

COUNTY FOREST COMPREHENSIVE LAND USE PLAN

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CHAPTER 800

INTEGRATED RESOURCE MANAGEMENT

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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 Oconto County Forest during this planning period.
- (2) To provide "Integrated Resource Management Units" (IRMU) that will identify and summarize the natural resources, social and physical management potential and opportunities for each unit. (These units are identified and are to be updated in the Chapter 4000.

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 Oconto County Forest is managed. This broad definition describes the content of everything within this comprehensive land use plan. Previous chapters have discussed in depth many of the social and economic issues.

For the purpose of this chapter, the scope of Integrated Resource Management includes:

- Forests, habitats, biological communities
- Wetlands and waters
- Wildlife and endangered resources
- Soils and minerals
- Cultural and historical resources

Management of one resource affects the management or use of other resources in an area. Managing each use or resource by itself is less effective than managing all of them in an integrated way. This is a field level approach to integrated

resource management. Management decisions are made while considering that each site is part of a larger ecosystem. Similarly, the development and implementation of this plan also considers other planning efforts in order to provide for broader scale management.

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 definition of sustainable forestry in the Wisconsin Administrative Code and the Wisconsin Statutes is as follows:

"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. The DNR forester will be responsible for the completion and maintenance of the recon system and will assist in interpretation of the data to be utilized in planning and scheduling resource management.

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.

The Forest Habitat Classification System is an ecological tool that promotes a common language for interpreting site capability based on potential natural vegetation. Its primary use is the assessment of biological potential of upland forest sites. Through the application of Forest Habitat Classification, land managers are better able to assess site potential of current stands, identify ecological and silvicultural alternatives, predict the effectiveness of possible silvicultural treatments, assess feasible management alternatives, and choose appropriate management objectives.

Data will be collected in order to classify the entire forest. This information should be collected along with, and made part of, the compartment reconnaissance system during regular field inspections. This data should also be compared to soil survey information in order to associate the relationships between forest habitat types and soil types.

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. Detailed soil surveys, when available, will be made a part of the compartment reconnaissance system and continue to be correlated to the Forest Habitat Classification system.

Soil survey information may be obtained from the Natural Resource Conservation Service office.

810.1.4 National Hierarchical Framework of Ecological Units/Ecological Landscapes of Wisconsin

Integrated resource management recognizes that an individual forest site is part of a larger landscape, and management activities can have an impact beyond a specific site. The National Hierarchical Framework of Ecological Units (NHFEU) is a useful tool in understanding natural landscapes.

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.

Landtype Associations (LTA's) are considered landscape-scale ecological units, and are identified by surficial geology, patterns of vegetation, soil parent materials, and water tables. Most LTA's are between 10,000 and 300,000 acres in size.

Each landtype association contains a general description of characters such as landform, historic vegetation, current vegetation, water resources, land area, socioeconomic data, agriculture, population, and ecological opportunities.

Goals can be developed for an LTA based in part on its capability, productivity, unique character, and the scarcity or abundance of similar LTA's in the state, region or beyond. Objectives for vegetation management, wildlife habitat, ecological restoration, and recreation use can be tailored to the characteristics and potentials of the ecosystem.

810.1.5 Integrated Pest Management

Integrated Pest Management for the purpose of this Plan, is defined as follows:

“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

Often 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 FR093.

Consistent with the aforementioned manual (page 6), Oconto 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, close proximity to streams or lakes, or steep slopes may require mitigating measures in excess of those outlined in the manual. These more sensitive areas are identified on the erosion susceptibility map included in Chapter 900 – (See Aesthetic Zone Maps). All Oconto County employees practicing forestry will receive BMP training. Additionally, Oconto County will require Forest Industry Safety and Training Alliance (FISTA) training of all logging contractors that bid and operate on County timber sales. At a minimum, the contract holder and one “in-woods” person actively responsible for each logging site must have FISTA Training. In some cases, the contract holder may also be the “in-woods” person.

