FOREST STEWARDSHIP and MANAGEMENT PLAN

Prepared For

WHITE TOWNSHIP SUPERVISORS

950 Indian Springs Road
Indiana, PA 15701

On Lands of

WHITE'S WOODS

245 total acres
229 forest management and stewardship acres

Prepared by

BABYAK FORESTRY SERVICES
DAVID J. BABYAK, R.P.F
33 Moretti Road
Indiana, PA 15701
724-465-8345

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SECTION 1

INTRODUCTION

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Introduction

This *Forest Stewardship & Management Plan* has been prepared at the request of the White Township Supervisors. This plan addresses the forest component of the White's Woods and its relationship to the recreational values, water, soil, flora and fauna found therein. It is intended to be a multiple use plan by addressing the uses and needs of the visitor's of the White's Woods and the residents of White Township and Indiana.

The recreational use of White's Woods is that of a passive recreation property. Walking, leisure hiking and some biking and cross country skiing are the primary activities. There are no current plans to develop the property with any facilities such as pavilions, parking or rest rooms

Method of Inventory

An inventory of the forest resources was performed using basal area analysis (see glossary of forestry terms). The inventory was conducted to determine stand (management unit) densities, volumes, tree quality and condition, and regeneration potential.

A total of 102 variable size plots were randomly placed on 229 forest stewardship acres, which have the potential for forest management. Included are approximately 22 acres that have been recommended to be excluded from active forest management. This area could be retained as "natural" area with the only tree harvest to be for White's Woods visitors' safety. As mapped, the tract contains approximately 245 acres which is similar to the 247 acres mapped in a timber appraisal performed in 1995. The remaining acreage is comprised of pipeline right-of-ways, gas wells and roads. Unit acreage was determined by measurement using *MapTech's Terrain Navigator* topographic mapping program and are approximate, as are park property boundary locations.

A *Tract Summary* is included that summarizes unit acreage and timber volumes and values by species. Timber prices are based on prices paid for standing timber (stumpage) on a competitive bid basis at the time of this plan. Prices consider access, operating conditions, and other constraints of operating in a sensitive area such as White's Woods. Timber prices fluctuate depending on domestic and international economic conditions and consumer preferences for wood.

Timber volumes were determined by using the Scribner Log Rule, Form Class 78 (see note below). Minimum sawtimber diameters include trees larger than 11 inches at dbh.

Note: There are a variety of log rules available for use. Log rules are based on mathematical equations that determine tree and log volumes. The three most common log rules are the Doyle, Scribner, and International ¼-inch rule. The Scribner rule is an intermediate estimator of the content and lumber yield for logs and trees.

Log rules are estimates of volume; therefore, variability exists between the different methods as well as log shape, size, taper, and human error.

General Findings

Approximately 229 acres of White's Woods are forested with transition hardwoods (tulip poplar), mixed transition hardwoods (poplar/oak) and mixed oak timber types/ that are approaching maturity or are overmature.

Most of the forest has developed on units that are abandoned farmland or previously harvested woodland. According to Richard S. Stephenson, naturalist and historian, in his 1980 *Human History of White's Woods,* "White's Woods has been logged at least twice since the early settlers. Some areas in the woods were logged as recently as the 1940's and early 1950's." Gilpin silt loams (32%), Gilpin-Weikert 24%) and Dekalb 25%) are the primary soil associations and are generally suited for timber growth and production.

The units generally contain an excessive number of trees for optimum tree growth. The dominant tree species by sawtimber volume are tulip poplar (68%), red oak (15%), and black oak maple (5%). The dense forest canopy and heavy shade is not conducive for tree seedling establishment.

Most of the tree understory is comprised of shade tolerant species such as birch, beech, red (soft) maple, and cherry. Excessive deer browsing has also contributed to the poor regeneration of oak species and tulip poplar. Browsing has also contributed to the proliferation of species not preferred by deer such as fern and spicebush.

There were no endangered or threatened species found in a PA Natural Diversity Inventory performed. The large expanse of mature forest does not offer a diverse or special vegetative habitat for wildlife in general.

The adjoining IUP CO-OP properties located to the north and west are similar in habitat to White's Woods. The adjoining private lands north of Route 954 also support similar forest covers. Springs and seeps form intermittent streams which form the head waters of White's Run and Stoney Run. No ponds are located on the property.

A *Timber Cruise and Appraisal* was conducted by another party in March 1995. The report indicated that approximately 1,916,000 board feet (1,916 MBF) were inventoried. This plan shows 2,650,000 board feet of standing saw timber. This represents an ingrowth of 716 MBF or an annual growth rate of 3.5%. Assuming just a 3.5% ingrowth, White's Woods timber volume would increase by over 900 MBF in the next ten years.

Management Goals and Objectives

Primary Goal

The primary goal of this plan is to protect and enhance the renewable forest resources of White's Woods while managing and conserving the water, soil, and recreational opportunities of White's Woods by implementing sustainable forest management principles (see pages 5 & 6 for a discussion of sustainable forestry principles).

Objectives

- Protect the forest aesthetics, water, soil and bio-diversity, which as a whole comprise White's Woods.
- To inventory and examine the age, health, vigor, and quantity of the forest resource in order to manage White's Woods for the benefit of the citizens of White Township and White's Woods visitors.
- To carefully plan and conduct timber harvest activities without diminishing recreational activities or soil and water quality.
- Implement silvicultural techniques, which will improve growing conditions, sustain the productivity of the forest, and harvest forest products that may otherwise be lost.
- Identify areas that may support unique and sensitive flora, fauna or have historical significance.
- Coordinate forestry activities with park activities such as facility expansion, maintenance or safety considerations.
- Establish forestry demonstration areas that use Best Management Practices and sound silvicultural practices.

Principles of Sustainable Forestry

Principles of Sustainable Forestry courtesy of:
Northern Forest Alliance www.northernforestalliance.org

A common goal of sustainable forestry is to pass on to future generations a forest that is ecologically healthy and productive. The White's Woods Forestry Stewardship & Management Plan is based on the principles of sustainable forestry. One overall goal of the plan and its implementation is to establish White's Woods as a demonstration site for sustainable forestry practices.

