

Potential Bog Turtle (*Clemmys muhlenbergii*) Habitat in Albany County

Introduction:

Currently the bog turtle (*Clemmys muhlenbergii*) has been listed as a threatened species in the United States and as an endangered species in New York State. As we speak, the DEC is working with owners of private lands to help restore *C. muhlenbergii*'s habitat in New York State counties including Columbia, Dutchess, Ulster, Orange and Putnam (NYSDEC). However, it may also be possible to restore the *C. muhlenbergii* population in Albany County. The bog turtle enjoys early successional habitat in wetland areas with little canopy cover allowing for sunlight to penetrate the land (NRDC). Unfortunately, much of this original habitat no longer exists where the bog turtle once stood due to human adaptation of the land.

Following the knowledge of habitat destruction and the thought that habitat my able be restored, the exact habitat needs of the turtle were determined and analyzed to see if there was habitat present for them in Albany County. The final model provides insight that demonstrates that Albany County does have habitat potential in the lower areas of Albany County and outside the Cities of Albany, Watervliet and Cohoes.

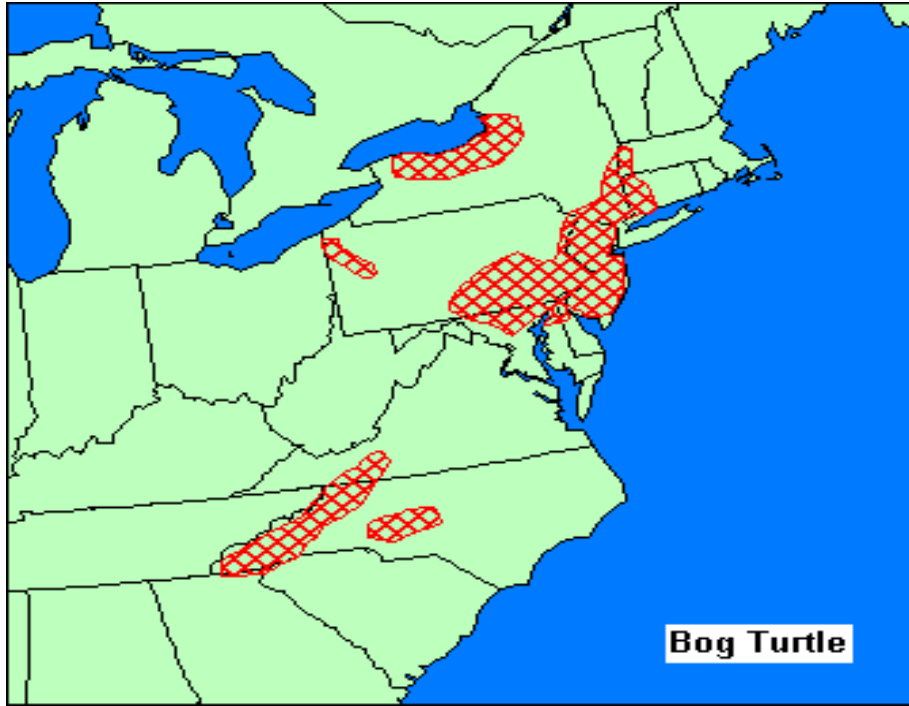


Figure 1.0: Current Bog Turtle distribution on the East Coast of the United States. Map provided by the NYSDEC.



Figure 2.0: Photograph of *Clemmys Muhlenbergii*

Objective :

Determine the areas in Albany County that could potentially provide habitat for *Clemmys muhlenbergii*.

Methodology :

1. Specific habitat needs were determined for the bog turtle to thrive.
2. Determine rating criteria for both beneficial and detrimental factors of the bog turtle.
3. Models were created for each set of rating criteria using ArcGIS ModelBuilder.
4. A final habitat model was created that combined all rating criteria and applied to tax parcels in Albany County.

