WOOD COUNTY, WI
FOREST COMPREHENSIVE LAND USE PLAN
TABLE OF CONTENTS
CHAPTER 800
INTEGRATED RESOURCE MANAGEMENT

800 CHAPTER OBJECTIVES

1. To introduce and communicate to the public, the County Board of Supervisors, and to the Wisconsin DNR, the integrated resource approach that forestry, wildlife and other natural resource staff will use on the Wood County Forest during this planning period.
2. Counties may wish to consider "Integrated Resource Management Units" (IRMU) that will identify and summarize the natural resources, social and physical management potential and opportunities for each unit. Although Wood County Forest accommodates certain areas associated with specialized uses (e.g. ATV Intensive Use Area, Public Shooting Range), there are no areas managed or planned for any special timber or habitat management different from the rest of the forest. Should this situation change and specific IRMUs be developed in the future, they will be identified in this chapter as well as Chapter 3000.

805 INTEGRATED RESOURCE MANAGEMENT APPROACH

Integrated Resource Management is defined as: "the simultaneous consideration of ecological, physical, economic, and social aspects of lands, waters and resources in developing and implementing multiple-use, sustained yield management" (Helms, 1998).

This balance of ecological, economic, and social factors is the framework within which the Wood County Forest is managed.

The working definition of Integrated Resource Management means, in large part, keeping natural communities of plants and animals and their environments healthy and productive so people can enjoy and benefit from them now and in the future.

The remainder of this chapter is written to help communicate how the Forest is managed on an integrated resource approach.

810 SUSTAINABLE FORESTRY

"The practice of managing dynamic forest ecosystems to provide ecological, economic, social and cultural benefits for present and future generations" NR 44.03(12) Wis. Adm.

Code and s.28.04 (1) (e), Wis. Stats.

For the purpose of this chapter, <u>sustainable</u> <u>forestry</u> will be interpreted as the management of the Forest to meet the needs of the present without knowingly compromising the ability of future generations to meet their own needs (economic, social, and ecological) by practicing a land stewardship ethic which integrates the growing, nurturing, and harvesting of trees for useful products with the conservation of soil, air and water quality, and wildlife and fish habitat. This process is dynamic, and changes as we learn from past management.

810.1 TOOLS IN INTEGRATED RESOURCE MANAGEMENT

810.1.1 Compartment Recon

The County will support and utilize the compartment reconnaissance procedures as set forth by the DNR Public Forest Lands Handbook 2460.5. WisFIRS serves as the database for housing recon information.

810.1.2 Forest Habitat Classification System

The Forest Habitat Classification System (*A Guide to Forest Communities and Habitat Types of Northern Wisconsin Second Edition; Kotar, et al.*) is a natural classification system for forest communities and the sites on which they develop. It utilizes systematic interpretation of natural vegetation with emphasis on understory species.

Forest Habitat Classification Types are discussed in detail in the "Integrated Resource Management Units" (Section 880) section of this chapter.

810.1.3 Soil Surveys

Forestry staff's knowledge of forest ecology and their experience across the landscape can assist in associating forest habitat types and site indices with soil type information. These associations can be beneficial in determining management prescriptions for specific sites. WisFIRS contains soil survey data, and this information can be found on the NRCS website-based soil survey.

810.1.4 Ecological Landscapes of Wisconsin

The Wisconsin DNR uses Ecological Landscapes of Wisconsin (WDNR Handbook 1805.1) which is an ecological land classification system based on the National Hierarchical Framework

of Ecological Units (NHFEU). Ecological landscapes distinguish land areas different from one another in ecological characteristics. A combination of physical and biological factors including climate, geology, topography, soils, water, and vegetation are used. They provide a useful tool and insight into ecosystem management. Land areas identified and mapped in this manner are known as ecological units.

Generally accepted silvicultural systems are prescribed on a stand level scale, in recognition of the position within an ecological landscape.

810.1.5 Integrated Pest Management

"The maintenance of destructive agents, including insects, at tolerable levels, by the planned use of a variety of preventive, suppressive, or regulatory tactics and strategies that are ecologically and economically efficient and socially acceptable"

The Committee has the authority to approve and direct the use of pesticides and other reasonable alternatives in an integrated pest management program on the Forest.

Refer to Chapter 600 (610.3) for discussion that is more detailed and integrated pest management strategies.

810.1.6 Best Management Practices for Water Quality

The most practical and cost-effective method to assure that forestry operations do not adversely affect water quality on the County Forest is to utilize "best management practices" (BMP's) as described in *Wisconsin's Forestry Best Management Practices for Water Quality. Publication number FR-093*.

Consistent with the aforementioned manual (page 6), Wood County will use BMP's on the Forest with the understanding that the application of BMP's may be modified for specific site conditions with guidance from a forester or other natural resource professional. Modifications will provide equal or greater water quality protection or have no impact on water quality. Areas with highly erodible soil types, proximity to streams or lakes, or steep slopes may require mitigating measures in excess of those outlined in the manual. All Wood County employees practicing forestry will receive BMP training. Additionally, Wood County will encourage BMP training of all logging contractors that operate on County timber sales.

810.1.7 Fire Management

Reference Chapter 600.

810.1.7.1 Prescribed Fire

Prescribed burning on the County Forest may play an important role in management. Many of the plant communities present today are the result of wild fires.

As the needs are presented to regenerate or maintain timber types or other plant communities, the Committee will examine the costs and benefits of each opportunity. Increased regulations, the county's cost of completing the burn, and the risk of breakouts and uncontrolled fires will have to be considered with any benefits of vegetation management through prescribed burning.

All prescribed burning will be done in accordance with Wisconsin State Statutes 26.12, 26.14, and the DNR Prescribed Burn Handbook 4360.5 and in cooperation with the Department of Natural Resources per section 605.5 of this plan.

810.1.8 Outside Expertise, Studies and Survey

Additional data necessary to make management decisions on the County Forest will be sought from agencies or individuals, who have the best capability and technical expertise, including, but not limited to:

- Water Resources: WDNR
- Wildlife Resources: WDNR
- Soil Resources: NRCS
- Mineral Resources: WDNR
- Wetland Resources: WDNR, Army Corps of Engineers, County Zoning
- Navigable Streams: WDNR, Army Corps of Engineers, County Zoning
- Floodplains: County Zoning
- Cultural Resources: WDNR, State Historical Society
- Entomology / Pathology: WDNR
- Endangered Resources: WDNR
- Forestry: Cooperative Field Trials, see WDNR website
- Other subjects as needed

810.1.9 Local Silvicultural Field Trials

To date, numerous silvicultural field trials have been completed, or are ongoing on Wisconsin's County Forests. However, currently there are no trials taking place on the Wood County Forest.

815 MANAGEMENT CONSIDERATIONS TO REDUCE LOSS

815.1 RISK FACTORS

Refer to Chapter 600 for Wood County Forest plans for protection (i.e. fire, insects, diseases, illegal cutting, etc.).

Natural disasters and occurrences such as wind, flooding, fire are unpredictable. In the event of these and other occurrences, Wood County Forest will work to salvage the affected timber as quickly as possible given: immediate hazard to public, scope, location, time of year, markets, availability of contractors. Etc.

820 PLANT COMMUNITIES MANAGEMENT

Wood County recognizes the importance of maintaining the diversity of the forest under an ecosystem approach. The process involved in making management decisions to encourage or not encourage specific species or communities is complex. It includes an understanding of:

- Objectives of the County
- Integration of landforms, soils, climate, and vegetative factors
- Habitat classification
- Past, present and future desired condition
- Surrounding ownership patterns and general objectives
- Wildlife habitat and other values
- Social needs

820.1 SILVICULTURAL PRACTICES/TREATMENTS

Silviculture is the art and science of controlling forest composition, structure, and growth to maintain and enhance the forest's utility for any purpose. These practices are based on research and general silviculture knowledge of the species being managed. The goal is to encourage vigor within all developmental stages of forest stands, managed in an even aged or uneven aged system. The application of silviculture to a diverse forest needs a unified, systematic approach. The DNR Public Forest Lands Handbook (2460.5) and DNR Silvicultural Guidance will be used as guidelines for management practices used on the County Forest.

820.1.1 Natural Regeneration

Where feasible, natural regeneration will be encouraged with silvicultural methods that promote regrowth and recruitment of the forest. In general, the particular silvicultural method chosen will depend on the biological functions of the target species or forest type.