Sustainable forest management is built on the following five principles, which should be implemented to the degree practicable:

1. Sustainable forest management places the highest priority on maintaining the long-term integrity of the forest ecosystem.

Sustainable forest management should:
• Maintain the productive capacity of the soil.
• Protect water quality, wetlands, and riparian zones.
• Maintain habitat for native, forest-based flora and fauna.
• Identify and protect unusual or fragile natural areas

2. Sustainable forest management uses the structure, function, and dynamics of the natural forests as a model when planning and carrying out management activities.

Sustainable forest management should:
• Use harvesting techniques and patterns that reflect the natural disturbance regime of the forest.
• Maintain large live trees, snags, and coarse woody debris ("biological legacies") in all harvested areas.
• Use species native to the site when re-generating stands.
• Restore and maintain a full range of age classes and structures, including a significant component of mature and late-successional trees and stands.
• Include some areas not managed for timber production where natural ecological processes can take place.

3. Sustainable forest management is conducted according to a management plan that takes a long-term perspective at all levels.

Sustainable forest management should:
• Calculate harvest levels for timber and other products that can be maintained over the long-term, consistent with the maintenance of forest ecosystem integrity and the protection of ecological and cultural features.
• Include regular monitoring of forest composition, structure, and yield.
• Consider varying scales, including stand management, the overall ownership, and the surrounding landscape.

4. Sustainable forest management should maintain important cultural values of the forest.

Sustainable forest management should:
• Provide appropriate opportunities for public access and traditional uses.
• Mitigate the aesthetic impact of harvesting and other activities.
• Identify and protect important archaeological, historical, cultural, or recreational sites.

5. Sustainable forest management recognizes the responsibilities of land ownership as well as the rights.

Sustainable forest management should:
• Sustain the potential for long-term economic return to the landowner.
• Give the owner and land manager flexibility in the mix of stewardship methods used to achieve sustainable forestry within a given forest holding.
• Maintain and enhance the long-term social and economic well being of local communities, forest-based businesses, residents, and visitors.
• Support public interests, values, and resources (such as water) when preparing management plans.
• Maintain and enhance the forest-based values and opportunities available to future generations.

General Recommendations

It is recommended that certain Management Units, or portions thereof, be harvested by a series of intermediate thinnings over a 10-year cycle. This would involve the selective marking of over mature, mature, dead, and damaged and suppressed or over crowded saw timber and pulpwood trees. An intermediate thinning is the initial type of harvest utilized in sustaining and regenerating a forest stand. Selective are harvests where individual trees or groups of trees are individually marked for harvest. These thinnings would accomplish the following:

1. Release residual trees from excessive competition resulting in improved tree growth and vigor.
2. Create an environment to renew and sustain the forest in White's Woods by providing sunlight and reducing competition to newly established and existing tree seedlings and saplings.
3. Maintain the aesthetics values of White's Woods while protecting the soil and water resources.
4. Provide a more diversified habitat for wildlife.
5. Conserve and utilize the forest resource while providing a monetary return for White's Woods and White Township and its residents.

No regeneration harvests have been prescribed in this 10 year plan, and should be considered in this period only if a severe storm or insect/disease event would warrant such a harvest.

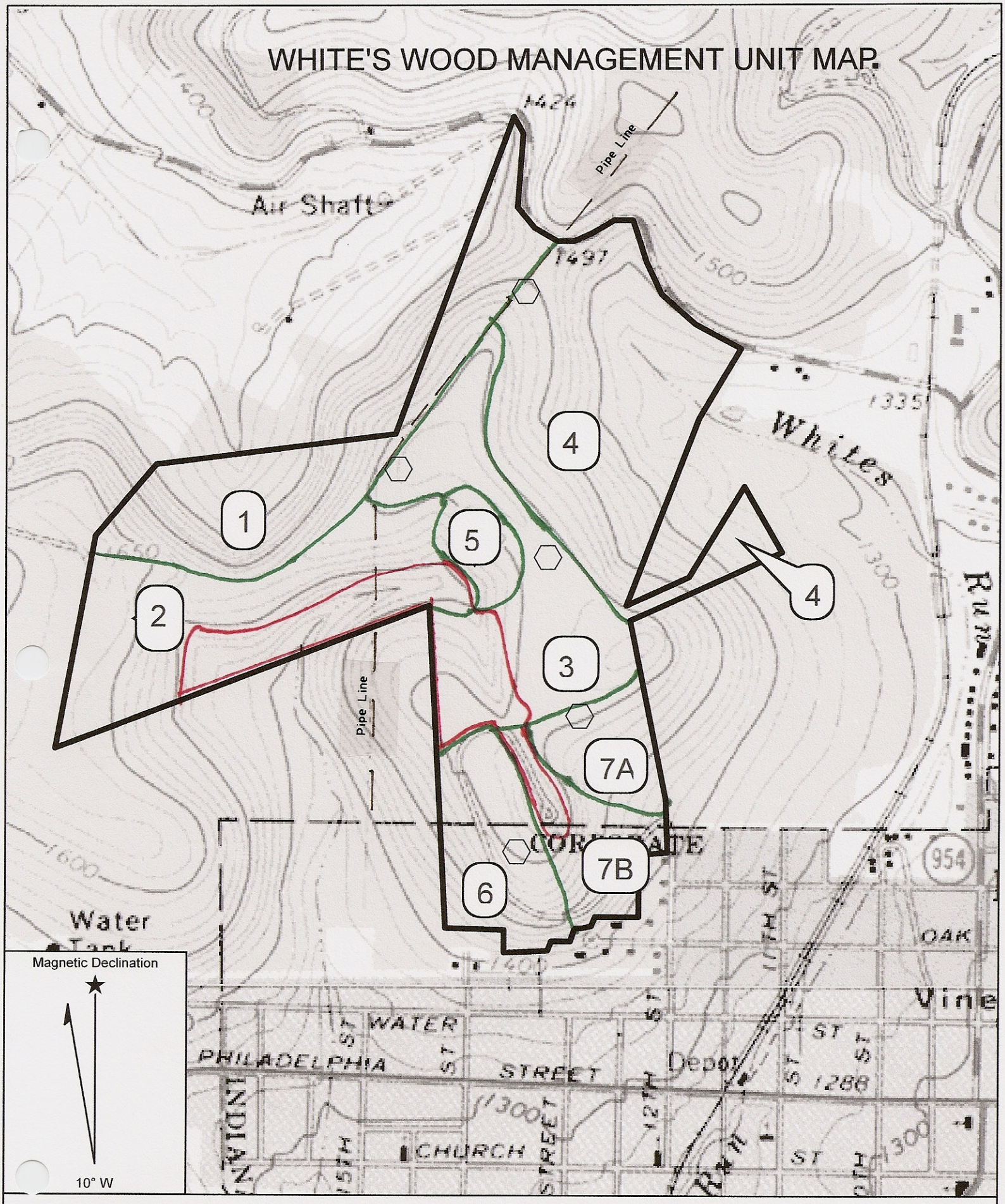
The over population of deer has eliminated the establishment of desirable oak and poplar seedlings. The adjoining residential areas have also suffered widespread damage to landscape and garden plants. It is also recommended that the PA Game Commission be contacted in order to develop a plan to open the area to a controlled permit hunt with bow and muzzleloader weapons while observing all PA Game Commission laws including safety zones.

