FOREST STEWARDSHIP PLAN

April 9, 2013

Property Information

Original Preparation Date: April 9, 2013

New X	Update ___	Revision ___

Owner's Name:
Louis Meyer

Address:
3648 County Road 113
Carbondale, CO 81623

Phone:
H: 970-945-5680
W: 970-945-1004

County:
Ralls

Location:
Township 56N
Range 3W
Sections 27, 28, 33

Farm Information:
Planned Acres: ~237.7
Unplanned Acres: ~ 48.1
Total Acres: ~285.8

Prepared by:
Matt Arndt
Quality Forest Management
12500 E Judy School Rd
Columbia, MO 65202
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Required Signatures

I have reviewed this plan and approve its content.

Landowner _____ Date _____

I certify that this Forest Management Plan meets the requirements of the federal Forest Stewardship Program.

Plan Preparer Matt Frat Date 4/9/2013

I certify that this Forest Management Plan meets the requirements of the federal Forest Stewardship Program.

Forestry Regional Supervisor _____ Date _____

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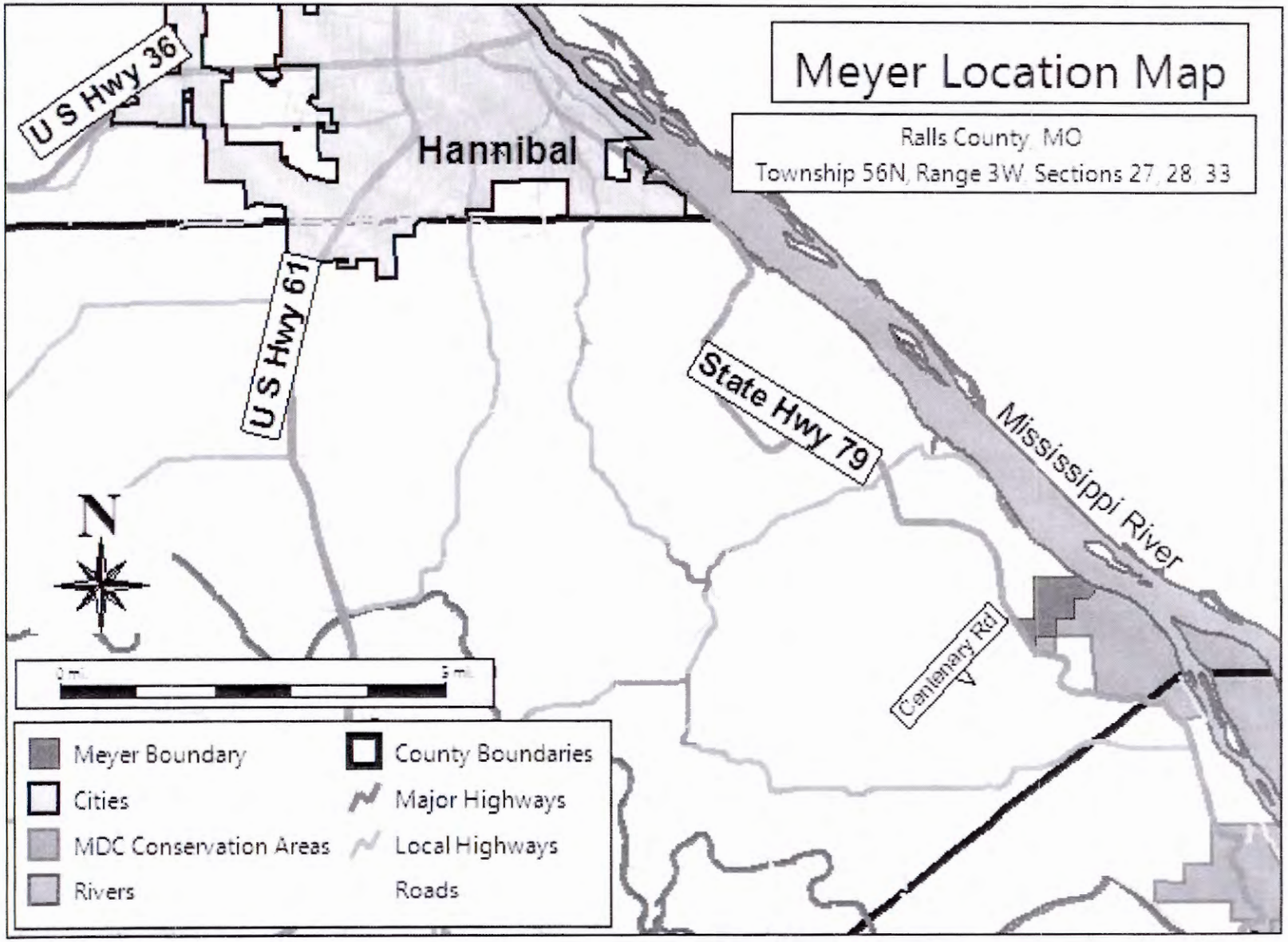
Soils Report – Map Unit Descriptions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Landowner Objectives

Mr. Meyer's objectives are to manage this property in a manner that will protect and enhance the farm's natural resources.

Some of his current objectives are:

- Maintaining the aesthetic appeal of the forest
- Utilizing the forest to build a cabin, either through the use of on-site logs or funds gained by logging the property
- Enhanced wildlife habitat for a wide range of species
- Become increasingly knowledgeable regarding the current structure of the forest and the possible management options for the forest
- Increased productivity of the existing forest for timber production
- Improve forest species composition over time by managing regeneration
- Protection and improvement of all natural resources

Forest Health and Protection

Your property and forests are valuable assets and should be protected from damaging forces if at all possible. Some of these forces include: wildfires, grazing, insect damage and diseases. Some common practices that could help improve your forest health might include fencing, fire lines and surveillance for insect and disease damage.

Boundaries - Well maintained boundaries are one of the easiest, yet most underutilized, means of protecting your property. By having a readily apparent boundary, you are assuring that inadvertent trespass and associated detrimental activities will be kept to a minimum. Two common and effective ways of maintaining one's boundary are by establishing a fence, or by using purple paint or signage to mark the perimeter of your property. All 3 methods, if installed properly, are legal boundary markers against trespass.

Wildfires - Fire can be a very useful tool in natural resource management, but it can also be one of the most harmful. This difference depends on your management objectives and the timing and intensity of the fire. Generally, it is a good idea to eliminate fire from your woods if you are managing the forest for timber production, as fire is likely to lower the timber value of your trees. A proactive approach to discouraging fire is to maintain fire lines and trails to prevent any unintended fire from reaching your woods.

Insects and Disease - Recently, there have been many instances of disease and insect outbreaks across the nation. Missouri is not immune to these afflictions. There are several different diseases and insects currently affecting Missouri's forest, with more sure to follow. These are, for the most part, natural occurrences and have occurred throughout history. However, there are several exotic or introduced agents that are currently of concern. It is important that you remain observant, especially during the growing season, for any type of unhealthy tendencies in your woods. Following is a list of common symptoms to be on the lookout for:

- Pockets of dead or dying trees.
- Defoliation during the growing season.
- Yellowing, browning, or wilting of a large portion of a tree's leaves.

If you should happen to observe any of these symptoms, contact your Forester as soon as possible. Many times, it is too late for the trees that have already been affected; however, there may be steps that will prevent the further spread of an outbreak.

