

Photo by C. Kilheffer and M. Keskin



Abundance & Distribution of White-tailed Deer in the Town of DeWitt

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Hello Everyone.

My name is Brian Underwood. I'm a research wildlife biologist with the USGS Patuxent Wildlife Research Center on the SUNY-ESF Campus. I've been studying deer ecology and management for nearly 30 years. I can be reached at:

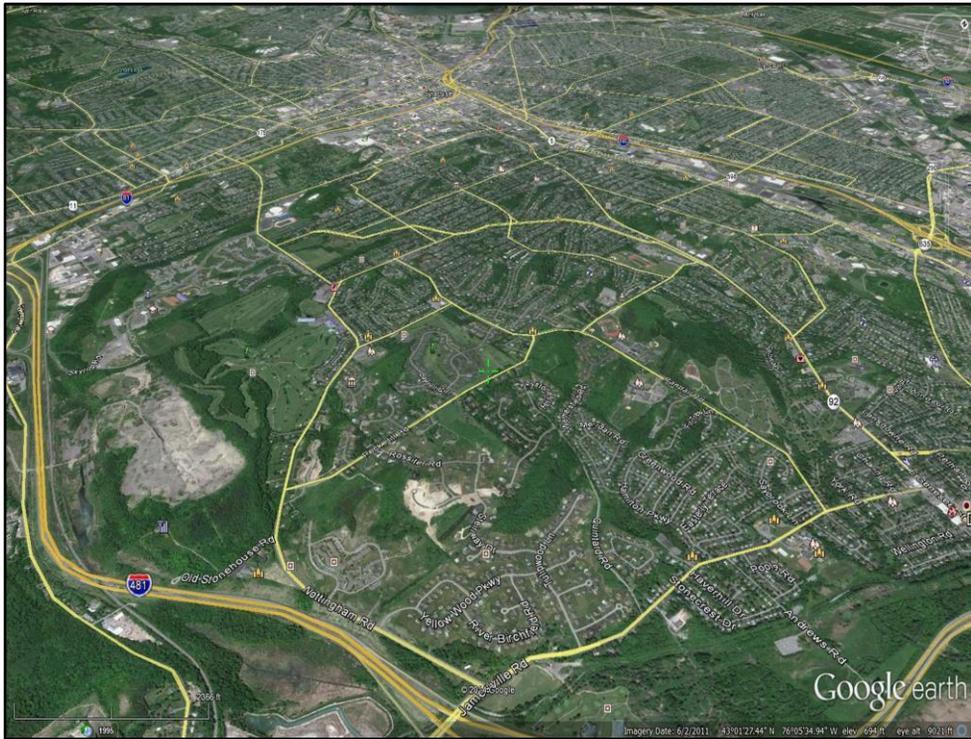
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Overabundant deer herds are the cause of several, serious quality-of-life issues for people including damage to property either through automobile collisions or from browsing landscape plantings, potential Lyme disease transmission and general nuisance of highly habituated animals.



This is Morningside Community Garden imprisoned within a 6 foot tall perimeter fence to keep deer out.

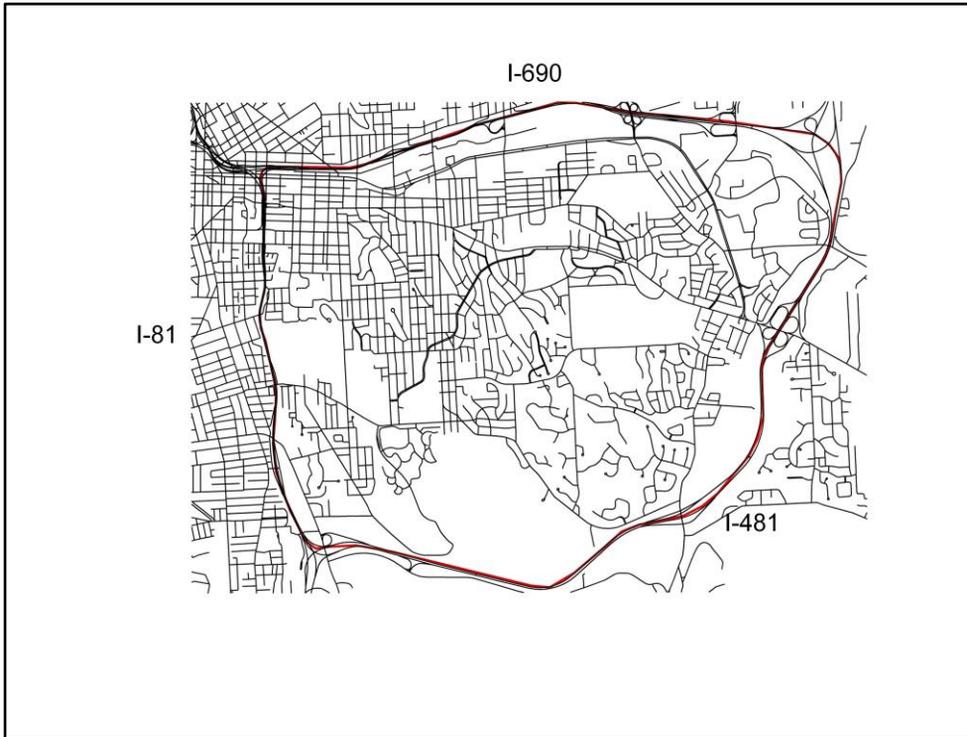


Our study area is comprised of public and private property within the City of Syracuse and the Town of DeWitt. Land use is predominantly residential with a spattering of commercial and municipal parks.

- Counted deer along roadsides from April – October, 2013
- Characterized land cover from high-resolution digital photos
- Delineated areas of contiguous cover to identify potential deer cover
- Verified patch use by deer through winter track counts (2013-14)
- Estimated population size

What We Did...

We initiated this study in 2013 in an attempt to understand deer abundance and distribution throughout the area. We conducted a land cover classification of high resolution imagery to understand the nature and extent of deer habitat in this urban landscape. We assessed abundance of deer from roadside counts and from track surveys after fresh snowfall. Finally, we generated a estimate of total deer population size.



Here is a schematic of the study area which is bounded by I690 to the North, I81 to the West and I481 to the South and East.



