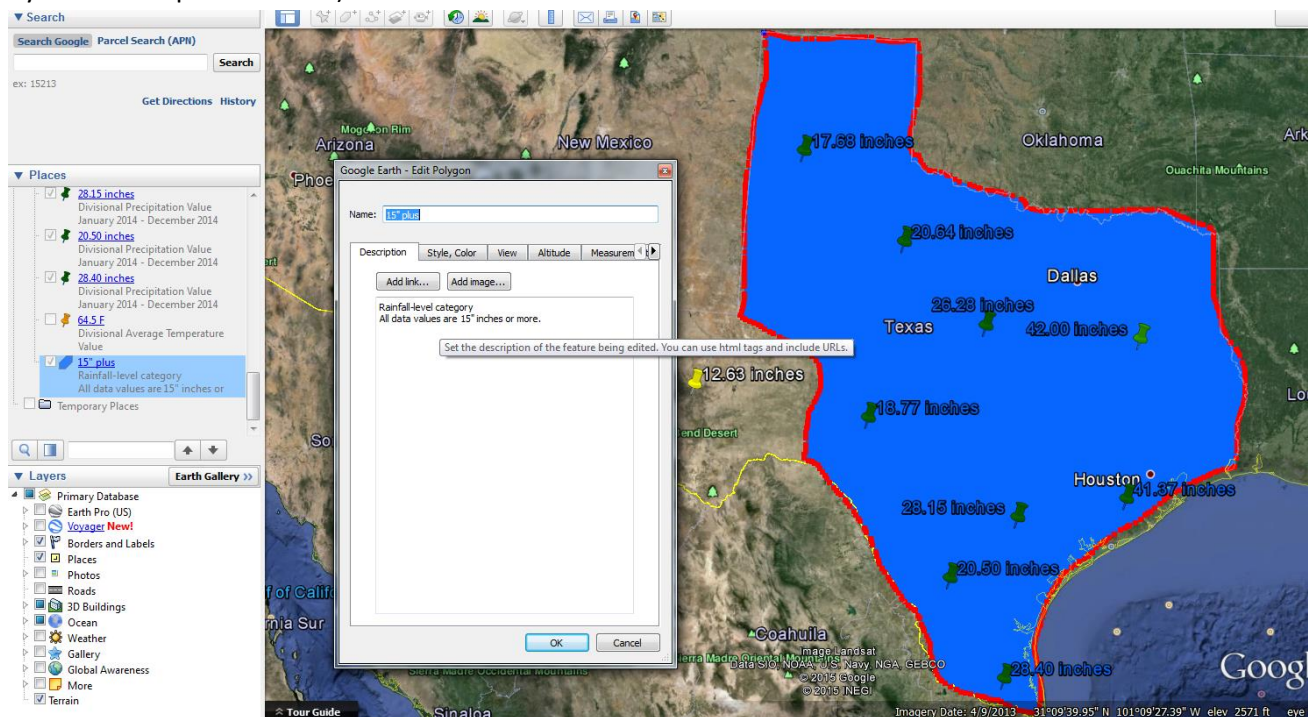


- Use the cursor to draw the polygon delineating the areas of the map that fall into the different rainfall-level categories. The image below shows the first polygon as it is being drawn.

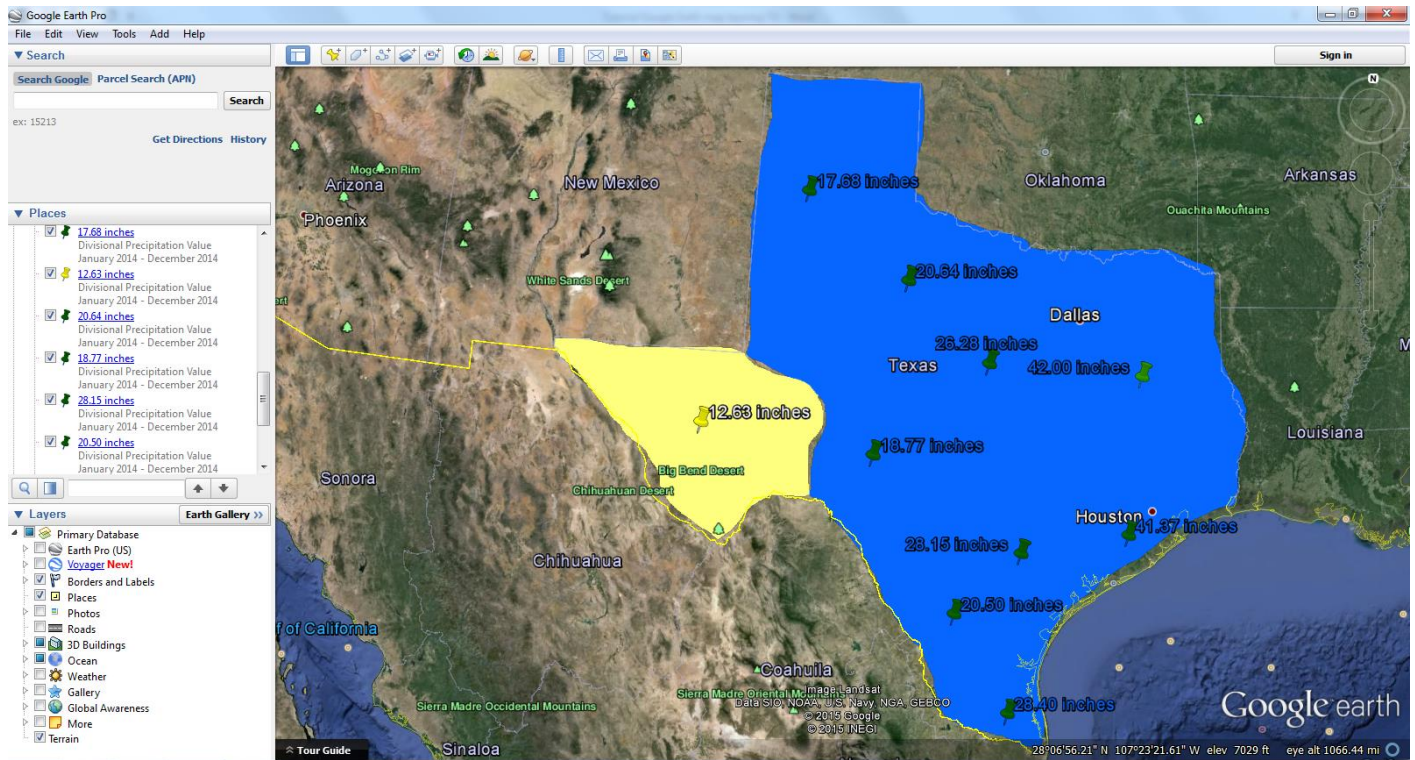


8. Use the “Name” box to label the polygon. Fill in the “Description” box with any related information. Use the “Style, Color” tab to change the colors of the polygon. See image below to see the 15” plus polygon added to the map.

