

**Indiana Department of Natural Resources
Division of Forestry
DRAFT
RESOURCE MANAGEMENT GUIDE**

State Forest: Harrison-Crawford
Forester: John Segari
Management Cycle: 20 Years

Compartment: 05 Tract: 02
Date: __1/9/2013__

INVENTORY SUMMARY

Number of stands: 3 **Est. Annual Growth:** 219 bd. ft/ac/yr*
Permanent Openings: 0.0 ac **Average Basal Area:** 106 sq. ft/ac
Tract Acreage: 109 **Site Index:** 68 (for upland oaks)*

*Due to this being the first inventory conducted on this tract since state ownership began, growth calculations and site indices are calculated using NRCS descriptions of soils found on the tract. These yields are for even-aged stands not the un-even aged structure for which Indiana State Forests are managed. As such, they may not be accurate indicators of the growth rates and potentials available on the tract.

Table 1. Tract 502 Inventory Summary

Species	Harvest		Leave		Total	
	Total	Per acre	Total	Per acre	Total	Per acre
White oak	93,700	860	177,770	1,631	271,470	2,491
Loblolly pine	35,000	321	24,630	226	59,630	547
White ash	20,900	192	2,040	19	22,940	210
Yellow poplar	18,920	174	22,840	210	41,760	383
Black oak	11,380	104	55,970	513	67,350	618
Northern red oak	10,710	98	35,700	328	46,410	426
Pignut hickory	9,410	86	12,030	110	21,440	197
Sugar maple	9,130	84	3,700	34	12,830	118
American beech	7,610	70	5,300	49	12,910	118
Eastern redcedar*	4,490	41	1,820	17	6,310	58
Blackgum	2,670	24	0	0	2,670	24
Chinkapin oak	1,540	14	0	0	1,540	14
American sycamore	0	0	2,100	19	2,100	19
Black cherry	0	0	540	5	540	5
Black walnut	0	0	2,380	22	2,380	22
Red maple	0	0	2,420	22	2,420	22
Shagbark hickory	0	0	17,390	160	17,390	160
Total	225,460	2,068	366,630	3,364	592,090	5,432

* Cedar volume was calculated using a special cedar scale that counts volume in trees 6" DBH and larger, which results in high volumes for stands of small trees.

Location

This tract is located in Crawford County, Whiskey Run Township. The PLSS description is the portions of section 20 T2S R2E.

The tract is approximately two miles SW of Milltown and is 1/8 mile south of East Stonecipher Rd.

General Description

This tract has 109 acres dominated by a central ridge. The N-S ridge was an old field that was planted to jack and loblolly pine in 1952. There are three main covertypes in this tract; Oak-Hickory, Loblolly pine, and Old-field. These stands will be described briefly below and in more detail in the Management section.

Stratum 1

Oak-Hickory

This covertype is 75% of the land and 83% of the sawtimber volume in the tract. It is found on the slopes on both sides of the pine covered ridge. White and black oak of medium to good quality on small to medium sawtimber size dominate the canopy. Parts of this covertype were fields prior to state ownership but have since converted to stocked oak-hickory. These areas are of lower quality. The covertype is currently experiencing some mortality in the largest of the white and black oaks.

Stratum 2

Loblolly pine

This covertype is approximately 12% of the land and 13% of the sawtimber volume. It is located on the ridge top on both sides of the road. The pine is medium quality and medium to large size with good live crown ratios.

Stratum 3

Old-field

This covertype occupies a transition area between the pine and oak-hickory. It is 16 acres, 15% of the area, and 6% of the volume. It is composed mostly of small sawtimber trees and pole trees, with a third of the basal area being less than 14 inches. The sawtimber trees are generally of poor quality and scattered.

History

This tract was acquired in 1952 from the Slaughtbacks (Deed 131.165). The ridge top was planted to jack pine in 1952. The planting on the east side of the road failed and was replanted in 1953 with loblolly pine. There have been no managed harvests in this tract. The area was likely cut prior to state ownership.

Landscape Context

The dominant land use within a 5-mile radius is a combination of agricultural, rural residential, and forested. The forests in the area have remained somewhat constant with only occasional development.

Geology, Soils, and Hydrology

A central N-S ridge and a single drainage on the west side of the ridge dominate the tract. The tract also includes the east side of another ridge to the west.

