

Forest Stewardship Plan

Volga State Recreation Area



A plan that will increase the diversity of forest wildlife and perpetuate a healthy and diverse forest ecosystem.

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Park Manager: Andy Roach

Location:
Sections: 2-4, 9-15, 22, 23, 27 Westfield Township
Section: 34 Union Township

Acres: 3,918 (Forested) ~ 6,000 (Total)

Public Meeting Held: February 27th, 2018



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HOW THE FOREST WILDLIFE STEWARDSHIP PLAN WAS DEVELOPED

The Park Ranger is the manager of the area and determines the objectives for the Volga State Rec area. Objectives address the habitat needs of Species of Greatest Conservation Need determined by the wildlife action plan and the woodland condition of each area. Approximately sixty five per cent of the Volga State Recreation Area is woodland. Managing woodland is essential to improve the areas for wildlife and recreation.

Management of recreation area is a cooperative effort by the parks, wildlife and forestry bureaus to enhance state owned areas for a diversity of wildlife species and recreation opportunities. Stands are identified by tree species, tree size, topography, and management system. Stands are walked and identified by the forester. The park ranger, biologist and forester discuss the options for each stand and how management of that stand will fit into the overall management for the area. Forester recommendations are designed to manage the stand to reach the established goals and objectives for the property.

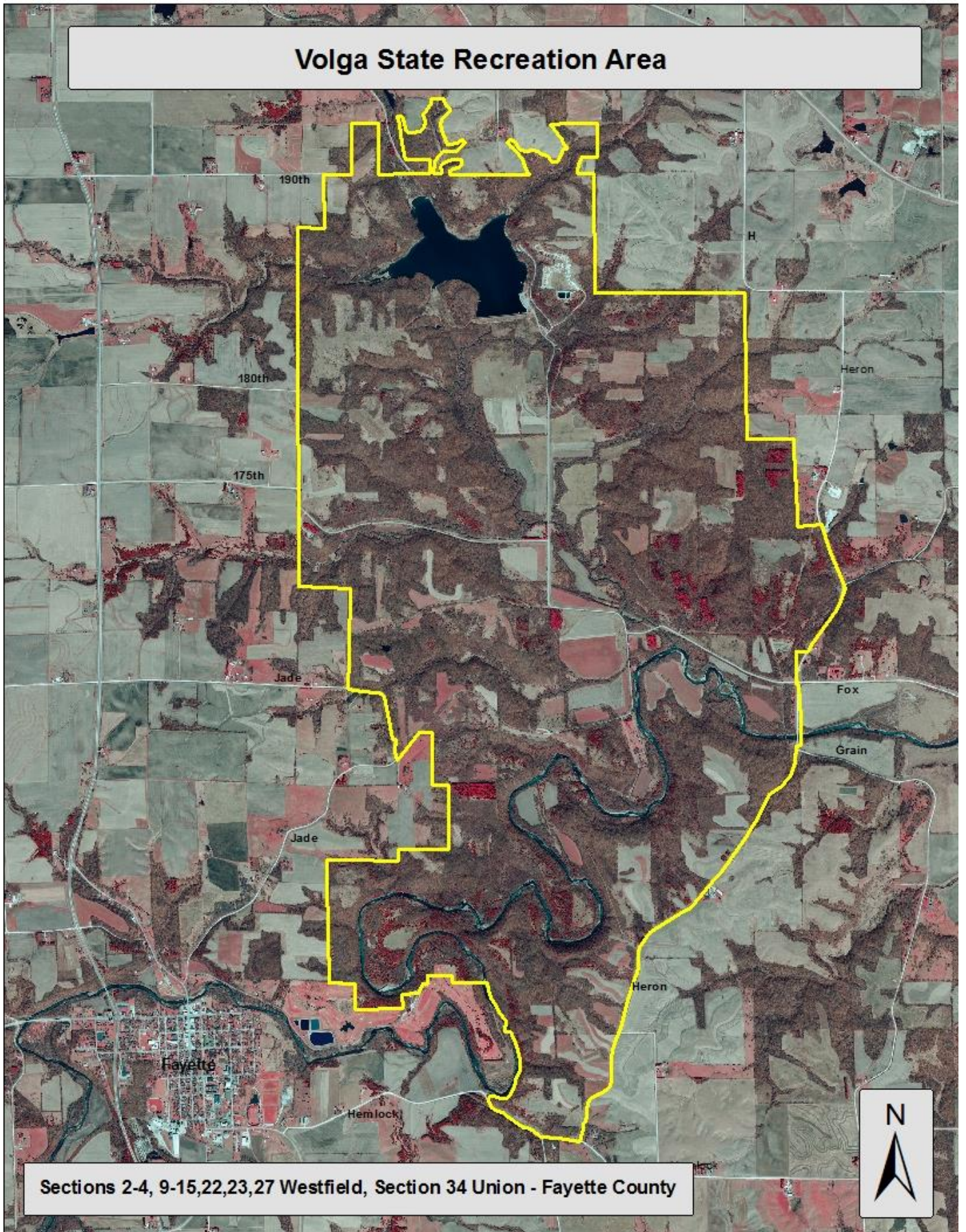
The park ranger is responsible for the day to day operations of the state recreation area. The forester will implement the forest wildlife stewardship plan in coordination with the park ranger.

One of four management systems is specified for each stand. This identifies the overall management system for that stand and designates the "road map" for what work will take place on the site in the future.

Each management system is described in detail in this plan. A brief description of each management system is as follows:

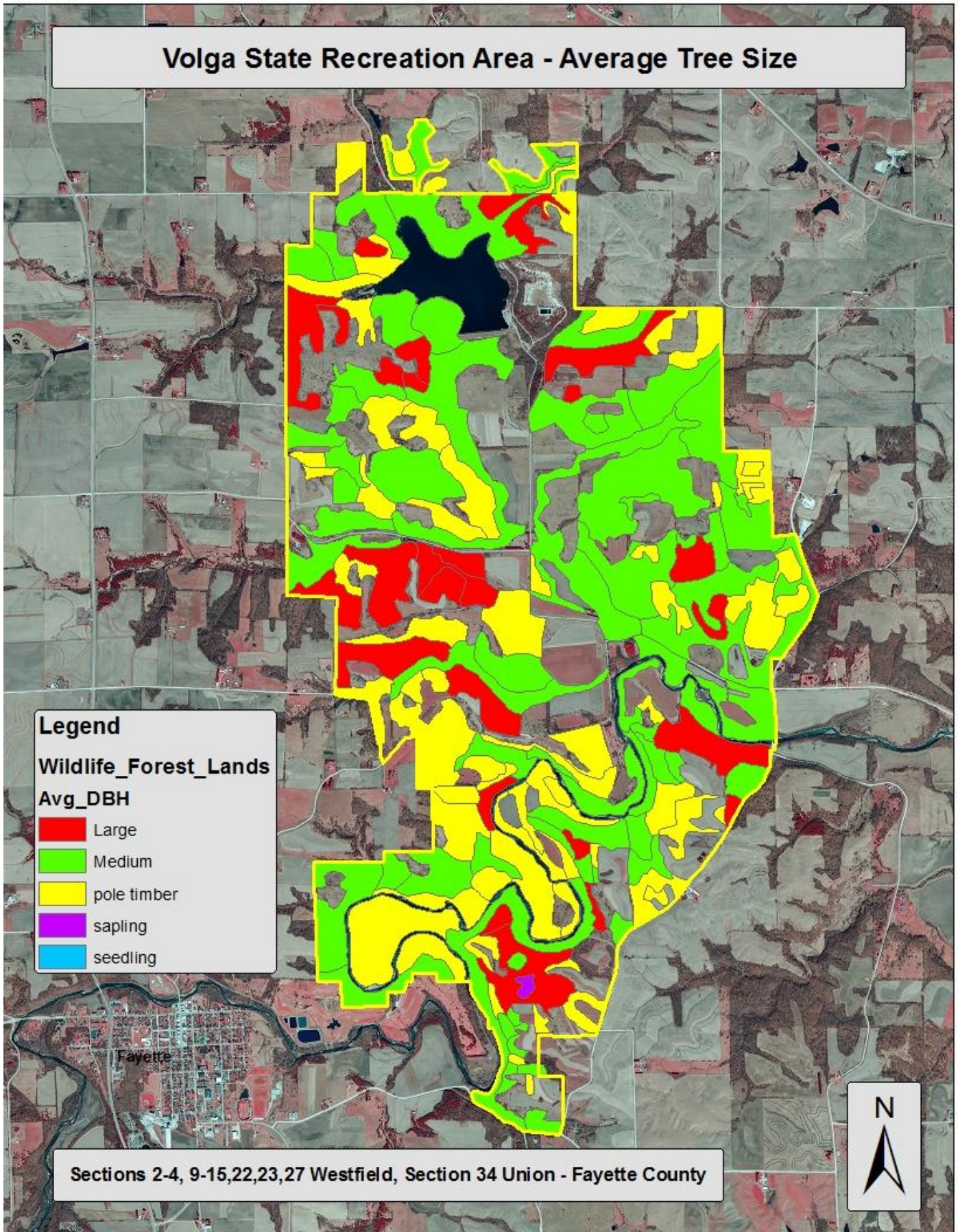
- Early Successional - Areas are clearcut every 15 years to maintain young, high stem density habitat. These areas are generally on the woodland edges to feather the edge.
- Even Age - Shade intolerant species such as oak, shagbark hickory, and walnut require full sunlight to grow. Even age management involves a clearcut at some point to create the full sunlight condition. Even age stands are clearcut every 80-120 years. Clearcutting also creates early successional habitat for the first 15 years.
- Uneven Age - Uneven age management can be used to manage species that will grow in shade such as hard maple and basswood. Every 20 years, the stand can be selectively harvested to remove the mature and defective trees. The openings are filled with young maple and basswood, creating an all age or uneven age forest.
- Viewshed - These are steep slopes, high recreational use areas, and buffers along the streams and rivers where management will be minimal. Management activities are not entirely excluded from these areas but are rare in occurrence.

Volga State Recreation Area

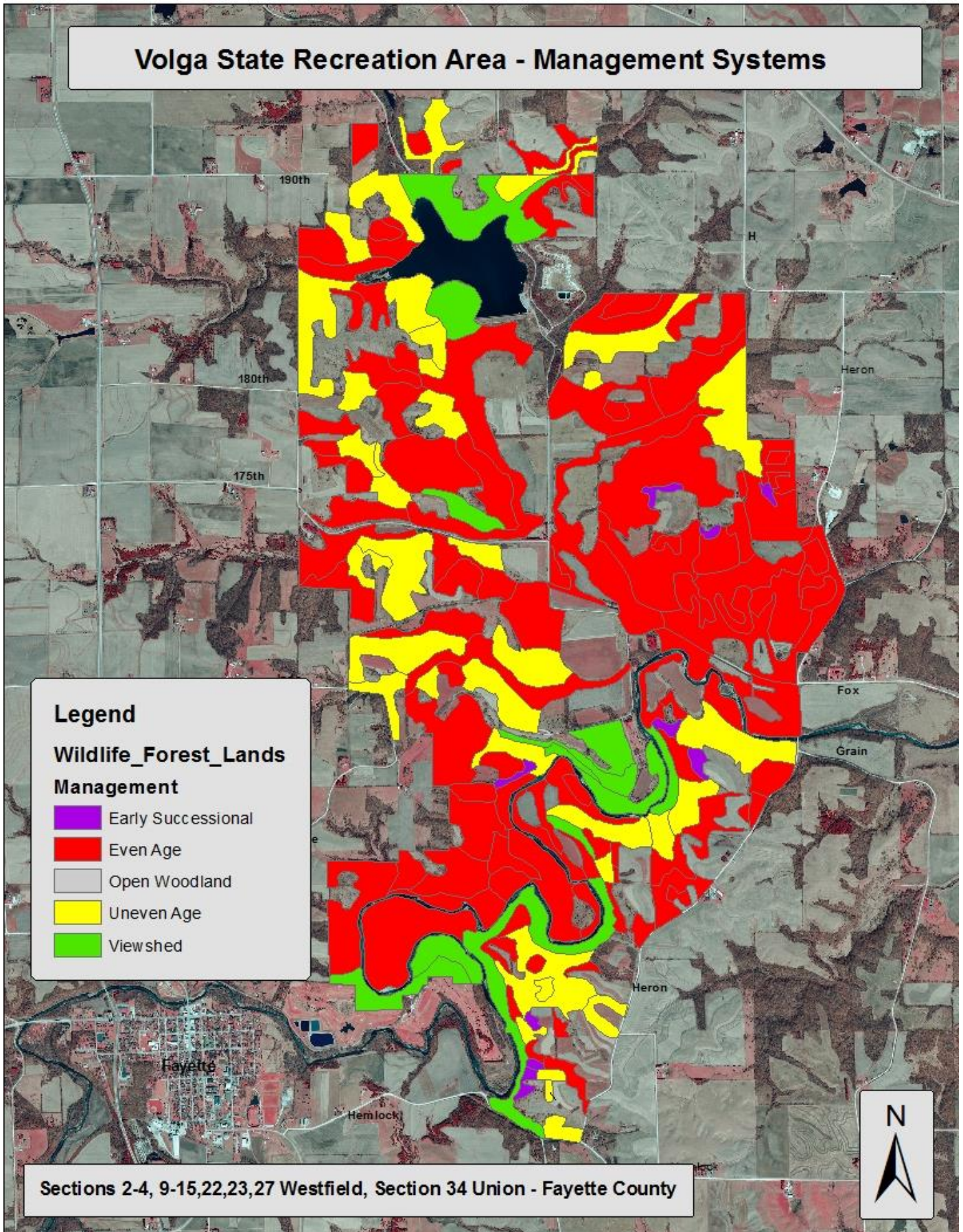


Sections 2-4, 9-15,22,23,27 Westfield, Section 34 Union - Fayette County

Volga State Recreation Area - Average Tree Size



Volga State Recreation Area - Management Systems



INTRODUCTION

In Iowa, the Department of Natural Resources (DNR) is the government agency responsible for the stewardship of indigenous and migratory wildlife species found in the state. Many of these species live near and in DNR managed forested land. Forests are a relatively slow-changing landscape with some stands reaching maturity after a period of 100 years. This time span may extend through the careers of several state land managers. The longevity factor emphasizes the need for a Forest Wildlife Stewardship Plans (FWSP) in order to wisely manage our state owned forests.

The forest can be managed to improve the forest ecosystem for wildlife species as well as to perpetuate a healthy, diverse and vibrant forest. The method in which the forest is managed effects what wildlife species will use a particular area at any point in time as the forest changes. Forests on state land are also a renewable resource that is owned by the public. Properly managed, these forests can provide multiple benefits such as wildlife habitat, water quality, air quality, recreation, and are a good investment for the people of Iowa.

There are 3 primary factors emphasizing the need for FWSP's for state owned forested lands:

1. The continued succession of many forest stands past the oak-hickory stage to the shade tolerant stands of maple and basswood.
2. The loss of early successional forest stands and associated wildlife species.
3. The lack of proper management to secure mature forest stands with diverse overstory and understory tree species for associated forest-interior wildlife species.

Some wildlife species use all of the forest age classes but others have very specific needs where one or two of particular forest age classes are needed to survive. Although the over-all change in forest succession is relatively slow, changes in the early stages of forest succession occur relatively fast. For example, some populations of indigenous and migratory bird species, dependent on these short-lived forest age classes, are experiencing dramatic declines.

In Iowa, they include the ruffed grouse and the American woodcock. Nation-wide declines of both species have been detected. Many migratory non-game birds including the gold-winged warbler, blue-winged warbler, black-billed cuckoo, yellow-billed cuckoo and eastern towhee are also dependent on this early stage of forest growth. Each of these species is showing populations declines.

Conversely, some species of Neotropical migratory birds are dependent upon mature, undisturbed woodlands. The Acadian flycatcher, Cerulean warbler and the Vireo are some examples of bird species needing mature forests. Management objectives will attempt to either protect these types of sites or include needed management to secure these necessary habitats for the future.

The DNR's Wildlife Action Plan identifies all of the above species and others as species of greatest conservation needs. (Table 1 through Table 6).

Generally, the DNR manages state-owned forest for the greatest diversity of forest wildlife and aesthetic value. The DNR's FWSP will prioritize the species of greatest conservation needs and the habitat needs of these wildlife species will be guiding factors to forest management decisions. Evaluations will be conducted to monitor the success of these management decisions. The Forest Wildlife Stewardship Plan is dynamic and will change and is updated as new information and techniques become available.

DESCRIPTION OF AREA

The Volga River State Recreation Area is located in northeast Iowa between Fayette and West Union. The Big Rock Wildlife Area was purchased by the Iowa Conservation Commission in 1959 and it became the nucleus for the Volga River State Recreation Area. The majority of the remaining land was acquired between 1963 and 1967 except for the two latest purchases in 1994 and 1997. Approximately seven miles of the Volga River flows through the southern portion of the recreation area and the 138 acre Frog Hollow Lake is located in the northern portion of the recreation area.

The rugged beauty of the Volga River provides a picturesque setting for many recreational activities, including camping, hiking, birding, horseback riding, snowmobiling, and of course hunting and fishing. 34 equestrian campsites with electricity are located in the Albany campground and 41 modern campsites are found in the Lakeview campground.



An expansive trail system covering 25 miles in length provides excellent opportunities for horseback riding, cross country skiing, mountain biking and hiking. The trail system also provides excellent access to much of the property and will play a critical role in implementing many of the management recommendations given in this plan. Established trail systems can significantly lessen the impact on the landscape during forest management activities. Cooperation and coordination with the recreational uses of the trails during forest management activities will be important.

In general, the great diversity of recreational opportunities provided by the Volga State Rec Area are exactly what make it such a special property. Active forest management will play a critical role in improving and enhancing many of those recreational activities.

Landscape

The Volga River State Recreation Area contains many examples of geographical features associated with the Niagara Escarpment, a tall, conspicuous topographic rise formed by dolomite bluffs as well as Paleozoic Plateau of northeast Iowa, a region often characterized as “Little Switzerland” because of its steep and rugged topography. Pinnacles and bluffs of solution-pitted dolomite rise from the forested slopes. Glacial deposits occur along the area’s western boundary and are scattered throughout the interior.

Objectives

There are a number of positive objectives that will occur from implementation of the Forest Wildlife Stewardship Plan (FWSP). First, it will perpetuate a healthy and diverse forest ecosystem which best meets the goals for the property. Second, it will showcase a living classroom of proper forest management for the public to view throughout its various stages. Finally, implementation of the FWSP will help enhance the safety of trail use by removing dying and hazardous trees found along the trail system.

Income from Timber Harvests

Harvesting is conducted to regenerate stands to desirable species and to achieve a diversity of tree sizes and species. Income from timber harvesting operations will be reinvested into the area to plant trees, thin young stands, convert areas to more desirable species, and create early successional habitat. Revenue generated by the timber sales will be a critical component of implementing good forest management, ultimately perpetuating a highly desirable, diverse and healthy forest ecosystem on the Volga State Rec Area.

Current Distribution of Tree Size on the Area

The woodland was stand mapped according to the average tree size as follows:

Tree Size	Acres	% of Total Area
Sapling (<4” dbh)	5	1
Pole size (5-12” dbh.)	1184	30
Medium Size (14-18” dbh.)	2087	53
Large (>20” dbh)	642	16
Totals	3918	100

Soils

The steep slopes have Burkhardt and Sparta soils, which are shallow soils over limestone. There are limestone outcrops on the steepest slopes.

The gentle slopes and ridge tops are dominated by Fayette soils. These are well drained, fertile loams that are good sites for upland hardwood trees such as red oak, white oak, bur oak, walnut, hard maple, basswood, and cherry.

The bottomland has Spillville and Dorchester silt loams. These soils are somewhat poorly drained and subject to frequent flooding.

The greatest limitations on the area are the steep slopes with shallow soils over limestone.

PROPOSED MANAGEMENT SYSTEMS FOR THE AREA

Recommendations for each stand were based on whether the area will be managed to create early successional growth, on an even age system, uneven age system, or as viewshed. The decision on what system would be used was based on the objectives for the area to maintain an oak component where feasible, develop a diverse woodland landscape, protect fragile sites, improve water quality in the Volga River and increase the acres of early successional growth.

Based on my recommendations for the areas, the acres under each management system are as follows:

Management System	Acres	% of Total Area
Early Successional	40	1
Even Age	2552	65
Uneven Age	919	24
Viewshed	407	10
Total	3918	100

Early Successional Management

Many species of birds such as ruffed grouse, American woodcock, gold winged warbler, blue winged warbler, black billed cuckoo, yellow billed cuckoo, and eastern towhee are dependent on the early stages of forest growth. The high stem density of both trees and shrubs provides suitable nesting habitat and protection from predators. Because aspen will sprout from the roots when the parent tree is cut, aspen is an excellent species to create the dense growth needed by these species. Aspen also is a short lived tree species, and cutting the aspen will rejuvenate and expand the aspen stands through root sprouting.

