FOREST WILDLIFE STEWARDSHIP PLAN

FOR

NORTH BEAR WILDLIFE AREA

Developed by Gary Beyer
District Forester
and
Terry Haindfield
Wildlife Biologist

IOWA DEPARTMENT OF NATURAL RESOURCES WILDLIFE BUREAU

FOREST WILDLIFE STEWARDSHIP PLAN

A plan that will increase the diversity of forest wildlife and prioritize species of greatest concern.

In Iowa, the Department of Natural Resources (IDNR) 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 IDNR Wildlife Management Area (WMA) forests. 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 wildlife managers. The longevity factor emphasizes the need for a Forest Wildlife Stewardship Plans (FWSP) in order to wisely manage our WMA forests.

There are 3 primary factors emphasizing the need for FWSP's for WMA's:

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 proper overstory and understory tree species for associated forest-interior species.

Some wildlife species use all 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 indigenous game bird, the ruffed grouse and the migratory game bird 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 veery 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 IDNR Wildlife Bureau's State Comprehensive Wildlife Conservation Plan identifies these species and others as species of greatest conservation needs (Tables 1-6).

Generally, the Wildlife Bureau manages state-owned forest for the greatest diversity of forest wildlife and esthetic value. The IDNR Wildlife Bureau's FSP will prioritize the "species of greatest conservation needs," and will utilize habitat factors to benefit species of declining populations. Forests land inventory will be conducted on each WMA and the information will be entered into a database. This database along with the following FWSP definitions and guiding factors will be use to make forest management decisions on the WMA's.

FOREST WILDLIFE STEWARDSHIP PLAN DEFINITIONS AND GUIDING FACTORS

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.

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.

Woodland Edge – 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.

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.

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.

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.

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.

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.

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.

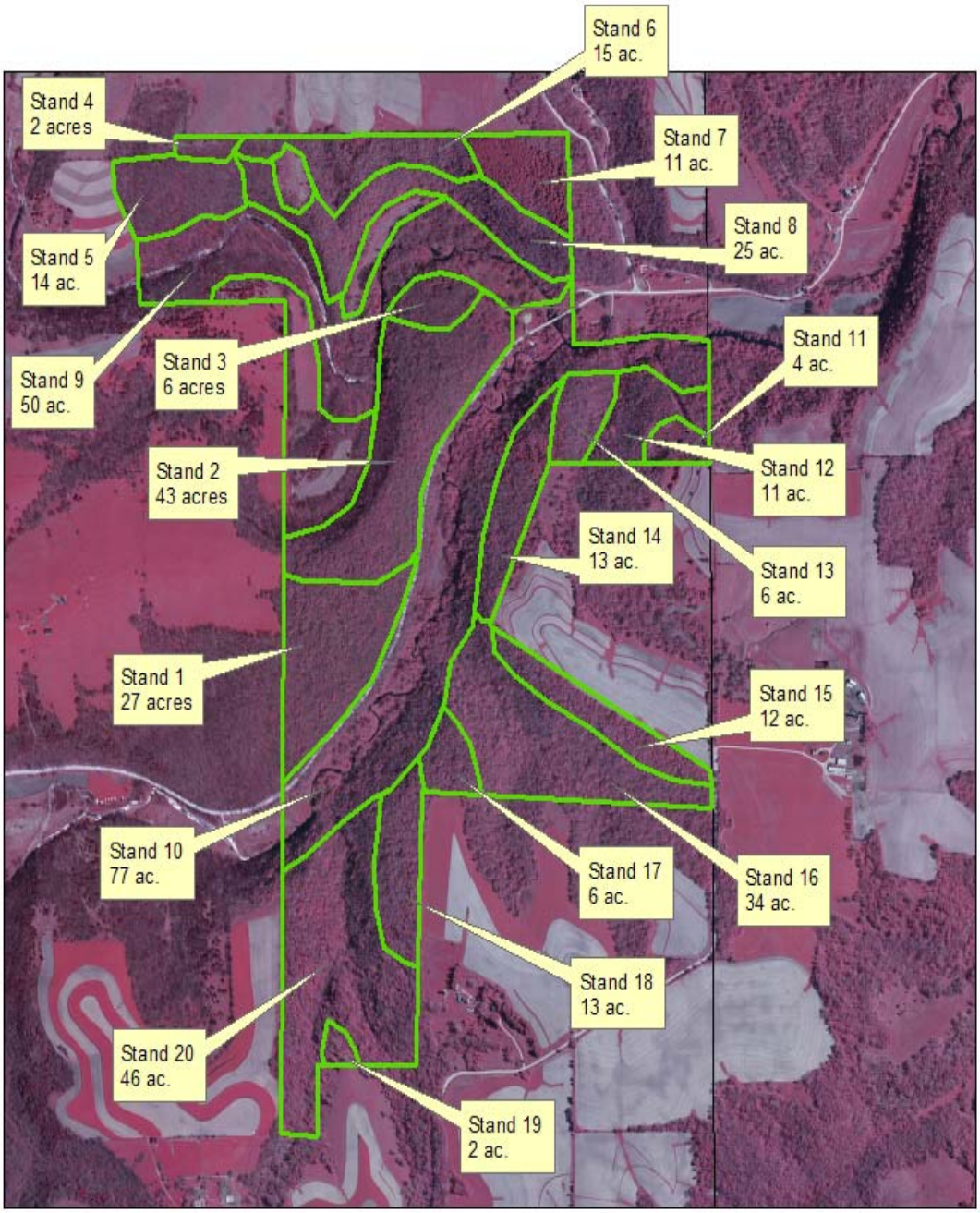
Unique Natural Sites – Sites that contain unusual or rare natural components that should be preserved for their unique characteristics, such as algific slopes. This habitat factor will identify these uncommon sites for management considerations.

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.

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.

WOODLAND MANAGEMENT PLAN
FOR NORTH BEAR WILDLIFE AREA



Sec. 25 & 36 Highland Twsp.,
T100N-R7W, Winneshiek Co.