Remember that the best way to guard against insects and disease is to keep your woods healthy and vigorous through a regular regime of thinning and harvest to help remove poor quality and unhealthy trees that might serve as a host for these agents.

Livestock Grazing - Livestock grazing can significantly reduce your forest's ability to produce high quality timber. Grazing introduces considerable risk to existing trees in the form of soil compaction, stem damage, and increased erosion potential. Ninety percent of a tree's feeder roots lie in the upper 6 inches of soil. Soil compaction from grazing can eliminate the air space in the soil that these roots need, effectively suffocating them.

Studies have shown that in average situations, it would take 17 acres of woods to provide the equivalent forage benefit of 1 acre of pasture. So, from an economic standpoint it is much more advantageous to manage your forests for high quality timber than for livestock grazing.

Water Resources

Forests are important in protecting the quality of waters in our lakes and streams. A forest canopy diffuses the force of falling rain, and the organic layer on the forest floor acts as a natural sponge, minimizing run off and filtering sediments and nutrients. Additionally, tree roots help stabilize the banks of streams. Tree canopies shade the stream, lowering water temperature and allowing an increase in the amount of oxygen in the water. Organic matter from forests provides habitat in streams and is an important beginning level of the food chain. Therefore, properly managed forests are an essential component of healthy watershed systems.

This property has a variety of water systems present, including a pond and a network of permanent, intermittent, and ephemeral streams. It is important that buffers along waterways be maintained and enhanced in order to achieve the aforementioned benefits.

Soil Resources

Soils are the foundation on which trees grow, so it is important to manage the right tree species on the correct soils. Doing so will lead to a healthier, more productive forest.

A soils map is provided and soils reports are also attached. Refer to your county soil survey for additional descriptions of the soils on your property. This can be obtained from your local USDA/NRCS office, or on the internet at soildatamart.nrcs.usda.gov.

Wildlife Resources

A healthy forest system comprises more than just timber production, it is also built around the complex interactions of other plant, animal, and insect species. A quality forest will provide habitat in which a wide variety of plants and animals can thrive. The forest components other than the trees must be considered before determining the proper management strategy for your forest. Most landowners are interested in a combination of objectives for their forest. Fortunately, many of the tree species that are important in timber production are also very desirable for wildlife habitat. In the end, your specific management goals will be the guide for the ongoing management of your forest system.

Limited resources such as growing space, available sunlight, water, and nutrients determine the productivity of individual trees and the stand as a whole. All of the trees in a forest compete for these limited resources; therefore, it is important to remember that more trees are not always better. It is a common occurrence that a forest will experience greater overall wood and mast production after removing a portion of the trees than it would have with all of the original trees. It is important to determine which trees in the stand are desirable based on your management objectives so the undesirable trees can be removed. This thinning will free up resources for the remaining "crop" trees, making the stand more productive and allowing more sunlight to reach the forest floor. The extra water and nutrients now available, coupled with the increased light, will lead to a flush of ground-layer growth that can be beneficial to many types of wildlife. These areas of thick regeneration are not always considered aesthetically pleasing, however this stage offers more food and habitat opportunities than at any other time in the succession of a forest. For more information on wildlife management, refer to the Missouri Department of Conservation publication "Wildlife Management for Missouri Landowners," available upon request from your local MDC personnel.

Recreational and Aesthetic Resources

Practices that affect the timber and wildlife components of your property will also affect the recreational and aesthetic resources. It is important to realize that to maximize long term health and productivity of your forest and wildlife, there may be some short term sacrifices in what most individuals find to be aesthetically pleasing woods. Areas that have been recently thinned or harvested will have an abundance of "brushy" growth for the next 10-15 years. While this may not be the park-like setting some people associate with a healthy forest, it provides excellent cover and forage opportunities for wildlife. Additionally this "brush" will contain the seedlings and saplings that will become the forest for the next generation.

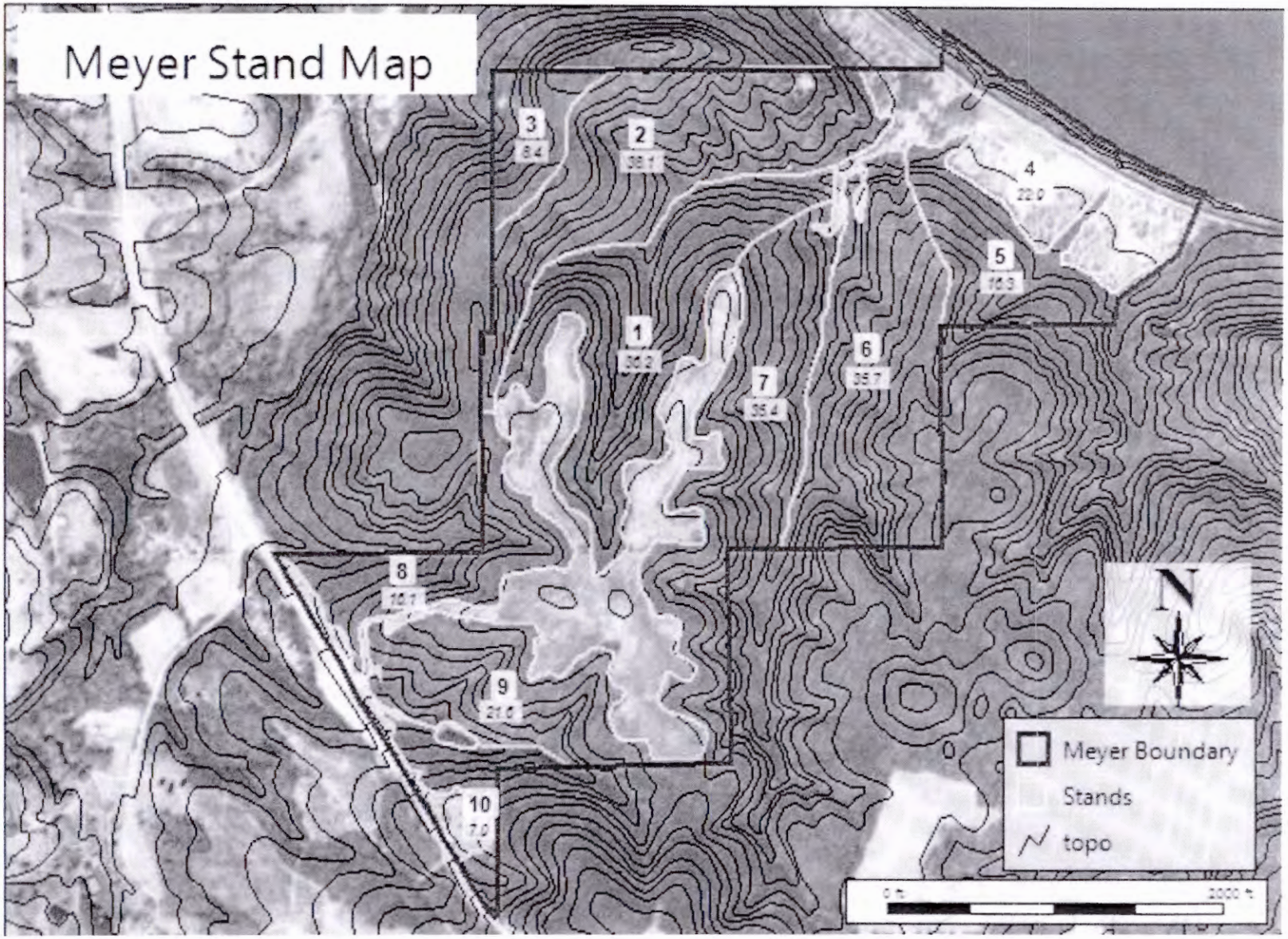
Threatened and Endangered Species

There were no threatened or endangered species recorded on this property, as identified by the MDC Heritage Review. If threatened or endangered species are found, it would be advisable to alter your management practices to favor these species.

