Georeferencing Protocol
Robert K. Godfrey Herbarium
Florida State University

Introduction

Virtually all specimens in the Robert K. Godfrey Herbarium contain important geographic information, ranging from the names of places and special geographic units, to roads, ordinal directions, counties, states, countries, and sometimes the latitude and longitude associated with the point of collection. Some of these label data, such as latitude/longitude coordinates, are precise; other data are more general. When available, these data allow herbarium users to derive a sense of where a specimen originated as well as provide important information about a species' geographic and ecological ranges. Unfortunately, much of this valuable label data is not currently recorded in the herbarium database in a way that allows precise and efficient searching or mapping. The challenge in this exercise is to convert the textual localities described on herbarium labels into sets of latitude/longitude coordinates. You will be using the online application Geolocate to achieve this goal.

All of the points that you will be asked to georeference lie within or closely adjacent to the Apalachicola National Forest, which is located in the central part of the Florida panhandle, centered on the villages of Sumatra and Wilma, and traversed by highways 65 and 379.

You will receive an Excel spreadsheet with 16 records that need to be georeferenced. Instructions for using this spreadsheet are found at the end of this document. Before following these instructions, it is advisable to familiarize yourself with the Geolocate website. The following link provides additional information about using GeoLocate: http://www.museum.tulane.edu/geolocate/default.html. Review this page and the available video. After you complete this introduction, navigate to: http://www.museum.tulane.edu/geolocate/web/webcomgeoref.aspx and explore the following Geolocate features.

If you experience difficulties, send e-mail to gil.idigbio@gmail.com.

Geolocate Features

Loading map layers
GeoLocate includes several helpful map layers. To access and load these layers, click on the + near the top, right-hand side of the map window. Experiment by selecting varying map layers. Some are better for roads, some for terrain, some for habitat, others for geographic features like rivers and lakes. Bing Hybrid is especially useful for national forest road numbers, which are particularly important for the locality strings you will be georeferencing. Don't forget to try different layers with each locality as you georeference. Sometimes exploring several layers is required. To hide the list of layers, click the – sign at the top right of the layer list.

Expanding the screen

The square at the extreme top right of the map window allows you to expand the screen to the full monitor. This can be helpful when zoomed-in or when attempting to measure distance. You will note that the locality string is hidden when the map is zoomed-in. Click the same square to return the screen to normal.

Zooming and panning
The icons at the top left of the map window allow you to pan (up, down, right, left) or zoom in or out. You can accomplish the same functionality by using the mouse. Clicking and holding the left mouse button allows panning. The mouse wheel allows zooming. **Tip:** It is best to roll the mouse wheel one click at a time, otherwise you will zoon in too quickly and lose your place on the map.

Marking a spot
To mark a spot on the map, click the *Place marker* radio button below the map, then click on the screen at the point you want to place the marker. A green dot will appear, along with a balloon showing the latitude and longitude of this spot. To move the mark, close the balloon, position the mouse pointer over the dot, depress the left mouse button, and drag the dot to its new location. This marking and dragging process will be your chief method for arriving at a georeferenced point. **Note:** In most instances, as you georeference from your spreadsheet, green and red dots will appear on your map automatically. You may drag these dots to a location to achieve the same effect as *Place marker*. You will also note that the latitude and longitude values in the pane below the map are updated to match the new location. These values are important in the instructions below.

Measuring
Many locality descriptions will include cardinal directions and distances, as "2.2 m ESE of jct SR 267 and SR 20," which can be interpreted to mean 2.2 miles east–southeast of the point where SR 267 diverges from SR 20. You can use the green dot and the measuring tool to mark a more exact location. To measure the distance between two points, click the *Measure* radio button in the pane below the map window. The cursor will now display as a white square. Place the square at the origin of the intended measurement and click the left mouse button and release it. Move the cursor the desired distance, to a known end point, or to the point where road direction changes. To follow a curvy road, click once at each change of direction, then drag in the desired direction. The measured distance is shown with the cursor as you move the mouse. At the appropriate distance or known terminus, double click the mouse to stop measuring. You can then move the green dot to this new location.

Saving Your Point
Once you are confident that the green dot is positioned in a location that reasonably matches the spot referenced in the locality description, you will highlight and copy the latitude and longitude values displayed in the pane below the map to the appropriate row and columns on your spreadsheet.

Georeferencing Instructions

The spreadsheet contains 10 columns. Column J is a hyperlink to the Geolocate website. Columns H and I will receive the latitude and longitude values after you have georeferenced the locality.

To georeference a locality, close your browser and execute the following steps:

1. Click the Georef Me! link in column H of the next record to be georeferenced. This will load your browser and navigate to the Geolocate website.
2. With the Geolocate website active, click the Georeference button (left side of screen below the map). This will place one or more green or red dots on your map. **Note:** Although Geolocate attempts to put the green dot close to or at the location described in the locality string, with red dots at reasonable alternate locations, it is not always successful. On occasion, dots may be located at great distances from the Apalachicola National Forest. Or, a red dot may be closer to the correct location than a green dot. It is up to you to place the final green dot at a place that in your judgment best represents the location described in the locality string.
3. Activate the Bing Hybrid map layer (you may also use other map layers as you see fit).
4. Center and zoom into the green dot until road numbers and names become visible.
5. Carefully read the locality description in the Locality String field located below the map.
6. Pan and zoom the map as needed to search for the described location. You may also find it helpful to use Google Search or Google Maps to search for place names, roads, etc., then find corresponding sites on Geolocate.
7. If measurements are included in the locality string, you may find the measurement tool (click the *Measure* radio button) helpful to estimate distance from known locations.
8. When you have determined what you believe to be the most reasonable estimate of the described location, drag the nearest green or red dot to that location, or click the *Place marker* radio button below the map, then click on the map at your determined location.
9. With the green dot remaining at your selected point, highlight and copy the latitude and longitude values to Columns H and I of your spreadsheet. **Tip:** If you highlight the latitude and longitude values as a single unit, copy, place the cursor in the correct cell in column H, and paste, the values will be parsed into the two columns automatically.
10. Save your spreadsheet.
11. Close your browser (not just the Geolocate tab, the entire browser), move to the next record in your spreadsheet, start over with step 1. **Tip:** Not closing your browser after each point is georeferenced sometimes overloads Geolocate, making it extremely slow to respond.

Close your spreadsheet and rename it to the username portion of your e-mail address. For example, if your e-mail address is abc123@fsu.edu, name your spreadsheet abc123. Submit your completed spreadsheet by e-mailing it to gil.idigbio@gmail.com.