

FOREST MANAGEMENT PLAN

For the

PINNEY-PURDUE AG. CENTER WOODLAND

Prepared by Don Carlson-Purdue University Forester
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1. Location and General Description

The Pinney-Purdue Ag Center (Pinney-PAC) is located about 8 miles east of Valparaiso on the north side of US Route 30 where Porter and LaPorte Counties meet. Pinney-PAC has one main forested area totaling 36 acres. This forest is divided into two compartments: Compartment 1 is the western portion of the forest and contains 21.47 acres. Compartment 2 is the eastern portion and contains 14.58 acres.

2. Physical Description

Soils: (Tracey-Hanna-Bourbon) This complex consists of soils found on nearly level, moderately well drained to poorly drained soils formed in loamy and sandy outwash. The dominant soil is a Hanna sandy loam, 0 to 3% slope, with a reported site index (SI) for red and white oak of 90 (90 feet tall in 50 years).

Topography: The land in this area is nearly level.

3. Forest Description

- **Stand Characteristics:** The forest has an even-aged structure and appearance overall as a result of past management. The majority of Compartment 1 has not been cut in many years and is in decline as evidenced by the many down trees in various stages of decay on the forest floor and the additional decaying, dying, or dead trees in the overstory. The natural regeneration has been slow to respond to the small gaps created by individual trees dying at random. Therefore, much of Compartment 1 has a two storied appearance, the overstory canopy and the understory / midstory layer of struggling trees and brush. The 1977 harvest in compartment 2 removed pockets of the overstory to allow increased sunlight to hit the understory and forest floor. This has resulted in several small, naturally regenerated, even-aged stands of vigorously growing trees and other plant life.
- **Species composition and size classes:** The many years of livestock grazing culminated in the 1930's with several livestock grazing studies. A description of the forest in 1954 by a research forester still adequately describes the majority of Compartment 1 today.

The woodland consists of an even-aged stand of mature black oak. A small number of white oak, cherry, and hickory are scattered through portions of the stand. The average tree was estimated to be 20" diameter at breast height (dbh) with a stocking of 35-50 merchantable trees per acre and a basal area (BA) of 70-100 square feet per acre. There probably is little net growth because of decay and mortality. There is little in the way of secondary age class representation. The exclusion of grazing 20 years ago has had little effect in establishing reproduction under the main canopy.

In the openings, where the trees have been cut or have died, cherry is the principal species that has been reproduced. Oak reproduction is evident but growing slowly in

these openings, two inches or less in height per year. Brush (*Rubus*, *Corylus*, etc.) is the conspicuous vegetation in the openings, in general.

A modification to the 1954 statement would be that the average remaining black oaks are now averaging 26 inches dbh and most of the openings described as containing “brush” in 1954 have regenerated to primarily pole to small sawlog sized black cherry with some hickory and very few oak.

A 2.5 acre opening in Compartment 2 created during the 1977 timber harvest has now naturally regenerated into black cherry and aspen with some elm and cottonwood. The same harvest also removed diseased or dying trees plus additional individuals to reduce competition on the remaining trees.

An important note to realize is that if this forest (Comp. 1 and 2) continues on its present course, a mix of black cherry and hickory with additional miscellaneous species will seemingly replace the dominant oak overstory. The black cherry appears to reach its physical maturity on this site between 18-22 inches.

- Stocking: Compartment 1 contains 122 square feet per acre and has essentially reached its carrying capacity for the given species mix. In order for existing trees to survive and grow, others will decline and die. Timber harvesting and fire are two alternatives that will reduce the stocking level to increase the growth and vigor of the remaining trees.

Compartment 2 contains 117 square feet of BA per acre. This is 5 square feet more than what was present in 1975. It is nearing its maximum stocking level but has the ability to increase to a higher level (~130 sq. ft.) due to a more diverse species composition and improved health overall. As the stocking increases, competition increases and the overall health and vigor of the stand will decrease.

- Inventory Data: In 1975, Purdue foresters established 20 Continuous Forest Inventory (CFI) plots. The systematically laid out plots have a fixed center point and cover 1/20th of an acre. Within the plot, every tree three inches or larger is measured and recorded. The analysis of the data provides precise and directly comparable measurements of growth and mortality while tracking changes in species composition, stocking, size, quality, and value. The CFI system allows for the gathering of additional data as deemed necessary to enhance the understanding how changes in the forest impact various characteristics such as wildlife habitat and populations, forest health, and soil productivity.

The summaries of the 1975 and 2001 CFI inventories are available if requested. Listed below are a few of the interesting facts that immerge when the two inventories are compared on the compartment level. Before looking at the summaries, it must be remembered that 105,600 board feet (BF) of timber in 273 trees was cut from Compartment 2 in 1977. No timber has been cut in Compartment 1 for many years.

