Indiana Department of Natural Resources
Division of Forestry

DRAFT

Resource Management Guide

State Forest: Harrison-Crawford
Forester: John Segari

Compartment: 09 Tract: 04
Date: 12/21/2011

INVENTORY SUMMARY

Number of stands: 4
Permanent Openings: 0.0 ac
Tract Acreage: 54.3
Average Basal Area: 114 sq. ft/ac

Est. Annual Growth: 181 bd. ft /ac/yr
Est. Cutting Cycle: 10-15 yrs
*see Appendix 1 for growth and cutting cycle calculations
Site Index: 70-80 (for upland oaks)

Table 1. Tract 0904 Inventory Summary

Species	Harvest		Leave		Total	
	Total	Per acre	Total	Per acre	Total	Per acre
American beech	3,840.0	70.7	0.0	0.0	3,840.0	70.7
American elm	1,050.0	19.3	0.0	0.0	1,050.0	19.3
American Sycamore	0.0	0.0	3,070.0	56.5	3,070.0	56.5
Bitternut	1,010.0	18.6	0.0	0.0	1,010.0	18.6
Black cherry	0.0	0.0	1,140.0	21.0	1,140.0	21.0
Black oak	20,080.0	369.8	28,370.0	522.5	48,460.0	892.4
Black walnut	0.0	0.0	1,550.0	28.5	1,550.0	28.5
Chinquapin oak	1,680.0	30.9	2,500.0	46.0	4,180.0	77.0
Eastern-red cedar	*24,610.0*	*453.2*	*0.0*	*0.0*	*24,610.0*	*453.2*
Mockernut Hickory	1,560.0	28.7	3,990.0	73.5	5,540.0	102.0
Northern red oak	0.0	0.0	16,700.0	307.6	16,700.0	307.6
Pignut hickory	13,300.0	244.9	20,700.0	381.2	34,000.0	626.2
Red maple	860.0	15.8	4,560.0	84.0	5,430.0	100.0
Scarlet oak	8,900.0	163.9	3,570.0	65.7	12,470.0	229.7
Shingle oak	0.0	0.0	5,150.0	94.8	5,150.0	94.8
Shumard oak	0.0	0.0	2,220.0	40.9	2,220.0	40.9
Sugar maple	8,560.0	157.6	4,660.0	85.8	13,220.0	243.5
Sweetgum	0.0	0.0	1,830.0	33.7	1,830.0	33.7
White oak	28,600.0	526.7	79,530.0	1,464.6	108,140.0	1,991.5

Yellow poplar	60,300.0	1,110.5	50,000.0	920.8	110,300.0	2,031.3
Total	**174,350.0**	**3,210.9**	**225,990.0**	**4,161.9**	**401,690.0**	**7,397.6**

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.

Context

Location

This tract is located in Crawford County approximately 4 miles northwest of Wyandotte Cave in the NE ¼ of the NE ¼ of Section 16 and the W ½ of the NW ¼ of the NW ¼, Township 3S and Range 2E. It is north of Schafer Ridge Road on the west side of Devil's Hollow Road.

General Description

This Tract is 54 acres of mostly uplands. There are 4 covertypes in this tract. These grade into each other and so do not have definite boundaries. It is dominated by upland Oak-hickory. This tract provides a variety of wildlife habitats and hunting opportunities as well as water filtration for Dry Run Creek. These stands will be described briefly below and in more detail in the Management section. See Appendix 2 for a map of stand locations.

Stand 1
Bottomland
This covertype is found adjacent to Dry Run Creek on the east side of the tract and comprises 16% of the land area of the tract. It is dominated by Yellow poplar (1310 bd. ft/ ac.) and American sycamore (310 bd. ft/ac). The remaining 45% is composed of red, white, and chinquapin oak with American beech and maples. The timber is variable in size from poles to large sawtimber and of medium quality.

Stand 2
Mixed Mesic Hardwoods
This covertype is found on the east facing slope above Dry Dun Creek and comprises 21% of the tract. It is dominated by Yellow poplar (4071 bd.ft. /ac), Northern red oak (1402 bd.ft. /ac), Black oak (1016 bd.ft. /ac), and Sugar maple (970 bd.ft. /ac). The remaining 29% is composed of pignut hickory, white oak, shingle oak, American beech, and black walnut. The timber in this tract is medium to poor quality medium to large sawtimber. The steep slopes and thin soil likely contribute to the lack of quality.