820.1.1.1 Clearcutting/Coppice

Clearcutting is a silvicultural method used to regenerate shade intolerant species. Complete or nearly complete removal of the forest canopy will stimulate the regeneration and growth of species such as aspen, jack pine and white birch. This method is also used as a final rotation removal in species such as red oak, red pine and others. Tree retention guidelines are followed when prescribing clear-cut or coppice cuts.

820.1.1.2 Shelterwood / Seed Tree

Shelterwood harvest is a method used to regenerate mid-shade tolerant and shade tolerant species. Partial canopies stimulate regeneration, enhance growth and can provide seed source. Canopies are eventually removed. This method is used for white birch, white pine, red oak, and northern hardwood (when managing even aged).

820.1.1.3 All Aged Regeneration Harvests

All aged regeneration harvests are used in shade tolerant species. Gaps in the forest canopy allow regeneration to occur throughout the stand. Over time, multiple entries into the stand will create multiple age class structure with the intent of creating a fully regulated stand. All aged regeneration harvests may be prescribed in the form of single tree selection, group selection or patch selection. This method is used in northern hardwood and occasionally in swamp hardwoods (when managing for all aged)

820.1.1.4 Prescribed Burning

Prescribed burning may be utilized as a tool to promote regeneration. A few forest types in the Wood County Forest are ecologically tied to fire. Burning may create seeding conditions or release regeneration from competing vegetation. Although prescribed fire has not been used on the Wood County Forest, it is a tool available to forest managers, and may be used for regeneration of red oak, jack pine or white pine. Any prescribed burns will be conducted in consultation with Wisconsin DNR Forestry personnel, according to DNR Prescribed Burn Handbook 4360.5, and according to DNR burning

regulations.

820.1.1.5 Soil Scarification

Scarification is a technique used to prepare a seedbed beneath forest stands scheduled for harvest and regeneration. This mechanical disturbance that exposes bare mineral seedbeds and creates conditions necessary for regeneration of various species. Disturbance that mixes seed into duff and soil layers creates optimal conditions for regeneration of oak, white birch, fir and others. Wood County may utilize salmon blades, root rakes, straight blade, and anchor chain for soil scarification.

820.1.1.6 Other

Other natural regeneration techniques may be considered where necessary and appropriate. New methods for natural regeneration are continually tested for effectiveness.

820.1.2 Artificial Regeneration

When natural regeneration fails, or when tree species present do not coincide with management objectives for the site, artificial means will be employed to establish a desirable stand of trees. Artificial regeneration on a site usually requires some form of site preparation followed by seeding or planting.

820.1.2.1 Mechanical Site Preparation

Mechanical site preparation includes the use of soil disturbance equipment such as a disc, roller chopper, patch scarifier, disk trencher, root rake, or V-plow prior to tree planting or seeding. These types of equipment are used to reduce logging debris to a smaller size, incorporate debris into the soil, clear brush and debris from the site, prepare a bare mineral seedbed, and to reduce competition from other vegetation.

820.1.2.2 Chemical Site Preparation

Herbicide application can be an effective means of controlling unwanted vegetation in order to establish seedlings or plantations. It should be used sparingly and in situations where mechanical treatment is not expected to provide the level of vegetative control needed. Chemical will be applied in strict accordance with label recommendations, requirements, and under the oversight of a certified applicator. The objective of

herbicide use is not to kill all competing vegetation, but rather kill or set back competing vegetation enough to allow establishment of a reasonably stocked stand of desirable tree trees. Proximity to private lands, residences, highways, and other public use areas shall be considered in selecting both the herbicide(s) and the means of application. Herbicides will normally be applied with motorized, ground based equipment, hand applications, or aerially. A written prescription for each herbicide application will be prepared and kept on file.

820.1.2.3 Prescribed Burning

Prescribed burning for site preparation can be used to reduce logging debris, clear the site, reduce competing vegetation, and to release nutrients into the soil.

820.1.2.4 Tree Planting / Seeding

Both machine and/or hand planting/seeding will be utilized to insure adequate regeneration. The selection of species will be determined according to the specific management objectives and capabilities of each site. Planting or seeding will primarily occur in areas where natural regeneration is inadequate or conflicts with the management goals of the site. Planting/seeding may also be employed to maintain a desirable species distribution on the forest for purposes of aesthetics, biodiversity, and wildlife habitat. Wood County will make all reasonable efforts to source seeds/seedlings from local genetics.

820.1.3 Intermediate Treatments

Intermediate treatments are those practices used to enhance the health and vigor of a forest stand. In general, intermediate treatments are applied to forest stands managed as even aged.

820.1.3.1 Mechanical Release

Mechanical release is the removal of competing vegetation by means other than herbicide or fire. Mechanical may include releasing young pine plantations from competing vegetation using chain saws or other hand-held equipment; or mowing to release regeneration.

820.1.3.2 Chemical Release

Chemical Release is the removal of competing vegetation from desirable trees using herbicides. It should be used sparingly and in situations where mechanical treatment is not expected to provide the level of vegetative control needed. Chemical will be applied in strict accordance with label recommendations, requirements and under the oversight of a certified applicator. A written prescription for each herbicide application will be prepared and kept on file.

820.1.3.3 Non-Commercial Thinning (TSI)

In general, most thinning needs are accomplished through commercial harvest operations. Non-commercial thinning may be considered if the individual site requirements, funding and/or available labor make it desirable.

820.1.3.4 Thinning / Intermediate Cuts

Management of some even aged forest types necessitates the use of commercial thinning, also known as intermediate harvests, to maintain forest health and vigor. Thinning is generally prescribed in forest types such as red pine, red oak, and in cases of even aged hardwood management. Thinning may be prescribed on other even aged types as appropriate and where feasible. Intermediate harvests include prescriptions for residual densities, marking priorities, spacing, crown closure, diameter distribution, or other measurements.

820.1.3.5 Pruning

Pruning is the removal of limbs from lower sections of trees to increase log quality. Additionally, pruning may be conducted to enhance aesthetics in certain situations. Pruning efforts may have been conducted in the past on a limited basis, but it is not generally recognized as economically viable on the forest.

820.2 SILVICULTURAL PRESCRIPTIONS

820.2.1 Even-Aged Management

A forest stand composed of trees having relatively small differences in age. Typical

cutting practices include clear cutting, shelterwood cutting and seed-tree cutting. Even aged management is generally required to manage shade intolerant, early successional forest types.

820.2.1.1 Aspen

These are types where aspen trees comprise of more than 50% of the stems. On the forest, quaking or big tooth aspen or a combination of both may dominate aspen types. Aspen stands contain a wide variety of associated hardwood and conifer species.

Shade tolerance:	*Intolerant*
Habitats:	*PVG*
Intermediate treatments:	*None*
Median rotation age:	45
Primary regeneration method:	*Natural*
Harvest method:	*Clearcutting with coppice, Coppice with reserves*
Habitat value:	*Early successional related species*
Economic value:	*Fiber production / bolts*
Insect disease considerations:	*Hypoxylon and other cankers*
Trends:	General declines on statewide acreage
Landscape considerations:	*Retain/increase acreages where possible*

Aspen Management

Aspen is a shade intolerant species that is found throughout the Wood County Forest and is managed on an even-aged basis. This means that aspen needs full sunlight to regenerate and the best method for creating these conditions for stand replacement is using clearcutting.

The aspen type is recognized as providing habitat values to a wide variety of wildlife species as well as being an important species for economics and fiber production. A bulk of the County Forest revenue is generated through the management of aspen.

The extent of this vital resource is declining to a degree. The chief reason for the decline has been a lack of harvest as stands reach maturity. Forty-seven percent *(down from 60% in the previous planning period)* of Wood County's forested acreage is in the aspen forest type with most of that acreage originating from fires in the 1930's and 1940's. As a result, Wood County has been faced with a large acreage of stands that have matured at the same time. Over the last ten to fifteen years, Wood County has focused on regenerating mature and over-mature aspen stands. Even with this harvest emphasis, Wood County anticipates that the amount of aspen on the forest by the end of this planning period will likely decrease by at least five percent for a number of reasons. Some stands decline to the point where aspen regeneration is no longer

possible (these stands typically succeed to red maple, oak and/or white pine). Other stands present opportunities to encourage other valuable species, such as oak, which are not as abundant on the forest. In addition, acreage reductions occur as recon updates fine tune the database. Red maple and oak are the most common species replacing aspen along with white pine.