SECTION II

MANAGEMENT UNIT MAP

UNIT DESCRIPTIONS and RECOMMENDATIONS

WHITE'S WOOD MANAGEMENT UNIT MAP.



Name: ERNEST
Date: 4/2/2007
Scale: 1 inch equals 800 feet

Location: 040° 37' 55.47" N 079° 10' 03.09" W NAD 27
Caption: Natural Area- Gas Well

Management Unit 1.

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Management Unit Descriptions and Recommendations

This section provides a description, miscellaneous comments, and recommendations for each of White's Woods management units.

Management Unit 1 **Area: 34 acres**

Timber Type- Mixed Transition Hardwoods; Large Saw timber

Description:

Tulip poplar and Red Oak large saw timber (18-30" DBH) are the predominant timber species. The stand is fully to overstocked for optimum tree growth. Basal area is approximately 118 square feet per acre. Numerous small and medium size (12'-18") saw timber size red (soft) maple and chestnut (rock) oak trees are found as co dominant and intermediate trees in the canopy. Overall tree quality is very good to excellent and tree condition is good. Certain areas have a heavy growth of fern and witch hazel in the understory.

Gilpin and Ernest silt loams are the primary soil series associations and are well suited to timber production. Site quality is excellent except for some wet areas on the lower slopes. Numerous springs and seeps are found in the hollow near the University Farm boundary.

There are more than an adequate number of den/cavity trees for wildlife use.

Comments

Excellent access is provided from Fulton Run Road via a gas well road and pipe line. The Water's Divide Trail leading to College Lodge is part of the south border of the unit.

Timber volume is approximately429 MBF (thousand board feet) of which 62% is Tulip Polar and 21% is red Oak.

Recommendations

1. Plan a selective timber sale to remove damaged, decayed and overcrowded trees. Basal area should be lowered to no lower than 90 square feet per acre.
2. Cut the wild grapevines in heavily infested areas to prevent their spread into productive timberland.
3. Retain some mature red oak trees for mast production and cull trees for wildlife.
4. Minimal disturbance must occur in the area with springs and seeps.
5. Logging slash must be removed within 75 feet of the Water's Divide Trail and cut to three feet within 150 feet of the trail.
6. Consider placing forestry demonstration area along the trail. A demonstration area is usually small (2-5 acre) plot in which different types of forest harvest and management are employed and is used for educational purposes.

<u>Management Unit 2-</u> **Area: 48 acres**

Timber Type- Transition Hardwoods; Large/Medium Sawtimber

Description:

Tulip poplar, red oak and black oak; large to medium size (16-24" DBH) sawtimber of very good quality are the dominant tree species. Stocking levels are variable but is generally overstocked with an average basal area of 105. The western portion of the stand has lower stocking levels due to gypsy moth mortality suffered in the late 80's and early 90's. There is also a heavy grapevine growth in this area. Overall tree condition is good.

A heavy stand of cherry saplings has developed in areas which were gypsy moth defoliated. Spice bush is also found in the under story.

Gilpin silt loams and Dekalb stony loams are the primary soils and are suitable for timber production.

Comments

The Spring Trail is located in the unit and the Water's Divide Trail is the northern border.

The unit contains approximately 541 MBF of which 76% is tulip poplar.

Recommendations

1. In order to protect the aesthetics of the Spring Trail and protect the water quality of the small intermittent stream, approximately 10 acres between the trail and the property line should be retained as a natural area or "Big Tree" area. The area near the trail should be inspected during other harvest work to remove
2. A selective harvest should be planed in the remaining 38 acres in order to reduce stocking levels for better growth rates. In areas

that were defoliated by gypsy moth a group selection harvest can be used.

3. Cut the wild grapevines along the heavy grape vine growth in the west portion of the stand. This will retain food and cover for wild life, but will prevent the spread of the vine into productive forest land.
4. Care must be taken to preserve the aesthetics of the Waters Divide trail by using a buffer area. Timber access roads should be perpendicular to the trail and power line, but not crossing the trail.

Management Unit 3 **Area: 38 acres**

Timber Type: Mixed Transition Hardwoods; Large saw timber

Description

This unit is located on the relatively large flat area on the ridge top. Tulip poplar and red oak large saw timber trees (18"-30"DBH) are the dominant trees. Timber quality is very good while condition is generally fair. The unit suffered heavy mortality of oak species from past gypsy moth defoliations. The northern portion of the unit supports a higher oak component.

A well stocked under story of red maple and black cherry has established from light provided from defoliations. Average basal area is 117 square feet per acre and is generally over stocked.

Gilpin and Dekalb are the primary soil groups and are suitable for timber production.

Comments

Excellent access is provided by the gas well road from 12th Street. The Spring Trail and Water's divide Trail are located in the unit.

A total of 413 MBF is found on the unit of which 65% is tulip poplar and 20% is red oak.

Recommendation:

1. Set aside, and incorporate with the area from Unit 2, approximately 12 acres as a natural area or "Big Tree" area. This area should include the Overlook, the picnic area and the Spring Trail. In order to reduce maintenance cost and for safety high risk tree which may fall into the high use areas may be harvested.
2. A selective harvest is recommended in the remaining area to remove mature trees, stressed trees and those overtopping the young under story.

