RESOURCE MANAGEMENT GUIDE

State Forest: Greene-Sullivan Compartment: 4 Tract: 8
Forester: Tom Moore Date: 7/8/10
Management Cycle End Year: 2030 Management Cycle Length: 20

Location

Compartment 4, Tract 8 is located primarily in the SW 1/4 of Section 25 – T7N – R8W of Sullivan County. There is approximately 32 acres of the tract that is located in the NW ¼ of section 25. It is approximately 1.5 miles south of the town of Dugger.

General Description

The tract is approximately 129 acres. The various land use components can be delineated as follows:

- Closed Canopy –96 acres
- Lakes/Wetlands – 16 acres
- Blow-down/Storm damage – 17 acres

Approximately 71% of this tract has been surface mined. The majority of the surface mined area is on the east side of Lonnie Lake. This management plan is written for 96 acres of this tract, although there were approximately 24 acres that were not accounted for due to inaccessibility. This inaccessibility is due to a storm that occurred 2 years previous to inventory. The unmined land within the tract lies on the western boundary and west of Lonnie Lake. Approximately 56 acres of the tract consist of mixed hardwoods. The primary hardwood species are sycamore, red oak, silver maple, and black cherry. Pine occupies about 40 acres of the stand, most of which is eastern white pine, but also includes some Virginia pine as well.

History

The deed of this tract was acquired from the Central Indiana Coal Company on July 14th, 1949. No known records exist of the planting operation, but based upon old aerial photography and tree size, plantings of silver maple and sycamore occurred within a few years of the land being acquired by the state. The planting of the silver maple and sycamore trees occurs in the central portion of the tract. Approximately 10 years after the land was acquired pine was planted throughout the stand. The inventory was conducted in the summer of 2010.

Boundary and Landscape Context

The north-western boundary of this tract borders State Highway 159 and private land. The remainder of the western boundary borders private land. The south-western portion of the tract also borders private land. The north-eastern boundary of the tract is Lynn Lake.

Topography, Geology and Hydrology

Most of the tract has been surface mined and consists largely of moderately steep mounds of mine spoil (a mixture of soil, shale, sandstone, and some coal). These hills occur on the eastern side of Lonnie Lake. Lonnie Lake is just east of the western boundary of the tract. The land west of Lonnie Lake is relatively flat, but there are a few steep hills and ridges within this area. The majority of the hills run from the NW to the SE. There are some low marshy areas within the stand that will stay wet late into the year.

Soils

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber	
			Cu ft/ac	
AlB2:				
Ava	Northern red oak Tuliptree White oak	80 90 75	57 86 57	Baldcypress, Black oak, Blackgum, Bur oak, Chestnut oak, Common persimmon, Eastern white pine, Scarlet oak, Shingle oak, Southern red oak, Virginia pine, White oak
AlB3:				
Ava, severely eroded	Northern red oak Tuliptree White oak	80 90 75	57 86 57	Black oak, Blackgum, Bur oak, Chinkapin oak, Eastern white pine, Northern red oak, Shagbark hickory, Shingle oak, Tuliptree, White oak
CnB2:				
Cincinnati	Northern red oak	80	57	Baldcypress, Black oak, Blackgum, Bur oak, Chestnut oak, Common persimmon, Eastern white pine, Scarlet oak, Shingle oak, Southern red oak, Virginia pine, White oak
CnC3:				
Cincinnati, severely eroded	Northern red oak	80	57	Baldcypress, Black oak, Blackgum, Bur oak, Chestnut oak, Common persimmon, Eastern white pine, Scarlet oak, Shingle oak, Southern red oak, Virginia pine, White oak
CnD3:				
Cincinnati, severely eroded	Northern red oak	80	57	Baldcypress, Black oak, Blackgum, Bur oak, Chestnut oak, Common persimmon, Eastern white pine, Scarlet oak, Shingle oak, Southern red oak, Virginia pine, White oak
HkE:				
Hickory	Northern red oak Tuliptree White oak	85 95 85	72 100 72	American beech, Black cherry, Black oak, Black walnut, Bur oak, Chinkapin oak, Eastern white pine, Kentucky coffeetree, Northern red oak, Norway spruce, Pecan, Pignut hickory, Shagbark hickory, Shumard's oak, Sugar maple, Tuliptree, White oak
HkF3:				
Hickory, severely eroded	Northern red oak Tuliptree White oak	85 95 85	72 100 72	American beech, Black cherry, Black oak, Black walnut, Bur oak, Chinkapin oak, Eastern white pine, Kentucky coffeetree, Northern red oak, Norway spruce, Pecan, Pignut hickory, Shagbark hickory, Shumard's oak, Sugar maple, Tuliptree, White oak