Soils

Adyeville Very Fine Sandy Loam (AciE), 50 acres, excessively drained, sandstone derived
Apalonia Silt Loam (Agr), 30 acres, well drained, loess derived over shale with limestone and siltstone

Wellston Silt Loam (Whf), 26 acres, well drained formed in loess over sandstone and siltstone

Haggatt Silty Clay (Haf), 3 acres, well drained derived from clay residuum and loess over limestone

These soils are indicative of an area that has medium productivity and a tendency towards the development of small sinkholes. Most of the soils are shallow due to past erosion. The upper slopes, particularly in the pine and old-field areas have numerous erosional gullies produced during the period when this area was farmed. None of these gullies show signs of active erosion.

Soil concerns

The NRCS has rated these soils as moderate for timber harvesting activities including heavy machinery and log landings except for the Haf series. None of these soils is exceptionally vulnerable to erosion or compaction.

Hydrology

The entire tract drains to Slick Run Creek to the south. There were no active or open sinkholes observed during the inventory. The main drainages on both the west and east sides of the tract are a mapped intermittent streams. Following appropriate BMP's will protect these stream courses and reduce or prevent downstream sedimentation.

Access

Access to this tract is unclear. There is a road on the ridgeline that goes from Stonecipher Rd. to the private property to the south of the tract. This road was used for planting in the 50's. It has been assumed that we had an easement through the area that allowed for management but no documentation can be found. We have deeded access on the west corner but this is on the other side of a drainage and is not usable. We need to find out if we actually have legal access from Stonecipher Rd or if we need to get permission. The issue has been turned over to the division surveyor. If we have access for harvesting, the entrance at Stonecipher Rd would have to be widened to accommodate trucks.

Boundaries

There are six boundary lines associated with this tract. Timberlake Civil Engineering has done several surveys of surrounding properties and has monumented several points. The southwest corner is monumented with a sandstone cornerstone. Fencing in various degrees of falling is visible to the east of this stone forming the southern line. There is another stone on this line at the S ¼ corner; it is scribed "1/4S". The southeast corner is marked with a white pipe and some carsonites. There are several rebar marking the eastern line and the northern line. The western line has some fence fragments. The northwest corner is more complicated. There is an orange Timberlake Rebar located 86 ft SE of a wooden fencepost. This marks the southwest corner of the northern neighbor. The division owns a strip starting at this rebar then going west 16ft and running north to the road. This strip is currently full of trees and brush.

Wildlife

This tract represents typical upland forest habitat, in addition to a component of old field successional habitat, with pine 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 co-verttype provides hard mast food sources, but another habitat component would come from the old field and pine stands. These stands provide denser cover for bedding areas, especially during the winter months. The cedar and pine especially might provide cover from snow or ice, as well as roosting areas for turkeys and other birds. Many turkeys were seen during the inventory process in the pine stand.

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 the 14 species noted, “As having relatively high value as potential Indiana bat maternity roost trees” by the USFWS. There are many other trees, of various species, present on the tract, that are not included in these numbers.**

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

# of live trees	Guidelines Maintenance	Tract 0502 actual present	
12”+ DBH class	979	3047	
20” DBH and greater	326	907	

# snags	Guidelines Maintenance	Guidelines optimal	Tract 0502 actual
5” + DBH class	435	762	1005
9”+ DBH class	326	653	284
19” DBH and greater	54	109	67

These numbers show that live tree densities are more than adequate. Both large and small snags meet maintenance levels. However, there is a deficiency in the medium size class.

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

This inventory did not locate any invasive or exotic species.

Recreation

This tract does not currently have any established recreational facilities or amenities. The area is likely used for hunting by local residents, however no deer stands were found. Due to the lack of public access, this area has very limited potential for developed recreation.

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 coverteype is 75% of the land and 83% of the sawtimber volume in the tract. It is found on the slopes on both sides of the pine covered ridge. White and black oak of medium to good quality and small to medium sawtimber size dominates the site. Parts of this coverteype were fields prior to state ownership. These areas are of lower quality. The coverteype is currently experiencing some mortality in the largest of the white and black oaks. The canopy is stratified with many suppressed and intermediate oaks and hickories. The inventory is summarized in Table 2 with species composition detailed in Table 3. Stocking in this coverteype is currently just below 100%.