Management Unit 4 **Area: 60 acres**

Timber Type- Transition Hardwoods; Large/Medium Saw timber

Description

This unit is located on the north east slope facing Fulton Run Road. Tulip poplar is the predominant specie. Tree quality and condition are very good. Basal area is 125 square feet per acre, as such; the stand is overstocked with an excessive number of trees for optimum diameter growth. The heavy stocking will likely cause future natural mortality.

Spice bush, fern and barberry are found in the under story and will interfere with long term management and regeneration of the stand.

Gilpin and Ernest silt loams are the primary soil groups. A few springs outcrop on the lower slopes to from the head waters of White's Run.

Comments

Access is provided by a gas well road from Fulton Run Road. The Fulton Run and Stephenson Trails pass through the unit. The remnant of the old Moorhead orchard is located along Fulton Run road.

Tulip poplar comprises 83% of the units 841 MBF. This unit represents 25% of White's Woods' area.

Recommendations

1. A selective saw timber/pulp wood harvest is prescribed to reduce stocking to more desirable levels (approx. 95 basal area). Smaller diameter trees which are suppressed should be harvested along with larger trees which are overcrowded or defective/damaged. Retain as many oak trees as possible for mast production and to increase species diversity.

2. Periodically inspect the area for insect and tree diseases that may affect tree health and park use.

3. Care should be exercised near any springs and water courses.

<u>Management Unit 5</u> **Area: 6 acres**

Timber Type- Mixed Oak; Large Sawtimber

Description

Black, scarlet and red oak, are the dominant species. The trees are of generally poor to average quality and fair condition. Average basal area is 77 square feet/acre which indicates the stand is adequately stocked.

The stand has developed on an old field/pasture. Aspen, sassafras and red maple saplings are found in the under story. A considerable amount of mortality was suffered from gypsy moth.

Gilpin silt loam is the primary soil.

Comments

The Water's Divide Trail passes through the unit. Timber volume is 37 MBF of which 87% is black and scarlet oak.

Recommendations

1. Stocking levels are adequate and no treatment or harvest is necessary.
2. Annually monitor the unit for gypsy moth infestation. This oak type is very susceptible to gypsy moth build up.

Management Unit 6 **Area: 80 acres**

Timber Type- Mixed Oak; Medium/Large Saw timber

Description

Red, black and white oaks of average to good quality and condition are found in this unit. The stand is overall fully stocked, but is variable due to some gypsy moth mortality. Average basal area is 103 square feet/acre.

The under story consists of beech, birch and cherry saplings. Some heavy growths of grape vine are found in the stand.

Dekalb-Gilpin stony loams are the main soil associations and are suited to wildlife and woodlands.

Comments

Access to the stand is provided by a gas well road from 12th Street. An old sandstone quarry and gas well are found in the unit. Some large overmauture oaks are found near the gas well.

Timber volume is 151 MBF of which 37% is red oak and 17% is black oak.

Recommendations

1. Plan a selective harvest on approximately 10 acres of the southern portion of the stand to remove mature oaks, defective and over crowded trees.
2. Cut grapevines scattered in the stand. Cut around the peripheries of heavy vine tangles.
3. Appropriate buffers should be utilized near the residential areas and along the access road used by hikers. Only high risk trees which may pose a danger to residents and White's Woods visitors should be removed.

Management Unit 7A **Area: 9 acres**

Timber Type- Mixed Oak, Medium Sawtimber

Description

Black oak, red oak, tulip poplar; medium size (15"-18" DBH) sawtimber size trees are the dominant trees. Overall quality and condition are average to good. The area is fully stocked with an average basal area of 106 square feet. Some large (24 inch+) mature red oak and black oak are scattered in the stand.

Red maple, chestnut oak and birch are found in the under story. Light to moderate growths of fern and grapevine are also found.

The upper slope exhibits mortality from gypsy moth.

Dekalb-Gilpin stony loam is the primary soil series.

Comments

The Step Trail forms the west boundary of the unit. A two inch pipe line is also located within.

The area contains approximately 76 MBF of which 68% is comprised of oak species.

Recommendations

1. A selective harvest is prescribed to remove mature oak and damaged and suppressed trees. Basal area should be lowered to no lower than 80 square feet per acre.

2. Plan the harvest to protect the Step Trail and its aesthetics.

3. Monitor the stand for gypsy moth and other insects and diseases.

<u>Management Unit 7B</u> **Area: 13 acres**

Timber Type- Transition Hardwoods; Large/Medium Saw timber

Description

Tulip poplar and red oak large saw timber of very good quality condition predominate this unit. The area is over stocked with an average basal area of 110 square feet per acre. Some very large (24 inch+) red oak and poplar saw timber trees are scattered through the unit. Some large dead standing trees were also observed.

Birch saplings and growths of fern are found in the under story.

There are numerous den trees for wildlife use.

Dekalb-Gilpin very stony loam is the primary soils and is considered good to well-suited for timber production.

Comments

The Step Trail forms the east border of the unit. Tulip poplar comprises 57% and red oak comprises 34% of the 160 MBF of the sawtimber volume.

Recommendations

1. Plan a selective harvest to remove damaged, suppressed and over mature trees. The unit should be harvested in conjunction with units 6 and 7A.
2. Retain 2-3 den trees per acre as well as standing dead trees (away from trails) for wild life.
3. Protect the Step Trail and provide a buffer along it.

SECTION III

TIMBER HARVEST SCHEDULE

REVENUE PROJECTIONS and HARVEST VOLUMES

TIMBER MARKING PROCEDURES

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TIMBER HARVEST SCHEDULE
10-Year Cycle

Priority	Management Unit	Harvest Area (Acres)	Harvest Volume (MBF)*
A	#1	34	100 (23%)
A	#2	38	120 (22%)
B	#3	26	70 (17%)
B	#4	60	200 (24%)
C	#6	10	15 (10%)
C	#7A	9	15 (20%)
C	#7B	13	35 (22%)
	TOTALS =	**190 acres**	**555 MBF (21%)**

*** (%) indicates % of total timber volume from unit recommended for removal.**

The priorities above are set in a relative order of stand/unit silvicultural needs. They can be changed if economic conditions for forest products dictate. Storm events, disease outbreaks and park development may also alter the priorities. "Natural Areas" units should be inspected for any hazard tree removal work to be done in conjunction with the above harvests.