Note: The red outline is only visible while editing the polygon. To edit the polygon after it is saved, simply right click on the polygon either on the map directly or in the “Places” area of the pane at the left of the screen (same way to edit the placemarkers).

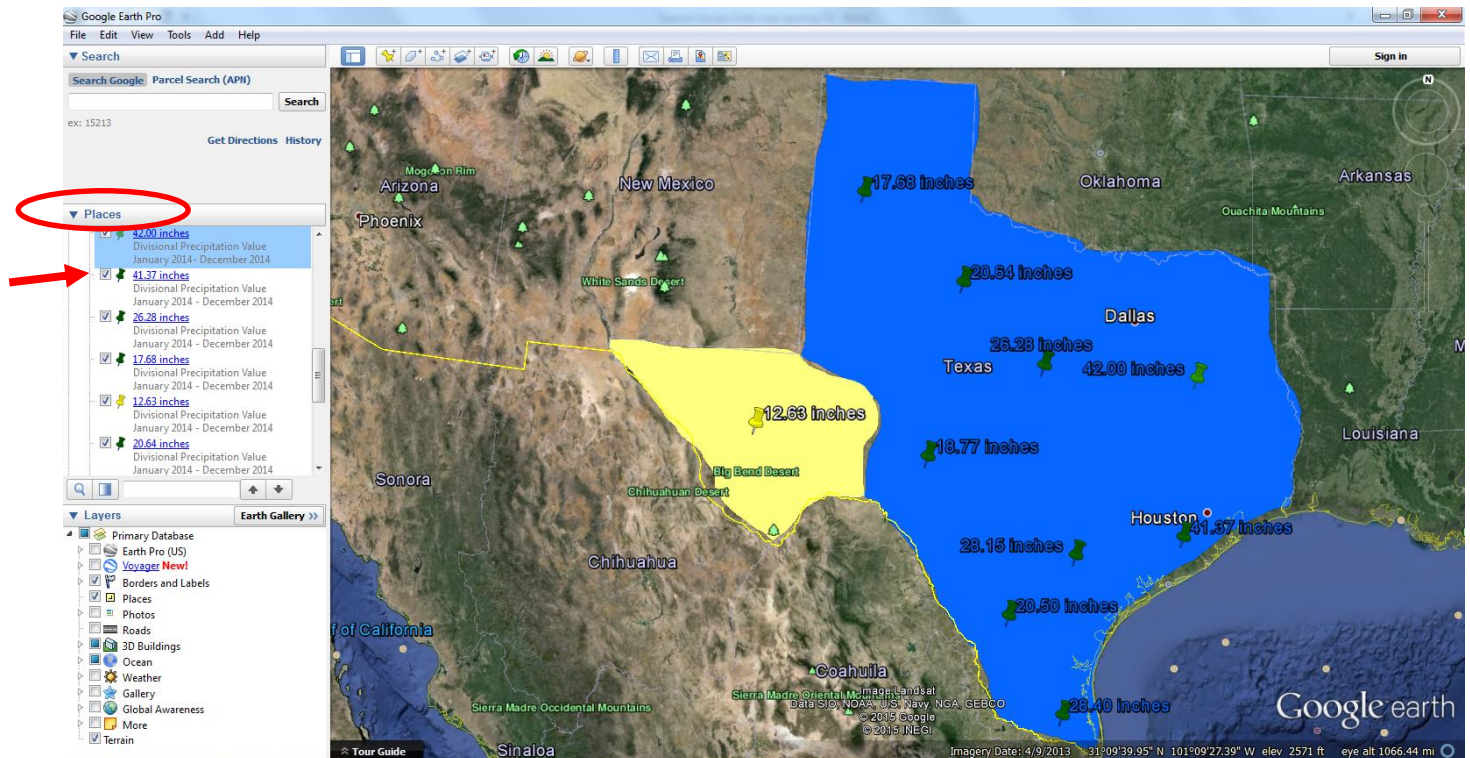


9. Continue to add the rest of the polygons for the rainfall-level categories to the map in the same way.

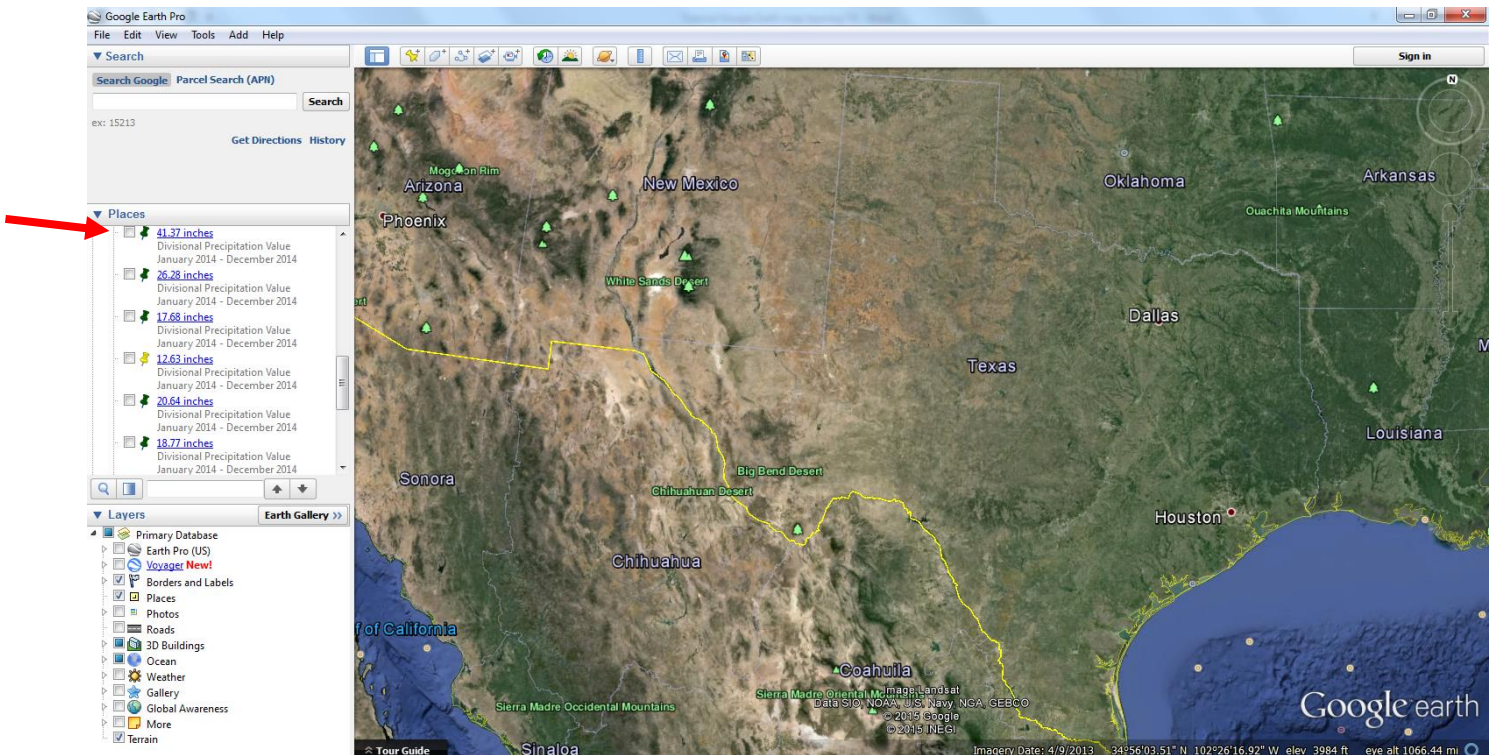


Note: The layers of data added to the map may seem overwhelming when viewed all at once after you continue to add to the map. Each layer can be removed from view or added to the view by checking or unchecking the box for the item in the “Places” sidebar area.