One endangered species that can be present in Missouri forests between April 1 and September 30 is the Indiana bat. These bats will roost under the loose bark of dead trees as well as under the shaggy bark of hickories. Avoid destroying potential habitat during the period stated above. Harvesting or cutting trees greater than 9" DBH must be limited to before April 1 or after September 30 to ensure the protection of this species.

Archeological, Cultural, and Historical Sites

There are multiple Indian burial mounds located on high points on this and neighboring properties.


Meyer Stand Map
3
8.4
2
38.1
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22.0
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16.3
1
32.3
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7
35.4
8
18.1
9
21.0
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Meyer Boundary
Stands
topo
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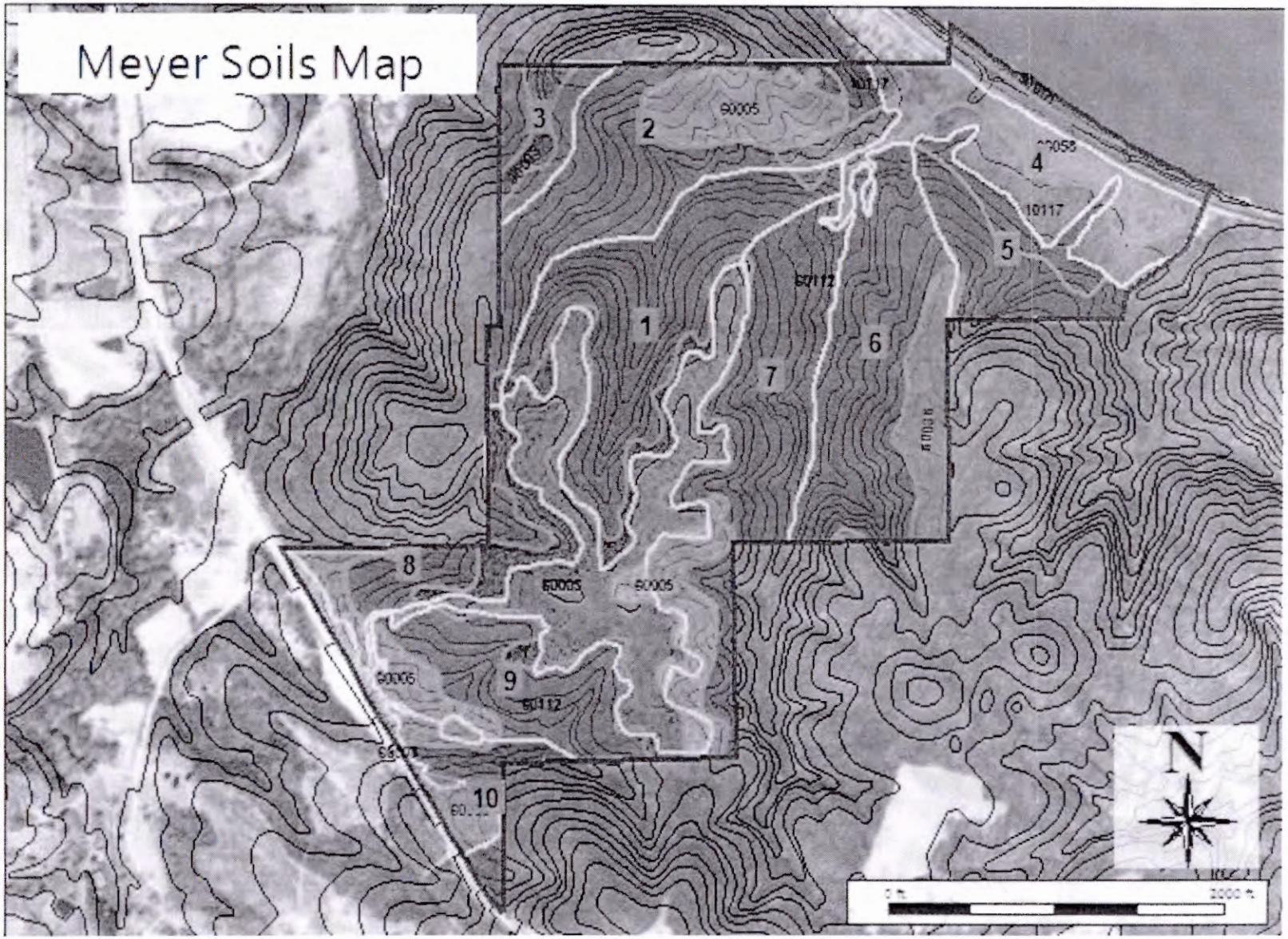
2000 ft


Meyer Soils Map
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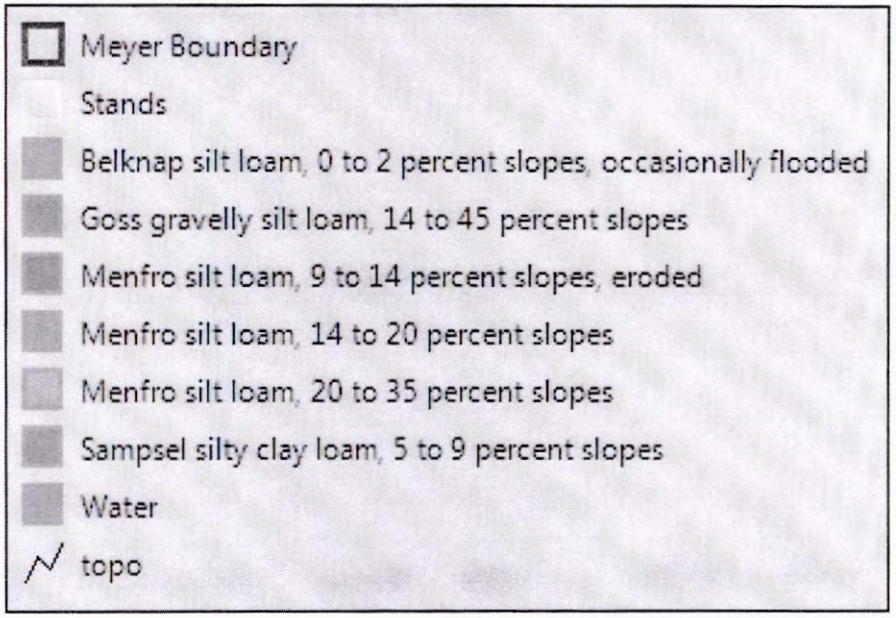
Meyer Soils Legend