A reasonable time period to implement the harvest would be over a 10-year cycle. At that time the stewardship plan should be updated.

The projected harvest is approximately 61% of the estimated 10-year net in-growth (timber volume increase minus decay and mortality).

Anticipated revenues will depend on the actual values and volumes at the time of sale. The *Tract Summary* provides current values. Timber harvest volumes will vary depending on the width of buffer strips. A professional forester with knowledge of economic conditions of the forest industry should be consulted prior to harvesting any unit.

WHITE'S WOODS

Revenue Projections & Harvest Volume Summary

Management Unit	Value of Entire Unit	Unit Acres	Harvest Acres	Harvest Volume MBF	Total MBF of Entire Unit	Harvest % of Total Volume
1	$ 136,800	34	34	100	429.1	23%
2	$ 154,768	48	38	120	541	22%
3	$ 132,083	36	26	70	413.8	17%
4	$ 227,115	60	60	200	841.3	24%
5	$ 12,350	6	0	0	36.7	
6	$ 52,470	23	10	15	151.8	10%
7A	$ 23,188	9	9	15	75.9	20%
7B	$ 52,795	13	13	35	160.2	22%
Total=	**$ 791,569**	**229**	**190**	**555**	**2649.8**	**21%**

Revenue for 10 year cycle= $ 166,000

Note: actual revenues would vary depending on current market prices at time of sale and species of trees harvested.

MBF = "thousands" of board feet

APPENDIX

HARVEST AND MARKING PROCEDURES

GLOSSERY

SOILS MAP

HISTORICAL MAP

PNDI REVIEW RECEIPT

WHITES WOODS/CO-OP TRAIL MAP

Timber Harvest and Marking Procedures

Harvest Procedures

This plan recommends silvicultural treatments that include timber harvest operations for certain management units.

It is recommended that all timber harvested be selectively marked and a forester prepare the subsequent timber sale. The supervision of the harvest will be the responsibility of the forester. The timber harvest will require a publicly advertised sale with sealed bids. The White Township Supervisors, the Recreation and Parks Board and Staff, with guidance from the forester, should set the terms and conditions of the sale.

It is necessary that an operating procedure be developed for the conduct of such harvest work to insure that the goals of this Plan are met. General rules for recommended timber harvests are as follows:

1. Primary consideration must be given to protecting the resources of White's Woods as set forth in this plan.
2. All access roads should be planned, constructed and maintained under the supervision of park personnel and the forester. Existing roads and trails should be used as much as possible.
3. Roads, trails, and landings should be installed and maintained using Best Management Practices
4. All harvested trees should be utilized to the maximum commercial (diameter) limit in order to conserve the forest resource and mitigate adverse aesthetics.
5. Logging slash (tops) should be cut and lopped to lay within four feet of the ground so that soil moisture and fungi will hasten decomposition which will benefit the soil, while still offer protection from deer browsing. Slash should be cut lower in buffer areas.
6. All disturbed areas should be planted with a suitable grass and legume mixture. Logging trails should be incorporated into the trail system when possible.
7. Harvest work should be scheduled, when practical, during low usage times and dry frozen soil conditions.

Marking Procedures

Proper marking and tree selection procedures are dependent upon individual site and stand conditions and should be based on recommendations of the forester, providing the recommendations are consistent with this plan in regard to tree selection, basal area, and stocking guidelines.

Tree selection should, where practical, attempt to meet wildlife requirements and consider sensitive plants, animals, and all parts of the ecosystem. Den trees and bee trees should be protected. Sufficient mast trees should be retained.

Buffer zones for little or no cut areas should be established for trails, roads, and high use areas. The White Township Supervisors, the Recreation and Parks Department and the Consulting Forester should set the width and location of the buffer zones.

Glossary of Forestry Terms

Basal Area. A measure of stand density. It is represented in the average square feet per acre of the cross-sectional area of the trees growing on that area.

Board Foot. A unit of wood 1 inch thick, 12 inches long, and 12 inches wide. One board foot contains 144 cubic inches of wood.

Intermediate Thinning. A forest management harvest that is performed prior to a stand becoming mature. The harvest is designed to improve growing conditions for the remaining trees.

Selective Harvest. A type of intermediate thinning or harvest designed to improve growing conditions or to create and perpetuate an uneven-aged forest. Trees may be removed singly or in groups (group selection). This term is often misused by non-professionals as a replacement term for "diameter limit" harvest.

Crown. Top portion of the tree with leaves and branches.

Crown Class. An evaluation of an individual tree's crown in relation to its position in the canopy and the amount of sunlight it receives. The four crown categories are dominant, codominant, intermediate and overtopped or suppressed.

DBH. Diameter in inches at breast height (4.5 feet above the ground), usually written in small letters, dbh.

Den tree. A tree with cavities or holes in which birds, mammals, or insects such as bees may nest.

MBF. Refers to sawtimber volumes in "thousands" of board feet.

Pole Stand. A stand of trees with dbh ranging from 5 to 9 inches.

Saw log or Sawtimber. A log large enough to yield lumber. Usually the small end of the log must be at least 10 inches in diameter for hardwoods.

Stocking. A qualitative reference to stand density that compares the existing number of trees and diameters to the number desired for optimum growth. Commonly referred to as *full, under or over* stocked.

Shelterwood. A regeneration cut designed to stimulate reproduction by removing all overstory trees. This is achieved by a series of cuts over several years.

Slash. Branches, tops and cull trees left on the ground following a harvest. Some slash can be used for firewood or arranged in piles for wildlife cover. Left scattered slash can protect seedlings and sprouts from deer browsing and reduce soil erosion.

Species Richness. The number of tree species present in a forest community or area.

Stewardship. The wise management and use of forest resources to ensure the health and productivity of the forest for future generations.

Transition Hardwoods. A timber type cover that is usually associated with tulip poplar, red maple, and red oak. It often is established on an area in "transition" from farmland to forestland.

Variable Plot Cruise. A forest inventory method that uses a calibrated glass prism to determine "count" trees. Larger diameter trees are measured more than smaller trees by mathematical formula. For example, a 12inch dbh tree can be 33 feet from the plot center; a 24-inch tree, 66 feet.