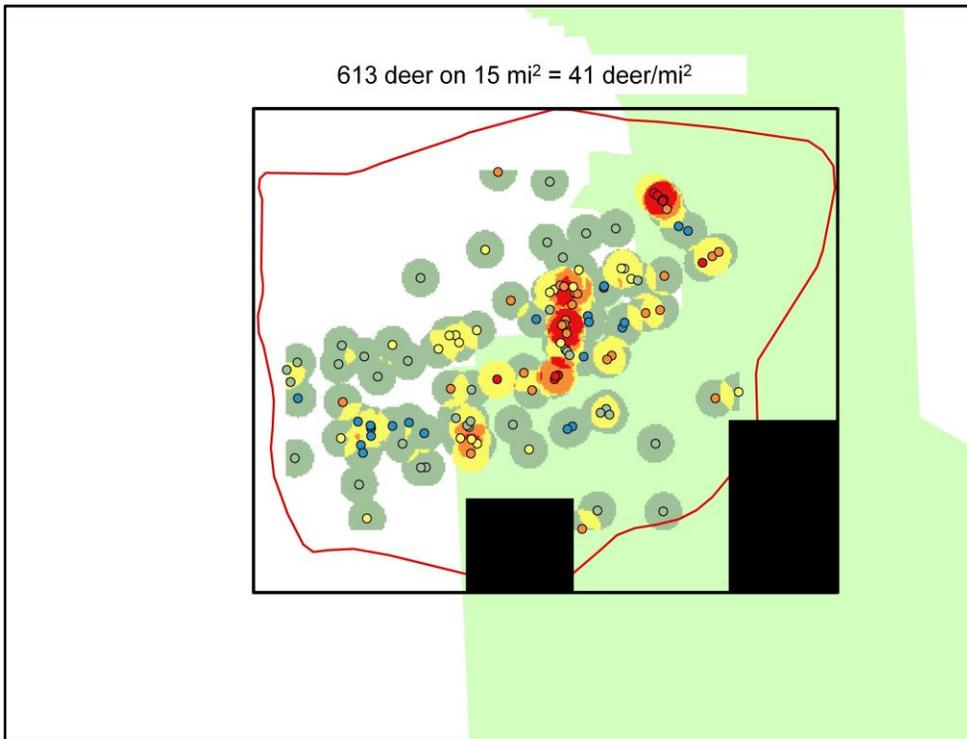
I've distinguished the Town of DeWitt by highlighting it in green, so about one-half the study area resides in either the City of Syracuse or the Town of DeWitt.



We conducted counts of deer at sunrise from May through October. The precise location of each cluster of deer was mapped in a Geographical Information System. We conducted 21 counts by driving random road segments separated in space to prevent double counting the same group of deer.

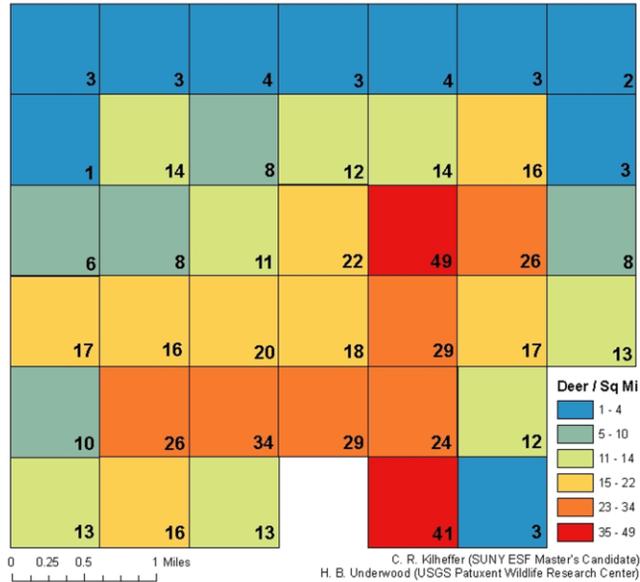


Clusters of deer align on a swath from northeast to southwest across the study area with higher concentrations shown in warmer colors. Notice the lack of deer observations in the heavily commercialized, northwest portion of the study area.



A hotspot analysis revealed similar trends in deer concentrations. We estimated 613 deer on 15 square miles or 41 deer per square mile.

Deer Densities by Tile in the Eastside Communities of Syracuse (# deer/sq mi)



Modeled deer densities (from land cover statistics) reveal an uneven distribution of deer across the study area. Highest densities were recorded in and around St. Mary's Cemetery and the Jamesville Quarry.

- **Conducted track surveys for deer from December, 2013 – March, 2014**
- **Completed 3 full surveys and 5 partial surveys**
- **Compared track densities across the study area for each survey**



Winter Track Counts

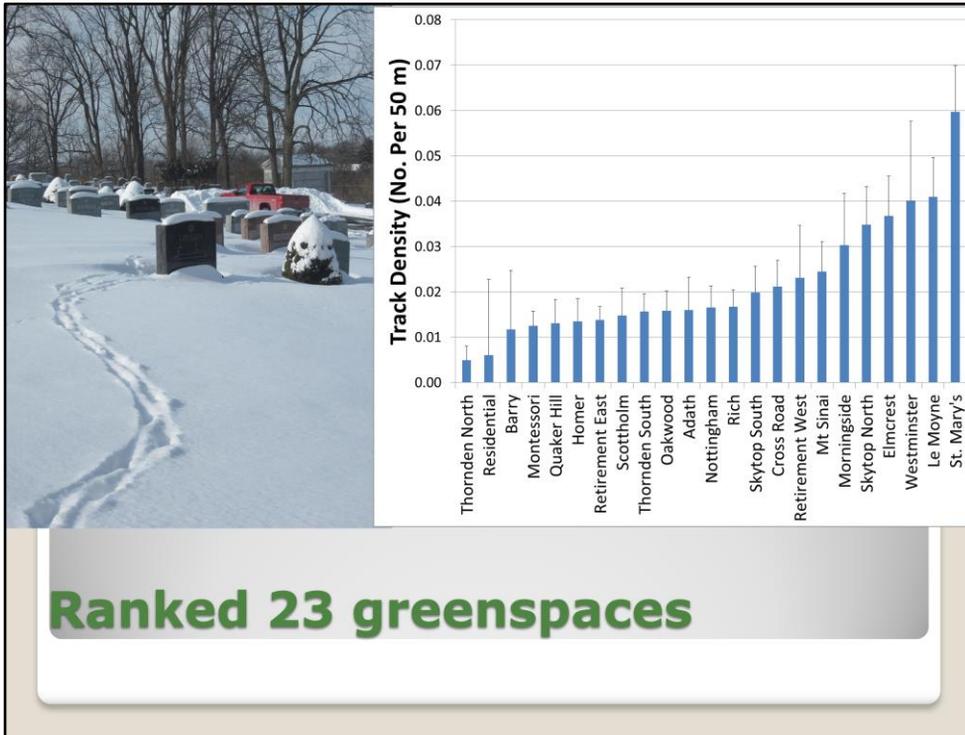
We also conducted a series of winter track counts for deer in 23 greenspaces throughout the study area.