Wood County is committed to maintaining as much of its aspen acreage as possible and will accomplish this by regenerating the mature aspen stands using clear-cuts. Aesthetic concerns can be mitigated by retaining pine and/or hardwood tree species on the sites, limiting the size of harvests, and creating irregularly shaped sale boundaries.

820.2.1.2 Oak

These are types where oak species makes up more than 50% of the basal area in pole and saw timber stands, and more than 50% of stems in seedling and sapling stands. Common associates in Wood County are aspen, red maple, white pine, jack pine, white birch.

Shade tolerance: *intolerant to intermediate tolerance depending on species*

Habitats: *PVG, PVRh, PVHa*
Intermediate treatments: *improvement thinning*
Median rotation age: *70-100 years*
Primary regeneration method: *Natural*
Harvest method: *Shelterwood, coppice, overstory removal, group selection*
Habitat value: *Mast-producing species, longer lived den and cavity trees*
Economic value: *fiber production, bolts, sawlogs*
Insect disease considerations: *Oak wilt, gypsy moth, and deer herbivory*
Trends: *somewhat poor regeneration, oak replaced by other species (white pine, red maple)*
Landscape considerations: *Try to maintain or increase oak as major cover type on Wood County Forest.*

Oak Management

Oak forests comprise 22% of the forested acreage and include pin oak/black oak stands on the sand soils and red oak stands on the loamy soils. Northern red oak stands are found in the Hiles block, Yellow River Bottoms, in the Hemlock Creek bottoms of the Hemlock Creek block, and in the northern edge of Owl Creek block. Pin oak and black oak are more common and are found in all blocks of the forest.

Management of red oak forests to date has been primarily limited to improvement thinning's designed to increase the growth and future value of the oak resource. Regeneration harvests in many stands are projected in this planning cycle as stands reach 80 to 100 years and beyond in

age. Red oak stands are managed on an even-aged basis using clear-cut harvests, shelterwood harvests and group selection harvests depending on stand conditions. Wood County will strive to maintain or expand the red oak forest wherever it is found.

The pin and black oak stands are found primarily on the sandier soils. These stands are managed for pulpwood, firewood and low-grade sawlogs. Because of the low value of these stands for saw timber production, they are not generally thinned during their life cycle and are typically managed with one harvest at maturity. Regeneration harvests are scheduled between the ages of 60 and 80 years using clear-cuts, shelterwood harvests, and occasionally seed tree harvests. Oak wilt is a management problem with the black/pin oak forest type (white oaks are encouraged wherever they are found on the forest for long-term protection against oak wilt). Clearcutting and conversion to pine are options for stands severely infected with oak wilt. Additionally, some stands severely impacted by oak wilt are candidates for scarification and seeding to jack pine as a post-harvest option and opportunity to promote biodiversity on the Wood County Forest. Wood County does not anticipate any significant loss of black/pin oak acreage as losses are offset by gains from pine and aspen stands that convert to oak. Aside from oak wilt and gypsy moth, deer herbivory (browsing) is becoming an increasing concern with potential negative impacts to oak regeneration. This is a topic of current interest and study on many County and State Forests.

820.2.1.3 Red and White Pine

These are types where red pine or white pine make up more than 50% of the basal area in pole and saw timber stands, and more than 50% of stems in seedling and sapling stands. Common associates in Wood County are red maple, black oak, jack pine, white birch.

Shade tolerance: *intolerant to intermediate tolerance depending on species*

Habitats: *PVG, PVRh, PVHa*
Intermediate treatments: row thinning, *improvement thinning*
Median rotation age: *70 years – red pine, 120 years – white pine*
Primary regeneration method: *both artificial and Natural depending on species and stand conditions.*
Harvest method: *Shelterwood, seed tree, overstory removal, clear-cut.*
Habitat value: conifer species, biodiversity, therman cover, longer lived den, cavity and nest tree species (white pine).
Economic value: *fiber production, bolts, sawlogs*
Insect disease considerations: *Bark beetles, pocket decline, annosum root rot (Heterobasidion annosum)*

Trends: *Red pine acreage decreasing over time, white pine acreage increasing.*

Landscape considerations: *Try to maintain or increase conifer component on Wood County Forest for habitat and diversity purposes.*

Red and White Pine Management

Red and white pine forests account for 15% of the forested acreage. The vast majority of this acreage is in plantations; especially red pine. Pine management consists of a series of thinning's, beginning around age 25 and continuing every 7-10 years to maturity. First thinning's generally remove every third or every other row. Subsequent thinning's marked; improvement thinning's of approximately one-third of the trees at each entry. In the central sands area of the state, many red pine plantations begin to experience health problems between ages 45 and 60 which is dictating the maturity age. Red pine pocket mortality is the most common problem in planted red pine stands on Wood County in this age range. Because of this condition, some plantations are experiencing mortality rates that are significantly affecting annual stand growth. Where this is occurring, Wood County plans to conduct regeneration harvests to limit further timber losses.

Mature red pine stands are commonly regenerated using a clear-cut harvest followed by replanting of nursery stock. Wood County may use this method for regenerating red pine. In many mature red pine stands, the site conditions are more favorable for white pine, and may contain significant advance white pine regeneration. In some cases, mature red pine stands will be allowed to convert to white pine, oak, and red maple following the final harvest, depending on stand location, size, and advance regeneration present.

White pine stands are managed similar to red pine with intermediate thinning's beginning at age 25 and continuing every ten years or so. White pine does not suffer from the decline facing red pine stands and white pine stands will be managed to 100-120 years in age on the Wood County Forest. White pine regenerates naturally very well on the Wood County Forest. Wood County anticipates that shelterwood harvests, or clear-cut harvests with reserve trees depending on advance regeneration, will be sufficient to regenerate mature white pine stands.

Over time, Wood County anticipates an increase of white pine acreage compared to its current level. This is mostly due to strong white pine natural regeneration trends. Red pine acreage is expected to decrease over time. This is because most red pine plantations are naturally converting to other species (previously mentioned), and new plantings of red pine are not

occurring at the same rate as in the past. Overall, total pine acreage is expected to increase significantly from current levels. Most of this is due to natural regeneration of white pine that is occurring on the landscape wherever a white pine seed source exists.

820.2.2 Uneven-Aged Management

A forest stand composed of trees in various age and size classes. The typical cutting practice is selection cutting, where individual trees are removed from the stand. Regeneration is continually occurring after the stand is cut. Uneven-aged management is generally used to manage shade tolerant forest types such as Northern Hardwoods. Other forest types that may be considered for uneven-aged management include Bottomland Hardwoods, and Central Hardwoods.

Wood County Forest does not contain any Northern Hardwoods. However, small amounts of Bottomland Hardwoods (4%) and Central Hardwoods (1%) do occur and could be considered for uneven-aged management. It should be noted that historically management in the Bottomland Hardwood type has occurred sporadically and at a relatively low level. Reasons include accessibility difficulties, as well as sensitive, threatened, and endangered species considerations.

820.3 LOCALLY UNCOMMON TREES / FOREST TYPES

The presence or lack of a particular tree species is dependent on land capability, climate, natural range, natural or human disturbance and many other factors. The following trees and types are considered uncommon on the Wood County Forest and likely across the general region. These trees may be left as reserves in even aged management prescriptions, or in thinning's and all aged regeneration harvests.

820.3.1 American Elm (*Ulmus americana*) is scarce primarily due to mortality caused by the introduction of Dutch elm disease. On Wood County Forest, elm is primarily found in small numbers in bottomland hardwood forests. Healthy elm will normally be left uncut in hopes that they may continue in the landscape as potential resistant seed source individuals.

820.3.2 Butternut (*Juglans cinerea*) is declining due to butternut canker. Healthy individuals that appear to be canker free will be reserved in the forest as potential resistant seed sources.

820.4 FOREST TYPES REQUIRING INTENSIVE EFFORT TO REGENERATE

There are certain forest types within the County Forest that are difficult to regenerate. In many cases, this difficulty may be related to the exclusion of fire from the landscape, deer herbivory or other factors. The following list itemizes forest types with difficult regeneration and County management goals:

820.4.1 Northern Red Oak

Northern red oak is a shade intolerant to mid tolerant species found in primarily even aged stands. Northern red oak appears to require disturbance to regenerate and deer herbivory appears to be a limiting factor on regeneration success. The red oak type is more abundant in the Hiles block of Wood County Forest. Red oak grows best on sites that are also suitable for other hardwoods, especially maples. On many sites, normal thinning practices tend to promote these other species and in many cases, regeneration in red oak stands tends towards red maple. Over time, this shade tolerant seral stage will replace the red oak. The difficulty in regenerating red oak on these sites appears to be related to lack of soil disturbance with the removal of fire from the landscape

Red oak has very high wildlife value due to its mast production and tendency to produce cavities that are suitable for wildlife dens. It also has very high timber value in sawlog-sized timber. Because of these factors, Wood County will work to retain and promote red oak on the forest.

