



### **Location**

This tract is located in Harrison County, Harrison Township, Predominantly Section 1, T4S, R2E. It is located at the Northeast corner of the intersection of Old Forest Rd and Hwy 462. It is approximately one-half mile from the State Forest office.

### **General Description**

This tract is an average quality Oak-hickory dominated tract with five distinct covertypes. These covertypes intergrade to an extent. These types are Oak-Hickory (52%), Pine (19%), Mesic Hardwoods (14%), Old Field (14%), and Open (1%). Public roads border two sides of the tract and the tract is very visible to the public.

These strata will be described briefly below and in more detail in the Management section.

#### **Stratum 1 – Oak Hickory**

Oak-Hickory comprises 52% of the land area and 69% of the sawtimber volume of the tract. It is found on the majority of the slopes in the tract. A mixture of oaks, including white, black, and northern red, along with yellow poplar dominates the stratum. The timber is of medium quality with scattered pockets of higher quality. Scattered “wolf” trees are present and provide good wildlife value.

#### **Stratum 2 - Mesic Hardwoods**

This stratum comprises 14% of the land area and 9% of the sawtimber volume of the tract. It is found in three locations and is of three different compositions. These compositions include senescing American beech, drought damaged poplar, and an old regeneration opening that has returned to a combination of oak and poplar and cherry. Quality is medium to good with a variety of wildlife values.

#### **Stratum 3 - Pine**

Pine comprises 19% of the land area and 20% of the sawtimber volume of the tract. There are three distinct formations of this coertype; the white pine dominated component is found at the junction of Hwy 462 and Old Forest Rd and is falling apart, another is red pine dominated and found in the southeast portion of the tract. The final composition is a mixture of pine species but is mostly dead with good OH regeneration established. The red pine has held up better over time and is of medium to good quality. All of these covertypes are highly visible from the road.

#### **Stratum 4 - Old Field**

This stratum is found on the upland portion of the tract that was previously an archery range. It comprises 14% of the land area but only 5% of the sawtimber volume for the tract. It is poor to medium quality trees with a lot of dead pine and open grown hardwoods. The area has good timber potential but it is a long way from producing commercial products.

### **History**

The lands comprising this tract were obtained through two acquisitions. The first acquisition was in 1944 from Samuel Breeden. This was part of a 572.08-acre deed (Deed # 131.130). The southeastern 40 acres was acquired in 1988 from the Funks (Deed # 131.260).

This tract has a long history of management since the state took possession. The first management record is that of a thinning in the pine stratum in 1976. There is no record of any metrics for this thinning. The pine to the east of the range was pruned to 16ft in 1981. Next, a 1.5 acre shortleaf pine area was cleared for a white oak planting in 1983, 360 planting was at 10x10. The site was inventoried in 1985 showing a tract acreage of 72 acres and a volume of 2724 bdf/acre (this was prior to the Funk addition in 1988). This inventory did not include the pine on the ridge top but called for 98Mbf of removals. The plan called for an improvement harvest in the remainder of the tract and noted the poor use of the archery range. In 1986, 46 Mbf was removed as part of a 260 Mbf sale that included tracts 2202, 3, and 4. This operation included a 4.5 acre regeneration opening to remove hollow and senescing American beech. Postharvest TSI was marked and completed in 1986. This removed 362 trees ranging in DBH from 2 to 26+ inches and noted vine control north of the archery range. The archery range was closed in 1987 and the final addition to the tract occurred in 1988. The 1985 plan also called for inventorying and planning a thinning in the pine covertime. The only record of follow up on this is a 1991 inventory by Bowden, which gives total keep volumes for the white pine plantation; there is a card with tallied cut trees but no totals or notes on the survey system with which to calculate. In addition, the area is only 2 acres so it likely does not include all of the area specified as pine in the current management cycle. There is no record of a thinning having occurred.