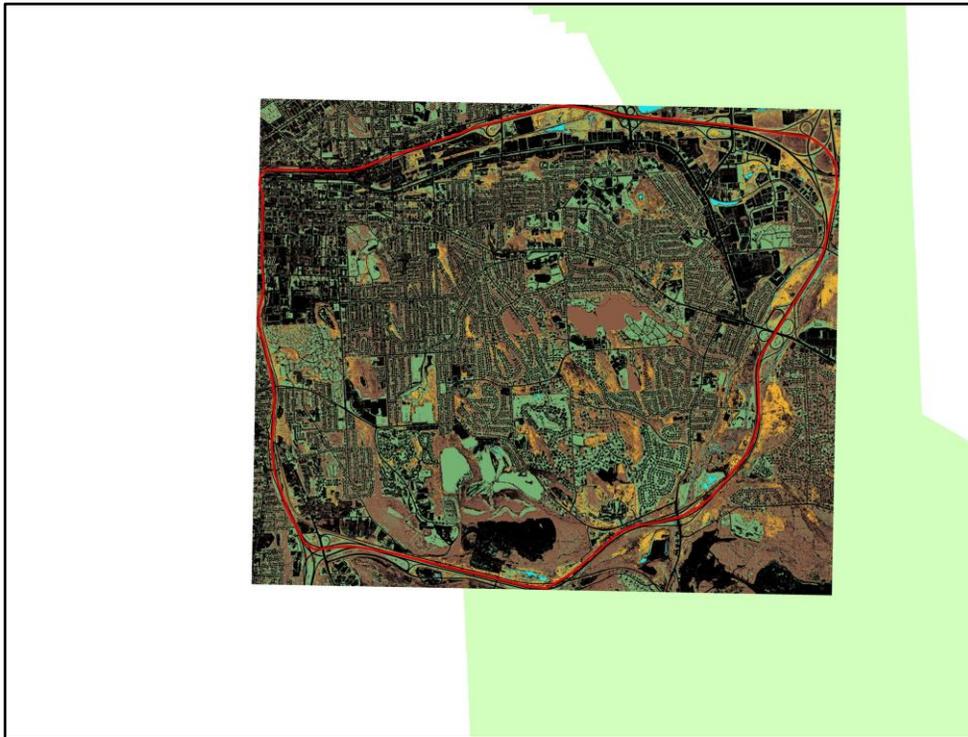
All the surveys were conducted on foot over freshly fallen snow. At locations where deer tracks intersected transects, a GPS location was recorded along with other pertinent information.



We encountered much deer sign in nearly every location we searched. Here, four deer bedded down under the protection of a grove of cedar trees in a local cemetery.



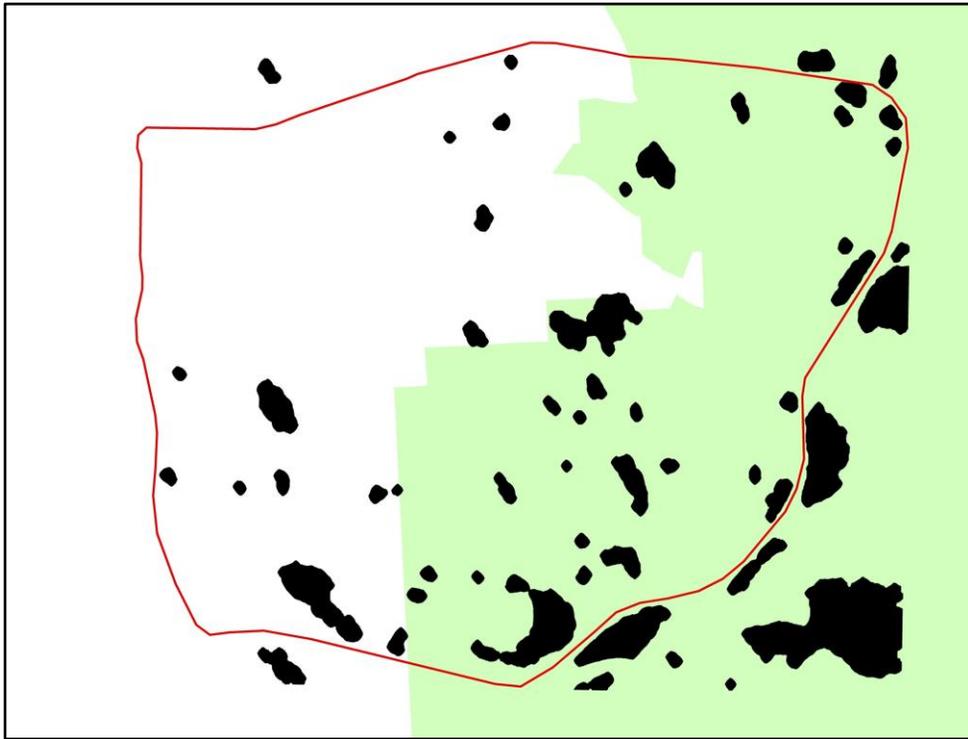
We filtered our GPS track logs to 50 meter segments and counted the number of track crossings in each segment. Shown here is the average track density (+/- 1 SE) ranked from lowest to highest.



