

A Spring Survey of the Native Wildflowers of Snowville, Virginia

Anthony Phillips
HORT 4994 – Undergraduate Research
Virginia Polytechnic Institute & State University
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Abstract

With an ever-increasing threat of Global Warming, dramatic changes in the distribution and range of the nation's flora and fauna are a real possibility. Many mammals and birds have the ability to migrate seasonally and thus may have a better opportunity to reestablish their population elsewhere; however, plants require decades even centuries to relocate to a suitable habitat. This could pose a problem as research indicates that temperatures will increase several degrees centigrade by 2050 sending our native plants into shock and potentially resulting in extinction for some species.

This research is an effort to document many of the spring and early summer flowering plants found near Snowville, Virginia in the year 2010. Emphasis is placed on the native wildflowers, such as those in, but not limited to, the families: *Ranunculaceae*, *Compositae*, *Geraniaceae*, *Iridaceae*, *Orchidaceae*, and *Violaceae*. Less of an interest will be placed on nomenclature and botanical research; rather the focus for each individual species will be:

- positive identification,
- accurate spatial location and representation,
- and detailed documentation, including photographs.

This paper will explain, in detail, how the project was completed and will provide instructions on how to use ESRI's ArcView software.

Introduction

The community of Snowville is located in southeastern Pulaski County in the Commonwealth of Virginia at roughly 37° 1' 57"N, 80° 33' 40"W. Situated along Little River, the village itself was established in August of 1850 and is bounded to the north by Claytor Lake and to the south by High Knoll and Bench mountains. The regional climate is characterized by average winter temperatures in the 30s and 40s (degrees Fahrenheit) and average summer temperatures in the 70s and 80s. Snowfall amounts average between twelve and twenty-four inches per year with total precipitation amounts near forty inches annually.

Field Work

Field work began by determining the extent of the survey area using topographic maps and aerial photos. Areas from the Montgomery-Pulaski county line west to Lowman's Ferry Bridge (Route 672) and from Claytor Lake south to Bench Mountain were designated as "Snowville." Using an All-Terrain Vehicle (ATV), as well as a Sport Utility Vehicle (SUV) and simple hiking, wildflowers were located, identified, and spatially tagged using a Global Positioning System (GPS) unit. The following were necessary for field work:

- Field guide
- Digital camera
- Tripod for camera stability
- GPS unit
- Notebook and pen.

Field work occurred two to three times each week, usually on weekends, and lasted at least six hours per-outing. Once discovering a new species, identification was made using Newcomb's Wildflower Guide, by Lawrence Newcomb published in 1977. Next, several photographs were taken of the plant and its surroundings and each photograph's identification number was recorded alongside the species name. Finally, a GPS position was acquired which will be used in creating a unique spatial database of Snowville's wildflowers that links both location and digital pictures together.

Data

After completing all field work, GPS data was downloaded to a computer, as were all photographs and other associated notes. Next, each image was uploaded to the following directory online:

<http://www.wx4sno.com/botany/Images/>

These images will be available for the foreseeable future. The Google Earth file will be associated with this website and will link to individual images when necessary (see below). GPS data was imported into ExpertGPS, a software program associated with topographic maps and aerial photography. Once each wildflower location was loaded into the program, each was given a specific number/label to distinguish one from another. All locations have latitude and longitude data associated with them and many have elevation data. All this information was easily exported from ExpertGPS as a Comma-Separated (.csv) file type (which will be easy to import into ArcGIS). **Note: ExpertGPS is one of several programs that can download GPS data and export**

the results as a .csv file type. Any program that can read GPS data and export latitude/longitude data as a Comma-Separated file type will be fine.

The following are step-by-step directions to create both an ArcGIS map and Google KML file for wildflower locations and data. Some knowledge of ArcGIS and ArcMap will be necessary.

To import the latitude/longitude for each location as a point shapefile:

1. Click Tools>Add XY Data... and then select the .xls file that contains the GPS data.
 - 1.1. Make sure that the X Field contains the Longitude data, while the Y Field contains Latitude data.
2. Click Edit under the Coordinate System and then click Select>Geographic Coordinate System>World>WGS 1984.prj then click Add. Click OK.
3. Click OK to add the data as points to ArcMap.
4. There should now be points loaded in ArcMap. Each represents the location where data and photographs were taken for wildflowers.

To view the data for each location in a table format:

1. Under the ArcMap box Layers, right click the only file loaded and select Properties. Then rename to Wildflower_Locations next to Layer Name. Click OK.

2. Next, right click again on the file which now is named Wildflower_Locations and select Open Attribute Table.
3. You will now see a table that contains the following columns: FID, Shape *, Longitude, Latitude, Label, and Elevation.

3.1. Latitude and Longitude are in decimal degrees and elevation is in feet.

To add the plant name and images associated with each point:

1. Under the attributes of Wildflower_Locations, select Options>Add Field...
2. Next, name the field Species and make it a type Text with length 30. Click OK.
3. Repeat this step two more times to add fields named Image_1 and Image_2, both as type Text with lengths 50.

Now that we have a table that has everything we need to know about the locations for each species found, we can begin to add the scientific name of each flower for each point/label. We can also add the image file name associated with that species.

