

Areas of Potential Susceptibility of Emerald Ash Borer Infestation in the Capital Region

Department of Environmental Studies, Siena College, Loudonville, NY

Melyssa Smith , Emily Merritt,
Katherine Meierdiercks

Introduction

Emerald Ash Borer (*Agilus planipennis*) is a native species of China, Japan, Korea and eastern Russia and was first discovered in southeast Michigan in 2002 and detected in New York in 2009 [1&4]. This introduced species has been found in ash trees in Illinois, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Virginia, West Virginia, Wisconsin and Tennessee [1]. Concern of EAB infestation in New York is focused on green, black and white ash trees ≥ 1 in. diameter at 4.5 ft DBH [2].

In June and July, EAB adult females (1-1.25 in.) lay eggs in ash trees and within 1-2 weeks the larvae emerge and begin to bore through the tree bark, from late July to October, effectively killing the tree by destroying the water and nutrient conducting tissues under the bark. This process is referred to as girdling. The trees foliage begins to thin and its canopy dies back [1]. In the state of NY it is estimated that 767,300,000 trees will be infested with EAB [3].

EAB infestation is facilitated by the transport of infested ash logs, trees or firewood to non-infested, vulnerable areas. Many government agencies such as the USDA, DEC and USFS are working together to prevent the spread of this non-native, invasive species. Some efforts include quarantine of infested areas and regulations on the transport of potentially infested firewood, logs and trees. Because no insecticides are fully effective against EAB, destruction of currently infested ash trees is necessary to prevent further spread. Preliminary research efforts include the introduction of a parasitic wasp, a natural enemy to the EAB, to help mitigate the species [1].

Current infestations in the state of New York are in Region 4 (Greene County) and Regions 3 (Lower Hudson Valley; Orange and Ulster counties), 8 (Western Finger Lakes; Chemug, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Steuben, Wayne and Yates counties) and 9 (Western New York; Allegany, Chautauqua, Cattaraugus, Erie, Niagara and Wyoming counties) [5&6].

Objectives

For this project we will look at the current and future potential of EAB infestation within Albany County. The two specific criteria we are determining are:

-Potential EAB infestation areas within Albany County based on white, black and green ash tree distribution, elevation, and water features.

-The connection, if any, between currently infested areas and the presence of DEC campgrounds within the Albany County. (We are looking at this because of the potential spread of EAB from firewood being brought to this region by human actions).

It is our hope that these assessments will make clear which areas have not been invested already but could be in the future. We will also see if humans could be a contributor to the spread of EAB in the Albany County of NYS.

Methods

1. Obtain elevation, hydrography, vegetation distribution, and campground GIS data from sources such as the DEC, USDA, and NLCD.
2. Find which counties were previously infested from NYS DEC data.
3. Develop ArcGIS geoprocessing models using ModelBuilder to apply areas of infestation within Albany County, New York.
4. Determine areas of susceptibility within Albany County based on ideal EAB elevation, vegetation distribution, and water availability using the "Intersect" and "Clip" features in ModelBuilder.
5. Find the correlation between the presence of DEC campgrounds and areas of current or potential EAB infestation.