Timber Stand Information

All Stands

1. Indian burial mounds are located on high points on this and neighboring properties. Care should be taken so that no practices implemented on this property disturb those sites.
2. Evidence of past fire was noted in a few stands. Fire can be a very beneficial forest management tool if utilized properly, but burning of a forest stand will likely result in lowered timber quality for future harvest.
3. Multiflora rose is common throughout the property. This species is not terribly thick in any one area, but can become so. It may be beneficial to remove this species via foliar chemical application or cutting.
4. Invasive species, such as bush honeysuckle and autumn olive, were noted scattered along the field edges on the property. When conducting forest management activities, it is advisable to cut and chemically treat these species to prevent further spread.
5. Several management recommendations suggest reducing the Basal Area to below B-Level stocking. While B-level is the generally accepted level to reduce a stand to during a non-commercial thinning, reducing the Basal Area further will result in a more open stand, with more brushy new growth and fewer undesirable stems. In some situations, such as glade, savanna, or open woodland management, the desired ecosystem requires reducing the Basal Area to sometimes well below B-level stocking.
6. Sugar maple and ironwood are the dominant species in the understory layers of most Stands. These species are both allelopathic, meaning they secrete a chemical from their roots that suppresses growth of other trees, particularly seedlings and saplings. Their presence leads to the very open, park-like setting that is present throughout the property. While this can be aesthetically pleasing, the allelopathy, coupled with maple's shade-tolerance, will lead to the eventual conversion of species dominance from mixed oaks to almost exclusively sugar maple. The ironwood can be completely removed without affecting too much of the overall feel of the forest atmosphere, as it is an understory species. However, the sugar maple makes up not just a major component of the understory, but also a significant portion of the overstory in many areas of the property. Sugar maple can be managed in a mixed species or pure stand, and can be utilized commercially for timber and maple sap (syrup) production, though taps for collecting sap will create defects in the timber.
7. If the eradication of sugar maple is desired, it is recommended to take a long-term multi-step approach, rather than an immediate, drastic removal. First, deaden all understory sugar maple, as well as unhealthy, crowded, or poorly formed maples from the overstory. The hack-n-squirt method is ideal for this initial removal. Leave the quality sawtimber-sized maples in the stand to continue to grow. As these trees near commercial maturity, conduct a harvest to remove them, making sure that the stumps are sprayed with an approved herbicide to prevent re-sprouting. Follow the harvest with a final thinning to remove any large maples not taken in the harvest, as well as any new maples that have sprouted in the understory. This long-term approach will allow desirable species to germinate and begin to grow in the understory before the complete removal of sugar maple from the overstory.

8. The range of management recommendations in this plan will create a variety of conditions in the stands following their implementation. Any thinning, particularly if removing allelopathic species such as sugar maple, will result in a vast increase in the amount of ground-layer vegetation. While this may be considered aesthetically unpleasing, it is necessary to allow the native oaks to regenerate, as they need direct sunlight to the forest floor to encourage acorn germination. Less invasive options, such as a Crop Tree Release treatment instead of a full-scale Forest Stand Improvement treatment, will have the same or similar effects on the overstory stocking, but will not allow enough light to reach the forest floor to encourage increased oak regeneration, so the stand will eventually transition to dominance by shade tolerant species, such as maple and hickory. Other stands are recommended to be managed as Woodland communities, in which regular fire is implemented in the stand to keep woody vegetation from becoming too thick in the understory.
9. It may be desirable to leave visual buffers along field edges and trails on the property to maintain the aesthetic appeal of the current forest, while allowing for active management through the bulk of the property.

Stand 1, 36.2 ac. - *Medium Priority*

 # Sample Plots: 7

Slope:	20-11
Aspect:	N-E-WNW
Site Index:	58
Stocking %:	79
Merch. Vol./ac.:	2,676 bd-ft
Merch. TPA:	40
Merch. BA/ac.:	44

	BA/ac.	TPA	Avg. DBH
Total:	84.3	421	6.1
AGS:	37.1	40	13.0
UGS:	40.0	369	4.5
Mature:	1.4	1	16.0
Cull:	5.7	11	9.7
Cavity:	0.0	--	--
Snag:	0.0	--	--

	B-Level	C-Level
Stocking %:	57	35
BA/ac.:	65.6	47.5
TPA:	266	116
Avg. DBH:	6.7	8.7

Top 5 spp. by BA:	Maple-Sugar (30.0), Oak-White (17.1), Oak-Northern Red (10.0), Oak-Chinkapin (5.7), Ironwood (4.3)
Top 5 spp. by TPA:	Ironwood (147), Paw Paw (131), Maple-Sugar (80), Oak-White (21), Elm-American (11)

Management Focus:

1) Timber Production. 2) Wildlife Habitat.

Soils and Topography:

- Goss gravelly silt loam, 14 to 45 percent slopes — Avg. Site Index: 54
- Menfro silt loam, 9 to 14 percent slopes, eroded — Avg. Site Index: 81
- Belknap silt loam, 0 to 2 percent slopes, occasionally flooded — Avg. Site Index: 90

Description of Management Unit Condition:

- ***Overstory:*** Mixed hardwoods. Oaks, hickories, sugar maple, and others. White and black oaks are most common.
- ***Understory:*** Variable. Fairly open in some areas, particularly on the more exposed west-facing slope. Sugar maple and ironwood become very thick on the east and north facing sections of the stand.
- ***Regeneration:*** Minimal desirable. Maple and hickory are most common.
- ***Dominant Size Class:*** Small sawtimber.
- ***Invasive Species:*** Multiflora rose.
- ***Accessibility:*** Good to top edges. Very steep within. Old logging trails exist on the lesser slopes.
- ***Past Use:*** Forest. Evidence of past harvest.
- ***Current Use:*** Forest.

Management Recommendations:

- ***Primary Recommendation:*** FSI with Understory Removal - *FSI Level:* Medium
  - *Target BA, TPA:* 52.7 ft^2/ac., 73 trees/ac. | *Reduction BA, TPA:* 31.6 ft^2/ac., 348 trees/ac.
- ***Alternative Option:*** Forest Stand Improvement to B-Level - *FSI Level:* Light
  - *Target BA, TPA:* 65.6 ft^2/ac., 266 trees/ac. | *Reduction BA, TPA:* 18.7 ft^2/ac., 155 trees/ac.

Observations/Comments:

The recommended FSI treatment should completely remove the undesirable component from the understory, particularly sugar maple and ironwood. The overstory should be thinned using a Crop Tree Release strategy, focusing releasing oaks for timber and mast production. If a complete sugar maple removal is desired, use the Long-Term Sugar Maple Removal Strategy described in the All Stands section of this Plan. If maple syrup production is planned, leave healthy sugar maples in the pole and larger size classes. The stand could be managed for long-term maple dominance for syrup production by leaving the young sugar maple in the understory. If desired, a lighter FSI treatment may be conducted to reduce the stocking to B-Level. If desired, the west-facing portion of the stand could be separated and managed as an Open Woodland community.

Stand 2, 38.1 ac. - *Low Priority*

 # Sample Plots: 8

Slope:	20-70
Aspect:	E-SE
Site Index:	52
Stocking %:	78
Merch. Vol./ac.:	1,082 bd-ft
Merch. TPA:	31
Merch. BA/ac.:	28

	BA/ac.	TPA	Avg. DBH
Total:	83.8	288	7.3
AGS:	45.0	71	10.8
UGS:	32.5	188	5.6
Mature:	0.0	--	--
Cull:	6.3	29	6.3
Cavity:	5.0	3	18.4
Snag:	0.0	--	--

	B-Level	C-Level
Stocking %:	58	42
BA/ac.:	65.0	50.3
TPA:	182	99
Avg. DBH:	8.1	9.6

Top 5 spp. by BA:	Maple-Sugar (31.3), Oak-Chinkapin (16.3), Oak-White (12.5), Oak-Black (8.8), Oak-Northern Red (6.3)
Top 5 spp. by TPA:	Maple-Sugar (174), Oak-Black (29), Oak-White (20), Oak-Chinkapin (19), Redcedar-Eastern (14)

Management Focus:

1) Natural Community Restoration. 2) Wildlife Habitat.