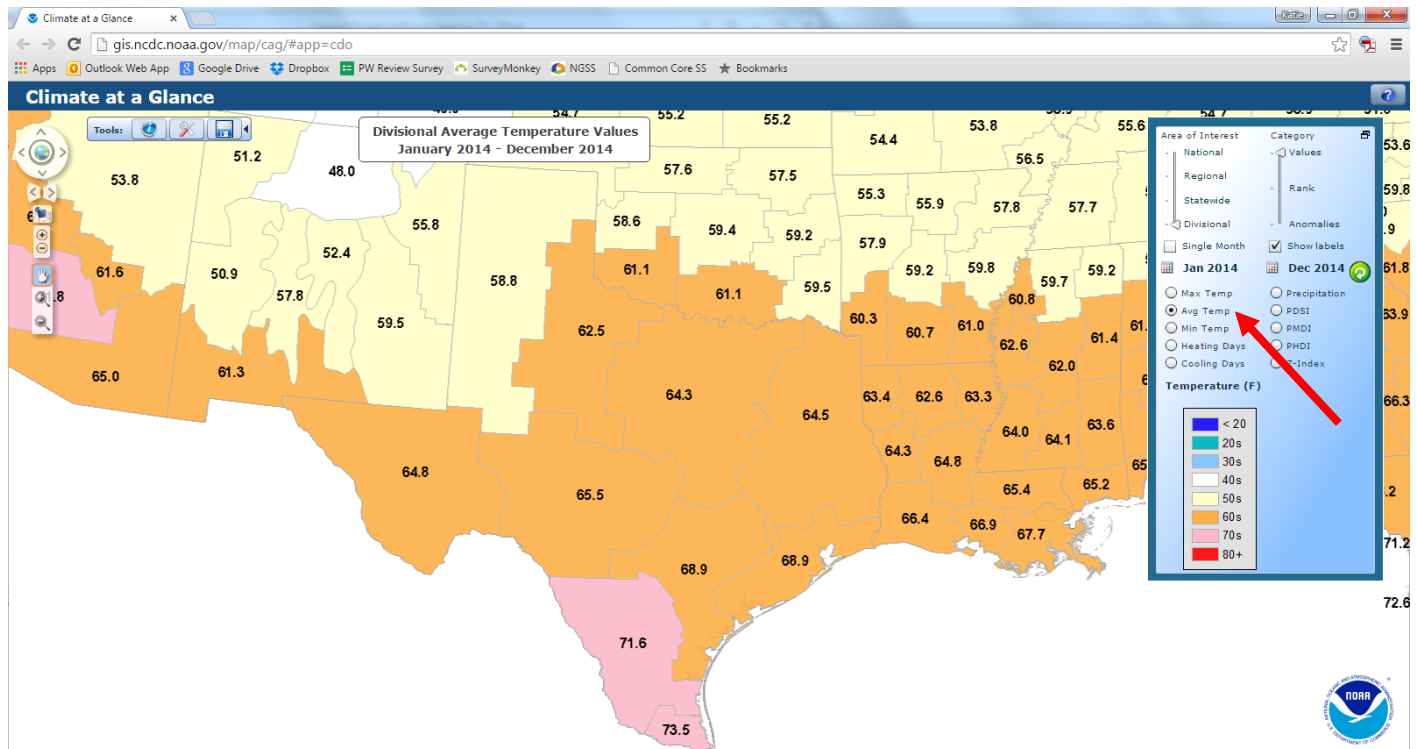
Before proceeding to add the temperature data, the user may wish to hide the precipitation data from view to decrease distraction while adding more data. All data is stored and easily returned to view on the map. Notice the “Places” area in the pane on the left of the screen (circled in red below). All the data (placemarkers, polygons, etc.) added to the map are listed here.



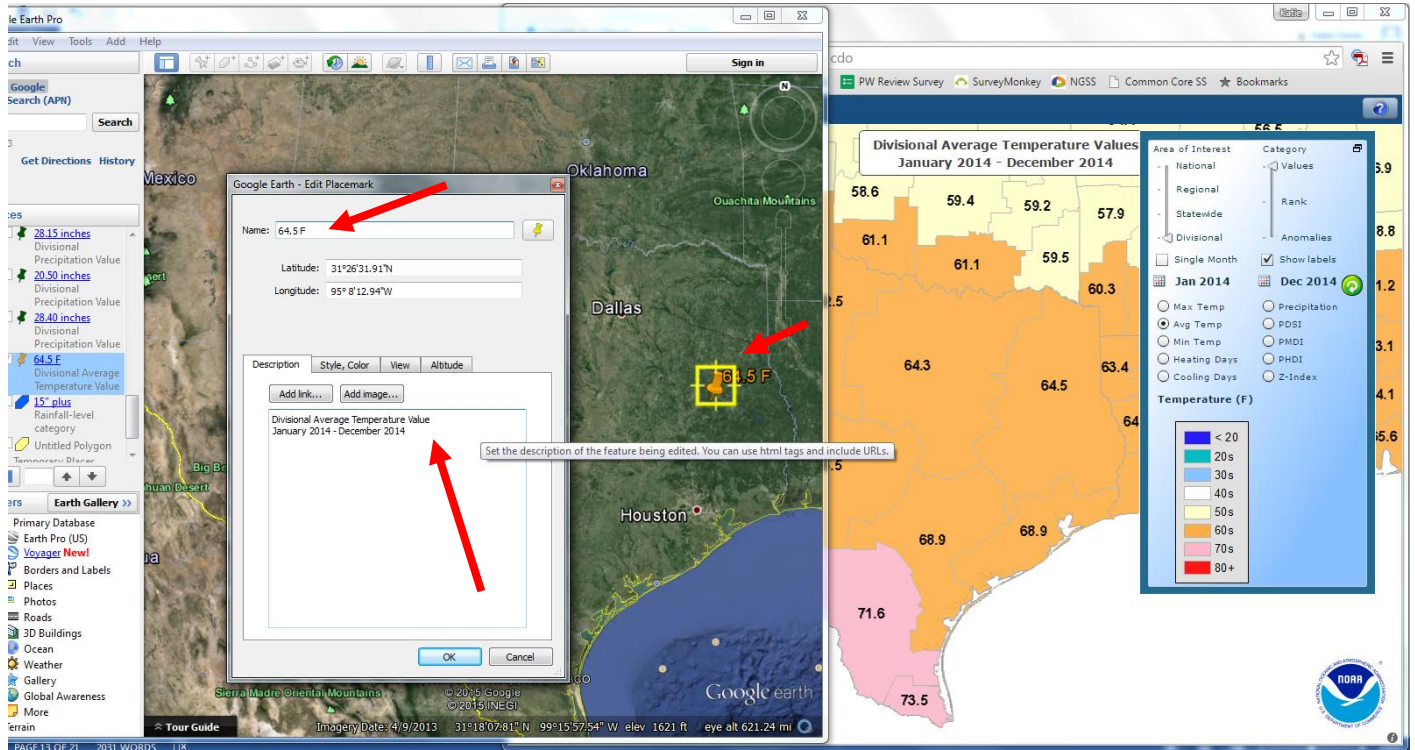
When the boxes next to each placemaker or polygon in this list is checked, it is visible on the map. Uncheck the boxes at any time to remove the item from view on the map. See image below – all boxes are unchecked, none are visible on the map.