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber	
			Cu ft/ac	
St:				
Strip mines	---	---	---	Black locust, Blue spruce, Eastern white pine, Tuliptree
VgA:				
Vigo	Pin oak	90	72	American beech, American sycamore, Baldcypress, Bitternut hickory, Blackgum, Bur oak, Cherrybark oak, Eastern cottonwood, Eastern white pine, Northern red oak, Norway spruce, Pin oak, Shingle oak, Silver maple, Sugar maple, Swamp chestnut oak, Swamp white oak, Sweetgum, White oak
	Sweetgum	90	100	
VgB2:				
Vigo	Sweetgum	90	100	American beech, American sycamore, Baldcypress, Bitternut hickory, Blackgum, Bur oak, Cherrybark oak, Eastern cottonwood, Eastern white pine, Northern red oak, Norway spruce, Pin oak, Shingle oak, Silver maple, Sugar maple, Swamp chestnut oak, Swamp white oak, Sweetgum, White oak

Access

The tract can be accessed by an access road that runs east off of State Highway 159. This road ends at a boat ramp at the north-western corner of Lynn Lake. There is also a boat ramp on the north-western point of Lonnie Lake where the tract can be easily accessed. The south-western portion of the stand is inaccessible due to blow down from a storm that occurred two years previous to the inventory.

Wildlife Habitat Features

Wildlife habitat suitable for a wide variety of native species should be optimized throughout the tract in order to promote and maintain a high level of faunal diversity.

Cover/Habitat Overview

TABLE 1

Habitat/cover type	0%	0 < 1%	1-10%	11-50%	51-90%	>90%	Unknown
Closed-canopy deciduous/mixed forest	☐	☐	☐	☐	☒	☐	☐
Pine/conifer plantations or natural stands	☐	☐	☒	☐	☐	☐	☐
Early successional forest (≤ 20 years old)	☐	☒	☐	☐	☐	☐	☐
Shrub-scrub or old field	☒	☐	☐	☐	☐	☐	☐
Grasslands/hayfield	☒	☐	☐	☐	☐	☐	☐
Cropland, pastures, feedlots	☐	☐	☒	☐	☐	☐	☐
Open water (lakes, ponds, rivers, streams, etc.)	☐	☐	☒	☐	☐	☐	☐
Riparian areas	☐	☐	☒	☐	☐	☐	☐
Developed areas	☐	☐	☒	☐	☐	☐	☐
Other: Reclaimed Mine Land	☐	☐	☒	☐	☐	☐	☐

Table 1 shows the estimated proportion of each cover/habitat type within 1 mile of tract center. The area is primarily a mix of closed canopy deciduous forest (43%) with pine stands ranging from a couple to over 10 acres in size, making up about 31% of the stand. The remaining cover is made up of lakes, wetlands, riparian areas, and a few developed areas. There is no cropland, early successional forest, or grassland/hayland habitat in this area. There is a fair amount of forest edge due to this interspersion of forest and developed areas (i.e., roads, residences). If a regeneration opening(s) is established as a result of harvest operations, then some early successional forest habitat may eventually be represented in the habitat overview. Other than this, none of the proposed management activities will significantly alter the relative proportion and availability of the other habitat/cover types in the assessment area.