Wolf Tree. A large, excessively branched tree that occupies more space in the forest than surrounding trees. Wolf trees have high aesthetic and wildlife value, but usually little timber value.

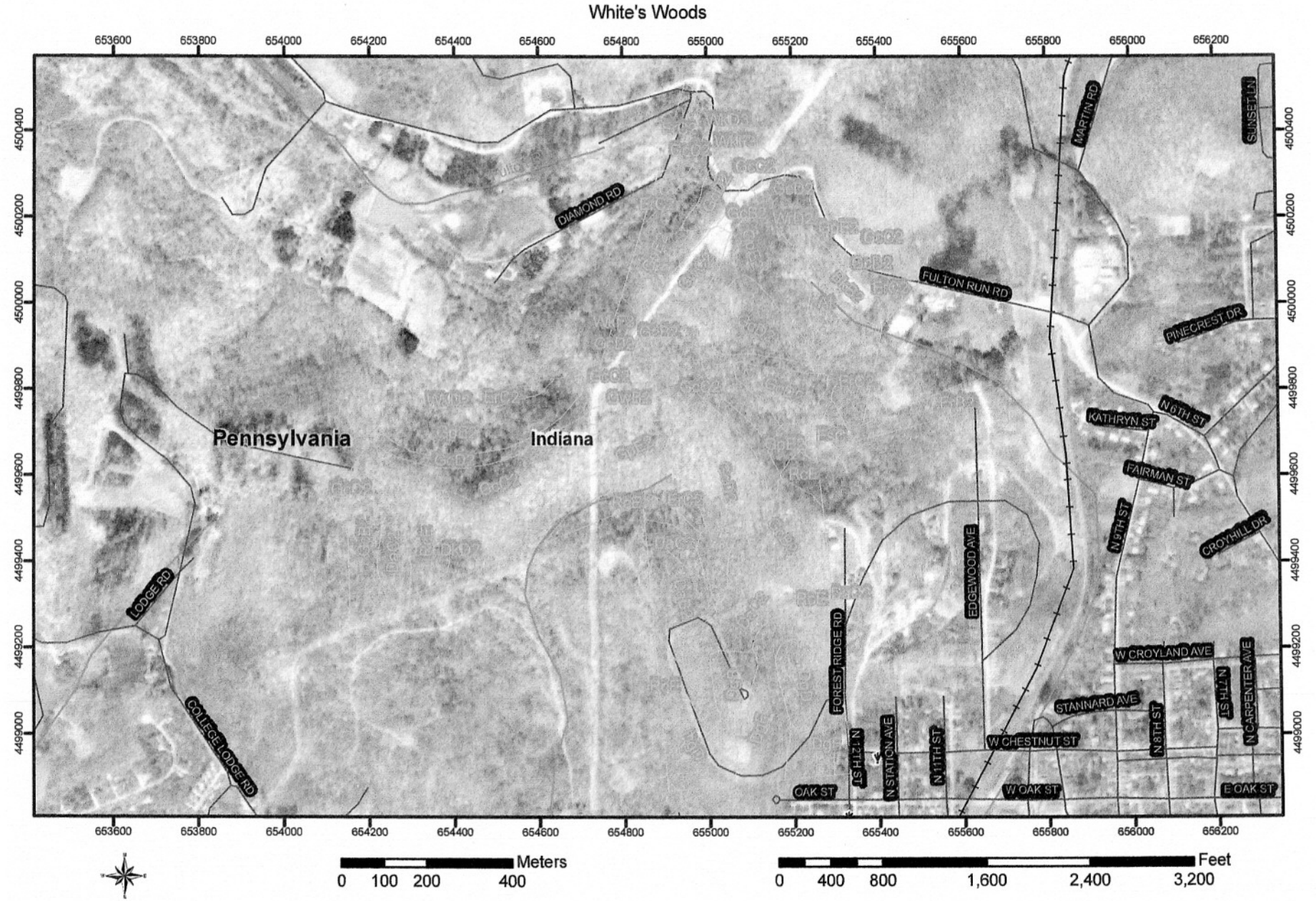
TRACT SUMMARY SHEET WHITES WOODS

UNIT	ACRES	# PLOTS	RED OAK	WH OAK	BL OAK	SMAPLE	CHERRY	CUCMBR	POPLAR	HICK	MISC	TOTAL
1	34	15	91.9	10.4	6.8	11.7	7	14.4	268.7	4.1	14.1	429.1
2	48	21	64.2	0	24.7	11.8	3.2	14.7	413	3.7	5.7	541
3	36	15	86.3	6.7	9.8	5.9	7.7	0	269.2	2.7	25.5	413.8
4	60	25	36.8	4.2	8	28.4	9.2	18.7	702	9.5	24.5	841.3
5	6	5	3.7	0	32	0	0	0	0	0	1	36.7
6	23	11	56	20.3	26.3	0	0	0	21.8	1.2	26.2	151.8
7A	9	5	17.6	3.9	16.6	1.5	0	0	22.5	0	13.8	75.9
7B	13	5	54.3	2	2.8	0	0	0	92.5	0	8.6	160.2
TOTALS	**229**	**102**	**410.8**	**47.5**	**127**	**59.3**	**27.1**	**47.8**	**1789.7**	**21.2**	**119.4**	**2649.8**
$/MBF(Scribner)			*$500.00*	*$ 375*	*$ 325*	*$ 350*	*$ 1,400*	*$ 100*	*$ 250*	*$ 200*	*$ 100*	
VALUE BY SPECIES			$205,400.00	$ 17,813	$ 41,275	$ 20,755	$ 37,940	$ 4,780	$447,425	$ 4,240	$ 11,940	

TRACT VALUE **$791,568**

NOTE: Timber volumes are represented in"MBF" or "thousands of board feet"

Timber values are based on prevailing prices paid for standing timber at the time of appraisal. Actual sale prices will vary due to economic conditions at the time of sale.