Table 2. Oak-Hickory Inventory Summary

STAND: Oak-Hickory		ACREAGE: 82	
	CUT (bd ft)	LEAVE (bd ft)	TOTAL (bd ft)
Volume/acre	2,048	3,939	5,986
Volume total	167,936	322,998	490,852
Basal area/acre	35	72	107
Trees/acre	27	236	268

Table 3. Oak-Hickory Volume by Species

Species	CUT (bd ft/ac)	LEAVE (bd ft/ac)	TOTAL (Bd ft/ac)
American beech	93	65	158
American sycamore	0	26	26
Black cherry	0	7	7
Black oak	66	576	642
Black walnut	0	29	29
Chinkapin oak	19	0	19
Northern red oak	131	437	568
Pignut hickory	79	147	226

Shagbark hickory	0	213	213
Sugar maple	112	45	157
White ash	256	0	256
White oak	1,148	2,178	3,326
Yellow poplar	143	214	357
Total	2,047	3,937	5,984

Desired future condition:

The objective of this stand 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 harvest is recommended. Much of the white oak, and almost all of the shagbark hickory, in this tract is losing canopy position. The white oak should be thinned to capture the imminent mortality. A harvest in the next few years will have the added benefit of allowing the selection of higher quality stems and more control of species composition. Interceding now will allow us to release shagbarks and other ecologically significant trees before the larger crowned and more dominant poplars and beeches shade them out. 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. Inventory data projects a harvest removal of 2,047 bd ft/ac. 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. Selection should favor releasing future crop trees and ecologically important species. The residual stand should be slightly heavier to oak, with a lesser component of 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. The early seral habitat created by the abandonment of the farmland many decades ago, is quickly disappearing as the pine and old-field covertypes move to closed canopy conditions. 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 should be reduced from 100% to approximately 68%, 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 any large snags that are felled for operational and safety reasons during harvest operations as well as increase the downed woody material present and provide invertebrate and small vertebrate habitat.

Stratum 2: Loblolly Pine

Current Condition:

This covertime is approximately 12% of the land and 13% of the sawtimber volume. It is located on the ridge top on both sides of the road. The pine is medium quality and medium to large size. The pines still have relatively good live crown ratios and may still be responsive to thinning. The inventory is summarized in Table 4 with species composition detailed in

Table 5. Currently, the covertime is just above the 100% stocked condition, (USFS, Miscellaneous report, R8-MR11, p77).

Table 4. Loblolly Pine Inventory Summary

STAND: Loblolly Pine		ACREAGE: 11	
	CUT (bd ft)	LEAVE (bd ft)	TOTAL (bd ft)
Volume/acre	3,000	4,087	7,087
Volume total	35,000	42,957	77,957
Basal area/acre	35	103	138
Trees/acre	30	350	380

Table 5. Loblolly Pine Volume by Species

Species	CUT (bd ft/ac)	LEAVE (bd ft/ac)	TOTAL (bd ft/ac)	Desired Condition:	Future
Loblolly pine	3,000	3,126	6,126	The objective of management in this stand is to maintain a stand of healthy conifer cover that can transition over time to a quality hardwood stand. A secondary objective is to maintain a visually appealing buffer along the road.	
Pignut hickory	0	158	158		
Yellow poplar	0	802	802		
TOTAL	3,000	4,087	7,087		

Silvicultural Prescription:

A moderate thinning combined with a regeneration opening will provide for all three management goals. Live crown ratios are indicative of the health and ability of pines to respond to release. The dominant pines have healthy, greater than 20%, live crowns and will likely respond well to release by increases in both crown density and diameter. This will help maintain the coniferous covertime in the area as well as the visual appeal of the area. However, the loblolly pine will not live forever and will have to convert to a hardwood stand at some point in the future. Allowing the area to convert naturally will result in poorly formed maple and beech dominating the area. Creating openings now will allow oaks and hickories to establish. They will have strong and responsive root systems when the pine begins to break apart. Then, the new stand will have a component of oak and hickory. This will result in a more species rich and resilient stand that will offer an increased diversity of management options into the future. To accomplish this last goal, approximately 50% of the pine volume should be removed. This should be accomplished with a thinning from below combined with some canopy openings. Those dominant trees with good live crown ratios should be release and 2-3 small openings, approximately 1 acre, should be created. These openings should maintain a buffer to the road. Maintaining all of the hardwood in the stand will help ensure an adequate seed source. This operation should produce a harvest volume of approximately 35 MBF.

