

COUNTY FOREST COMPREHENSIVE LAND USE PLAN

TABLE OF CONTENTS

**CHAPTER 800**

**INTEGRATED RESOURCE MANAGEMENT**

<b><u>Section</u></b>	<b><u>Subject</u></b>	<b><u>Page</u></b>
<b>800</b>	<b>CHAPTER OBJECTIVES.....</b>	<b>5</b>
<b>805</b>	<b>INTEGRATED RESOURCE MANAGEMENT APPROACH.....</b>	<b>5</b>
<b>810</b>	<b>SUSTAINABLE FORESTRY.....</b>	<b>5</b>
810.1	TOOLS IN INTEGRATED RESOURCE MANAGEMENT.....	6
810.1.1	Compartment Recon.....	6
810.1.2	Forest Habitat Classification System.....	6
810.1.3	Soil Surveys.....	6
810.1.4	Ecological Landscapes of Wisconsin.....	6
810.1.5	Integrated Pest Management.....	7
810.1.6	Best Management Practices for Water Quality.....	7
810.1.7	Fire Management.....	8
810.1.7.1	Prescribed Fire.....	8
810.1.8	Outside Expertise, Studies and Survey.....	8
810.1.9	Local Silvicultural Field Trials.....	9
<b>815</b>	<b>MANAGEMENT CONSIDERATIONS TO REDUCE LOSS .....</b>	<b>9</b>
815.1	RISK FACTORS.....	9
815.1.1	Wind.....	9
815.1.2	Flooding.....	10
815.1.3	Climate Change.....	10
815.1.4	Timber Markets.....	11
<b>820</b>	<b>PLANT COMMUNITIES MANAGEMENT.....</b>	<b>11</b>
820.1	SILVICULTURAL PRACTICES/TREATMENTS.....	11
820.1.1	Natural Regeneration.....	12
820.1.1.1	Clearcutting/Coppice.....	12
820.1.1.2	Shelterwood/Seed Tree.....	12

<u>Section</u>	<u>Subject</u>	<u>Page</u>
	820.1.1.3 All Aged Regeneration Harvests.....	12
	820.1.1.4 Prescribed Burning.....	13
	820.1.1.5 Soil Scarification.....	13
	820.1.1.6 Other.....	13
820.1.2	Artificial Regeneration.....	13
	820.1.2.1 Mechanical Site Preparation.....	14
	820.1.2.2 Chemical Site Preparation.....	14
	820.1.2.3 Prescribed Burning.....	14
	820.1.2.4 Tree Planting / Seeding.....	14
820.1.3	Intermediate Treatments.....	15
	820.1.3.1 Mechanical Release.....	15
	820.1.3.2 Chemical Release.....	15
	820.1.3.3 Non-Commercial Thinning (TSI).....	15
	820.1.3.4 Thinning / Intermediate Cuts.....	16
	820.1.3.5 Pruning.....	16
820.2	SILVICULTURAL PRESCRIPTIONS.....	16
820.2.1	Even-Aged Management.....	16
	820.2.1.1 Aspen .....	17
	820.2.1.2 Jack Pine .....	17
	820.2.1.3 Black Spruce/Tamarack.....	18
	820.2.1.4 Oak.....	18
	820.2.1.5 Red Maple.....	19
	820.2.1.6 White Birch.....	19
	820.2.1.7 Red Pine.....	20
820.2.2	Uneven-Aged Management.....	20
	820.2.2.1 Northern Hardwood.....	21
820.3	LOCALLY UNCOMMON TREES / FOREST TYPES.....	21
	820.3.1 American Elm.....	21
	820.3.2 Butternut.....	22
	820.3.3 Eastern Hemlock.....	22