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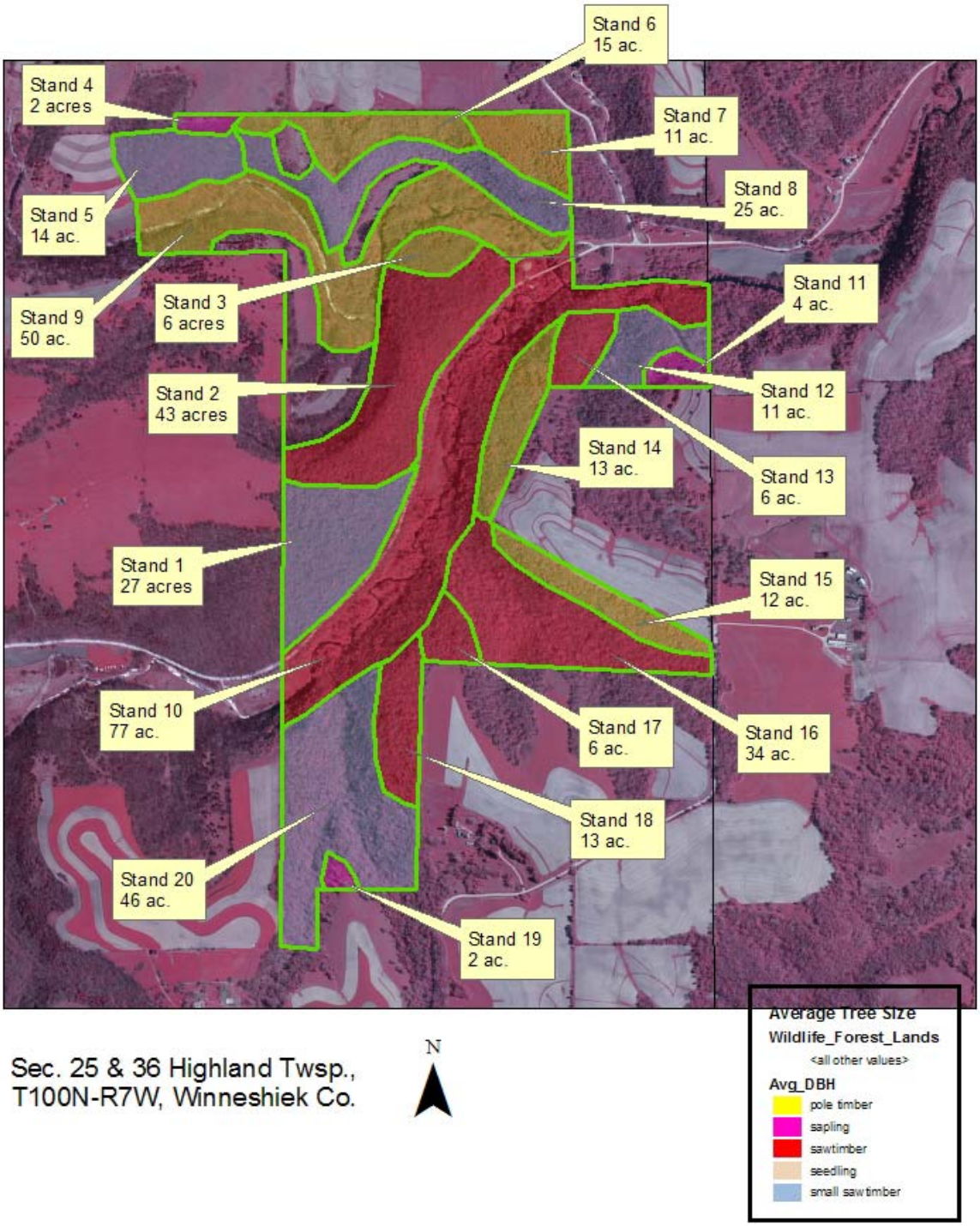
NORTH BEAR WILDLIFE AREA
AVERAGE TREE SIZE



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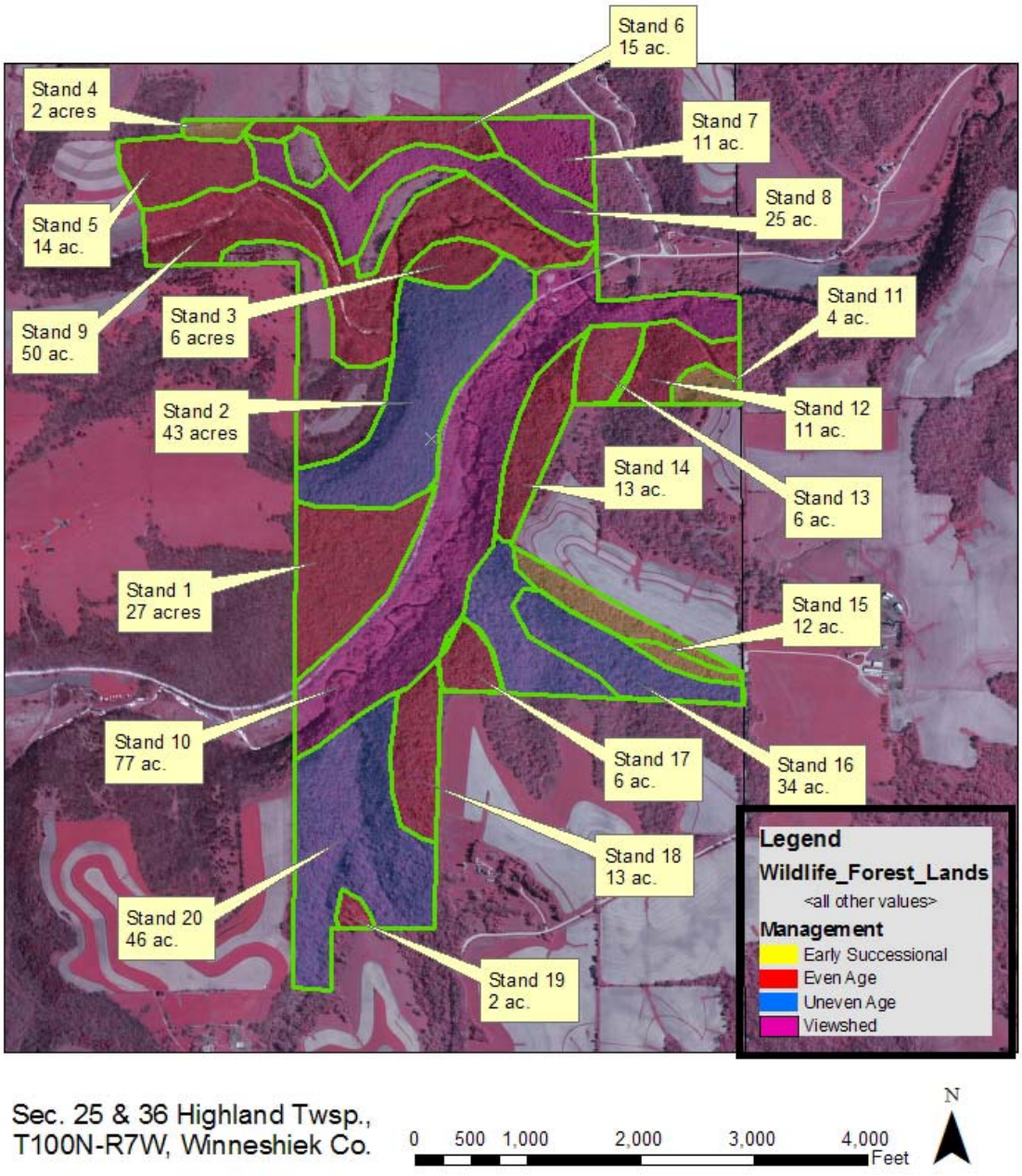
WOODLAND MANAGEMENT PLAN
FOR NORTH BEAR WILDLIFE AREA