Stratum 3: Old Field

Current Condition:

This covertepe is found on the upper and shoulder-slopes of the tract and comprises 15% of the area, and 6% of the volume. It is composed mostly of small sawtimber trees and pole trees, with a third of the basal area being less than 14 inches. The sawtimber trees are generally of poor quality and scattered. The inventory is summarized in Table 6 with species composition detailed in Table 7. Currently the covertepe is just above the 60% stocked condition.

Table 6. Old Field Inventory Summary

STAND: Old Field		ACREAGE: 16	
	CUT (bd ft)	LEAVE (bd ft)	TOTAL (bd ft)
Volume/acre	1,035	1,137	2,171
Volume total	16,560	18,192	34,736
Basal area/acre	23	47	70
Trees/acre	19	196	215

Table 7. Old Field Volume by Species

Species	CUT (bd ft/ac)	LEAVE (bd ft/ac)	TOTAL (bd ft/ac)
Blackgum	147	0	147
Black oak	332	493	825
Eastern redcedar	247	100	347
Loblolly pine	225	0	225
Pignut hickory	82	0	82
Red maple	0	133	133
White ash	0	112	112
Yellow poplar	0	298	298
TOTAL	1,033	1,136	2,169

Desired Future Condition:

The objective of this stand is to provide early seral habitat while transitioning to a quality hardwood timber stand. Structurally the covertepe should provide areas of shrubs with open

areas to transition to the conifer covertepe.

Silvicultural Prescription:

This covertepe currently provides the structure and transitory species composition desired in the future. This covertepe needs little management actions to maintain current condition. During the harvest of the oak-hickory covertepe, the opportunity should be taken to release some of the better quality hardwood poles in the old field area. The skidding through this area should knock back current shrubs and provide for resprouting of denser cover. The scattered poorly formed sawlog sized trees should be managed to increase both the structural diversity and increase the stocking. This can be accomplished by girdling the larger trees that are suppressing better quality poles. This would provide for release of the smaller trees while maintaining larger diameter perch and cavity trees and increase the snag density. Those trees that are poorly formed but are less than 14 inches in diameter should be coppiced to provide stump sprouts and increase the hardwood stocking in the covertepe.

Tract summary

Summary of silviculture throughout the tract:

Due to the current condition of the stand, a medium level improvement harvest should be undertaken in this tract at anytime. Overall stocking should be reduced from the current 95% to approximately 60%. This is accomplished by a combination of crop tree release, cull removal, and maintaining the old field areas and thinning the loblolly pine. The residual stocking would be a temporary condition with the remaining trees utilizing the canopy gaps by the expansion of their crowns within a few years. Larger crowns mean faster growth, increased vigor and potential for larger seed crops. This management would produce a sale volume of approximately 202 MBF board feet or about 1,870 board feet per acre and leave about 390 MBF or 3,577 board feet per acre. These volumes are based on the recommended harvest levels laid out in the plan and may not add up to the total volume of available volume based on the inventory. Timber Stand Improvement (TSI) should be undertaken in this tract after the harvest to accomplish a variety of tasks, including completion of any marked openings and understory removal in the pine area to facilitate oak establishment.

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: Hydrology should not be permanently affected by management on this tract. Water quality and yield should not be altered if BMPs are followed during harvest.

Wildlife: Wildlife in this tract should not be adversely affected. No rare threatened or endangered species will be adversely affected during the planning period. Snags and coarse woody debris should remain at viable levels in the stand and should continue to provide habitat for the Indiana bat. No action in this tract would result in the reduction of a hard mast source for small mammals and birds. 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: 1.1 Additionally, management activities involving a timber sale should not affect this habitat long-term from the perspective of any wildlife utilizing it due to the maintenance of a forested habitat on the tract. There is no recommended covertype conversion during the management cycle. Creation of regeneration openings will provide early successional habitat that will be beneficial to certain groups of wildlife dependent upon this habitat. Likely, 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.