### **Landscape Context**

The natural community classification of this tract is a combination of Dry-mesic upland forest and Mesic upland forest with the mesic upland forest type being found on the lower slopes and drainages. Both communities are abundant in the area. The dominant land use within a 5 mile radius is a mixture of forest and pasture land.

This tract is less than 1 mile from the state park boundary and is part of a large contiguous block of managed forest.

### **Geology, Soils, and Hydrology**

This tract is part of an east-west oriented ridge and it accompanying north-facing slope. The uplands are gentle and the slopes are gentle to moderate. There are two dominant drainages forming the northeast and northwest boundaries of the tract.

### **Soils**

Soils are highly dependent on slope position and history. As such, they are variable and intergraded in forested setting with large amounts of topographic relief such as is found in southern Indiana. The following soils describe approximately 97% of the land area found in the tract.

#### AgzB-Apalona-Zanesville silt loams, 2 to 6 percent slopes

This gently sloping, somewhat deep, moderately well drained complex is found on ridges and slopes in the uplands. It is well suited to trees. Apalona has a site index of 60 for white and black oak and Zanesville has a site index of 60 for northern red oak.

#### EbhD3- Ebal-Gilpin-Wellston silt loams, 10 to 22 percent slopes, severely eroded

This moderate to strongly sloping, deep, moderately well drained soil is found on shoulders and side slopes on uplands and benches. It is well suited to trees. Ebal had a site index of 80 for black oak, Gilpin has a site index of 95 for yellow poplar, and Wellston has a site index of 81 for northern red oak.

GfcF- Gilpin-Tipsaw-Ebal complex, 18 to 35 percent slopes, stony

This moderately sloping to steep, somewhat deep, somewhat to moderately well drained complex is found on side slopes of uplands and benches. It is well suited to trees. Gilpin has a site index of 80 for northern red oak and 95 for yellow poplar, Tipsaw has a site index of 70 for black oak, and Ebal has a site index of 80 for black oak.

### **Soil Concerns**

These soils are good stable soils with few concerns. The NRCS soil rating rates the majority of the area as moderate for log landings. Keeping any expansive exposed areas, such as log yards, on AgzB soils is advised.

### **Hydrology**

The hydrology of this tract is dominated by the northeast and northwest drainages. These drainages are mapped intermittent streams that only carry water during high flow times such as intense rain or quick snow melt. There were no karst features observed during the inventory. There were steady water flows in hillside channels during the summer indicating a perched water table. This is common of the Apalonia soils series found in the upland pine covertime.

### **Access**

Public access to this tract is good. Two adjacent parking areas are regularly used, one on the northwest corner of the juncture on Old Forest Rd and Hwy 462, the other on the south side of Old Forest Rd across from the old archery range entrance.

Management access to this tract is fair to good. Past operations have been staged at the entrance to the old archery range. The 1985 thinning was yarded at that entrance. Internal access is good with previously established skid trails and no steep drop-offs or exposed rock outcrops. The entrance requires improvement to allow all season access and to move the road away from culturally sensitive areas. This area require access up grades during the prescribed management cycle.

### **Boundaries**

This tract is triangle shaped with the two northern boundaries being drainages and the southern boundary being Old Forest Rd. There is a pocket of private land in the southeast corner. The 90-degree corner of private land is monumented by a Division Bernstein monument.

No further boundary determination is warranted in this tract at this time.

### **Wildlife**

This tract represents typical upland forest habitat, in addition to a component of old field successional habitat, with cedar and smaller hardwoods. Consequently, it likely receives use

from a typical assemblage of common game and nongame wildlife species such as white-tailed deer, wild turkey, squirrels, songbirds, snakes, box turtles, and others. The oak-hickory stratum provides hard mast food sources, but another habitat component would come from the old field stratum and the Pine plantation. This stratum provides denser cover for bedding areas, especially during the winter months. The cedar especially might provide cover from snow or ice, as well as roosting areas for turkeys and other birds.