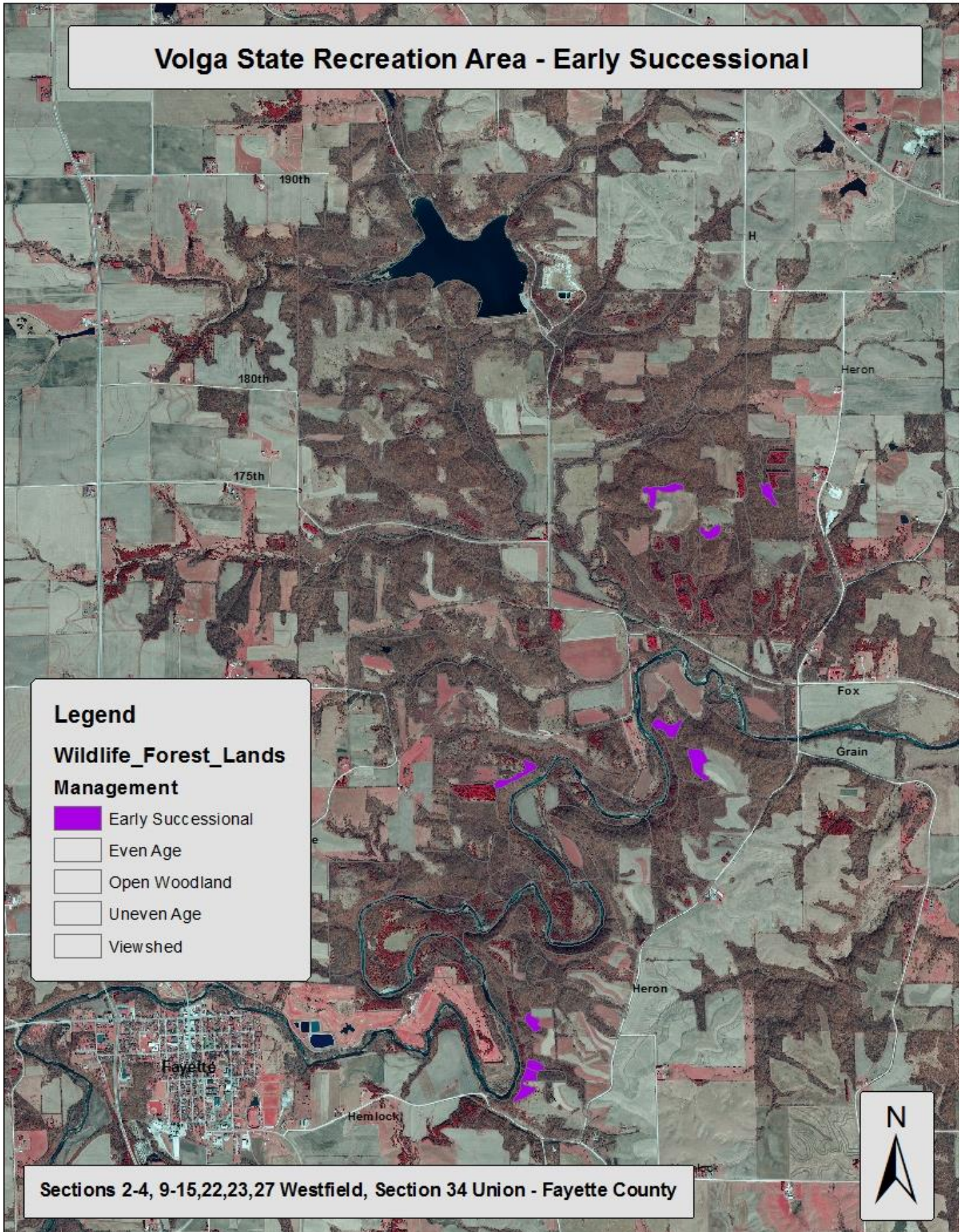
The majority of early successional management is on the woodland edges and aspen stands. This work will “feather” the edges and make a gradual transition from the field edges to the larger trees. Feathering or softening the edges results in less nest parasitism of interior forest bird species by brown-headed cowbirds.



Aspen provides critical habitat for ruffed grouse. Aspen is most easily regenerated by root suckering. Once aspen is allowed to become over mature, its ability to root sucker is decreased. The best method to maintain aspen and expand the aspen clone is to cut the stand while the trees are in a healthy condition. Big tooth aspen will grow to 16-20” in diameter, but small tooth aspen generally begins to die at 14-16” in diameter. Ideally, 1/3 of the aspen would be 1-2 inches in diameter, 1/3 of the trees 3-4 inches in diameter and 1/3 of the aspen 5-8 inches in diameter.

The early successional management areas will be managed on a 15 year rotation. In other words, every 15 years the area will be cut to rejuvenate the aspen and create areas with high stem density.

Volga has 40 acres scheduled for early successional management, or 1% of the wooded acres. Applying sustainable forestry guidelines, 13 acres could be cut every 5 years to maximize the diversity of tree sizes.



Even Age Management



Even age management is essential for wildlife species depending on oak/hickory forests. Oak acorns (mast) are at the top of the food list for many species of wildlife. In the absence of even age management techniques, the oak forests in Iowa will eventually be lost. Even though large blocks of forest are needed for some wildlife species, each stage of an even age stand provides habitat for wildlife. For example, regenerating stands (1-15 years old) benefit the same species of birds as does early successional stands, golden-winged warbler, blue-winged warbler, black-billed cuckoo, yellow-billed cuckoo, Eastern towhee, along with ruffed grouse and American woodcock.

Sapling to small pole sized stands between 10 and 20 years old, may be used by black and white, Kentucky, and worm eating warblers. From age 20-60 years, pole to medium size trees tend to be used by canopy nesters such as scarlet tanagers, wood thrushes, and ground nesters such as ovenbirds and black and white warblers.

Mature stands of 60 to 125 years of age are used by birds such as the wood thrush, Acadian flycatcher, ovenbird, worm eating warbler, and scarlet tanagers.

Even age management involves growing a stand of trees which are close to the same age. At some point in the stands life, the area is clearcut which creates the even age structure. Even age management creates excellent habitat for deer, turkey, and grouse and woody debris on the forest floor provides habitat for amphibians and reptiles. Clearcutting is essential for regeneration of oak which require full sunlight. The only way that oak can be maintained as a component of the forest is by practicing some form of even age management.

Even age management involves clearcutting and planting, clearcutting with regeneration already established, or a shelterwood system to develop desirable seedlings on the ground.

Shelterwood is a form of even-age management. The final cut is a clearcut, but several thinnings are done prior to the final cut. The large, healthy trees are left to provide seed for naturally reseeding the stand, and to create partial shade to inhibit the growth of weeds and brush until the desirable seedlings are well established. The final cut or clearcut is normally done when there are a sufficient number of desirable trees that are 3-5 ft. tall. The shelterwood system can take many years to develop a good stocking of desirable young trees. You may have to kill the undesirable species several times to favor the species you want. The final clearcut should not be made until you are satisfied with the stocking of desirable young trees.



Clearcutting to create full sunlight is essential at some point in the stands life to successfully regenerate oak. If stands are not clearcut, the oak component of the forest will be lost to shade tolerant species. Clearcuts also provide additional early successional habitat in the early stages. The area is in the brushy stage for a very short period, normally 10-15 years. After that time, the trees will totally shade the ground, and the area becomes a pole sized (5-10" dia.) stand of trees.

Fire is a tool in managing oak stands that is currently being studied. Frequent burning of the leaf layer in the woods will kill thin barked species such as hard maple, cherry, elm, bitternut hickory, and ironwood. Fire will expose mineral soil and open up the ground to sunlight. These conditions favor the natural regeneration of oak. Oak seedlings will tolerate light fires. The top will be killed by the fire, but the deep root systems survive and sprout. Fire will be utilized on a limited scale to encourage oak regeneration in oak stands. Once a good number of oak seedlings are present, these stands will have to be clearcut or the young oak will die from lack of sunlight.

Throughout the implementation of this plan it is important to leave snag trees (wherever harvest or thinning work is done), from 7 to 10 snag trees per acre, because of the large importance that snag trees have for birds, small mammals, and other wildlife. At least 40 species of Iowa birds nest in cavities. It is also especially important to retain live loose bark tree species (e.g., shagbark hickory) whenever possible to benefit bats. Attention also should be given to allowing some large woody debris to remain on the ground in the forest to provide shelter and wintering areas for a host of small mammals, amphibians, reptiles, and beneficial insects. Contractors will be encouraged to utilize girdling of undesirable trees where it can safely be implemented.

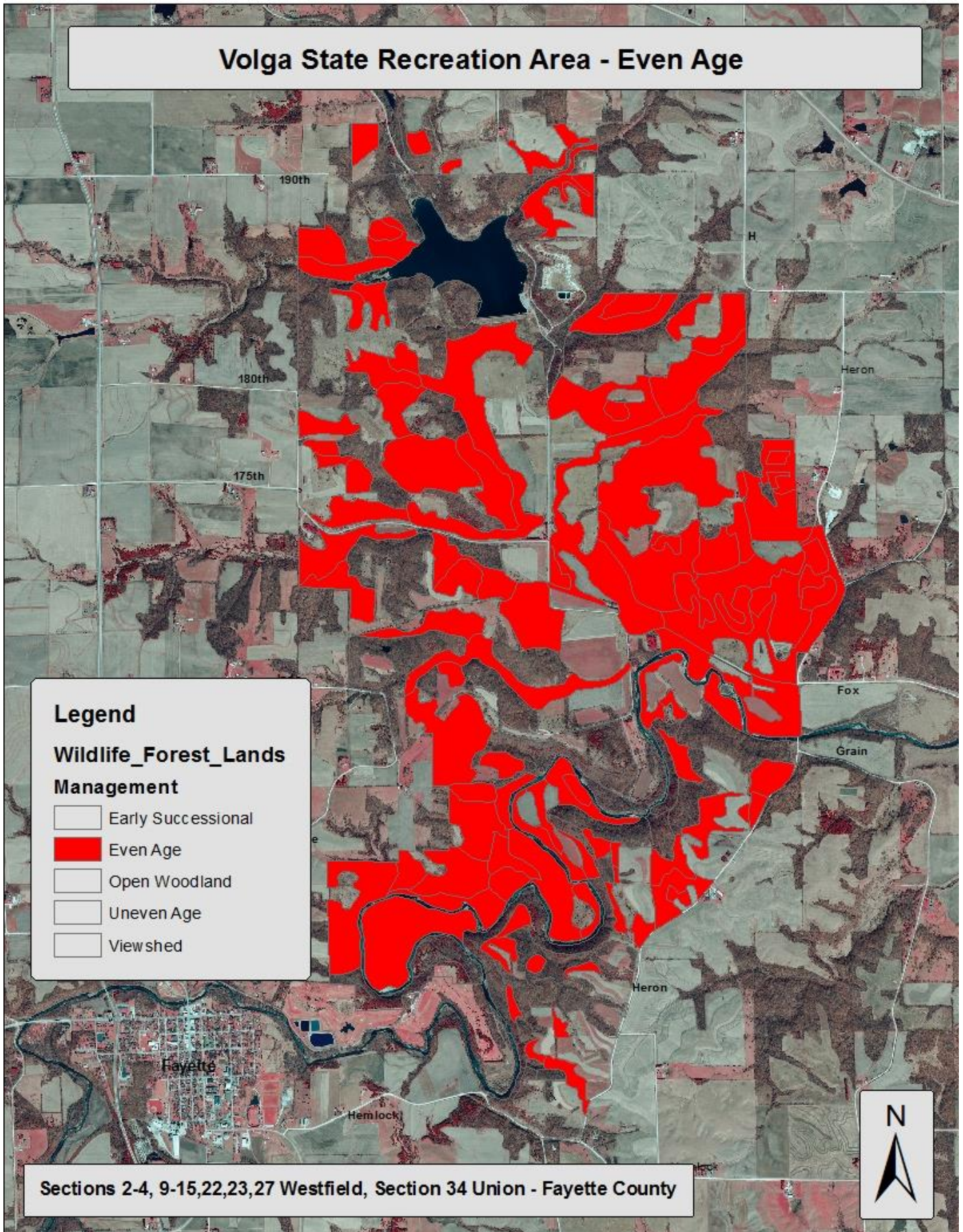
Open Woodland Alternative: A number of stands classified as even aged or viewshed have an opportunity to simply apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand. Approximately 656 acres of area have had this alternative listed along with their stand description and prescription within this plan. Some portions of the stands that have this alternative listed may be found to be quite suitable for this to be implemented, especially the south facing and shallow to rock areas.

Typical managed life cycles (also known as rotation age) of even aged species in north east Iowa is between 80 and 120 years. Oak that is managed on a shorter rotation age, closer to 80 years, will lead to a much more vibrant regeneration through stump sprouting. This typically makes it much easier to perpetuate the oak component of the forest. Oak that is managed on a longer rotation age, closer to 120 years, can often times result in larger mature trees which can benefit several different wildlife species. To realize benefits of both strategies a standard of 100 years will be used to determine the annual harvest allotment on the Volga State Rec Area. Where beneficial, some stand may be harvested ahead of the 100 year mark, just as some may be harvested after the 100 year mark.

There are 2,552 acres of even aged management planned for Volga, or 65% of the wooded area. 25-26 acres can be clearcut annually or 125-130 acres every 5 years under sustainable forestry guidelines.

It is important to note that many acres on the Volga State Rec Area that have been designated as even aged management currently contain no desirable or merchantable timber. Past land uses and management decisions led to a current condition of nearly monoculture pole sized stands of undesirable species. The prescription for these stands will call for these areas to be converted to desirable species which will have to be accomplished through a replanting and non-commercial clear cut.

Volga State Recreation Area - Even Age



Legend

Wildlife_Forest_Lands Management

-  Early Successional
-  Even Age
-  Open Woodland
-  Uneven Age
-  View shed

Sections 2-4, 9-15,22,23,27 Westfield, Section 34 Union - Fayette County



Uneven Age Management

Uneven age management develops a stand of trees with all tree sizes represented. The stand structure is developed by selectively harvesting mature and defective trees, and removing unwanted small trees that are damaged or defective. Because uneven age stands always have large trees present, this system favors species that will grow in shade such as hard maple and basswood. Sustainable harvest guidelines dictate the ability to selectively harvest mature and defective trees every 20 to 25 years in these stands.

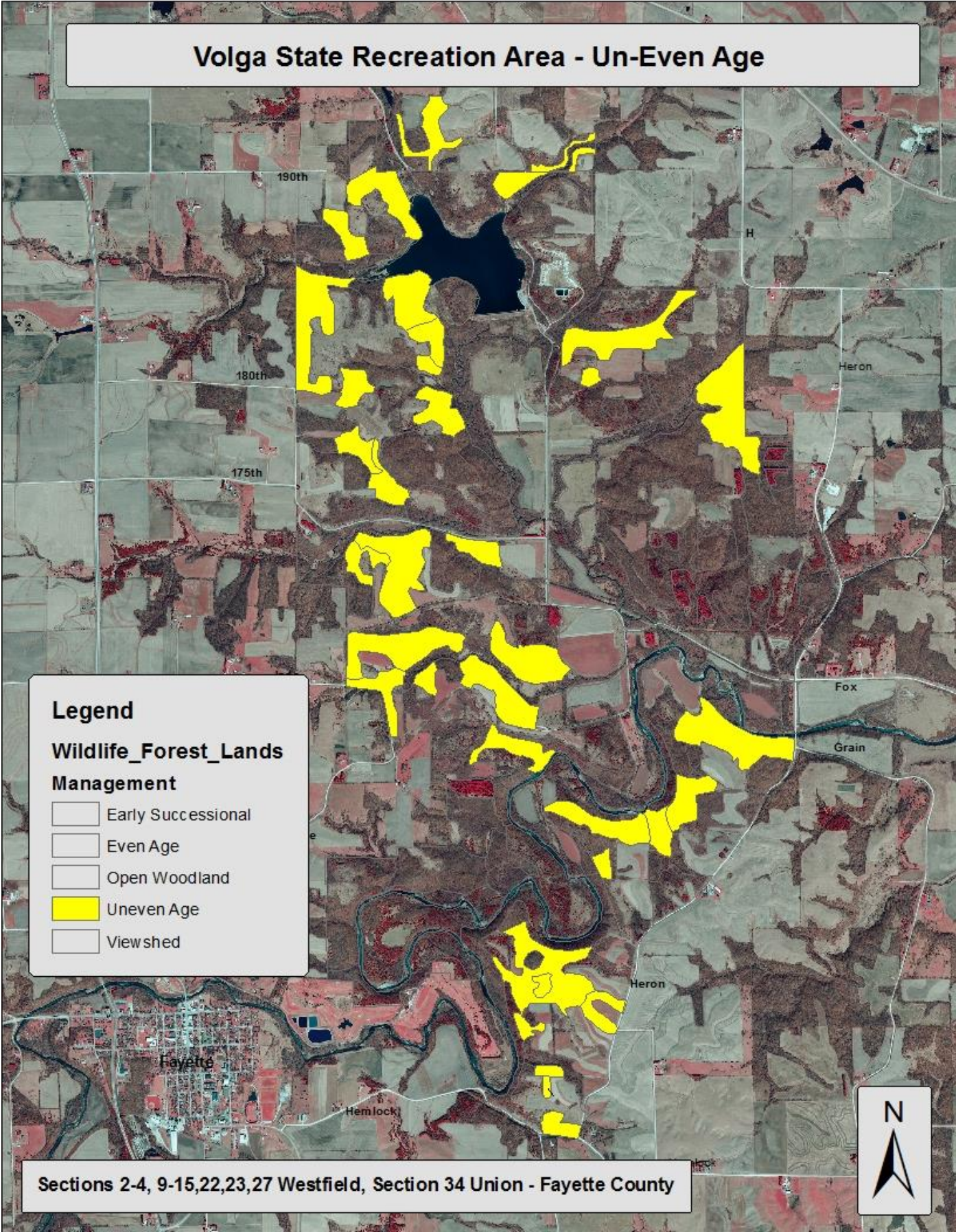


Uneven age management will maintain blocks of woodland that will always have larger trees. This system is desirable where the understory is mainly hard maple, on steep slopes, and on areas where always having large trees is important.

Uneven age management areas will provide continuous tracts of woodland with infrequent disturbance. Large tracts of uneven age management will provide necessary habitat for neotropical migratory bird species such as cerulean, hooded, Canada, and Kentucky warblers. Selective harvesting will create small openings in the canopy, which will increase ground cover, and enhance stand structure. Den trees will be left to provide cavities for wildlife such as woodpeckers, bats, and squirrels. Large oaks that are healthy will be left to provide acorns for many wildlife species. Timber stand improvement and selective harvesting will create woody debris on the forest floor for reptiles and amphibians.

There are 919 acres scheduled for uneven age management, 24% of the area. Many of the areas are on steep slopes but there is also evidence of shade tolerant species gradually spreading across the entire property. 46 acres could be selectively harvested annually and approximately 230 acres over a 5 year time period under sustainable forestry guidelines.

Volga State Recreation Area - Un-Even Age



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Viewshed Management

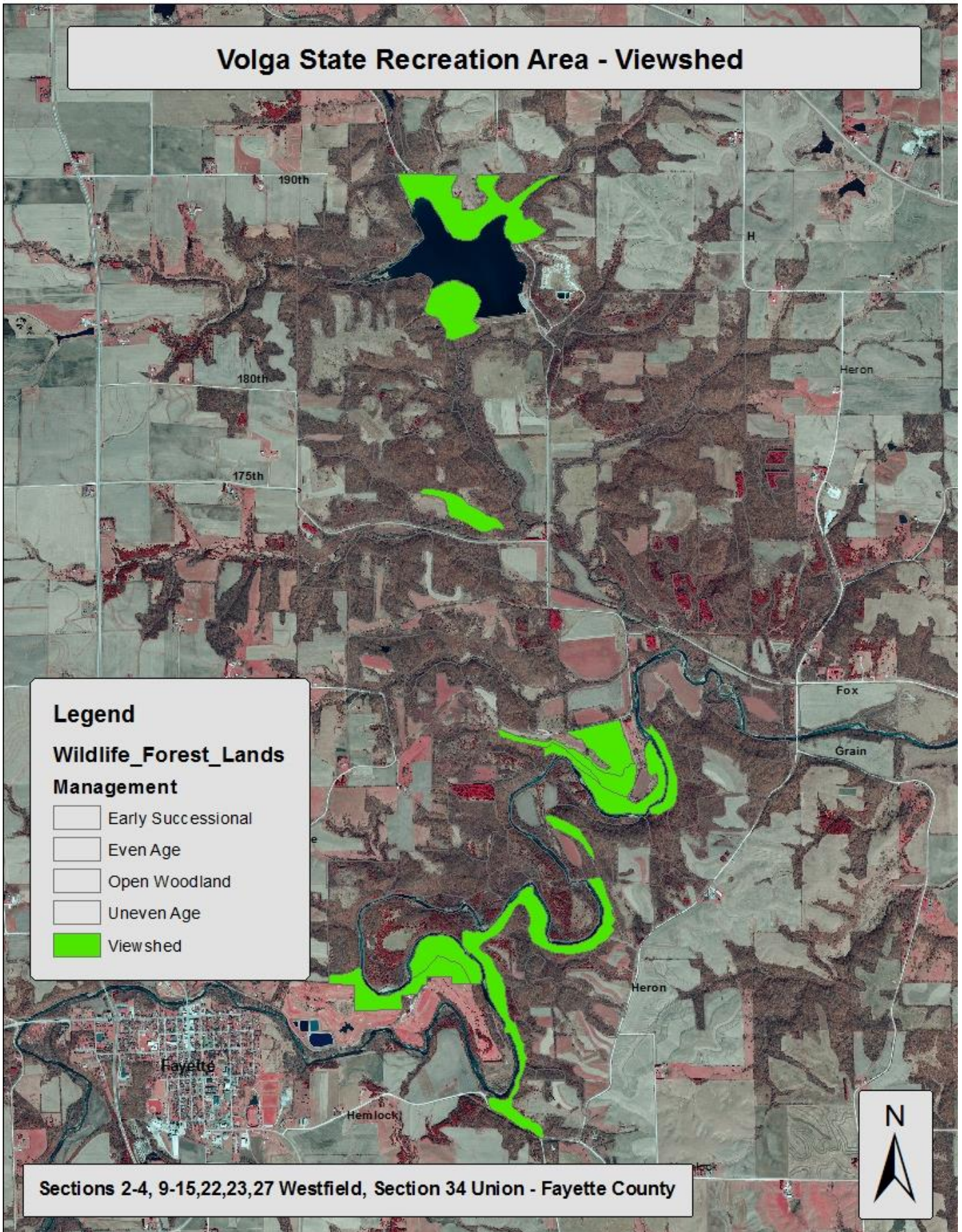
Viewshed areas are typically steep slopes and areas along streams which are fragile and are best left to naturally progress through succession. Areas where endangered plant or animal species exist will also be under viewshed management. Management can take place on these areas where desirable to improve the health and species composition of the forest, and to enhance the area for endangered species, but the major objective is to have minor disturbance.