TABLE 2

State Forest: Greene-Sullivan **Compartment Number:** 04 **Tract:** 08

Reference Number: 6330408 **Tract Acres:** 96

	Maintenance Level	Optimal Level	Inventory	Available Above Maintenance	Available Above Optimal
Legacy Trees *					
11"+ DBH	864		761	-103	
20"+ DBH	288		258	-30	
Snags (all species)					
5"+ DBH	384	672	2404	2020	1732
9"+ DBH	288	576	724	436	148
19"+ DBH	48	96	95	47	-1
Cavity Trees (all species)					
7"+ DBH	384	576	72	-312	-504
11"+ DBH	288	384	72	-216	-312
19"+ DBH	48	96	0	-48	-96

*** Species Include:** AME, BIH, BLL, COT, GRA, REO, POO, REE, SHH, ZSH, SIM, SUM, WHA, WHO

Table 2 shows the optimal level of trees needed for the best potential wildlife habitat. Approximately 80 acres of the stand is closed canopy hardwood, but there are also large pine stands within the tract. The other 16 acres of the tract are lakes and wetlands. The majority of the trees in the stand are eastern white pine. Most of the eastern white pine trees present in the stand is small to pole size, but there are a good number of saw timber trees as well. The larger eastern white pine trees are great trees for the turkey to roost.

This table also shows that the vast majority of the snags in the stand are 5-8” DBH and that the tract is significantly over the number of snag trees for an optimal level. The figures in Table 1 also shows that the number of cavity trees for an optimal level are significantly lacking. The suggested management activities should not have any drastic affects on the cover/habitat type. The legacy trees are mostly in the 11-19” range, no

optimal level was given, but it seems that there is definitely room for an increase of legacy trees.

Structural Habitat Features

TABLE 3

Target Snag Density

Diameter (DBH) Distribution	Goal	C4T8
Including at least this many snags per acre ≥ **5”**:	4	25
Including at least this many snags per acre ≥ **9”**:	3	7.5
Including at least this many snags per acre ≥ **19”**:	0.5	9

The data in *Table 3* represents the number of snags in the tract compared to the guidelines set by the DoF for forest stand snag density. The data shows that the number of snag trees within the tract is considerably over the goal per acre, particularly in the small diameter trees. Based upon observations in the field, it is unlikely that the number of snags per acre for trees **≥ 5”** is quite this high. Most of the smaller snags consist of American elm and black locust.

TABLE 4

Cavity Trees per Acre

Diameter (DBH) Distribution	Goal	C4T8
Total minimum cavity trees per acre ≥**7”**:	4	.75
Including at least this many roost trees ≥ **11”**:	3	.75
Including at least this many roost trees ≥ **19”**:	1	0

Table 4 shows how this tract compares to DoF guidelines for the forest stand cavity tree density. The data suggests that the stand is severely lacking the optimal number of cavity trees for wildlife. However, there are most likely more cavity trees than represented here; this is due to a lack of visibility into the canopy. Some of the larger trees may have had cavities present but due to the thickness of the canopy they were difficult to notice.

TABLE 5

Preferred Legacy Trees per Acre

Diameter (DBH) Distribution	Goal	C4T8
Total minimum Legacy trees per acre ≥**11”**:	9	7.9
Including at least this many Legacy trees ≥ **20”**:	3	2.6

Table 5 shows how this tract compares to the Indiana Bat guidelines for preferred legacy trees. The data shown suggests that the number of legacy trees within the tract is lower than the preferred number for both size classes. The main species of legacy trees in this stand consist of American elm, silver maple, and black locust.

The structural habitat features listed above will be considered during management operations. Efforts will be made to meet maintenance level guidelines for each habitat feature.

IDNR Natural Heritage Database Review

A NHDB review was conducted for this tract. There are records of four bird species of concern (Henslow's Sparrow, American Bittern, Northern Harrier, and the Bald Eagle) to the west of forest property.

Habitat

The Henslow's Sparrow is listed as an endangered species in Indiana. An estimated several thousand individuals breed in 19 reclaimed coal mine grasslands in southwestern Indiana. It is an obligate grassland species that historically bred in tallgrass prairie habitat. They also breed in other grasslands, including hayfields, pastures, and meadows.