Stand 3
Oak-Hickory
This covertype is found on the southern portion of the east-facing slope and all along the west-facing slope. It comprises 38% of the tract's area and 42% of the volume. It is dominated by white oak (3283 bd.ft. /ac), yellow poplar (1862 bd.ft. /ac), black oak (1260 bd.ft. /ac), and pignut hickory (783 bd.ft. / ac). The remaining 16% is composed of a variety of upland hardwoods including scarlet, northern red, and chinquapin oak, Mockernut hickory, American beech, and red and sugar maples. Timber here is medium to good quality sawtimber.

Stand 4
Old field Advanced
This covertype is found along the north-south ridge top and constitutes 25% of the land area. It is dominated by Eastern red cedar (2882 bd.ft. /ac) and Yellow poplar (2829 bd.ft. /ac) with lesser amounts of oaks and hickories coming in underneath. The cedar is good quality and the oaks and hickories that are coming in are good sized poles and saplings. The Yellow poplar is low to medium quality and small sawtimber size.

History

This tract was acquired in 2 transactions. The western portion in Section 17 was purchased from the Schafer family in 1944 (Deed 131.131). The eastern portion was purchased from the Bye's in 1941

(Deed 131.119). Aerial photos from the 1940's indicate that the central ridge was a pastureland with scattered trees while the east and western slopes were forested.

This tract was last inventoried in 1990. At that time the stand was classified as 3 stands including oak-hickory in the west, mixed hardwoods in the east, and an unmerchantable old field in the center of the tract, with a total volume of 161,203 bd.ft or 2936 bd.ft/acre. Approximately 27% white oak, 25% yellow poplar, 14% black oak, and 13% pignut hickory. Management goals at this time were timber production, wildlife habitat, and watershed protection. The tract was treated with an intermediate improvement cutting in late summer 1990 removing 14 MBF of black and white oak, 10 MBF of yellow poplar, 5 MBF of scarlet oak, 3 MBF of sugar maple, and 6 MBF of other hardwoods. At this time a .66 acre opening was put in on the western side of the upper ridge.

Landscape Context

The surrounding landscape in this area of the county is dominated by upland deciduous forests. There is occasional evergreen cover in the form of CCC pine plantations dating from the 1930's and old fields that have reverted to eastern red cedar. The surrounding deciduous forest is usually of younger age classes on private lands. The state holdings in the area likely comprise the most mature age classes with the largest structural diversity in the area.

Topology, Geology and Soils

This tract is dominated by a north-south oriented ridge running through the west-central portion of the tract. It is composed of a gentle southwest facing slope, the ridge top, a moderate to steep east slope going down to dry run creek, and a bottomland near and to the east of the creek.

Soils

Tipsaw-Adyeville Complex, 6.5 acres, 25-75% slopes, TblG,

Tipsaw: Site index for black oak and northern red oak is 70 and annual growth is approximately 684 bd.ft./acre*.

Adyeville: Site index for northern red oak is 64 and annual growth is approximately 516 bd. Ft/ acre*.

Apalona Silt Loam, 8.7 acres, AgrC2 (6-12% slopes),

Site index for black oak and white oak is 60 and annual growth is approximately 516 bd.ft./acre*.

Wellston Silt Loam, 29.6 acres, WhfD2 (12-18% slopes),

Site indices for yellow poplar and northern red oak are 90 and 81, respectively, with annual growth of approximately 1032 and 684 bd.ft./acre*, respectively.

*-Annual growth is based on the NRCS soil series yields, Table 3. These values represent even-aged stands at culmination of Mean Annual Increment and should be viewed as the upper range of possible yields. Actual yields based on consecutive inventories have shown a much lower yield (See page 1).

These soils, as a complex, vary from moderately well-drained to excessively-drained. They are derived from loess and loamy residuum over sandstone, siltstone, and shale deposits. They do not offer rooting layer restrictions with restrictive layers being 40-70+ inches in depth in most spots, See Appendix 3 for soils map.

Soil concerns

The soils in some areas are steep and easily eroded. Management activities on the slopes will have to be planned to utilize exposed rocks and conserve soil. This will help maintain these deep soils and prevent excess erosion.

Hydrology

This tract drains to Dry Run which eventually enters the Blue River approximately 6.5 miles downstream. There is also a spring on the west side of the tract.

Access

External access to the tract is reasonably good. Devil's Hollow road, a county road, forms the eastern boundary but dry run creek would need to be forded. Access from the west through private land would be the better route. The process is under way to obtain an easement from the neighbor, Mr. Draper, in exchange for access through a common corner to our northwest. The landowner is amenable and the route has been surveyed. This will likely be the access for any management activities into the future.

Boundaries

This tract contains three external boundaries and one internal. The northern boundary is a well flagged old fence line. The southwest corner has an inscribed stone and a survey marker. The southern boundary has posts set in and the property to the south was been cut fairly hard. The east boundary is Devil's Hollow road and is an internal boundary with tract 1001. It is unclear whether the western line is the property line or a private posting. This should be resolved prior to any management activities.