Silvicultural trials using prescribed burns coupled with shelterwood harvests appear to be successful. However, conducting these burns on a large scale has proven difficult. Scarification and other methods will continue to be investigated. Wood County is committed to retain as much of the existing acreage of northern red oak as possible. Regeneration efforts will focus on timing soil scarification with good acorn crops and shelterwood harvests. Regeneration may require prescribed burning to release seedlings from competing vegetation.

820.5 INVASIVE PLANT SPECIES OF CONCERN

Invasive plants can cause significant damage to the forest. Invasive species can displace native plants and hinder the forest regeneration efforts. Preventing them from dominating forest understories is critical to the long-term health of the forest. There are a number of invasive plant

species in varying densities on the County Forest. Some warrant immediate and continual treatment efforts while others may be allowed to remain due to extent and financial ability to control them. Currently Buckthorn (Common and Glossy) is the invasive species of greatest concern for Wood County Forest. It occurs throughout most of the forest to some degree, with the greatest densities found in stands close to Wisconsin Rapids, Port Edwards, Dexterville, and in the Richfield 360. The County will continue to train staff in invasive species identification as well as attempt to secure funding sources to control them as much as is practical. Other invasives noted on the Wood County Forest include Spotted Knap Weed, Purple Loosestrife, Phragmites, Honeysuckle, and Japanese Barberry.

820.6 LEGALLY PROTECTED AND SPECIAL CONCERN PLANT SPECIES

There are plants in Wisconsin that are protected under the Federal Endangered Species Act, the State Endangered Species Law, or both. On County Forest, no one may cut, root up, sever, injure, destroy, remove, transport or carry away a listed plant without a valid endangered or threatened species permit. There is an exemption on public lands for forestry, agriculture and utility activities under state law. The County will, however, make reasonable efforts to minimize impacts to endangered or threatened plants during the course of forestry/silviculture activities (typically identified in the timber sale narrative).

The Wisconsin Department Natural Resources Bureau of Natural Heritage Conservation tracks information on legally protected plants with the Natural Heritage Inventory (NHI) program. The NHI program also tracks Special Concern Species, which are those for which some problem of abundance or distribution is suspected, but not yet proven. The main purpose of this category is to focus attention on certain species before they become threatened or endangered.

The County has access to this data under a license agreement and is committed to reviewing this database for endangered resources that may occur within proposed land disturbing project areas.

820.7 TREE RETENTION GUIDELINES

Tree retention Guidelines became a topic of increasing importance to all Wisconsin County Forests towards the end of the last planning period (2017,2018), primarily due to shortcomings identified during forest certification audit process. During this same general timeframe, Wisconsin DNR developed tree retention guidelines as part of a chapter in the Silviculture

Handbook (HB24315), chapter 24. Many Counties have adopted these guidelines, or a modified version of them.

The following are the tree retention guidelines that will be applied for the timeframe covered under the current planning period:

Wood County Forest
TREE RETENTION GUIDELINES

Reserve Trees

Reserve trees are living trees, ≥5 inches dbh, retained after the regeneration period under even-aged or two-aged silvicultural systems. They are retained well beyond stand rotation, and for purposes other than regeneration. They may be harvested eventually or retained to complete their natural lifespan (becoming a snag and then coarse woody debris). Reserve trees can be dispersed uniformly or irregularly, as single trees or aggregated groups or patches, or any mixture thereof. Synonyms include standards, legacy trees, and green tree retention.

The characteristics of desirable reserve trees are highly variable and depend on the intended benefits, the species present, stand condition, and site. Desired compositional and structural attributes may be present when trees are selected and stands are rotated, or additional time may be required for development.

Typical characteristics of desirable individual reserve trees (either scattered or within patches) include:
- Large size (tree height, diameter, crown dimensions) for the species and site.
  - If large trees are lacking, then potential future large trees can be selected.
- Older trees with large size and rough bark.
- A mix of vigorous and decadent trees.
  - Vigorous trees of long-lived species can enable long-term retention and potentially yield a variety of benefits.
  - Decadent trees can provide current and future cavity trees, as well as future snags and down coarse woody debris.
- A mix of species, including locally uncommon species and mast trees.

The development and maintenance of large structures (vigorous trees, cavity trees, snags, down woody debris) and species diversity is typically encouraged.

Generally, poor candidates for individual reserve trees include:
- Relatively small (height, diameter, crown), suppressed to intermediate trees.
- Relatively young trees within the stand.

These smaller, younger trees are retained in reserve groups and patches along with larger, older trees.

Exceptions to these typically desirable and generally poor reserve tree characteristics will occur.

Benefits of Reserve Tree Retention

Silvicultural practices are designed to manipulate vegetation to achieve management objectives. At its foundation, silviculture is based on understanding and working with ecological processes. Silvicultural practices that more closely emulate natural disturbance and stand development processes are more likely to sustain a wide array of forest benefits. Most natural disturbance regimes and events retain compositional and structural legacies in heterogeneous patterns and create ecological complexity. Silvicultural practices that develop and maintain reserve trees in managed stands can enable the promotion of ecological complexity – composition, structure, and pattern.

The retention of reserve trees can provide a "lifeboat" function that contributes to the conservation of biological diversity (see preceding section). These structures facilitate the perpetuation of some biota (plant and animal species and genotypes) on site. They also perpetuate habitat for re-colonization and occupation. They can improve landscape connectivity, facilitating the movement of some organisms. Reserve trees influence reorganization and recovery processes in post disturbance ecosystems; they can sustain functional roles and modify the post-disturbance environment.

The actual benefits achieved through the retention of reserve trees can be variable, depending on such factors as landscape composition and structure, stand composition and structure, site, retention design, and management objectives.
Some specific potential benefits include:

- Timber Production
  - Reserve high quality trees for future harvest
  - Perpetuation of tree species diversity
- Wildlife and Plant Habitat (Biodiversity)
  - Cover
  - Cavity (den) and nest trees
  - Display locations
  - Food (foraging, hunting)
  - Future snags and down woody debris (coarse and fine)
  - Habitat diversity
  - Protect special habitat
  - Travel corridors
- Aesthetics
  - Limit line of vision
  - Break up "clear-cut" look
  - Retain visually unique trees
  - Provide diversity in future stand
- Water and Soil Quality
  - Reduce run-off
  - Reduce erosion
  - Maintain water and nutrient cycles
- Miscellaneous
  - Buffer adjacent stands
  - Protect cultural resources
  - Landmarks, such as marker trees and witness trees

<u>Potential Costs of Reserve Tree Retention</u>

The retention of reserve trees in actively managed stands can provide ecological benefits desired by landowners and society. However, there are also costs or trade-offs. The primary potential cost is reduced timber yield at the stand-level. In addition, retention can result in less available habitat for

some wildlife species, particularly those that prefer open, treeless habitat. However, impacts on long-term forest ecosystem sustainability and productivity are uncertain; current understanding suggests that the maintenance of ecological complexity will more likely sustain long-term productivity.

Some specific potential costs include:

- Potential additional operational costs to manage reserve tree retention
- Potential for reduced timber growth rates maintained by larger, older trees
- Potential for reduced short-term stand-level timber yields by foregoing harvest of some trees
- Potential for epicormic branching
- Potential for stem and crown damage during stand harvest
- Potential for crown dieback and mortality following harvest
- Potential for wind throw, particularly on wet or shallow soils, or for shallow rooted species
- Potential damage to younger stand if reserve trees are harvested during mid-rotation
- Reduced growth rates of regeneration occurring beneath reserve trees
- Potential sites for pathogen breeding and maintenance
- Potential for reduced habitat for or increased predation of certain wildlife species

Considerations for Reserve Tree Retention

Reserve overstory trees will shade portions of a newly developing stand. Increased numbers of dispersed reserve trees and trees with larger and denser crowns will cause more shading. Furthermore, reserve tree crowns can expand over time, increasing shading effects. Shading by reserve trees potentially can reduce growth within portions of newly developing established even-aged stands. The point at which growth reductions become significant depends on a variety of factors, including: stand management objectives (for reserve trees and young trees), growth rates and potential development of reserve trees, growth rates and shade tolerance of species comprising the new stand, site quality, understory competition, and potential damaging agents. In general, to promote optimum growth of established even-aged stands of reproduction, (nearly) full sunlight is preferred. Under even-aged management systems, when objectives include the retention of reserve trees beyond the regeneration establishment phase, crown cover of <20% generally (for most species and conditions) will not significantly reduce vigor, growth, and development of most of the developing stand. If reserve trees are dispersed and expected to survive and grow, crown cover will increase over time; 15% crown cover is a generally recommended maximum for dispersed retention at final rotation. If reserve trees are aggregated, then shading impacts will be reduced; total crown cover retained could be greater, and will depend on stand management objectives.