Many neotropical birds will benefit greatly from the areas designated as viewshed. Algific slopes and moderate slopes will be under viewshed management which will protect 8 species of land snails listed as species of greatest conservation need.

There are 433 acres of viewshed management on the area, or 11% of the wooded areas. Viewshed management is recommended to protect the fragile slopes and floodplain along the Volga River as well as to provide a visual buffer around areas of high recreation use.



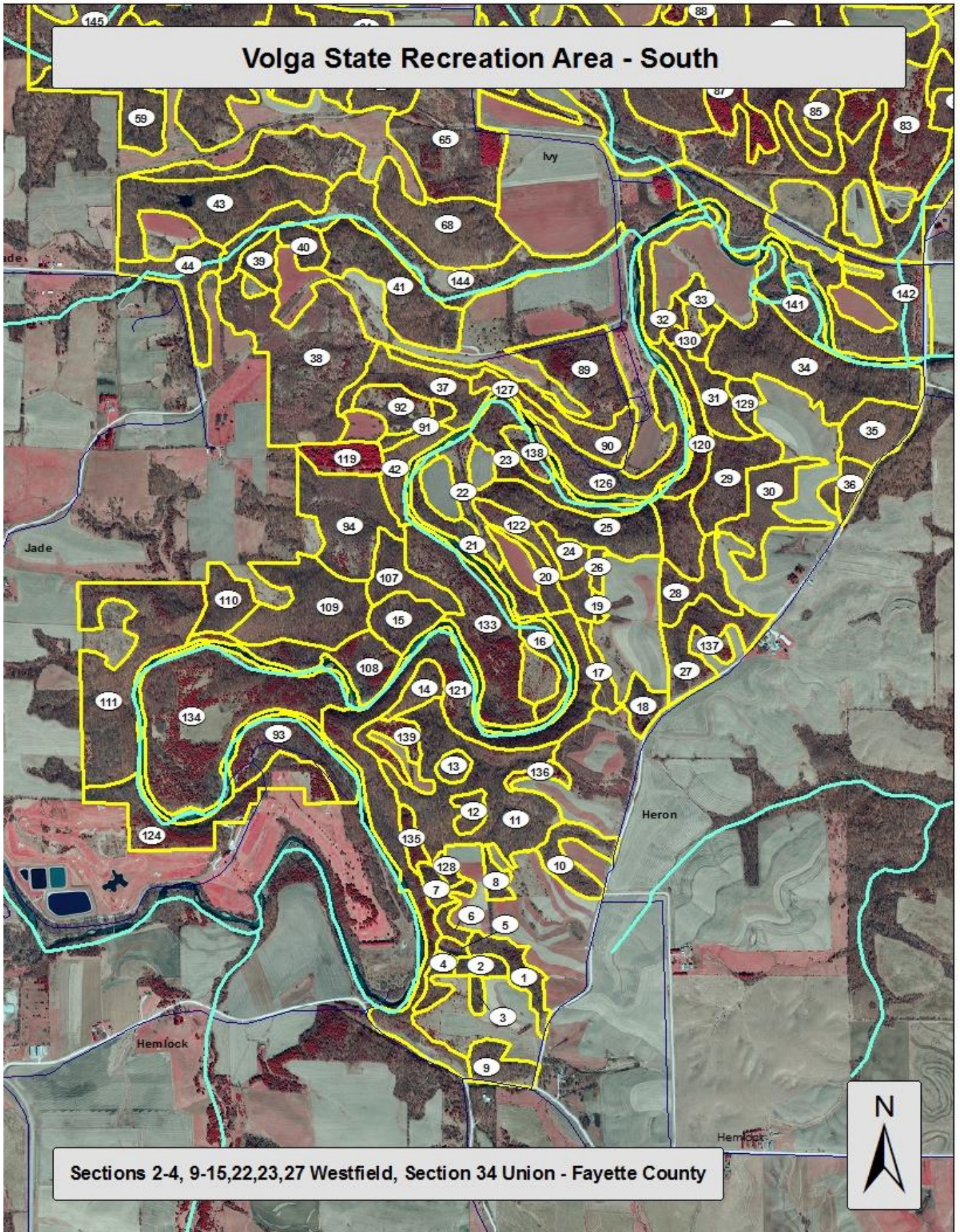
Volga State Recreation Area - Viewshed



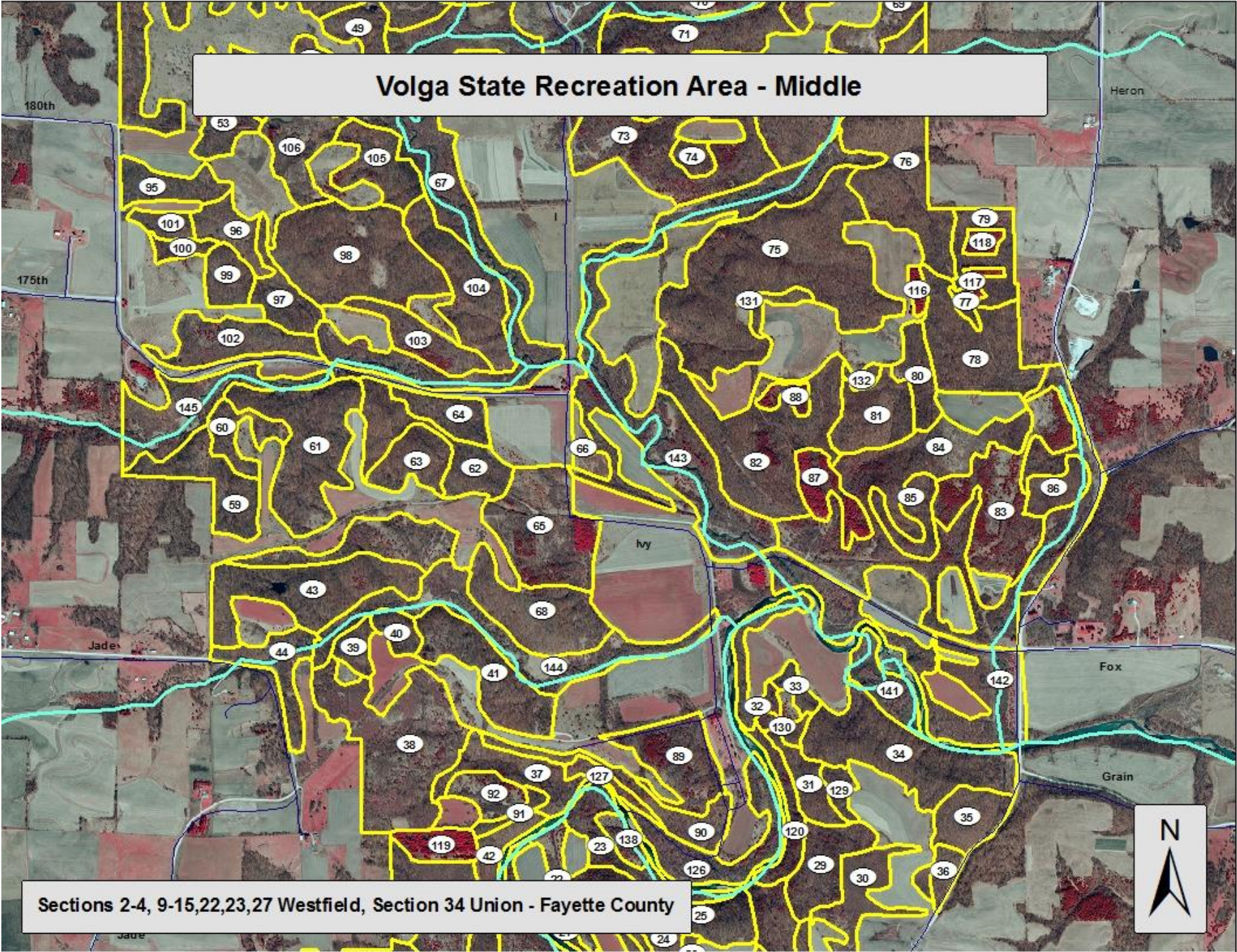
WORK PLAN FOR VOLGA STATE RECREATION AREA

This is the “working plan” for the Volga State Recreation Area management. The plan is designed to aid professional foresters in the implementation of forest management practices. It is written with the understanding that these professionals have a basic understanding of forest management principles and techniques. Every detail has not been outlined in the plan because the plan would become too long to be of practical use. This plan is intended to get work accomplished on the ground.

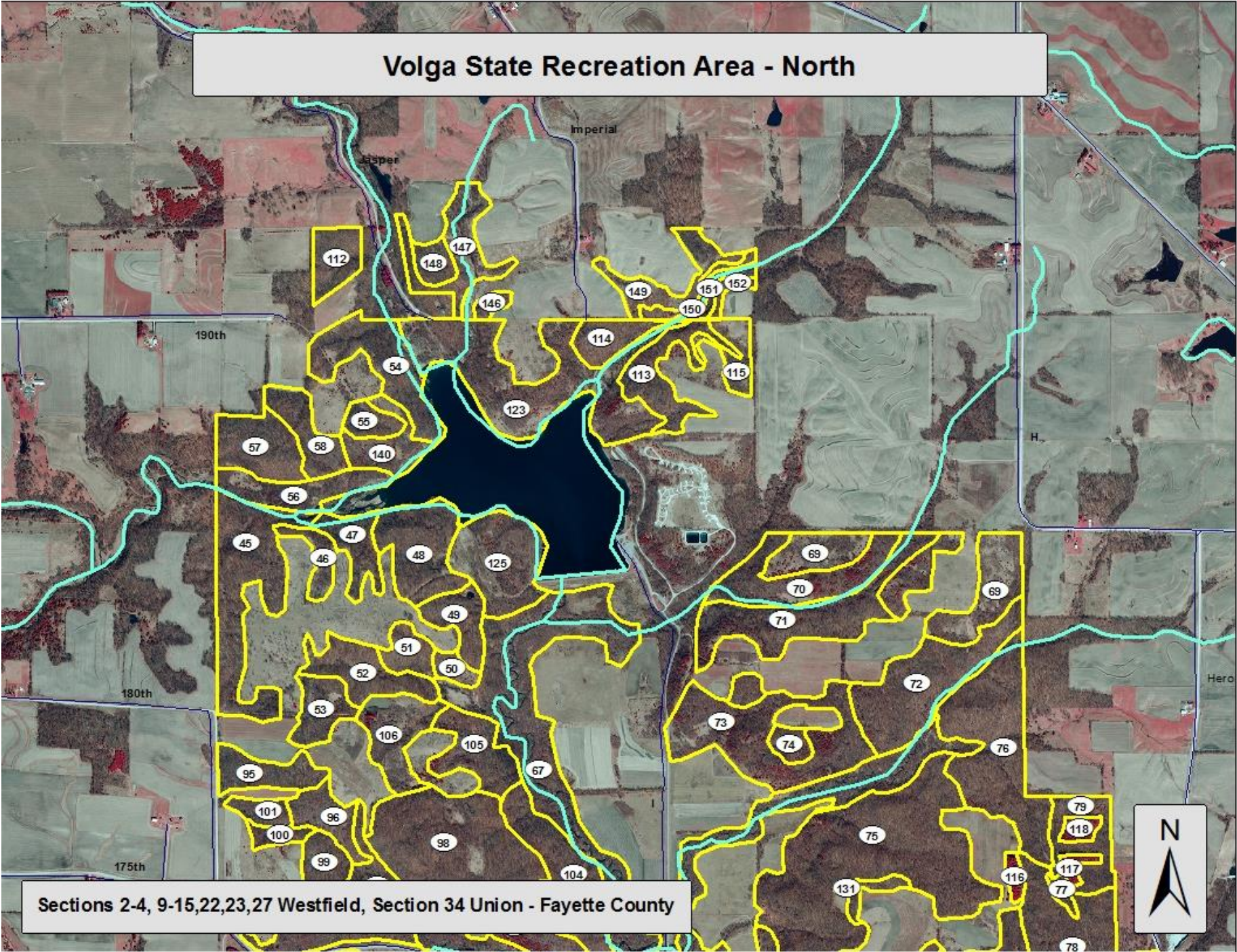
Volga State Recreation Area - South



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Volga State Recreation Area - North



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Description and Recommendations for Individual Stands

Stand 1: 12.9 acres - Even Aged Management

- **Site/Woodland Description** - This area is a mostly south facing slope with poorer quality soils. The average overstory is pole sized black walnut, cherry, elm, ironwood and other central hardwoods. There are scattered large oak, walnut, bitternut hickory and elm found throughout the stand. These are likely left over from a previous harvest.
- **Management Prescription** - Improvement Harvest (2020) - Crop Tree Release (Post Harvest)
The scattered large overstory trees found throughout this stand should be harvested to release the advanced walnut regeneration. There is not a lot of volume to be harvested and the quality of the merchantable trees is relatively poor. This harvest should be combined with the harvest of any adjacent stands to ensure enough volume for a timber sale. Crop trees should be identified and released following the harvest.

Stand 2: 5.1 acres - Un-Even Aged Management

- **Site/Woodland Description** - This area is a mostly north facing slope with better quality soils. The average overstory is medium to large sawtimber of walnut, bitternut hickory, cherry, oak and scattered hard maple. As with most areas on the southern end of the property there is a history of harvest and much of the remaining overstory is poorer quality trees left behind. There is evidence in the understory of hard maple beginning to establish itself along with some good quality walnut regeneration.
- **Management Prescription** - Selective Harvest (2020) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the walnut and maple regeneration. This harvest should be combined with the harvest of any adjacent stands to ensure enough volume for a timber sale. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 3: 2.7 acres - Un-Even Aged Management

- **Site/Woodland Description** - This area is a mostly north facing slope with better quality soils. The average overstory is pole sized hard maple, hackberry, black walnut and bitternut hickory. An occasional large sawtimber hard maple, walnut or oak is found scattered throughout the stand.
- **Management Prescription** - Improvement Harvest (2020) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the walnut and maple regeneration. This harvest should be combined with the harvest of any adjacent stands to ensure enough volume for a timber sale. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 4: 5.9 acres - Early Successional Management

- **Site/Woodland Description** - This area is mostly field edge that transitions into the steeper west facing slope that overlooks the Volga River. The overstory is dominated by pole to small sized aspen with some merchantable walnut also occasionally found.
- **Management Prescription** - Harvest (2020) - Early Successional Clearcut (Post Harvest)
The mature and defective overstory trees should be harvested. This harvest should be combined with the harvest of any adjacent stands to ensure enough volume for a timber sale. Following the harvest all remaining trees should be felled to create early successional habitat. Undesirable trees should be treated and killed.

Stand 5: 2.4 acres - Early Successional Management

- **Site/Woodland Description** - This area is a steep south facing slope with poor quality soils. The overstory is dominated by pole to small sawtimber sized aspen with some hard maple and red cedar also present. There is some hard maple regeneration found in the understory.
- **Management Prescription** - Early Successional Clearcut (2030)
All trees in this stand should be felled to create early successional habitat. The undesirable trees should be treated and killed. This prescription should reoccur every 15-20 years.

Stand 6: 3.8 acres - Even Aged Management

- **Site/Woodland Description** - This is a transition area from along the field edge to the steeper west facing slope that overlooks the Volga River. The overstory is pole to small sawtimber sized red oak, white oak, elm, bitternut

hickory and a few other occasional central hardwoods. Undesirable species such as ironwood, elm and bitternut hickory dominate the midstory and understory. Desirable regeneration is nearly nonexistent.

- **Management Prescription** - Underplanting (2035) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 7: 6.3 acres - Un-Even Aged Management

- **Site/Woodland Description** - This upland ridge/shoulder transitions into the steep west facing slope that overlooks the Volga River. The overstory of this stand consists of decent quality small sawtimber sized white oak and a midstory primarily containing hard maple. The establishment of hard maple in the understory and midstory will cause this stand to eventually become a traditional un-even aged management stand.
- **Management Prescription** - Selective Harvest (2025) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the maple regeneration. This harvest should be combined with the harvest of any adjacent stands to ensure enough volume for a timber sale. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 8: 4.7 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to a nearly monoculture stand of what is now pole sized boxelder. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut is found to have established itself with the boxelder.
- **Management Prescription** - Underplanting (2045) - Non Commercial Clearcut (2 Yrs Post Planting)
Work should be completed in this stand to convert it to desirable species that better meet the long term goals and objectives for the property. High quality seedlings should be planted throughout the stand. The seedlings should be allowed to establish themselves for one to two years, followed by a non-commercial clearcutting of the overstory. The stumps of the undesirable species should be treated and killed to prevent sprouting. Desirable species should be coppiced.

Stand 9: 11.5 acres - Un-Even Aged Management

- **Site/Woodland Description** - Stand 9 is located on the far southern edge of the property and is highly visible from hemlock road. The overstory is mostly medium sawtimber sized hard maple with a few elm and bitternut hickory. Maple regeneration is present in the understory and midstory. Uneven aged management should mitigate the high visibility issues.
- **Management Prescription** - Selective Harvest (2025) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the maple regeneration. This harvest should be combined with the harvest of any adjacent stands to ensure enough volume for a timber sale. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 10: 15.2 acres - Un-Even Aged Management

- **Site/Woodland Description** - Stand 10 is an area that over time has transitioned from open grasslands to trees. The overstory consists primarily of undesirable species such as elm and boxelder but a decent stocking of hard maple is also present. The understory and midstory also have a good stocking of maple regeneration, making this a stand a good candidate for long term un-even aged management.
- **Management Prescription** - Crop Tree Release (2030)
The pole sized hard maple found scattered throughout this stand would benefit from a crop tree release in approximately 15 years. This is a relatively low priority as it is likely the maple will continue to hold its own against the undesirable species.

Stand 11: 67.9 acres - Un-Even Aged Management

- **Site/Woodland Description** - Stand 11 is a relatively large area of mostly uniform overstory and regeneration. Small sawtimber to large sawtimber red oak, hard maple, elm, ash and basswood are found throughout the stand. The understory has established hard maple seedlings and saplings along with some elm, ironwood and ash. The maple presence will push this stand to un-even aged management in the long term.
- **Management Prescription** - Selective Harvest (2020) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the maple regeneration. This method of selective harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 12: 5.3 acres - Un-Even Aged Management

- **Site/Woodland Description** - Stand 12 was clearcut within the last 10-15 years. There is little evidence that any trees planted at that time survived. The stand is now dominated by sapling sized cherry, bitternut hickory, elm and hard maple.
- **Management Prescription** - Crop Tree Release (2025)
The desirable trees found in this stand should be crop tree released in the next 10-15 years. Maple will likely be the primary crop tree identified.

Stand 13: 4.3 acres - Even Aged Management

- **Site/Woodland Description** - This is a smaller area interior to stand 11 that doesn't seem to have as much hard maple established in the understory. Even aged management should be applied to try and perpetuate the oak. The overstory currently has some small sawtimber to large sawtimber ash, white oak and aspen. Undesirable species such as ironwood, elm and bitternut hickory dominate the midstory and understory with some hard maple also present. Desirable regeneration is nearly nonexistent.
- **Management Prescription** - Underplanting (2020) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced. The aspen that is harvested or felled should be allowed to regenerate itself to add some early successional habitat.

Stand 14: 8.3 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is small sawtimber to large sawtimber sized red oak, hard maple, elm, basswood and a few other occasional central hardwoods. Undesirable species such as ironwood, elm and bitternut hickory dominate the midstory and understory. Desirable regeneration outside of hard maple is nearly nonexistent. The occurrence of hard maple in the understory is relatively minor, making this stand an area of priority to regenerate and perpetuate oak.
- **Management Prescription** - Underplanting (2020) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 15: 14.6 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to a nearly monoculture stand of what is now pole sized undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut is found to have established itself with the boxelder. This stand does have a few scattered large walnut.

- **Management Prescription** - Underplanting (2030) - Non Commercial Clearcut (2 Yrs Post Planting)
Work should be completed in this stand to convert it to desirable species that better meet the long term goals and objectives for the property. High quality seedlings should be planted throughout the stand. The seedlings should be allowed to establish themselves for one to two years, followed by a non-commercial clearcutting of the overstory. The stumps of the undesirable species should be treated and killed to prevent sprouting. Desirable species should be coppiced. Some large scattered walnut should be harvested.

Stand 16: 10.2 acres - Even Aged Management

- **Site/Woodland Description** - Stand 16 is found along the Volga River and is an area that over time seedling in naturally with walnut and some scattered red oak. The overstory trees now average 5-10" in diameter.
- **Management Prescription** - Crop Tree Release (2025)
The good quality pole sized walnut and red oak found in this stand should be crop tree release in approximately 10 years.

Stand 17: 6.5 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is small sawtimber to large sawtimber sized white oak, bur oak, red oak, walnut, a couple hard maple and a few other occasional central hardwoods. Undesirable species such as ironwood, elm and bitternut hickory dominate the midstory and understory. Desirable regeneration is nearly nonexistent. The occurrence of hard maple in the understory is relatively minor, making this stand an area of priority to regenerate and perpetuate oak. This stand is also located along a visible access road. This could be used as an easily accessed area for public education of forest management.
- **Management Prescription** - Underplanting (2020) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced. Poor and defective walnut trees in stand 19 should be harvested at the same time as this stand.