<u>Section</u>	<u>Subject</u>	<u>Page</u>
	820.3.4 White Cedar.....	22
820.4	FOREST TYPES REQUIRING INTENSIVE EFFORT TO REGENERATE....	22
	820.4.1 White Birch.....	22
	820.4.2 Northern Red Oak.....	22
820.5	INVASIVE PLANT SPECIES OF CONCERN.....	23
820.6	LEGALLY PROTECTED- SPECIAL CONCERN PLANT SPECIES.....	23
820.7	LINCOLN COUNTY TREE RETENTION GUIDELINES.....	24
820.8	BIOMASS HARVESTING GUIDELINES.....	33
<b>825</b>	<b>ANIMAL SPECIES MANAGEMENT.....</b>	<b>33</b>
	825.1 TECHNICAL PLANNING.....	33
	825.2 GUIDELINES.....	34
	825.3 INVENTORY.....	34
	825.4 RESOURCE MANAGEMENT CONSIDERATIONS FOR WILDLIFE.....	35
	825.4.1 General Management Policies.....	35
	825.5 IMPORTANCE OF HABITATS.....	35
	825.5.1 Non-forested Wetlands.....	35
	825.5.2 Aquatic Habitats.....	36
	825.5.3 Riparian and Other Non-managed Areas.....	36
	825.5.4 Early Successional Forests.....	36
	825.5.5 Conifers.....	36
	825.5.6 Oak Management.....	36
	825.5.7 Uneven/All-aged Management.....	37
	825.5.8 Large Forest Blocks.....	37
	825.5.9 Grasslands, Openings, Upland Brush.....	37
	825.6 INTENSIVE WILDLIFE MANAGEMENT PROJECTS.....	37
	825.6.1 Wisconsin Wildlife Action Plan / SGCN.....	37
	825.7 FISH AND WATERS MANAGEMENT.....	38
	825.7.1 Technical Planning and Surveys.....	38
	825.7.2 Special Projects.....	38
	825.7.3 Shoreland Zoning.....	39

825.7.4	Access and Development.....	39
---------	-----------------------------	----

<u>Section</u>	<u>Subject</u>	<u>Page</u>
<b>830</b>	<b>EXCEPTIONAL RESOURCES, UNIQUE AREAS .....</b>	<b>39</b>
830.1	HCVFs FOR FSC AND DUAL-CERTIFIED COUNTIES.....	39
830.2	AREAS RECOGNIZED BY STATE OR FEDERAL GOVERNMENT.....	41
830.2.1	State Natural Areas.....	41
830.2.2	Endangered Species Habitats.....	42
830.2.3	Harrison Hills Lakes.....	42
830.3	AREAS RECOGNIZED BY COUNTY OR LOCALLY.....	43
830.3.1	Forests with Old Growth Characteristics.....	43
830.3.2	Wildlife Sites.....	44
830.3.3	Geological Features of Significance.....	44
830.3.4	Unique Forest Types.....	44
830.3.5	Endangered or Threatened Species Habitat.....	45
830.4	CULTURALLY SIGNIFICANT SITES.....	45
830.4.1	Cemeteries.....	45
830.4.2	Logging Camps.....	45
<b>835</b>	<b>AESTHETICS.....</b>	<b>45</b>
835.1	AESTHETIC MANAGEMENT.....	46
835.2	AESTHETIC MANAGEMENT ZONES.....	46
835.2.1	Aesthetic Management Zone Examples.....	46
835.2.2	Aesthetic Management Prescriptions/Options.....	46
<b>840</b>	<b>LANDSCAPE MANAGEMENT.....</b>	<b>46</b>
840.1	CONSERVATION OF BIOLOGICAL DIVERSITY.....	47
840.2	HABITAT FRAGMENTATION.....	47
<b>845</b>	<b>RESOURCE MANAGEMENT BLOCKS.....</b>	<b>47</b>
845.1	OBJECTIVES.....	47
845.2	BLOCK NARRATIVES.....	47

## 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 Lincoln County Forest during this planning period.
2. To provide “Resource Management Blocks” that will identify and summarize the natural resources, social and physical management potential and opportunities for each unit. These blocks are identified in the Lincoln County Access Plan found in 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 Lincoln 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, sustainable forestry 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 greater 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 also 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 to differentiate land types from one another. Characterizing land in this way provides 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 more detailed discussion 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 Lincoln 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), Lincoln 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 Lincoln County employees practicing forestry will receive BMP training. Additionally, Lincoln 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, 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 field trials have been completed or are ongoing on the Lincoln County Forest. These trials include:

- White Birch Regeneration
- Northern Red Oak Regeneration
- Black Spruce/Tamarack Regeneration
- Swamp Hardwood Regeneration

A compilation of silvicultural trials on State and County lands is available at <https://dnr.wi.gov/topic/forestmanagement/documents/silvicultureTrials/ABtrials.pdf>

## **815 MANAGEMENT CONSIDERATIONS TO REDUCE LOSS**

### 815.1 RISK FACTORS

#### 815.1.1 Wind

The first order of business after a wind event is to clear and open roads, trails and recreational sites such as campgrounds and parks. As those tasks are completed, efforts are then turned to cleaning up and salvaging damage done to the forest.

Storm-damaged pine stands should be top priority when deciding where to start. Salvaging pine is much more urgent than oak or other hardwood stands because damaged pines will quickly begin to stain, and insects and disease will rapidly infest the damaged trees. As areas with pine are salvaged, the focus can turn to hardwoods and other types of timber. Stands with a high percentage of oak should follow oak harvesting guidelines if possible.

