

# FOREST MANAGEMENT PLAN

For the

## GLADDEN MEMORIAL WOODLAND

Prepared by Don Carlson-Purdue University Forester  
DECEMBER 2003  
UPDATED: OCTOBER 2009

### 1. Legal Description and Location

The Purdue University Claude M. Gladden Memorial Woodland is located approximately 2 miles east of Scottsburg, Indiana. More specifically, it is composed of 106 acres located in Sections 15 and 22, T3N, R7E, of Scott County, IN.

To reach the property take SR 56 east out of Scottsburg to 100 East (first county road outside of Scottsburg). Turn north on 100 East for about a mile to County Road 50 North. Turn east onto 50 North for about 1.25 miles to the northern edge of the Gladden property.

### 2. Physical Description

- Soils:  
The soils on the Gladden Woodland are numerous and varied. They range from very productive, moist soils to less productive, eroded, dry, old fields. See attached soils map for soil boundaries.

The bottomland soils are primarily Stendal and Steff silty clay loams. These soils are of alluvial origin and are deep and somewhat poorly drained. Due to their position, these soils are frequently flooded for brief periods and have a water table around two feet. Site indexes (tree height at 50 years) are: sweet gum-90, yellow poplar-107, pin oak-88.

The upland silty clay loam soils are loess derived. All of these soils are reported to have a fragipan at 20-40 inches (shallower in severely eroded areas). Due to the fragipan, a perched water table is common at 1.5-3 feet. However, the soils are considered to be well drained and deep. The sloping ground contains Cincinnati and Haubstadt soils while the more level upland, old fields contain Jennings and Scottsburg soils. Site indexes are: Oak-65-80, yellow poplar-85-100.

- Topography: The land is relatively flat on the north (upland) and south (bottomland). It is gently rolling in the middle with slopes in the 2-12% range. The maximum elevation change is roughly 50 feet.
- Acreage: The 106 acre property can be divided into five contiguous compartments. Compartment 1 is a 16.2 acre old field that was replanted to hardwoods in 2003. Compartment 2 is a 14 acre upland old field that has naturally regenerated small saw log sized hardwoods. Compartment 3 contains 43.6 acres of an upland hardwood forest.

Compartment 4 contains approximately 15.3 acres of bottomland hardwood forest. Compartment 5 is a 16.9 acre old field that has naturally regenerated since the mid 1970s.

- Property lines: The property is bounded on the north by CR 50 North and on the south by Stucker Ditch. The east line has an established access lane and a fence on the property line. The west line is easily definable where neighboring agriculture fields meet the Purdue property. Along this western edge where neighboring forest meets Purdue's forest, the line has been marked on trees to make it distinguishable.

### **3. Forest Description**

- Stand Characteristics: Most of the Gladden property consists of even aged stands of trees. Compartments 1, 2, and 5 were cleared for agricultural use and have since been planted or naturally regenerated to trees. Compartments 3 and 4 have apparently always been managed as forest with the initial harvests of virgin timber occurring over one hundred years ago.

The forest has been selectively harvested twice since 1979. All harvests have and will be conducted in a fashion to maintain and improve the health of the forest. Harvest trees are selected to reduce competition of future crop trees or to create forest openings to allow quality, natural regeneration of shade intolerant species to occur. This ongoing management will maintain a mosaic of even-aged stands of various size and age classes.

- Species Composition: Compartment 1 was planted to hardwoods in the spring of 2003. The species planted included red, white, shumard, and bur oak, walnut, cherry, ash, and tulip poplar. Along with the planted trees, naturally occurring ash, sweet gum, red maple, and black locust are present and will thrive.

Compartment 2 consists of naturally regenerated, shade intolerant tree species such as ash, cherry, yellow poplar, elm, sycamore, sweet gum, soft maple, pin oak, and walnut. The numbers of shade tolerant species such as sugar maple, hickory, and beech are increasing as overstory trees die out and are replaced by shade tolerants growing in the understory.

Compartment 3 contains much of the same species mix as compartment 2 with the addition of red oak. Compared to Compartment 2, there is a much larger component of shade tolerant species due to the age of the stand and the ability of shade tolerant species to survive and grow in the shaded understory.