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DATE: 7/8/05

FOREST WILDLIFE STEWARDSHIP PLAN
FOR
NORTH BEAR WILDLIFE AREA

Prepared by Gary Beyer, District Forester
And Terry Haindfield, Wildlife Biologist

MANAGER:

Terry Haindfield
2296 Oil Well Rd.
Decorah, Iowa 52101

TELEPHONE: 563/382-4895

LOCATION: Sec. 25 & 36 Highland Twsp., T100N-R7W, Winneshiek County

TOTAL ACRES: 417

DESCRIPTION OF AREA

The 417 acres addressed in this plan are outlined on the attached aerial photo. The area is divided into 20 different areas or stands, labeled 1-20 on the map. Each area is described in this plan and recommendations outlined for woodland management.

A trout steam runs through the North Bear Wildlife Area. The woodland is a mixture of steep slopes, ridge tops, and stream valleys.

Objectives -

The primary objectives for the area are improving wildlife habitat for a variety of wildlife species, recreation, water quality, and protecting threatened and endangered species. This Forest Wildlife Stewardship Plan strives to develop a forest ecosystem that has a diversity of tree sizes and species. Developing a diverse forest will benefit the widest variety of wildlife species. Wildlife species have diverse habitat requirements. Even on a Wildlife Management Area, what is productive habitat for one species may be unproductive for another.

Oak acorns are an important food source for many species of wildlife. Maintaining large oak trees and regenerating young stands of oak to replace the older trees are a major focus of the recommendations. Oak is by far the most important tree for a variety of wildlife species, and is a difficult tree to regenerate because it will not survive in shade. Ruffed grouse, woodcock, and Eastern Towhee populations in northeast Iowa are declining due to a lack of early successional growth. Neotropical migratory birds dependent on early successional growth are also declining.

Clearcutting or Shelterwood cutting are even age management techniques to regenerate oak and provide early successional growth. Areas suitable for even age management will be managed to create stands with an oak component. Although clearcutting is planned for even age stands, the next harvest would not occur for 125 years. Some current even age stands may not be harvested for 60 or 80 years. Even age management is the only forest management system that will regenerate stands with an oak component.

Uneven age management develops a forest with all tree sizes, from seedlings to large trees present. Uneven age management will gradually convert areas to hard maple and basswood, because these species are able to grow in shade. As older trees are selectively harvested or die, species that are able to survive in the shade will fill in the openings.

Fragile sites and areas that are important for their visual impact will be left as viewshed or old growth forests to provide areas where natural beauty, stream protection, and erosion control are the primary focus.

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 cut the early successional habitats. Harvesting is a very minimal portion of this plan. The majority of the work recommended is to thin young stands so that the oak is not shaded out by other trees, remove undesirable species to encourage natural regeneration of desirable trees, complete the early successional work, and tree planting.

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)	12	3
Pole size (5-12" dbh.)	103	25
Medium (14-18" dbh.)	123	29
Large (>20" dbh)	179	43
Totals	417	100

Proposed Management Systems for the Area -

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

Based on my recommendations for North Bear Wildlife Area, the acres under each management system are as follows -

Management System	Acres	% of Total Area
Early Successional	18	4
Even Age	163	39
Uneven Age	123	30
Viewshed	113	27