Uprooted trees, and those with completely broken tops, will die and should be salvaged. Standing trees with some broken branches are judgment calls. A general rule is to salvage the tree if more than 50% of the crown or top is broken, but there may be situations when

these damaged trees could be left to help the forest recover. Trees that are leaning may have broken roots or broken stem fibers and should be considered for salvage. Hail damage associated with wind storms may not be apparent until the following spring. Dieback, and mortality associated with storms could continue for 2-3 years after the event. As a result, stands will continue to be monitored for several years, especially if additional stresses occur in the year or years after the storm damage occurred.

#### 815.1.2 Flooding

Flooding and high water can cause mortality by reducing the amount of oxygen in the soil, depriving trees with submerged roots of the oxygen needed for growth and respiration. Along with submerged roots, trees can also die from uprooting and from subsequent insect and disease attack following flooding stress.

DNR Forest Health Specialist's may be consulted in flood-damaged stands and it may become necessary to conduct salvage harvests in flooded stands where appropriate. Access to wet or flooded sites can be difficult and may require frozen ground conditions. This is of greatest concern in stands where salvage harvests are needed to capture value, such as stands impacted by insects like emerald ash borer and eastern larch beetle.

#### 815.1.3 Climate Change

Northern forests may be affected by climate change during the next century. Lincoln County recognizes that these potential changes to our climate can impact our forest and the various programs that we manage. A proactive approach will be followed with consideration being given to how changing conditions could impact forest composition, management of roads and recreational trails, wildlife habitat, watersheds, invasive species and forest pests/ diseases. Timber management may include goals such as encouraging ecosystems with a variety of species on the landscape whenever possible, and giving consideration to forest types that will be less impacted by changing climate patterns.

#### 815.1.4 Timber markets

Generally, the number of mills utilizing raw forest products in Wisconsin has declined significantly over the last 20 years. However, this decline has been somewhat offset by an increased demand for export logs and lumber. As transportation costs continue to rise, short distance hauls to a mill become more desirable for timber producers. With a pulp/paper mill (hardwood) and an OSB mill located in Tomahawk; a pulp/paper mill (hardwood) in Rothschild and a pulp/paper mill (softwood) in Mosinee, the Lincoln County Forest is situated well for small diameter lower quality raw material markets. The Lincoln County Forest also has several markets for hardwood saw logs and saw bolts and softwood saw logs within close proximity. Considering the location of the Lincoln County Forest, demand for its forest products should remain strong into the future.

## **820 PLANT COMMUNITIES MANAGEMENT**

Lincoln 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 through the use of 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 and Coppice are silvicultural methods used to regenerate shade intolerant and mid shade tolerant 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. These methods are also used as a final rotation removal in species such as red oak, red pine and others. Tree retention guidelines are followed when prescribing clearcut or coppice cuts.

##### 820.1.1.2 Shelterwood / Seed Tree

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

##### 820.1.1.3 All Aged Regeneration Harvests

All aged regeneration harvests are used in shade tolerant and mid-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, red maple, oak 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 number of forest types in Lincoln County are ecologically tied to fire. Burning may create seeding conditions or release regeneration from competing vegetation. Prescribed fire may be used for regeneration of red oak, jack pine or white pine.

#### 820.1.1.5 Soil Scarification

Scarification is a technique used to prepare a seedbed to encourage tree regeneration. This mechanical disturbance exposes bare mineral soil, incorporates seeds into the soil, reduces competition from unwanted vegetation, and creates conditions favorable for the regeneration of many tree species. Scarification is generally completed in conjunction with a timber harvesting activity; either pre or post-harvest, depending on the application. Oak, white birch, pine, fir and other tree species benefit from soil scarification. Lincoln 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 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, 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. 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. Lincoln 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 release may include releasing young pine, spruce, or oak from competing vegetation using chain saws or other equipment.

#### 820.1.3.2 Chemical Release

Chemical Release is the removal of competing vegetation from desirable trees through the use of 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. Pruning will be considered mainly for conifer species and carried out when deemed economically feasible.

### 820.2 SILVICULTURAL PRESCRIPTIONS

A silvicultural prescription is a planned treatment(s) designed to meet forest stand management goals and objectives. The Silvicultural prescriptions found in this section are a general summarization of practices carried out on the Lincoln County Forest and are not intended to be all encompassing. All silvicultural prescriptions performed on the Lincoln County Forest are accepted practices found within the WDNR Silviculture Handbook (3431.5), are based on other scientifically proven methods, or are part of an experimental trail.

#### 820.2.1 Even-Aged Management

A forest stand composed of trees having relatively small differences in age. Typical cutting practices include: clearcutting, coppice, shelterwood and seed tree. 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, aspen types may be dominated by quaking or big tooth aspen or a combination of both. Aspen stands contain a wide variety of associated hardwood and conifer species.