Indiana Bat

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

# of live trees per acre	Guidelines Maintenance	Tract 0502 present	Planned Harvest	Planned Residual
12"-18" DBH class	979	3047	1397	1650
20" DBH and greater	326	907	384	523

Harvest levels advised in this management guide will maintain viable levels of “Legacy trees”. As noted above, both large and small snags meet maintenance levels. However, there is a deficiency in the medium size class. This deficiency will be addressed by post harvest TSI. 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. **Numbers above include only the 14 species noted, “As having relatively high value as potential Indiana bat maternity roost trees” by the USFWS. There are many other trees, of various species, present on the tract, that are not included in these numbers.**

Recreation: Given the limited amount and type of recreation that is carried out on this tract, this resource will be temporarily affected. Hunting opportunities should be improved by 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:

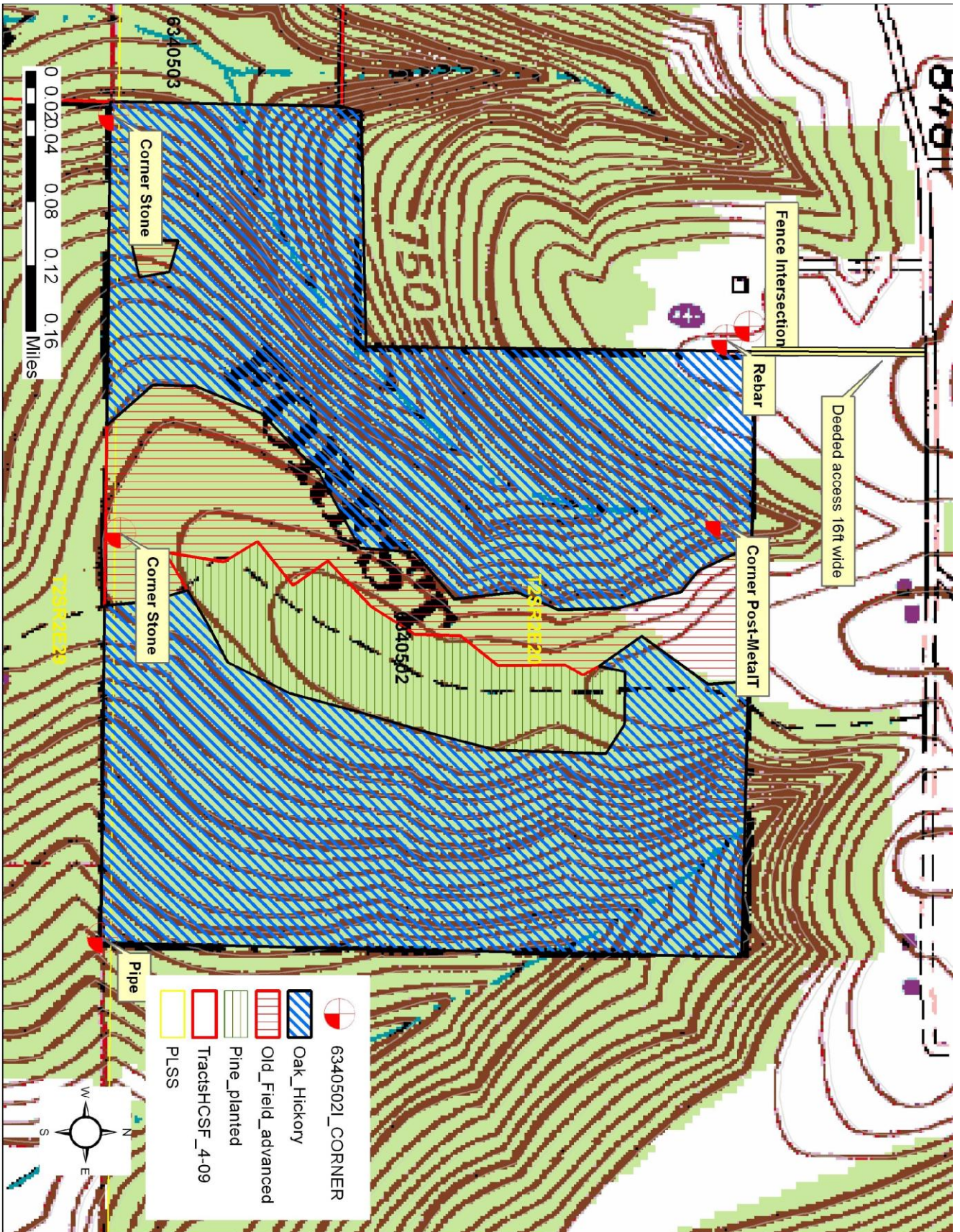
<u>Proposed Activity</u>	<u>Proposed date:</u>
Figure out firelane access	2013-4
Mark sale	2014-5
Sell timber	2015
Post harvest tsi	2018
Monitor regeneration openings	2018
Re-inventory	2033
Write new management plan	2033