The Northern harrier is listed as an endangered species in Indiana. Only one observation exists for a state forest property. The lack of observations on state forests is due to the avoidance this species has for forested areas, preferring instead marshes, meadows, grasslands, old fields, pastures, and other open areas during the breeding season.

American bitterns most often breed in shallow wetlands dominated by tall emergent vegetation, including cattail marshes, wet meadows, bogs, shrubby marshes, and occasionally hayfields. When compared to the Least Bittern, the American Bittern uses a wider variety of wetland types, less densely vegetated sites, shallower water depths, and exclusively freshwater habitats.

The Bald Eagle is designated as a species of special concern in Indiana. In Indiana 68 nests were known in 2006. Nesting Bald Eagles are associated almost exclusively with lakes, rivers, or seacoasts that support an adequate food supply and have nearby forested areas. Nests typically are located in canopy-level trees – live or dead – that are open and accessible, as well as rock ledges and promontories. Bald Eagles generally are thought to be intolerant of human activity close to nest sites during the nesting season, though some individuals nest successfully in close proximity to such activity.

Management

The biggest threat to the listed species is the loss of habitat. None of the species listed in the review are forest dwelling species. Therefore, the proposed management activities should have no impact on these species or their habitat. The DoF will follow the appropriate guidelines published by the USFWS for all forest management activities near bald eagle nests. These guidelines specify the appropriate timing and distance at which various activities can take place near active and inactive bald eagle nests.

Exotic/Invasive Species

Species	Immediate Management Required	Monitoring/ Re-evaluation Recommended	Mapped?
Ailanthus	☒	☒	☒
Autumn Olive	☒	☐	☐
Multiflora Rose	☒	☒	☐
Privet	☐	☐	☐

This stand is infested with multiflora rose, immediate treatment is highly recommended. A foliar spray is almost certainly the best option, but a prescribed burn may also help but may be difficult to implement over the entire tract. Some ailanthus was noticed while performing inventory, but it was not a large amount. In order to prevent further spread of ailanthus, immediate treatment is recommended. Autumn olive was also noticed throughout parts of the stand, there was not an alarming amount noticed, but immediate treatment is also recommended due to the rapid spread and difficulty of removal once established.

Recreation

Common activities in this tract are mushroom gathering, deer and turkey hunting and fishing.

Cultural

There were no cultural features found within this tract.

Stand Descriptions and Silvicultural Prescriptions

Mixed Hardwood – 56 ac

Current Condition

This stand is comprised of a wide variety of species. It seems that only eastern white pine had been planted throughout parts of the tract after mining was completed on the land. The rest of the trees are a result of natural regeneration. Eastern white pine comprises approximately 42% of the total sawtimber volume and around 39% of the total BA per acre. The majority of the eastern white pine is around 9.5" DBH. The remainder of the stand consists of a diverse mixture of species and size classes. The eastern white pine dominates every size class except for the small size class, which is dominated by white ash. The advance regeneration consists largely of eastern white pine, American elm, white ash, and sassafras.

A combination of disease, grapevines, and poor stocking during stand development and establishment is most likely the reason for the poor tree quality throughout the stand. The most vigorous trees in the stand consist of eastern white pine, red maple, and shingle oak.

The stand is currently 95% stocked with 101.8 ft^2 of basal area (BA), 384 trees per acre (TPA), and 5,520 board feet (bd. ft.) per acre.

Prescription

An improvement cut, utilizing single tree/group selection and regeneration cutting is highly recommended for this stand. The marking should focus on removing the small American elm, poorly formed black cherry, larger red maple, and eastern white pine of sawtimber size. The inventory data suggests that approximately 1,620 bd. ft. could be harvested from the stand. Overall the majority of the sawtimber volume would be comprised of eastern white pine (19%), red oak (15%), and silver maple (12.5%). The remainder of the volume is primarily made up of shingle oak (10%), red maple (8%), and sycamore (8%). The primary crop tree species would be eastern white pine and red oak. The harvest would result in a residual stocking of 66%, 66.3 ft² of basal area (BA), 342 trees per acre (TPA), and 3900 bd.ft./ac.