<u>Shade tolerance:</u>	Intolerant
<u>Habitats:</u>	ATM, AOCa, TMC, PArV, PArVAa, AVVb, ACal, ATAtOn, ArAbCo
<u>Intermediate treatments:</u>	None
<u>Mean rotation age:</u>	45
<u>Primary regeneration method:</u>	Natural
<u>Harvest method:</u>	Coppice with/without standards
<u>Habitat value:</u>	Early successional related species
<u>Economic value:</u>	Fiber production / bolts
<u>Insect disease considerations:</u>	Hypoxylon, cankers and others
<u>Trends:</u>	General declines on statewide acreage
<u>Landscape considerations:</u>	Retain/increase acreages where possible

#### 820.2.1.2 Jack Pine

These are types where jack pine makes up more than 50% of the stems. Common associates in Lincoln County are aspen, balsam fir and red maple.

<u>Shade tolerance:</u>	Intolerant
<u>Habitats:</u>	PArV, PArVAa, HYDRI
<u>Intermediate treatments:</u>	None
<u>Mean rotation age:</u>	50
<u>Primary regeneration method:</u>	Artificial or Natural
<u>Harvest method:</u>	Clearcut or Seed Tree
<u>Habitat value:</u>	Early successional related species
<u>Economic value:</u>	Fiber production

<u>Insect disease considerations:</u>	Budworm, Diplodia and Gall Rust
<u>Trends:</u>	General decline on statewide average
<u>Landscape considerations:</u>	Retain/increase acreages where possible

#### 820.2.1.3 Black Spruce/Tamarack

These are types where black spruce or tamarack makes up more than 50% of the stems. Common associates are balsam fir, cedar and hemlock.

<u>Shade tolerance:</u>	Tolerant/intolerant
<u>Habitats:</u>	HYDRI
<u>Intermediate treatments:</u>	None
<u>Mean rotation age:</u>	100
<u>Primary regeneration method:</u>	Natural
<u>Harvest method:</u>	Strip clearcut or seed tree
<u>Habitat value:</u>	Wetland related species
<u>Economic value:</u>	Fiber production
<u>Insect disease considerations:</u>	Mistletoe/Sawfly
<u>Trends:</u>	General decline on statewide average
<u>Landscape considerations:</u>	Retain acreage

#### 820.2.1.4 Oak

These types are where oak makes up more than 50% of the stems. Common associates are white birch, red maple, aspen and white pine.

<u>Shade tolerance:</u>	Intermediate
<u>Habitats:</u>	ATM, AOCa, AVVb, PArV
<u>Intermediate treatments:</u>	Thinning or TSI
<u>Mean rotation age:</u>	100
<u>Primary regeneration method:</u>	Natural
<u>Harvest method:</u>	Shelterwood, coppice
<u>Habitat value:</u>	Food source
<u>Economic value:</u>	High quality saw log and fiber
<u>Insect disease considerations:</u>	Gypsy moth, defoliators and oak wilt
<u>Trends:</u>	General decline on statewide average

Landscape considerations: Retain acreage where possible

#### 820.2.1.5 Red Maple

These types are where red maple makes up more than 50% of the stems. Common associates are balsam fir, aspen, white birch, oak, white pine, sugar maple, and black ash.

Shade tolerance: Mid-tolerant

Habitats: ATM, AOCa, TMC, PArV, PArVAa, AVVb, ACal, ATAtOn, ArAbCo, HYDRI

Intermediate treatments: Thinning

Mean rotation age: 60

Primary regeneration method: Natural

Harvest method: Coppice, shelterwood, strip clearcut, overstory removal

Habitat value: Early successional species, browse

Economic value: Fiber production, saw logs

Insect disease considerations: Cankers, defoliators

Trends: General increase on statewide acreage

Landscape considerations: Retain acreage where feasible

#### 820.2.1.6 White Birch

This type is where white birch makes up more than 50% of the stems. Common associates are oak, red maple, aspen, sugar maple, red pine, white pine and balsam fir. Lincoln County will allow aspen to regenerate and spread where it is a component of a white birch stand.

Shade tolerance: Intolerant

Habitats: PQE, PArV, PArVa, ArAbVC, TMC, ArAbCo, AVVb, AVb, ATM, ATD, AOCa, AH,

<u>Intermediate treatments:</u>	Thinning
<u>Mean rotation age:</u>	60
<u>Primary regeneration method:</u>	Natural
<u>Harvest method:</u>	Strip clear cut, seed tree
<u>Habitat value:</u>	Early successional species. Food source: browse, seeds, buds and catkins
<u>Economic Value:</u>	Fiber and saw log production, decorative
<u>Insect disease considerations:</u>	Cankers, defoliators, borers
<u>Trends:</u>	General decrease in acreage statewide
<u>Landscape considerations:</u>	Maintain acreage where feasible

#### 820.2.1.7 Red Pine

This type is where red pine makes up 50% or more of the stems. Common associates are white pine, jack pine, aspen and oak. Most of the red pine stands on the Lincoln County Forest occur in artificially regenerated pine plantations.