Stand 18: 8.0 acres - Even Aged Management

- **Site/Woodland Description** - Stand 18 is a highly visible stand found around an old building site near what is currently used an archery range. The primary species found here is pole to small sawtimber sized walnut.
- **Management Prescription** - Crop Tree Release (2025)
Management activities in this stand should be done in accordance with the high traffic and visibility. The walnut should be crop tree released and pruned in approximately 10 years. These activities will be relatively low impact but will foster good quality veneer growth in the walnut.

Stand 19: 1.5 acres - Even Aged Management

- **Site/Woodland Description** - Stand 19 is a pocket of good quality small sawtimber sized black walnut.
- **Management Prescription** - Commercial Crop Tree Release (2025)
The poor quality and defective walnut trees found in this stand should be removed in accordance with a timber sale in stand 17. The removal of these trees will allow more room for the best quality residual trees to continue to grow at an optimal rate.

Stand 20: 7.7 acres - Even Aged Management

- **Site/Woodland Description** - Stand 20 is found along the road that comes off of Heron road and travels into the bottom toward the Volga River. This area appears to have naturally seeded to walnut, red oak, white oak, elm and an occasional hard maple. The average sized tree is 8-12" DBH.
- **Management Prescription** - Crop Tree Release (2025)
The good quality pole sized walnut and red oak found in this stand should be crop tree release in approximately 10 years. Prescribed burning could be considered at some point to control any hard maple or invasive species that establish themselves.

Stand 21: 16.6 acres - Even Aged Management

- ***Site/Woodland Description*** - Stand 21 is found along the Volga River and is an area that over time seedling in naturally with walnut, red cedar, boxelder and some scattered red oak. The overstory trees now average 5-10" in diameter.
- ***Management Prescription*** - Crop Tree Release (2030)
This stand should be reevaluated in 10-15 years for a possible crop tree release.

Stand 22: 11.7 acres - Even Aged Management

- ***Site/Woodland Description*** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to a nearly monoculture stand of what is now pole sized boxelder with an occasional red cedar. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut is found to have established itself with the boxelder.
- ***Management Prescription*** - Underplanting (2045) - Non Commercial Clearcut (2 Yrs Post Planting)
Work should be completed in this stand to convert it to desirable species that better meet the long term goals and objectives for the property. High quality seedlings should be planted throughout the stand. The seedlings should be allowed to establish themselves for one to two years, followed by a non-commercial clearcutting of the overstory. The stumps of the undesirable species should be treated and killed to prevent sprouting. Desirable species should be coppiced.

Stand 23: 21.6 acres - Even Aged Management

- ***Site/Woodland Description*** - Stand 23 is found along the Volga River and is an area that over time seedling in naturally with walnut, red oak, white oak, red cedar, boxelder and some scattered hard maple. The overstory trees now average 8-12" in diameter.
- ***Management Prescription*** - Crop Tree Release (2025)
This stand should be reevaluated in 10-15 years for a possible crop tree release and pruning.

Stand 24: 6.9 acres - Even Aged Management

- ***Site/Woodland Description*** - The overstory is small sawtimber to large sawtimber sized red oak, walnut, white oak and a few hard maples. The midstory is relatively open and there is some seedling hard maple present. This is an area with good overstory oak that should be a priority to try and regenerate. If nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- ***Management Prescription*** - Underplanting (2020) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 25: 53.2 acres - Un-Even Aged Management

- ***Site/Woodland Description*** - Stand 25 is a relatively large area of mostly uniform overstory and regeneration. Small sawtimber to large sawtimber red oak, hard maple, elm, ash and basswood are found throughout the stand. The understory has established hard maple seedlings and saplings along with some elm, ironwood and ash. The maple presence will push this stand to un-even aged management in the long term. Some areas of this stand are fairly steep.
- ***Management Prescription*** - Selective Harvest (2030) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the maple regeneration. This method of selective harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 26: 3.0 acres - Even Aged Management

- **Site/Woodland Description** - Stand 26 is an area that historically was open grass or pasture that has since seeded in to trees. This stand happens to have established a good stocking of walnut. The average diameter is 5-10". There is also some red cedar, elm, boxelder and bitternut hickory found throughout the area.
- **Management Prescription** - Crop Tree Release (2020)
The good quality pole sized walnut and red oak found in this stand should be crop tree release in approximately 3-5 years.

Stand 27: 24.1 acres - Even Aged Management

- **Site/Woodland Description** - Stand 27 is an area that over time seeded in naturally with some good quality walnut along with boxelder, elm and red cedar. The overstory trees now average 5-10" in diameter.
- **Management Prescription** - Crop Tree Release (2025)
The good quality pole sized walnut found in this stand should be crop tree released and pruned in approximately 5 years.

Stand 28: 16.7 acres - Even Aged Management

- **Site/Woodland Description** - This area appears to have historically been relatively open with a few wolf trees per acre. Currently the big bur oak wolf trees are scattered throughout the stand with many areas of dead or dying elm. Some walnut regeneration is scattered throughout the stand. This is a low priority stand.
- **Management Prescription** - Improvement Harvest (2040) - WTR (Post Harvest)
This stand should be reevaluated in 25 years and an appropriate prescription applied at that time. A possible improvement harvest and weed tree removal could be appropriate.
 - **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 29: 25.0 acres - Un-Even Aged Management

- **Site/Woodland Description** - This is a transition area from the upland crop fields to the steep slopes that drop off to the Volga River. The soils here are relatively poor and shallow to rock. The current overstory consists of primarily 4-8" DBH hard maple with some walnut, cherry, ash, boxelder and red cedar.
- **Management Prescription** - Crop Tree Release (2035)
This stand should be reevaluated in 15 to 20 years to determine if the crop trees would benefit from a release.

Stand 30: 26.5 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to a nearly monoculture stand of what is now pole sized boxelder. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut is found to have established itself with the boxelder.
- **Management Prescription** - Underplanting (2045) - Non Commercial Clearcut (2 Yrs Post Planting)
Work should be completed in this stand to convert it to desirable species that better meet the long term goals and objectives for the property. High quality seedlings should be planted throughout the stand. The seedlings should be allowed to establish themselves for one to two years, followed by a non-commercial clearcutting of the overstory. The stumps of the undesirable species should be treated and killed to prevent sprouting. Desirable species should be coppiced.

Stand 31: 13.7 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is small sawtimber to large sawtimber sized red oak, walnut, white oak, elm and a few cherry. Some ironwood and hard maple are found in the midstory and understory. This is an area with good overstory oak that should be a priority to try and regenerate. If nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.

- **Management Prescription** - Underplanting (2025) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 32: 14.9 acres - Even Aged Management

- **Site/Woodland Description** - Stand 32 runs along the Volga River across from the campground. There is a good stocking of pole to small sawtimber sized walnut found in this stand, along with some elm, bur oak, red cedar and boxelder. The walnut will be the primary species of management.
- **Management Prescription** - Walnut Harvest/Commercial Crop Tree Release (2030)
This stand should be left as it is to grow for 10 to 15 years. Reevaluation at that time should determine if a selective harvest or possibly a commercial crop tree release should be implemented to benefit the best quality walnut scattered throughout the area.

Stand 33: 5.5 acres - Even Aged Management

- **Site/Woodland Description** - This is a small area that has a good stocking of small sawtimber walnut and some nice pole sized red oak along the field edges.
- **Management Prescription** - Commercial Crop Tree Release (2030)
This stand should be left as it is to grow for 10 to 15 years. Reevaluation at that time should determine if a selective harvest or possibly a commercial crop tree release should be implemented to benefit the best quality walnut scattered throughout the area. If there are trees to be commercially removed they could be added to stand 32 to generate enough volume for a sale.

Stand 34: 58.6 acres - Un-Even Aged Management

- **Site/Woodland Description** - Stand 34 is a relatively large area of mostly uniform overstory and regeneration. Small sawtimber to large sawtimber red oak, white oak, hard maple, elm, ash and basswood are found throughout the stand. The understory has established hard maple seedlings and saplings along with some elm, ironwood and ash. The maple presence will push this stand to un-even aged management in the long term.
- **Management Prescription** - Selective Harvest (2020) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the maple regeneration. This method of selective harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 35: 18.7 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is small sawtimber sized red oak, white oak, hard maple, elm and bitternut hickory. Some ironwood and hard maple are found in the midstory and understory. This is an area with good overstory oak that should be a priority to try and regenerate. If nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2035) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 36: 6.6 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is small sawtimber to large sawtimber sized red oak, white oak, hard maple, elm and bitternut hickory. The general size of the overstory trees is larger than that of the adjacent stand

35 although they could be managed as one stand if oak regeneration is aggressively pursued. Some ironwood and hard maple are found in the midstory and understory. This is an area with good overstory oak that should be a priority to try and regenerate. If nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.

- **Management Prescription** - Underplanting (2020) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 37: 23.1 acres - Un-Even Aged Management

- **Site/Woodland Description** - Stand 37 appears to likely have been pastured in past history with currently scattered large hard maple trees present. Post grazing this stand seeded in with some walnut, elm, red cedar, hard maple and basswood. The average overstory tree size is pole to small sawtimber sized and the understory has seeded heavily into hard maple. Hard maple and other shade tolerant species will dominate this stand well into the future.
- **Management Prescription** - Basal Area Thinning (2030)
This stand should be reevaluated in 10 to 15 years to determine if it would benefit from a basal area thinning. In the meantime, if there is an opportunity to salvage any large mature or defective overstory trees, they should be removed.

Stand 38: 76.0 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to a nearly monoculture stand of what is now pole sized boxelder. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut is found to have established itself with the boxelder.
- **Management Prescription** - Underplanting (2045) - Non Commercial Clearcut (2 Yrs Post Planting)
Work should be completed in this stand to convert it to desirable species that better meet the long term goals and objectives for the property. High quality seedlings should be planted throughout the stand. The seedlings should be allowed to establish themselves for one to two years, followed by a non-commercial clearcutting of the overstory. The stumps of the undesirable species should be treated and killed to prevent sprouting. Desirable species should be coppiced.

Stand 39: 7.9 acres - Un-Even Aged Management

- **Site/Woodland Description** - The overstory of stand 39 consists primarily of 6 to 8" DBH bitternut hickory and hard maple. There are a few scattered red oak and an occasional large white oak wolf tree. The stand appears to be progressing towards hard maple. If managed very aggressively there is a chance this stand could be converted to shade intolerant species and managed as even aged but is more likely to continue to favor hard maple and un-even aged management.
- **Management Prescription** - Crop Tree Release (2030)
The pole sized hard maple found scattered throughout this stand could benefit from a crop tree release in approximately 15 years. This is a relatively low priority as it is likely the maple will continue to hold its own against the undesirable species.

Stand 40: 8.0 acres - Even Aged Management

- **Site/Woodland Description** - The overstory of stand 40 is primarily 6-10" DBH red oak, walnut, ash, cherry, elm, basswood and a few hard maple. There is some elm, ash and hard maple regeneration present.
- **Management Prescription** - Crop Tree Release (2020)
The good quality pole sized crop trees found in this stand should be released and pruned in approximately 5 years.

Stand 41: 38.5 acres - Un-Even Aged Management

- **Site/Woodland Description** - Stand 41 is a relatively large area of mostly uniform overstory and regeneration. Small sawtimber to large sawtimber red oak, white oak, hard maple, elm, ash and basswood are found throughout the stand. The understory has established hard maple seedlings and saplings along with some elm, ironwood and ash. The maple presence will push this stand to un-even aged management in the long term.
- **Management Prescription** - Selective Harvest (2020) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the maple regeneration. This method of selective harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration

Stand 42: 12.9 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is large sawtimber sized red oak, hard maple, black walnut and elm. Some ironwood and hard maple are found in the midstory and understory. This is an area with good overstory oak that should be a priority to try and regenerate. If nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2020) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 43: 38.5 acres - Un-Even Aged Management

- **Site/Woodland Description** - Stand 43 is a relatively large area of mostly uniform overstory and regeneration. Small sawtimber to large sawtimber ash, aspen, hard maple, red oak, black walnut, cherry and elm are found throughout the stand. There is a good stocking of sawtimber sized ash. The understory has established hard maple seedlings and saplings along with some elm, ironwood and ash. The maple presence will push this stand to un-even aged management in the long term.
- **Management Prescription** - Selective Harvest (2025) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the maple regeneration. The merchantable ash and aspen should be targeted and salvaged before they die. This method of selective harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 44: 20.5 acres - Un-Even Aged Management

- **Site/Woodland Description** - The overstory of stand 44 is primarily pole sized hard maple, cherry, elm and bitternut hickory.
- **Management Prescription** - Crop Tree Release (2040)
There are no immediate needs in this stand. It should be allowed to grow 20 to 25 years and then be evaluated for crop tree release.

Stand 45: 56.0 acres - Un-Even Aged Management

- **Site/Woodland Description** - Stand 45 is a relatively large area of mostly uniform overstory and regeneration. Small sawtimber to large sawtimber hard maple, red oak, black walnut, cherry and elm are found throughout the stand. The understory has established hard maple seedlings and saplings along with some elm, ironwood and ash. The maple presence will push this stand to un-even aged management in the long term.
- **Management Prescription** - Selective Harvest (2025) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the maple regeneration. The merchantable ash and aspen should be targeted and salvaged before they die. This method of selective harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 46: 9.2 acres - Even Aged Management

- ***Site/Woodland Description*** - The overstory is large sawtimber sized red oak, white oak, hard maple, black walnut and elm. Some ironwood and hard maple are found in the midstory and understory. This is an area with good overstory oak that should be a priority to try and regenerate. If nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- ***Management Prescription*** - Underplanting (2016) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest) High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 47: 15.7 acres - Even Aged Management

- ***Site/Woodland Description*** - This area historically was open with a few scattered mature trees. It has since filled in with bottomland hardwoods that transition to a nearly pure stand of elm on the benches. There are a few black walnut in the bottom and a few red oak mixed in with the elm. This is a low priority stand
- ***Management Prescription*** - Underplanting (2035) - Non Commercial Clearcut (2 Yrs Post Planting) Work could be completed in this stand to convert it to desirable species that better meet the long term goals and objectives for the property. High quality seedlings should be planted throughout the stand. The seedlings should be allowed to establish themselves for one to two years, followed by a non-commercial clearcutting of the overstory. The stumps of the undesirable species should be treated and killed to prevent sprouting. Desirable species should be coppiced.

Stand 48: 33.6 acres - Un-Even Aged Management

- ***Site/Woodland Description*** - Stand 48 is a relatively large area of mostly uniform overstory and regeneration. Small sawtimber to large sawtimber hard maple, red oak, black walnut, cherry and elm are found throughout the stand. The understory has established hard maple seedlings and saplings along with some elm, ironwood and ash. The maple presence will push this stand to un-even aged management in the long term.
- ***Management Prescription*** - Selective Harvest (2035) - Weed Tree Removal (Post Harvest) The mature and defective overstory trees should be harvested to release the maple regeneration. The merchantable ash and aspen should be targeted and salvaged before they die. This method of selective harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 49: 15.8 acres - Un-Even Aged Management

- ***Site/Woodland Description*** - Stand 49 is quite similar to stand 48 in composition but the overstory trees are larger and more mature. Large sawtimber hard maple, red oak, black walnut, cherry and elm are found throughout the stand. The understory has established hard maple seedlings and saplings along with some elm, ironwood and ash. The maple presence will push this stand to un-even aged management in the long term.
- ***Management Prescription*** - Selective Harvest (2025) - Weed Tree Removal (Post Harvest) The mature and defective overstory trees should be harvested to release the maple regeneration. The merchantable ash and aspen should be targeted and salvaged before they die. This method of selective harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 50: 5.6 acres - Un-Even Aged Management

- ***Site/Woodland Description*** - This area appears to have historically been relatively open with a few wolf trees per acre. Currently the big oak wolf trees are scattered throughout the stand. Quite a bit of hard maple is found in the midstory and understory. Long term this will be a hard maple and un-even aged stand. This is a low priority stand.

- **Management Prescription** - Improvement Harvest (2040) - WTR (Post Harvest)
This stand should be reevaluated in 25 years and an appropriate prescription applied at that time. A possible improvement harvest and weed tree removal could be appropriate.
 - **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 51: 10.6 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is small sawtimber to large sawtimber sized red oak, white oak, hard maple, black walnut and elm. Some ironwood and hard maple are found in the midstory and understory. This is an area with good overstory oak that should be a priority to try and regenerate. If nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2025) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 52: 24.1 acres - Even Aged Management

- **Site/Woodland Description** - Stand 52 is similar to stand 51 only a little smaller in average overstory DBH. The overstory is small sawtimber to large sawtimber sized red oak, white oak, hard maple, black walnut and elm. Some ironwood and hard maple are found in the midstory and understory. This is an area with good overstory oak that should be a priority to try and regenerate. If nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2030) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 53: 15.8 acres - Un-Even Aged Management

- **Site/Woodland Description** - The overstory of stand 53 is small sawtimber to large sawtimber hard maple, red oak, black walnut, cherry and elm are found throughout the stand. The understory has established hard maple seedlings and saplings along with some elm, ironwood and ash. The maple presence will push this stand to un-even aged management in the long term.
- **Management Prescription** - Selective Harvest (2030) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the maple regeneration. The merchantable ash and aspen should be targeted and salvaged before they die. This method of selective harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 54: 2.7 acres - Un-Even Aged Management

- **Site/Woodland Description** - This area is a mostly north facing slope with better quality soils and wraps around the northwestern corner of the lake. The overstory contains remnants of a high grade timber sale with scattered large trees and the understory has since seeded in with lots of maple. Un-even aged management will be implemented to help lessen the management impacts of the aesthetics around the lake.

- **Management Prescription** - Improvement Harvest (2030) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees could be harvested to release the walnut and maple regeneration. This harvest should be combined with the harvest of any adjacent stands to ensure enough volume for a timber sale. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 55: 8.3 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is small sawtimber to large sawtimber sized red oak, white oak, black walnut and elm. Some ironwood and hard maple are found in the midstory and understory. This is an area with good overstory oak that should be a priority to try and regenerate. If nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2025) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 56: 22.4 acres - Un-Even Aged Management

- **Site/Woodland Description** - Stand 56 is the bottomland draw that runs to the west of the lake. This area appears to have over time naturally seeded itself to a good quality stand of black walnut. The current average DBH is 6-8"
- **Management Prescription** - Crop Tree Release (2025)
The good quality crop trees in this stand should be evaluated for release in approximately 10 years. The release crop trees should also be pruned at that time.

Stand 57: 25.12 acres - Even Aged Management

- **Site/Woodland Description** - The overstory of this area is mostly poor quality red oak, white oak, elm, bitternut hickory, basswood, walnut, aspen and ash. The average overstory DBH is 12-18". The understory regeneration is primarily bitternut hickory, elm and ironwood. This is a low priority stand.
- **Management Prescription** - Underplanting (2040) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.
 - **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 58: 17.6 acres - Un-Even Aged Management

- **Site/Woodland Description** - This stand is quite similar to stand 57 with the exception of an abundance of hard maple regeneration being present in this area. The overstory is mostly poor quality red oak, white oak, elm, bitternut hickory, basswood, walnut, aspen and ash. The average overstory DBH is 12-18". This is a low priority stand.
- **Management Prescription** - Selective Harvest (2040) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the maple regeneration. The merchantable ash and aspen should be targeted and salvaged before they die. This method of selective

harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

- **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 59: 28.1 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is small sawtimber to large sawtimber sized scattered white oak, red oak, ash and elm. Desirable regeneration is nonexistent and the midstory primarily contains ironwood, elm and bitternut hickory. This is a relatively low priority stand but if nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2030) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest) High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be copped. This stand needs a lot of work to regenerate and could be expensive to accomplish.

Stand 60: 14.5 acres - Un-Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area mostly undesirable species. There are many areas like this across the Volga State Rec Area. Some hard maple is present in this stand and it may continue to establish itself.
- **Management Prescription** - Crop Tree Release (2035) This stand should be reevaluated in 20 to 25 years and is a low priority. If the maple continues to establish itself, a crop tree release may be warranted. If not, stand conversion may be the best option.

Stand 61: 55.3 acres - Un-Even Aged Management

- **Site/Woodland Description** - Stand 61 is a relatively large area of mostly uniform overstory and regeneration. Small sawtimber to large sawtimber hard maple, red oak, white oak, elm, ash and cherry are found throughout the stand. The understory has established hard maple seedlings and saplings along with some elm, ironwood and ash. The maple presence will push this stand to un-even aged management in the long term.
- **Management Prescription** - Selective Harvest (2025) - Weed Tree Removal (Post Harvest) The mature and defective overstory trees should be harvested to release the maple regeneration. The merchantable ash and aspen should be targeted and salvaged before they die. This method of selective harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 62: 32.2 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is small sawtimber sized red oak, white oak, hard maple, elm and bitternut hickory. Some ironwood and hard maple are found in the midstory and understory. This is an area with good overstory oak that should be a priority to try and regenerate. If nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2020) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest) High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives.