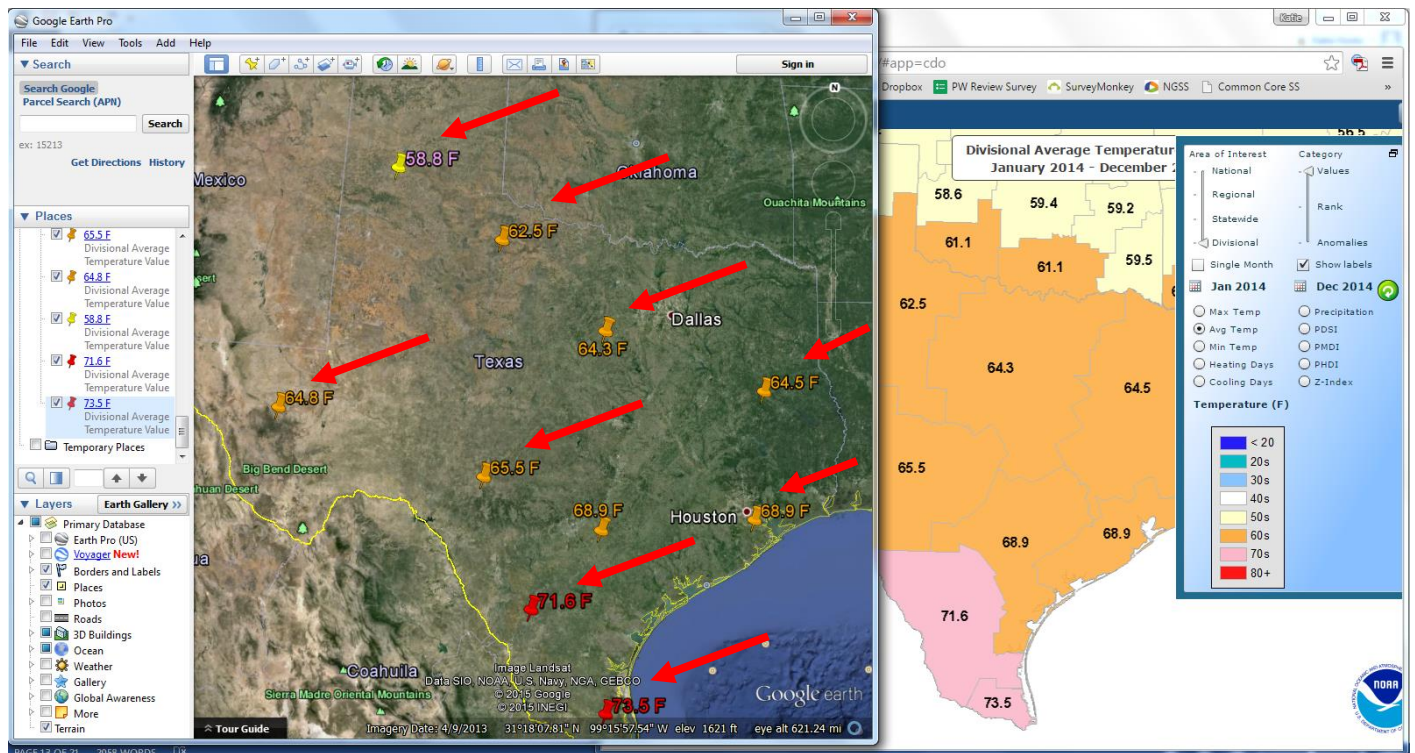
10. Now the average temperature data will be added to the map. We will continue to use the “Climate at a Glance” map (<http://gis.ncdc.noaa.gov/map/cag/#app=cdo>). Click to select the “Avg Temp” feature in the pane on the right. The map should change to show the temperature values like the image below.



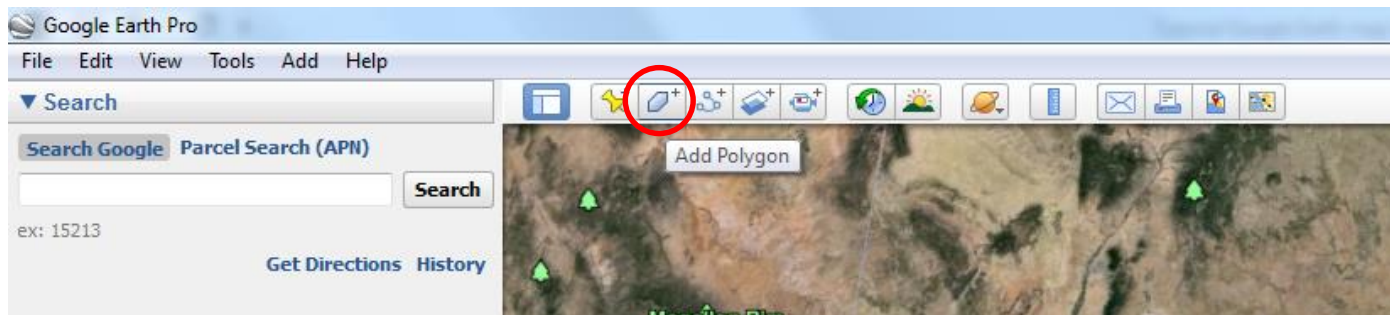
- In the same way the precipitation values were added earlier, use the “Add Placemark” icon to add each temperature data value to the Google Earth map. As the temperature data points are added, edit the “Style, Color” for each for ease in viewing and distinguishing between the precipitation values added earlier.