810.1.7 Forest Fire Management

Any issues regarding forest fire management will be addressed in consultation with Department of Natural Resources forestry staff who have primary jurisdiction in the prevention, detection, and suppression of forest fires.

810.1.7.1 Uncontrolled Fire Refer to Chapter 600

That all uncontrolled fires will be promptly reported and suppressed by the Department of Natural Resources in cooperation with the county and local fire departments.

810.1.7.2 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 in the Committee's opinion, are best equipped to provide that service. This data will be used as appropriate for management planning.

810.1.8.1 Water Resources

The DNR fisheries biologist and the water management specialist will provide surveys, studies, and technical advice as necessary to prepare and carry out recreational planning affecting waters on the County Forest. (Also see Chapter 840.6)

810.1.8.2 Wildlife Resources

DNR wildlife biologists will implement population and habitat surveys, provide technical advice, and direct assistance needed for wildlife management planning and implementation on County Forest lands. (Also see Chapter 840) Wildlife projects are identified and implemented in collaboration with the County Forest administrator, DNR liaison forester, and the Committee.

810.1.8.3 Soil Resources

Soil maps and surveys prepared by the Natural Resource Conservation Service (NRCS) will be used in various phases of planning.

810.1.8.4 Mineral Resources

The DNR may provide information valuable for management of gravel and other mineral resources. (Also see Chapter 515.2).

810.1.8.5 Wetland Resources

Maps prepared by the DNR's Bureau of Fisheries Management and Habitat Protection, may be utilized for identifying wetlands. Although not comprehensive, particularly in forested areas, these maps are a good initial tool for identifying wetlands on County Forest lands. Assistance and technical advice will be requested from the DNR water management specialist when wetlands may be affected by management practices. The Army Corps of Engineers will also be consulted as appropriate. In addition, Wisconsin's Forestry Best Management Practices for protecting water quality will be used. (Also see 820.2.2 for further details). Oconto County has wetlands and soil maps digitized and will be used with GIS.

810.1.8.6 Navigable Streams

The DNR's water regulations specialist will be consulted when navigable stream crossings or navigable stream management projects are being planned. (Also see Chapter 840.6.5). Best Management Practices for protecting water quality will be used.

810.1.8.7 Floodplains

Maps prepared by the Federal Emergency Management Agency (FEMA) will be used to identify floodplains. The County zoning staff may be consulted regarding management activities in the floodplain.

810.1.8.8 Cultural Resources

Management planning will take into consideration historical and archaeological sites. More information may be obtained from the State Historical Society or the DNR's archeologist.

810.1.8.9 Entomology / Pathology

Wisconsin DNR forest pest staff will provide information and consultation as requested by the County. (Also see Chapter 610 for more information on forest pest control.

810.1.8.10 Endangered Resources

DNR endangered resource staff will provide Natural Heritage Inventory (NHI) information and are available for consultation on endangered resources issues.

810.1.9 Local Silvicultural Field Trials

To date, numerous field trials have been completed or are ongoing on the County Forest. These trials include:

- 1) Strip and block harvest patterns for cedar regeneration
- 2) Cyclone fencing on 1 acre block cut in cedars to protect regeneration

A compilation of silvicultural trails on State and County lands is available at:
<http://dnr.wi.gov/org/land/forestry/sciences/silviculture/index.html>.

810.1.10 Local Citizen Involvement

The Oconto County Forestry, Parks and Recreation Committee is an open forum to listen, evaluate and incorporate, where appropriate, the public's input into management of the County Forest.

The public's needs and interpretation of management of the Forest should be improved by the availability of "Integrated Resource Management Unit" information (see Section 880). It is hoped that an inventory of each unit's attributes, threats, trends, regulations and opportunities will encourage

communication on specific issues and focus on possible solutions using a total integrated resource and ecosystem viewpoint.