Excessive shading may also be a concern when regenerating shade intolerant species in small stands or in narrowly linear stands, surrounded by relatively mature forest. In such cases, it may be necessary to retain fewer reserve trees. Alternatively, there may be opportunities to redesign stand boundaries creating a larger stand with increased opportunities for internal tree retention.

Reserve tree retention is a generally recommended silvicultural practice for stands ≥10 acres. It is encouraged in smaller stands, but operational, shading, and other biological issues may limit application.

Insect and disease issues and potential impacts on tree health should be another consideration in reserve tree selection and design. Regeneration methods are designed to foster the vigor of the regenerating stand. Although the imminent mortality of some reserve trees may be desirable or acceptable, typically some vigorous trees will be retained with the expectation of continued growth and survival (perhaps for a long time). When regenerating a stand and retaining reserve trees, potential risks to tree health should be evaluated, and methods implemented to reduce risks while achieving stand management objectives. In most cases, well-designed regeneration and retention strategies can minimize risks; however, stand

and site conditions may limit options in some cases. Refer to the cover type chapters in this handbook and forest pest management guidelines to appropriately consider and address insect and disease risks when selecting and designing regeneration methods and reserve tree retention for a specific stand and site.

Two examples of how insect and disease considerations can influence reserve tree selection and design:

- Red pine: Retaining red pine reserve trees when regenerating a new red pine stand may significantly increase the risk of Sirococcus and Diplodia incidence within the young stand. This risk is highly variable geographically; where experience has shown the risk to be significant, then retaining red pine reserve trees over red pine regeneration would be poor silviculture. In such cases, retain other species (e.g. oak) as reserve trees if available; if not available, then it may not be possible to retain reserve trees as generally recommended, but consider including representation of other species as part of stand regeneration to provide increased options for future managers. Red pine can be an excellent reserve tree when regenerating other species (e.g. aspen or oak).
- Jack Pine: In general, retaining jack pine reserve trees when regenerating a new jack pine stand is not recommended, because of the risk of budworm outbreaks. When regenerating jack pine, other species (e.g. oak) should be retained as reserve trees if available. Jack pine can be retained as a reserve tree when regenerating other species.

Representation of reserve trees can range from none to many. If silviculture is to simulate, to some extent, natural disturbance processes, then most actively managed stands should include some level of structural retention. To accomplish general sustainable forestry goals that include multiple stand management objectives, recommended representation could typically range from 3-15% of stand area or crown cover. In some stands, particularly intensively managed single objective stands (e.g. maximize short-term economic returns, maximize pulp production, or maximize populations of wildlife species that prefer completely open, treeless habitat), landowners may choose to not retain reserve trees. In some stands, with appropriate species and site characteristics, where the optimization of tree vigor and timber quantity and quality is a minor concern, adaptive silvicultural practices that retain 20-60% cover could be considered by the landowner. It is recommended that sound reasons and expected impacts be documented when the decision is to retain reserve trees at less than or greater than the recommended level of 3-15% of stand area or crown cover.

Distribution of reserve trees can be evenly or irregularly dispersed individuals, groups, and patches.

Retention in aggregated patches generally provides the most benefits, including:

- patches of habitat that maintain forest floor, understory plants, and vertical structure within the patch, and increase compositional and structural diversity,
- more heterogeneity across the stand,
- less damage to retained trees during harvesting operations, and
- less impact on regeneration in stand matrix.

Patch retention should consider retention of large trees, cavity trees, and snags within the patches. Reserve patches can be thinned during the even-aged rotational harvest of the matrix; however, retention of unthinned patches potentially provides the greatest benefit. Patches can be located to complement other management objectives or respond to stand conditions; for example, patches can be located in riparian management zones, to provide connectivity between stands, and to protect sensitive sites (e.g. cliff faces and vernal pools) or endangered resources. Patches should be >0.1 acres and generally <2.0 acres, but can be larger; patches, particularly large ones, should be documented as retention patches.

Retention of evenly dispersed individual trees also provides unique benefits, including:

- retention of comparatively more large trees, and
- wide distribution of structural benefits (large trees, snags, and coarse woody debris) and seed

sources.

Retention of irregularly dispersed individual trees and small groups provides another strategy; this can be particularly useful to develop feathered edges to stands and reduce abrupt transitions and edge effects.

The general recommended strategy is to retain irregularly distributed patches along with scattered groups and individuals.

Table 24.1 Patch sizes for retention and approximate dimensions (circular and square)		
Area (acres)	Diameter (feet)	Square (feet)
0.1	74	66 x 66
0.25	118	104 x 104
0.5	167	148 x 148
0.75	204	181 x 181
1.0	236	209 x 209
1.5	288	256 x 256
2.0	333	295 x 295

Stand representation and spatial distribution patterns of reserve trees can be highly variable. The goal of heterogeneity of conditions indicates a wide array of retention strategies. Retention design, including amount to retain, species, and distribution, can enable the production of increased benefits and minimize potential costs. Criteria to consider when determining desired representation and distribution include: landowner goals and stand management objectives, current and desired stand and community condition, characteristics of current and desired plant and animal species, potential damaging agents, site, and landscape characteristics. Detailed landscape analysis and planning that clearly addresses the sustainable allocation of resources, including the production of timber and the conservation of biodiversity, can improve upon stand-based management guidelines (such as those offered herein).

Recommendations for Retention in Managed Stands: Reserve Trees, Mast Trees, Cavity Trees, and Snags

Sustainable forest management is implemented within a framework defined by landowner goals and objectives, ecosystem condition and potential and sustainable silvicultural systems and practices. Forests are cultivated to provide a variety of socio-economic and ecological benefits. Sustainable forest management integrates multiple management goals and objectives into most silvicultural systems and the management of most stands and landscapes.

Most stands that are actively managed include timber production as a management goal (often in concert with other goals). Tree retention typically focuses on crop tree selection and regeneration methods. To satisfy multiple objectives and provide multiple benefits, retain additional trees to achieve non-timber management objectives. Integrate the following recommendations for tree and snag retention into the management of most forest stands:

- Even-aged rotations
  - Retain ≥3 (if available), preferably large, snags per acre.
  - Retain reserve trees and/or patches at 3-15% crown cover or stand area, including large vigorous trees, mast trees, and cavity trees. Reserve tree retention is a generally recommended silvicultural

practice for stands ≥10 acres. It is encouraged in smaller stands, but operational, shading, and other biological issues may limit application.

- Even-aged intermediate treatments
  - Retain ≥3 (if available), preferably large, snags per acre.
  - Retain ≥3 (if available), preferably large, cavity trees per acre.
  - Retain ≥3 (if available), preferably large, mast trees per acre.
  - If previously established, manage reserve trees and patches. Management may include timber harvesting or passive retention. Consider retaining ≥3 trees per acre to develop into large, old trees and to complete their natural lifespan. These trees may also satisfy cavity and mast tree recommendations. These trees will often become large snags and coarse woody debris.
- Uneven-aged systems
  - Retain ≥3 (if available), preferably large, snags per acre.
  - Retain ≥3 (if available), preferably large, cavity trees per acre.
  - Retain ≥3 (if available), preferably large, mast trees per acre.
  - Consider retaining ≥3 trees per acre to develop into large, old trees and to complete their natural lifespan. These trees may also satisfy cavity and mast tree recommendations. These trees will often become large snags and coarse woody debris.

In cases where these recommendations for retention are not applied, then sound reasons and expected impacts of deviation should be documented.