Compartment 4 is primarily bottomland that contains many of the same species as all the other compartments but is heavy to species that are able to thrive in poorly drained soils. These species include soft maple, pin, swamp chestnut, cherrybark, and shumard oak, sycamore, sweet gum, and ash. The better drained soils produce quality yellow poplar, sugar maple, oak, and beech.

Compartment 5 is an old field that has naturally regenerated to shade intolerant trees that are able to grow on frequently flooded bottomland soils. These species include soft maple, ash, river birch, sycamore, pin and swamp chestnut oak, and sweet gum.

- **General Size Classes:** Size classes of trees range from seedlings to large saw timber. Compartment 1 contains the smallest trees as they are all two years old or less. Compartment 5 contains post sized trees as all the trees are roughly 25 years old. Compartment 4 contains a mix of sawtimber sized trees mixed with a large pocket of post sized trees as a result of the 1983 harvest. The 1999 harvest created additional openings presently containing thousands of seedlings per acre. Compartments 2 and 3 are upland hardwood stands containing all size classes with some exceptionally large yellow poplar and red oak along with several other individuals of various species.
- **Stocking:** To keep the crop trees vigorously growing while maintaining quality and health, the BA should remain between 80-120. The forest is presently well stocked with at around 90 ft.<sup>2</sup> BA / acre. See Inventory Data below for additional stocking information.
- **Inventory Data:** The analysis of the 1985 and 1997 CFI data has been completed using the Indiana Division of Forestry's program called Inventory 2000. The summaries for Compartments 2, 3, and 4 are attached. There is no inventory data for Compartments 1 and 5.

The initial 1985 continuous forest inventory (CFI) followed the 1983 timber harvest and revealed a stocking of 96.4 ft.<sup>2</sup> BA / acre and 5,357 board feet per acre on the 72.9 acres comprising Compartments 2,3, and 4. According to the most recent CFI data from 1997, the woodlands had a total stocking of 116 ft.<sup>2</sup> BA / acre in an average of 217 trees / acre greater than or equal to 3.0 inches in diameter at breast height (dbh). In 1997, there were 8,906 board feet / acre with a total of 649,319 board feet. When comparing the 1985 CFI to the 1997 CFI, the Gladden woodlands increased 1.7 ft.<sup>2</sup> of BA / acre / year and 296 board feet / acre / year.

Since that time, a harvest of 473 trees, plus 46 culls, containing 188,088 board feet occurred in 1999. This harvest reduced the BA from a high of approximately 120+ ft.<sup>2</sup> BA / acre to an estimated 95 ft.<sup>2</sup> BA / acre. During the winter of 2000-1, post-harvest timber stand improvement (TSI) was completed to further reduce the excessive competition on future crop trees. This resulted in an additional stocking reduction of roughly 5 ft.<sup>2</sup> of BA / acre. With the present stocking at an estimated 90 ft.<sup>2</sup> BA / acre, the forest is in an ideal condition to vigorously grow healthy, high quality trees until the next harvest around 2012.

#### **4. Unique Features**

- **Physical:** The southern boundary is Stucker Ditch that was dredged many years ago. The dredging has undoubtedly changed the natural drainage of the area.
- **Biological:** The forest is unique in that it has been protected from past typical abuses that were common throughout the early to mid 1900's. All things considered, this forest contains diverse natural plant communities and provides good wildlife habitat for a variety of species, none of which are known to be endangered or threatened.
- **Cultural:** none

#### **5. History**

- **Acquisition Date:** 1979
- **Fire:** There is no record or evidence of fire in the forest.

- **Grazing:** According to records, cattle have been excluded from this woodland for at least the last 80 years.
- **Inventory:** The woodland was first inventoried in 1980 using a point sample inventory for 62 acres containing sawtimber trees. This inventory revealed an impressive 11,000 board feet average per acre and totaled an estimated 675,840 board feet of timber. In 1984, 36 permanent 1/5<sup>th</sup> acre CFI plots were established on the entire 72.9 wooded acres. In 1997, all of the CFI plots were remeasured. During the 12 years between 1984 through 1996, the forest had grown roughly 296 board feet per acre per year. The attached inventories demonstrate the high growth potential of this woodlands when properly managed and harvested
- **Installation of Research Plots:** There is presently an herbicide trial on controlling black locust in the newly established tree planting.
- **Harvests:** Prior to Purdue's acquisition, no timber had been harvested on the Gladden property since the original virgin timber was cut around the turn of the century. In 1983, 680 trees, plus 85 culls, containing 251,519 board feet were sold for \$40,265 (\$0.16 / board foot). Most of this timber was cut from the overmature bottomland stand or southern point of the upland hardwood stand. In 1999, a second harvest was conducted by selling 473 trees, plus 46 culls, containing 188,088 board feet for \$69,300 (\$0.37 / board foot). This harvest concentrated primarily in the upland hardwood stands of Compartments 2 and 3.
- **Specific Management Activities:**