To modify cells within the attribute table for Wildflower_Locations:

1. Make sure the Editor toolbar and extension are running.
2. Click on Editor and then click Start Editing.
3. Now, open the attribute table for Wildflower_Locations and begin to edit each cell.

Each cell will have its own species name, as well as the image file name for two photographs taken of the wildflower. Once this is complete, we will be able to create a Google Earth KML file.

Download, install and create a Google KML file:

1. Download the ArcScript entitled *Export to KML* from here:
<http://arcscripts.esri.com/details.asp?dbid=14273>
2. Follow the instructions provided within the ZIP file to install the script. Make sure ArcGIS IS NOT running when you install.
 - 2.1. After successfully installing the script, follow the directions provided to activate the extension within ArcMap.
3. Now we're ready to create a Google Earth KML file. Click on the Google Earth icon that was loaded into ArcMap after the installation.
4. Under "Select the layer to export:" select Wildflower_Locations. Leave all other options blank.
5. Next click the Options tab on the right.
 - 5.1. Under Export Options, the Output KML layer name will be the name of the KML file you create. Change this as needed.
 - 5.2. Click the tab Labeling and Description Options. Under Select an attribute for naming each feature select "Species" since this is the name of each wildflower at each location. Under Feature description expression (HTML) include the following HTML code (an explanation of this basic coding style can be found online by doing a Google Search):

```
<b>Scientific Name:</b> <i>[Species]</i> <br/>
```

```
<b>Latitude:</b> [Latitude] <br/>
<b>Longitude:</b> [Longitude] <br/>
<b>Elevation:</b> [Elevation] feet <br/>
<br/>
<b>Image 1:</b> <a
href="http://www.wx4sno.com/botany/Images/[Image_1]">Image 1</a><br/>
<b>Image 2:</b> <a
href="http://www.wx4sno.com/botany/Images/[Image_2]">Image 2</a><br/>
```

5.3. Click OK to close the Export to KML (OPTIONS) menu.

5.4. Click OK to exit and simultaneously run the Export to Google Earth KML application.

5.5. You should receive a message asking to run the new KML file in Google Earth. Click OK to open Google Earth and the new file. You will see a map appear of the locations for each recorded wildflower. If you click on each icon at each location, the following data will appear:

Scientific Name: *[Species]*

Latitude: [Latitude]

Longitude: [Longitude]

Elevation: [Elevation] feet

Image 1: [Image 1](#)

Image 2: [Image 2](#)

5.6. That's it...your all done!

Results & Conclusion

The KML file created for this project is available online by pointing your browser to this location:

www.wx4sno.com/botany/Snowville_Wildflowers.kml

Save the file to your computer, then open Google Earth. After it has initialized, then drag-and-drop the Snowville Wildflowers.kml file into Google Earth. You should now see Google Earth re-zoom to the Snowville area in Pulaski County. You may now explore the data associated with each point.

The following is a tabular list of each species recorded between the months of March and June 2010 in Snowville, Virginia:

<i>Achillea millefolium</i>	<i>Hypoxis hirsuta</i>
<i>Anemone quinquefolia</i>	<i>Iris verna</i>
<i>Antennaria plantaginifolia</i>	<i>Lysimachia quadrifolia</i>
<i>Aquilegia canadensis</i>	<i>Mitella diphylla</i>
<i>Asclepias quadrifolia</i>	<i>Orchis spectabilis</i>
<i>Asclepias tuberosa</i>	<i>Pastinaca sativa</i>
<i>Barbarea vulgaris</i>	<i>Phlox paniculata</i>
<i>Cardamine concatenata</i>	<i>Polygala paucifolia</i>
<i>Chimaphila maculata</i>	<i>Porteranthus trifoliatus</i>
<i>Chrysogonum virginianum</i>	<i>Potentilla canadensis</i>
<i>Chrysopsis mariana</i>	<i>Prunella vulgaris</i>
<i>Clinopodium vulgare</i>	<i>Rudbeckia serotina</i>
<i>Convallaria majalis</i>	<i>Sanguinaria canadensis</i>
<i>Cypripedium acaule</i>	<i>Scutellaria elliptica</i>
<i>Dianthus armeria</i>	<i>Silene virginica</i>
<i>Galax urceolata</i>	<i>Thalictrum thalictroides</i>
<i>Geranium maculatum</i>	<i>Trillium grandiflorum</i>
<i>Glechoma hederacea</i>	<i>Triodanis perfoliata</i>
<i>Hepatica americana</i>	<i>Tussilago farfara</i>
<i>Hieracium venosum</i>	<i>Uvularia grandiflora</i>
<i>Houstonia caerulea</i>	<i>Uvularia sessilifolia</i>

Vicia cracca
Vinca minor
Viola pallens
Viola papilionacea
Viola pedata
Viola pubescens
Viola rostrata
Viola septentrionalis

*The following species are in alphabetical order by Genus.

There were 50 species found during this project; a far from complete list of the species found in Snowville, Virginia, but a beginning nonetheless. A more detailed, research-based study would be needed to further enhance this list and this draft report. Hopefully future research will be applied to this end. Please monitor the following websites to keep posted about future updates to this project and its data:

<http://www.wx4sno.com/>

<http://www.wx4sno.com/blog/>