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. Hard mast food sources are provided by the Oak-Hickory covertype, but another habitat component would come from the old field cedar stand. This stand 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. The categories of optimal and maintenance guideline numbers were broken down by size class subcategory, but are inclusive of size classes above that. In other words, the maintenance guideline for number of snags in the 6" class and larger was 4 per acre, but of that number, 0.5 per acre should be 20"+ and 3 should be 10'-18" or greater. This was done because larger trees are more valuable and less common, and were given the greater importance when calculating total guideline numbers.

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

# of live trees per acre	Guidelines Maintenance	Tract 0904 present
12"-18" DBH class	6	38
20" DBH and greater	3	12
Total	9	50

# snags per acre	Guidelines Maintenance	Guidelines optimal	Tract 0904 actual
6" - 8" DBH class	1	1	.3
10"-18" DBH class	2.5	5	2
20" DBH and greater	0.5	1	.8
Total	4	7	3.1

These numbers show that live tree densities are above that recommended by the Interim Indiana Bat Management Guide. Snag Densities are more complicated. Snag densities do not meet either "maintenance" or "optimal" levels with the exception of large (>20" DBH) trees. These exceed "maintenance" levels. So there are plenty of large snags but not enough small and medium snags.

Rare, Threatened, and Endangered Species

A Natural Heritage Database review was obtained for this tract. 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 an opening created during the previous harvest. The infestation wasn't large, a single stem, but should be taken care of before becoming a problem. Trees were painted in pink to facilitate TSI operations and removals.

There are also some areas of multifloral rose (*Rosa multiflora*) in places – especially in the old field stand and the oak-hickory stand on the west side of the tract – and this would be difficult to eradicate by spraying. While providing a small hindrance to travel and tree regeneration, this thorny shrub can also increase habitat for small mammals and birds by providing protective cover. Large scale elimination of this species is infeasible and this species declines in abundance the longer canopy remains closed. As such, the species should be treated during TSI operations in and around future regeneration openings prior to any harvests.

Recreation

Currently, this stand receives heavy hunting pressure from neighbors. This is evidenced by the presence of deer stands within and adjacent to the property boundary. Other recreational uses such as OHV's, hiking, or camping are not evidenced at this time. This tract doesn't offer any unique recreational opportunities that are not currently being offered or managed for in the surrounding area. Hunting is likely the best recreational benefit that can be managed for in this tract and should be encouraged. Control of Deer and small mammal populations through hunting will help reduce seed and seedling predation and when combined with other management practices will encourage the establishment and recruitment of hard mast species such as oaks and hickories.

Cultural Resources

Cultural resources may be present on this tract but their location is protected. Adverse impacts to significant cultural resources will be avoided during any management or construction activities.

Management Prescription

Stand 1: Bottomland

Current condition

This covertype is found around Dry Run Creek and comprises 16% of the land area and approximately 6% of the volume in the tract. This covertype is dominated by medium to large sawtimber Sycamore and small saw-large pole yellow poplar. The inventory is summarized in Table 2**Error! Reference source not found.** with species composition detailed in Table 3. Currently the covertype is just below the 80% stocked condition, see Appendix 4. However, this is misleading because the chart is for upland oak-hickory not bottomlands.

Table 2. Bottomland Inventory Summary

STAND: BOTTOMLAND		ACREAGE: 9	
	HARVEST (BD FT)	LEAVE (BD FT)	TOTAL (BD FT)
VOLUME/ACRE	0	2,968	2,968
VOLUME TOTAL	0	26,120	26,120
BASAL AREA/ACRE	8	69	77
TREES/ACRE	135	218	353

Table 3. Bottomland volume by species

Species	Harvest/acre	Leave/acre	Total/acre
Sycamore	0	310	310
Black cherry	0	116	116
Chinquapin oak	0	253	253
Northern red oak	0	293	293
Shumard oak	0	225	225
Sugar maple	0	83	83
Sweetgum	0	185	185
White oak	0	193	193
Yellow poplar	0	1,310	1,310
Total	**0**	**2,968**	**2,968**

Desired future condition:

The main objective for this stand is to maximize ecological services while providing for quality timber supply. Ecological services that are appropriate here are water filtration, sedimentation prevention, lowland habitat, and mast production.