820 BIOLOGICAL COMMUNITY TYPES

A community is an assemblage of different plant and animal species, living together in a particular area, at a particular time in specific habitats. Communities are complex and dynamic systems named for their dominant plant species.

Species/community information has been condensed to familiarize the reader with the make-up of the Forest.

Refer to Chapter 130.1.4 for more information

820.1 FORESTED COMMUNITIES

The forested cover types are made up of a variety of size classes (regeneration, sapling-pole, and saw timber) and structure (canopy, layers, ground vegetation, dead and downed material, and inclusions). Forested communities within the Oconto County Forest cover approximately 83.51% of the Forest.

Forest cover types associated with the County Forest are:

Primary Type	Acres	Percentage	Definition
Aspen (A)	12,929	29.57%	More than 50% aspen.
Aspen (AX)	260	.59%	An aspen type in which aspen may not produce sound merchantable pulpwood. Typically high water table or extremely low moisture/nutrients.
White Birch (BW)	32	.08%	More than 50% white birch.
White Cedar (C)	4,054	9.16%	More than 50% swamp conifers with white cedar outweighing other species. Forested Wetland.
Fir-Spruce (FS)	151	.36%	Swamp border or upland types with mixed species predominately balsam fir and spruce and associated

			with white pine, cedar, red maple, aspen, yellow birch etc.
Hemlock-Hardwood (HH)	210	.49%	More than 50% hemlock associated with northern hardwood species.
Red Maple (MR)	1,280	2.95%	More than 50% red maple.
Northern Hwds (NH)	2,006	4.61%	More than 50% northern hardwood species; sugar maple, yellow birch, basswood, rock elm, beech, etc.
Oak (O)	836	1.93%	Dominated by red oak, white oak, or black oak, and associated with other hardwoods.
Scrub Oak (OX)	364	.84%	More than 50% stocked by various species of oak which, in this type, will produce only fuelwood and cellulose materials.
Jack Pine (PJ)	1,494	3.44%	More than 50% pine with jack pine outweighing red and white pine.
Red Pine (PR)	5,262	12.05%	More than 50% pine with red pine outweighing white and jack pine.
White Pine (PW)	988	2.22%	More than 50% pine with white pine outweighing red and jack pine.
Black Spruce (SB)	892	2.05%	More than 50% swamp conifers with black spruce outweighing other species. Forested wetland.
Swamp Conifer (SC)	416	.96%	Swamp type with mixed species predominately balsam fire, cedar, and spruce and associated with red maple and a variety of other hardwoods. Forested wetland.
Swamp Hwds (SH)	4,989	11.47%	More than 50% swamp hardwood species; black ash, red maple, American elm, Balm of Gilead, etc. Forested wetland.
Cedar (SXC)	143	.33%	More than 50% cedar.
Black Spruce (SXSB)	27	.07%	More than 50% black spruce.
Tamarack (T)	146	.34%	More than 50% swamp conifers with white cedar outweighing other species. Forested wetland.

Total	36,479	83.51%	
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820.2 NON-FORESTED COMMUNITIES

Non-forested communities within the Oconto County Forest cover 16.49% of the forest. In broad categories, they are: upland (1.35%), wetland (14.68%) and water (.46%).

Non-forested habitats are important components of management within the County Forest. Upland and wetland non-forest types provide important habitat for distinct groups of species.

820.2.1 Upland Non-Forest

Upland Non-Forest areas of the County Forest include:

Primary Type	Acres	Percentage	Definition
Grass (G)	86	.19%	The “G” symbol will be used for upland grass, sweet fern, bracken fern, etc., including abandoned fields less than 10% stocked with tree species.
Grass (GG)	33	.08%	Ground cover predominately true grasses such as brome, quack, blue grass, timothy, big and little luestem, Indian grass, etc.
Herbaceous Vegetation (GH)	12	.03%	Ground cover predominately herbaceous vegetation species such as bracken fern, sweet clover, giant ragweed, stinging nettle, upland aster, goldenrod, prairie dock, etc.
Campground (ICG)	19	.05%	Areas designated for either family camping (tent and trailer), group tent camping or indoor group camps.
Picnic Area (IP)	21	.05%	Maintained day use areas containing picnic tables, toilets, etc, for picnickers.
Developed Use (I)	2	.01%	The “I” symbol should be used for general developed

			uses.
Recreational (R)	42	.10%	An area developed for general recreation use.
Rights-of-way (ROW)	74	.17%	Improved roads, railroads or right-of-way for gas, power or telephone lines.
Upland Brush (UB)	114	.29%	Upland sites less than 10% stocked with tree species but having 50% or more of the area stocked with taller growing, persistent shrubs. Includes but is not limited to, shrubs such as hazel, gray dogwood, juneberry, sumac, ninebark, prickly ash, etc.
Rock Outcrops and sand dunes (Z)	157	.38%	Rock outcrops including rocky beaches more than 1 acre in extent. Sand dunes including sand beaches, more than 1 acre in extent.
Totals	560	1.35%	

820.2.2 Wetlands (Non Forested)

Wisconsin State Statutes define a wetland as “an area where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation, and which has soils indicative of wet conditions.”

Wetland communities are recognized to be a complex association of plants and animals, soils and water levels having special natural values. They are fragile systems that undergo rapid degradation when affected by incompatible uses and unskilled management. Wetlands provide many functional values including shoreline and flood protection, water quality protection, groundwater recharge, and animal and plant habitat. Therefore, it is the policy of Oconto County to preserve, protect and manage the wetlands under its jurisdiction in a manner that recognizes the natural values of wetlands and their importance in the environment. To this end the County will:

- 1) Recognize wetland values in management plans, taking reasonable steps to minimize harmful effects.

- 2) Cooperate with the DNR in wetland inventories and in preparation of essential wetland information.
- 3) Maintain control of vital wetlands under its jurisdiction when to relinquish such control would risk substantial site alteration and subsequent degradation of wetland values vital to the area and the state.
- 4) Minimize adverse changes in the quality or quantity of the flow of waters that nourish wetlands.
- 5) Cooperate with local, state and national agencies and citizens to increase understanding of the importance of wetlands and the need for land and water stewardship in guiding development decisions.
- 6) Cooperate with the DNR in wetland management activities that would enhance the quality and diversity of wetlands in the county and the region.

Wetlands are the transitional habitats between upland and aquatic systems where the water table is usually at or near the surface, or where the land is covered by shallow water. Wetlands presently make up a total of 39.06% of the County Forest, which include 24.38% of Forested Wetlands and 14.68% Non-forested Wetlands. Wetlands are made up of 15 descriptive types (adapted from PUBL-WZ-029-94). They include:

Shallow, open water – wetlands characterized by submergent, floating and floating-leaved aquatic vegetation such as pondweed, water lilies, water milfoil, and duckweed. Water depths are generally less than 6.6 feet.

Deep marshes - wetlands characterized by emergent vegetations such as cattails and pickerel weed and floating leaved plants such as white and yellow water lily and watershield. Water depths of 6 feet are typically found on deep marshes.

Shallow marshes - wetlands characterized by persistent emergent vegetation such as cattails and pickerelweed, etc., and water depths to 1.5 feet.

Sedge meadow - wetlands characterized by sedges and cattails. Surface water depths to 6 inches in winter and early spring, and exposed saturated soil surface in summer.

Fresh (wet) meadow – wetlands dominated by grasses, such as red-top grass and the invasive, non-native, reed canary grass, and by forbs such as giant golden rod growing on saturated soils.

Low prairie – wetlands with open, herbaceous plant communities covered by low-growing plants. They are dominated by native grasses and forbs associated with prairies, such as prairie cordgrass, big bluestem, and New England aster.