Snags were tallied in this inventory for potential uses by wildlife. The following tables summarize guidelines and actual data with regard to the new strategy for consideration of the Indiana bat. **Numbers below include only the species and genera “that collectively include the overwhelming majority of maternal roosts”**

Guidelines for preferred density of live and dead trees for use by Indiana bat:

# of live trees	Guidelines Maintenance	Tract 2101 actual present
11”+ DBH class	774	2176
20” DBH and greater	258	531

# snags	Guidelines Maintenance	Guidelines optimal	Tract 2101 actual
5” + DBH class	334	602	2930
9”+ DBH class	258	516	1446
19” DBH and greater	43	86	42

These numbers show that both live tree densities as well as snag densities meet maintenance guidelines on this tract except in the snag 19'+ DBH class. However, it is likely that additional snags in the large size class will develop during the management cycle through natural senescence.

**Rare, Threatened, and Endangered Species**

A Natural Heritage Database Review is part of the management planning process. If Rare, Threatened or Endangered species were identified for this area, the activities prescribed in this guide will be conducted in a manner that will not threaten the viability of those species.

**Exotic Species**

*Ailanthus altissima*, tree of heaven, was found in three locations in the tract. They were all isolated areas with no seed bearing trees seen. There was a single stem in the old opening, a small group in the 1988 acquisition, and a few small stems in the old archery range area. These isolated individuals should be easy to eliminate with basal bark application of triclopyr.

### Recreation

This tract includes a portion of the Adventure Hiking Trail (AHT). It is a popular beginning point for multiday trips due to the parking area to the west across Hwy 462. The trail is blocked in some areas due to the continually declining pine. The state park should be notified of blockages as found to assist them in their trail clearing efforts. Given the number of vehicles parked at the trail heads during deer opener, this are likely receives moderate hunting use as well.

### Cultural Resources

Cultural resources may be present, but their location(s) are protected. Adverse impacts to significant cultural resources will be avoided during management or construction activities

### Management Prescription

#### Stratum 1: Oak-Hickory

##### Current condition:

This stratum is found on the majority of the slopes in the tract and comprises 52% of the area and 69% of the volume of the tract. This coertype is dominated by medium sawtimber white, black, and red oak with yellow poplar. The inventory is summarized in Table 2 with species composition detailed in Table 3. Currently, the coertype is at the 95% stocked condition.

**Table 2. Oak-Hickory Inventory Summary**

<b>STRATUM: Oak-Hickory</b>		<b>ACREAGE: 45</b>	
	<b>CUT (bd ft)</b>	<b>LEAVE (bd ft)</b>	<b>TOTAL (bd ft)</b>
Volume/acre	2,538	5,627	8,165
Volume total	114,210	253,215	367,425
Basal area/acre	45	67	112
Trees/acre	60	108	168

**Table 3. Oak-Hickory Volume by Species**

Species	CUT (bd ft/ac)	LEAVE (bd ft/ac)	TOTAL (Bd ft/ac)
American beech	30	0	30
Black oak	235	913	1,148
Black walnut	28	26	54
Chestnut oak	121	634	755
Eastern red cedar	0	40	40
Northern red oak	0	525	525

Pignut hickory	126	243	369
Red pine	312	0	312
Scarlet oak	30	0	30
Shagbark hickory	0	184	184
Sugar maple	167	70	237
White ash	305	0	305
White oak	561	2,325	2,886
Yellow poplar	623	667	1,290
<b>Total</b>	<b>2,538</b>	<b>5,627</b>	<b>8,165</b>

Desired future condition:

The objective of this stratum is to provide for multiple economic and ecological services specifically a quality hardwood timber stand, dominated by oak and hickory, while providing hard mast and early to mid-seral habitat for wildlife.

