Oconee Bell Distribution in Devil's Fork State Park, SC

Sunny Rae Granger

Abstract:
As part of an ongoing wildlife protection effort to preserve the Oconee Bell Wildflower in Devil's Fork State Park, my GIS project consists of a detailed history of the plant and its location within this area. The park is located in what is called the Jocassee Gorges of South Carolina. Over ninety percent of the world's population of the Oconee Bell wildflower resides within this area. Visitors can view this rare species on two walking trails: the Oconee Bell Nature trail, and the Bear Cove trail. By using geographical information systems, I have collected GPS coordinates of the flower's locations along the trails and mapped them on a recent aerial photo of Devil's Fork State Park. This data will be helpful in creating kiosks and visitor information centers that will inform those who come to the park of the Oconee Bell's importance. Also, the park is in need of an up-to-date map of the two footpaths. Due to increased visitor traffic and natural erosion processes, some parts of the trails are beginning to show signs of deterioration. In the event of amplified degeneration, some parts of the trails may need to be rerouted in order to protect the plant's specific habitat. These maps can be used to further minimize human impact on the species and create safer viewing areas for those over zealous visitors.

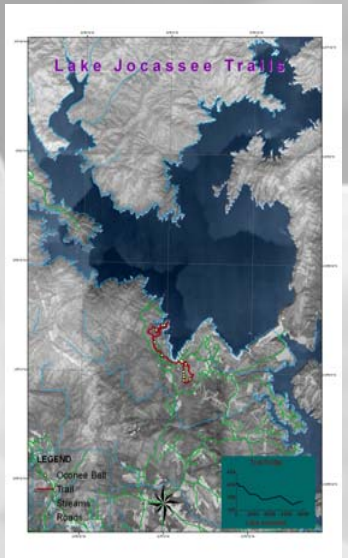

Figure 1. Aerial photo of Lake Jocassee and its two nature trails.

Background Research:
The Oconee Bell (*shortia galacifolia*) was first collected and examined by the French botanist Andre Michaux in 1787. He discovered the species surrounding the Toxaway and Horsepasture Rivers in South Carolina. Not until 1839, however, did Harvard professor Asa Gray give the plant its name and full scientific description. It was later when scientists learned that this plant is only native to the North Carolina, South Carolina, and Georgia mountains. It thrives in moist wooded areas near both discontinuous and permanent streams. It is a perennial species with round waxy leaves and small white and pink blooms that appear in early spring.

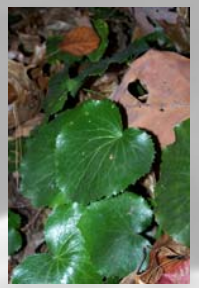

Figure 2. Oconee Bell Wildflower

Figure 3. Oconee Bell bloom in early spring.

Park History:
Lake Jocassee was created in 1973 by the Duke Power Company as a means to generate hydroelectric power. It was not until about 15 years ago that the park itself was opened to the public after years of careful consideration and planning. An initial map of the Oconee Bell wildflower was created as part of a "Special Species Inventory" in order to protect this rare foliage during park construction. This map (figure3), and its contemporary (figure 4), are of Oconee Bell distribution in Devil's Fork.

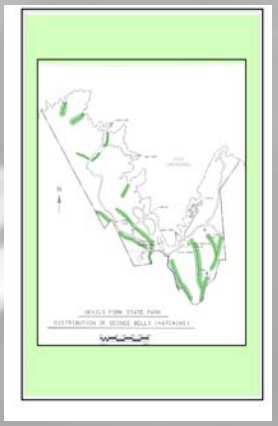

Figure 4. Oconee Bell distribution 15 years ago.

Figure 5 Oconee Bell distribution in 2005.

Figure 6. The above photo was created using Google Earth. It shows the varying elevation profile along the park trails, as well as the surrounding mountainous terrain of Lake Jocassee.

Data Collection Methods:
Using the GIS base layers from Oconee County, I created an initial map of Devil's Fork State Park and surrounding areas. Next I collected data by walking the two nature trails with a GPS device and recorded every Oconee Bell sighting I encountered. I projected the data using ArcMap and created an overlay of the park, local streams, main roads, and the plant species *shortia galacifolia*. I then created a buffer around the parts of the trail that contained the Oconee Bell on either side of the path.

Methodology:

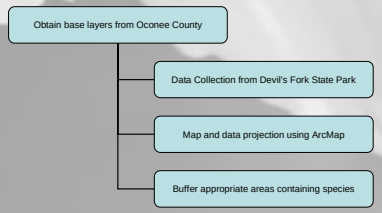

Figure 7. Sequence of major project steps.

Results:
My task to pinpoint, map, and analyze the location of the Oconee Bell wildflower within Devil's Fork State Park provides thorough, though preliminary results. Additional trail surveys and GPS mapping are necessary to locate the entire *shortia galacifolia* population within the park's boundaries. Though the trails venture very close to some colonies, I did not find any damaged plants. Some areas, however, are being threatened by the creeping paths. The data provided can be helpful in the possible rerouting of trail paths to avert further impact on the species' habitat, as well as updating older park trail maps.

Figure 8. Data collection on the Oconee Bell trail.

Metadata:
The following contain Projected Coordinate System NAD 1983 State Plane South Carolina FIPS 3900 Feet and Geographic Coordinate System GCS North American 1983: Aerial photo, Local roads, Trails, and Oconee Bell waypoints.

Google Earth

Acknowledgements:
I would like to thank Dr. Suresh Muthukrishnan for his many hours of assistance and patience with this project. I would also like to thank Singh Roopra for his help with the Oconee County GIS data. Thanks also to Michael Trotter for his willingness to help me gather data and historical information, and to Chick Gaddy for the use of his "Special Species Inventory" map.

Figure 9. The view from the tip of Lake Jocassee.

Figure 10. Oconee Bell colony.