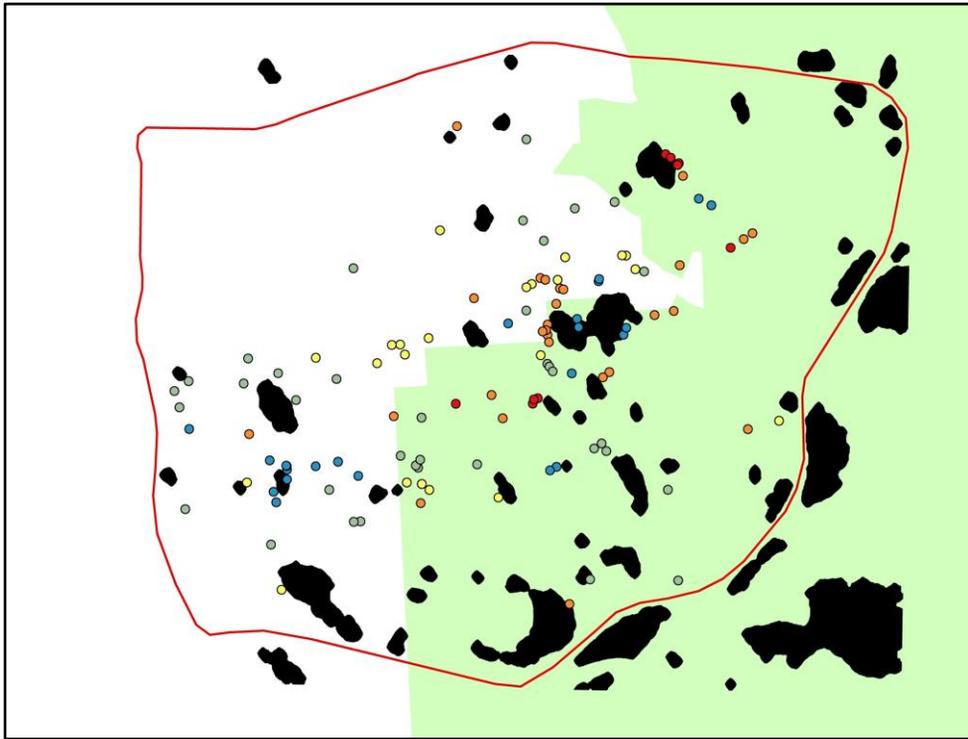
This is an image of the study area classified according to land cover (grass, tree, shrub, water and impervious surfaces). It was derived from very high resolution imagery to capture the detail of potential deer habitat.



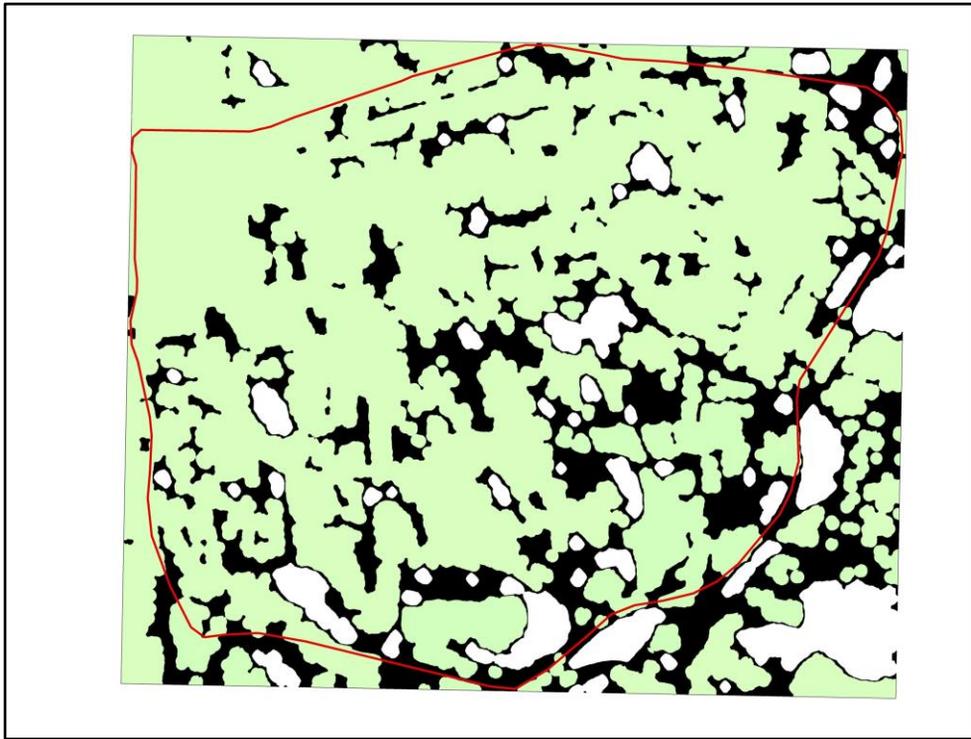
A close up inspection reveals the detailed nature of the image's content. Houses, roads, swimming pools and even individual trees can be readily distinguished in the classified image. We learned two primary lessons from the analysis of this image. First....(next slide)



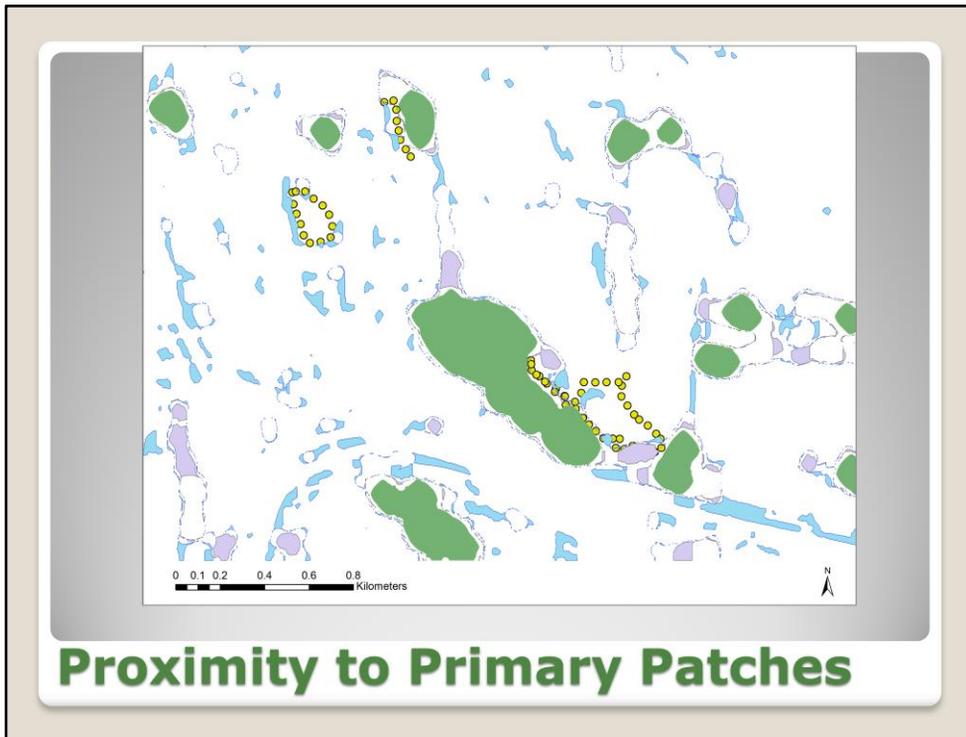
We identified approximately 50 patches of forested cover, ranging between 2 and 250 acres, capable of supporting deer.