All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 63: 19.4 acres - Even Aged Management

- **Site/Woodland Description** - Stand 63 is similar in species composition to stand 62 but with a larger average DBH in the overstory. The overstory is very good quality red oak and white oak. Some hard maple is found in the midstory but could likely be controlled in a commitment is made to regenerating oak. If nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2016) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest) High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 64: 15.5 acres - Un-Even Aged Management

- **Site/Woodland Description** - Decent quality 16" to 24" walnut is found throughout stand 64. The midstory primarily consists of hard maple, walnut, ironwood, bitternut hickory and elm. The maple presence will push this stand to un-even aged management in the long term.
- **Management Prescription** - Selective Harvest (2025) - Weed Tree Removal (Post Harvest) The mature and defective overstory trees should be harvested to release the maple regeneration. This method of selective harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 65: 81.0 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.
- **Management Prescription** - Crop Tree Release (2040) This area should be reevaluated in 20-25 years to determine if there are enough good quality crop trees that could benefit from being released and pruned. A decision could be made at that time as to whether this area should be converted to more desirable species or to continue to grow what is found on the site.

Stand 66: 7.6 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. It has since been planted to primarily oak and walnut. The average DBH of the planted trees is currently 6 to 8". Overall the growth has been slowed by a general lack of grass and weed control.
- **Management Prescription** - Crop Tree Release (2030) This stand should be evaluated in 7 to 10 years for crop tree release.

Stand 67: 126.9 acres - Even Aged Management

- **Site/Woodland Description** - Stand 67 is a large bottomland riparian area located south of the lake. There are several areas very similar to this stand spread across the property. These areas are primarily dominated by traditional bottomland hardwoods such as cottonwood, boxelder, ash and elm but also many times have walnut sprinkled in. The soils in these stands are generally poorly drained, affecting which species will grow and thrive.
- **Management Prescription** - Walnut Harvest (2016) - Commercial Stand Conversion (2045) The mature and poor quality or defective walnut trees should be harvested in this stand. Good quality residual walnut will serve as a seed source for potential natural regeneration of areas where trees are removed. In the

long term these areas should be looked at to determine if they should be converted to more desirable bottomland species such as swamp white oak, bur oak or walnut.

Stand 68: 40.6 acres - Un-Even Aged Management

- **Site/Woodland Description** - The overstory of this stand is primarily scattered large red oak and white oak with some small sawtimber sized hard maple and elm also present. The midstory primarily consists of hard maple, walnut, ironwood, bitternut hickory and elm. The maple presence will push this stand to un-even aged management in the long term.
- **Management Prescription** - Selective Harvest (2030) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the maple regeneration. This method of selective harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 69: 56.5 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.
- **Management Prescription** - Underplanting (2045) - Non Commercial Clearcut (2 Yrs Post Planting)
Work should be completed in this stand to convert it to desirable species that better meet the long term goals and objectives for the property. High quality seedlings should be planted throughout the stand. The seedlings should be allowed to establish themselves for one to two years, followed by a non-commercial clearcutting of the overstory. The stumps of the undesirable species should be treated and killed to prevent sprouting. Desirable species should be coppiced.

Stand 70: 33.9 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is small sawtimber sized red oak, white oak, elm and bitternut hickory all of which are likely left over from a previous harvest. Some ironwood and elm are found in the midstory and understory. This is an area with good overstory oak that should be a priority to try and regenerate. If nothing is done here maple will work to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2025) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 71: 51.5 acres - Un-Even Aged Management

- **Site/Woodland Description** - The overstory of this stand is similar to many stands with primarily scattered large red oak and white oak with some small sawtimber sized hard maple and elm also present. The midstory primarily consists of hard maple, walnut, ironwood, bitternut hickory and elm. The maple presence will push this stand to un-even aged management in the long term.
- **Management Prescription** - Selective Harvest (2025) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the maple regeneration. This method of selective harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 72: 49.9 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is small sawtimber to large sawtimber sized scattered bur oak, red oak, white oak, hickory and elm. Desirable regeneration is nonexistent and the midstory primarily contains

ironwood, elm and bitternut hickory. This is a relatively low priority stand but if nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.

- **Management Prescription** - Underplanting (2030) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.
 - **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 73: 61.9 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.
- **Management Prescription** - Underplanting (2045) - Non Commercial Clearcut (2 Yrs Post Planting)
Work could be completed in this stand to convert it to desirable species that better meet the long term goals and objectives for the property. High quality seedlings should be planted throughout the stand. The seedlings should be allowed to establish themselves for one to two years, followed by a non-commercial clearcutting of the overstory. The stumps of the undesirable species should be treated and killed to prevent sprouting. Desirable species should be coppiced.

Stand 74: 6.3 acres - Even Aged Management

- **Site/Woodland Description** - Stand 74 is a smaller area of better quality soils within stand 73. The overstory is better quality small sawtimber sized red oak, white oak, bur oak, hickory and some elm. Some ironwood and hard maple are found in the midstory and understory. This is an area with good overstory oak that should be a priority to try and regenerate. If nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2020) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 75: 126.0 acres - Even Aged Management

- **Site/Woodland Description** - Stand 75 is a large area of fairly uniform overstory and understory composition. The overstory is small sawtimber to large sawtimber sized scattered poor quality black oak, red oak, white oak, hickory and elm. There are some areas of better quality pole to small sawtimber sized red oak. Desirable regeneration is nonexistent and the midstory primarily contains ironwood, elm and bitternut hickory. This is a relatively low priority stand but if nothing is done here the maple will continue to establish itself. Currently there is little to no maple found which will buy some time in implementing management. This stand is too large to manage as one and will need to be broken into smaller treatment units over time as management is implemented.

- **Management Prescription** - Underplanting (2035) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 76: 66.0 acres - Un-Even Aged Management

- **Site/Woodland Description** - Stand 76 is quite similar to many north facing slopes across the Volga River State Rec Area in which it has a good quality oak overstory but through a historic lack of even aged management, maple has been able to establish itself in the understory and midstory. The maple presence will push this stand to un-even aged management in the long term. The opportunity for regenerating oak here has likely been lost.
- **Management Prescription** - Selective Harvest (2025) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the maple regeneration. This method of selective harvesting should be repeated in this stand every 20 to 25 years. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 77: 3.3 acres - Early Successional Management

- **Site/Woodland Description** - Stand 77 is an area found internal of stand 78 that consists of a nearly monoculture of pole to small sawtimber sized aspen. In the past this area would have served as excellent early successional habitat but has grown beyond serving that role.
- **Management Prescription** - Early Successional Clearcut (2020)
All trees in this stand should be felled to create early successional habitat. The undesirable trees should be treated and killed. This prescription should reoccur every 15-20 years.

Stand 78: 46.1 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is poor quality small sawtimber to large sawtimber sized scattered bur oak, red oak, white oak, hickory and elm. Desirable regeneration is nonexistent and the midstory primarily contains ironwood, elm and bitternut hickory. This is a relatively low priority stand but if nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2035) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.
 - **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 79: 20.8 acres - Even Aged Management

- **Site/Woodland Description** - Stand 79 is an area along the eastern boundary of the property that appears to have historically been grazed or cultivated. Over time it was allowed to naturally fill in with trees. Today the overstory consists of primarily decent quality pole sized hickory and walnut with a few other central hardwoods mixed in. It currently is also fairly brushy in the understory and is providing good quality habitat.
- **Management Prescription** - Crop Tree Release (2030)
This stand should be reevaluated in 10-15 years for a possible crop tree release and pruning.

Stand 80: 14.6 acres - Even Aged Management

- ***Site/Woodland Description*** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.
- ***Management Prescription*** - Underplanting (2045) - Non Commercial Clearcut (2 Yrs Post Planting)
Work could be completed in this stand to convert it to desirable species that better meet the long term goals and objectives for the property. High quality seedlings should be planted throughout the stand. The seedlings should be allowed to establish themselves for one to two years, followed by a non-commercial clearcutting of the overstory. The stumps of the undesirable species should be treated and killed to prevent sprouting. Desirable species should be coppiced.

Stand 81: 25.5 acres - Even Aged Management

- ***Site/Woodland Description*** - Stand 81 is quite similar to many across the property that a historic lack of even aged management has allowed shade tolerant hard maple to creep into the understory. The overstory is better quality small sawtimber to large sawtimber sized red oak, white oak, bur oak, hickory and some elm. Some ironwood and hard maple are found in the midstory and understory. This is an area with good overstory oak that should be a priority to try and regenerate. If nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- ***Management Prescription*** - Underplanting (2025) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 82: 74.4 acres - Even Aged Management

- ***Site/Woodland Description*** - Stand 82 is very similar to stand 75. The overstory is small sawtimber to large sawtimber sized scattered poor quality black oak, red oak, white oak, hickory and elm. Desirable regeneration is nonexistent and the midstory primarily contains ironwood, elm and bitternut hickory. This is a relatively low priority stand but if nothing is done here the maple will continue to establish itself. Currently there is little to no maple found which will buy some time in implementing management. This stand is too large to manage as one and will need to be broken into smaller treatment units over time as management is implemented.
- ***Management Prescription*** - Underplanting (2035) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 83: 55.3 acres - Even Aged Management

- ***Site/Woodland Description*** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.
- ***Management Prescription*** - Crop Tree Release (2040)
This area should be reevaluated in 20-25 years to determine if there are enough good quality crop trees that could benefit from being released and pruned. A decision could be made at that time as to whether this area should be converted to more desirable species or to continue to grow what is found on the site.

Stand 84: 140.8 acres - Even Aged Management

- **Site/Woodland Description** - Stand 84 is a large area totaling over 140 acres. It is another example of a large area on the property that was historically fairly open and likely grazed. It currently has a few scattered large oak trees and over time has filled in with many undesirable trees including elm, bitternut hickory, boxelder and a few hard maples. Little to no desirable regeneration is found. This stand is a relatively low priority and would take considerable work to convert it to desirable tree species. It is also too large of an area to work with at one time. Portions of this stand could be worked with in coordination with management applied to other adjacent stands.
- **Management Prescription** - Underplanting (2040) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.
 - **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 85: 14.8 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is small sawtimber to large sawtimber sized red oak, white oak, bur oak, elm and bitternut hickory. Some ironwood and hard maple are found in the midstory and understory. This is an area with good overstory oak that should be a priority to try and regenerate. If nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2020) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 86: 12.0 acres - Even Aged Management

- **Site/Woodland Description** - Stand 86 is found on the east side of the property and covers approximately 12 acres. The overstory consists of low density small to large sawtimber sized oak and a few walnut. The midstory and understory contain primarily undesirable species with little to no desirable regeneration found. If nothing is done here the maple could establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2025) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 87: 16.7 acres - Even Aged Management

- **Site/Woodland Description** - Stand 87 is what appears to be an old crop field or open area that was planted to conifers. Currently it is a near monoculture of small sawtimber sized white pine with a few other conifers

scattered throughout. Stands like this play an important role in adding diversity to a landscape largely dominated by hardwoods and cropland. Traditional commercial management of these plantations will be difficult as there currently is no established market for conifer products.

- **Management Prescription** - Basal Area Thinning (2025)

As stated above, traditional commercial thinning of these stands will be difficult to implement. Needed thinning will likely have to be completed in a non-commercial manner. When appropriate, this stand should be basal area thinned to an appropriate stocking as dictated by the stocking guides.

Stand 88: 5.7 acres - Even Aged Management

- **Site/Woodland Description** - Stand 88 is what appears to be an old crop field or open area that was planted to conifers. Currently it is a near monoculture of small sawtimber sized white pine with a few other conifers scattered throughout. Stands like this play an important role in adding diversity to a landscape largely dominated by hardwoods and cropland. Traditional commercial management of these plantations will be difficult as there currently is no established market for conifer products.

- **Management Prescription** - Basal Area Thinning (2025)

As stated above, traditional commercial thinning of these stands will be difficult to implement. Needed thinning will likely have to be completed in a non-commercial manner. When appropriate, this stand should be basal area thinned to an appropriate stocking as dictated by the stocking guides.

Stand 89: 32.0 acres - Viewshed Management

- **Site/Woodland Description** - Stand 89 is another historically open area that has filled in with a mixture of hardwoods and red cedar. There are some decent oak and walnut found scattered throughout the stand. This area is highly visible from the campground and should be managed as “viewshed”. That designation should not preclude it from management but any management implemented must be done so in a sensitive manner.

- **Management Prescription** - Crop Tree Release (2030)

This stand should be evaluated in 10 to 15 years to determine if the scattered oak and walnut could benefit from being released and pruned. As stated above, this area is highly visible. Crop tree release would be a very low impact activity that could greatly benefit the desirable species found in this stand.

Stand 90: 22.2 acres - Viewshed Management

- **Site/Woodland Description** - Stand 90 is also located near and visible from the campground. It is a fairly steep and rocky area but does have a decent stocking of good quality pole sized walnut trees. Similarly to stand 89 this area is designated as viewshed management but that should not preclude it from management entirely. Any management implemented must be done so in a sensitive manner.

- **Management Prescription** - Crop Tree Release (2025)

This stand should be evaluated in 10 years to determine if the scattered oak and walnut could benefit from being released and pruned. As stated above, this area is highly visible. Crop tree release would be a very low impact activity that could greatly benefit the desirable species found in this stand.

Stand 91: 5.0 acres - Early Successional Management

- **Site/Woodland Description** - Stand 91 is an old field edge that consists of a nearly monoculture of pole to small sawtimber sized aspen. In the past this area would have served as excellent early successional habitat but has grown beyond serving that role.

- **Management Prescription** - Early Successional Clearcut (2016)

All trees in this stand should be felled to create early successional habitat. The undesirable trees should be treated and killed. This prescription should reoccur every 15-20 years.

Stand 92: 12.9 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.

- **Management Prescription** - Underplanting (2045) - Non Commercial Clearcut (2 Yrs Post Planting)
Work should be completed in this stand to convert it to desirable species that better meet the long term goals and objectives for the property. High quality seedlings should be planted throughout the stand. The seedlings should be allowed to establish themselves for one to two years, followed by a non-commercial clearcutting of the overstory. The stumps of the undesirable species should be treated and killed to prevent sprouting. Desirable species should be coppiced.

Stand 93: 27.0 acres - Viewshed Management

- **Site/Woodland Description** - Stand 93 is located on the southwest portion of the property and is just on the north side of the golf course. This is a highly used recreation area. It is also another area that historically was open with a few scattered mature trees that has since filled in with mixed hardwoods and red cedar. There is some decent quality mature walnut present with some good quality pole sized walnut regeneration also scattered throughout the stand. Because of the high visibility and recreational activities, this stand has been designated as viewshed management. This designation though should not preclude this area from low impact management in accordance with the properties overall goals and objectives.
- **Management Prescription** - Walnut Harvest (2025)
Although this stand is designated as viewshed management, there are some walnut trees that could be periodically harvested. The removal of the trees will allow the younger walnut room to grow and take their place. These harvests should be conducted in as low of an impact as possible.

Stand 94: 39.2 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to a nearly monoculture stand of what is now pole sized boxelder. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut is found to have established itself with the boxelder.
- **Management Prescription** - Underplanting (2045) - Non Commercial Clearcut (2 Yrs Post Planting)
Work should be completed in this stand to convert it to desirable species that better meet the long term goals and objectives for the property. High quality seedlings should be planted throughout the stand. The seedlings should be allowed to establish themselves for one to two years, followed by a non-commercial clearcutting of the overstory. The stumps of the undesirable species should be treated and killed to prevent sprouting. Desirable species should be coppiced.

Stand 95: 17.2 acres - Even Aged Management

- **Site/Woodland Description** - Stand 95 is found on the west side of the property off of 180th street. It lies on good quality soils with the ability to grow a good diversity of species. Currently found in the overstory is a good stocking of small to large sawtimber sized ash. Some scattered sawtimber elm, ash, cherry, red oak, white oak and aspen are also found. The midstory and understory area relatively free of hard maple and mostly consist of bitternut hickory, elm and ironwood. With emerald ash borer moving across the state, the salvage of the sawtimber ash in this stand should be a priority. The ash found in stand 96 should also be salvaged at this time.
- **Management Prescription** - Underplanting (2016) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 96: 14.9 acres - Un-Even Aged Management

- **Site/Woodland Description** - Stand 96 is a continuation of stand 95 but transitions into an area with much more hard maple established in the understory and midstory, greatly influencing the recommended management. The overstory does have some decent quality small sawtimber to large sawtimber sized ash, red oak, white oak, elm and hard maple. If a harvest is conducted in stand 95 the ash found in stand 96 should also be salvaged prior to the arrival of emerald ash borer.

- **Management Prescription** - Improvement Harvest (2025) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the hard maple regeneration. This harvest should be combined with the harvest of any adjacent stands to ensure enough volume for a timber sale. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 97: 17.5 acres - Un-Even Aged Management

- **Site/Woodland Description** - The overstory of this stand consists primarily of pole sized red oak, hard maple, shagbark hickory and a few other mixed hardwoods. In the long term this will be a mixed hardwoods stand that will likely establish a hard maple understory and midstory, dictating un-even aged management.
- **Management Prescription** - Crop Tree Release (2025)
The pole sized oak, hard maple and shagbark hickory found scattered throughout this stand could benefit from a crop tree release in approximately 10 years. This is a relatively low priority as it is likely the maple will continue to hold its own against the undesirable species.

Stand 98: 68.9 acres - Even Aged Management

- **Site/Woodland Description** - The overstory of stand 98 is small sawtimber sized red oak, white oak, black oak, elm and a few other central hardwoods. The midstory and understory contain primarily undesirable species with little to no desirable regeneration found. There is some hard maple present but doesn't seem to be an unmanageable population at this time. If nothing is done here the maple could establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species. If that happens, un-even aged management will have to be implemented.
- **Management Prescription** - Underplanting (2025) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 99: 12.8 acres - Even Aged Management

- **Site/Woodland Description** - The overstory is small sawtimber sized red oak, white oak, hard maple, hickory and elm. There is some hard maple present but the midstory primarily contains ironwood, elm and bitternut hickory. This is a relatively low priority stand but if nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2035) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
This stand should be allowed to grow another 20 years and then be reevaluated. If ready and appropriate at that time, high quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 100: 5.5 acres - Even Aged Management

- **Site/Woodland Description** - Stand 100 is an area that at some point in the past has been harvested. The existence of several stump sprouted red oak and white oak confirm this. The current overstory is pole sized and contains a mix of the stump sprouted oak along with some elm, cherry and hard maple. Hard maple also has established itself in the midstory.
- **Management Prescription** - Crop Tree Release (2020)
The good quality pole sized oak found in this stand should be crop tree release in approximately 10 to 15 years. All released crop trees should also be pruned at the time of release.

Stand 101: 7.2 acres - Even Aged Management

- **Site/Woodland Description** - Stand 101 is similar in composition to stand 100 but with fewer desirable trees present and a slightly smaller average size class. This stand is mostly sapling to pole size undesirables with an occasional red oak, hard maple, cherry or ash.
- **Management Prescription** - Crop Tree Release (2020)
Nothing should be done at this time and the stand should be allowed to grow another 10 to 15 years. At that time an evaluation should be made to determine if the desirable found in this stand should be crop tree released. All released crop trees should also be pruned at the time of release.

Stand 102: 27.7 acres - Even Aged Management

- **Site/Woodland Description** - Stand 102 is located on the north side of the road just across from the main park offices. This is a steep south facing slope with poor quality and shallow to rock soils. The productivity of this site is very low. Species present and that typically do well on these sites are bur oak, elm, red cedar and an occasional walnut. The low productivity of these sites inherently make them a low priority for management but they often times serve as excellent wildlife habitat areas.
- **Management Prescription** - Weed Tree Removal (2035)
Nothing should be completed in this stand at this time. A reevaluation should occur in 15 to 20 years to determine if any management activities would be appropriate at that time. The stand may benefit from a weed tree removal to give any present desirable trees more room to grow and enhance the habitat.
 - **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 103: 20.1 acres - Viewshed Management

- **Site/Woodland Description** - Stand 103 is very similar to stand 102 but is more visible from the main road. This is a steep south facing slope with poor quality and shallow to rock soils. The productivity of this site is very low. Species present and that typically do well on these sites are bur oak, elm, red cedar and an occasional walnut. The low productivity of these sites inherently makes them a low priority for management but they often times serve as excellent wildlife habitat areas.
- **Management Prescription** - Weed Tree Removal (2035)
Nothing should be completed in this stand at this time. A reevaluation should occur in 15 to 20 years to determine if any management activities would be appropriate at that time. The stand may benefit from a weed tree removal to give any present desirable trees more room to grow and enhance the habitat.
 - **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 104: 39.0 acres - Even Aged Management

- **Site/Woodland Description** - Stand 104 has some small sawtimber to large sawtimber sized mixed hardwoods scattered throughout it. Beyond that is a good stocking of pole sized mixed hardwoods that will serve as the long term future of this stand.
- **Management Prescription** - Improvement Harvest (2025) - Crop Tree Release (Post Harvest)
The scattered large overstory trees found throughout this stand could be harvested to release the advanced mixed hardwoods regeneration. There is not a lot of volume to be harvested and the quality of the merchantable trees is relatively poor. This harvest could be combined with the harvest of any adjacent stands to ensure enough volume for a timber sale. Crop trees should be identified and released following the harvest.

Stand 105: 23.8 acres - Un-Even Aged Management

- ***Site/Woodland Description*** - The overstory of stand 105 consists of pole sized to small sawtimber sized hard maple, basswood, aspen, bitternut hickory and some elm. Oaks are few and far between. The understory and midstory are dominated by hard maple regeneration.
- ***Management Prescription*** - Crop Tree Release (2025)
This stand should be reevaluated in 10 to 15 years to determine if the crop trees would benefit from a release.

Stand 106: 24.8 acres - Even Aged Management

- ***Site/Woodland Description*** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.
- ***Management Prescription*** - Underplanting (2045) - Non Commercial Clearcut (2 Yrs Post Planting)
Work could be completed in this stand to convert it to desirable species that better meet the long term goals and objectives for the property. High quality seedlings should be planted throughout the stand. The seedlings should be allowed to establish themselves for one to two years, followed by a non-commercial clearcutting of the overstory. The stumps of the undesirable species should be treated and killed to prevent sprouting. Desirable species should be coppiced.