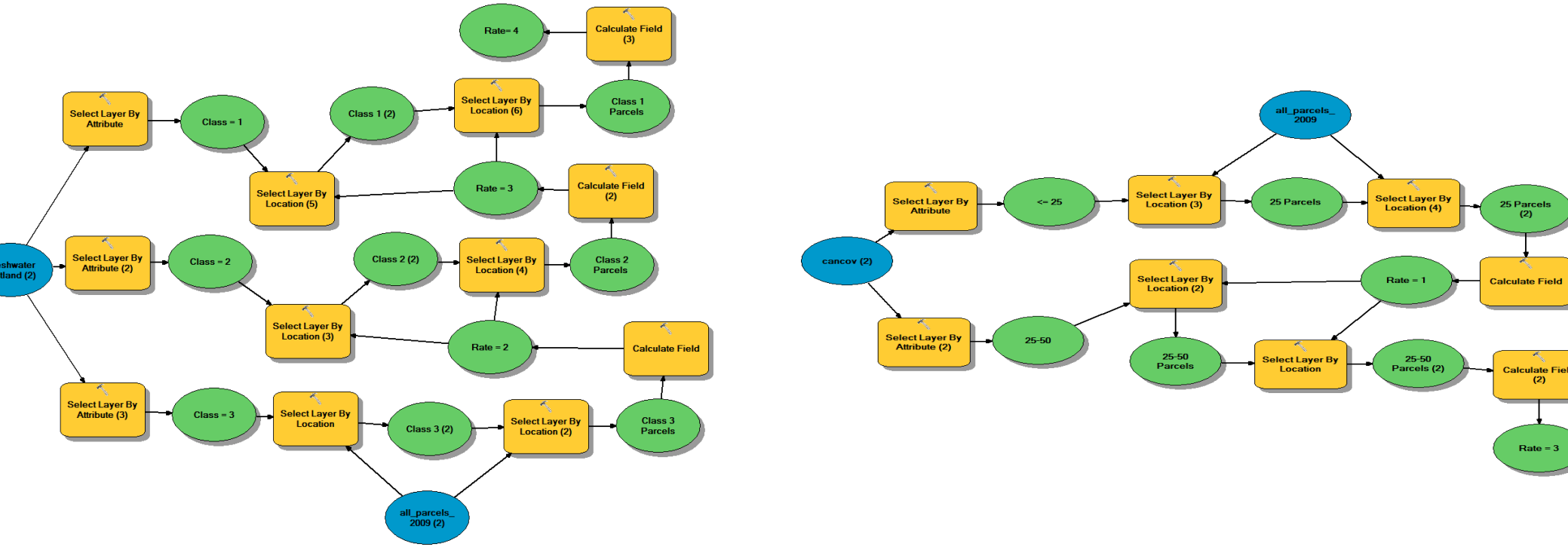


Figure 3.0: Examples of models created for water quality (left) and canopy cover (right).