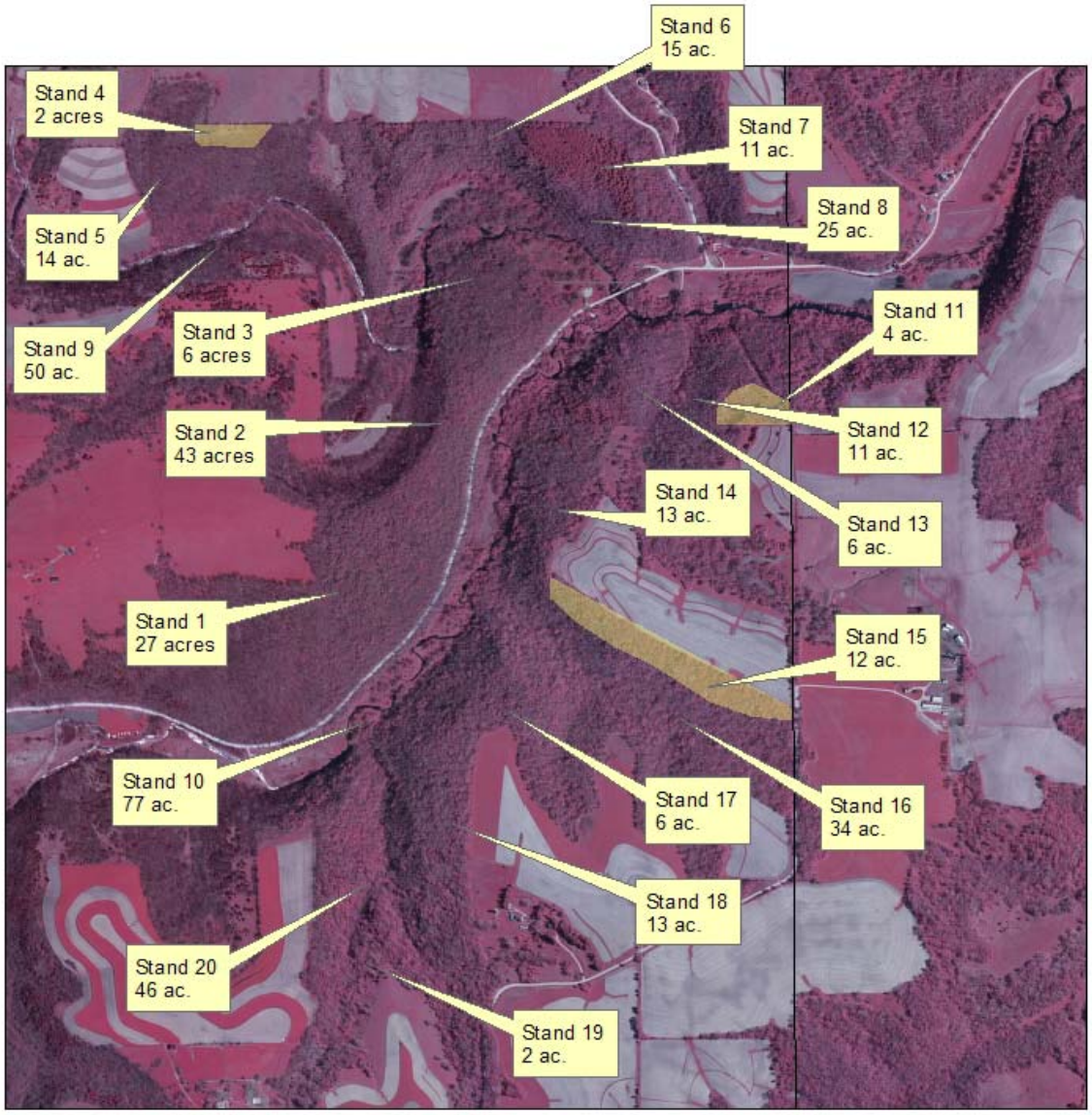
Early Successional Management -

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 woody growth. The high stem density of both trees and shrubs provides suitable nesting habitat and protection from predators. Because aspen will spout 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. Ideally, 1/3 of the aspen would be sapling size (1-4" dia.), 1/3 pole sized (5-10" dia.), and 1/3 medium sized (12-16" dia.). Big tooth aspen will grow to 16-20" in diameter, but small tooth aspen generally begins to die at 14-16" in diameter.

NORTH BEAR WILDLIFE AREA
EARLY SUCCESSIONAL MANAGEMENT AREAS



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T100N-R7W, Winneshiek Co.

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Even Age Management -

Even age management is essential for wildlife species depending on oak/hickory forests. Even though large blocks of forest are needed on some Wildlife Management Areas for some wildlife species, each stage of an even age stand provides habitat for wildlife. For example, regenerating stands (1-10 years) 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, may be used by black and white, Kentucky, and worm eating warblers. From age 20 to 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 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.

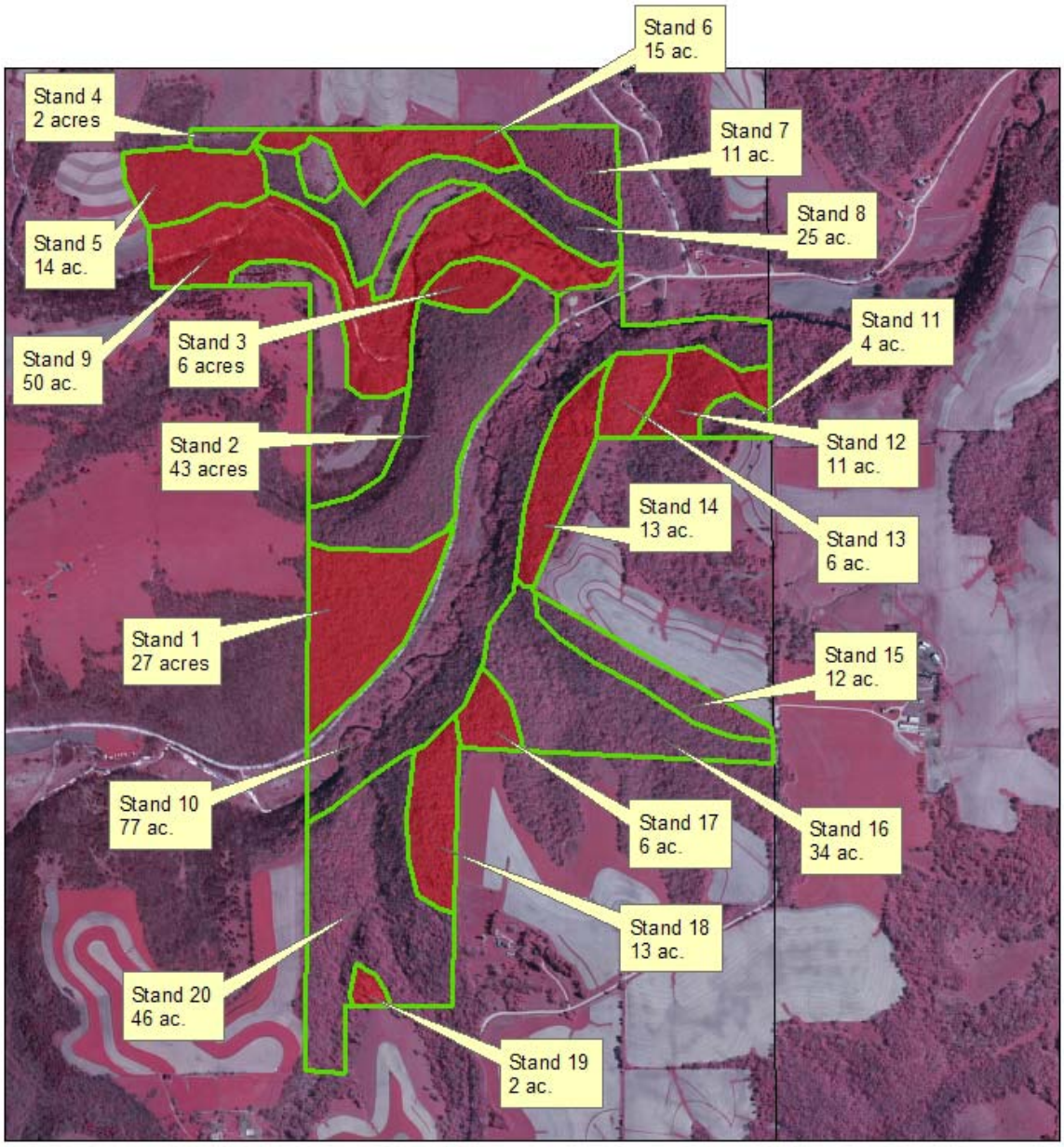
Even age management involves clearcuttting and planting, clearcutting with regeneration already established, or a shelterwood system to develop desirable seedlings on the ground.

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.