Stand 107: 16.4 acres - Even Aged Management

- ***Site/Woodland Description*** - This is a steep south facing slope with poor quality and shallow to rock soils. The productivity of this site is very low. Species present and that typically do well on these sites are bur oak, elm, red cedar and an occasional walnut. The low productivity of these sites inherently makes them a low priority for management but they often times serve as excellent wildlife habitat areas. There is some hard maple present in the understory and midstory that may serve as the future of this stand.
- ***Management Prescription*** - Weed Tree Removal (2035)
Nothing should be completed in this stand at this time. A reevaluation should occur in 15 to 20 years to determine if any management activities would be appropriate at that time. The stand may benefit from a weed tree removal to give any present desirable trees more room to grow and enhance the habitat.

Stand 108: 25.9 acres - Even Aged Management

- ***Site/Woodland Description*** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.
- ***Management Prescription*** - Crop Tree Release (2030)
This area should be reevaluated in 10 to 15 years to determine if there are enough good quality crop trees that could benefit from being released and pruned. A decision could be made at that time as to whether this area should be converted to more desirable species or to continue to grow what is found on the site.

Stand 109: 41.8 acres - Even Aged Management

- ***Site/Woodland Description*** - Stand 109 is on the west side of the property and is primarily accessed through private property. This stand has a good quality overstory of small sawtimber walnut, red oak, black oak elm and a few other mixed hardwoods. There is some hard maple present in the understory and mid story but currently not enough to deter one from implementing even aged management. That may change in the future if the maple continues to establish itself.
- ***Management Prescription*** - Commercial Thinning (2030)
Stand 109 should be reevaluated in 10 to 15 years to determine if a commercial thinning would be possible or beneficial.

Stand 110: 14.3 acres - Even Aged Management

- **Site/Woodland Description** - Stand 110 is also located on the western side of the property and is accessed through private property. The overstory is mostly poorer quality small sawtimber sized black oak, bur oak, hickory and elm. There is some hard maple present but the midstory primarily contains ironwood, elm and bitternut hickory. This is a relatively low priority stand but if nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2030) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
This stand should be allowed to grow another 10 to 15 years and then be reevaluated. If ready and appropriate at that time, high quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 111: 68.2 acres - Even Aged Management

- **Site/Woodland Description** - Stand 111 is also located on the western side of the property and is accessed through private property. The overstory is mostly better quality small sawtimber sized red oak, white oak, hard maple, ash and elm. There is some hard maple present in the understory which should dictate un-even aged management for this stand. The difficult private land only access may make repeated entries into this stand difficult. Implementing even aged management may be easier as the actions can be completed in fewer entries. This is a relatively low priority stand but if nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2030) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
This stand should be allowed to grow another 10 to 15 years and then be reevaluated. If ready and appropriate at that time, high quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 112: 14.5 acres - Even Aged Management

- **Site/Woodland Description** - Stand 112 is found in the very northwest corner of the property. Pole sized to small sawtimber sized mixed hardwoods including a few scattered oak are found in this area.
- **Management Prescription** - Crop Tree Release (2025)
The good quality crop trees in this stand should be evaluated for release in approximately 10 years. The release crop trees should also be pruned at that time.

Stand 113: 24.1 acres - Even Aged Management

- **Site/Woodland Description** - Currently found in the overstory of stand 113 is a good stocking of small sawtimber to large sawtimber sized ash, mixed oak, a few walnut, elm and some additional mixed hardwoods. The midstory and understory area relatively free of hard maple and mostly consist of bitternut hickory, elm and ironwood. With emerald ash borer moving across the state, the salvage of the sawtimber ash in this stand should be a priority. Management in this stand will have to be done in cooperation of the campground nearby. Winter activities only may have to be implemented
- **Management Prescription** - Underplanting (2016) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 114: 13.5 acres - Even Aged Management

- **Site/Woodland Description** - Stand 114 is on the north edge of the property and is a north facing slope. There is some hard maple present in the understory which could dictate un-even aged management for this stand. There is small sawtimber timber to scattered large sawtimber sized oak, maple, walnut and ash in the overstory. This is a relatively low priority stand but if nothing is done here the maple will continue to establish itself, eventually to a point where it will be impossible to regenerate shade intolerant species.
- **Management Prescription** - Underplanting (2025) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
This stand should be allowed to grow another 10 to 15 years and then be reevaluated. If ready and appropriate at that time, high quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 115: 11.7 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.
- **Management Prescription** - Underplanting (2045) - Non Commercial Clearcut (2 Yrs Post Planting)
Work could be completed in this stand to convert it to desirable species that better meet the long term goals and objectives for the property. High quality seedlings should be planted throughout the stand. The seedlings should be allowed to establish themselves for one to two years, followed by a non-commercial clearcutting of the overstory. The stumps of the undesirable species should be treated and killed to prevent sprouting. Desirable species should be coppiced.

Stand 116: 3.5 acres - Even Aged Management

- **Site/Woodland Description** - Stand 116 is what appears to be an old crop field or open area that was planted to conifers. Currently it is a near monoculture of small sawtimber sized white pine with a few other conifers scattered throughout. Stands like this play an important role in adding diversity to a landscape largely dominated by hardwoods and cropland. Traditional commercial management of these plantations will be difficult as there currently is no established market for conifer products.
- **Management Prescription** - Basal Area Thinning (2025)
As stated above, traditional commercial thinning of these stands will be difficult to implement. Needed thinning will likely have to be completed in a non-commercial manner. When appropriate, this stand should be basal area thinned to an appropriate stocking as dictated by the stocking guides.

Stand 117: 3.0 acres - Even Aged Management

- **Site/Woodland Description** - Stand 117 is what appears to be an old crop field or open area that was planted to conifers. Currently it is a near monoculture of small sawtimber sized white pine with a few other conifers scattered throughout. Stands like this play an important role in adding diversity to a landscape largely dominated by hardwoods and cropland. Traditional commercial management of these plantations will be difficult as there currently is no established market for conifer products.
- **Management Prescription** - Basal Area Thinning (2025)
As stated above, traditional commercial thinning of these stands will be difficult to implement. Needed thinning will likely have to be completed in a non-commercial manner. When appropriate, this stand should be basal area thinned to an appropriate stocking as dictated by the stocking guides.

Stand 118: 4.2 acres - Even Aged Management

- **Site/Woodland Description** - Stand 118 is what appears to be an old crop field or open area that was planted to conifers. Currently it is a near monoculture of small sawtimber sized white pine with a few other conifers scattered throughout. Stands like this play an important role in adding diversity to a landscape largely dominated by hardwoods and cropland. Traditional commercial management of these plantations will be difficult as there currently is no established market for conifer products.
- **Management Prescription** - Basal Area Thinning (2025)
As stated above, traditional commercial thinning of these stands will be difficult to implement. Needed thinning will likely have to be completed in a non-commercial manner. When appropriate, this stand should be basal area thinned to an appropriate stocking as dictated by the stocking guides.

Stand 119: 12.1 acres - Even Aged Management

- **Site/Woodland Description** - Stand 119 is what appears to be an old crop field or open area that was planted to conifers. Currently it is a near monoculture of small sawtimber sized white pine with a few other conifers scattered throughout. Stands like this play an important role in adding diversity to a landscape largely dominated by hardwoods and cropland. Traditional commercial management of these plantations will be difficult as there currently is no established market for conifer products.
- **Management Prescription** - Basal Area Thinning (2025)
As stated above, traditional commercial thinning of these stands will be difficult to implement. Needed thinning will likely have to be completed in a non-commercial manner. When appropriate, this stand should be basal area thinned to an appropriate stocking as dictated by the stocking guides.

Stand 120: 14.4 acres - Viewshed Management

- **Site/Woodland Description** - Stand 120 is a very steep or highly visible area in which it will be very difficult to appropriately implement most management prescriptions. Management can take place on these areas where desirable to improve the health and species composition of the forest, and to enhance the area for endangered species, but the major objective is to have minor disturbance.
- **Management Prescription** - Continual Monitoring (2040)
Nothing should be completed in this stand at this time. A reevaluation should continually occur to determine if any management activities would be appropriate at that time. If opportunities for low impact management activities in coordination with adjacent stands present themselves, they should be considered at that time. Selective harvesting may be an example.
 - **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 121: 88.2 acres - Viewshed Management

- **Site/Woodland Description** - Stand 121 is a very steep or highly visible area in which it will be very difficult to appropriately implement most management prescriptions. Management can take place on these areas where desirable to improve the health and species composition of the forest, and to enhance the area for endangered species, but the major objective is to have minor disturbance.
- **Management Prescription** - Continual Monitoring (2040)
Nothing should be completed in this stand at this time. A reevaluation should continually occur to determine if any management activities would be appropriate at that time. If opportunities for low impact management activities in coordination with adjacent stands present themselves, they should be considered at that time. Selective harvesting may be an example.
 - **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 122: 8.8 acres - Viewshed Management

- **Site/Woodland Description** - Stand 122 is a very steep or highly visible area in which it will be very difficult to appropriately implement most management prescriptions. Management can take place on these areas where desirable to improve the health and species composition of the forest, and to enhance the area for endangered species, but the major objective is to have minor disturbance.
- **Management Prescription** - Continual Monitoring (2040)
Nothing should be completed in this stand at this time. A reevaluation should continually occur to determine if any management activities would be appropriate at that time. If opportunities for low impact management activities in coordination with adjacent stands present themselves, they should be considered at that time. Selective harvesting may be an example.
 - **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 123: 80.7 acres - Viewshed Management

- **Site/Woodland Description** - Stand 123 is a very steep or highly visible area in which it will be very difficult to appropriately implement most management prescriptions. Management can take place on these areas where desirable to improve the health and species composition of the forest, and to enhance the area for endangered species, but the major objective is to have minor disturbance.
- **Management Prescription** - Continual Monitoring (2040)
Nothing should be completed in this stand at this time. A reevaluation should continually occur to determine if any management activities would be appropriate at that time. If opportunities for low impact management activities in coordination with adjacent stands present themselves, they should be considered at that time. Selective harvesting may be an example.

Stand 124: 39.6 acres - Viewshed Management

- **Site/Woodland Description** - Stand 124 is a very steep or highly visible area in which it will be very difficult to appropriately implement most management prescriptions. Management can take place on these areas where desirable to improve the health and species composition of the forest, and to enhance the area for endangered species, but the major objective is to have minor disturbance.
- **Management Prescription** - Continual Monitoring (2040)
Nothing should be completed in this stand at this time. A reevaluation should continually occur to determine if any management activities would be appropriate at that time. If opportunities for low impact management activities in coordination with adjacent stands present themselves, they should be considered at that time. Selective harvesting may be an example.
 - **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 125: 37.2 acres - Viewshed Management

- **Site/Woodland Description** - Stand 125 is a very steep or highly visible area in which it will be very difficult to appropriately implement most management prescriptions. Management can take place on these areas where desirable to improve the health and species composition of the forest, and to enhance the area for endangered species, but the major objective is to have minor disturbance.
- **Management Prescription** - Continual Monitoring (2040)
Nothing should be completed in this stand at this time. A reevaluation should continually occur to determine if any management activities would be appropriate at that time. If opportunities for low impact management

activities in coordination with adjacent stands present themselves, they should be considered at that time. Selective harvesting may be an example.

- **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 126: 31.1 acres - Viewshed Management

- **Site/Woodland Description** - Stand 126 is a very steep or highly visible area in which it will be very difficult to appropriately implement most management prescriptions. Management can take place on these areas where desirable to improve the health and species composition of the forest, and to enhance the area for endangered species, but the major objective is to have minor disturbance.
- **Management Prescription** - Continual Monitoring (2040)
Nothing should be completed in this stand at this time. A reevaluation should continually occur to determine if any management activities would be appropriate at that time. If opportunities for low impact management activities in coordination with adjacent stands present themselves, they should be considered at that time. Selective harvesting may be an example.
 - **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 127: 6.4 acres - Viewshed Management

- **Site/Woodland Description** - Stand 127 is a very steep or highly visible area in which it will be very difficult to appropriately implement most management prescriptions. Management can take place on these areas where desirable to improve the health and species composition of the forest, and to enhance the area for endangered species, but the major objective is to have minor disturbance.
- **Management Prescription** - Continual Monitoring (2040)
Nothing should be completed in this stand at this time. A reevaluation should continually occur to determine if any management activities would be appropriate at that time. If opportunities for low impact management activities in coordination with adjacent stands present themselves, they should be considered at that time. Selective harvesting may be an example.
 - **Open Woodland Alternative:** An alternative to be explored in this stand is simply to apply weed tree removal, resulting in a reduced basal area and creating an open woodland effect. This state of growth will be short lived but that action could be repeated every 15-20 years to continue the effect. The overstory in the meantime should continually be monitored for deterioration to a point that justifies regeneration of the stand.

Stand 128: 2.9 acres - Early Successional Management

- **Site/Woodland Description** - Stand 128 consists of a nearly monoculture of pole to small sawtimber sized aspen. In the past this area would have served as excellent early successional habitat but has grown beyond serving that role.
- **Management Prescription** - Early Successional Clearcut (2025)
All trees in this stand should be felled to create early successional habitat. The undesirable trees should be treated and killed. This prescription should reoccur every 15-20 years.

Stand 129: 6.4 acres - Early Successional Management

- **Site/Woodland Description** - Stand 129 consists of a nearly monoculture of pole to small sawtimber sized aspen. In the past this area would have served as excellent early successional habitat but has grown beyond serving that role.

- **Management Prescription** - Early Successional Clearcut (2025)
All trees in this stand should be felled to create early successional habitat. The undesirable trees should be treated and killed. This prescription should reoccur every 15-20 years.

Stand 130: 5.1 acres - Early Successional Management

- **Site/Woodland Description** - Stand 130 consists of a nearly monoculture of pole to small sawtimber sized aspen. In the past this area would have served as excellent early successional habitat but has grown beyond serving that role.
- **Management Prescription** - Early Successional Clearcut (2025)
All trees in this stand should be felled to create early successional habitat. The undesirable trees should be treated and killed. This prescription should reoccur every 15-20 years.

Stand 131: 6.0 acres - Early Successional Management

- **Site/Woodland Description** - Stand 131 consists of a nearly monoculture of pole to small sawtimber sized aspen. In the past this area would have served as excellent early successional habitat but has grown beyond serving that role.
- **Management Prescription** - Early Successional Clearcut (2025)
All trees in this stand should be felled to create early successional habitat. The undesirable trees should be treated and killed. This prescription should reoccur every 15-20 years.

Stand 132: 3.3 acres - Early Successional Management

- **Site/Woodland Description** - Stand 132 consists of a nearly monoculture of pole to small sawtimber sized aspen. In the past this area would have served as excellent early successional habitat but has grown beyond serving that role.
- **Management Prescription** - Early Successional Clearcut (2025)
All trees in this stand should be felled to create early successional habitat. The undesirable trees should be treated and killed. This prescription should reoccur every 15-20 years.

Stand 133: 51.8 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.
- **Management Prescription** - Crop Tree Release (2040)
This area should be reevaluated in 20-25 years to determine if there are enough good quality crop trees that could benefit from being released and pruned. A decision could be made at that time as to whether this area should be converted to more desirable species or to continue to grow what is found on the site.

Stand 134: 92.4 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.
- **Management Prescription** - Crop Tree Release (2040)
This area should be reevaluated in 20-25 years to determine if there are enough good quality crop trees that could benefit from being released and pruned. A decision could be made at that time as to whether this area should be converted to more desirable species or to continue to grow what is found on the site.

Stand 135: 4.9 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable

species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.

- **Management Prescription** - Crop Tree Release (2040)

This area should be reevaluated in 20-25 years to determine if there are enough good quality crop trees that could benefit from being released and pruned. A decision could be made at that time as to whether this area should be converted to more desirable species or to continue to grow what is found on the site.

Stand 136: 3.9 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.

- **Management Prescription** - Crop Tree Release (2040)

This area should be reevaluated in 20-25 years to determine if there are enough good quality crop trees that could benefit from being released and pruned. A decision could be made at that time as to whether this area should be converted to more desirable species or to continue to grow what is found on the site.

Stand 137: 4.8 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.

- **Management Prescription** - Crop Tree Release (2040)

This area should be reevaluated in 20-25 years to determine if there are enough good quality crop trees that could benefit from being released and pruned. A decision could be made at that time as to whether this area should be converted to more desirable species or to continue to grow what is found on the site.

Stand 138: 6.9 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.

- **Management Prescription** - Crop Tree Release (2040)

This area should be reevaluated in 20-25 years to determine if there are enough good quality crop trees that could benefit from being released and pruned. A decision could be made at that time as to whether this area should be converted to more desirable species or to continue to grow what is found on the site.

Stand 139: 10.5 acres - Even Aged Management

- **Site/Woodland Description** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.

- **Management Prescription** - Crop Tree Release (2040)

This area should be reevaluated in 20-25 years to determine if there are enough good quality crop trees that could benefit from being released and pruned. A decision could be made at that time as to whether this area should be converted to more desirable species or to continue to grow what is found on the site.

Stand 140: 16.8 acres - Even Aged Management

- ***Site/Woodland Description*** - This is an area that historically was cultivated, open grass or pasture. As the previous land use was abandoned, Mother Nature took it upon herself to seed this area to mostly undesirable species. There are many areas like this across the Volga State Rec Area. Occasionally a good quality walnut or oak is found to have established itself with the boxelder. This is a low priority stand and currently serves as excellent wildlife habitat.
- ***Management Prescription*** - Crop Tree Release (2040)
This area should be reevaluated in 20-25 years to determine if there are enough good quality crop trees that could benefit from being released and pruned. A decision could be made at that time as to whether this area should be converted to more desirable species or to continue to grow what is found on the site.

Stand 141: 16.2 acres - Even Aged Management

- ***Site/Woodland Description*** - Stand 141 is a bottomland riparian area. There are several areas very similar to this stand spread across the property. These areas are primarily dominated by traditional bottomland hardwoods such as cottonwood, boxelder, ash and elm but also many times have walnut sprinkled in. The soils in these stands are generally poorly drained, affecting which species will grow and thrive.
- ***Management Prescription*** - Walnut Harvest (2025) - Commercial Stand Conversion (2045)
The mature and poor quality or defective walnut trees should be evaluated for harvest at any time. Good quality residual walnut will serve as a seed source for potential natural regeneration of areas where trees are removed. In the long term these areas should be looked at to determine if they should be converted to more desirable bottomland species such as swamp white oak, bur oak or walnut.

Stand 142: 65.2 acres - Even Aged Management

- ***Site/Woodland Description*** - Stand 142 is a bottomland riparian area. There are several areas very similar to this stand spread across the property. These areas are primarily dominated by traditional bottomland hardwoods such as cottonwood, boxelder, ash and elm but also many times have walnut sprinkled in. The soils in these stands are generally poorly drained, affecting which species will grow and thrive.
- ***Management Prescription*** - Walnut Harvest (2025) - Commercial Stand Conversion (2045)
The mature and poor quality or defective walnut trees should be evaluated for harvest at any time. Good quality residual walnut will serve as a seed source for potential natural regeneration of areas where trees are removed. In the long term these areas should be looked at to determine if they should be converted to more desirable bottomland species such as swamp white oak, bur oak or walnut.

Stand 143: 120.3 acres - Even Aged Management

- ***Site/Woodland Description*** - Stand 143 is a bottomland riparian area. There are several areas very similar to this stand spread across the property. These areas are primarily dominated by traditional bottomland hardwoods such as cottonwood, boxelder, ash and elm but also many times have walnut sprinkled in. The soils in these stands are generally poorly drained, affecting which species will grow and thrive.
- ***Management Prescription*** - Walnut Harvest (2025) - Commercial Stand Conversion (2045)
The mature and poor quality or defective walnut trees should be evaluated for harvest at any time. Good quality residual walnut will serve as a seed source for potential natural regeneration of areas where trees are removed. In the long term these areas should be looked at to determine if they should be converted to more desirable bottomland species such as swamp white oak, bur oak or walnut.

Stand 144: 53.7 acres - Even Aged Management

- ***Site/Woodland Description*** - Stand 144 is a bottomland riparian area. There are several areas very similar to this stand spread across the property. These areas are primarily dominated by traditional bottomland hardwoods such as cottonwood, boxelder, ash and elm but also many times have walnut sprinkled in. The soils in these stands are generally poorly drained, affecting which species will grow and thrive.
- ***Management Prescription*** - Walnut Harvest (2025) - Commercial Stand Conversion (2045)
The mature and poor quality or defective walnut trees should be evaluated for harvest at any time. Good quality residual walnut will serve as a seed source for potential natural regeneration of areas where trees are removed.

In the long term these areas should be looked at to determine if they should be converted to more desirable bottomland species such as swamp white oak, bur oak or walnut.

Stand 145: 37.5 acres - Even Aged Management

- **Site/Woodland Description** - Stand 145 is a bottomland riparian area. There are several areas very similar to this stand spread across the property. These areas are primarily dominated by traditional bottomland hardwoods such as cottonwood, boxelder, ash and elm but also many times have walnut sprinkled in. The soils in these stands are generally poorly drained, affecting which species will grow and thrive.
- **Management Prescription** - Walnut Harvest (2025) - Commercial Stand Conversion (2045)
The mature and poor quality or defective walnut trees should be evaluated for harvest at any time. Good quality residual walnut will serve as a seed source for potential natural regeneration of areas where trees are removed. In the long term these areas should be looked at to determine if they should be converted to more desirable bottomland species such as swamp white oak, bur oak or walnut.