Invasives such as multiflora rose, grapevines, and ailanthus should be controlled during pre-harvest TSI operations. Also, undesirable seedlings/saplings and non merchantable trees should be killed in potential regeneration openings during the pre-harvest TSI. Post harvest TSI should consist of coppicing, cull removal, prescribed burning, invasive monitoring and control, as well as planting and direct seeding trees. Planting and direct seeding would most likely consist of oak, walnut and poplar.

Pine – 40 ac

Current Condition

The stand is currently 90% stocked with 129.8 ft² of BA, 635 TPA, 7,710 bd.ft./ ac. The average tree is about 4" DBH. Eastern white pine comprises 62.7% of the BA and 70% of the total volume in this stand. The other dominant species in the stand are Virginia Pine (8% BA and 16% Volume) and black cherry (6% BA and 2% volume). The remainder of the stand is comprised primarily of sycamore (4% BA and 5% volume) and sassafras (3% BA and 0% volume). 68% of the white pine BA is sawtimber size. The majority of this is medium to large, good quality sawtimber. There is a scattering of white ash, red maple, and American elm. The majority of the elm and ash are of small size.

Invasives including grapevines are not prevalent within this stand. Although, there is a fair amount of multiflora rose within the stand. The rose would be more prevalent in the stand if not for the pine trees blocking out much of the sunlight.

Prescription

This stand is fully stocked according to the stand density chart for white pine. A free thinning and improvement cut, utilizing single/group selection is recommended for this stand. The marking should focus on releasing vigorous, co-dominant white pine. This can be accomplished by removing defective and suppressed white pine. Also, removal of undesirable, poor growing stock should be implemented as well. The inventory suggests that approximately 190,920 bd.ft could be harvested from this stand. The majority of the sawtimber volume would be comprised of white pine (71%), Virginia pine (12%), and sycamore (5%). The remainder of the volume is made up of shortleaf pine, cottonwood, and black oak. The harvest of this stand should result in a residual stocking of 65%, 81.8 ft² BA, 439 TPA, and 5,850 bd.ft./ac.

Any grapevines or invasives should be controlled through pre-harvest TSI operations. Post harvest TSI may consist of coppicing, cull removal, and invasive control.

Tract Summary

Overall the current tract has an average stocking of 108%, with a BA of 110.8 ft^2, 497 TPA, and 7,880 bdft/ac. The proposed harvesting operation could potentially produce an estimated total of 190,920 bd. ft. or roughly 1,860 bd.ft./ac. Overall the majority of the sawtimber volume would be comprised of eastern white pine (50%), Virginia pine (8%) sycamore (6%), red oak (5%), and silver maple (5%). The remainder of the volume would come from black cherry, shingle oak and red maple.

The proposed management activities would result in an average stocking of 81%, with a BA of 83ft^2, 446 trees per acre, and 1,161.3 bdft/ac.

As long as harvesting operations are not conducted during wet periods and skidding and hauling equipment remain in designated areas, there should not be any negative long term impacts to the soil.

The tract would need to be closed to the public during harvesting operations. Therefore, hunting activities would be adversely affected during this period. However, there are numerous locations in the surrounding property that offer the same opportunities. Wildlife habitat, timber quality and biodiversity should be enhanced as a result of the proposed harvesting and TSI operations.

Proposed Activity Planning

Proposed Management Activity	*Proposed Date*
Skid Trail / Log Yard Construction	2015 - 2016
Timber Marking	2015 - 2016
Harvest	2016 - 2018
Close Out	2017 - 2018
TSI (Post-Harvest)	2018 - 2020
Re-Inventory	2030

Attachments (On file in Property office)

- Maps (Tract, Inventory, Soils, Harvest)
- A stocking guide chart with the tract level stocking condition plotted and identified.
- Ecological Review
- T Cruise reports

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