NORTH BEAR WILDLIFE AREA
EVEN AGE MANAGEMENT AREAS



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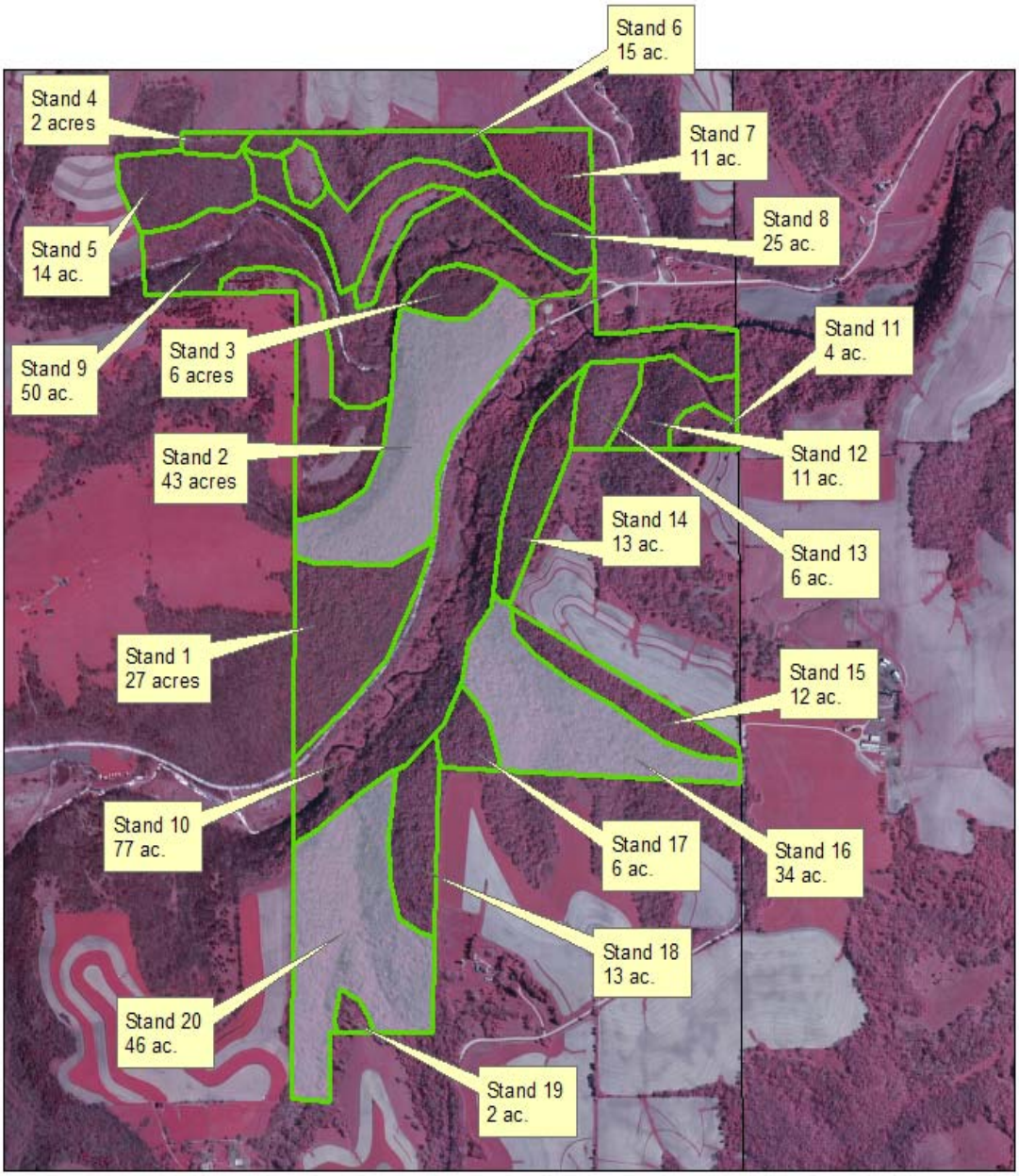
Uneven Age Management -

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.

Uneven age management will maintain blocks of woodland that will always have larger trees. Uneven age management 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 minimal disturbance. Large tracts of uneven management will provide necessary habitat for neotropical migratory birds such as cerulean, hooded, Canada, and Kentucky warblers. Selective harvesting will create small openings in the canapy, 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, including the Northern myotis and red squirrel, species of greatest conservation need. Timber stand improvement and selective harvesting will create woody debris on the forest floor for reptiles and amphibians.

NORTH BEAR WILDLIFE AREA
UNEVEN AGE MANAGEMENT AREAS



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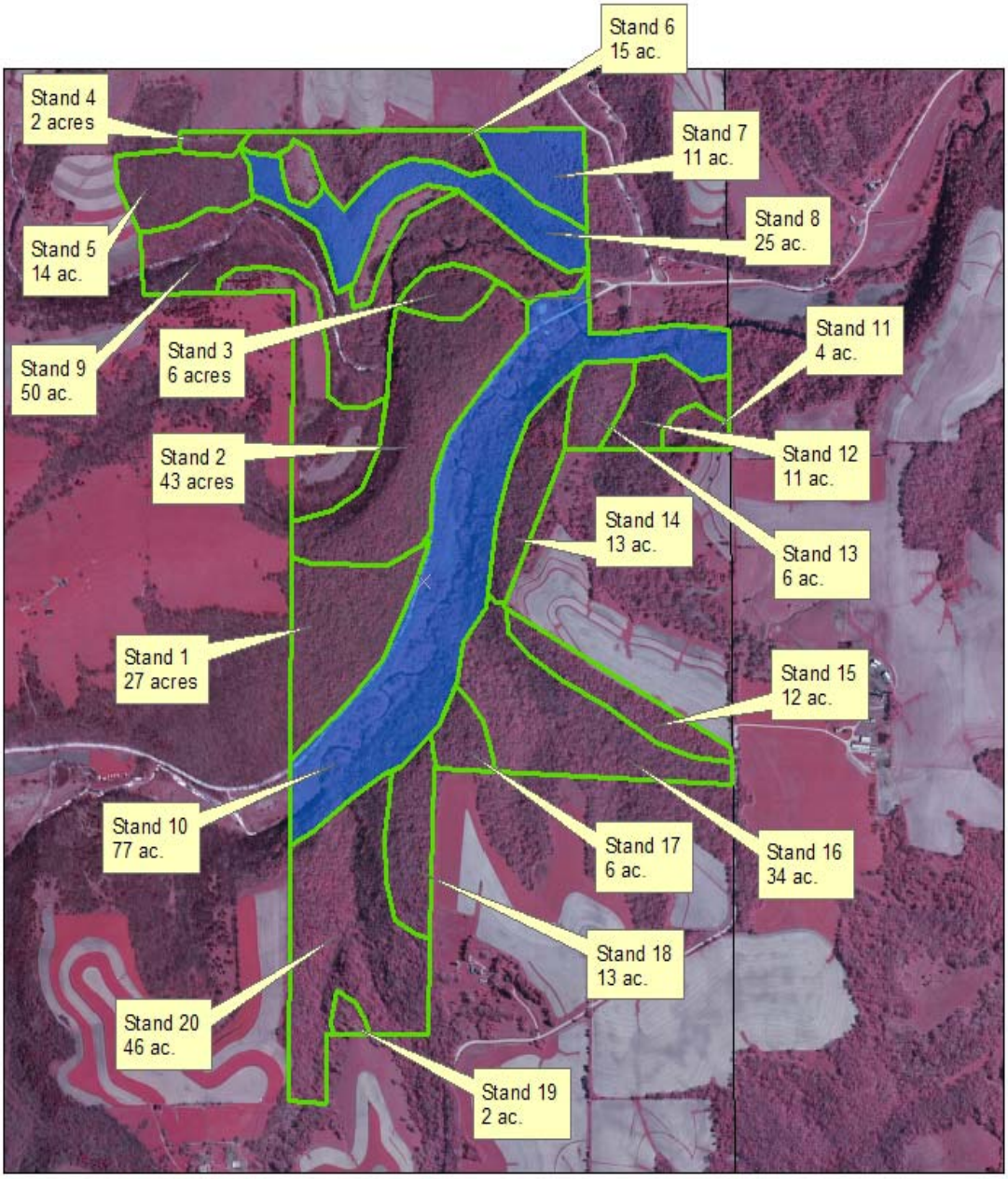
Viewshed Management -

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, but the major objective is to have very minor disturbance if any.