<u>Shade tolerance:</u>	Intolerant
<u>Habitats:</u>	ATM, AOCa, AVVb, TMC, PArVAa, PArV
<u>Intermediate treatments:</u>	Thinning
<u>Mean rotation age:</u>	75
<u>Primary regeneration method:</u>	Artificial
<u>Harvest method:</u>	Intermediate Commercial Thinnings, Overstory removal
<u>Habitat value:</u>	Shelter, Thermal Cover, Food Source
<u>Economic value:</u>	Fiber production, Saw Logs, Utility Poles
<u>Insect disease considerations:</u>	Heterobasidion Root Disease, Bark Beetles
<u>Trends:</u>	General increase on statewide acreage
<u>Landscape considerations:</u>	Retain acreage where possible

#### 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 and mid shade tolerant forest types.

#### 820.2.2.1 Northern Hardwood

These are stands dominated by shade tolerant and mid-shade tolerant species. In Lincoln County, northern hardwood stands are typically dominated by sugar maple, ash, basswood, cherry and yellow birch.

<u>Shade tolerance:</u>	tolerant to mid-tolerant
<u>Habitats:</u>	ATM, AOCa, TMC, AVVb, ACal, ATAtOn, ArAbCo, AH
<u>Intermediate treatments:</u>	none
<u>Mean rotation age:</u>	n/a
<u>Primary regeneration method:</u>	natural – all aged regeneration
<u>Harvest method:</u>	single tree, gaps,
<u>Habitat value:</u>	snag, mast and cavity habitat components
<u>Economic value:</u>	Fiber, high quality sawlogs
<u>Insect disease considerations:</u>	emerald ash borer, others
<u>Trends:</u>	generally stable
<u>Landscape considerations:</u>	develop high quality sawlogs

### 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 Lincoln County Forest and likely across the general region. These trees may be left as reserves in even aged management prescriptions, or in thinnings and all aged regeneration harvests.

820.3.1 American Elm (*Ulmus americana*.) is scarce primarily due to Dutch elm

disease. Healthy looking elm may be left uncut in hope that they may continue on the landscape as potential resistant seed sources.

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.

820.3.3 Eastern Hemlock (*Tsuga canadensis*) is a highly preferred deer and small mammal browse species. Regeneration is difficult and remnant stands will be retained and managed to provide seed sources for future management activities.

820.3.4 White Cedar (*Thuja occidentalis*) is a highly preferred deer and snowshoe hare browse species. Regeneration is difficult and remnant stands and individual trees will be retained to provide seed source for future management activities.

#### 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 White Birch

White birch is a shade intolerant species normally found in even aged stands. White birch is an early successional species adapted to colonize sites after disturbances such as fire. Where feasible, Lincoln County is committed to retain and regenerate the white birch cover type. Regeneration efforts will include seed-tree harvest with scarification.

##### 820.4.2 Northern Red Oak

Northern red oak is a shade intolerant to mid tolerant species found in primarily even aged stands. Northern red oak benefits from disturbance to regenerate and herbivory can be a limiting factor on regeneration success. Where practicable, Lincoln County is

committed to retain and regenerate the northern red oak cover type. Regeneration efforts will focus on timing soil scarification with good acorn crops and shelterwood, patch selection and coppice 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 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 Lincoln 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. The County will continue to train staff and user groups in invasive species identification as well as attempt to secure funding sources to control them as much as is practical.

#### 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 species 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 LINCOLN COUNTY TREE RETENTION GUIDELINES

### **Reserve Trees**

Reserve trees are living trees,  $\geq 5$  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 “clearcut” 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

#### Potential Costs of Reserve Tree Retention

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. Also, 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 windthrow, 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  $\geq 10$  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 the silviculture 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.

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  $\geq 3$  (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  $\geq 10$  acres. It is encouraged in smaller stands, but operational, shading, and other biological issues may limit application.
- Even-aged intermediate treatments
  - Retain  $\geq 3$  (if available), preferably large, snags per acre.
  - Retain  $\geq 3$  (if available), preferably large, cavity trees per acre.
  - Retain  $\geq 3$  (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  $\geq 3$  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  $\geq 3$  (if available), preferably large, snags per acre.
  - Retain  $\geq 3$  (if available), preferably large, cavity trees per acre.
  - Retain  $\geq 3$  (if available), preferably large, mast trees per acre.
  - Consider retaining  $\geq 3$  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. Also, 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.