Soils and Topography:

- Goss gravelly silt loam, 14 to 45 percent slopes — Avg. Site Index: 54
- Menfro silt loam, 20 to 35 percent slopes — Avg. Site Index: 81
- Sampsel silty clay loam, 5 to 9 percent slopes — Avg. Site Index: --
- Belknap silt loam, 0 to 2 percent slopes, occasionally flooded — Avg. Site Index: 90
- Menfro silt loam, 9 to 14 percent slopes, eroded — Avg. Site Index: 81

Description of Management Unit Condition:

- ***Overstory:*** Mixed oaks, hickories, maple, and others. Chinkapin and black oaks are most common.
- ***Understory:*** Moderately thick with hickory, maple, redbud, and assorted others.
- ***Regeneration:*** Minimal desirable due to sugar maple component.
- ***Dominant Size Class:*** Small sawtimber.
- ***Invasive Species:*** Multiflora rose.
- ***Accessibility:*** Fair to the top edge from the ridgetop trail. Steep and loose, rocky soil within.
- ***Past Use:*** Forest. Evidence of past harvest.
- ***Current Use:*** Forest. Ridgetop has been cleared in the past.

Management Recommendations:

- ***Primary Recommendation:*** Woodland Restoration - *FSI Level:* Medium
  - *Target BA, TPA:* 45 ft^2/ac., 71 trees/ac. | *Reduction BA, TPA:* 38.8 ft^2/ac., 217 trees/ac.
- ***Primary Recommendation:*** Prescribed Burning
- ***Alternative Option:*** FSI with Understory Removal - *FSI Level:* Medium
  - *Target BA, TPA:* 52.1 ft^2/ac., 263 trees/ac. | *Reduction BA, TPA:* 31.7 ft^2/ac., 25 trees/ac.

Observations/Comments:

The slope, aspect, and soils of this stand suggest management as an Open Woodland Community. Reduce the overall canopy closure to 30-60%, keeping mainly large, spreading, fire-tolerant oaks. Understory soft mast producers, such as dogwood, should be left as well. Burn this stand in the second and fourth years following the thinning, then on a 3-7 year rotation during the dormant season thereafter. Following the re-introduction of fire, there should be a natural increase in the abundance of native grasses and forbs. If vegetative species do not return to desired levels or diversity, interseeding may be necessary. Scattered sugar maple may be left, especially in the more protected lower slopes of the stand. The residual stocking should be most dense on the lower and more sheltered slopes, most open on the exposed south-facing slopes, and treated as a transition to the adjacent forest stand on the ridgetop. The far east end of the stand is more open, nearing a site index of 20-25. This area should be most open following the thinning. The solid patch of cedar on the north side of the ridge spine may be left for wildlife cover. If desired, the stand may be given an FSI treatment and managed as forest.

Stand 3, 8.4 ac. - *Low Priority*

 # Sample Plots: 3

Slope:	10-40
Aspect:	NW-W
Site Index:	58
Stocking %:	77
Merch. Vol./ac.:	1,618 bd-ft
Merch. TPA:	46
Merch. BA/ac.:	40

	BA/ac.	TPA	Avg. DBH
Total:	83.3	318	6.9
AGS:	63.3	85	11.7
UGS:	10.0	208	3.0
Mature:	0.0	--	--
Cull:	10.0	25	8.6
Cavity:	3.3	2	19.9
Snag:	0.0	--	--

	B-Level	C-Level
Stocking %:	58	43
BA/ac.:	68.8	54.8
TPA:	152	74
Avg. DBH:	9.1	11.7

Top 5 spp. by BA:	Maple-Sugar (43.3), Hickory-Shagbark (13.3), Oak-Chinkapin (13.3), Hickory-Bitternut (6.7), Ironwood (3.3)
Top 5 spp. by TPA:	Ironwood (153), Maple-Sugar (119), Oak-Chinkapin (20), Hickory-Shagbark (17), Hickory-Bitternut (8)

Management Focus:

1) Timber Production. 2) Agricultural Uses.

Soils and Topography:

- Goss gravelly silt loam, 14 to 45 percent slopes — Avg. Site Index: 54
- Menfro silt loam, 9 to 14 percent slopes, eroded — Avg. Site Index: 81

Description of Management Unit Condition:

- ***Overstory:*** Maple dominated. Hickory and oaks are intermixed. The small southwest-facing portion of the stand is oak dominated.
- ***Understory:*** Moderately open. Sugar maple is common, with scattered others.
- ***Regeneration:*** Minimal desirable. Maple and hickory are most common.
- ***Dominant Size Class:*** Small sawtimber.
- ***Invasive Species:*** Multiflora rose.
- ***Accessibility:*** Fair to the top edge from the ridgetop trail and intersecting forest trail. Many steep-sided drainages toward the eastern end of the stand.
- ***Past Use:*** Forest. Evidence of past harvest.
- ***Current Use:*** Forest.

Management Recommendations:

- ***Primary Recommendation:*** Forest Stand Improvement - *FSI Level:* Light
  - *Target BA, TPA:* 68.8 ft^2/ac., 152 trees/ac. | *Reduction BA, TPA:* 14.5 ft^2/ac., 166 trees/ac.
- ***Alternative Option:*** Crop Tree Release - *FSI Level:* Light
  - *Target BA, TPA:* 78.3 ft^2/ac., 218 trees/ac. | *Reduction BA, TPA:* 5 ft^2/ac., 100 trees/ac.
- ***Alternative Option:*** FSI with Understory Removal - *FSI Level:* Heavy
  - *Target BA, TPA:* 10.3 ft^2/ac., 218 trees/ac. | *Reduction BA, TPA:* 73 ft^2/ac., 100 trees/ac.

Observations/Comments:

This stand is dominated by sugar maple, with scattered oaks. The recommendation is to manage the stand for sugar maple syrup and timber production. The highest quality maple trees should be left for timber production, and the remaining maple trees should be tapped for syrup collection. The small area of oaks should be given a Crop Tree Release treatment to encourage increased timber and mast production. This section could be separated and managed as an Open Woodland Community if desired. Alternatively the entire stand could be pushed toward oak dominance using the method described in the All Stands section of this Plan.

Stand 4, 22.9 ac. - *High Priority*

 # Sample Plots: 4

Slope:	0-10
Aspect:	Bottom
Site Index:	46
Stocking %:	71
Merch. Vol./ac.:	565 bd-ft
Merch. TPA:	13
Merch. BA/ac.:	13

	BA/ac.	TPA	Avg. DBH
Total:	62.5	668	4.1
AGS:	32.5	98	7.8
UGS:	30.0	570	3.1
Mature:	0.0	--	--
Cull:	0.0	--	--
Cavity:	0.0	--	--
Snag:	0.0	--	--

	B-Level	C-Level
Stocking %:	56	34
BA/ac.:	52.8	38.1
TPA:	484	203
Avg. DBH:	4.5	5.9

Top 5 spp. by BA:	Honeylocust (15.0), Maple-Silver (12.5), Buttonbush (7.5), Redcedar-Eastern (7.5), Persimmon (7.5)
Top 5 spp. by TPA:	Buttonbush (344), Elm-American (115), Honeylocust (86), Redcedar-Eastern (54), Persimmon (33)

Management Focus:

1) Timber Production. 2) Wildlife Habitat.