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

Viewshed management is designated for 589 acres on the area, or 40% of the forest resource.

NORTH BEAR WILDLIFE AREA
VIEWSHED MANAGEMENT AREAS



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Soils

The steep slopes have shallow soils over limestone. The east and north facing slopes are cooler and productive for tree growth. The west and south facing slopes are droughty. Bur oak and red cedar normally occupy these dry slopes. The ridge tops have Fayette and Dubuque silt loam soils. These are very good soils for upland hardwood trees such as oak, hickory, and walnut. The bottomland has alluvial soils, which are soils deposited by flooding. Normally green ash, silver maple, cottonwood, and hackberry grow best on the floodplain sites.

WORK PLAN

FOR

NORTH BEAR WILDLIFE AREA

This is the "working plan" for North Bear Wildlife Area designed to aid professional biologists and foresters in the implementation of forest management practices. It is written with the understanding that these professionals have an understanding of forest management principles and techniques. All of the details of the management techniques suggested are not listed because the plan would become too long to be of practical use. This plan is intended to get work accomplished on the ground.

FOREST MANAGEMENT

DESCRIPTION AND RECOMMENDATIONS FOR INDIVIDUAL STANDS

Stand 1: 27 acres

Stand 1 is a south and east facing slope. The timber is pole to small sawtimber (6-14" dbh) white oak, black oak, shagbark hickory, basswood, hard maple, and elm. There are scattered, large white oak, black oak, and basswood.

Stand 1 can be managed on an even age system. The scattered, large trees could be harvested to create an even age stand. Following the harvest, the crop trees could be released. This area is low priority at this time.

Improvement Harvest –

Harvest the scattered, large white oak, black oak, and basswood. Large white oak along the road and west border could be left for mast production.

Timber Stand Improvement (Crop Tree Release) –

Following the harvest, locate the best tree every 30 ft. apart. Remove trees with crowns that are touching or overtopping the crowns of the crop trees. Trees to favor as crop trees are oak, hickory, basswood, and hard maple.

Stand 2: 43 acres

Stand 2 is a ridge top and steep slopes. The timber is small sawtimber to sawtimber (14" and larger dbh) red oak, white oak, walnut, hard maple, and basswood. There are scattered, large red oak. The understory is hard maple, ironwood, elm, and ash.

Stand 2 can be managed as an uneven age stand. Hard maple is very prevalent in the understory and the steep slopes are more conducive to uneven age management.

Selective Harvest –

In approximately 10 years, the stand could be selectively harvested. The large oak are beginning to deteriorate and could be salvaged. The harvest would remove mature and defective trees. Large oak that are healthy would be left for mast production.

Timber Stand Improvement (Weed Tree Removal) -

The undesirable species such as elm, ironwood, bitternut hickory, and boxelder could be killed. The trees should be cut off or girdled. Tordon RTU should be applied to the cut surface to prevent resprouting. This work can be done anytime except spring during heavy sap flow. Remove undesirable species that are 1" and larger in diameter.

In addition, desirable species that are poor formed or damaged should be coppiced. This is cutting the trees at ground level so the stumps will sprout. No herbicide should be used on the stumps of desirable species.

Stand 3: 6 acres

Stand 3 is a stand of large pole sized (8-10" dbh) red oak, basswood, bitternut hickory, and cherry. This area could be thinned to favor the development of the oak.

Timber Stand Improvement (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.

Locate your good quality trees. Do not waste your time and money on poor quality trees. If there are no high quality trees present on an area, go on to an area with good trees. You can not create high quality trees. Either they are present or not. Be selective and work with only your best trees.

The trees to be removed can be felled or double girdled. No herbicide is necessary.

Stand 4: 2 acres

Stand 4 was clearcut to create grouse habitat 7 years ago. The area is sapling aspen, ash, walnut, and black oak. The oak and walnut are from stump sprouts. This area will be maintained as a "grouse edge" and should be clearcut again in approximately 8 years to maintain the dense, young growth.

Stand 5: 14 acres

The area is a gentle south facing slope with a nice stand of small sawtimber (14-18" dia.) walnut, black oak, and white oak. The understory is elm, ash, bitternut hickory, and hackberry. This area could be managed on an even age system and worked in with the edge management work. In approximately 20 years, 5-7 acres could be clearcut harvested to create grouse cover and regenerate oak and walnut.

Stand 6: 15 acres

Stand 11 is a ridge top with pole sized walnut, black oak, red cedar, aspen, bur oak, and white oak. There is a good percentage of oak on the area. This stand could be thinned to favor the growth of oak and walnut.

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Locate your good quality trees. Do not waste your time and money on poor quality trees. If there are no high quality trees present on an area, go on to an area with good trees. You can not create high quality trees. Either they are present or not. Be selective and work with only your best trees.

The trees to be removed can be felled or double girdled. No herbicide is necessary.

Stand 7: 11 acres

Stand 7 was planted to white pine 40 years ago. Where there was poor initial survival, white pine naturally seeded in. The majority of the trees are 6-12 inches in diameter. The stand is overstocked and trees are beginning to die from crowding. In order to maintain a nice stand of white pine with healthy trees, the stand should be thinned.

The area should be thinned so that the trees have an average spacing between trees of 12 to 14 ft. apart. This can be done in stages over the next several years to minimize wind damage.

Stand 8: 25 acres

Stand 8 is a steep, south facing slope with bur oak, black oak, and red cedar. This area should be left as is, or viewshed management.

Stand 9: 50 acres

Stand 9 is bottomland along the trout stream. The area is mainly pole sized walnut, elm, and boxelder. There are scattered, large cottonwood, hackberry, bur oak, and elm. Some of the larger trees could be harvested to create an even age stand. Following the light harvest, the stand could be thinned to provide more growing space for the high quality, young walnut.

Improvement Harvest –

Harvest merchantable elm, and large cottonwood and hackberry. Healthy bur oak should be left for mast production.

Timber Stand Improvement (Crop Tree Release) –

Locate the high quality, pole sized walnut and hackberry. Select the best tree every 30 ft. apart. Remove trees with crowns that are touching or overtopping the crowns of the selected trees. Some areas will have no crop trees to work with. Leave these areas as they are.