Calcareous fen – rarest wetland plant community in Wisconsin. They are found in wet, seepage sites that have an internal flow of groundwater that is rich in chemical compounds and creates harsh, alkaline soil. Species like the shrubby cinquefoil, Ohio golden rod, and sterile sedge are characteristic.

Open bog – wetlands that are composed of living sphagnum moss growing over a layer of acid peat. Herbs and low shrubs colonize the mat and immature or stunted trees of black spruce and/or tamarack may be scattered through the area.

Coniferous bog – wetlands similar to open bogs, except that mature black spruce and/or tamarack trees are the dominant species growing on the sphagnum moss mat. Black spruce and heath family shrubs are characteristics only of acid peats, whereas tamarack can grow in calcareous peats, such as those of northern white cedar swamps.

Shrub-Carrs – wetlands composed of tall deciduous shrubs growing on saturated to seasonally flooded soils. They are usually dominated by willows or red-osier dogwood. Non-native shrub species invade shrub-carrs, especially

where drainage and pasturing have disturbed the area. In particular, honeysuckle and buckthorn can invade quickly.

Alder thicket – wetlands similar to shrub-carrs, but dominated by speckled alder. It can also include other shrub species like high bush cranberry and sweet gale.

Lowland hardwood swamp – wetlands dominated by deciduous hardwood trees. Soils are saturated during much of the growing season, and may be inundated by as much as a foot off standing water. Species include black ash, red maple, yellow birch, and northern white cedar.

Coniferous Swamp – wetlands dominated by lowland conifers, primarily northern white cedar and tamarack. Soils are saturated during much of the growing season and may be inundated by as much as a foot of standing water. Soils are usually organic. A sphagnum moss mat is not present.

Floodplain forest – wetlands dominated by mature, deciduous hardwood trees growing on alluvial soils associated with riverine systems. These wetlands often occur in the backwaters and depressions of rivers, which retain water for a long period into the growing season. Typically they include northern and southern wet-mesic hardwood forest associations. Floodplain forests support diverse plant and animal species because they serve as migration corridors.

Seasonally flooded basin – wetlands in poorly drained, shallow depressions that may have standing water for several weeks of each year, but are usually dry for much of the growing season. Typical species include smartweeds, beggarsticks, and wild millet. These basins often support an abundance of plant seeds and invertebrates, which make them ideal feeding and resting areas for migrating waterfowl and shorebirds.

Following are the Non-Forested Wetland cover types for the County Forest:

Primary Type	Acres	Percentage	Definition
Marsh (K)	409	.93%	The “K” symbol should be used for grass or high water table areas.
Muskeg-bog (KB)	724	1.67%	Bog such as sphagnum moss, cotton grass, leatherleaf, cranberry, Labrador tea, etc.
Lowland Grass (KG)	225	.52%	Ground cover consisting of more than 50% of true grasses such as canary grass, bluejoint, redtop, cordgrass, big bluestem, fire stemmed sedges, etc.
Emergent Vegetation (KEV)	806	1.96%	Coarse emergent marsh vegetation such as attails, river bulrush, tall sedges, etc.
Lowland Herbaceous Vegetation (KH)	35	.08%	Ground cover consisting of more than 50% of herbaceous vegetation, such as lowland asters, stinging nettle, wild sunflowers, etc.
Lowland Brush (LB)	2,007	4.69%	The “LB” symbol will be used for lowland brush on forest lands less than 10% stocked with tree species.
Alder (LBA)	1,343	3.16%	More than 50% alder.
Willows (LBW)	733	1.67%	More than 50% shrub willow.
Total	6,282	14.68%	

820.2.3 Open Water Habitats

Open water habitats are permanently flooded lands below the deep-water boundary of wetlands. Water is generally too deep to support emergent vegetation. Presence of these aquatic habitats within a forest landscape greatly increases the number of wildlife species that can potentially occur. They include rivers, lakes, and streams and occur on .12% of the forest landscape. They are broken down into:

Lakes - lakes, ponds, and flowages in excess of 40 acres in an area; or rivers in excess of 1/8 of a mile in width.