White's Woods
653600
653800
654000
654200
654400
654600
654800
655000
655200
655400
655600
655800
656000
656200
4500400
4500200
4500000
4499800
4499600
4499400
4499200
4499000
Pennsylvania
Indiana
DIAMOND RD
FULTON RUN RD
MARTIN RD
SUNSET LN
PINECREST DR
KATHRYN ST
N 6TH ST
FAIRMAN ST
N 9TH ST
CROYHILL DR
EDGEWOOD AVE
FOREST RIDGE RD
LODGE RD
COLLEGE LODGE RD
W CROYLAND AVE
STANNARD AVE
N 7TH ST
N CARPENTER AVE
N 8TH ST
W CHESTNUT ST
N 12TH ST
N STATION AVE
N 11TH ST
OAK ST
W OAK ST
E OAK ST
Meters
0 100 200 400
Feet
0 400 800 1,600 2,400 3,200

WHITE'S WOODS NATURE CENTER HISTORICAL SITES

1. burial vault
2. tenant house site
3. old sandstone quarry
4. old fields and pastures
5. slaughter house site
6. rock crusher site
7. air shaft site
8. old iron water tank site
9. REA substation:site of coal mine substation
10. Pennelec substation
11. old two inch natural gas line
12. Peoples six inch gas line
13. road built for housing development
14. overlook of Indiana
15. electric power line

gas well ⊙

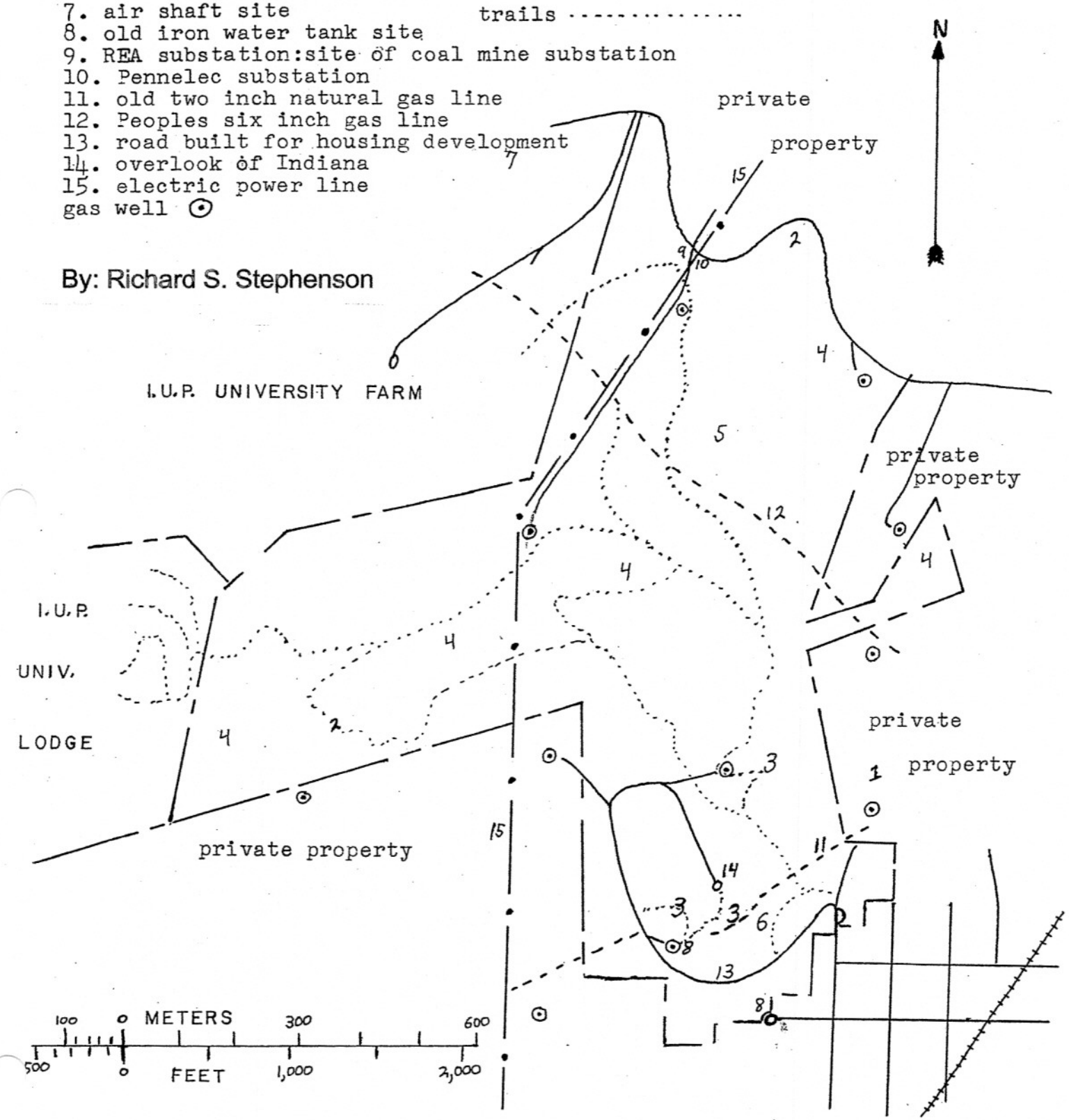
Nature Center property line ——— — —

road or street ————————

natural gas pipeline — — — —

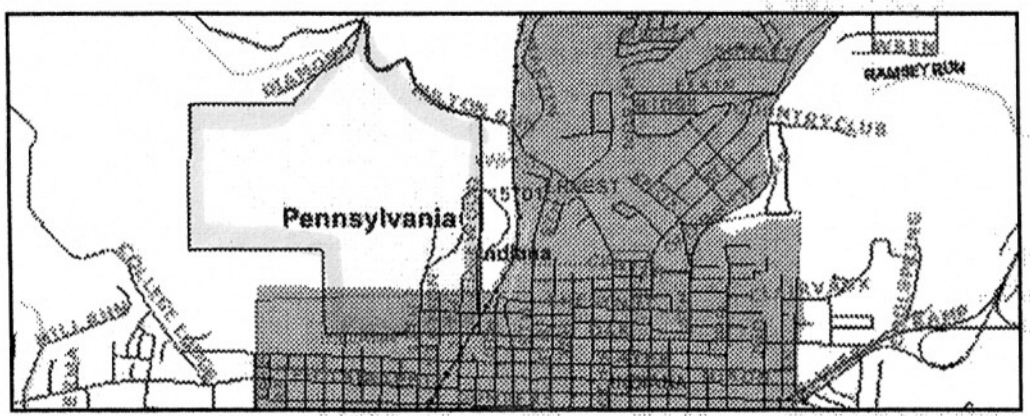
trails ·····

By: Richard S. Stephenson



PNDI Project Environmental Review Receipt
Project Search ID: 20070326084189
Project Name: White's Woods mgt plan
Date: 3/26/2007 2:38:47 PM