To submit a comment on this document, click on the following link:

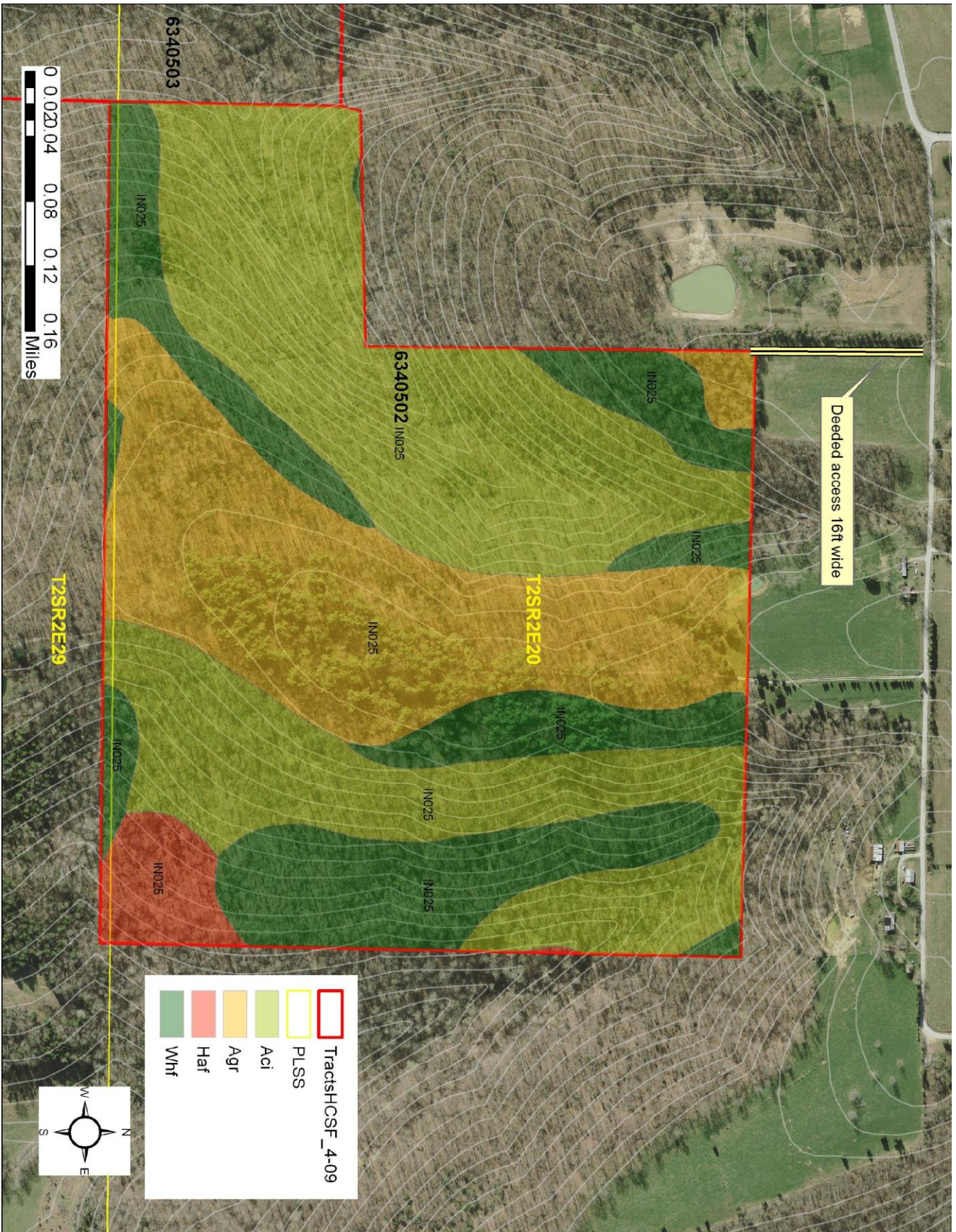
http://www.in.gov/surveytool/public/survey.php?name=dnr_forestry

You must indicate the State Forest Name, Compartment Number and Tract Number in the “Subject or file reference” line to ensure that your comment receives appropriate consideration. Comments received within 30 days of posting will be considered. Note: Some graphics may distort due to compression.