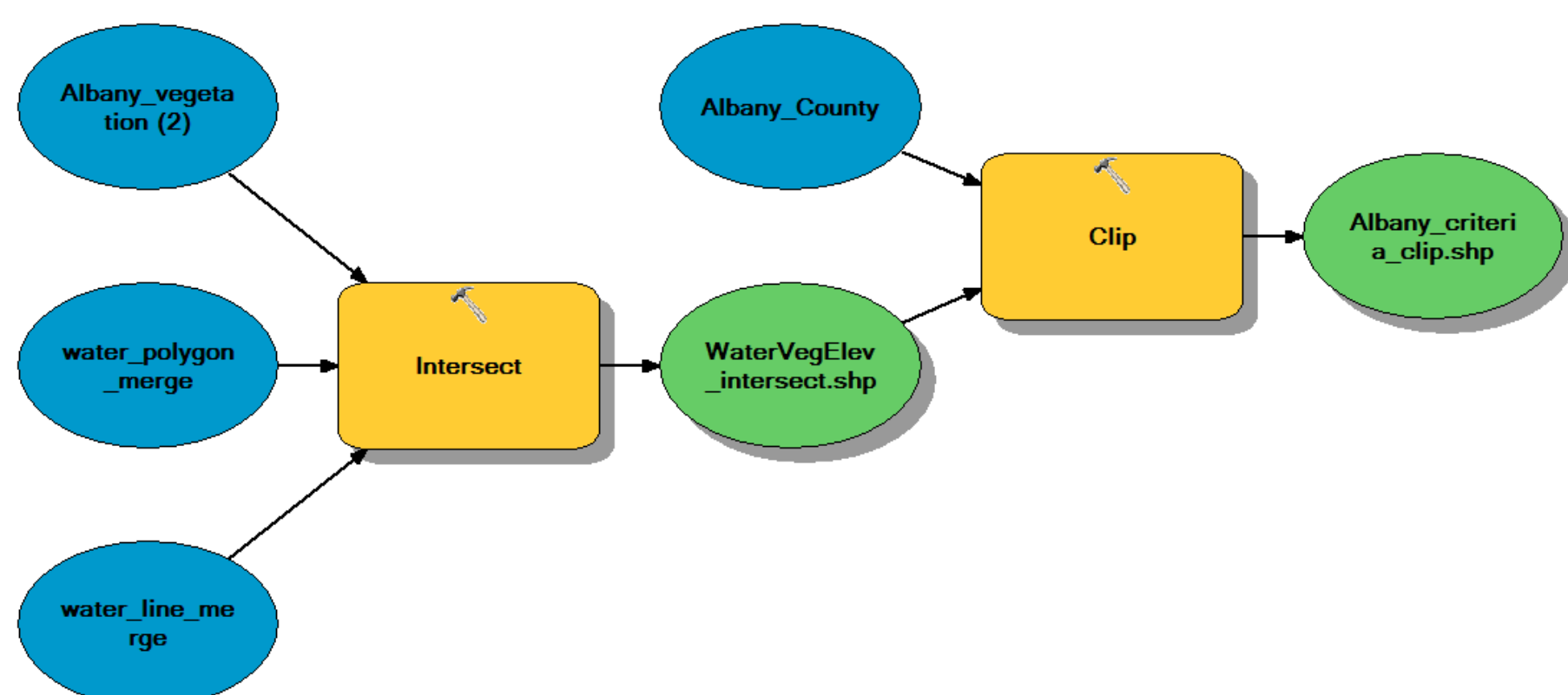


Figure1: Illustration of a constructed model in ModelBuilder.

