

Survey and Map of Invasive Bush Honeysuckle at Locust Grove National Historic Landmark, Jefferson County, Kentucky

Patrick Haulter and Crystal Haulter

Haulterhouse@yahoo.com, Chaulter@gmail.com

Faculty Sponsors: Susan Reigler, MA - Department of Biology and Dr. Peter Galvin - Department of Geoscience, Indiana University Southeast

Abstract

Locust Grove is a 55 acre National Historic Landmark. Some 27.5 acres of this land is covered in forest. In fall 2011, a survey was conducted to estimate the extent of invasive bush honeysuckle (*Lonicera maackii*) coverage. Sixty random points were visited in the wooded area and the number of bush honeysuckle plants in a three meter radius was recorded. Height taller than one meter and those that were less were differentiated in order to predict age distribution. The density of bush honeysuckle in each area was calculated in order to evaluate which areas are in greater need of attention and design an effective action plan.

Background: Bush honeysuckle

Bush honeysuckle is an invasive species and ecological concern in North America. It is native to Eurasia and identified by its egg-shaped opposite leaves, red berries and striated bark. They out-compete native plant species by rapid growth that forms dense shrub layer crowding and shading out native plants. They impair plant and animal habitats by decreasing accessible sunlight and depleting soil moisture and nutrients. In addition, they decrease the biodiversity by competing with native plants for pollinators. They have abundant and highly fertile seeds which also out-compete native species. The seeds pose a serious threat to animal populations that feed on them as they provide very little nutrients. In addition to ecological concerns, bush honeysuckle is extremely difficult to remove and could present economical threats as well.

Background: Locust Grove

Locust Grove in Louisville, Kentucky was established in 1790 by William Croghan and Lucy Clark. Croghan was a surveying partner with George Rogers Clark (founder of Louisville) and Clark himself spent 9 years at Locust Grove. "Locust Grove tells the story of George Rogers Clark, early Kentucky history, western expansion and everyday life on the frontier." Today it is a National Historic landmark located on 55 acres, including 27.5 acres of wooded area(www.Locustgrove.org)

Study Objective

Management of the grounds is one of the priorities for the preservation of the historic site. In order to create a logical management plan regarding bush honeysuckle, a survey of sixty random points was conducted to obtain data about which areas are of highest concern. With the data from the survey, Locust Grove will be able to recognize problem areas and develop a bush honeysuckle eradication plan for the forest.