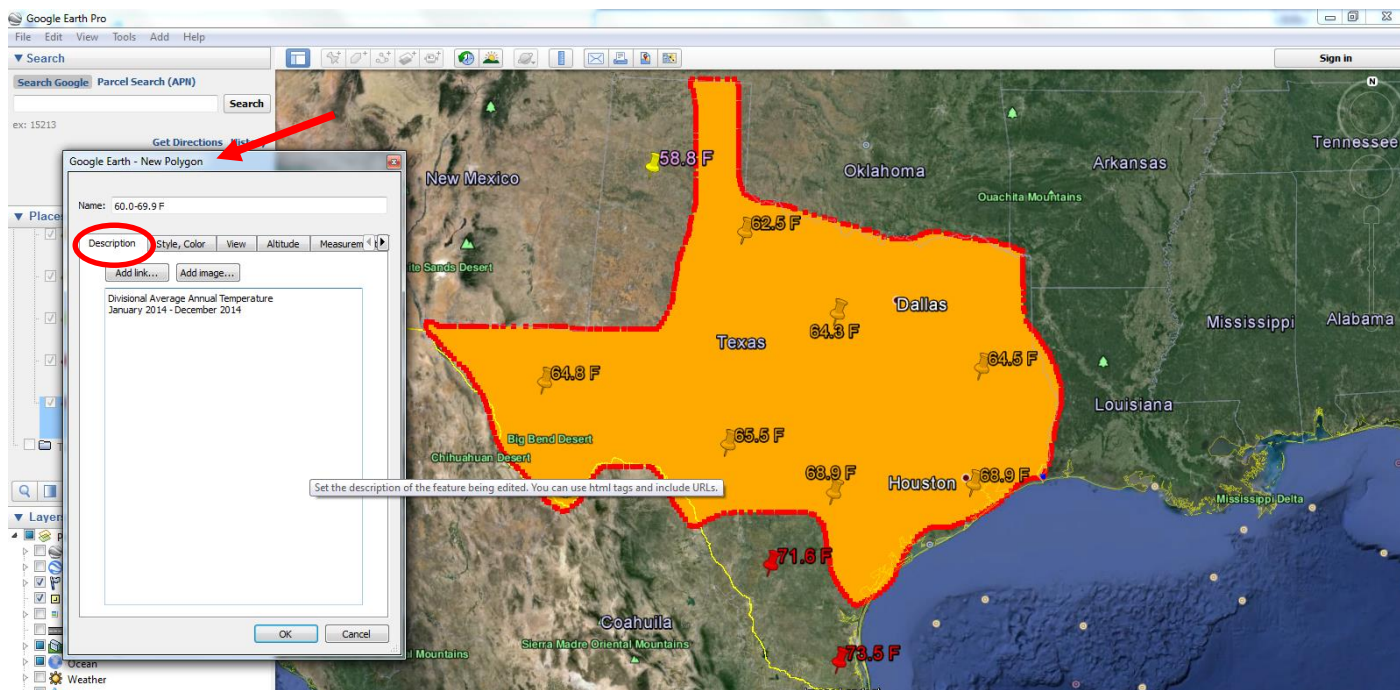
In the image below, all the average temperature values have been added to the map as placemarkers. The color coding is based on temperature categories of 50.0-59.9°F, 60.0-69.9°F, and 70.0-79.9°F.



12. Now the map can be blocked off based on the category range levels (decided by teacher or students) for the data to help visualize the variation in areas (e.g., Shading the color orange for areas with average temperature of 60.0-69.9° F). To do this, find the icon next to the placemark icon that says “Add Polygon” when the cursor hovers over it (as seen in the image below).

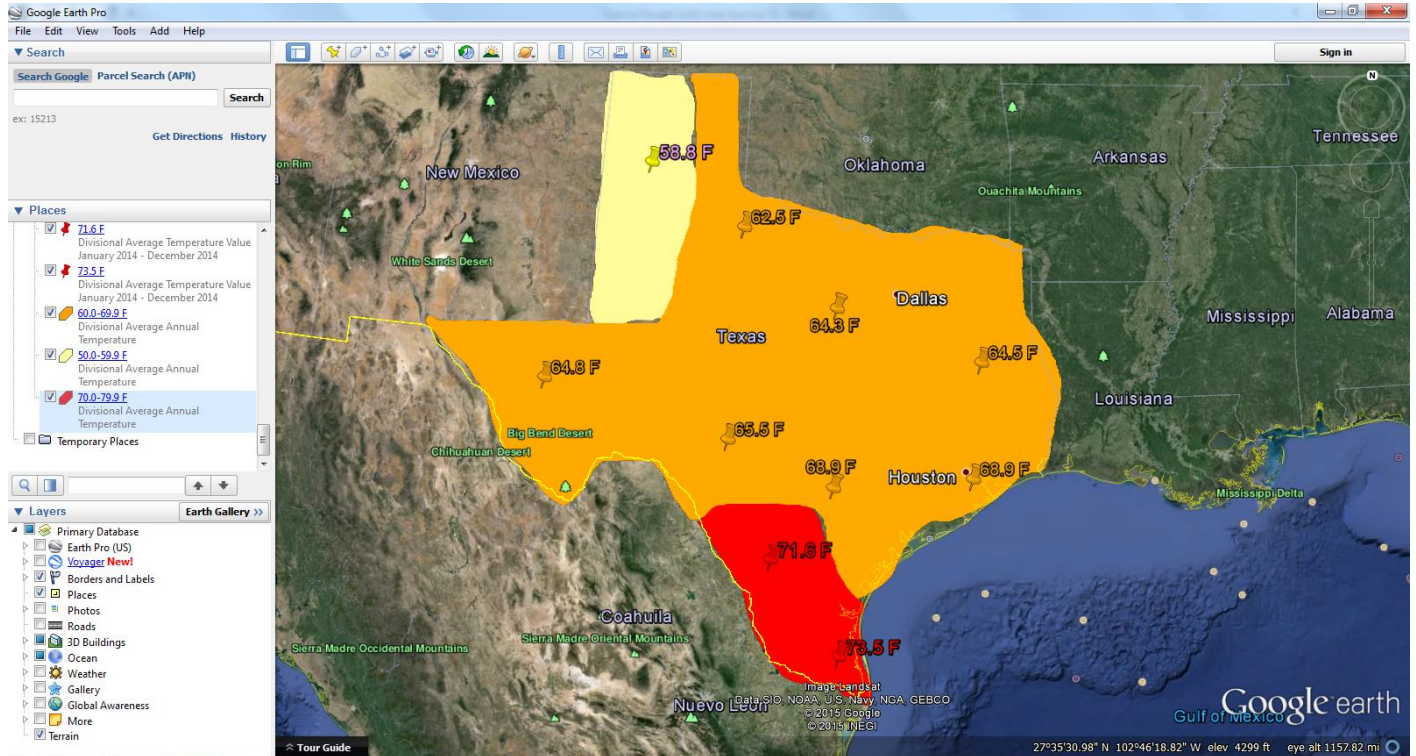


Once the icon is clicked, a new window pops up titled “Google Earth – New Polygon.” While the window is open, use the cursor to draw the polygon shape over the area you would like to mark. The image below shows the first polygon added to the map that marks the area where there is an average temperature range of 60.0-69.9° F for the year 2014. Go through the same steps to add polygons marking the other temperature areas.