Results

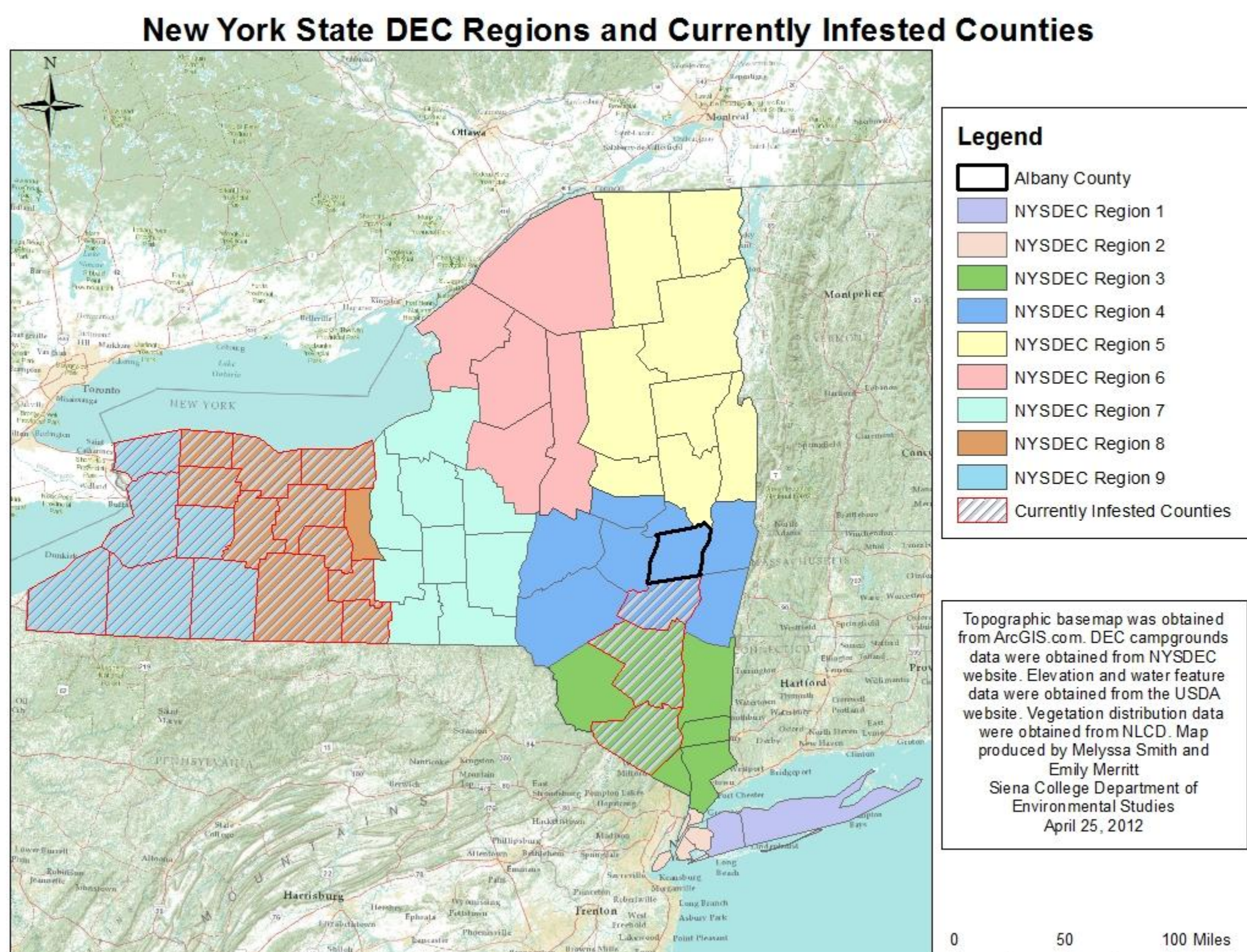


Figure 2: This map shows New York State DEC Regions and counties within them currently infested by the EAB. The entirety of Region 9 and most of Region 8 are infested. Ulster and Orange counties in Region 3 and Greene county in Region 4 are also infested by the EAB. Albany County is within Region 4 and is not currently infested.