Streams - intermittent or permanent watercourses with slow water velocities and are usually defined as being less than 1/8 mile in width.

Rivers - wetlands and deep-water habitats contained in a channel through which the water flows and associated with forested riparian zones.

Following are the open water cover types for the County Forest:

Primary Type	Acres	Percentage	Definition
Water (L)	88	.21%	Lakes, ponds and flowages in excess of 40 acres in area.
Minor – Lake (LM)	104	.24%	Water under 40 acres in area,
Minor - Stream (LMS)	3	.01%	Streams
Total	195	.46%	

830 PLANT COMMUNITIES MANAGEMENT

Oconto 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 to encourage, specific species or communities is complex. It includes an understanding of:

- Objectives of the County Forest.
- Integration of the National Hierarchical Framework of Ecological Units (NHFEU - landforms, soils, climate, vegetation classification at multiple scales).
- Application of habitat type classification to identify ecological potentials and silvicultural alternatives.

- Past, present, and future desired condition.
- Surrounding ownership patterns and their generalized objectives.
- Socio-economic needs.

830.1 SILVICULTURE

Plant communities are normally managed within the guidelines found in the Wisconsin Department of Natural Resources. Silviculture and Forest Aesthetics Handbook 2431.5. Silviculture is the practice of controlling forest composition, structure, and growth to maintain and enhance the forest's utility for any purpose. Typically, silvicultural guidelines are written to encourage a stand to contain the greatest quality and/or quantity of timber under either an even-, or uneven-aged system.

A summary of management on the Oconto County Forest is described as follows:

830.1.1 Jack pine

Jack pine is a shade intolerant species that occurs throughout the sand regions of the Forest. This species is shade intolerant and is normally regenerated by wildfire. Full sunlight, prepared seedbed, and heat are the key conditions provided by fire. With the control of wildfire, other techniques have become necessary in order to perpetuate this type.

The most widely used, and successful method in this county is scarification followed by harvest. This method is most advantageous from an economic and ecological standpoint, lending itself to a more natural condition. Planting has been equally successful however, it requires more expenditure and administration.

From a landscape perspective, the jack pine type is declining as it is converted either successionaly or through planting to another species. Oconto County Forest will attempt to minimize conversion of jack pine to other species in order to stem long-range decline of this forest type. Management of Jack Pine will be through even-aged techniques with rotation periods of 40-45- years.

830.1.2 Aspen Management

Aspen is a shade intolerant species that is found throughout various areas of the forest and is managed on an even-aged basis. This means that aspen needs full sunlight to regenerate and the best method for creating optimum conditions for stand replacement is 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 has been steadily declining since the 1960s. The chief reasons for the decline are: 1) lack of harvest as stands reach maturity (natural succession) and 2) selective harvest. In both instances, the end result is conversion to more shade tolerant timber types.

Oconto County is committed to maintaining its aspen acreage and will accomplish this by regenerating the mature aspen stands through the use of clearcuts.

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. Management of Aspen will be through even-aged techniques with rotation periods of 45-50 years.

830.1.3 Red Pine

Red Pine is relatively shade intolerant but will subsist in partial shade and has been known to respond well to release after 30 years of suppression approximately 35% of full sunlight is recommended for seedling establishment.

The most widely used and successful method for Oconto County has been site preparation after harvest, followed by machine planting the next spring.

From a landscape perspective, red pine type will decline after final harvest due to natural conversion to Northern Hardwoods that currently exist in understory. Oconto County is committed to minimizing the conversion of Red Pine plantation to other forest types.

Management of Red Pine will be through even-aged techniques with rotation periods of 120 years. Minimum Basal area of stocking to conduct thinnings is 180 square feet/acre. Scheduling thinnings will be based on current basal area plus basal area growth of 8.0 square feet per acre per year.