Stand 146: 3.4 acres - Even Aged Management

- **Site/Woodland Description** - This stand is part of a fairly recent acquisition for the Volga State Rec Area. It had been managed under a stewardship plan by the previous owner. The overstory of this stand is poorer quality mixed hardwoods that are small sawtimber sized. Any merchantable walnut has been harvested by the previous landowner. The midstory and understory area relatively free of hard maple and mostly consist of bitternut hickory, elm and ironwood.
- **Management Prescription** - Underplanting (2035) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 147: 25.2 acres - Un-Even Aged Management

- **Site/Woodland Description** - This stand is part of a fairly recent acquisition for the Volga State Rec Area. It had been managed under a stewardship plan by the previous owner. The overstory of this stand is small sawtimber sized hard maple, basswood, walnut, oak, ash and elm. Any merchantable walnut has been harvested by the previous landowner. The steepness of this stand along with the hard maple regeneration dictates un-even aged management.
- **Management Prescription** - Improvement Harvest (2030) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the hard maple regeneration. This harvest should be combined with the harvest of any adjacent stands to ensure enough volume for a timber sale. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration. Approximately 45 walnut trees were harvested from this stand in 2007.

Stand 148: 7.8 acres - Even Aged Management

- **Site/Woodland Description** - This stand is part of a fairly recent acquisition for the Volga State Rec Area. It had been managed under a stewardship plan by the previous owner. The overstory of this stand is poorer quality mixed hardwoods that are small sawtimber sized. Any merchantable walnut has been harvested by the previous landowner. The midstory and understory area relatively free of hard maple and mostly consist of bitternut hickory, elm and ironwood.
- **Management Prescription** - Underplanting (2035) - Clearcut (2 Yrs Post Planting) - WTR (Post Harvest)
High quality seedlings of desirable species should be planted in the understory of this stand to supplement any natural regeneration. The seedlings should be given one to two years to establish themselves prior to removing the overstory. The overstory should be commercially clearcut to promote the artificial and natural regeneration; perpetuating desirable shade intolerant species which best meet the properties long term goals and objectives. All remaining non merchantable undesirable trees should be felled, treated and killed. Residual desirable trees should be coppiced.

Stand 149: 18.5 acres - Even Aged Management

- ***Site/Woodland Description*** - This stand is part of a fairly recent acquisition for the Volga State Rec Area. It had been managed under a stewardship plan by the previous owner. The average overstory is pole sized black walnut, cherry, elm, ironwood and other central hardwoods. There are scattered large oak, walnut, bitternut hickory and elm found throughout the stand. These are likely left over from a previous harvest. Many of the merchantable walnut were harvested in 2007.
- ***Management Prescription*** - Improvement Harvest (2030) - Crop Tree Release (Post Harvest)
The scattered large overstory trees found throughout this stand should be harvested to release the advanced walnut regeneration. There is not a lot of volume to be harvested and the quality of the merchantable trees is relatively poor. This harvest should be combined with the harvest of any adjacent stands to ensure enough volume for a timber sale. Crop trees should be identified and released following the harvest.

Stand 150: 6.1 acres - Un-Even Aged Management

- ***Site/Woodland Description*** - This stand is part of a fairly recent acquisition for the Volga State Rec Area. It had been managed under a stewardship plan by the previous owner. The overstory of this stand is small sawtimber sized hard maple, basswood, walnut, oak, ash and elm. Any merchantable walnut has been harvested by the previous landowner. The steepness of this stand along with the hard maple regeneration dictates un-even aged management.
- ***Management Prescription*** - Improvement Harvest (2030) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the hard maple regeneration. This harvest should be combined with the harvest of any adjacent stands to ensure enough volume for a timber sale. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

Stand 151: 4.8 acres - Even Aged Management

- ***Site/Woodland Description*** - This stand is part of a fairly recent acquisition for the Volga State Rec Area. It had been managed under a stewardship plan by the previous owner. Stand 151 is a bottomland area that has scattered pockets of walnut and boxelder. This stand is a low priority.
- ***Management Prescription*** - Crop Tree Release (2035)
This stand should be reevaluated in 15-20 years for a possible crop tree release and pruning.

Stand 152: 3.7 acres - Un-Even Aged Management

- ***Site/Woodland Description*** - This stand is part of a fairly recent acquisition for the Volga State Rec Area. It had been managed under a stewardship plan by the previous owner. The overstory of this stand is small sawtimber sized hard maple, basswood, walnut, oak, ash and elm. Any merchantable walnut has been harvested by the previous landowner. The steepness of this stand along with the hard maple regeneration dictates un-even aged management.
- ***Management Prescription*** - Improvement Harvest (2030) - Weed Tree Removal (Post Harvest)
The mature and defective overstory trees should be harvested to release the hard maple regeneration. This harvest should be combined with the harvest of any adjacent stands to ensure enough volume for a timber sale. Undesirable weed trees should be killed following the harvest to further promote desirable regeneration.

SUSTAINABLE FORESTRY GUIDELINES

Sustainable forestry is managing a forest to maximize the distribution of age classes on the property, and insure there is a balanced distribution of tree sizes. With even age management, the acres of even age management divided by the rotation age is the allowable harvest per year to remain on a sustainable management path. The target rotation age for the area is 100 years. This insures that large oaks will always be present on the area but that the oak will be regenerated at an early enough age to help perpetuate its presence.

Early Successional Management - 15 year rotation

The early successional areas will be managed on a 15 year rotation. There are 40 acres designated for early successional management. The allowable cut is 2.7 acres per year (40 acres divided by 15 yrs.). With a working cycle of 5 years, approximately 13.5 acres could be cut every 5 years.

Even Age Management Area - 100 year rotation

The even age management stands will be managed on a 100 year rotation. There are 2,552 acres under even age management. Dividing 2,552 acres by 100 years yields an allowable cut of 25.5 acres per year, or 125-130 acres every 5 years.

Un-even Age Management Area - 20 year cutting cycle

Un-even stands can be selectively harvested every 20 years to remove mature and defective trees. There are 919 acres under uneven age management. Dividing 919 acres by 20 years yields an allowable harvest of 46 acres per year, or 230 acres of selective harvest every 5 years.

HIGHEST PRIORITY STANDS

Even Age

Stand	Acres	Overstory	Ave DBH	Prescription 1	Year 1	Prescription 2	Year 2	Prescription 3	Year 3
17	6.5	oak-walnut	Large	Woodland Planting	2016	Harvest-Clearcut	2016	Weed Tree Removal	2016
63	19.4	mixed oak	Large	Woodland Planting	2016	Harvest-Clearcut	2016	Weed Tree Removal	2016
46	9.2	mixed oak	Large	Woodland Planting	2016	Harvest-Clearcut	2016	Weed Tree Removal	2016
95	17.2	elm-ash-hickory	Medium	Woodland Planting	2016	Harvest-Clearcut	2016	Weed Tree Removal	2016
113	24.1	mixed oak	Large	Woodland Planting	2016	Harvest-Clearcut	2016	Weed Tree Removal	2016
13	4.3	aspen	Medium	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020
14	8.3	oak-maple-basswood	Large	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020
24	6.9	oak-walnut	Large	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020
36	6.6	oak-maple-basswood	Large	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020
42	12.9	oak-maple-basswood	Large	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020
62	32.2	mixed oak	Large	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020
74	6.3	white oak-red oak-hickory	Medium	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020
85	14.8	mixed oak	Large	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020

Un-Even Age

Stand	Acres	Overstory	Ave DBH	Prescription 1	Year 1	Prescription 2	Year 2	Prescription 3	Year 3
2	5.1	walnut-ash-elm	Medium	Harvest-Selective	2020	Weed Tree Removal	2020		
3	2.7	maple-basswood	Pole Timber	Harvest-Selective	2020	Weed Tree Removal	2020		
11	67.9	oak-maple-basswood	Large	Harvest-Selective	2020	Weed Tree Removal	2020		
34	58.6	oak-maple-basswood	Large	Harvest-Selective	2020	Weed Tree Removal	2020		
43	51.4	elm-ash-hickory	Large	Harvest-Selective	2025				
45	56.0	maple-basswood	Large	Harvest-Selective	2025	Weed Tree Removal	2025		
49	15.8	oak-maple-basswood	Large	Harvest-Selective	2025				
61	55.3	oak-maple-basswood	Large	Harvest-Selective	2025	Weed Tree Removal	2025		
71	46.6	oak-maple-basswood	Large	Harvest-Selective	2025	Weed Tree Removal	2025		
71	4.9	oak-maple-basswood	Large	Harvest-Selective	2025	Weed Tree Removal	2025		
114	13.5	oak-maple-basswood	Large	Harvest-Selective	2025	Weed Tree Removal	2025		

Early Successional

Stand	Acres	Overstory	Ave DBH	Prescription 1	Year 1	Prescription 2	Year 2	Prescription 3	Year 3
4	5.9	aspen	Medium	Harvest-Clearcut	2020	Edge Management	2020		
77	3.3	aspen	Medium	Edge Management	2020				
91	5.0	aspen	Pole Timber	Edge Management	2016				

Walnut Harvest

Stand	Acres	Overstory	Ave DBH	Management	Prescription 1	Year 1	Prescription 2	Year 2	Prescription 3	Year 3
19	1.5	walnut-ash-elm	Medium	Even Age	Harvest-Walnut	2016	Harvest-Clearcut	2035	Woodland Planting	2035
67	126.9	elm-ash-soft maple	Medium	Even Age	Harvest-Walnut	2016	Stand Conversion	2045		
64	15.5	walnut-ash-elm	Large	Uneven Age	Harvest-Walnut	2025				

APPENDIX

Volga State Recreation Area Summary of Woodland Stands

Stand	Acres	Overstory	Ave DBH	Management	Prescription 1	Year 1	Prescription 2	Year 2	Prescription 3	Year 3
1	12.9	oak-walnut	Pole timber	Even Age	Harvest-Selective	2020	crop tree release	2025		0
2	5.1	walnut-ash-elm	Medium	Uneven Age	Harvest-Selective	2020	Weed Tree Removal	2020		0
3	2.7	maple-basswood	Pole Timber	Uneven Age	Harvest-Selective	2020	Weed Tree Removal	2020		0
4	5.9	aspen	Medium	Early Successional	Harvest-Clearcut	2020	Edge Management	2020		0
5	2.4	aspen	Pole Timber	Early Successional	Edge Management	2030		0		0
6	3.8	white oak-red oak-hickory	Medium	Even Age	Woodland Planting	2035	Harvest-Clearcut	2035	Weed Tree Removal	2035
7	6.3	white oak-red oak-hickory	Medium	Uneven Age	Harvest-Selective	2025	Weed Tree Removal	2025		0
8	4.7	boxelder	Pole Timber	Even Age	Stand Conversion	2045	Woodland Planting	2045		0
9	11.5	maple-basswood	Medium	Uneven Age	Harvest-Selective	2025		0		0
10	15.2	elm-ash-hickory	Pole Timber	Uneven Age	Crop Tree Release	2030		0		0
11	67.9	oak-maple-basswood	Large	Uneven Age	Harvest-Selective	2020	Weed Tree Removal	2020		0
12	5.3	elm-ash-hickory	Sapling	Uneven Age	Crop Tree Release	2025		0		0
13	4.3	aspen	Medium	Even Age	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020
14	8.3	oak-maple-basswood	Large	Even Age	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020
15	14.6	hackberry-elm-ash	Pole Timber	Even Age	Harvest-Walnut	2030	Stand Conversion	2030	Woodland Planting	2030
16	10.2	oak-walnut	Pole Timber	Even Age	Crop Tree Release	2025		0		0
17	6.5	oak-walnut	Large	Even Age	Woodland Planting	2016	Harvest-Clearcut	2016	Weed Tree Removal	2016
18	8.0	walnut-ash-elm	Medium	Even Age	Crop Tree Release	2025	Pruning	2025		0
19	1.5	walnut-ash-elm	Medium	Even Age	Harvest-Walnut	2016	Harvest-Clearcut	2035	Woodland Planting	2035
20	7.7	oak-walnut	Pole Timber	Even Age	Crop Tree Release	2025		0		0
21	16.6	walnut-ash-elm	Pole Timber	Even Age	Crop Tree Release	2030		0		0
22	11.7	boxelder	Pole Timber	Even Age	Stand Conversion	2045	Woodland Planting	2045		0
23	21.6	oak-walnut	Pole Timber	Even Age	Crop Tree Release	2025	Pruning	2025		0
24	6.9	oak-walnut	Large	Even Age	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020
25	15.1	white oak-red oak-hickory	Medium	Uneven Age	Harvest-Selective	2030	Weed Tree Removal	2030		0
25	6.3	white oak-red oak-hickory	Medium	Uneven Age	Harvest-Selective	2030	Weed Tree Removal	2030		0
25	31.8	white oak-red oak-hickory	Medium	Uneven Age	Harvest-Selective	2030	Weed Tree Removal	2030		0
26	3.0	oak-walnut	Pole Timber	Even Age	Crop Tree Release	2020		0		0
27	24.1	walnut-ash-elm	Pole Timber	Even Age	Crop Tree Release	2025	Pruning	2025		0
28	16.7	bur oak-black oak	Medium	Even Age	Weed Tree Removal	2040	Harvest-Selective	2040		0

Stand	Acres	Overstory	Ave DBH	Management	Prescription 1	Year 1	Prescription 2	Year 2	Prescription 3	Year 3
29	25.0	maple-basswood	Pole Timber	Uneven Age	Crop Tree Release	2035	Pruning	2035		0
30	2.4	boxelder	Pole Timber	Even Age	Stand Conversion	2045	Woodland Planting	2000		0
30	24.1	boxelder	Pole Timber	Even Age	Stand Conversion	2045	Woodland Planting	2000		0
31	13.7	oak-walnut	Medium	Even Age	Woodland Planting	2025	Harvest-Clearcut	2025	Weed Tree Removal	2025
32	14.9	oak-walnut	Medium	Even Age	Crop Tree Release	2030	Harvest-Walnut	2030		0
33	5.5	oak-walnut	Pole Timber	Even Age	Crop Tree Release	2030	Harvest-Selective	2030		0
34	58.6	oak-maple-basswood	Large	Uneven Age	Harvest-Selective	2020	Weed Tree Removal	2020		0
35	18.7	oak-maple-basswood	Medium	Even Age	Woodland Planting	2035	Harvest-Clearcut	2035	Weed Tree Removal	2035
36	6.6	oak-maple-basswood	Large	Even Age	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020
37	23.1	walnut-ash-elm	Medium	Uneven Age	Basal Area Thinning	2030		0		0
38	76.0	boxelder	Pole Timber	Even Age	Stand Conversion	2045	Seedling Planting	2000		0
39	7.9	maple-basswood	Pole Timber	Uneven Age	Crop Tree Release	2025		0		0
40	8.0	oak-walnut	Pole Timber	Even Age	Crop Tree Release	2020		0		0
41	38.5	oak-maple-basswood	Large	Uneven Age	Harvest-Selective	2030	Weed Tree Removal	2030		0
42	12.9	oak-maple-basswood	Large	Even Age	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020
43	51.4	elm-ash-hickory	Large	Uneven Age	Harvest-Selective	2025		0		0
44	20.5	elm-ash-hickory	Pole Timber	Uneven Age	Crop Tree Release	2045		0		0
45	56.0	maple-basswood	Large	Uneven Age	Harvest-Selective	2025	Weed Tree Removal	2025		0
46	9.2	mixed oak	Large	Even Age	Woodland Planting	2016	Harvest-Clearcut	2016	Weed Tree Removal	2016
47	15.7	elm-ash-hickory	Pole Timber	Even Age	Woodland Planting	2035	Stand Conversion	2035		0
48	33.6	oak-maple-basswood	Medium	Uneven Age	Harvest-Selective	2035		0		0
49	15.8	oak-maple-basswood	Large	Uneven Age	Harvest-Selective	2025		0		0
50	5.6	bur oak-black oak	Large	Uneven Age	Harvest-Selective	2040		0		0
51	10.6	mixed oak	Large	Even Age	Woodland Planting	2030	Harvest-Clearcut	2030	Weed Tree Removal	2030
52	24.1	white oak-red oak-hickory	Medium	Even Age	Woodland Planting	2030	Harvest-Clearcut	2030	Weed Tree Removal	2030
53	15.8	oak-maple-basswood	Medium	Uneven Age	Harvest-Selective	2030	Weed Tree Removal	2030		0
54	34.9	walnut-ash-elm	Medium	Uneven Age	Harvest-Selective	2035	Crop Tree Release	2035		0
55	8.3	mixed oak	Large	Even Age	Woodland Planting	2025	Harvest-Clearcut	2025	Weed Tree Removal	2025
56	22.4	walnut-ash-elm	Pole Timber	Even Age	Crop Tree Release	2025		0		0
57	25.2	mixed oak	Medium	Even Age	Woodland Planting	2040	Harvest-Clearcut	2040	Weed Tree Removal	2040
58	17.6	mixed oak	Medium	Uneven Age	Harvest-Selective	2040	Weed Tree Removal	2040		0

Stand	Acres	Overstory	Ave DBH	Management	Prescription 1	Year 1	Prescription 2	Year 2	Prescription 3	Year 3
59	28.1	white oak-red oak-hickory	Large	Even Age	Woodland Planting	2030	Harvest-Clearcut	2030	Weed Tree Removal	2030
60	14.5	walnut-ash-elm	Pole Timber	Uneven Age	Crop Tree Release	2035		0		0
61	55.3	oak-maple-basswood	Large	Uneven Age	Harvest-Selective	2025	Weed Tree Removal	2025		0
62	32.2	mixed oak	Large	Even Age	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020
63	19.4	mixed oak	Large	Even Age	Woodland Planting	2016	Harvest-Clearcut	2016	Weed Tree Removal	2016
64	15.5	walnut-ash-elm	Large	Uneven Age	Harvest-Walnut	2025		0		0
65	51.2	red cedar-hardwoods	Pole Timber	Even Age	Crop Tree Release	2035		0		0
65	29.8	red cedar-hardwoods	Pole Timber	Even Age	Crop Tree Release	2035		0		0
66	7.6	oak-walnut	Pole Timber	Even Age	Crop Tree Release	2030		0		0
67	126.9	elm-ash-soft maple	Medium	Even Age	Harvest-Walnut	2016	Stand Conversion	2045		0
68	40.6	mixed oak	Medium	Uneven Age	Harvest-Selective	2030		0		0
69	17.0	red cedar-hardwoods	Pole Timber	Even Age	Woodland Planting	2045	Stand Conversion	2000		0
69	12.8	red cedar-hardwoods	Pole Timber	Even Age	Woodland Planting	2045	Stand Conversion	2000		0
69	26.7	red cedar-hardwoods	Pole Timber	Even Age	Woodland Planting	2045	Stand Conversion	2000		0
70	33.9	bur oak-black oak	Medium	Even Age	Woodland Planting	2025	Harvest-Clearcut	2025	Weed Tree Removal	2025
71	46.6	oak-maple-basswood	Large	Uneven Age	Harvest-Selective	2025	Weed Tree Removal	2025		0
71	4.9	oak-maple-basswood	Large	Uneven Age	Harvest-Selective	2025	Weed Tree Removal	2025		0
72	49.9	white oak-red oak-hickory	Medium	Even Age	Woodland Planting	2030	Harvest-Clearcut	2030	Weed Tree Removal	2030
73	61.9	red cedar-hardwoods	Medium	Even Age	Harvest-Clearcut	2045		0		0
74	6.3	white oak-red oak-hickory	Medium	Even Age	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020
75	126.0	bur oak-black oak	Medium	Even Age	Woodland Planting	2035	Harvest-Clearcut	2035	Weed Tree Removal	2035
76	66.0	white oak-red oak-hickory	Medium	Uneven Age	Harvest-Selective	2025	Weed Tree Removal	2025		0
77	3.3	aspen	Medium	Early Successional	Edge Management	2020		0		0
78	46.1	bur oak-black oak	Medium	Even Age	Woodland Planting	2035	Harvest-Clearcut	2035	Weed Tree Removal	2035
79	20.8	bur oak-black oak	Pole Timber	Even Age	Crop Tree Release	2030		0		0
80	14.6	boxelder	Medium	Even Age	Woodland Planting	2045	Stand Conversion	2000		0
81	25.5	mixed oak	Large	Even Age	Woodland Planting	2025	Harvest-Clearcut	2025	Weed Tree Removal	2025
82	74.4	bur oak-black oak	Medium	Even Age	Woodland Planting	2035	Harvest-Clearcut	2035	Weed Tree Removal	2035
83	55.3	red cedar-hardwoods	Pole Timber	Even Age	Crop Tree Release	2040		0		0
84	140.8	bur oak-black oak	Medium	Even Age	Woodland Planting	2040	Harvest-Clearcut	2040		0
85	14.8	mixed oak	Large	Even Age	Woodland Planting	2020	Harvest-Clearcut	2020	Weed Tree Removal	2020