Silvicultural Prescription:

In order to meet the desired future condition this area should be allowed to naturally develop for the foreseeable future. The inventory doesn't represent the prevalence of buckeye seedlings and saplings as well as the cherry and sweetgum saplings. The poplar is mostly small but will eventually develop due to the deep moist soils here. Opossum, deer, squirrel, and song birds were seen and heard during the inventory. The moist environment provided by depressions and holes in this covertype would also be ideal for amphibian habitat.

If deemed feasible when marking the rest of the tract for treatment, this area could benefit from an improvement cutting, removing the large residual trees if they are competing with, or suppressing, quality regeneration. There are not enough to vines to justify a contract being bid out but if TSI is done in the remainder of the tract, this area should be included. TSI would be to control vines and dogwood to allow

quality crop trees to continue to develop and reduce competition for light to seedlings and establish more tree species.

Stand 2: Mixed Mesic Hardwoods

Current condition

This covertype is found uphill from Dry Run Creek and comprises 21% of the land area and approximately 30% of the volume in the tract. This covertype is dominated by medium to large sawtimber poplar and red oak with several over mature black oak. The inventory is summarized in Table 4 with species composition detailed in Table 5. Currently the covertype is well over the 100% stocked condition, see Appendix 4. However, this is misleading because the chart is for upland oak-hickory not mesic hardwoods which can carry more volume per acre. However the covertype is still likely overstocked.

Table 4. Mixed Mesic Hardwood Inventory Summary

STAND: MIXED MESIC HARDWOODS		ACREAGE: 11	
	HARVEST (BD FT)	LEAVE (BD FT)	TOTAL (BD FT)
VOLUME/ACRE	3,941	6,628	10,568
VOLUME TOTAL	44,920	75,550	120,480
BASAL AREA/ACRE	79	71	150
TREES/ACRE	366	110	476

Table 5. Mixed Mesic Hardwoods volume by Species

Species	Harvest/acre	Leave/acre	Total/acre
American beech	509	0	509
Black oak	1,016	0	1,016
Black Walnut	0	393	393
Northern red oak	0	1,402	1,402
Pignut hickory	0	871	871
Shingle oak	0	741	741
Sugar maple	0	970	970
White oak	0	596	596
Yellow poplar	2,416	1,656	4,071
Total	**3,941**	**6,629**	**10,569**

Desired future condition:

The desired future condition for this stand is to provide for species diversity and quality timber production. The soils on the slope are thinner than in other areas of the tract and as such likely will not carry high quality maple or other mesic hardwoods. This however provides the opportunity to increase the amount of oak growing on more productive sites.

Silvicultural Prescription:

In order to reach the desired future condition, the most effective route would be the harvest of the majority of the poplar and black oak. This will allocate more canopy space to the red oak. The soils scarification caused by harvest operations will likely assist new oak in establishing to be released in the future. A regeneration opening should be placed in this covertype to allow a new cohort of intolerants to establish.

Stand 3: Oak-Hickory

Current condition

This covertype is found on parts of the ridge top and on the west facing slopes as well as on the southern half of the east facing slope and comprises 37% of the land area and approximately 43% of the volume in the tract. This covertype is dominated by medium to large sawtimber white oak, poplar, and black oak. The inventory is summarized in Table 6 with species composition detailed in Table 7. Currently the covertype is fully stocked at just under the 100% stocked condition, see Appendix 4.

Table 6. Oak-Hickory Inventory Summary

STAND: OAK-HICKORY		**ACREAGE: 20**	
	HARVEST (BD FT)	**LEAVE (BD FT)**	**TOTAL (BD FT)**
VOLUME/ACRE	3,816	4,759	8,575
VOLUME TOTAL	77,080	96,140	173,220
BASAL AREA/ACRE	59	54	113
TREES/ACRE	288	130	418

Table 7. Oak-Hickory volume by Species

Species	**Harvest/acre**	**Leave/acre**	**Total/acre**
American beech	58	0	58
American elm	33	0	33
Bitternut	32	0	32
Black oak	508	753	1,260
Chinquapin oak	53	0	53
Eastern red cedar	57	0	57
Mockernut hickory	49	126	175
Northern red oak	0	219	219
Pignut Hickory	263	520	783
Red maple	27	95	122
Scarlet oak	281	113	394
Sugar maple	243	0	243
White oak	905	2,378	3,283
Yellow poplar	1,306	556	1,862
Total	**3,815**	**4,760**	**8,574**

Desired future condition:

The desired future condition for this covertype is to provide an adequately stocked stand of quality sawtimber that provides hard mast for game and non-game wildlife species. Other multiple uses that are appropriate for this site include hunting.