Project Location



Location Accuracy

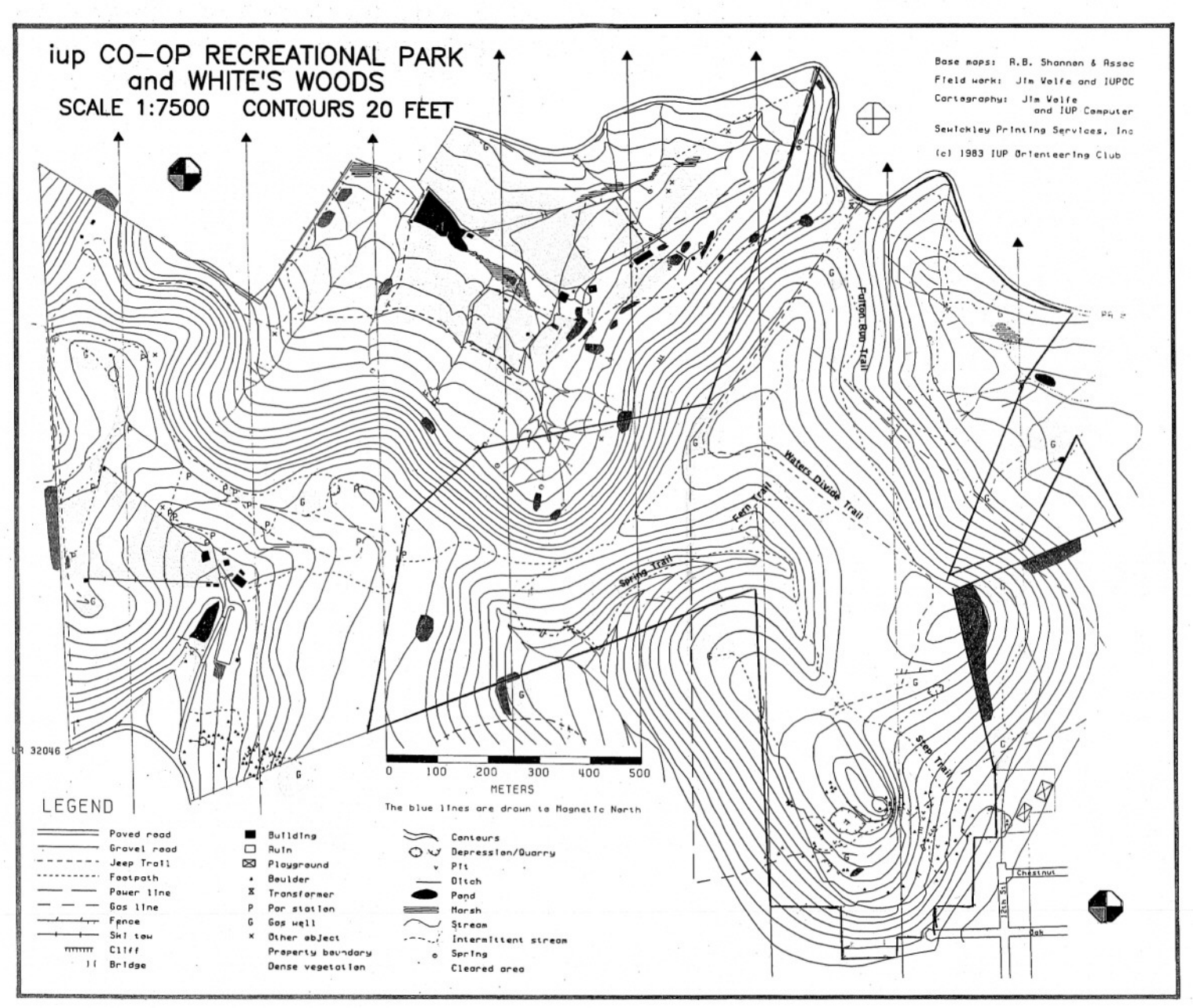
Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Receipt is solely responsible for the project location and thus the correctness of the Project Review Receipt content.

0 Known Impacts

Under the Following Agencies' Jurisdiction:
None

Project Name: White's Woods mgt plan
On Behalf Of: Local Government
Project Search ID: 20070326084189
Date: 3/26/2007 2:38:41 PM
# of Potential Impacts: 0
Jurisdictional Agency:
Project Category: Timber harvesting and Vegetation Management,Forest Stewardship Plan
Project Location
Decimal Degrees: 40.64096 N, -79.16704 W
Degrees Minutes Seconds: 40° 38' 27.4" N, 79° 10' 1.4" W
Lambert: -324103.98180393, 596938.15370108 ft
ZIP Code: 15701
County: Indiana
Township/Municipality: WHITE,INDIANA
USGS 7.5 Minute Quadrangle ID: 685
Quadrangle Name: ERNEST
Project Area: 448.4 acres

APPLICANT INITIALS: DJB


iup CO-OP RECREATIONAL PARK
and WHITE'S WOODS
SCALE 1:7500 CONTOURS 20 FEET
Base maps: R.B. Shannan & Assoc
Field work: Jim Wolfe and IUPOC
Cartography: Jim Wolfe
and IUP Computer
Sewickley Printing Services, Inc
(c) 1983 IUP Orienteering Club
Forest Run Trail
Waters Divide Trail
Fern Trail
Spring Trail
Steep Trail
Chestnut
13th St
Oak
0 100 200 300 400 500
METERS
The blue lines are drawn to Magnetic North
LEGEND
Paved road
Gravel road
Jeep Trail
Footpath
Power line
Gas line
Fence
Ski tow
Cliff
Bridge
Building
Ruin
Playground
Boulder
Transformer
Pay station
Gas well
Other object
Property boundary
Dense vegetation
Contours
Depression/Quarry
Pit
Ditch
Pond
Marsh
Stream
Intermittent stream
Spring
Cleared area