Stand 10: 77 acres

Stand 10 consists of steep slopes and bottomland along the trout stream. The area has a mixture of hardwoods such as red oak, white oak, bur oak, hard maple, basswood, elm, and a few white pine. The understory is elm, ironwood, hard maple, and basswood. Because this area is very visible from the gravel road and the slopes are very steep, I recommend viewshed management, where the area will be left as is.

Stand 11: 4 acres

Stand 11 was clearcut for grouse habitat 5-6 years ago. The area is a dense stand of sapling aspen. This area should be clearcut again in 7-8 years to maintain a dense stand of aspen.

Stand 12: 11 acres

The woods is pole to small sawtimber (8-16" dia.) black ash, bitternut hickory, walnut, hard maple, and elm. There are scattered, large red oak, white oak, and walnut. The stand can be managed on an even age system and clearcut in roughly 15 years. This will add more grouse cover to this upland area.

Stand 13: 6 acres

Stand 13 is a ridge and north east facing slope. The timber is sawtimber red oak, white oak, and walnut. The understory is bitternut hickory, black ash, ironwood, elm, and hard maple. This area can be clear cut and planted with oak to regenerate oak and develop early successional growth.

Clearcut Harvest –

All trees 14 inches and larger in diameter will be marked and scaled. The trees will be advertised for sale on a lump sum, sealed bid sale.

Site Preparation

Following the harvest, all remaining trees over 1 inch in diameter will be cut at ground level. The stumps of undesirable species will be treated with Tordon RTU to prevent sprouting.

Oak Planting -

Plant the area with large oak seedlings. Planting large stock is essential for the trees to compete with the competition and grow above deer browsing height. The trees should be a minimum of 18-24" in height and 3/8" in caliper. Plant the trees 30 ft. apart, or 50 trees per acre.

Deer and rabbits will heavily browse oak seedlings. It is nearly impossible to establish oak without protection. You can protect the seedlings with a vented, plastic shelter or a wire cage. It you use wire, I suggest using 14 gauge welded wire with 2 X 4 inch openings. Cut a 4 ft. piece of wire and wrap it into a hoop making a 15 inch diameter cage. Fasten the wire cage to a steel post or stake.

Control competing vegetation by spot spraying a combination of Roundup and Princep 4L herbicides. Protect the seedling from the spray and spray an area 4 ft in

diameter around each tree. Apply 2 quarts of Roundup and 4 quarts of Princep 4L per acre treated. The herbicides must be applied when the vegetation is actively growing. The trees should have 2 growing seasons of competition control.

Stand 14: 13 acres

Stand 14 is pole sized cherry, aspen, hard maple, walnut, bitternut hickory, birch, and a few red and black oak. There are scattered, large red and white oak. The large trees can be left. Areas not shaded by the large trees can be thinned to release the crop trees.

Timber Stand Improvement (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.

Locate your good quality trees. Do not waste your time and money on poor quality trees. If there are no high quality trees present on an area, go on to an area with good trees. You can not create high quality trees. Either they are present or not. Be selective and work with only your best trees.

The trees to be removed can be felled or double girdled. No herbicide is necessary.

Stand 15: 12 acres

The timber is pole sized aspen, ironwood, bitternut hickory, cherry, elm, basswood, and a few oak and walnut. There are scattered, sawtimber size shagbark hickory, black oak, and bur oak. Stand 15 will be managed as an edge for grouse. The west 3-4 acres were clearcut 5-6 years ago. The scattered, large trees could be harvested. The 12 acres could then be put on a rotation where 1/3 of the area or 4 acres are clearcut every 5-6 years.

Stand 16: 34 acres

Stand 16 is a ravine with steep side slopes. The timber is sawtimber hard maple, basswood, elm, red oak, black oak, and white oak. The understory is hard maple, elm, ironwood, basswood, and bitternut hickory. Garlic mustard forms a solid ground cover over much of this area.

Stand 16 can be managed on an uneven age system by selective harvesting and removing the undesirable species.

Selective Harvest –

The merchantable elm and defective trees can be harvested. Healthy oak should be left. The harvest would be a light cut of approximately 1,000 board feet per acre.

Timber Stand Improvement (Weed Tree Removal) -

The undesirable species such as elm, ironwood, bitternut hickory, and boxelder could be killed. The trees should be cut off or girdled. Tordon RTU should be applied to the cut surface to prevent resprouting. This work can be done anytime except spring during heavy sap flow. Remove undesirable species that are 1" and larger in diameter.

In addition, desirable species that are poor formed or damaged should be coppiced. This is cutting the trees at ground level so the stumps will sprout. No herbicide should be used on the stumps of desirable species.

Stand 17: 6 acres

Stand 17 is a ridge top with sawtimber red and white oak. The understory is mainly ironwood. There are some hard maple seedlings present, but they are not dense. This area could be clearcut and planted with oak as recommended for Stand 13.

Clearcut Harvest -

All trees 14 inches and larger in diameter will be marked and scaled. The trees will be advertised for sale on a lump sum, sealed bid sale.

Site Preparation -

Following the harvest, all remaining trees over 1 inch in diameter will be cut at ground level. The stumps of undesirable species will be treated with Tordon RTU to prevent sprouting.

Oak Planting -

Plant the area with large oak seedlings. Planting large stock is essential for the trees to compete with the competition and grow above deer browsing height. The trees should be a minimum of 18-24" in height and 3/8" in caliper. Plant the trees 30 ft. apart, or 50 trees per acre.

Deer and rabbits will heavily browse oak seedlings. It is nearly impossible to establish oak without protection. You can protect the seedlings with a vented, plastic shelter or a wire cage. It you use wire, I suggest using 14 gauge welded wire with 2 X 4 inch openings. Cut a 4 ft. piece of wire and wrap it into a hoop making a 15 inch diameter cage. Fasten the wire cage to a steel post or stake.

Control competing vegetation by spot spraying a combination of Roundup and Princep 4L herbicides. Protect the seedling from the spray and spray an area 4 ft in diameter around each tree. Apply 2 quarts of Roundup and 4 quarts of Princep 4L per acre treated. The herbicides must be applied when the vegetation is actively growing. The trees should have 2 growing seasons of competition control.

Stand 18: 13 acres

Stand 18 is a ridge top with sawtimber size white oak and black oak. The understory is ironwood, hard maple, and elm. Stand 18 should be managed on an even age system to maintain oak. In roughly 15 years, approximately 6 acres could be clearcut. In approximately 30 years, the remaining 7 acres could be clearcut.

Stand 19: 2 acres

This area is semi open with a good stocking of red and white oak seedlings and saplings. All non oak species should be killed in this area so they do not shade out the young oak. The non oak species should be cut and the stumps treated with Tordon RTU to prevent sprouting.