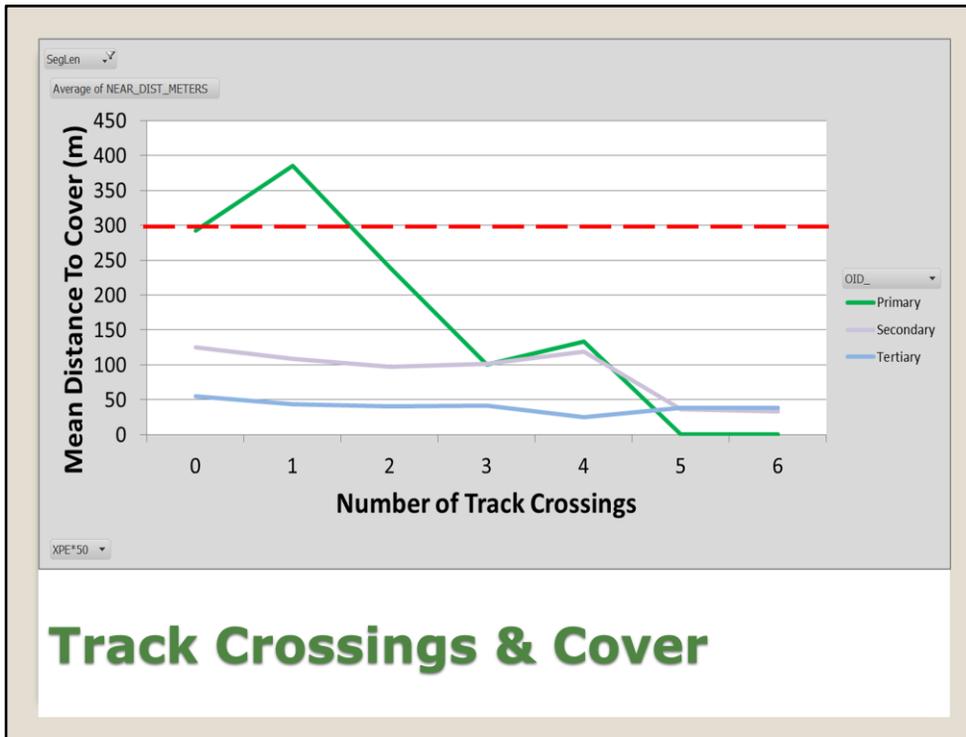
In fact, deer clusters mapped during roadside counts were closely associated with these primary patches of trees. Secondly....(next slide)



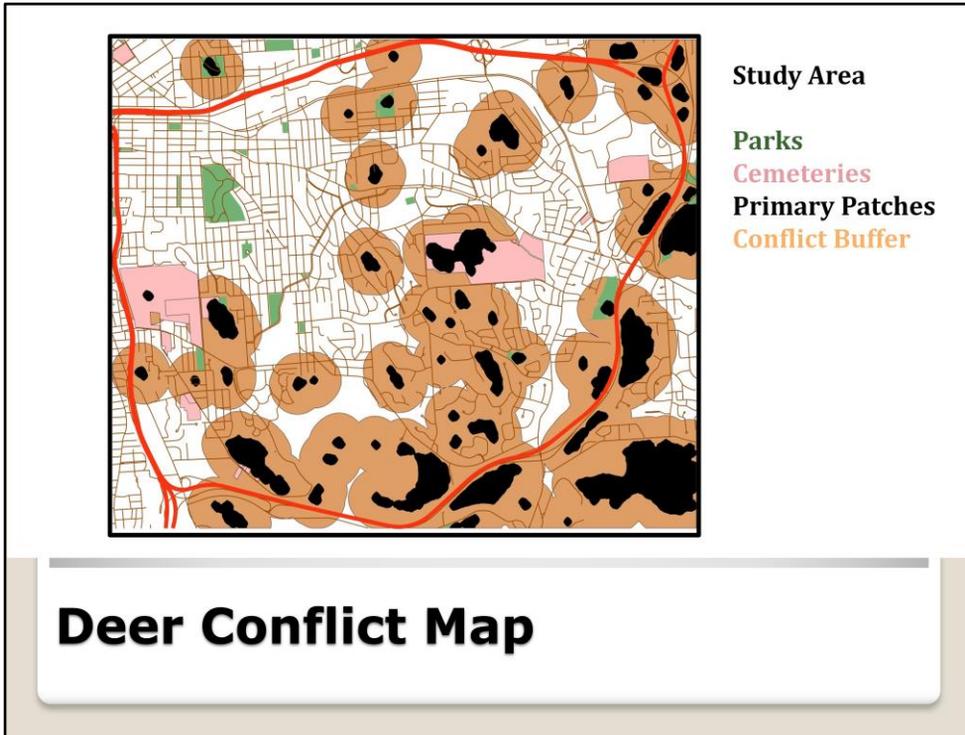
We were able discern a high degree of connectivity (shown in black) among these primary patches (now shown in white).