Silvicultural Prescription:

In order to meet the desired future condition a thinning is prescribed. Oaks and hickories are not only the best species for supplying hard mast but are also the best quality timber group that is occurring in this covertime. According to the inventory data, approximately 2,538 bd ft/ac is tallied for potential removal. Most of this would be removed under a single tree selection routine with larger regeneration openings targeting groups of low-grade trees or multiple large trees growing together. When possible, selection should also favor releasing future crop trees. The residual stand should be slightly heavier to white oak, with a lesser component of other oak and hickory species, as well as a minor component of mesophytic species. This provides a stand of longer-lived higher-quality white oak that allows for more management options into the future. Openings created by group selection areas will be used to ensure the supply of oak into the future as well as maintain the presence of early seral habitat. Openings should be large enough to achieve regeneration of desirable species and should coincide with the release of advance regeneration when possible. Stocking in this covertime would be reduced from the current 95% to approximately 60%, still a fully stocked stand.

Uneven aged management requires that trees in all size classes be removed during harvesting to ensure regeneration. Given that many of these will be un-merchantable, post harvest TSI will be needed to ensure that poorly-formed, low-quality trees are removed and treat the understory to eliminate shade tolerant species in favor of oaks and other more desirable species. The girdling of large cull trees will also help to replace large snags lost over time, as well as increase the downed woody material present and provide invertebrate and small vertebrate habitat. TSI will also be needed to control ailanthus that has been found.

## Stratum 2: Mixed Mesic Hardwoods

### Current Condition:

This coverytype is found in three locations all of which are drainages and have different compositions. It comprises 14% of the area and 9% of the volume. The western occurrence is dominated by medium to large sawtimber Yellow poplar and scattered oaks. The poplar is showing tight crowns and other symptoms of drought damage. The northern occurrence is the old regeneration opening. This is fully stocked with well-formed oak and poplar saplings with a closed canopy that is starting to ascend. The final occurrence is in the 1988 acquisition on the east side of the tract. This location is dominated by large cull beech with younger poplar taking over in the gaps. The inventory is summarized in Table 4 with species composition detailed in Table 5. Currently the coverytype is fully stocked at just below the 70% stocked condition. This site is certainly a more productive coverytype than the oak-hickory. There are a number of openings in this coverytype.

**Table 4. Mixed Mesic Hardwoods Inventory Summary**

<b>STRATUM: Mixed Mesic-Hardwoods</b>		<b>ACREAGE: 12</b>	
	<b>CUT (bd ft)</b>	<b>LEAVE (bd ft)</b>	<b>TOTAL (bd ft)</b>
Volume/acre	1,004	2,963	3,967
Volume total	12,048	35,556	47,604
Basal area/acre	20	52	72
Trees/acre	34	169	203

**Table 5. Mixed Mesic Hardwoods Volume by Species**

Species	CUT (bd ft/ac)	LEAVE (bd ft/ac)	TOTAL (bd ft/ac)
American beech	0	107	107
Black walnut	0	135	135
Shagbark hickory	0	608	608
Sugar maple	0	547	547
White oak	0	636	636
Yellow poplar	1,004	931	1,935
<b>Total</b>	<b>1,004</b>	<b>2,964</b>	<b>3,968</b>

### Desired Future Condition:

The objective of this stratum is to provide for multiple economic and ecological services specifically a quality hardwood timber stand, dominated by mid- and late-seral species, while providing hard mast and mid to late-seral habitat for wildlife and a safe hiking environment.

### Silvicultural Prescription:

In order to meet the desired future condition, a sanitation cutting is recommended. This cutting will focus on removing declining poplar on the west side of the tract to release other individuals that are ready to take over the canopy. These removals will also limit the amount of trail clearing that will be necessary when the poplar naturally dies and fall in the trail.



Any existing snags should be maintained, except along trails. The 1985 opening should be chemically thinned to ensure the oak remains a component and the poplar does not overtop it. It should also have the ailanthus and any vines controlled. The eastern occurrence is naturally converting to poplar and should be allowed to continue.