Soils and Topography:

- Belknap silt loam, 0 to 2 percent slopes, occasionally flooded — Avg. Site Index: 90
- Sampsel silty clay loam, 5 to 9 percent slopes — Avg. Site Index: --

Description of Management Unit Condition:

- ***Overstory:*** Patchy. Large tree species include: silver maple, honeylocust, pecan, bur oak, hackberry, kentucky coffeetree, and cottonwood.
- ***Understory:*** Open through most of the stand. The section nearest the railroad tracks is dense buttonbush. The more upland portion nearest the bluffs is mostly honeylocust, cedar, and assorted others.
- ***Regeneration:*** Same as the understory layer.
- ***Dominant Size Class:*** Sapling.
- ***Invasive Species:*** Multiflora rose.
- ***Accessibility:*** Fair from forest trail.
- ***Past Use:*** Old field. Evidence of past harvest. Evidence of past grazing.
- ***Current Use:*** Extremely early successional forest.

Management Recommendations:

- ***Primary Recommendation:*** Clear
- ***Primary Recommendation:*** Tree Planting
  - *Planted Trees per Acre:* 363 tpa, 10'x12' spacing
- ***Alternative Option:*** Invasive Removal

Observations/Comments:

The recommended treatment is to bulldoze the entire old-field portion of the stand. This area should be treated with glyphosate once the vegetation again begins to grow following the clearing. The following spring, a mixture of riparian trees should be planted. The area of buttonbush should be left as-is. The large, established trees of desirable species (all but honeylocust) should be left as well. If desired, the stand could be left to re-establish itself as forest. If this option is chosen, most of the stand will be dominated by honeylocust, although there are desirable trees scattered throughout.

Stand 5, 16.3 ac. - *Medium Priority*

 # Sample Plots: 5

Slope:	10-60
Aspect:	NE
Site Index:	58
Stocking %:	78
Merch. Vol./ac.:	1,182 bd-ft
Merch. TPA:	34
Merch. BA/ac.:	30

	BA/ac.	TPA	Avg. DBH
Total:	84.0	281	7.4
AGS:	46.0	87	9.8
UGS:	24.0	166	5.1
Mature:	0.0	--	--
Cull:	14.0	29	9.4
Cavity:	0.0	--	--
Snag:	0.0	--	--

	B-Level	C-Level
Stocking %:	58	40
BA/ac.:	65.7	49.2
TPA:	188	104
Avg. DBH:	8.0	9.3

Top 5 spp. by BA:	Oak-White (20.0), Maple-Sugar (20.0), Hickory-Shagbark (18.0), Oak-Chinkapin (12.0), Oak-Black (6.0)
Top 5 spp. by TPA:	Ironwood (92), Maple-Sugar (64), Oak-White (36), Hickory-Shagbark (30), Oak-Chinkapin (24)

Management Focus:

1) Timber Production. 2) Wildlife Habitat.

Soils and Topography:

- Goss gravelly silt loam, 14 to 45 percent slopes — Avg. Site Index: 54
- Sampsel silty clay loam, 5 to 9 percent slopes — Avg. Site Index: --

Description of Management Unit Condition:

- ***Overstory:*** Mixed hardwoods. Chinkapin oaks and hickory are most common on the lower slopes, transitioning toward maple and mixed oak dominance on the upper slopes.
- ***Understory:*** The upper slopes are exclusively sugar maple, transitioning to hickory, elm, blue ash, ironwood, and scattered maple and clumps of prickly ash on the lower slopes.
- ***Regeneration:*** Minimal desirable. Maple and hickory are most common.
- ***Dominant Size Class:*** Small sawtimber.
- ***Invasive Species:*** Multiflora rose.
- ***Accessibility:*** Fair from below or old logging trails. Best access is from MDC area to the south.
- ***Past Use:*** Forest. Evidence of past harvest. Evidence of past fire.
- ***Current Use:*** Forest.

Management Recommendations:

- ***Primary Recommendation:*** FSI with Understory Removal - *FSI Level:* Light
  - *Target BA, TPA:* 57.2 ft^2/ac., 108 trees/ac. | *Reduction BA, TPA:* 26.8 ft^2/ac., 173 trees/ac.
- ***Alternative Option:*** Forest Stand Improvement to B-Level - *FSI Level:* Light
  - *Target BA, TPA:* 65.7 ft^2/ac., 188 trees/ac. | *Reduction BA, TPA:* 18.3 ft^2/ac., 93 trees/ac.

Observations/Comments:

Remove the undesirable understory, particularly sugar maple and ironwood. Thin the overstory using the Crop Tree Release strategy. Oaks, walnut, and hickories should be released to encourage increased mast and timber production. Scattered sugar maple may be left in the overstory if desired. .

Stand 6, 35.7 ac. - *High Priority*

 # Sample Plots: 7

Slope:	0-60
Aspect:	W-Varied
Site Index:	46
Stocking %:	78
Merch. Vol./ac.:	1,743 bd-ft
Merch. TPA:	34
Merch. BA/ac.:	34

	BA/ac.	TPA	Avg. DBH
Total:	85.7	301	7.2
AGS:	51.4	74	11.3
UGS:	30.0	216	5.0
Mature:	0.0	--	--
Cull:	4.3	12	8.1
Cavity:	0.0	--	--
Snag:	0.0	--	--

	B-Level	C-Level
Stocking %:	57	41
BA/ac.:	67.2	52.8
TPA:	180	86
Avg. DBH:	8.3	10.6

Top 5 spp. by BA:	Oak-White (24.3), Maple-Sugar (22.9), Oak-Chinkapin (11.4), Oak-Black (7.1), Hickory-Shagbark (7.1)
Top 5 spp. by TPA:	Maple-Sugar (121), Ironwood (82), Oak-White (40), Oak-Chinkapin (19), Buckeye-Ohio (13)

Management Focus:

1) Natural Community Restoration. 2) Wildlife Habitat.

Soils and Topography:

- Goss gravelly silt loam, 14 to 45 percent slopes — Avg. Site Index: 54
- Menfro silt loam, 14 to 20 percent slopes — Avg. Site Index: 81

Description of Management Unit Condition:

- ***Overstory:*** Mixed oaks, hickories, and scattered others. Chinkapin, white, and black oaks are most common.
- ***Understory:*** Fairly open. Ironwood common throughout, with scattered ash, hickories, and oaks.
- ***Regeneration:*** Mostly ironwood. Scattered oaks.
- ***Dominant Size Class:*** Small sawtimber.
- ***Invasive Species:*** Multiflora rose.
- ***Accessibility:*** Poor from this property. Best access is from MDC to the south.
- ***Past Use:*** Forest. Evidence of past harvest. Evidence of past fire.
- ***Current Use:*** Forest. Displays characteristics typical of an Open Woodland community.

