

Forestry Practices in a Northeast Wisconsin Woodland

Jacob Baisden, Adam L. Brandt

Division of Natural Sciences, St. Norbert College, 100 Grant Street, De Pere, Wisconsin 54115, USA



INTRODUCTION

- This study was the first forest inventory at this site that had a focus on native tree species.
- The entire St. Norbert Abbey property is about 130 acres. The land is home to the St. Norbert Abbey Church, with most of the property being used for agriculture. The woodland is 13.5 acres and was used for a brickyard in the 1930s. The pond area was excavated for clay and the depression filled in with water by the 1950s.
- The woodland is in early stages of succession following the previous human impact. As the forest changes over time inventories like these should be repeated every five or ten years to help make responsible land management decisions.
- Tree measurements were conducted with a variety of forestry instruments to determine tree species, diameter breast height (dbh), canopy cover, and tree height. Measured trees were marked with metal tags and coordinates were recorded using a handheld GPS unit.
- This property has been managed mainly for recreation by Norbertines from the St. Norbert Abbey and members of the Brown County chapter of the Izaak Walton League.
- This woodland is considered an open forest where more than half of the canopy area is open to the sky. With little canopy cover the forest has a high capacity for colonization of neighboring tree species.
- This study collected measurements on 41 trees throughout the entire 13.5 acre parcel. Selected trees were the dominant tree species within the area.

AIM

- The goal of this study was to gather baseline information on species richness, diversity, and ecological integrity of the St. Norbert Abbey woodland.
- As the forest changes over time inventories like these should be repeated every five or ten years to help make responsible land management decisions.
- This report functions as a baseline study for success of current species and aids in understanding of what successful management of the forest looks like as changes occur in species richness, species diversity, tree dimensions, and human impacts.
- Managed responsibly this woodland has the potential to grow in size, provide habitat for a more diverse range of plants and animals, and serve as a high quality natural science field station and recreational area.
- This data is meant to advance a research partnership that is capable of educating stakeholders on the forest dynamics of the site that will aid in implementing conservation and management actions. The data gathered in this inventory will start a long-term study on the forest succession of the St. Norbert Abbey.

METHODS

Diameter at Breast Height

- Diameter at breast height (DBH) was measured using measuring tape and calipers. Measuring dbh allows the researcher to calculate cross sectional area, surface area, and volume of a tree. The dbh measurement is taken at 4.5 feet or 1.3 meters off of the ground. Calipers are used to measure dbh when the diameter is less than 24 inches or 60 cm.

Tree Height

- Tree heights were measured using the tangent method. This was done with a tangent height gauge. The gauge has sights, a mirror, and a level. The observer looks through the gage sights at the top of the tree at a distance where the level is balanced.

Tree Tagging

- Measured trees were tagged using biodegradable flagging tape before being permanently tagged with double faced aluminum tags. Aluminum tags were nailed to trees with a hammer. Trees were tagged and flagged close to diameter breast height for easy identification. Tags were numbered with the corresponding GPS point of the tree. Tags allow specific trees to be revisited in future studies to track the growth of the tree.

GPS Point Entry

- A Garmin GPSmap 64s was used to record coordinates of 41 trees and shrubs at the St. Norbert Abbey. Dominant trees were tagged and measured every ten meters on the West side of the pond. On the remaining sides of the pond trees were measured and tagged every 20 meters as tree and shrub density was less than that of the West side.

Spherical Densiometer Readings

- The densiometer is an instrument used to measure percent canopy cover. It consists of a convex mirror with 24-1/4" squares engraved on the surface. The densiometer was held level and far enough from away from the body so that the operators head was not visible in the grid. The instrument was used in an open forest which requires a different procedure than when used in a dense forest with high canopy cover. Squares consisting of 4 imaginary points were counted if they were covered by the forest canopy. Points were added up and multiplied by 1.04 to obtain overstory density directly in percent.

Tree Identification

- The dichotomous key *Trees and Shrubs* published by Peterson Field Guides was used to identify tree and shrub species in the woodland. The reader looks at characteristics of the species in question to answer prompted questions from the guidebook. The questions start with basic observations of the tree and gradually get more specific. Questions are based off of tree anatomy, which is described in the beginning of the guidebook

RESULTS

- 41 trees and shrubs were selected with GPS locations marked on the Garmin GPS unit. Of these 41 trees and shrubs, 28 were measured using the methods mentioned. Some trees and shrubs were omitted from measurement if they were invasive and or not trees (i.e. DBH less than 3 cm.)
- 14 species were recorded with green ash being the most dominant. Of the 14 species ten are native and four are non-native or invasive. Buckthorn was the most dominant invasive species.
- The largest tree measured was a cottonwood that was 25.3 meters tall with a dbh of 84.03cm. The average dbh of measured trees was 20.11cm. The average canopy cover for the forest was 53.5%. Average tree height was 9.30 meters.



Figure 1: Photo of Abbey Pond with mating pair of Canada geese.



Figure 2: Photo of a stand of white cedar trees with prairie plants in foreground.

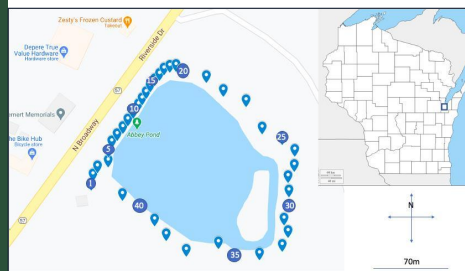


Figure 3: Map of Abbey Pond with marked tree locations.

DISCUSSION

- The future land managers of St. Norbert Abbey can use this inventory as a guide and as a starting point for long term data collection.
- Early successional tree species like ash, cottonwood, and boxelder are present with green ash being the most abundant.
- Thick buckthorn patches surround three sides of the pond with the East side being relatively open.
- Mature trees are sparse as the oldest trees in the forest are cottonwoods of at least 200 years of age located on the West side of the pond.
- Forest openings are occupied by prairie plants including common milkweed, aster, goldenrod, and queen anne's lace.
- Desired tree species for this woodland could include red oak, white oak, quaking aspen, sugar maple, and white birch. A benchmark of successful forest management would be increased species diversity with decreased density of invasive species.
- Four non-native species were listed in this study that include: buckthorn, honeysuckle, scotts pine and European spindle tree.

Advised Management Actions

- Buckthorn and queen anne's lace are the two most prolific invasives on the property. Removal of these two species would be extremely beneficial to boost the biodiversity of the woodland. On 13.5 acres eradication of these two invasives is realistic.
- Deer population at the Abbey is above its carrying capacity. Hunting should be done every year to make sure deer are not over browsing the woodland.
- Of 130 acres only 13.5 acres are functioning as an ecosystem. Reforestation of the agricultural fields would greatly increase the potential for biodiversity. This could be done passively paired with invasive species removal.



Figure 4: Spherical densiometer used to determine canopy cover percent.

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