**Stratum 3: Pine**

Current Condition:

This covertepe is found on the ridge top near Old Forest Rd. and comprises 19% of the area and 20% of the volume. This covertepe occurs in two areas each with a different composition. The eastern occurrence is dominated by good quality red pine but with short sparse crowns. The western most occurrence is dominated by large sawtimber eastern white pine. This pine is rapidly falling apart. The understory is a tangled mass of multiflora rose and oak regeneration. The inventory is summarized in Table 6 with species composition detailed in Table 7. There is little hardwood regeneration in the red pine section. There is also little to no understory.

**Table 6. Pine Inventory Summary**

<b>STAND: Pine</b>		<b>ACREAGE: 16</b>	
	<b>CUT (bd ft)</b>	<b>LEAVE (bd ft)</b>	<b>TOTAL (bd ft)</b>
Volume/acre	1,964	4,739	6,703
Volume total	31,424	53,520	107,248
Basal area/acre	56	72	128
Trees/acre	85	125	210

**Table 7. Pine Volume by Species**

Species	CUT (bd ft/ac)	LEAVE (bd ft/ac)	TOTAL (bd ft/ac)
Chestnut oak	0	303	303
Eastern white pine	0	1,394	1,394
Persimmon	0	62	62
Red pine	1,783	2,356	4,139
Yellow poplar	181	624	805
	<b>1,964</b>	<b>4,739</b>	<b>6,703</b>

Desired Future Condition:

The objective of this stand is to provide for coniferous habitats and winter cover in the short term while converting the area back to native hardwoods over time. The red pine area should continue to provide a visual buffer on the roadway while the site is converted to hardwoods.

Silvicultural Prescription:

In order to meet the desired future condition, this area should have the red pines removed in a two-step process. No action would result in an increase in the amount of beech and poorly formed maple in the stand as it begins to fall apart. Since there is no good hardwood regeneration to release in this operation, it should focus on thinning the area and establishing hardwood regeneration. This would best be done by thinning the areas as a whole and then including 4-5 acres of openings. The edges of these openings will be at least 200 ft from the permanent opening created by the road corridor. The area between the road and the openings should be lightly thinned to encourage hardwood establishment. The area should also receive follow-up TSI to control any shrubby species that might be a barrier to regeneration. Any mid-tolerant hardwoods in this area should be maintained to provide structural diversity and seed sources. The thinning recommended in this plan is not to increase the growth or longevity of the pine, but simply to use the pines as a nurse tree for midtolerant regeneration. The white pine area is already falling apart but provides great visual appeal for hikers and motorist. While the area could be cleared, the preferred option is to allow the pine to continue to fall apart on its own but to influence the composition of the next stand by prescribed fire. There is currently a moderate amount of regeneration that is being suppressed by a variety of overtopping shrub species. Fire would allow the tree regeneration to get a jump before the shrubs come back.

#### Stratum 4: Old Field

##### Current Condition:

This covertype is found on the north side of Old Forest Rd and occupies the site of the old archery range. It comprises 14% of the area and 5% of the volume. This covertype is dominated by scattered large open grown hardwoods with an understory of shrubby species and pioneers such as sassafras. The inventory is summarized in Table 8 with species composition detailed in Table 9. There is ample hardwood regeneration here.

**Table 8. Old Field Inventory Summary**

<b>STAND: Old Field</b>		<b>ACREAGE: 12</b>	
	<b>CUT (bd ft)</b>	<b>LEAVE (bd ft)</b>	<b>TOTAL (bd ft)</b>
Volume/acre	0	2,140	2,140
Volume total	0	25,680	25,680
Basal area/acre	22	43	65
Trees/acre	58	141	199

**Table 9. Old Field Volume by Species**

Species	<b>CUT (bd ft/ac)</b>	<b>LEAVE (bd ft/ac)</b>	<b>TOTAL (bd ft/ac)</b>
Red pine	0	584	584
Yellow poplar	0	1556	1,556
<b>Total</b>	<b>0</b>	<b>2140</b>	<b>2,140</b>

Desired Future Condition:

The objective of this stand is to convert the old archery range into productive developing quality hardwoods that will mature into quality wildlife habitat.