Management Recommendations:

- ***Primary Recommendation:*** Woodland Restoration - *FSI Level:* Medium
  - *Target BA, TPA:* 51.4 ft^2/ac., 74 trees/ac. | *Reduction BA, TPA:* 34.3 ft^2/ac., 227 trees/ac.
- ***Primary Recommendation:*** Prescribed Burning
- ***Alternative Option:*** Forest Stand Improvement - *FSI Level:* Light
  - *Target BA, TPA:* 65.7 ft^2/ac., 154 trees/ac. | *Reduction BA, TPA:* 20 ft^2/ac., 147 trees/ac.

Observations/Comments:

Small sites on exposed knobs within the stand display an extremely low site index (around 25); while more sheltered areas display much greater growth potential. Reduce the overall canopy closure to 30-60%, keeping mainly large, spreading, fire-tolerant oaks. Understory soft mast producers, such as dogwood, should be left as well. Kill all ironwood smaller than 1"". Repeated fire should kill the remaining stems. Burn this stand in the second and fourth years following the thinning, then on a 3-7 year rotation during the dormant season thereafter. Following the re-introduction of fire, there should be a natural increase in the abundance of native grasses and forbs. If vegetative species do not return to desired levels or diversity, interseeding may be necessary. As this stand is capable of producing merchantable timber throughout most of the area, the stand could be given an FSI treatment and managed for timber production.

Stand 7, 35.4 ac. - *Medium Priority*

 # Sample Plots: 7

Slope:	10-50
Aspect:	E-Varied
Site Index:	62
Stocking %:	79
Merch. Vol./ac.:	1,839 bd-ft
Merch. TPA:	33
Merch. BA/ac.:	33

	BA/ac.	TPA	Avg. DBH
Total:	84.3	305	7.1
AGS:	41.4	57	11.5
UGS:	35.7	230	5.3
Mature:	0.0	--	--
Cull:	7.1	17	8.8
Cavity:	0.0	--	--
Snag:	0.0	--	--

	B-Level	C-Level
Stocking %:	58	41
BA/ac.:	65.3	49.7
TPA:	194	103
Avg. DBH:	7.9	9.4

Top 5 spp. by BA:	Maple-Sugar (34.3), Oak-White (15.7), Oak-Chinkapin (15.7), Hickory-Shagbark (5.7), Oak-Northern Red (4.3)
Top 5 spp. by TPA:	Maple-Sugar (165), Ironwood (65), Oak-Chinkapin (23), Oak-White (22), Hickory-Shagbark (11)

Management Focus:

1) Timber Production. 2) Wildlife Habitat.

Soils and Topography:

- Goss gravelly silt loam, 14 to 45 percent slopes — Avg. Site Index: 54
- Menfro silt loam, 20 to 35 percent slopes — Avg. Site Index: 81
- Menfro silt loam, 9 to 14 percent slopes, eroded — Avg. Site Index: 81

Description of Management Unit Condition:

- ***Overstory:*** White and chinkapin oaks, with hickories, maple, red oaks, and others.
- ***Understory:*** Moderately open. Areas of thick ironwood and/or maple. Hickories, oaks, elm, ash, and others are scattered throughout.
- ***Regeneration:*** Minimal.
- ***Dominant Size Class:*** Small sawtimber.
- ***Invasive Species:*** Multiflora rose.
- ***Accessibility:*** Good from the field above. Steep drainages within the stand.
- ***Past Use:*** Forest. Evidence of past harvest. Evidence of past fire.
- ***Current Use:*** Forest.

Management Recommendations:

- ***Primary Recommendation:*** Forest Stand Improvement - *FSI Level:* Light
  - *Target BA, TPA:* 64.3 ft^2/ac., 174 trees/ac. | *Reduction BA, TPA:* 20 ft^2/ac., 131 trees/ac.
- ***Alternative Option:*** Crop Tree Release - *FSI Level:* Light
  - *Target BA, TPA:* 63.2 ft^2/ac., 259 trees/ac. | *Reduction BA, TPA:* 21.1 ft^2/ac., 46 trees/ac.

Observations/Comments:

The FSI should focus on improving the overall species composition, stem quality, and spacing. Select against maple and ironwood in the understory. Favor oaks in the overstory. This treatment will allow more light to reach the forest floor, thereby encouraging desirable regeneration. If desired, the stand may be given a Crop Tree Release treatment and managed as forest.

Stand 8, 16.1 ac. - *High Priority*

 # Sample Plots: 5

Slope:	10-40
Aspect:	NW-SW
Site Index:	68
Stocking %:	79
Merch. Vol./ac.:	2,075 bd-ft
Merch. TPA:	43
Merch. BA/ac.:	42

	BA/ac.	TPA	Avg. DBH
Total:	88.0	271	7.7
AGS:	62.0	80	11.9
UGS:	10.0	158	3.4
Mature:	0.0	--	--
Cull:	16.0	33	9.4
Cavity:	2.0	1	16.0
Snag:	0.0	--	--

	B-Level	C-Level
Stocking %:	57	44
BA/ac.:	69.3	55.8
TPA:	134	72
Avg. DBH:	9.7	11.9

Top 5 spp. by BA:	Maple-Sugar (42.0), Oak-Chinkapin (10.0), Oak-Black (10.0), Oak-Northern Red (6.0), Oak-White (6.0)
Top 5 spp. by TPA:	Maple-Sugar (121), Ironwood (92), Oak-Chinkapin (17), Oak-Black (12), Hickory-Bitternut (7)

Management Focus:

1) Timber Production. 2) Agricultural Uses.

Soils and Topography:

- Goss gravelly silt loam, 14 to 45 percent slopes — Avg. Site Index: 54
- Menfro silt loam, 20 to 35 percent slopes — Avg. Site Index: 81
- Menfro silt loam, 9 to 14 percent slopes, eroded — Avg. Site Index: 81

Description of Management Unit Condition:

- ***Overstory:*** Dominated by northern red oak and sugar maple. Mixed oaks and others are intermixed. Sassafras is abundant along the edge.
- ***Understory:*** Moderately thick. Hickory, maple, elm, buckeye, and others.
- ***Regeneration:*** Minimal, due to sugar maple component.
- ***Dominant Size Class:*** Small sawtimber.
- ***Invasive Species:*** Multiflora rose. Autumn olive is scattered along the field edge.
- ***Accessibility:*** Good from the top edge. Fairly steep.
- ***Past Use:*** Forest. Evidence of past harvest.
- ***Current Use:*** Forest.

Management Recommendations:

- ***Primary Recommendation:*** Forest Stand Improvement - *FSI Level:* Light
  - *Target BA, TPA:* 69.3 ft^2/ac., 134 trees/ac. | *Reduction BA, TPA:* 18.7 ft^2/ac., 137 trees/ac.
- ***Alternative Option:*** FSI with Understory Removal - *FSI Level:* Light
  - *Target BA, TPA:* 65.3 ft^2/ac., 248 trees/ac. | *Reduction BA, TPA:* 22.7 ft^2/ac., 23 trees/ac.
- ***Alternative Option:*** Crop Tree Release - *FSI Level:* Light
  - *Target BA, TPA:* 82 ft^2/ac., 171 trees/ac. | *Reduction BA, TPA:* 6 ft^2/ac., 100 trees/ac.

Observations/Comments:

Favor red oak and sugar maple with the FSI. High quality timber maples should be grown for timber, while lesser quality trees should be tapped for syrup production. If the transition to complete oak dominance is desired, follow the method outlined in the All Stands section of this plan. If desired, the stand may be given a Crop Tree Release treatment and managed as forest.