#### 820.8 BIOMASS HARVESTING GUIDELINES

Refer to Chapter 505.8.10 BMP's, Roads and Landings or the publication can be found on the Council on Forestry website at:

<https://councilonforestry.wi.gov/Documents/WoodyBiomass/BHGFieldManual.pdf>

### 825 ANIMAL SPECIES MANAGEMENT

The Lincoln County Forest provides a wide range of wildlife habitats from open grasslands/barrens to mature forests, from bogs to forested wetlands, from spring ponds to lake shorelines. A primary goal of wildlife management on the Lincoln 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 suite 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 Lincoln 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 and 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 as well as input from wildlife professionals. Population estimates will be conducted by WI DNR wildlife management staff, natural heritage conservation staff, and other trained cooperators. The following surveys are conducted on or adjacent to the Lincoln County Forest:

- Summer Deer Observations
- Operation Deer Watch
- Turkey and Grouse Brood Survey
- Carnivore Tracking
- Howl Surveys
- Black Bear Genetic Survey
- Woodcock Peenting Survey
- Ruffed Grouse Drumming Survey
- Waterfowl Survey
- Eagle Survey
- Biotic Inventories
- Frog and Toad Surveys
- Bat Monitoring
- Snapshot Wisconsin

## 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 (clearcuts, coppice and shelterwood) 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 Lincoln County Forest contains approx. 14,100 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 Lincoln County Forest includes approx. 1100 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 that are present on the forest 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 large suite of wildlife species that benefit from early successional forests. On the Lincoln County Forest there are currently approx. 39,600 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.

#### 825.5.5 Conifers

Conifers, whether jack pine, white pine, spruce, fir or other types are important habitat for a number of wildlife species. The Lincoln County Forest currently has approx. 15,400 acres of coniferous habitat. Connecticut warbler, red crossbill, northern flying squirrel, and many others utilize conifer types.

#### 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 Lincoln County Forest has approx. 1,650 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.

#### 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 Lincoln County Forest has approx. 20,240 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 type, 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. These cover types benefit pollinators and numerous species including upland plover and whip-poor-will. The Lincoln County Forest currently has approx. 880 acres identified as open grassland or upland brush habitat.

### 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 Wisconsin Department of Natural Resources 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 impact, 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

Trout stream and habitat improvement work and other fish habitat projects are conducted on streams and lakes located within the boundaries of the Lincoln County Forest. Several methods of trout habitat improvement may be applied including brushing, brush bundling, large wood additions, channel shaping and spring pond dredging. Specific locations for trout habitat projects on the Lincoln County Forest may be the Prairie River, North Branch of the Prairie River, Green Meadow Creek, Big Pine Creek, Little Pine Creek, Squaw Creek, Averill Creek, Armstrong Creek and the Spirit River. These

projects are done in cooperation with Department of Natural Resources Fish Management staff in order to improve fish habitat and make for higher quality recreational opportunities for users of the county forest.

### 825.7.3 Shoreland Zoning

Forestry activities such as harvesting of trees, and landings are exempt from regulation under the counties Chapter 21 Shoreland Zoning as long as best management practices, as prescribed by *Wisconsin's Forestry Best Management Practices for Water Quality* Field Manual, are adhered to by the landowner and logger or the practice is prescribed and supervised by a practicing forester. The full County Shoreland Zoning Ordinance can be viewed at the following link:

[https://library.municode.com/wi/lincoln\\_county/codes/code\\_of\\_ordinances?nodeId=CO\\_CH21SHZOCR432-2003](https://library.municode.com/wi/lincoln_county/codes/code_of_ordinances?nodeId=CO_CH21SHZOCR432-2003)

### 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.

## **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. These sites will be managed to perpetuate the timber type where possible in order to maintain or enhance their ecological values.

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

#### CRITERIA FOR 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 HCVPs on the Lincoln County Forest are the following:

#### Tomahawk Bog

This 1,300-acre high conservation value forest site features a large semi open bog, northern wet forest, northern hardwood swamp, and alder thicket communities. Black spruce and tamarack dominate a significant portion of the area. In the eastern part are areas of mineral water influence that permits excellent cedar swamp, black ash swamp, and tamarack fen communities to develop. Lincoln County manages the uplands for sustainable forest products. Bird species of special concern: Black-backed Woodpecker, Gray Jay, Boreal Chickadee, Yellow-bellied Flycatcher, and Evening Grosbeak have been recorded here in good numbers. A snowmobile trail crosses the bog. This bog is one of the best large acreage bogs remaining in the state.