Stand	Acres	Overstory	Ave DBH	Management	Prescription 1	Year 1	Prescription 2	Year 2	Prescription 3	Year 3
86	12.0	oak-walnut	Medium	Even Age	Woodland Planting	2025	Harvest-Clearcut	2025	Weed Tree Removal	2025
87	16.7	conifers	Pole Timber	Even Age	Basal Area Thinning	2025		0		0
88	5.7	conifers	Pole Timber	Even Age	Basal Area Thinning	2025		0		0
89	32.0	red cedar-hardwoods	Pole Timber	Viewshed	Crop Tree Release	2030		0		0
90	22.2	walnut-ash-elm	Pole Timber	Viewshed	Crop Tree Release	2025		0		0
91	5.0	aspen	Pole Timber	Early Successional	Edge Management	2016		0		0
92	12.9	red cedar-hardwoods	Pole Timber	Even Age	Woodland Planting	2045	Stand Conversion	2000		0
93	27.0	red cedar-hardwoods	Pole Timber	Viewshed	Harvest-Walnut	2025		0		0
94	39.2	boxelder	Pole Timber	Even Age	Woodland Planting	2045	Stand Conversion	2000		0
95	17.2	elm-ash-hickory	Medium	Even Age	Woodland Planting	2016	Harvest-Clearcut	2016	Weed Tree Removal	2016
96	14.9	elm-ash-hickory	Medium	Uneven Age	Harvest-Selective	2025	Weed Tree Removal	2025		0
97	17.5	oak-maple-basswood	Pole Timber	Uneven Age	Crop Tree Release	2025		0		0
98	68.9	white oak-red oak-hickory	Medium	Even Age	Woodland Planting	2025	Harvest-Clearcut	2025	Weed Tree Removal	2025
99	12.8	mixed oak	Medium	Even Age	Woodland Planting	2030	Harvest-Clearcut	2030	Weed Tree Removal	2030
100	5.5	mixed oak	Pole Timber	Even Age	Crop Tree Release	2035		0		0
101	7.2	elm-ash-hickory	Pole Timber	Even Age	Crop Tree Release	2035		0		0
102	27.7	bur oak-black oak	Medium	Even Age	Weed Tree Removal	2035		0		0
103	20.1	red cedar-hardwoods	Pole Timber	Viewshed	Weed Tree Removal	2035		0		0
104	39.0	mixed oak	Pole Timber	Even Age	Harvest-Selective	2025	Crop Tree Release	2025		0
105	23.8	maple-basswood	Pole Timber	Uneven Age	Crop Tree Release	2025		0		0
106	24.8	boxelder	Pole Timber	Even Age	Woodland Planting	2045	Stand Conversion	2000		0
107	16.4	bur oak-black oak	Medium	Even Age	Weed Tree Removal	2035		0		0
108	25.9	red cedar-hardwoods	Pole Timber	Even Age	Crop Tree Release	2030		0		0
109	41.8	oak-walnut	Medium	Even Age	Basal Area Thinning	2030	Harvest-Selective	2030		0
110	14.3	bur oak-black oak	Medium	Even Age	Woodland Planting	2030	Harvest-Clearcut	2030	Weed Tree Removal	2030
111	68.2	oak-maple-basswood	Medium	Even Age	Woodland Planting	2030	Harvest-Clearcut	2030	Weed Tree Removal	2030
112	14.5	elm-ash-hickory	Pole Timber	Even Age	Crop Tree Release	2025		0		0
113	24.1	mixed oak	Large	Even Age	Woodland Planting	2016	Harvest-Clearcut	2016	Weed Tree Removal	2016
114	13.5	oak-maple-basswood	Large	Uneven Age	Harvest-Selective	2025	Weed Tree Removal	2025		0
115	11.7	boxelder	Pole Timber	Even Age	Woodland Planting	2045	Stand Conversion	2000		0
116	3.5	conifers	Pole Timber	Even Age	Basal Area Thinning	2025		0		0

Stand	Acres	Overstory	Ave DBH	Management	Prescription 1	Year 1	Prescription 2	Year 2	Prescription 3	Year 3
117	3.0	conifers	Pole Timber	Even Age	Basal Area Thinning	2025		0		0
118	4.2	conifers	Pole Timber	Even Age	Basal Area Thinning	2025		0		0
119	12.1	conifers	Pole Timber	Even Age	Basal Area Thinning	2025		0		0
120	14.4	oak-maple-basswood	Medium	Viewshed	Harvest-Selective	2040		0		0
121	88.2	oak-maple-basswood	Medium	Viewshed	Harvest-Selective	2040		0		0
122	8.8	oak-maple-basswood	Medium	Viewshed	Harvest-Selective	2040		0		0
123	80.7	oak-maple-basswood	Medium	Viewshed	Harvest-Selective	2040		0		0
124	39.6	oak-maple-basswood	Medium	Viewshed	Harvest-Selective	2040		0		0
125	37.2	oak-maple-basswood	Medium	Viewshed	Harvest-Selective	2040		0		0
126	31.1	oak-maple-basswood	Medium	Viewshed	Harvest-Selective	2040		0		0
127	6.4	oak-maple-basswood	Medium	Viewshed	Harvest-Selective	2040		0		0
128	2.9	aspen	Medium	Early Successional	Edge Management	2025		0		0
129	6.4	aspen	Medium	Early Successional	Edge Management	2025		0		0
130	5.1	aspen	Medium	Early Successional	Edge Management	2025		0		0
131	6.0	aspen	Medium	Early Successional	Edge Management	2025		0		0
132	3.3	aspen	Medium	Early Successional	Edge Management	2025		0		0
133	51.8	red cedar-hardwoods	Pole Timber	Even Age	Crop Tree Release	2040	Pruning	2030		0
134	92.4	red cedar-hardwoods	Pole Timber	Even Age	Crop Tree Release	2040	Pruning	2030		0
135	4.9	red cedar-hardwoods	Pole Timber	Even Age	Crop Tree Release	2040	Pruning	2035		0
136	3.9	red cedar-hardwoods	Pole Timber	Even Age	Crop Tree Release	2040	Pruning	2035		0
137	4.8	red cedar-hardwoods	Pole Timber	Even Age	Crop Tree Release	2040	Pruning	2035		0
138	6.9	red cedar-hardwoods	Pole Timber	Even Age	Crop Tree Release	2040	Pruning	2035		0
139	10.5	red cedar-hardwoods	Pole Timber	Even Age	Crop Tree Release	2040	Pruning	2035		0
140	16.8	red cedar-hardwoods	Pole Timber	Even Age	Crop Tree Release	2040	Pruning	2035		0
141	16.2	elm-ash-soft maple	Medium	Even Age	Stand Conversion	2045	Harvest-Walnut	2025		0
142	65.2	elm-ash-soft maple	Medium	Even Age	Stand Conversion	2045	Harvest-Walnut	2025		0
143	120.3	elm-ash-soft maple	Medium	Even Age	Stand Conversion	2045	Harvest-Walnut	2025		0
144	53.7	elm-ash-soft maple	Medium	Even Age	Stand Conversion	2045	Harvest-Walnut	2025		0
145	37.5	elm-ash-soft maple	Medium	Even Age	Stand Conversion	2045	Harvest-Walnut	2025		0

Stand	Acres	Overstory	Ave DBH	Management	Prescription 1	Year 1	Prescription 2	Year 2	Prescription 3	Year 3
146	3.4	elm-ash-hickory	Pole Timber	Even Age	Woodland Planting	2035	Harvest-Clearcut	2035	Weed Tree Removal	2035
147	25.2	maple-basswood	Medium	Uneven Age	Harvest-Selective	2030	Weed Tree Removal	2030		0
148	7.8	elm-ash-hickory	Pole Timber	Even Age	Harvest-Selective	2035	Weed Tree Removal	2035		0
149	18.5	oak-walnut	Medium	Even Age	Harvest-Selective	2030	Crop Tree Release	2030		0
150	6.1	oak-maple-basswood	Medium	Uneven Age	Harvest-Selective	2030	Weed Tree Removal	2030		0
151	4.8	walnut-ash-elm	Pole Timber	Even Age	Crop Tree Release	2045		0		0
152	3.7	maple-basswood	Medium	Uneven Age	Harvest-Selective	2035	Weed Tree Removal	2035		0

Wildlife Species of Greatest Conservation Need in Northeast Iowa

Table 1. Forest Breeding Birds of Greatest Conservation Need in NE Iowa

Common Name	Scientific Name	State/National Listing
Ruffed Grouse	<i>Bonasa umbellus</i>	
Bald Eagle	<i>Haliaeetus leucocephalus</i>	State Special Concern
Red-shouldered Hawk	<i>Buteo lineatus</i>	State Endangered
Broad-winged Hawk	<i>Buteo platypterus</i>	
American Woodcock	<i>Scolopax minor</i>	
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	
Eastern Screech-owl	<i>Otus asio</i>	
Long-eared Owl	<i>Asio otus</i>	State Threatened
Whip-poor-will	<i>Caprimulgus vociferus</i>	
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	
Northern Flicker	<i>Colaptes auratus</i>	
American Kestrel	<i>Falco sparverius</i>	
Peregrine Falcon	<i>Falco peregrinus</i>	State Special Concern
Eastern Wood-pewee	<i>Contopus virens</i>	
Acadian Flycatcher	<i>Empidonax virescens</i>	
Veery	<i>Catharus fuscescens</i>	
Wood Thrush	<i>Hylocichla mustelina</i>	
Worm-eating Warbler	<i>Helmitheros vermivorus</i>	
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	
Prothonotary Warbler	<i>Protonotaria citrea</i>	
Kentucky Warbler	<i>Oporornis formosus</i>	
Cerulean Warbler	<i>Setophaga cerulea</i>	

Table 2. Forest Non-breeding Birds of Greatest Conservation Need in NE Iowa

Common Name	Scientific Name	State/National Listing
Olive-sided Flycatcher	<i>Contopus cooperi</i>	
Bohemian Waxwing	<i>Bombycilla garrulus</i>	
Bay-breasted Warbler	<i>Dendroica castanea</i>	
Canada Warbler	<i>Wilsonia canadensis</i>	
White-winged Crossbill	<i>Loxia leucoptera</i>	

Table 3. Forest Mammals of Greatest Conservation Need in NE Iowa

Common Name	Scientific Name	State/National Listing
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Federally Threatened
Little Brown Bat	<i>Myotis lucifigus</i>	
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	
Eastern Pipistrelle	<i>Perimyotis subflavus</i>	
Southern Flying Squirrel	<i>Glaucomys volans</i>	State Special Concern
Woodland vole	<i>Microtus pinetorum</i>	
Gray Fox	<i>Urocyon cinereoargenteus</i>	
Ermine	<i>Mustela ermine</i>	

Table 4. Forest Reptiles and Amphibians of Greatest Conservation Need in NE Iowa

Common Name	Scientific Name	State/National Listing
Eastern Tiger Salamander	<i>Ambystoma tigrinum</i>	
Eastern Newt	<i>Notophthalmus viridescens</i>	State Threatened
Blanchard's Cricket Frog	<i>Acris crepitans</i>	
Eastern Gray Treefrog	<i>Hyla versicolor</i>	
Wood Turtle	<i>Glyptemys insculpta</i>	State Endangered
Common Five-lined Skink	<i>Plestiodon fasciatus</i>	
Ringneck Snake	<i>Diadophis punctatus</i>	
Eastern Hognose Snake	<i>Heterodon platirhinos</i>	
Western Rat Snake	<i>Scotophis obsoletus</i>	
Timber Rattlesnake	<i>Crotalus horridus</i>	

**Table 5. Forest Land Snails of Greatest Conservation Need in NE Iowa
(Restricted to Algific Talus Slopes and Maderate Slopes)**

Common Name	Scientific Name	State/National Listing
Iowa Pleistocene Snail	<i>Discus macclintocki</i>	Federally & State Endangered
Minnesota Pleistocene Succinea	<i>Novasuccinea n. Sp. Minnesota a</i>	State Endangered
Iowa Pleistocene Succinea	<i>Novasuccinea n. Sp. Minnesota b</i>	State Endangered
Hubricht's Vertigo	<i>Vertigo hubrichti</i>	State Threatened
Bluff Vertigo	<i>Vertigo meramecensis</i>	State Endangered

Table 6. Forest Butterflies of Greatest Conservation Need in NE Iowa

Common Name	Scientific Name	State/National Listing
Harvester	<i>Feniseca tarquinius</i>	
Hickory Hairstreak	<i>Satyrium caryaevorum</i>	State Special Concern
White M. Hairstreak	<i>Parrhasius m-album</i>	
Edward's Hairstreak	<i>Satyrium edwardsii</i>	State Special Concern
Striped Hairstreak	<i>Satyrium liparops</i>	State Special Concern
Silvery Blue	<i>Glaucopteryx lygdamus</i>	State Threatened
Compton Tortoiseshell	<i>Nymphalis vaualbum</i>	
Juvenal's Duskywing	<i>Erynnis juvenalis</i>	
Columbine Duskywing	<i>Erynnis lucilius</i>	State Special Concern
Dreamy Duskywing	<i>Erynnis icelus</i>	State Special Concern
Sleepy Duskywing	<i>Erynnis brizo</i>	State Special Concern
Pepper and Salt Skipper	<i>Amblyscirtes hegon</i>	State Special Concern

Special Note on Northern Long-eared Bat

The Northern Long-eared Bat (NLEB) is a federally Threatened Species that can occur in any county of Iowa. To protect summer habitat for NLEB, tree removal should not occur within 0.25 miles of a known hibernaculum, and no trees within a 150-foot radius of a known, occupied maternity roost tree may be cut nor destroyed during the pup season (June 1 through July 31). Please contact the U.S. Fish and Wildlife Service (USFWS) for maps of known hibernacula and the most up-to-date information pertaining to the NLEB. Visit the USFWS Midwest Region Endangered Species webpage at: <https://www.fws.gov/midwest/endangered/index.html>

Special Note on Rusty Patched Bumble Bee

Rusty Patched Bumble Bee (*Bombus affinis*) - Status: Endangered

Habitat for the rusty patched bumble bee includes grasslands and woodlands with flowering plants from April through October, underground and abandoned rodent cavities or clumps of grasses above ground as nesting sites, and undisturbed soil for hibernating queens to overwinter. The rusty patched bumble bee has been observed and collected in a variety of habitats including prairies, woodlands, marshes, agricultural landscapes, and residential parks and gardens. In Iowa, known occurrences have been documented in Allamakee, Black Hawk, Clayton, Johnson and Winneshiek counties.

To help maintain high-quality bumble bee habitat and reduce potential impacts to the species, vegetation management (haymaking, mowing, grazing, and burning) should be conducted using the following conservation measures in high quality habitat during the active season (March through September) in areas that fall within the mapped High Potential Zones. In the event that new occurrences are documented, conservation measures should also be implemented. Check the USFWS Midwest Region Endangered Species webpage <https://www.fws.gov/midwest/endangered/index.html> for up to date maps of High and Low Potential Zones.

- Favor diverse seedings and work to maintain blooming plants throughout the flight season.
- Leave one or more areas of unmowed habitat for the entire year in management areas.
- If mowing during the active flight season, a minimum cutting height of 8-10 inches will be used and variable vegetation structure will be maintained.
- Prescribed burns will be rotated to ensure that there are unburned refugia every year.

Bee diversity is strongly linked to floral diversity and abundance over their entire active season. Management actions conducted which work to restore, enhance and maintain landscapes and habitats that contain a high diversity and abundance of wildflowers are therefore likely to provide a positive conservation effect to bees and pollinators in general.

FWSP Definitions & Guiding Factors

Conifer/Wildlife Plantation - A conifer or tree/shrub planting designed for wildlife habitat. This habitat factor will provide nesting sites, food and cover for wildlife. Conifers are also important to wildlife during the winter providing thermal benefits and areas of decreased snow depths.

Conversion - An existing shade tolerant forest stand converted to nut and fruit bearing species of trees and shrubs to provide more food and cover. This habitat factor is a timber stand improvement increasing the forest quality. It will begin forest succession from early stages to old growth.

Floodplain Forest Wildlife -Characterized by species such as silver maple, cottonwood, walnut, green ash, elm, hackberry and willows. This habitat factor will benefit wildlife such as songbirds and woodpeckers, furbearers, raptors, reptiles and amphibians on relatively level areas inundated by water from time to time.

Old Growth - Natural forests that have developed over a long period of time, generally at least 120 years, without experiencing severe, stand-replacing disturbance---a fire, windstorm, or logging. This habitat factor will provide necessary wildlife habitat for species requiring mature woodlands.

Preserve Status - An area of land or water formally dedicated for maintenance as nearly as possible in its natural condition though it need not be completely primeval in character at the time of dedication or an area which has floral, fauna, geological, archeological, scenic, or historic features of scientific or educational value. This habitat factor will recognize the quality of preserve sites and apply proper maintenance to protect its integrity.

Recreation -Leisure activities involving the enjoyment and use of natural resources. This habitat factor will favor hunting activities while taking into consideration secondary activities such as wildlife watching, mushroom picking, photography, and hiking.

Restoration - A new planting of seedlings, direct seeding, or regeneration of roots. This habitat factor will create new forest habitat that will be of higher quality for wildlife.

Riparian Buffer - Woodland next to streams, lakes, and wetlands that is managed to enhance and protect aquatic resources from adjacent fields. This habitat factor will provide a woody cover buffer to enhance soil and water conservation while providing wildlife habitat.

Special Restrictions - Certain limitations or conditions on the use or enjoyment of a natural resource area. This habitat factor will take into consideration these limitations or conditions to select proper management.

Unique Natural Sites - Sites that contain unusual or rare natural components that should be preserved for their unique characteristics, such as algalic slopes. This habitat factor will identify these uncommon sites for management considerations.

Upland Forest Wildlife - Representative tree species include oak, hickory, hard maple, cherry, elm, walnut, ash, and red cedar. This habitat factor will provide habitat for wildlife such as ruffed grouse, woodcock, songbirds and woodpeckers, deer, turkey, raptors, owls, squirrels, and associated furbearing predators.

Viewshed - A physiographic area composed of land, water, biotic, and cultural elements which may be viewed from one or more viewpoints and which has inherent scenic qualities and/or aesthetic values as determined by those who view it. Viewshed's are a habitat factor that will be primarily a "hands-off" area for aesthetics, proper soil and water conservation, along with providing special wildlife habitats.

Woodland Edge - This is an area of habitat transition that consists of vegetation (herbaceous and woody) of different heights and densities. This habitat factor will favor early successional vegetation for wildlife benefiting from edge cover.

Explanation of Timber Management Practices

Timber Stand Improvement

Timber stand improvement (TSI) is the removal of undesirable or low value trees. Removing these unwanted trees will provide more space and sunlight for desirable trees to grow. Timber stand improvement is a “weeding” to increase the growth of your forest.

Weed Tree Removal - In older timber, the undesirable species can be killed to encourage the natural reseeding of desirable species. The removal of the “weed” trees allows sunlight to reach the ground so that seedlings can become established. The undesirable species can be killed standing by cutting flaps in the trunk and applying Tordon RTU or Pathway into the cuts. The cuts must be in a circle around the trunk and overlapping. The trees can also be cut off and the stumps treated with Tordon RTU or Pathway to prevent resprouting. Wet the outer rim of freshly cut stumps. The work can be done anytime except spring during heavy sap flow.

Desirable trees that are poor formed or damaged should also be removed. These trees should not be treated with herbicide. The stumps will resprout and produce another tree. Cut the stumps close to the ground so that the sprout will originate near the ground.

Crop-Tree Release - In pole-sized stands (4-10” dia.), potential crop trees can be selected and released. At maturity, there is room for 35-50 trees per acre. Now you can select the trees you want to comprise your future stand of mature trees and thin around them to give them more growing space. Select a crop tree every 30-35 ft. apart. Remove trees with crowns that are touching or overtopping the crowns of your crop trees. Crop trees can be selected based on criteria that meets your objectives. Normally, the crop trees will be a desirable species, show good form without large side limbs, and be free of major defects. Species normally favored are black walnut, red oak, white oak, white ash, basswood, cherry, and hard maple.

Walnut Pruning - Walnut trees that are 2-12” in diameter can be pruned to promote veneer quality trees. You should prune during the dormant season. Limbs less than 1 inch in diameter are providing foliage which produces food for the tree and should be left. When the limbs approach 1 1/2 to 2” in diameter, they should be removed. Do not remove over 1/3 of the live crown in any one year. At least 50% of the total height of the tree should be maintained in live crown.

Harvest

Uneven-Age Management - Uneven-age management can be implemented to manage shade tolerant species. The timber is selectively harvested to remove mature, damaged, and defective trees. Because large trees are always present in the timber, only species that can grow in the shade can reproduce. Hard maple and basswood can be managed on an uneven-age system of management. Uneven-age management involves maintaining a good distribution of all tree sizes in your timber. It is critical that following a selective harvest, the smaller trees are thinned to remove the trees damaged by logging, poor formed trees, and low value species. The thinning following the harvest insures that you have high quality trees ready to replace the older trees as they are harvested.

Even-Age Management - Even-age management involves a clearcut at some point in the stands rotation. Clearcutting creates full sunlight to the ground. All trees 2” and larger in diameter are felled. Oak, ash, hickory, and walnut require full sunlight to grow. Even-age management must be applied to successively manage these species. Clearcutting creates stands of trees all the same age. The trees compete equally for sunlight and are forced to grow straight and tall, resulting in high quality timber. Clearcutting also provides excellent browse and cover for wildlife.

Shelterwood - Shelterwood is a form of even-age management. The final cut is a clearcut, but several thinnings are done prior to the final cut. The large, healthy trees are left to provide seed for naturally reseeding the stand, and to create partial shade to inhibit the growth of weeds and brush until the desirable seedlings are well established. The final cut or clearcut is normally done when there are a sufficient number of desirable trees that are 3-5 ft. tall.

The first thinning can be a killing of the undesirable species such as ironwood, elm, bitternut hickory, and boxelder. This removes the seed source for the undesirable species and opens up the ground to sunlight.

The mature and defective trees can be harvested if additional sunlight is needed for the development of desirable seedlings. The harvest should be light, removing the trees that are deteriorating and leaving the high quality trees for seed.

The shelterwood system can take many years to develop a good stocking of desirable young trees. You may have to kill the undesirable species several times to favor the species you want. The final clearcut should not be made until you are satisfied with the stocking of desirable young trees.