Stand 9, 21.6 ac. - *Low Priority*

 # Sample Plots: 6

Slope:	10-80
Aspect:	SW-Varied
Site Index:	44
Stocking %:	85
Merch. Vol./ac.:	1,536 bd-ft
Merch. TPA:	31
Merch. BA/ac.:	35

	BA/ac.	TPA	Avg. DBH
Total:	93.3	341	7.1
AGS:	45.0	51	12.7
UGS:	35.0	259	5.0
Mature:	0.0	--	--
Cull:	13.3	31	8.9
Cavity:	3.3	2	19.9
Snag:	13.3	24	10.0

	B-Level	C-Level
Stocking %:	57	39
BA/ac.:	68.4	51.9
TPA:	190	90
Avg. DBH:	8.1	10.3

Top 5 spp. by BA:	Oak-Chinkapin (26.7), Maple-Sugar (26.7), Oak-Black (15.0), Oak-White (8.3), Honeylocust (3.3)
Top 5 spp. by TPA:	Maple-Sugar (153), Ironwood (76), Oak-Chinkapin (54), Redcedar-Eastern (19), Oak-White (8)

Management Focus:

1) Natural Community Restoration. 2) Wildlife Habitat.

Soils and Topography:

- Goss gravelly silt loam, 14 to 45 percent slopes — Avg. Site Index: 54
- Menfro silt loam, 20 to 35 percent slopes — Avg. Site Index: 81
- Menfro silt loam, 9 to 14 percent slopes, eroded — Avg. Site Index: 81

Description of Management Unit Condition:

- ***Overstory:*** Dominated by chinkapin oak, with other mixed oaks, hickories, and others.
- ***Understory:*** Fairly open. Elm, hackberry, and ironwood are most common, particularly on the lower slopes.
- ***Regeneration:*** Scattered oaks.
- ***Dominant Size Class:*** Small sawtimber.
- ***Invasive Species:*** Multiflora rose. Autumn olive is scattered along the field edge.
- ***Accessibility:*** Good from the field above. Steep drainages within the stand.
- ***Past Use:*** Forest. Evidence of past harvest.
- ***Current Use:*** Forest. Displays characteristics typical of an Open Woodland community.

Management Recommendations:

- ***Primary Recommendation:*** Woodland Restoration - *FSI Level:* Heavy
  - *Target BA, TPA:* 45 ft^2/ac., 51 trees/ac. | *Reduction BA, TPA:* 48.3 ft^2/ac., 290 trees/ac.
- ***Primary Recommendation:*** Prescribed Burning
- ***Alternative Option:*** Forest Stand Improvement - *FSI Level:* Light
  - *Target BA, TPA:* 68.4 ft^2/ac., 190 trees/ac. | *Reduction BA, TPA:* 24.9 ft^2/ac., 151 trees/ac.
- ***Alternative Option:*** Leave

Observations/Comments:

Reduce the overall canopy closure to 30-60%, keeping mainly large, spreading, fire-tolerant oaks. Understory soft mast producers, such as dogwood, should be left as well. The more sheltered areas of the stand contain the highest quality timber, and should be left with the greatest canopy cover. The grove of persimmon trees along the upper field edge should be left as well. Burn this stand in the second and fourth years following the thinning, then on a 3-7 year rotation during the dormant season thereafter. Following the re-introduction of fire, there should be a natural increase in the abundance of native grasses and forbs. If vegetative species do not return to desired levels or diversity, interseeding may be necessary. As this stand is capable of producing timber, an FSI treatment could be performed, and the stand managed as forest.

Stand 10, 7.0 ac. - *Low Priority*

 # Sample Plots: 3

Slope:	10-40
Aspect:	N
Site Index:	60
Stocking %:	106
Merch. Vol./ac.:	4,686 bd-ft
Merch. TPA:	55
Merch. BA/ac.:	77

	BA/ac.	TPA	Avg. DBH
Total:	126.7	221	10.3
AGS:	63.3	39	17.3
UGS:	50.0	170	7.3
Mature:	0.0	--	--
Cull:	13.3	12	14.3
Cavity:	6.7	2	25.8
Snag:	3.3	10	8.0

	B-Level	C-Level
Stocking %:	58	46
BA/ac.:	76.4	64.5
TPA:	77	43
Avg. DBH:	13.5	16.6

Top 5 spp. by BA:	Oak-Northern Red (53.3), Maple-Sugar (23.3), Ash-Blue (10.0), Ash-White (10.0), Basswood-American (10.0)
Top 5 spp. by TPA:	Maple-Sugar (87), Ironwood (55), Oak-Northern Red (35), Ash-White (15), Ash-Blue (13)

Management Focus:

1) Timber Production. 2) Wildlife Habitat.

Soils and Topography:

- Goss gravelly silt loam, 14 to 45 percent slopes — Avg. Site Index: 54
- Menfro silt loam, 14 to 20 percent slopes — Avg. Site Index: 81

Description of Management Unit Condition:

- ***Overstory:*** Dominated by northern red oak, with basswood, hickory, ash, and others intermixed.
- ***Understory:*** Moderately open. Sugar maple and ironwood are common, with scattered elm, ash, and others.
- ***Regeneration:*** Minimal desirable due to sugar maple component.
- ***Dominant Size Class:*** Small - large sawtimber.
- ***Invasive Species:*** Multiflora rose.
- ***Accessibility:*** Fair from the highway easement to the east. Steep areas within the stand.
- ***Past Use:*** Forest. Evidence of past harvest.
- ***Current Use:*** Forest.

Management Recommendations:

- ***Primary Recommendation:*** FSI with Understory Removal - *FSI Level:* Heavy
  - *Target BA, TPA:* 85.5 ft^2/ac., 86 trees/ac. | *Reduction BA, TPA:* 41.2 ft^2/ac., 135 trees/ac.
- ***Alternative Option:*** Forest Stand Improvement to B-Level - *FSI Level:* Heavy
  - *Target BA, TPA:* 76.4 ft^2/ac., 77 trees/ac. | *Reduction BA, TPA:* 50.3 ft^2/ac., 144 trees/ac.
- ***Alternative Option:*** Leave

Observations/Comments:

The FSI should focus on improving the overall species composition, stem quality, and spacing. Completely remove the undesirable understory, particularly maple and ironwood. Release oaks in the overstory. This treatment will allow more light to reach the forest floor, thereby encouraging desirable regeneration.

Implementation Schedule

St.[1]	Ac.[2]	2013	2014	2015	2016	2017	2018	2019
1	36.2		FSI with Understory Removal					
2	38.1			Woodland Restoration		Prescribed Burning		Prescribed Burning
3	8.4			Forest Stand Improvement				
4	22.9	Clear -- Tree Planting						
5	16.3		FSI with Understory Removal					
6	35.7	Woodland Restoration		Prescribed Burning		Prescribed Burning		
7	35.4		Forest Stand Improvement					
8	16.1	Forest Stand Improvement						
9	21.6			Woodland Restoration		Prescribed Burning		Prescribed Burning
10	7.0			FSI with Understory Removal				

[1] - Stand Number.
[2] - Acres.

Property boundaries should be marked and maintained regularly. This plan should be updated in 2023.

NOTE: You can get a list of contractors to assist you with these practices. If you choose to go this route, it would be prudent to make sure that the contractors have forestry backgrounds and are licensed and insured to do the needed work.