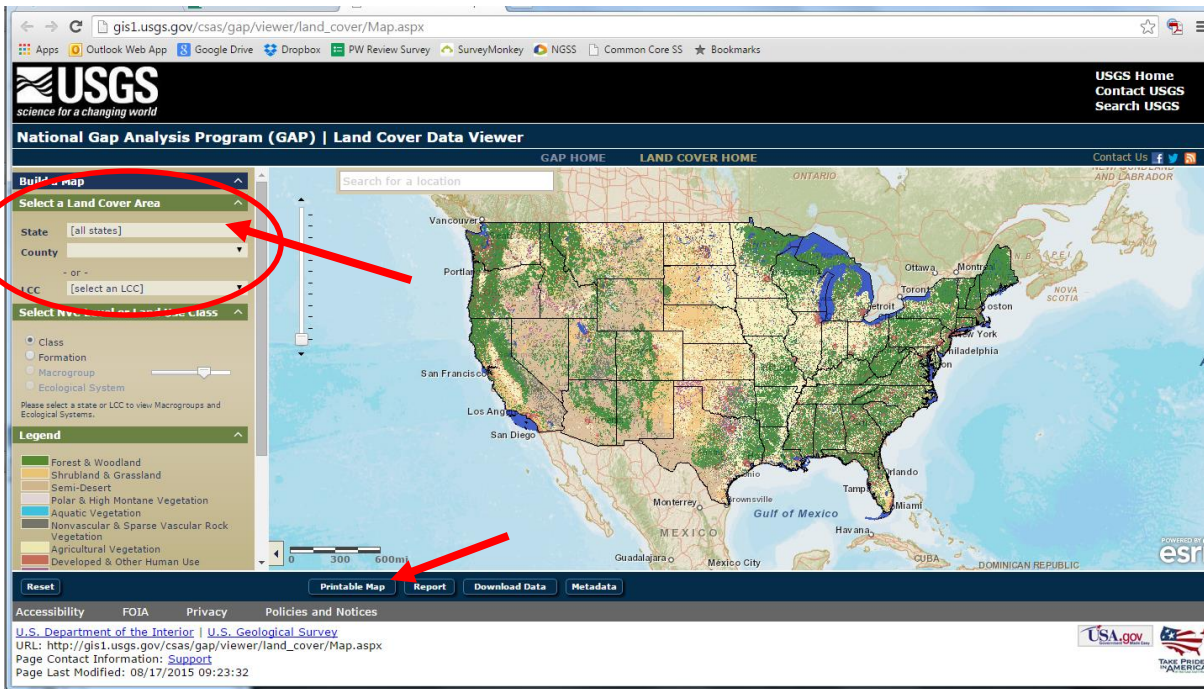


The information about the polygon can be added into the window (as was done when adding the placemarks in the early steps of the tutorial). The color of the polygon can be changed by clicking on the “Style, Color” tab within the popup window (marked by the red circle in the image).

The image below shows the polygons added for the average temperature ranges in Texas for the year 2014.



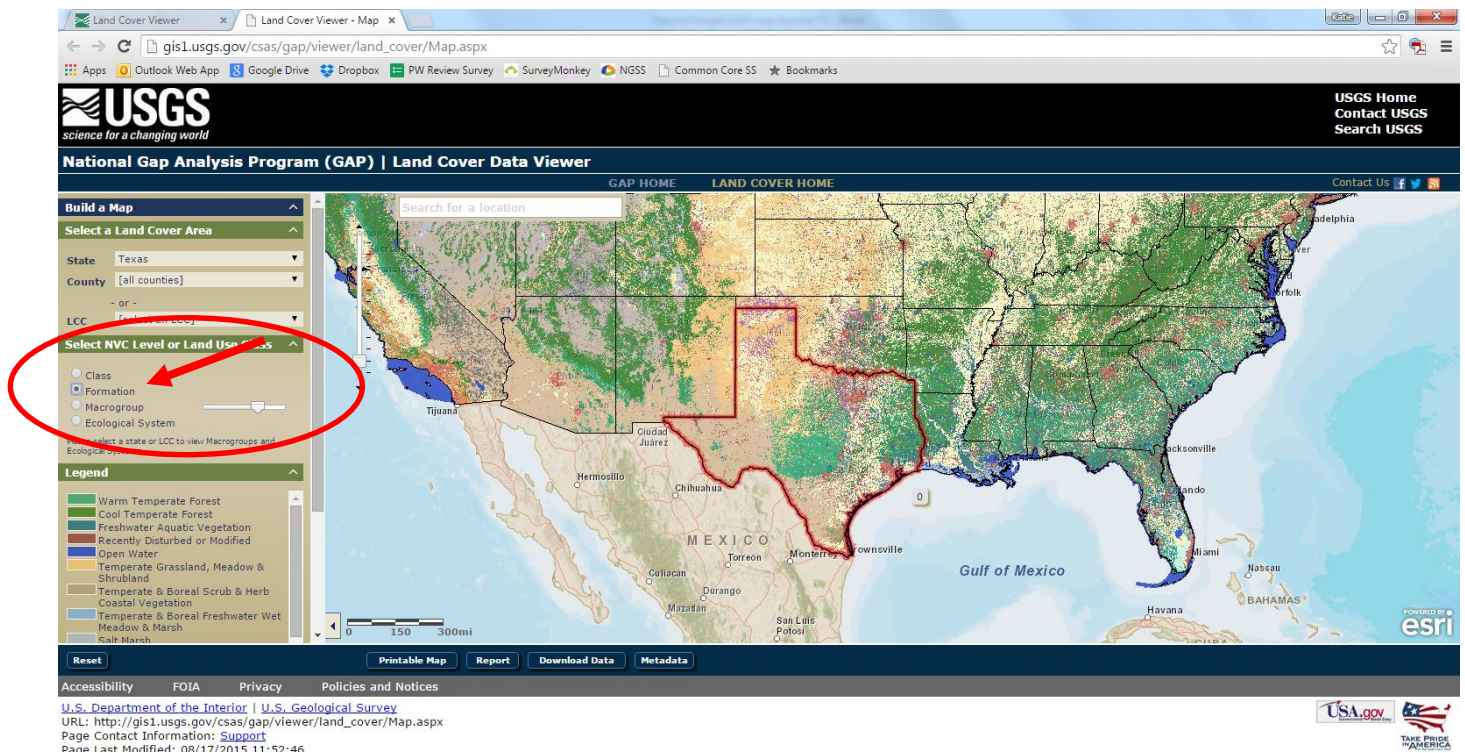
13. Now the vegetation data can be added to the map. Access a map or database on vegetation. The USGS National Gap Analysis Program provides the Land Cover Data Viewer, which is a great resource for vegetation information. The “Land Cover Data Viewer” (<http://gapanalysis.usgs.gov/gaplandcover/viewer/>), which will be used to gather the vegetation data in this tutorial, can be launched from the link provided above. Once the page loads, click on the “Launch Land Cover Viewer” button to open the interactive map (circled in red below).