When applying retention recommendations, be sure to consider:

- Retention will occur at the "Harvest Unit" level. Harvest Unit is defined as the stands within a timber sale. RMZ or Z prefix stands occurring within or adjacent to the Harvest Unit can provide retention opportunities. Retention will be encouraged in stands 10 acres in size or less that are managed as even-aged, but will not be required.
- Individual trees can provide multiple benefits and fulfill the intent of more than one of the above recommendations. For example, three large oak trees with cavities could satisfy the mast tree and cavity tree recommendations, as well as the large, old tree consideration.
- Retention of both vigorous and decadent trees will provide an array of benefits.
- In general, species diversity is encouraged when selecting trees to retain.
- Large trees and snags are >12 inches dbh, and preferably >18 inches dbh.
- Trees retained can be scattered uniformly throughout a stand or irregularly dispersed, as single trees, groups, and patches. The general recommended strategy is to retain irregularly distributed patches along with scattered groups and individuals.
- Retention in aggregated patches generally provides the most benefits for wildlife and biodiversity. In addition, patches retained can satisfy multiple benefits; for example, at stand rotation, an internal or adjacent unharvested buffer along a stream (RMZ) could provide a portion of reserve tree retention as well as satisfy BMP (water quality) recommendations. Patches should be >0.1 acres and generally <2.0 acres, but can be larger; reserve tree patches, particularly large ones, should be documented as retention patches.
- Harvesting of reserve trees may occur in the future or may be foregone to achieve other benefits. Retain reserve trees for at least one-half the minimum rotation age of the new stand (e.g. retain reserve trees at least 20-25 years if regenerating aspen). Consider retaining some trees to develop into large, old trees and to complete their natural lifespan; these trees will often become large cavity trees, snags, and coarse woody debris.
- Retain as many snags as possible. Retention of snag diversity (species and size) can potentially provide the greatest array of benefits. Snags that are determined to be a threat to human safety can be cut and retained on site as coarse woody debris.
- Clearly designate, in writing and/or by marking, which trees should be retained prior to any cutting operations.

Dominant Tree Retention under Even Aged Management
Justification for Guidance Variance

Standard Guidance:
Tree retention guidance under even aged management generally recommends retention of 3 – 15% of tree cover, including representation of the dominant tree species present on the harvest unit. Guidance also recommends retention in individual trees or in islands and also cavity, den and mast trees.

Variance Needs:
Tree retention under even aged management schemes is an important wildlife habitat component. There are cases, however, when retention of reserve trees may conflict with management objectives. Variances from tree retention guidance must be documented, along with a description of management conflict, in the timber sale narrative. It is also acceptable to document variance rationale in the County Forest Comprehensive Land Use Plan in cases where the variance need is a common management occurrence.

Example language for variance to < 3% - General

- Excessive shading is a concern when regenerating shade intolerant species in small stands (<10acres) or in narrowly linear stands that are surrounded by relatively mature forest or stands not ready for concurrent harvest.
- There is no opportunity for acceptable retention trees (possibly for reasons below). In this case, note how this may be mitigated in future rotations.
- Regeneration success could be compromised when using accepted silvicultural methods such as seed tree or shelterwood harvests to regenerate shade intolerant species (white pine, white birch, oak, etc.)
- Stands adjacent to the harvest unit can provide retention opportunities when a portion of a cover-type will be harvested (i.e. black spruce/tamarack strip regeneration harvests)

Example language for not retaining dominant species – General

- Other species (oak/pine) were selected to enhance/maintain the diversity of the stand, and/or to provide retention trees with longer lifespans and increased ability to withstand the wind, providing retention further into the future.
- Abundant snags are already present and will be left standing.

Example language for retention variance – aspen stands

- Hypoxylon canker is present in the stand and leaving isolated trees or small clones could result in substantially increased risk of introducing canker into the new stand.
- Aspen may be declining, low stocking, poor site index, poor quality, scattered or understory competition exists and trees will not be retained in order to maximize aspen suckering potential.
- In aspen areas being specifically managed for grouse/woodcock, retaining trees throughout the site create raptor perch trees which may be counterproductive to the intent of the wildlife habitat created. In addition, providing additional drumming logs at these sites or protecting existing drumming logs may also be beneficial to the targeted wildlife species. Less perch trees and increased drumming logs in these areas would be justification for altering retention of dominant species.

Example language for retention variance – jack pine stands

- Retaining jack pine reserve trees when regenerating a new jack pine stand is not recommended because of the significant risk of budworm outbreaks resulting in defoliation and death of the new stand.

- The residual trees will have a very good chance of being killed by bark beetles.
- Increased shading is detrimental to growth of the new stand.
- High risk of blow-down of retained trees (sandy sites, high water table).

Example language for retention variance – red pine stands

- Retaining red pine reserve trees when regenerating a new red pine stand may significantly increase the risk of Sirococcus and Diplodia incidence within the young stand.
- The residual trees will have a very good chance of being killed by bark beetles.
- Increased shading is detrimental to growth of new stand.

820.8 BIOMASS HARVESTING GUIDELINES

Biomass harvesting has historically been a rare occurrence on the Wood County Forest. Currently there is very little demand for this forest product from Wood County Forest primarily due to local markets, haul distances and associated lack of economic feasibility to reach markets further distances away. In the event biomass harvest occurs in the future, Wood County Forest will apply principles and guidance contained in: *Wisconsin's Forestland Woody Biomass Harvesting Guidelines – Field Manual for Loggers, Land Owners, And Land Managers*, and Wisconsin DNR PUB-FR-435-2014. A very small percentage of Wood County Forest is associated with soils that would limit biomass harvest. Specifically, soils identified as Plainfield Sand and Plainfield Loamy Sand would be of concern on the Wood County Forest. These soil types occur in the Dexterville area and comprise a very small acreage.

825 ANIMAL SPECIES MANAGEMENT

Wood County Forest provides a wide range of wildlife habitats from open grasslands to mature forests, from bogs to forested wetlands, from spring ponds to lake shorelines. A primary goal of wildlife management on the Wood County Forest is to provide a diversity of healthy ecosystems necessary to sustain and enhance native wildlife populations. This forest will be managed primarily to provide habitats for a wide range of species rather than focusing on a specific species, with exceptions made for Federal or State Listed Endangered or Threatened Species.

825.1 TECHNICAL PLANNING

Management of wildlife populations on the Wood County Forest falls under the jurisdiction of the DNR. Planning may be a cooperative effort of the County Forest staff, DNR liaison forester and wildlife manager in formulating management plans, utilizing forest, and wildlife management techniques to accomplish desired forest and wildlife management goals.

825.2 GUIDELINES

DNR operational handbooks including the Public Forest Lands Handbook (2460.5), manual codes and guidance documents are important references and guidelines to utilize in fish and wildlife planning efforts.

825.3 INVENTORY

Habitat needs will be determined by analysis of forest reconnaissance information. Population estimates will be conducted periodically by DNR wildlife, endangered resources personnel, and other trained cooperators. Currently, Department Wildlife staff conduct the following surveys on or adjacent to the Wood County Forest:

- Biotic Inventories
- Summer deer observations
- Brood surveys
- Furbearer tracking
- Bat Monitoring
- Bear bait surveys
- Snowshoe Hare surveys

Additionally, Wood County Forest has frequently used nickel-an-acre grant monies to hire an avian ecologist to perform surveys to detect the presence of special concern raptors such as Red-Shouldered Hawk and Goshawk, as well as any active nests.

825.4 RESOURCE MANAGEMENT CONSIDERATIONS FOR WILDLIFE

The following areas of focus are identified for achieving plan objects and for benefit of wildlife.

825.4.1 General Management Policies

Forest management practices may be modified to benefit wildlife and diversity. The following will be considered when planning for management activities:

- Even-aged regeneration harvests (clear-cuts) should vary in size and shape and include retention considerations.
- A diversity of stand age, size and species.
- Mast-bearing trees and shrubs, cavity trees, and an adequate number and variety of snags.
- Cull trees (future snag or den trees) not interfering with specific high value trees.
- Timber types, habitat conditions and impacts on affected wildlife.

- Access management.
- Best management practices for water quality (BMP's).

825.5 IMPORTANCE OF HABITATS

Important habitat types are those cover types known to be of importance to certain native wildlife and whose absence would make that wildlife significantly less abundant. These shortages may be on a local or broader scale. The following habitat types can be considered important:

825.5.1 Non-forested wetlands

The Wood County Forest contains 7847 acres (20% of recon acres) of non-forested wetland types providing a variety of habitats for common, rare and endangered species. Emergent wetland, sedge meadow, muskeg bog and deep marsh provide habitat for species such as wood turtle, black tern, American bittern, and numerous other species.