Silvicultural Prescription:

In order to reach the desired future condition, an improvement thinning should be performed. This should be a combination of single tree and group selections. The stand is currently adequately stocked but will become overstocked and start experiencing higher rates of mortality during the next cutting cycle if not treated. The thinning should remove trees to release quality crop trees focusing on white oak, hickories, and other oaks, but any good quality healthy tree should be treated as a crop tree. Most of the sugar maple and more tolerant hardwoods should be removed to encourage the maintenance of an oak-hickory species composition. Occasionally groups of trees may need to be removed to increase residual quality or to release existing favorable regeneration. Based on the inventory, stocking should be reduced to 50% to promote the establishment of oak regeneration and remove undesirable species.

Stand 4: Old Field Advanced

Current condition

This covertype is found on the central ridge top and comprises 24% of the land area and approximately 24% of the volume in the tract. This covertype is dominated by mature eastern red cedar and small sawtimber yellow poplar. The inventory is summarized in Table 8 with species composition detailed in Table 9. Currently the covertype is overstocked at well over the 100% stocked condition, see Appendix 4. However, this is misleading because the chart is for upland oak-hickory not for poplar or cedar which can carry fairly high volumes per acre.

Table 8. Old Field Advanced Inventory Summary

STAND: OLD FIELD		**ACREAGE: 13**	
	HARVEST (BD FT)	**LEAVE (BD FT)**	**TOTAL (BD FT)**
VOLUME/ACRE	4,816	2,677	7,493
VOLUME TOTAL	62,600	34,800	97,410
BASAL AREA/ACRE	72	73	145
TREES/ACRE	234	193	427

Table 9. Old Field Advanced Volume by Species

Species	**Harvest/acre**	**Leave/acre**	**Total/acre**
Black oak	0	575	575
Eastern red cedar	2,882	0	2,882
Northern red oak	0	168	168
Pignut hickory	629	104	732
Red maple	0	196	196
Sugar maple	109	0	109
Yellow poplar	1,196	1,633	2,829
Total	**4,816**	**2,676**	**7,491**

Desired future condition:

The desired future condition for this covertype is similar to that of the oak-hickory covertype: to provide an adequately stocked stand of quality sawtimber that provides hard mast for game and non-game wildlife species while practicing multiple uses that are appropriate for this site such as hunting.

Silvicultural Prescription:

In order to reach the desired future condition, this area should be converted to a new stand of hardwoods through a regeneration cutting. This would be accomplished through group selection with a heavy thinning. The majority of the timber here is of low quality with short boles and/or hollow bases. There is fair advance regeneration consisting of oak, hickory, and sugar maple. A heavy cutting here would release the oak and hickory regeneration; establish a higher quality stand of hardwoods likely including oaks, poplars, maples, and hickories, and remove the early successional cedar. Some of the poplar and most oaks would be left to provide a seed source. The stocking that follows would be approximately 60%, and would be more reflective of an oak-hickory covertype.

Effects of Management:

Summary of silviculture throughout the tract:
Due to the current condition of the stand, a medium level improvement harvest could be undertaken in this tract at anytime. Overall stocking should be reduced from the current 110% to approximately 58%. This is accomplished by a combination of crop tree release, cull removal, regeneration openings, and converting the old field area into a hardwood stand by removing the cedar and low quality trees. The area should receive at least 10%, or 5 acres of regeneration openings. Regeneration should be concentrated in the old field covertype to convert to native hardwoods. This would produce a sale volume of approximately 174,350 board feet or about 3,210 board feet per acre and leave about 225,990 board feet or 4162 board feet per 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, girdling cull trees, and control of ailanthus.

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: 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 may be some conversion of cedar or the old field area to temporarily open areas that will be allowed to succeed into native hardwoods, and this would change the character of the tract over time, but will not change it into a permanently non-forested cover type. Creation of regeneration openings and/or conversion of portions of the old field area into openings will create 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.

While, this tract does not border a major perennial stream, the bottomland around Dry Run Creek is wet and sparsely stocked. There should be no disruption of any potential travel corridors by forest management activities as the riparian covertype is to be kept in a forested condition. The riparian habitat on this tract, in the context of the surrounding landscape, does represent a special component that would be used more preferentially or exclusively by wildlife for traveling or dispersion. This utilization may be limited in scope due to established disturbance imposed by the county road that parallels Dry Run Creek. Since this tract represents a component of contiguous forest, it is possible that forest management activities might disrupt any forest interior species by creating edge habitat for generalist species to "invade" the area. This would possibly occur if regeneration openings were put in place that offered a habitat preferred by such generalist species which might move in and start using such habitat. In the context of the surrounding landscape, this tract represents a medium- sized chunk of forest in a matrix of surrounding forest land.