Year	Description
1980	Variable point sample inventory of 60 acres.
1983	Sold 251,519 board feet of timber.
1983	Cleared the upland agriculture field to make it suitable for farming.
1984	Completed post-harvest tsi.
1985	Established 36 permanent 1/5 <sup>th</sup> acre CFI plots on 70 acres of established woodlands.
1997	Remeasured CFI plots.
1999	Sold 188,088 board feet of timber.
2001	Completed post-harvest tsi.
2003	Gate installed to control access.
2005	Compartment 2: Spring broadcast spray application of glyphosate on 3-4 acres of Japanese honeysuckle and multiflora rose. Effective kill but significantly increases prevalence of Japanese stilt grass in this area. Comp. 2 & 3: Salvage harvest of 12,432 BF.
2009	CFI completed. Comp. 2 & 3: Japanese stilt grass control initiated along trails and via spot spraying. Japanese honeysuckle and multiflora rose control continued via spot spraying and limited broadcast application.
2009-10	<i>Timber harvest needed due to declining ash, hurricane Ike, and stand conditions.</i>

## 6. Forest Management Concerns

This woodlands has been protected from fire, grazing, and harvesting for many years prior to Purdue's acquisition. Therefore, it provides excellent examples of true old field succession and

natural forest regeneration. However, some invasive exotic species are established in the forest and threaten its ability to sustainably regenerate to its historic natural potential. The most notable exotic species are Japanese honeysuckle and multiflora rose and more recently Japanese stilt grass. All three of these species have invaded the understory of most of the upland hardwoods and present a major regeneration and access problem when the forest canopy is opened up through harvesting, natural disturbances, or large tree mortality.

## 7. Management Objectives

A major goal for this forest is to provide funds for annual scholarships for forestry students at Purdue University. These funds are derived from an endowment and increased by income generated from periodic, sustainable timber harvests. All management activities should be performed to generate the necessary income while improving the health, quality, and productivity of the woodlands. In addition, providing the opportunity for forest and wildlife research remains a high priority. Finally, the Gladden Woodlands should be used to demonstrate good stewardship to forestry professionals and the public.

## 8. Implementation Plan

The 1999 harvest and the completion of the post-harvest tsi in 2001 have put this forest in excellent growing condition until the next harvest that should occur around 2012. In the mean time, steps should be taken to control the invasive exotics, especially Japanese honeysuckle. Since there has been little applied research in controlling Japanese honeysuckle in Indiana, this may be an excellent opportunity to develop a research project in control measures within a managed forest.

For example, the 2003 planting has been invaded by black locust and Japanese honeysuckle. These aggressive species have a great potential to severely limit the success of this planting.

Realizing the value of this forest for its research potential, re-measuring the CFI plots should be a priority. All of the CFI plots should be re-measured in 2004 with a follow-up analysis of the data. The woodlands management forester, Don Carlson, should see to the completion of the data inventory and its analysis. Following this inventory, additional re-measurements and analysis should occur every five years.

Finally, efforts should be made to improve the forest's accessibility and use for management / demonstration purposes. 1) A small parking area needs to be established. 2) A trail system needs to be developed and maintained periodically to allow easy access for groups.