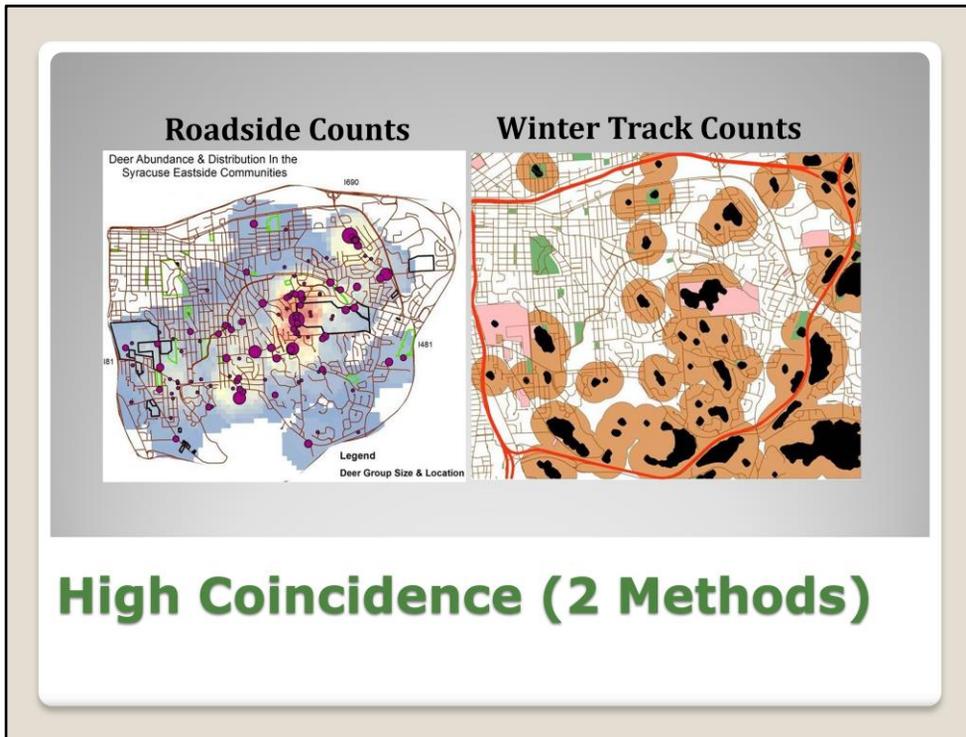
Winter deer track surveys were conducted on foot throughout the many green spaces we had permission to access. Observers typically walked in proximity to primary patches or among the connecting corridors. Here, a track line recorded from the GPS unit shows several transect segments.



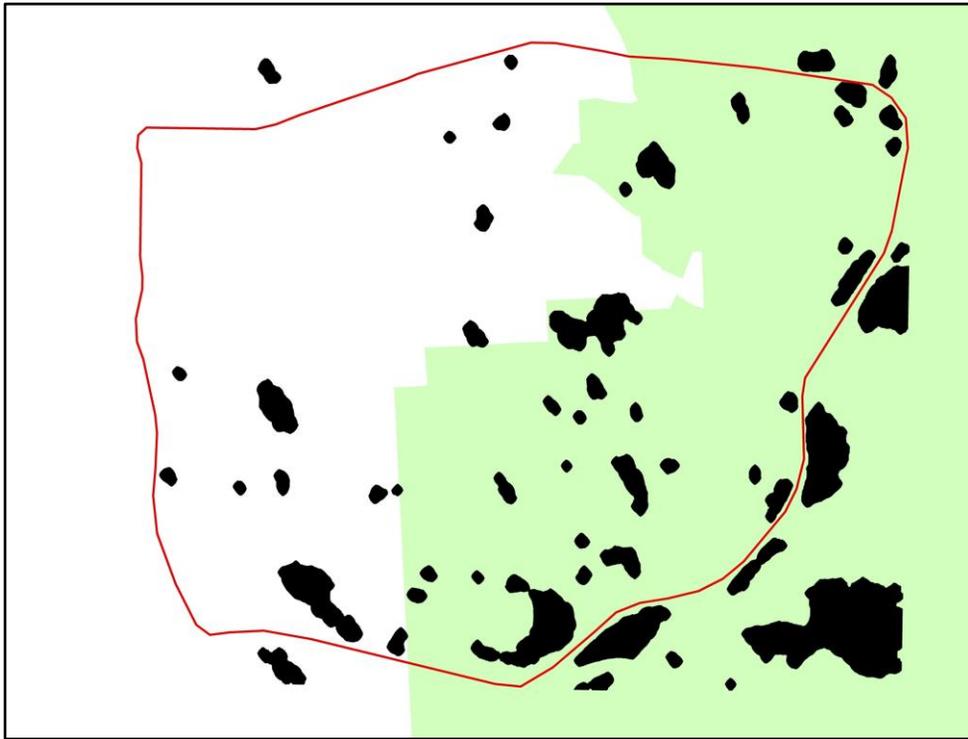
We indexed the number of segments with zero to many track crossings relative to their proximity to primary forested patches. Segments containing no deer tracks were 300-400 meters distant from the nearest primary patch, while segments with many deer track crossing were in close proximity to a primary patch.