1. Over the last 25 years 11 merchantable trees per acre have died in compartment 1 while 13 (9 harvested / 4 natural) have died in compartment 2. Merchantable trees per acre have declined in both compartments (New trees are not reaching merchantable size as fast as the mature trees are dying.).
2. Compartment 1 has been growing an average of 39 BF/acre/year while Compartment 2 has been growing an average of 121 BF/acre/year. An average stand should be growing 150-175 BF/acre/year.
3. The average diameter of trees in Compartment 1 and 2 has decreased.

4. In both stands, the oak is being replaced by cherry and hickory and several other miscellaneous species.
5. In compartment 1, pin oak has declined dramatically over the last 26 years. The black and white oak have increased in volume and BA but decreased in number of trees per acre.
6. In Comp. 2, black oak has been reduced substantially to increase species composition and improve the health and vitality of the stand.

4. Unique Features

- Physical: The Pinney PAC woodland is a relatively large, contiguous forest for this area.
- Biological: This forest provides excellent wildlife habitat for a variety of species, none of which are known to be endangered or threatened.
- Cultural: In a landscape dominated by productive crop fields and an ever expanding urban sprawl, the Pinney PAC woodlands is highly visible and aesthetically enjoyed by many neighbors and thousands of travelers each day as they drive by on US Highway Route 30. In view of this, it is necessary to maintain the forest's appearance and health while demonstrating its productivity and renewability.

5. History

- Acquisition Date: William E. Pinney and his daughter, Myra F. P. Clark, gifted The Pinney PAC to Purdue University and the people of Indiana on January 25, 1919.
- Fire: Fire damage has not been noted in this woodland.
- Grazing: According to the available history of the woodland, the forest was grazed in one form or another until around 1936.
- Inventory: Several inventories have been completed since Purdue acquired the property. However, the 1975 CFI data set is complete and provides an accurate base for comparison to additional remeasurements of the same trees and plots. The CFI plots were remeasured in 1986 and 2001. Every five years the CFI plots should be remeasured.
- Research Conducted: During the early 1930's, several grazing studies were conducted in the woodlands. The study confirmed the minimal forage benefit cattle receive from woodland pasture.
A top lopping study was conducted in Compartment 2 as part of the timber harvest in 1977. It was determined that top lopping results in excessive unproductive time to a logging operation. When top lopping is deemed necessary, it should be conducted apart from a timber sale / commercial harvest.
In 1979, an artificial regeneration study was initiated to (1) determine the effects of vegetation control on survival and growth of seedlings and (2) compare natural regeneration versus artificial regeneration (planted seedlings). The plantings included tulip poplar and black walnut. After 22+ years, both species fared poorly on this site in both growth and survival while naturally regenerated black cherry thrive.
- Harvests: Prior to 1960, the only apparent harvesting was of mature trees for farm use. In 1977, Compartment 2 was harvested yielding 105,600 BF in 273 trees. The harvest provided for the removal of mature and overmature trees, primarily black oak, and reduced the stocking level of poor quality trees to favor healthy trees and natural / artificial regeneration. The 1977 Harvest Volume summary is attached as Appendix 1. No commercial harvesting has taken place on Compartment 1.
- Specific Management Activities: Grape vine control was conducted on the northern portion of Compartment 1 and all of Compartment 2. No other record of forest management outside of harvesting has been completed to date.

6. Forest Management Concerns

The location and size of this forest dictate that the overall appearance of the forest must be strongly considered when making management decisions. Any harvesting should be conducted in a way to minimize the negative visual appearance of harvesting while accomplishing the necessary silvicultural requirements of the forest.

7. Management Objectives

Sustainable timber and wildlife management are the primary goals on this forest. This forest is also to be used for forest research and forest management demonstration purposes.

8. Implementation Plan

Understanding that a major role of all Purdue University forests is education for both the general public and forest management professionals, the continued remeasurements and analysis of the CFI plots should be a priority. All of the plots need to be remeasured every five years with the next remeasurements scheduled for 2006.

In addition to the CFI, a timber harvest needs to be conducted on both compartments to improve the overall health of the forest and increase the diversity of its species composition and stand structure. This will be accomplished by harvesting groups of trees in areas dominated by large diameter trees, especially when many are showing significant signs of decay and / or dieback. Due to the excessive decline of many of the trees, some of these groups may occupy areas ranging from one to five acres in size. Scattered individual trees should also be harvested when the stocking in a particular area is too high or when healthy trees of good quality need more room to grow. It should be ensured that quality hard mast producing species should remain along opening perimeters to ensure adequate opportunity for the natural regeneration of these species, primarily oak and hickory. The harvest should be conducted in a way to minimize the temporary negative visual impact harvesting will have on the woodland.