Indiana Bat

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

# of live trees per acre	Guidelines Maintenance	Tract 0904 actual present	–	harvest = residual
12"-18" DBH class	6	38	14	24
20" DBH and greater	3	12	5	7
Total	9	50	19	34.7

# snags per acre	Guidelines Maintenance	Guidelines optimal	Tract 0904 actual
6" - 8" DBH class	1	1	.3
10"-18" DBH class	2.5	5	2
20" DBH and greater	0.5	1	.8
Total	4	7	3.1

Harvest levels advised in this plan will maintain those live tree densities. Snag Densities are more complicated. It is likely that additional snags in the medium size class will be created by post harvest TSI activities as there are approximately 4 trees per acre inventoried as culls. These cull trees may or may not be harvested and those not harvested will be girdled in post harvest TSI creating a diversity of snag diameters and species. 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 impact that component significantly. Some snags may be felled during harvest operations if they present an unmanageable physical hazard to field personnel.

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

Another management plan will need to be written in 2020. And another inventory will need to be performed in 2020.

Proposed Management Activity	**Proposed date:**
Finish Easement establishment	2012
Mark Sale	2012-13
Harvest	2012-13
Post harvest TSI	2013-14
Reassess any openings, inventory, and write new Plan	2020

Appendix 1
Growth Calculations:

Growth calculated as follows:

1990 inventory	231,877 bd.ft
Harvest removals 1999	52444 bd. ft
2011 inventory	377,080 bd. ft
Growing seasons	20
Area	54.3 acres

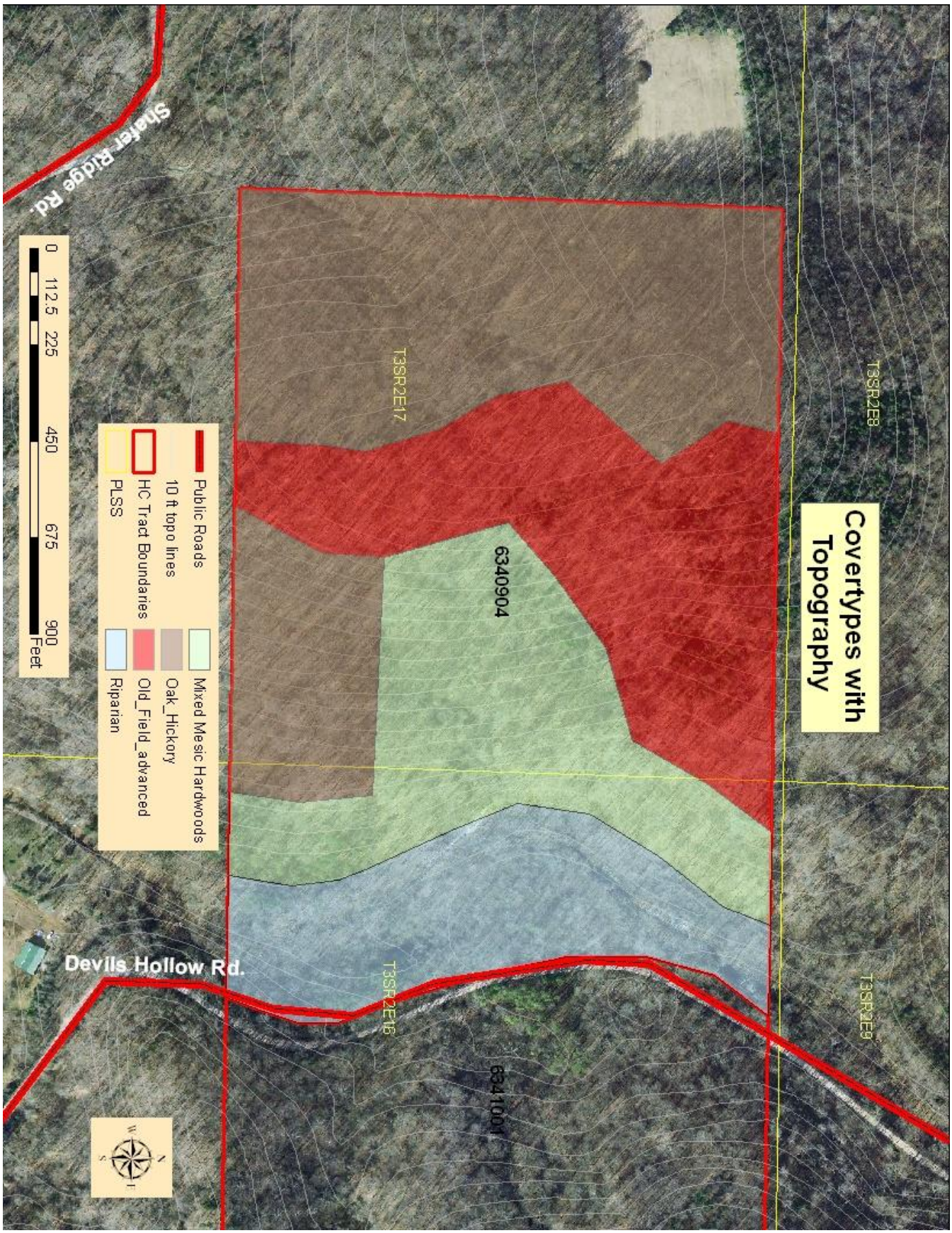
Estimated growth = [2011 volume - (1990 volume - harvest volume)]/ Growing seasons