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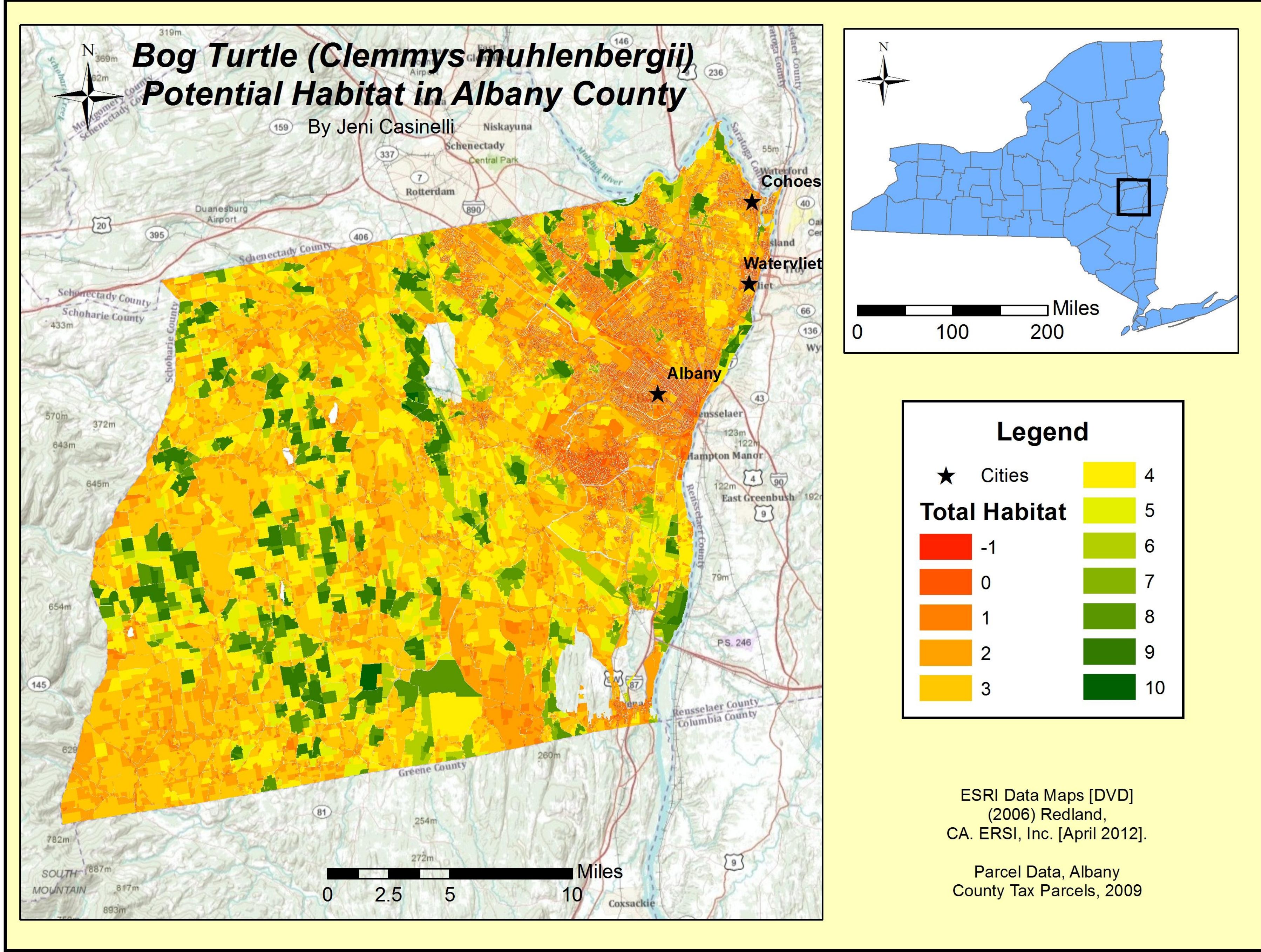


Future Work:

This research did leave out certain factors like water pH, presence of invasive species, vegetation height, water flow rate, annual precipitation, and air temperature due to lack of data available. All of these factors have been found to have an impact on *C. muhlenbergii*'s population. Thus, future work will need to site verify the conclusions from this study. Also, future work may determine that some simple land manipulation will allow for an increase in the turtle population on the parcels where ratings are currently low. This could be extremely important as the population is on the brink of extinction in New York State.

| Total Habitat Potential | Total Number of Parcels | Percent of Parcels |
|-------------------------|-------------------------|--------------------|
| 10 | 3 | 0.003 |
| 9 | 243 | 0.213 |
| 8 | 578 | 0.507 |
| 7 | 632 | 0.555 |
| 6 | 726 | 0.637 |
| 5 | 638 | 0.560 |
| 4 | 2186 | 1.919 |
| 3 | 7815 | 6.861 |
| 2 | 24253 | 21.294 |
| 1 | 45018 | 39.525 |
| 0 | 30852 | 27.087 |
| -1 | 954 | 0.838 |

Table 1: Data of Habitat Potential in Albany County



Results and Conclusions:

The data demonstrates that there is potential for *C. muhlenbergii* habitat in Albany County. A total of 2,820 out of 113,898 land parcels have a rating of 5 or higher for habitat potential (Table 1). It is not known if the total amount of good potential habitat (2.457% of Albany) is enough to help restore the turtle population in Albany. It is observed that almost 1% of the tax parcels in Albany County would actually be extremely detrimental to the turtle population due to factors like impervious area and roads cutting into the land.

Also, upon evaluation it is observed that there is significantly no potential in upper right section of Albany county, specifically in the area surrounding the cities of Albany, Watervliet, and Cohoes themselves. However, the areas that are not as highly populated by humans do show potential. Thus, there is some habitat potential for *C. muhlenbergii* in Albany County. While it may not be enough to completely revive the population, it is a start. Future work needs to determine how to manipulate the land for greater habitat potential so *C. muhlenbergii* may one day become a viable population again in Albany County. Currently, we need to continue to protect our present wetlands and watered habitat as it brings the most potential for the survival of the turtle population.