## 9. Summary

Year	Task to be completed <i>(Updated Oct. 2, 2009)</i>
2004	Establish a parking area and develop a maintainable trail system. <i>done</i> Conduct second year weed control on 2003 tree planting. <i>done</i> Develop management strategy to control invasive exotic plant species. <i>Continuously improving access (cutting / spraying new trails), controlling Japanese stilt grass (Aug. 2009), limited spot &amp; broadcast spraying. Much more needed!</i>
2004, 2009	Remeasure CFI plots. <i>done</i>

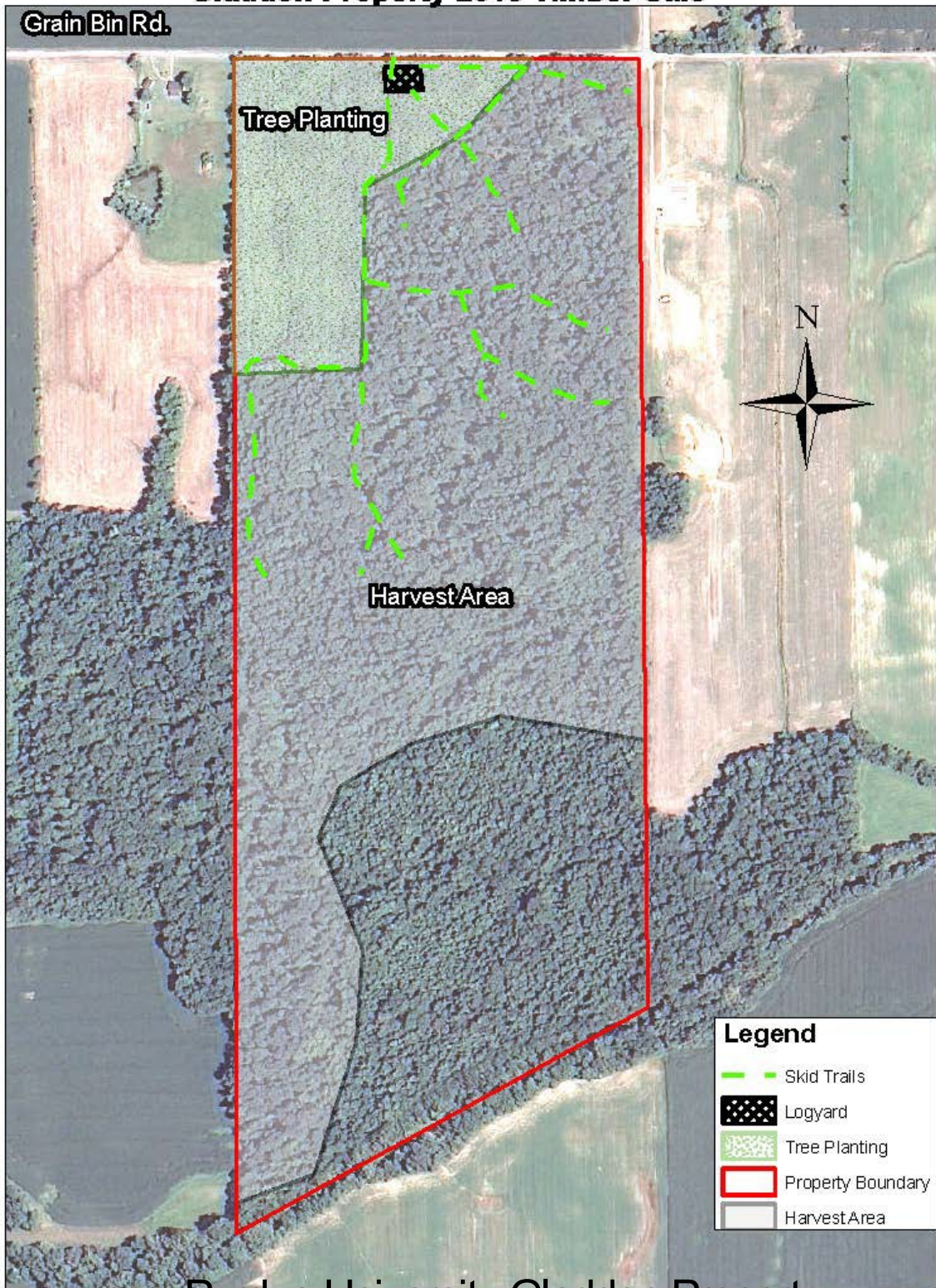
2010-2014	Conduct timber sale. Date can be adjusted as needed. <i>Ash seriously in decline. Hurricane Ike produced numerous windthrows and broken tops. Harvest needed in winter 2009-10.</i>
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Gladden Memorial Woodlands  
1998 Aerial Photo





# Gladden Property 2013 Timber Sale



Purdue University Gladden Property  
Photo Date: 1992







# Topographic Map