Growth = [377080-(231877-52444)]/20
Growth = 9882 bd. ft /yr
Growth = 181 bd. ft. /acre/yr

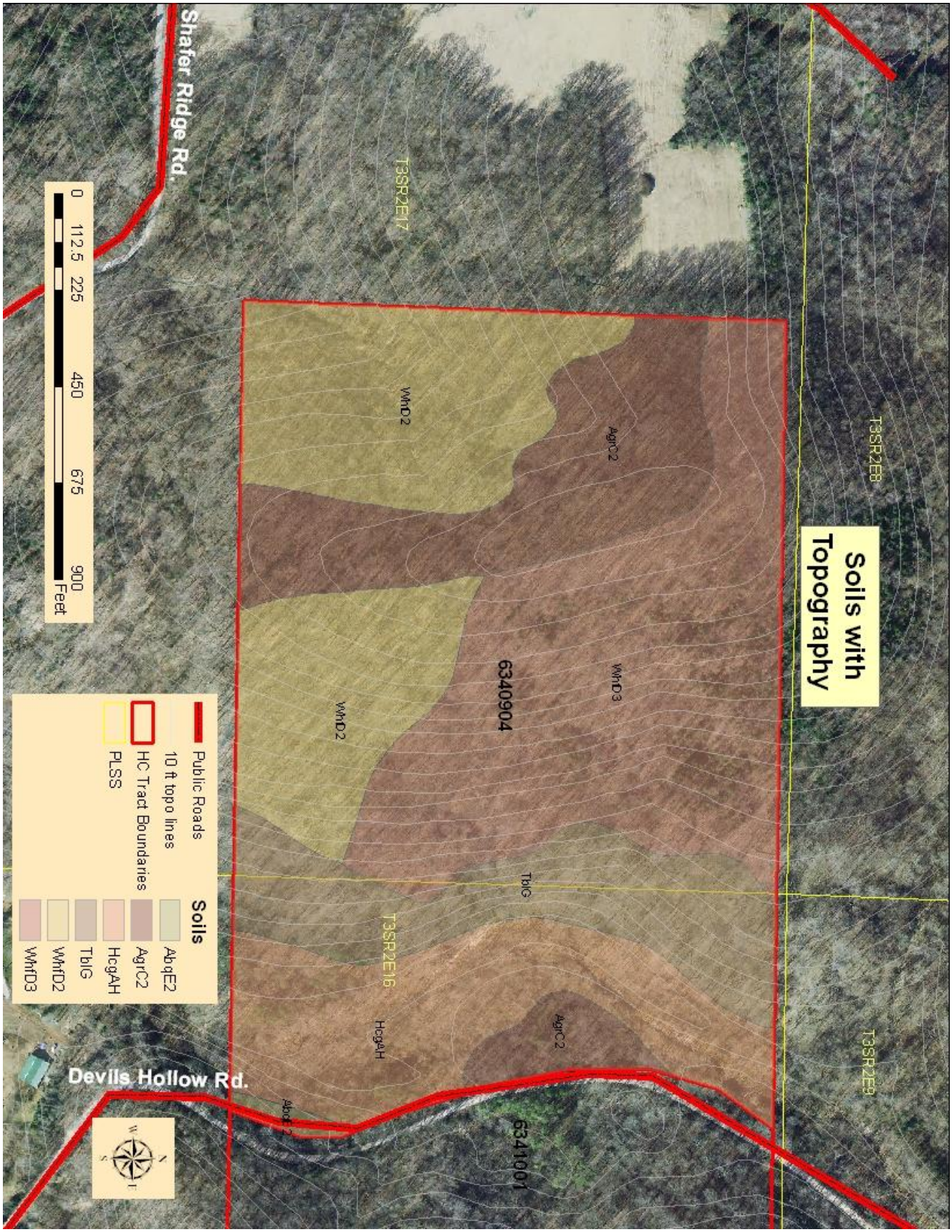
Volumes exclude Eastern red cedar due to different scales being used, current scales assign more volume and inclusion would result in an inflated growth estimate.