Stand 20: 46 acres

This area has steep, east and west facing slopes. The timber was logged heavy roughly 20 years ago. The stand is large pole to small sawtimber hard maple, elm, basswood, white oak, and bitternut hickory. There are scattered, large white oak, red oak, elm, and basswood. Stand 20 can best be managed on an uneven age system of management. In roughly 15 years, the stand could be selectively harvested.

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 cut per year. The target rotation age for the area is 125 years. This insures that large oaks will always be present on the area.

Early Successional Management -

The early successional areas will be managed on a 15 year rotation. There are 18 acres designated for early successional management. The allowable cut is 1.2 acres per year (18 acres divided by 15 yrs.). With a working cycle of 5 years, approximately 6 acres could be cut every 5 years.

Even Age Management Area –

There are 163 acres under even age management. Dividing 163 acres by 125 years, yields an allowable cut of 1.3 acres per year, or 6-7 acres every 5 years.

Uneven Age Management Area –

Stands can be selectively harvested every 20 years to remove mature and defective trees. There are 123 acres under uneven age management. The allowable harvest is 30 acres of selective harvest every 5 years.

HIGH PRIORITY PROJECTS

Timber Stand Improvement -

Stand #	**Acres**	**Prescription**
3	6	Release crop trees
6	15	Release crop trees
14	13	Release crop trees
16	34	Kill undesirable species following selective harvest
19	2	Kill all non oak species
Total	70	

Harvests -

Stand #	**Acres**	**Prescription**
13	6	Clearcut and plant oak
16	34	Selectively harvest mature and damaged trees
17	6	Clearcut and plant oak
Totals	46	

APPENDIX

NORTH BEAR WILDLIFE AREA

SUMMARY OF WOODLAND STANDS

No.	Acres	Timber Type	TreeSize	Mngt. System	Prescription	Priority	Year Complete	Comments
1	27	Oak, Hickory	Medium	Even	Harvest & Crop Tree Release	Low		
2	43	Mixed Hardwds	Large	Uneven	Selective Cut	Medium		
3	6	Oak-Basswood	Pole	Even	Crop Tree Release	High		
4	2	Aspen-Oak	Sapling	Even	Clearcut for grouse in 7-8 yrs.	Medium		
5	14	Oak-Walnut	Medium	Even	Clearcut & Plant	Medium		
6	15	Oak – Walnut	Pole	Even	Crop Tree Release	High		
7	11	White Pine	Pole	View Shed	Thinning	Low		
8	25	Oak – Cedar	Medium	View Shed				
9	50	Walnut-Elm-Boxelder	Pole	Even	Crop Tree Release	Medium		
10	77	Mixed Hardwds	Large	View Shed				
11	4	Aspen	Sapling	Even	Clearcut for grouse in 7-8 yrs.	Medium		
12	11	Mixed Hardwds	Medium	Even	Clearcut in 15 yrs.	Medium		
13	6	Red, White Oak	Large	Even	Clearcut & Plant	High		
14	13	Mixed	Pole	Even	Crop Tree Release	High		

		Hardwds						
15	12	Aspen-Hickory-Oak	Pole	Even	Clearcut 4 acres for grouse	Medium		
16	34	Mixed Hardwds	Large	Uneven	Selective harvest and TSI	High		
17	6	Red & White Oak	Large	Even	Clearcut & Plant	High		
18	13	White & Black Oak	Large	Even	Clearcut in 15 years	Medium		
19	2	Red & White Oak	Sapling	Even	Kill all non oak species	High		
20	46	Mixed Hardwds	Medium	Uneven	Selective harvest in 15 years	Medium		

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

Common Name	Scientific Name
Bald eagle	*Haliaeetus leucocephalus*
Red-shouldered hawk	*Buteo lineatus*
Broad-winged hawk	*Buteo platypterus*
Peregrine falcon	*Falco peregrinus*
Ruffed grouse	*Bonasa umbellus*
American woodcock	*Scolopax minor*
Black-billed cuckoo	*Coccyzus erythropthalmus*
Yellow-billed cuckoo	*Coccyzus americanus*
Long-eared owl	*Asio otus*
Whip-poor-will	*Caprimulgus vociferus*
Red-headed woodpecker	*Melanerpes erythrocephalus*
Acadian flycatcher	*Empidonax virescens*
Willow flycatcher	*Empidonax traillii*
Least flycatcher	*Empidonax minimus*
Brown creeper	*Certhia americana*
Veery	*Catharus fuscescens*
Wood thrush	*Hylocichla mustelina*
Blue-winged warbler	*Vermivora pinus*
Cerulean warbler	*Dendroica cerulea*
Black-and-white warbler	*Mniotilta varia*
Prothonotary warbler	*Protonotaria citrea*
Worm-eating warbler	*Helmitheros vermivorus*
Louisiana waterthrush	*Seiurus motacilla*
Kentucky warbler	*Oporornis formosus*
Hooded warbler	*Wilsonia citrina*
Eastern towhee	*Pipilo erythrophthalmus*

Table 2. Forest Migratory Birds of Greatest Conservation Need in NE Iowa

Common Name	Scientific Name
Golden-winged warbler	*Vermivora chrysoptera*
Canada warbler	*Wilsonia canadensis*

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

Common Name	Scientific Name
Northern myotis	*Myotis septentrionalis*
Red squirrel	*Tamiasciurus hudsonicus*
Woodland vole	*Microtus pinetorum*
Spotted skunk	*Spilogale putorius*
Southern Flying Squirrel	*Glaucomys volans*

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

Common Name	Scientific Name
Cricket Frog	*Acris crepitans*
Northern Prairie Skink	*Eumeces septentrionalis*
Bullsnake	*Pituophis catenifer sayi*
Timber Rattlesnake	*Crotalus horridus*

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

Common Name	Scientific Name
Iowa Pleistocene Snail	*Discus macclintocki*
Frigid Ambersnail	*Catinella gelida*
Minnesota Pleistocene Succinea	*Novasuccinea n. Sp. Minnesota a*
Iowa Pleistocene Succinea	*Novasuccinea n. Sp. Minnesota b*
Briarton Pleistocene Snail	*Vertigo brierensis*
Hubricht's Vertigo	*Vertigo hubrichti*
Iowa Pleistocene Vertigo	*Vertigo iowaensis*
Bluff Vertigo	*Vertigo occulta*

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

Common Name	Scientific Name
Pepper and Salt Skipper	*Amblyscirtes hegon*
Sleepy Duskywing	*Erynnis brizo*
Dreamy Duskywing	*Erynnis icelus*
Columbine Duskywing	*Erynnis lucilius*
Silvery Blue	*Glaucopsyche lygdamus*
Hickory Hairstreak	*Satyrium caryaevorum*
Edward's Hairstreak	*Satyrium edwardsii*
Striped Hairstreak	*Satyrium liparops*

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.