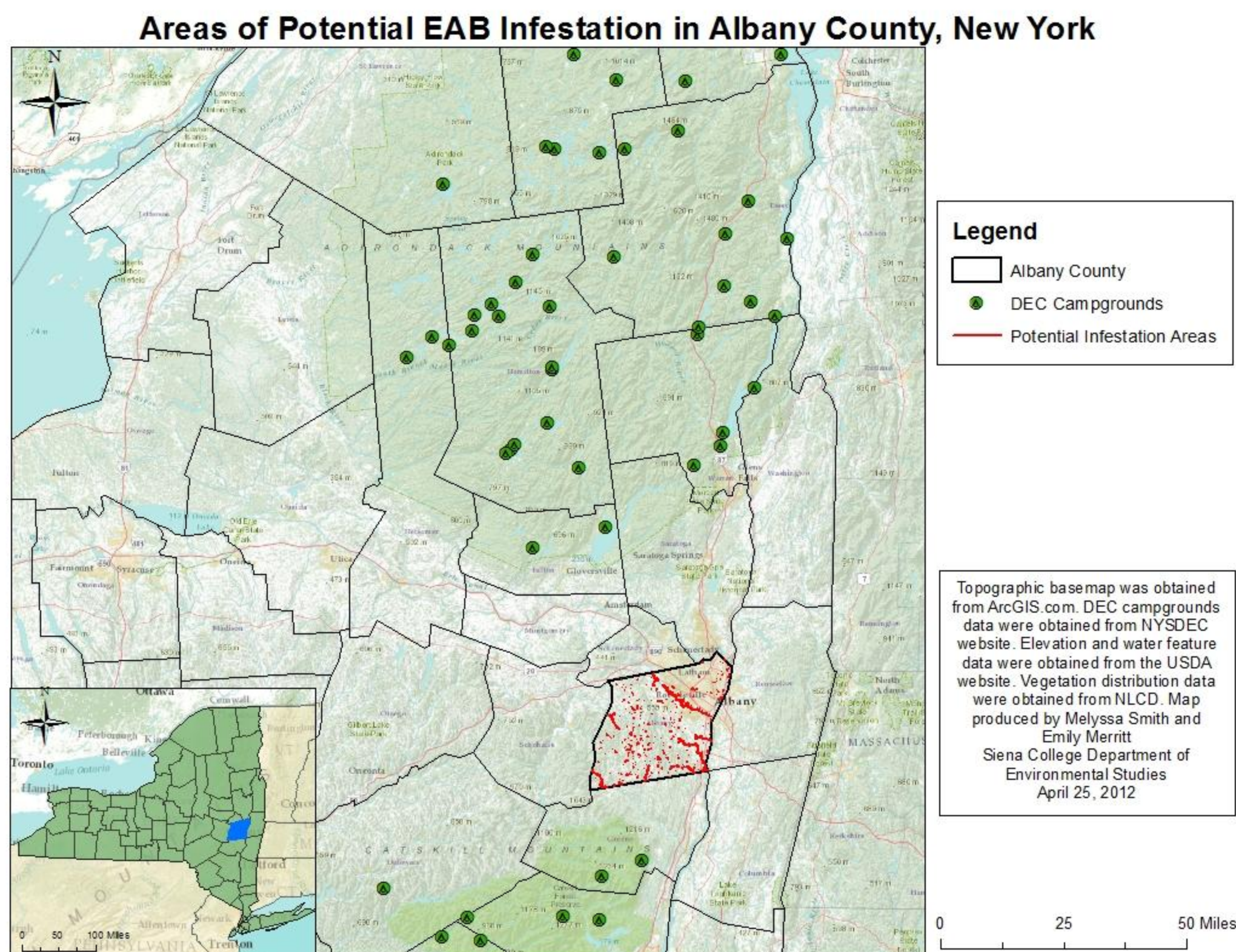


Figure 3: This map displays the infested areas (in red) within Albany County that are susceptible to EAB infestation and also shows the locations of DEC campgrounds within each county of New York State. Campgrounds are shown to assess whether humans have facilitated the spread of EAB in Albany County.