Rating Criteria:

- Vegetation:**
 - Canopy Cover**
 - 1.25 > 50 (3)
 - 2.Less than 25% (1)
 - Adjacent Vegetation**
 - 1.Wetland Adjacent to Wetland (4)
 - 2.Wetland Adjacent to Rangeland, Brush land Forested (3)
 - 3.Wetland Adjacent to Cropland , Agricultural (1)
 - Land Use**
 - 1.Wetland (3)
 - 2.Rangeland, Brush land, Forested (2)
 - 3.Cropland, Agricultural (1)
 - 4.Other (0)
 - 5.Industrial, Commercial (-1)
 - Water Resources:**
 - Presence of Wetland Habitat**
 - 1.Emergent Wetland (3)
 - 2.Freshwater Forested/Shrub Wetland (2)
 - 3.Freshwater Pond (1)
 - 4.Lake (0)
 - 5.Riverine, Estuarine and Marine Deepwater, Estuarine and Marine Wetland(-1)
 - Water Depth**
 - 1.Swamp, Brook, Creek, Spring, Inlet, Flow (3)
 - 2.Harbor, Cover, Bay (2)
 - 3.Pond, (1)
 - 4.Canal, Lake , Reservoir, Channel (0)
 - Quality of the Wetland**
 - 1.Class 1 (4)
 - 2.Class 2 (3)
 - 3.Class 3 (2)
 - 4.Class 4 (1)
 - Negatives:**
 - Impervious area**
 - 1.Impervious area greater than 50% (-1)
 - 2.Impervious area less than 50% (0)
 - Road presence**
 - 1.Road Presence (-1)
 - 2.No-Road Presence (0)
 - Other:**
 - Soil**
 - 1.Muck (3)
 - 2.Silt Loam (2)
 - 3.Gravelly Loam, Sandy Loam (1)
 - 4.Rocky Outcrop, Other (0)
 - Connectivity (In relation to Wetland)**
 - 1.Adjacent Parcel (4)
 - 2.1 Away (3)
 - 3.2 Away (2)
 - 4.3 Away (1)
 - Home Range/Parcel Size**
 - 1.<.025 acres (0)
 - 2.0.25-1.00 acres (1)
 - 3.1.00 – 10.00 acres (2)
 - 4.10.00 – 75.00 acres (3)
 - 5.>75.00 acres (4)

Data Sources:

Area Hydrography, Freshwater Wetland and Wetland data was obtained NYS Department Environmental Conservation, Division of Water. Published 2001. Data was downloaded in geospatial digital format from the Cornell University Geospatial Information Repository. Canopy Cover data was obtained from the US Geological Survey. Published in 2001. Data was downloaded in geospatial digital format from the National Land Cover Database. Impervious data was obtained from the US Geological Survey. Published in 2001. Data was downloaded in geospatial digital format from the National Land Cover Database. Land Use, Land Cover data was obtained from the US Geological Survey and converted in geospatial format by the Environmental Protection Agency. Published 1990. Data was downloaded in geospatial digital format from the Cornell University Geospatial Information Repository. Parcel Data was obtained from Albany County Tax Parcels, 2009. Road data was obtained from the US Department of Commerce, US Census Bureau Geography Division as part of the NYS Road Census. Published in 2001. Data was downloaded in geospatial digital format from the Cornell University Geospatial Information Repository. Soil data and classifications were obtained from the US Department of Agriculture/National Resources Conservation Service (USDA/NRCS). Published 2001. Data was downloaded in geospatial digital format from the Cornell University Geospatial Information Repository.

Works Cited :

Department of Environmental Conservation, "Protecting Bog Turtles on Private Lands," 2011: <http://www.dec.ny.gov/pubs/48707.html>
Department of Environmental Conservation, "Bog Turtle Fact Sheet," 2011, <http://www.dec.ny.gov/animals/7164.html>. (Map)
Natural Resource Conservation Service (NRCS) "Bog Turtle (*Clemmys muhlenbergii*). October 44 (2006): 1-13.