Silvicultural Prescription:

In order to meet the desired future condition, this stratum should be regenerated. Inclusion in the prescribed fire recommended in the pine covertime should release currently established individuals as well as promote the recruitment of newly established poplar. Many existing “Wolf” trees, maples, will likely be treated resulting in an increase in snag count for the tract overall.

### Tract Summary

Summary of silviculture throughout the tract:

Due to the current condition of the tract, a medium-level improvement harvest is prescribed. The target area is the oak-hickory and red pine area with a sanitation removal in the mixed hardwoods focusing on the declining yellow poplar. This is accomplished by a combination of crop tree release, cull removal, and converting the old-field area into a hardwood stand. This would produce a sale volume of approximately 150 Mbf or about 1.8 Mbf/acre and leave about 379 Mbf or 4.4 Mbf/acre. It is recommended that Timber Stand Improvement (TSI) be undertaken in this tract after the harvest to accomplish a variety of tasks, including completion of any marked openings. Ailanthus should be treated prior to the thinning to limit spread and establishment.

The efficacy and feasibility of a prescribed fire in the white pine and old-field areas should be studied. Operations in this tract have historically been coordinated with those of tract 2102 to the north. This should continue as 2102 is scheduled for inventory in the next year. If 2102 is in need of thinning, then the two tracts should be managed together.

Effect of Prescription on Tract properties:

Soils: The management activities prescribed in this plan should have minimal impact on soils in this tract. Some soil disturbance is likely during harvesting but this should be confined to landings and main skid trails. These areas should be properly closed out according to Indiana’s BMPs to minimize the impact of management on soils.

Hydrology: Management on this tract should not permanently affect the hydrology of the area. Water quality and yield should not be altered if BMPs are followed during harvest.

Wildlife: Snags and coarse woody debris should remain at viable levels in the stand and should continue to provide varied and diverse wildlife habitats for the Indiana bat and other species. The main affect on wildlife will be the reduction of the coniferous component of the stand. This currently provides a limited amount of thermal cover in the winter for deer and small mammals. This type of cover will be reduced in the

stand. The pine is in decline and will likely die out and this cover lost in the next two or three decades.. No action in this tract would result in the reduction of a hard mast source for small mammals and birds as the species composition transitions to a maple-poplar mix. Managing to recruit newly established or released oaks and hickories will help to ensure that this important food source is available into the foreseeable future.

Wildlife Discussion from Ecological Resource Review: Additionally, management activities involving a timber harvest should not adversely effect this habitat long-term due to the continued maintenance of a forested habitat on the tract. Creation of regeneration openings will create early successional habitat that will be beneficial to certain groups of wildlife dependent upon this habitat. The early successional habitat created with such management will also benefit a wider segment of wildlife species that preferentially utilize such habitat for feeding and cover more so than later successional stage habitat.

Management activities will not intentionally remove snags, with a few exceptions of large recently dead trees or storm damage when possible, so the timber sale will not negatively affect that component significantly. Some snags may be felled during harvest operations if they present a physical hazard to field personnel.