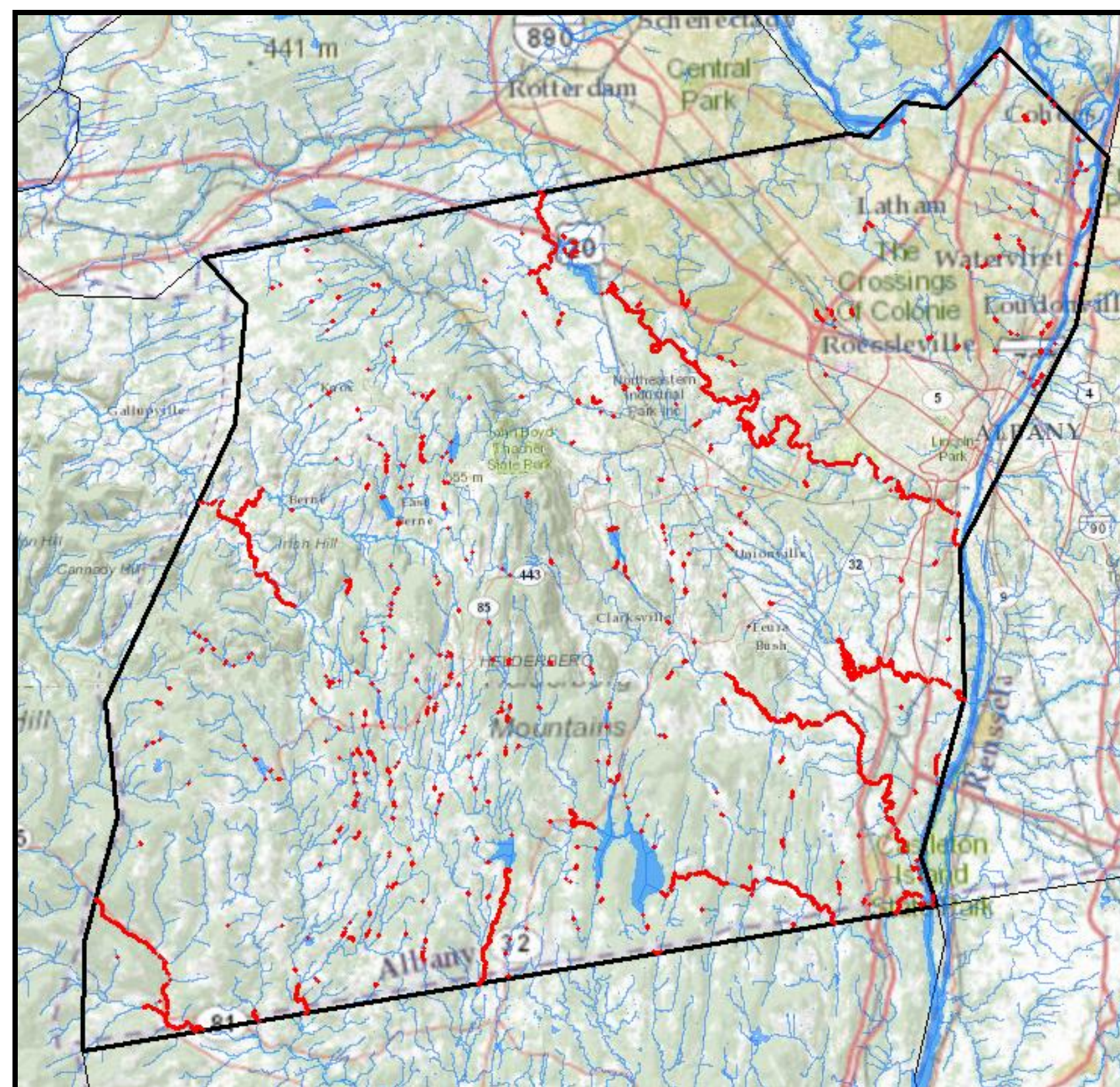


Figure 4: A close-up image of areas susceptible to EAB infestation in Albany County. Red indicates areas which meet all of the analysis criteria. Blue shows the water features within this region.

Results (continued)

In order for analysis of potential areas of EAB infestation to be completed, the following criteria were established to determine Ash tree habitat:

-Vegetation: deciduous forest, emergent herbaceous wetlands, mixed forest, and woody wetlands

-Elevation: 0-3,000 ft. (Note: All of Albany County's elevation fell under this criteria)

-Water Features: all water bodies, including rivers, creeks, ponds, lakes, etc.

As seen in Figures 3 and 4, 139 km of potentially susceptible areas for EAB infestation within Albany County were found based on the above criteria. No DEC campgrounds exist within Albany County, however there are a number of private campgrounds (Figure 5), therefore, humans that use the campgrounds could facilitate the spread of EAB. Of the 139 km of land that is susceptible to EAB infestation, 49 km (35%) is within 5 miles of a campground and 1.5 km (1%) is within 1 mile of a campground.