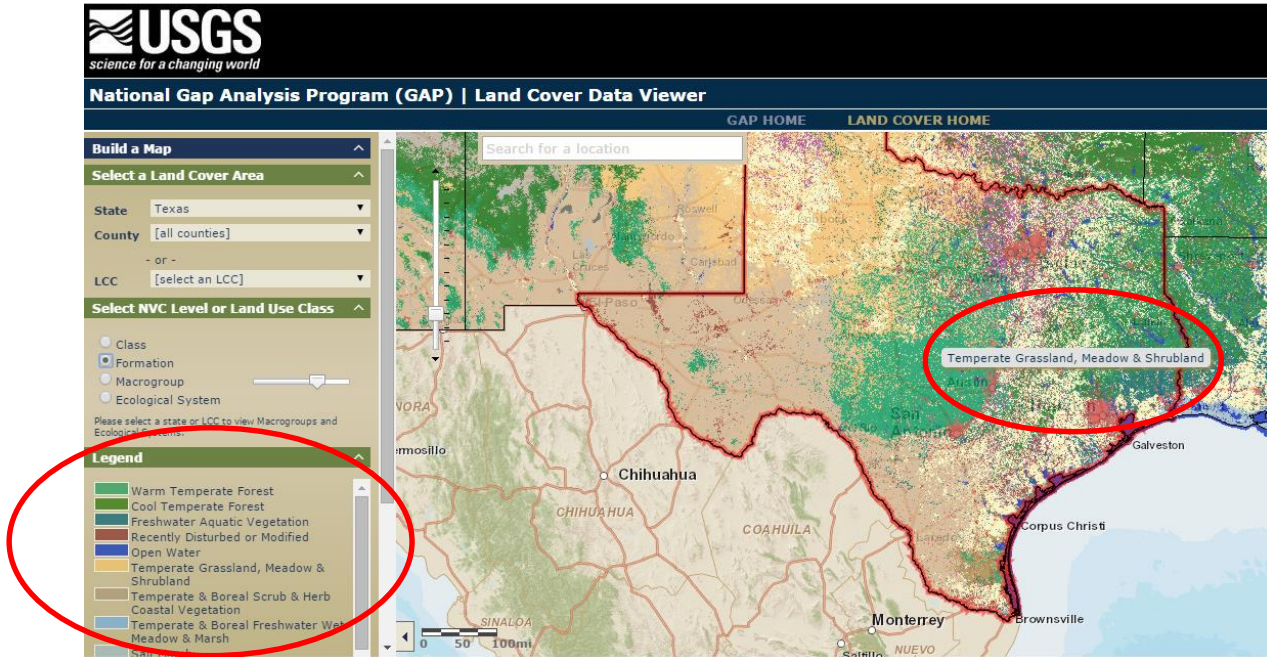
Use your mouse to click and drag to zoom in on your area of interest. In the pane on the left of the screen, notice the box titled “Select a Land Cover Area.” Use the drop-down feature to select a specific state.

Note: Once a state is selected by this feature, the user may also click on the “Printable Map” button to print off a hard copy.

As you can see in the image below, we have set the *NVC Level or Land Use Class* to “Formation,” which changes the type of information shown on the map and the legend to more specific information about the vegetation type.



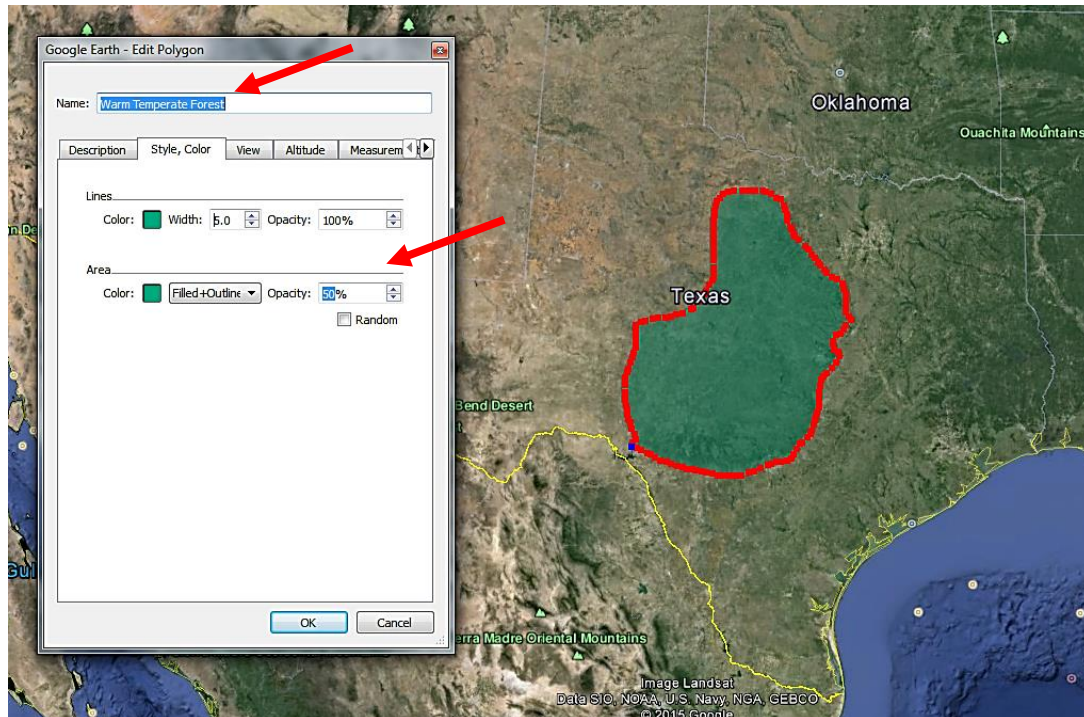
When the cursor hovers over an area, a box stating the type of vegetation in that area appears (as seen in the image below). Note how the color of an area corresponds to the Legend information.