825.5.2 Aquatic habitats

The Wood County Forest includes 572 acres (1.2% of recon acres) of lakes, rivers, streams, ponds and other aquatic habitats. Open water provides habitat for species such as wood duck, boreal chorus frog, water shrew and many other species reliant on water related resources.

825.5.3 Riparian and other non-managed areas

Undisturbed shoreline and riparian areas present on the forest and provide habitat for species such as red-shouldered hawk, green frog, and woodland jumping mouse.

825.5.4 Early successional forests

Management of aspen, white birch, jack pine and other shade intolerant species creates habitat for a variety of wildlife species that benefit from early successional forests. On the Wood County Forest, there are currently 13,589 acres of these forest types present. This is a key habitat used for recreational hunting activities providing conditions favorable for American woodcock, ruffed grouse, white-tailed deer and non-game species such as golden-winged warbler, Kirtland's warbler and black-billed cuckoo.

825.5.4.1 Aspen

Aspen is recognized as providing important habitat values to the greatest diversity of wildlife species. This type will continue to be regenerated, with consideration given to reserving scattered den, mast-producing trees, and conifers in the process.

825.5.4.2 Jack pine

Jack pine and its associated plant understory provide a vital mix of breeding and winter habitat for many wildlife species. This type will become increasingly important as conversion to other tree species occurs on private lands. Jack pine forests are not abundant on the Wood County Forest but will be maintained where possible.

825.5.5 Conifers

Conifers whether jack pine, white pine, spruce, fir or other types appear to be an important habitat for a number of wildlife species. The Wood County Forest currently has 4846 acres of coniferous habitat. Connecticut warbler, red crossbill, northern flying squirrel, and many others utilize conifer types. Jack pine areas can be managed to provide temporary barrens habitat providing habitat for Kirtland's warbler and other barren related species.

825.5.5.1 Lowland conifer

Lowland conifers on the forest consist of tamarack swamps. While this forest type does not provide quality winter cover compared to cedar, hemlock, and balsam fir, tamarack does provide cover for some species. This forest types is generally not managed on Wood County for timber production due to the small acreage and the isolated location of tamarack stands.

825.5.6 Oak management

Oak is an important mast producing food source on the forest, providing acorns for a wide variety of game and non-game species. The Wood County Forest has 6412 acres of oak habitat. It is considered a critical resource to retain on the landscape for both its timber and wildlife value, providing habitat for species such as scarlet tanager, wood thrush, red headed woodpecker, and black bear. Additionally the oak type is important to wildlife because of its cavity-forming potential and mast production. Future management will focus on protecting and regenerating this type.

825.5.7 Uneven/all aged management

Management of uneven aged stands provides for multi-storied canopies, diverse age structure and potentially older forest characters. The Wood County Forest has 587 acres being managed under an all aged management system. Species such as Canada warbler, little brown bat, black throated blue warbler and many others benefit from these forest types, In addition, numerous amphibian and reptiles utilize these forest types.

825.5.8 Large forest blocks

Large blocks of County Forest provide habitat for numerous interior species. Gray wolf, black throated blue warbler, Canada warbler and least flycatcher are a few examples of animals that rely on these large blocks.

825.5.9 Grasslands, openings, upland brush

Wildlife openings, grass rights-of-way, natural openings, upland brush and other upland open habitats provide for diversity and unique habitats benefitting pollinators, numerous species including upland plover and whip-poor-will. Wood County Forest currently has 203 acres identified as open grassland or upland brush habitat.

825.5.10 Other local habitats

Other habitats currently present on Wood County Forest include Rock Outcrops (6 acres), pipeline and utility Right of Way (117 acres).

825.6 INTENSIVE WILDLIFE MANAGEMENT PROJECTS

825.6.1 Wisconsin Wildlife Action Plan / Species of Greatest Conservation Need (SGCN)

In addition to species listed as endangered, threatened or special concern within the NHI database, the Department also maintains a statewide list of species of greatest conservation need.

This list includes species that have low or declining populations and may be in need of conservation action. The list includes birds, fish, mammals, reptiles, amphibians and insects that are:

- Already listed as threatened or endangered
- At risk due to threats
- Rare due to small or declining populations
- Showing declining trends in habitat or populations

The WWAP working list can provide information on how management activities may affect, or in many cases benefit species of greatest conservation need. More information is available on the WWAP website: *https://dnr.wi.gov/topic/wildlifehabitat/actionplan.html* .

825.7 FISH AND WATERS MANAGEMENT

Public waters shall be managed to provide for optimum natural fish production, an opportunity for quality recreation, and a healthy balanced aquatic ecosystem. Emphasis will also be placed on land-use practices that benefit the aquatic community. Management of County Forest lands will attempt to preserve and/or improve fish habitat and water quality.

825.7.1 Technical Planning and Surveys

Management of all waters within the County Forest is the responsibility of the DNR. Technical assistance will be provided by the local fisheries biologist. Studies and management will be conducted in the manner described in DNR Fish Management Handbook 3605.9. Water and Population Surveys fall under the jurisdiction of the Department and will be conducted as needed by fisheries biologists.

825.7.2 Special Projects

Wood County Forest has collaborated with local lions club and Wisconsin DNR Fisheries staff to accomplish a fish habitat improvement project (i.e. fish sticks) on Lake Dexter. This project was completed during the winter of 2018-2019 and was funded through the County Conservation Aids Grant program. Initially the project has been viewed as a success and there is potential for similar projects in the future.

825.7.3 Shoreland Zoning

See Shoreland Zoning Ordinance contained in the Appendix.

825.7.4 Access and development

Access and development of County Forest waters will be limited to those activities consistent with the above water management policies. See Chapter 740 also for further information on water access.

825.7.5 Important Water Resources

Management activities adjacent to these water resources, or in areas with sensitive soils or severe slopes, should consider measures above and beyond the customary BMP practices. County staff may work with their Liaison Forester in cooperation with the local DNR water resources staff to develop site-specific measures where appropriate. An inventory of water resources can be obtained from DNR Water staff for the County. Important water resources on the Wood County Forest include:

Dexter Lake/Yellow River
Hemlock Creek
East Fork Black River
Hay Creek
Owl Creek
Skunk Creek

830 EXCEPTIONAL RESOURCES, UNIQUE AREAS

830.1 HCVF FOR FSC AND DUAL CERTIFIED COUNTIES

The DNR established criteria for establishing HCVFs on state lands is found below. For the purpose of this plan, the county recognizes this criterion for identifying HCVFs on county land. This does not preclude the county from identifying other unique areas that do not meet the definition of HCVFs.

https://dnr.wi.gov/topic/TimberSales/documents/DNRLandsHCVFSelectionCriteriaFinal.pdf

HIGH CONSERVATION AREAS

- Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values including RTE species.
- Forest areas containing globally, regionally or nationally significant large landscape level forests, contained within, or containing the management unit, where viable populations of

most if not all naturally occurring species exist in natural patterns of distribution and abundance.

- Forest areas that are in or contain rare, threatened or endangered ecosystems.
- Forest areas that provide basic services of nature in critical situations (e.g., watershed protection). **Wisconsin does not have known locations meeting this criterion.**
- Forest areas fundamental to meeting basic needs of local communities (e.g. subsistence, health of indigenous communities) **Wisconsin does not have known locations meeting this criterion.**
- Forest areas critical to local communities' traditional cultural identity (e.g. areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

The HCVFs on Wood County Forest are the following:

- Red Oak Bottoms State Natural Area
- Owl Creek Fen Savanna State Natural Area
- Hiles Wetlands State Natural Areas
- Skunk Creek Woods State Natural Area

All of the above mentioned areas fall into the Category HCV3.

830.2 AREAS RECOGNIZED BY STATE OR FEDERAL GOVERNMENT

830.2.1 State Natural Areas

Note: More specific information pertaining to species can be found in original DNR reports/inventories contained in Chapter 2040.5 High Conservation Value Forest Ares.

Red Oak Bottoms

Goal: Manage the site as a floodplain forest with a heavy red oak component, rare bird habitat, and an ecological reference area. Natural processes will primarily determine the structure of the forest. The stand will be managed passively in the near term to develop old-growth characteristics. In the long-term, if natural disturbances of flood and wind throw do not create conditions for red oak regeneration, then patchy harvests would be conducted to regenerate the red oak. The site will be used as a reference area to compare management techniques on other similar cover type stands to assess retention of species diversity, differences in regeneration and other important ecological values.