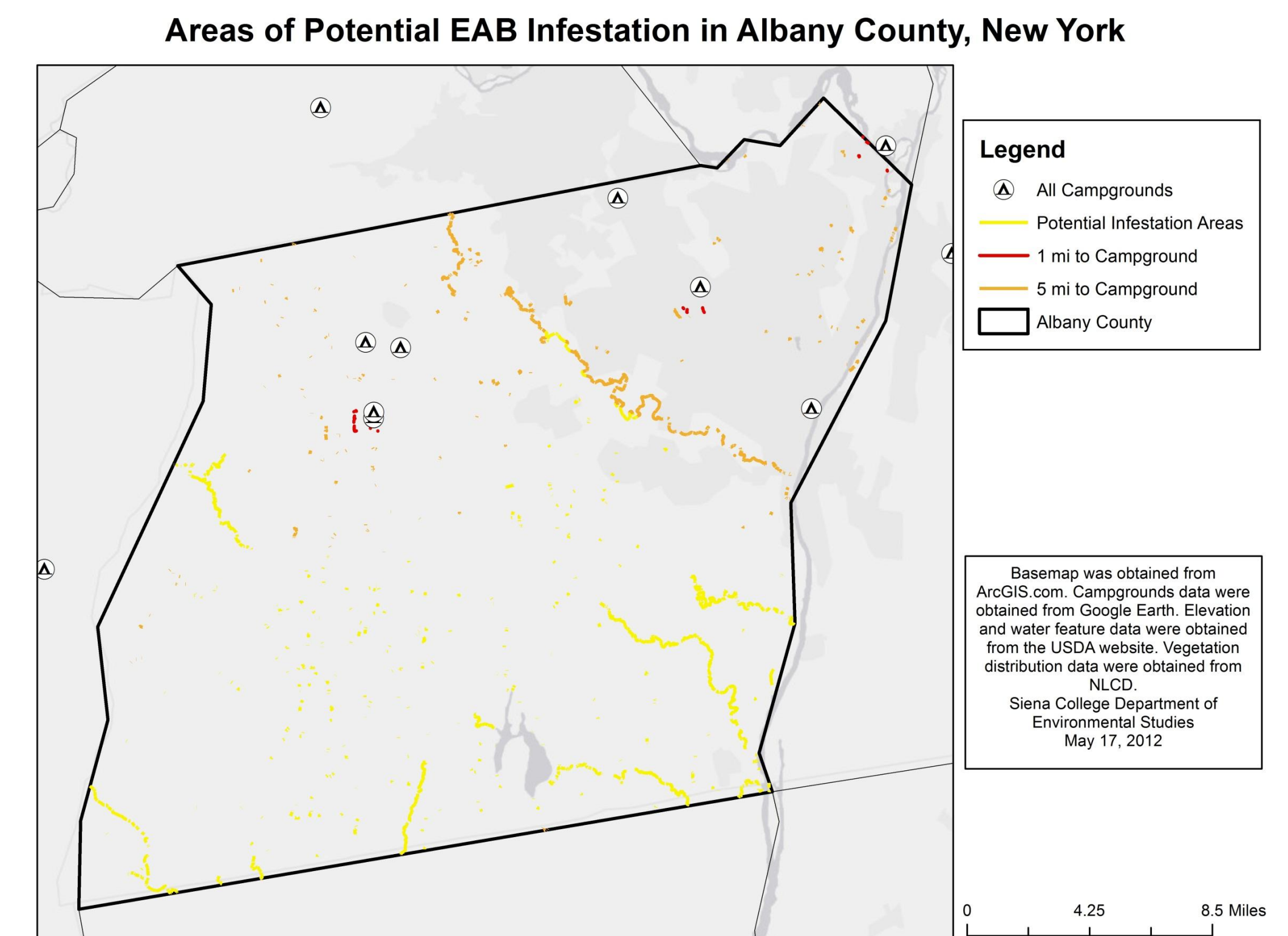


Figure 5: A close-up image of areas susceptible to EAB infestation in Albany County and the locations of private campgrounds. Areas in red and orange indicate those areas that are within 1 mile and 5 miles, respectively, of a private campground.

Conclusions and Future Work

As evident in Figure 3 and 4, there are numerous areas in Albany County that are susceptible to EAB infestation in wet, forested habitats under 3,000ft. Due to the presence of private campgrounds (Figure 5), human presence appears to be a high risk facilitator of the spread of this invasive species. However, this may not be true for other counties with campgrounds.

Immediate future research goals should include investigating the remaining counties within DEC Region 4, especially where DEC and private campgrounds are present, for potential susceptibility to EAB infestation. Additionally, DEC Regions 5 and 6 should also be assessed because they encompass the Adirondack State Park where many DEC campgrounds are located. Eventually, all of New York State's susceptibility should be compared to the locations of public and private camping and recreation facilities to determine the extent New York State is vulnerable to infestation and spread of EAB.

References

- 1) <http://www.tn.gov/agriculture/regulatory/eafaq.shtml>
- 2) newyorkinvasivespecies.info/insects/emeraldashborer.aspx
- 3) nrs.fs.fed.us/disturbance/invasive_species/eab/loc-resources/downloads/EAB_potential.pdf
- 4) www.stopthebeetle.info
- 5) <http://www.dec.ny.gov/24.html>
- 6) <http://www.dec.ny.gov/animals/42674.html>
- 7) www.na.fs.fed.us
- 8) www.gateway.nrcs.usda.gov (elevation and water feature data)
- 9) <http://landcover.usgs.gov/natl/landcover.php> (vegetation distribution)
- 10) ArcGIS.com (Topographic basemap)