#### Budinga Bog

This is a large wetland complex dominated by open sphagnum bog and swamp conifer forest of black spruce and tamarack. Rolling glacial topography occurs on



the surrounding uplands. A town road passes through the area. Heritage natural community types are open bog and northern wet forest both of which are given high quality A rank. The site is considered a High Conservation Value Forest in the County.

#### Sparrow Bog

Open bog plants, black spruce, and tamarack forests dominate this muskeg. One section has a significant feature referred to as a domed bog. This is a muskeg of stunted black spruce lying on accumulated peat that is significantly higher in the center than the edges forming a prominent domed aspect. This part of the bog is very acidic. The bog and northern wet forest have been given A rank. The site is a High Conservation Value Forest in the County.

#### Bradley Swamp

This swamp is another large bog area dominated by black spruce and tamarack. The same species of birds found at Tomahawk Bog are found here. The community features, northern wet forest and open bog, are ranked A. There is a road that divides the area and it is parceled into multiple owners making bog-wide management difficult.

#### Highway 8 Bog

This is a B ranked wetland north of Hwy 8. Dominants are black spruce and tamarack with a dense bog shrub understory.

## 830.2 AREAS RECOGNIZED BY STATE OR FEDERAL GOVERNMENT

### 830.2.1 State Natural Areas

The State Natural Areas system represents the wealth and variety of Wisconsin's native landscape. They contain outstanding examples of native biotic communities and are often the last refuges in the state for rare and endangered plant and animal species. SNAs are unique in that they can exist as stand-alone properties or be designated within the boundaries of another property type. There are no designated State Natural Areas within the Lincoln County Forest at this time.

At a future date, if State and County personnel concur on management objectives,

significant biological areas may become SNAs. If SNAs are designated in the future, Lincoln County will work cooperatively with the DNR Endangered Resources staff to coordinate educational, monitoring, and research activities.

#### 830.2.2 Endangered species habitats

The DNR keeps track of rare, threatened and endangered animal, plants and ecosystems through their Natural Heritage Inventory system (NHI). Each timber sale will have an NHI check performed prior to sale establishment. In the event any rare, threatened or endangered species or ecosystems are located within or near the proposed sale area, protective measures will be taken to minimize or eliminate any negative impacts.

#### 830.2.3 Harrison Hills Lakes

A unique feature of the Harrison Hills area is a concentration of lakes set in a relatively natural state. These lakes exhibit differences in species composition and population densities due to depth, alkalinity, shore features, and whether the lake is drained or gets its water via seepage. The lakes have a range of qualities that when combined would be unequaled as a reference site. *Wisconsin's Forestry Best Management Practices for Water Quality* are followed when managing timber around these lakes.

- Coppes Lake Soft water seepage lake with clear water and muck bottom
- Lake 11 (5) T34N-R8E Shallow hard water drained lake with associated wetlands
- Lake 11 (6) T34N-R8E Shallow hard water drainage lake with associated wetlands
- Lake 7 (15a) T34N-R8E Meromictic lake 0.3 surface acres, 41 feet deep
- Pine Lake Sec. 20 T34N-R8E Hard water drained lake with a bog wetland
- Tahoe Lake An exceptionally deep (54 feet) soft water seepage lake
- Lake 20 (14) T34N-R8E A very soft water seepage lake with no wetlands
- Lake 20 (15) T34N-R8E A small soft water bog lake
- High Lake A deep very soft water seepage lake with abundant rosette plants
- Lake 29 (8) T34N-R8E Deep (38 feet) with ultra-soft water
- Lake 29 (11) T34N-R8E Bog lakes with medium soft water

- Lake 29 (12) T34N-R8E Deep (40 feet) with no muck on the bottom
- Lake 29 (14) T34N-R8E Soft water seepage lake with some muck
- Turtle Lake The west portion is shallow with abundant emergent plants and invertebrates
- Thompson Lake Diverse shoreline, deep, wilderness type with diverse fish population

### 830.3 AREAS RECOGNIZED BY COUNTY OR LOCALLY

Lincoln County may contain areas that are locally considered exceptional or unique. Some are recognized by other agencies, while others are designated only within this Plan. These resources may include wild rivers, lakes, natural areas, geological features or historical/archeological sites. Lincoln County maintains a GIS layer of locally recognized areas of historic significance so these sites can be protected in the course of management of the forest.