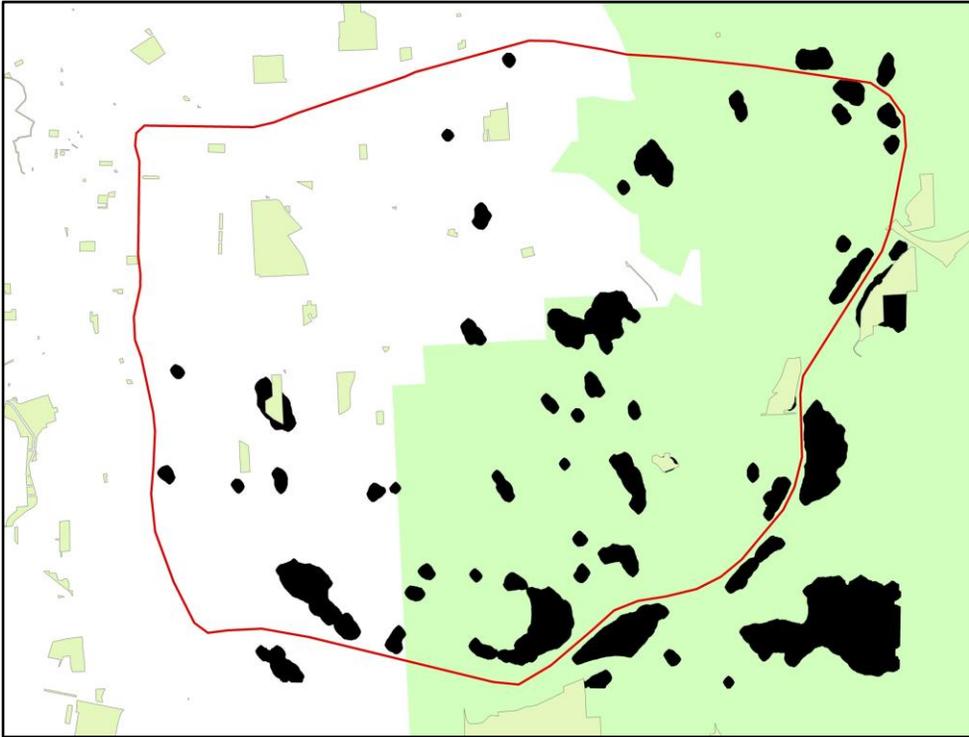
By creating a simple buffer of 300 meters around each primary patch, a very useful map was constructed showing areas with high potential conflict with deer.



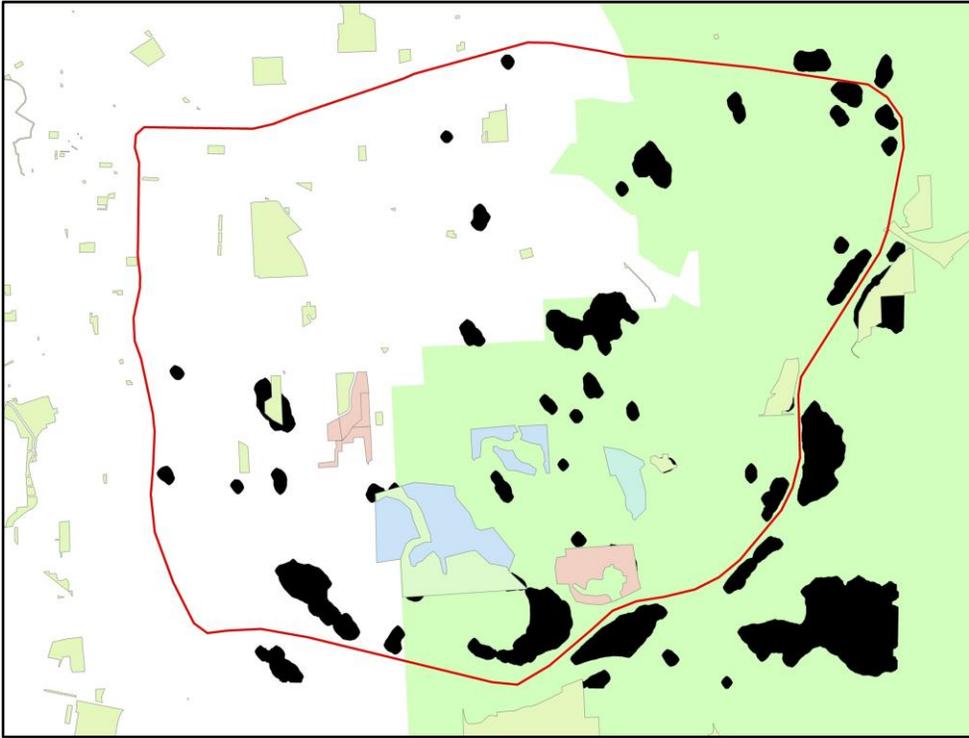
Analysis of winter track counts produced results consistent with the analysis of roadside counts for deer.



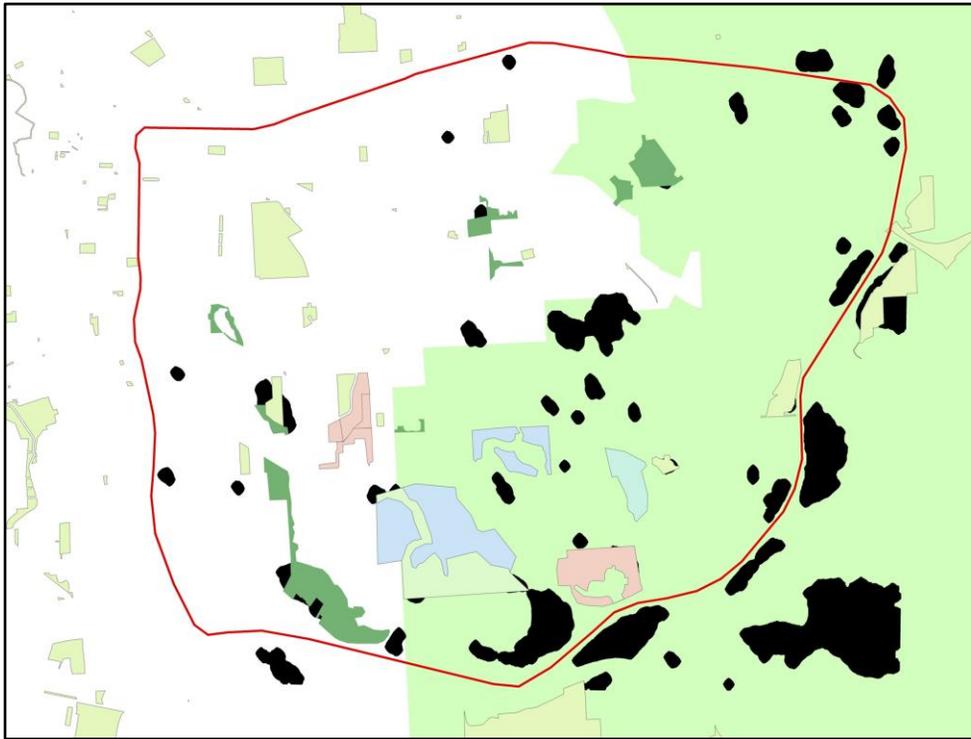
The following series of maps illustrates the various land uses and property ownership, which make deer management challenging in urban areas. Here is a map of primary patches.