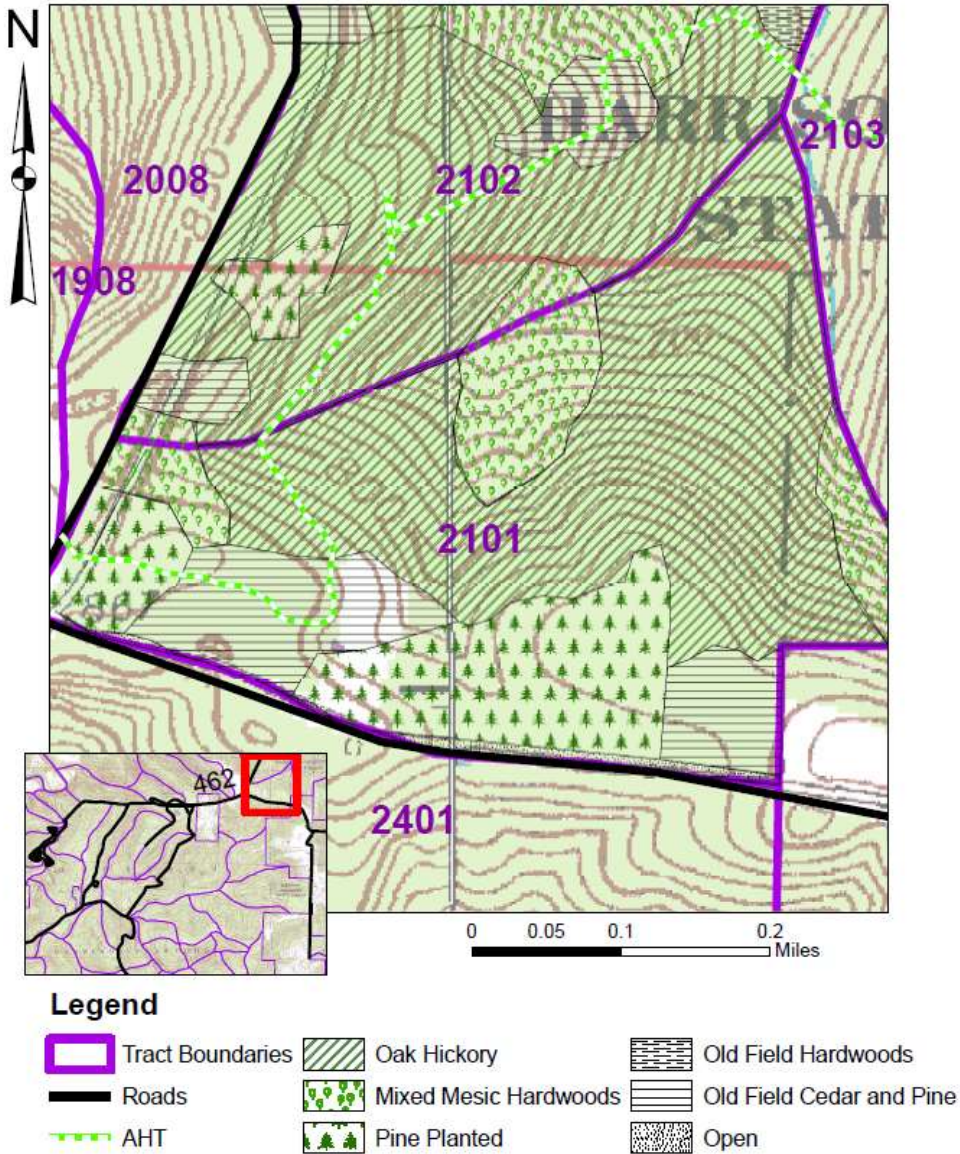
Recreation: The recommendations outlined in resource management guide will affect recreation within the tract. It will require that the AHT be closed for the harvesting operation for likely a single winter. Signs should be posted to inform recreational users about management options and outcomes. In the long term, the actions outlined in this guide will help keep the trail safer, requiring less maintenance, and increase visual appeal by converting the dying pine to more hardwoods. Hunting opportunities should be improved be the maintenance of early successional habitat and the recruitment of hard mast producers such as oak and hickory to provide deer and small mammal browse.

Landscape: Landscape forest patterns will remain similar to the current situation due to this tract being kept in a forested condition.

### **Proposed Activities Listing:**

<b><u>Proposed Activity</u></b>	<b><u>Proposed date:</u></b>
Treat ailanthus	Spring/ Summer 2014-17
Mark sale	2016-17
Sell timber	2017-18
Prescribed fire	2019-20
Post harvest tsi	2019-20
Monitor regeneration openings	2022
Re-inventory	2032
Write new management plan	2032

## 2101 Topographic Map with Covertypes



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