Cutting cycle calculated as the length of time required to reach a merchantable sale volume. Merchantable volume is assumed to be 1500 – 2000 bd. ft/ac. CC = 1500 / (.8)*(annual growth)

Appendix 2
Covertype Locations



Appendix 3
Soils:



Appendix 4
Stocking Chart:

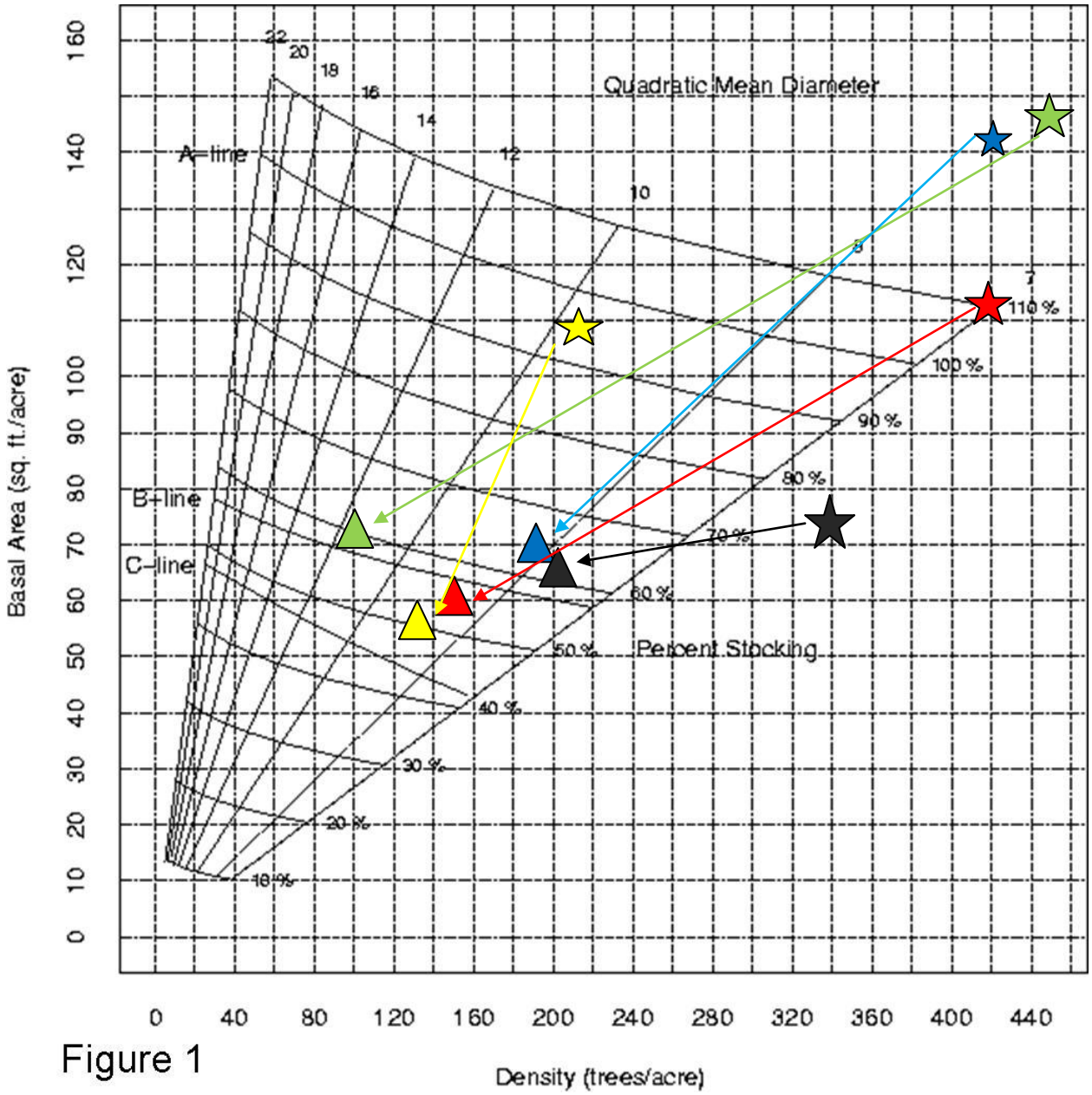


Figure 1

☆ **Indicates the current stocking condition**

△ **Indicates the proposed (post harvest) condition**

Indicates the Tract Total

Indicates the Oak-Hickory

Indicates the Bottomlands

Indicates the Mixed Mesic Hardwood

Indicates the Old Field

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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.