With an understanding of the above criteria, a improvement timber harvest was marked on the woodland (see Appendix 2). The northern portion of Compartment 1 will be harvested primarily through a group selection method to stimulate vigorous natural regeneration and remove the declining overstory trees. The southern end of Compartment 1 (approximately 10 acres) will receive no cutting at this time to serve as a visual buffer and provide a lasting example of how the forest will change over time without significant management. Compartment 2 will also be harvested primarily through the group selection method. However, on several relatively large areas where the forest was healthy and growing well, no trees were marked for harvest. The harvest should create a mosaic in the forest structure to allow for sun loving, fast growing trees to regenerate in the openings. The areas minimally harvested should experience little if any damage throughout the harvest and should remain in tact to withstand the increased exposure to the elements. Overall, the harvest will:

1. improve the health and vitality of the forest,
2. demonstrate the sustainability of the forest resource through management,
3. increase the diversity of wildlife habitat, and
4. minimize the negative visual impact of the required silvicultural management implemented.

Following the harvest, post-harvest timber stand improvement needs to be completed to complete the natural regeneration openings, deaden cull trees as needed, and release crop trees from excessive competition. In addition to timber stand improvement, several of the forest openings should be planted with oak seedlings to improve the chances that oak can once again be a significant component in the overstory. This will again be an excellent opportunity to repeat the research study conducted in 1979

comparing natural regeneration to artificial regeneration (planted trees). However, this study should concentrate on various oak species such as black, white, bur, pin, shumard, and red oak.

9. Summary

Year	Compartment	Task to be completed
10/2002	1 & 2	Sell timber marked for sale. After harvest, complete post-harvest timber stand improvement.
2006	1 & 2	Remeasure CFI plots. Remeasurement should occur every five years thereafter.
Spring or fall 2003	1 & 2	Establish a regeneration study concentrating on the establishment of oak.

Pinney Purdue Agriculture Center 36 Acre Forest



APPENDIX 1

PINNEY PAC
COMPARTMENT 2 TIMBER SALE
1977
14.58 ACRES

SPECIES	2.5 Acre Clearcut Area		Partial Cut Area		Total Compartment 2	
	Trees	Volume (board feet)	Trees	Volume (board feet)	Trees	Volume (board feet)
Basswood	1	226			1	226
Black Cherry	11	690			11	690
Hickory	48	3753	1	233	12	3986
Black Oak	44	17,548	111	69,477	155	87,025
Red Oak	2	1,250	1	777	3	2,027
Pin Oak	1	240			1	240
Bur and Swamp White Oak	39	4,760	7	2,796	46	7,557
White Oak	6	3,020	1	830	7	3,850
TOTALS	152	31,487	121	74,113	273	105,600

TIMBER VOLUME SUMMARY

County: Laporte
 Sale Date: 10:00 am on October 30, 2002
 Type of Sale: Sealed bid
 Owner: Purdue University
 Location: SW1/4 of Sec. 31, T35N, R4W on the Pinney Purdue Agriculture Center approximately 1 miles west of Wanatah.
 Contact: Don Carlson, Purdue Forester wk: 812-665-2247 hm: 812-847-1918
 Cell phone: 756-427-0944
 Remarks: Harvest area is ~30 acres. Trees are marked in blue and / or florescent orange at dbh and on the stump. The stump mark indicates the desired direction to fell trees. The ground is flat. Access is good. Buyer will pay 20% down at the signing of the contract with the balance due within 90 days or before any trees are cut. Bids must be submitted on bid sheet available from Don Carlson.

Pinney PAC Compartment 1 ~15 of 21.5 acres

Species	# of Trees	# of Culls	Total Volume	Ave. Vol. / Tree
Black Oak	55	17	24,401	444
Black Cherry	94	57	13,954	148
White Oak	26	1	8,104	312
Pignut Hickory	30	7	4,778	159
Bur Oak	7	1	2,366	338
Shagbark Hickory	11	8	1,471	134
Bitternut Hickory	5	5	577	115
Miscellaneous*	6	2	454	76
Total	234	98	56,105	240

*Miscellaneous = 2 (+1 cull) Swamp White Oak, 2 Red Elm, 1 Pin Oak (+1 cull), and 1 American Elm.

Pinney PAC Compartment 2 14.5 acres

Species	# of Trees	# of Culls	Total Volume	Ave. Vol. / Tree
Black Oak	43	10	17,196	400
Bur Oak	17	3	5,746	338
Black Cherry	42	30	5,147	123
Shingle Oak	12	1	1,907	159
Shagbark Hickory	10	6	1,293	129
White Oak	2	1	637	319
Pignut Hickory	5	3	629	126
Bitternut Hickory	2		333	167
Total	133	54	32,888	247