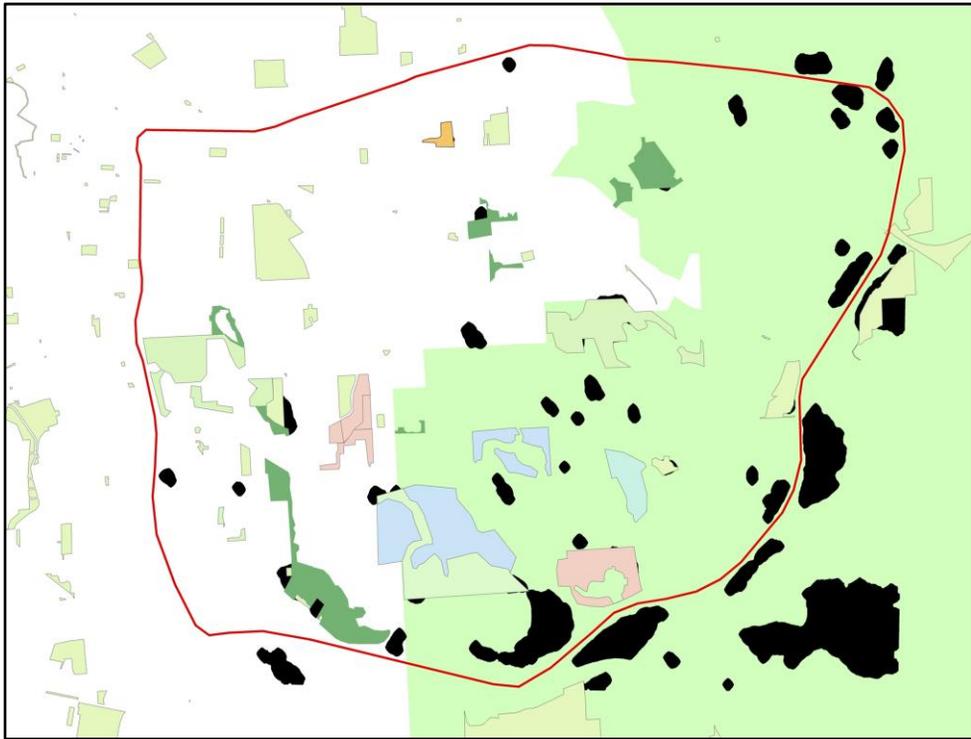
I'm now adding parks (public spaces) which account for five primary patches.



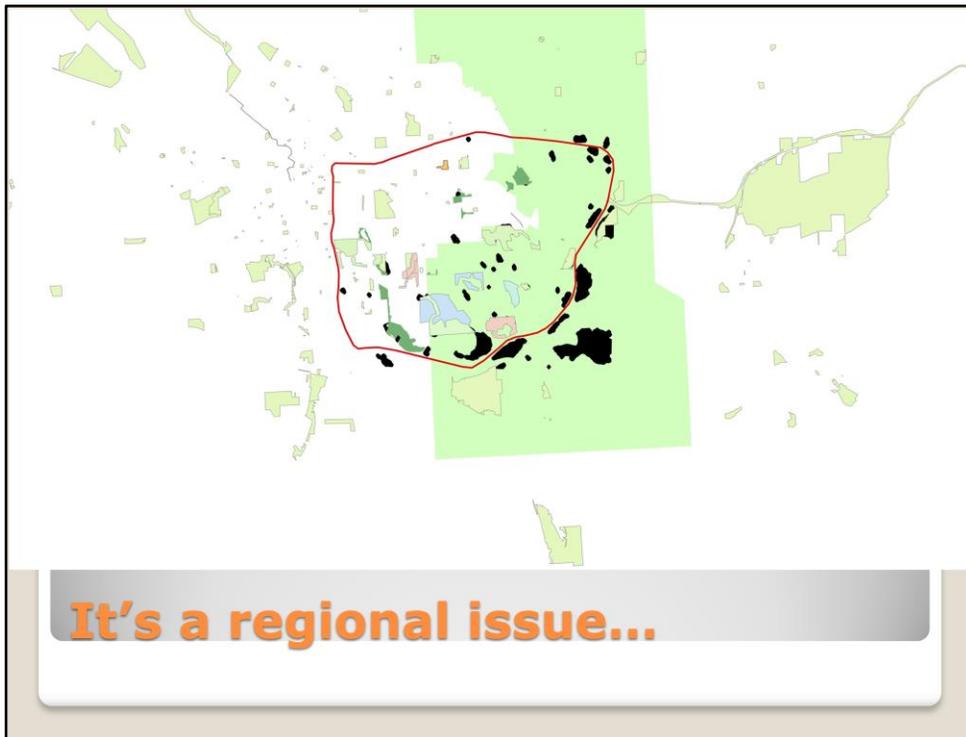
Adding golf courses and other outdoor amenity land uses accounts for another eight patches.



Adding school campuses (including secondary and post-secondary) accounts for another six patches.



Finally, adding cemeteries and places of worship accounts for another three, leaving about 30 patches of uncertain land use and ownership.



The primary land use in Central New York is agriculture in a predominantly forested landscape. Deer thrive in this environment. Urban areas serve as de-facto refuges from hunting. Low regional deer densities on rural lands are maintained by harvesting about 40% of the females and 80% of the males from the deer population every year! In the absence of hunting, deer numbers will grow to a level where birth and death rates are equilibrated by some combination of other mortality factors (e.g., vehicles, coyotes, diseases, etc.). Consequently, protected area management will necessarily require a close look at deer abundance to avoid future land management conflicts.

- Contains pertinent information about the deer population (i.e., abundance & distribution)
- Explores alternative management scenarios in a spatially explicit context
- Includes a realistic cost analysis
- Exhibits high buy-in potential from all constituents

Management Planning 101

A first step in the consideration of the place for deer in protected area management is the development of a comprehensive plan. Elements of that plan should include all pertinent information about the deer population (especially abundance and distribution), explore all reasonable alternatives for managing deer impacts, include realistic costs and benefits accrued by adoption a specific alternative, and should exhibit appealing qualities to a majority of constituents living in the affected areas.