#### 830.3.1 Forests with Old Growth Characteristics

Eastern hemlock and white cedar stands will be maintained. Hemlock is important to the diversity of our northern hardwood stands and provides a seed source for regeneration and needed habitat for many species, including migratory songbirds. Management is currently keyed to maintaining hemlock as a component of northern hardwood stands and improving the health and vigor of individual trees and islands of trees. Regeneration is dependent on overcoming high deer populations. Silvicultural techniques in conjunction with repellents, fencing, and/or bud capping may prove useful in regenerating hemlock and enhancing its presence on the County Forest. Cedar is equally important to the diversity of our forested wetlands and provides a seed source for regeneration and needed habitat for many species, including migratory songbirds. With regard to the difficulties in regenerating white cedar, due mostly to high deer populations, these stands are currently not being harvested. Regeneration is dependent on overcoming high deer populations. Silvicultural techniques in conjunction with

repellents, fencing, and/or bud capping may prove useful in regenerating white cedar and enhancing its presence on the County Forest.

#### 830.3.2 Wildlife Sites

Wildlife sites may include such things as bat hibernacula, herp hibernacula or bird rookeries. Special considerations will be given to such areas if they are identified on the Forest.

#### 830.3.3 Geological Features of Significance

- a. Summit Lake moraine in sections 10 and 11 of Harrison Township - This moraine is a prominent ridge up to 90 feet high and was part of the Langlade lobe that travel in a different direction than the Harrison lobe. The upper parts consist of meltwater stream sediment.
- b. Ice-walled Lake Plains are features that form in rugged moraines. Typically the only flat areas in very hilly topography, these plains were once lake bottoms. The sediment that formed at the bottom became perched when the surrounding ice blocks melted. The richer nutrients and the well-drained position at the top of hills permitted exceptional conditions for forest development.
- c. Drumlins, especially in Tomahawk, Somo, and Harding Townships are southeast trending and form the uplands between the extensive peatlands. This extensive field of drumlins is a significant geological feature.
- d. Prairie River Dells – The Dells contain a gorge, rapids and cliff side vegetation. The site contains exceptional scenic quality. The site is planned for minimal development with the construction of 3 viewing platforms in the “Prairie Dells Scenic Area.”

#### 830.3.4 Unique Forest Types

##### Ruffed Grouse/Woodcock Management Area

County Forest lands contain ruffed grouse and woodcock management areas located in the Mail Route Block, New Wood Block, Underdown Block and Wildwood Block. Some areas are established in cooperation with the Ruffed

Grouse Society and the Department of Natural Resources. Chapter 3000 contains maps of the Ruffed Grouse/Woodcock Management areas.

Management of the vegetation in this unit will promote aspen and oak forest types. The objectives are as follows.

1. Maintain and expand the aspen and oak acreage.
2. Establish timber harvest areas of relatively small size (20 to 40 acres), and with irregular boundaries to maximize the creation of forest edge.
3. Create and maintain structural and age class diversity in the aspen and oak types.

#### 830.3.5 Endangered or Threatened Species Habitat

Rare, threatened and endangered plant and animal species exist in the Lincoln County Forest. When habitat for these species is identified, appropriate measures will take place to protect these sites.

### 830.4 CULTURALLY SIGNIFICANT SITES

#### 830.4.1 Cemeteries

There are no known cemeteries located on the Lincoln County Forest.

#### 830.4.2 Logging Camps

Lumber camps were scattered throughout the Lincoln County Forest. Occasionally, remnants of these camps or other cabin sites are found on the Forest. When these sites are found, the location is entered in our GIS database. The site is designated as a restricted equipment zone during timber harvesting to protect it. To protect the integrity of these sites their locations are not disclosed.

### 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 by special timber management practices.

##### 835.2.1 Aesthetic Management Zone Examples

- Park and recreation areas, including access routes
- Lakes and rivers with significant recreational use
- Roads with heavy traffic or scenic drive.

##### 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**

Lincoln 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 Lincoln 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.

#### 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 is intended to decrease the conversion of forest land to other uses.

### **845 RESOURCE MANAGEMENT BLOCKS**

#### 845.1 OBJECTIVES

Previous chapters have outlined the planning objectives, decision guides and management considerations for administering the County Forest.

The intent of using resource management blocks is to document the differing physical characteristics of individual units on the Forest as well as any unique management and access considerations. Resource managers can use these chapters as a tool to guide management and to communicate management goals and resource needs to other foresters and resource managers.

#### 845.2 BLOCK MAPS AND NARRATIVES

Each block chapter contains a general resource map as well as summaries of the following information:

- Resource Management Block Name
- Block acreage

- Predominant Timber Cover Types
- General description of soils and topography
- Listing of primary water resources (lakes, rivers, streams)
- Recreational/access considerations
- Protection needs

In addition, the Resource Management Block Chapters contain basic Goals and Guidelines for the unit that will guide foresters in making management decisions within the block.

Block maps are compiled in Chapter 3000 of this plan.