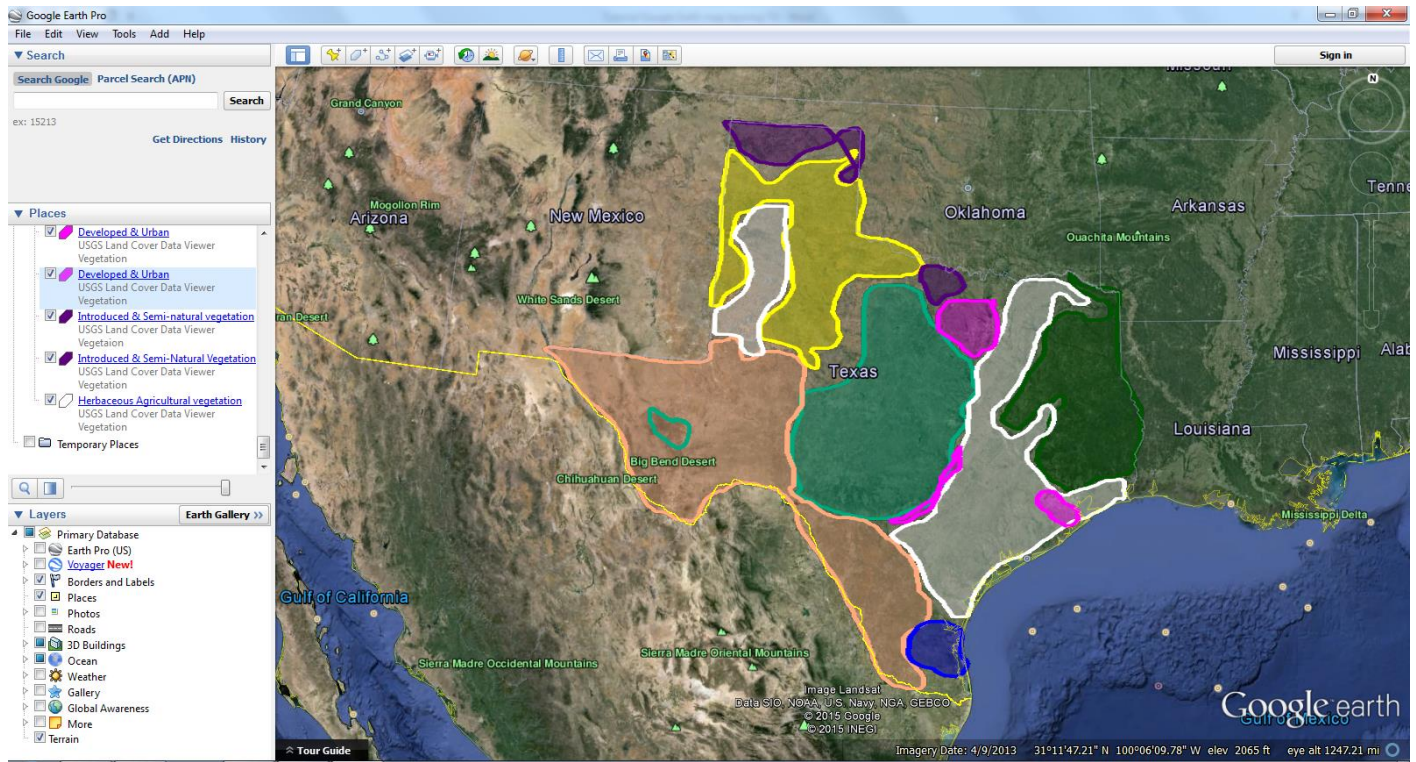
14. Use this information to create polygons marking the various vegetation types found in the state/region.

The Land Cover Data Viewer can zoom in to view close local areas, depending on how detailed the teacher/students would like to be in adding their polygon data.

In this tutorial, we will block off broad areas of the state of Texas. The image below shows the polygon of the area for “Warm Temperate Forest” being added. The appearance of this polygon is set to have a green outline with the area filled in with an Opacity of 50%. You may choose whatever “Style, Color” options preferred. (Notice the other polygon layers added previously have been unchecked for now to have a clear view of the map.)

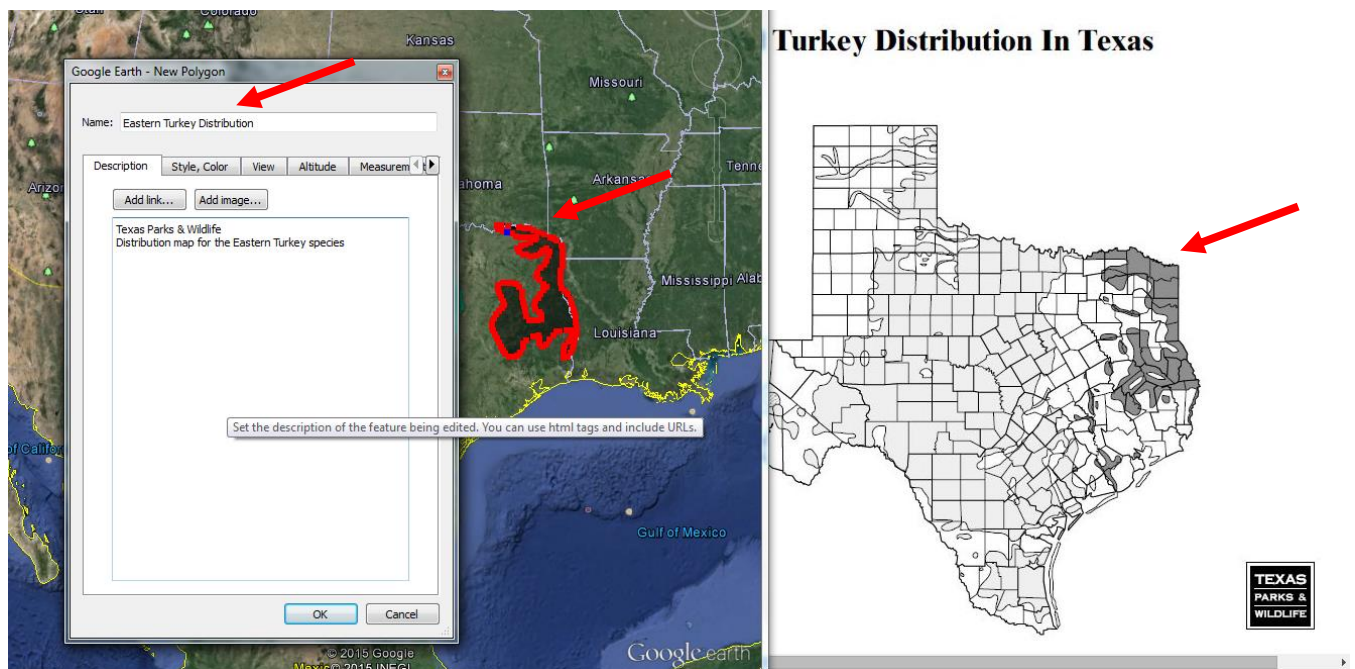


Proceed to add the other polygons for each vegetation type. Label and color code each vegetation type.



15. The next step is to add the range distributions of wildlife (chosen by students/teacher). You may find range distributions through multiple resources (online, field guides, etc.). Once you have a map of a species' distribution, you will go through the same steps of adding a polygon to mark the area on your map.

The image below shows a black polygon added for the distribution of the Eastern Turkey (subspecies of Wild Turkey) in Texas.



16. Continue to add as much data to your map as you would like/need. Once an adequate amount of data has been added to the map, students can begin to analyze the data.

Remember the purpose of this tutorial is to illustrate the basic steps of how to add the data to a digital map.