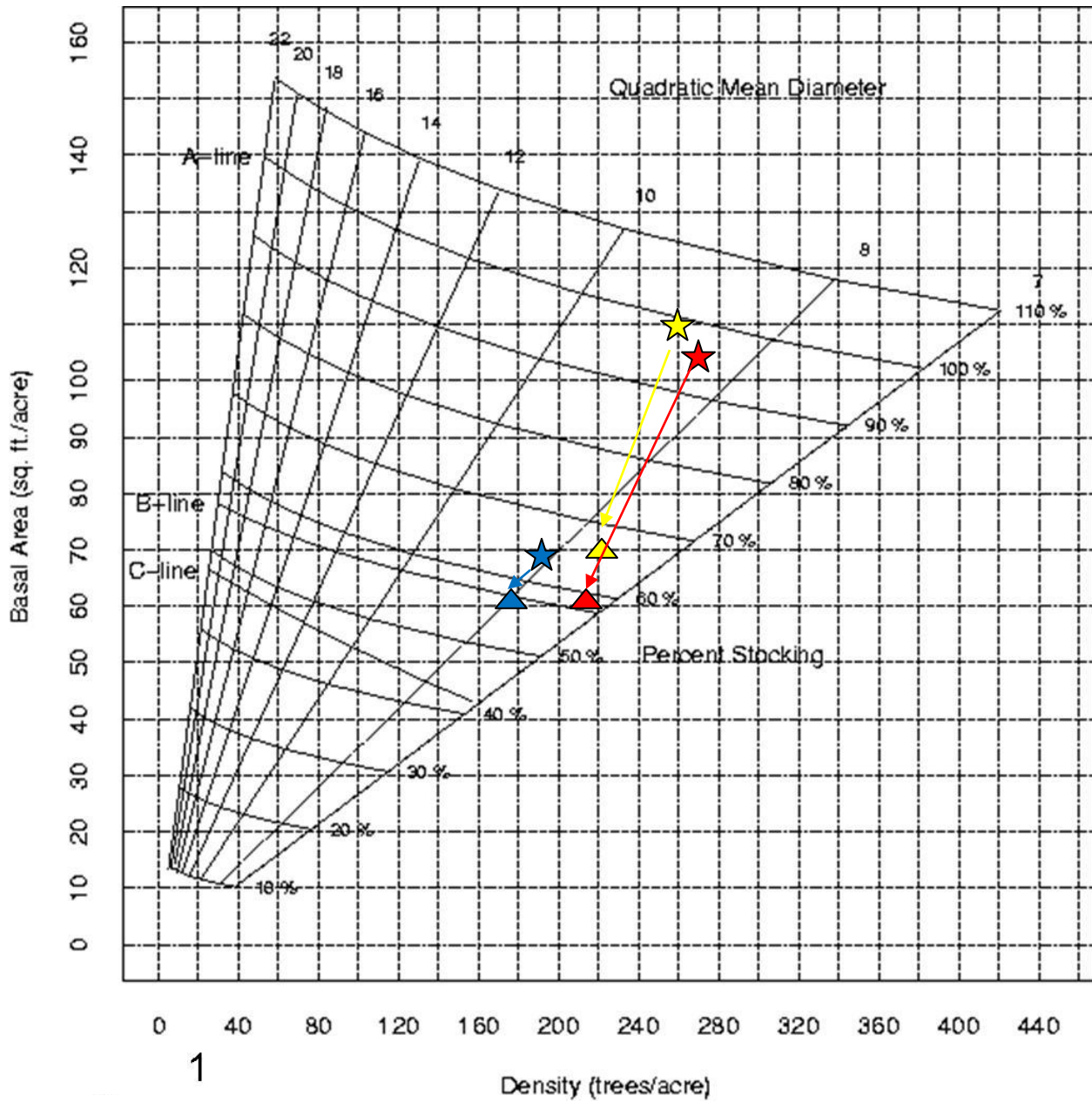
Tract 502 Topographic Map with Covertypes



Tract 502 Soils Map



Tract 502 Stocking Chart



- ☆ Indicates the current stocking condition
- △ Indicates the proposed (post harvest) condition
- Indicates the Tract Total
- Indicates the Oak-Hickory coertype
- Indicates the Old Field coertype