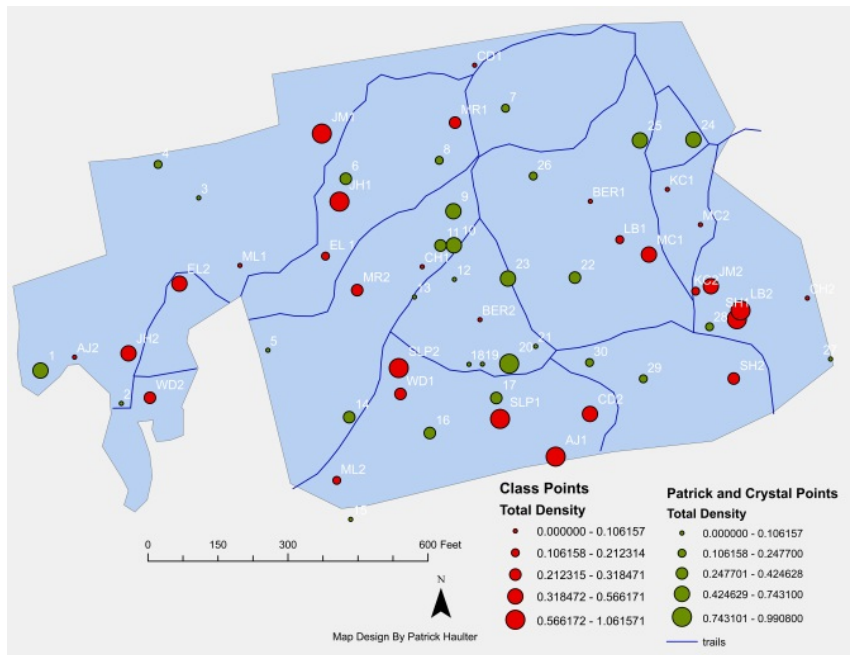
Methods

Using excel, 30 random points were generated and Dr. Attum's Fall 2011 ecology class surveyed the points using handheld GPS units for a density analysis of the bush honeysuckle. An additional 30 random points were generated using GIS (geological information systems). In order to efficiently access these points, a trail map was first created using Sky Blue GPS and Arcpad on a windows based notebook. The points were then surveyed in an orderly fashion using this same GPS, notebook setup. The data of all sixty random points was then plugged into ArcMap for analysis of the results; more analysis is to be achieved in the coming year.

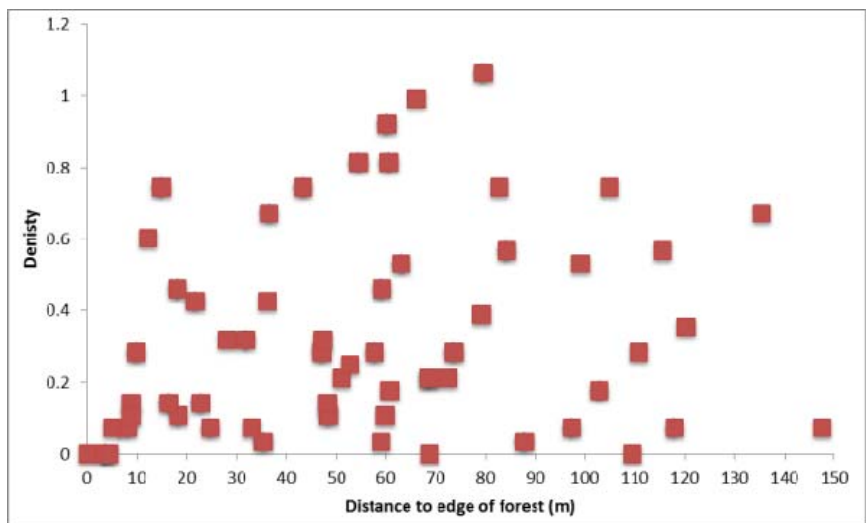
Results



(Figure 1)



(Figure 2)



(Figure 3)

The estimated number of bush honeysuckle plants surveyed was ~31,000, of which ~18,600 were less than 1 M high and ~12,400 were taller. As seen in **Figure 3**, between 60 and 90 meters of the forest edge, the honeysuckle is less dense. At this distance, it is closer to the forest interior and the honeysuckle has not competed with more established species. **Figure 1** shows the points in the woods where data was collected and by looking at **Figure 2** it

demonstrates that the habitat fragmentation caused by the trails as well as the forest edge contributes to higher densities in the bush honeysuckle.

Discussion

Invasive species are a global concern. Our study highlights a local example. Not only are invasive species an ecological concern, they threaten biodiversity. According to Rajvanski A., et al. (2011) “our livelihoods depend on a healthy, functioning, natural environment, which in turn depends on the conservation of the biodiversity.” With bush honeysuckle out competing native plants and damaging animal habitat and food sources, we risk losing diversity. In addition a healthy ecosystem is more likely to bounce back from a disturbance than an unhealthy or invaded system. For the stability of our planet, as well as the beauty, it is vital that we conserve our ecosystems.

Surveys are a critical step in advising efficient and economical action plans. This study will provide information for the Locust Grove Master Plan to be used in the sites management (Nyboer 1992).

References

Nyboer, R. 1992. Vegetation management guideline: bush honeysuckles. *Natural Areas Journal* www.nps.gov/plants/alien/facts

Rajvanshi, A., Brownlie, S., Sloatweg, R., & Arora, R. 2011. Maximizing benefits for biodiversity: the potential of enhancement strategies in impact assessment. *Impact Assessment & Project Appraisal*, 29(3): 181-193

www.locustgrove.org

Acknowledgements

We are grateful to Historic Locust Grove, Inc. and Louisville Metro Parks for providing permission to carry out this research and to the students in the Applied Conservation Biology class at Indiana University Southeast for their assistance in the field. This project was funded by Indiana University Southeast.