Permitted management activities: removal of invasive exotic plant species, non-manipulative research, educational activities, hunting and trapping, low-impact recreation, access to suppress fires, harvests to meet natural area regeneration objectives (see above), salvage of trees after a major wind event, management to prevent and suppress insect or disease infestations using best available scientific knowledge and in consultation with the DNR Bureau of Endangered Resources and maintenance of any existing facilities.
Prohibited activities: motorized vehicles off designated trails, permanent hunting stands, mountain bikes, horse-based recreation, and alteration of the hydrology.

Owl Creek Fen Savanna

Goal: Manage the site as a central poor fen reserve, unique wet aspen fen savanna habitat, and an ecological reference area. Natural processes will primarily determine the structure of the forest. The sparse, scattered, and off site trees will be managed passively. Small stands of more productive wetland forest and the more easily accessible islands may be managed to enhance regeneration of the tree species while providing diversity in rare bird habitat.

Permitted management activities: removal of invasive exotic plant species, non-manipulative research, educational activities, hunting and trapping, low-impact recreation, access to suppress fires, harvests to meet natural area aspen regeneration objectives (see above), salvage of trees after a major wind event, management to prevent and suppress insect or disease infestations using best available scientific knowledge and in consultation with the DNR Bureau of Endangered Resources and maintenance of any existing facilities.

Prohibited activities: motorized vehicles off designated trails (except winter access across ice roads to conduct timber harvest on adjacent uplands), permanent hunting stands, mountain bikes, horse-based recreation, and alteration of the hydrology.

Other activities may occur pending discussion and consultation with partners, NAPC and science experts.

Hiles Wetlands Natural Areas

Goal: Manage the site as a northern sedge meadow, tamarack poor fen, wet meadow and central poor fen reserve and an ecological reference area. Natural processes will primarily determine the structure of the wetlands. The sparse, scattered, and off site trees will be

managed passively. Stands of more productive wetland forest on the edge may be managed to enhance regeneration of the tree species while providing diversity. Some trees may be removed from the wetlands to maintain an open landscape character.

Permitted management activities: removal of invasive exotic plant species, non-manipulative research, educational activities, hunting and trapping, low-impact recreation, access to suppress fires, salvage of trees after a major wind event, management to prevent and suppress insect or disease infestations using best available scientific knowledge and in consultation with the DNR Bureau of Endangered Resources and maintenance of any existing facilities.

Prohibited activities: motorized vehicles off designated trails (except winter access across ice roads to conduct timber harvest on adjacent uplands), permanent hunting stands, mountain bikes, horse-based recreation, and alteration of the hydrology.

Other activities may occur pending discussion and consultation with partners, NAPC and science experts.

Skunk Creek Woods Natural Area

Goal: Manage the site as a representative example of the widespread white pine – oak forests of central Wisconsin, and an ecological reference area. Natural processes will primarily determine the structure of the forest. The stand will be managed to enhance old-growth characteristics in the near term, which may include removal of competing red maple and aspen. In the long-term, harvest to regenerate the white pine – oak forest will be necessary. The site will be used as a reference area to compare management techniques on other similar cover type stands to assess retention of species diversity, differences in regeneration and other important ecological values.

Permitted management activities: removal of invasive exotic plant species, non-manipulative research, educational activities, hunting and trapping, low-impact recreation, access to suppress fires, harvests to meet natural area objectives (see above), salvage of trees after a major wind event, management to prevent and suppress insect or disease infestations using best available scientific knowledge and in consultation with the DNR Bureau of Endangered Resources and maintenance of any existing facilities.

Prohibited activities: motorized vehicles off designated trails, permanent hunting stands, mountain bikes, horse-based recreation, and alteration of the hydrology.

Other activities may occur pending discussion and consultation with partners, NAPC and science experts.

830.2.2 State Scientific Areas

There are no known State Scientific Areas currently located on Wood County Forest.

830.2.3 Endangered species habitats (Karner Blue Butterfly, Kirtland's Warbler, etc.)

Wood County conducts annual surveys for Karner blue butterfly. To date, there is one population identified on the forest. The county is cooperating with the DNR to promote this population through shifting mosaic management of the surrounding forest.

Habitat for bird species of high conservation need has been identified in the Owl Creek Fen Savanna. More specific information pertaining to species can be found in original DNR reports/inventories contained in Chapter 2040.5 High Conservation Value Forest Ares.

830.2.4 Rare communities (mesic cedar forest, boreal rich fen, calcareous fen, dry prairie, etc.)

- South Bluff - this area contains open cliffs and rare species habitat.
- Remington Pines – this site contains pine-oak forest and barrens species.
- Hemlock Creek – this floodplain forest contains a similar mix of unusual species as the Red Oak Bottoms.

830.3 CULTURALLY SIGNIFICANT SITES

830.3.1 Burial mounds, cemeteries

There is one known gravesite on the Wood County Forest. This site is associated with a logging campsite from the late 1800s. This site is not highlighted or advertised to the general public. However it is protected when management activities occur, (e.g. "No Cut" buffer zone established and noted on cutting specifications in association with timber harvests, and through discussion with logging contractors).

830.3.2 Logging Camps, Dams, Forest History

Aside from the gravesite mentioned above, other culturally significant sites include:

- Lake Dexter Dam – A dam dating creating a small lake on the Yellow River back to the early 60's which is surrounded by Dexter Park and which has provided for numerous recreational activities since its creation.
- Skunk Creek Dam – A small dam creating a small flowage on Skunk Creek and which also forms the basis for an access road to a large block of Wood County Forest.
- South Bluff Fire Tower – An abandoned DNR fire tower (abandoned in the 80s) that has become a landmark and is a witness to past fire & fire management history associated with the area.

830.3.3 Landmarks

Landmarks include:

- Lake Dexter and Dam
- Skunk Creek Dam
- South Bluff and Fire Tower
- Wood County Forest Shooting Ranges

835 AESTHETICS

Public perception of forestry has changed over the last planning period and in general, it appears that the public is much more accepting of the visual impact of sound forestry. In response to this, aesthetic management planning is intended to be much more simplified in this Plan.

835.1 AESTHETIC MANAGEMENT

Aesthetic management techniques may be applied in areas of high visibility or high public use. Altered management, visual screens, slash disposal, conversion to other species, no cut zones or other methods may be employed, depending on the circumstances of the specific site.

835.2 AESTHETIC MANAGEMENT ZONES

Aesthetic Management Zones include areas where there may be high levels of public presence because of scenic attraction, or some use of the area that would be enhanced be special timber management practices.

835.2.1 Aesthetic Management Zone Examples

- Park and recreation areas including Dexter Park and Campground, Wood County Forest Shooting Ranges.

- Lakes and rivers with significant recreational use including Lake Dexter and Yellow River.
- Roads with heavy traffic or scenic drive: HWY 54, HWY 173, County Highway X, Park Road, South Bluff Road.

835.2.2 Aesthetic Management Prescriptions/Options

- Adjustment timing of timber harvesting
- Slash restrictions/requirements
- Staggered Harvests / Visual Screens
- Forced conversion to longer lived species
- Irregular harvest lines, interrupted sight distances

840 LANDSCAPE MANAGEMENT

The County will make efforts to evaluate surrounding landscapes while managing the County Forest. The County will strive to provide management that compliments the landscapes, but also try to provide for resources or forest types that are lacking or declining within surrounding landscapes.

840.1 CONSERVATION OF BIOLOGICAL DIVERSITY

For the purposes of this plan, biological diversity will be interpreted to reference the variety and abundance of species, their genetic composition, and the communities, ecosystems, and landscapes in which they occur. Forest management activities on the Wood County Forest enhance biological diversity by managing for a wide variety of habitat types, age structures and by attempting to perpetuate and protect declining forest types. Opportunities to manage Wood County Forest lands toward these ends will be continued and improved provided they are deemed to be in the public's best interest by the Committee and within the framework of the County Forest Law (s.28.11 Wis. Stats.).

840.2 HABITAT FRAGMENTATION

For the purposes of this plan, habitat fragmentation is interpreted as conversion of forests to land uses other than forestry. Lands enrolled in the County Forest Law help protect against habitat fragmentation. A continued program of encouraging land acquisition within the forest blocking boundary will help to decrease negative impact of forest fragmentation by land uses other than forestry.