830.1.4 Swamp Hardwoods

Swamp Hardwoods are relatively shade intolerant and managed through even-aged techniques including intermediate thinnings and shelter wood harvests.

Stands of swamp hardwoods with site index of less than 50% will have rotating age of 80 years if feasible. Stands of swamp hardwoods with site index of greater than 50% will have thinnings when basal area is greater than 120 square feet per acre. Scheduling thinnings will be based on current basal area and annual growth of 2.0 square feet per acre per year. Shelter wood harvest will be done at stand age of 120 years or older.

830.1.5 Northern Hardwoods

Northern Hardwood stands contain more than 50% hardwood species that are moderately to high shade tolerant. Predominant species include sugar maple, basswood, red maple, white ash, yellow birch and American Beach. Northern

Hardwoods will be managed through all aged techniques, with selected harvest rotation of 80 years or greater.

Minimum basal area stocking to conduct thinnings are 120 square feet per acre. Thinnings will be based on current basal area plus basal area growth of 2.5 square feet per acre per year.

830.1.6 Red Maple

Red Maple comprising more than 50% of the basal area in pole timber and saw timber or more than 50% of the stems in seedling and sapling stand. In Oconto County several margin Aspen, and Swamp Hardwood stands have converted to Red Maple.

Red Maple is shade tolerant and will be managed through even-aged techniques. Lower sites will be rotated and regenerated by spray at 45-50 years. High quality sites will be managed with saw logs objection by thinnings and regenerated by shelter wood or group selective techniques.

Minimum basal area stocking to conduct thinnings on higher quality sites will be 120 square feet per acre. Thinning will be based on current basal area plus basal areas growth of 2.5 square feet per acre per year (similar to Northern Hardwoods).

830.1.7 White Pine

White Pine stands containing more than 50% of basal are with White Pine predominant in Oconto County several stands are converting back to White Pine.

White Pine is intermediate shade tolerant and will be managed through even-age management techniques with periodic thinnings and naturally regeneration using seed tree and/or shelter wood methods with rotating ages of 160 years or older.

Minimum Basal Area stocking to conduct thinning will be 180 square feet per acre. Scheduling thinnings will be based on current basal area plus basal area growth of 8 square feet per acre per year.

830.1.8 Oak

Includes upland sites with loamy sands to silt loams where red oak and most Northern Hardwoods species, especially sugar maple dominant. Management of Oak (intermit shade tolerant) will be through even-aged techniques, using thinnings to maximize quantity and quality of oak component, and clear cutting and shelter wood harvesting. Minimum basal area stocking to conduct selective thinnings will be 120 square feet per acre and rotation age will be 80-100 years or greater. Scheduled thinnings will be based on existing basal area per acre plus basal area growth of 2.5 square feet per acre per year.

830.1.9 Scrub Oak

More than 50% of stands consist of Black Oak, White Oak, Northern Pin Oak, or Bur Oak. Scrub Oak will be managed through even-age techniques through regeneration cuts or shelter wood cuts depending on site. Rotation periods will be 45-70 years or greater.

830.1.10 White Cedar

More than 50% swamp conifers with Northern White Cedar. White Cedar cover type cover 4,000 acres in the Oconto County Forest. The following have been efforts for regeneration cuts:

- 1) Strip cutting
- 2) Block cutting (1 acre size)

These regeneration cuts do not contain sufficient cedar regeneration and have been converted to swamp hardwoods primarily due to deer browsing. An 1 acre block clear cut was fenced to prevent deer browsing. Cedar regeneration in this 1 acre block is not adequate due to other animals browsing.

The Brazeau Swamp contains approximately 3,500 of cedar cover types and is a essential for winter deer shelter.

Until alternate methods that promote and sustain cedar regenerate, Oconto County will not be harvesting the cedar cover type on the County Forest.

830.1.11 Other Cover Types

Other cover types with small acreage on the County Forest will be managed according to the Wisconsin Department of Natural Resources Silvicultural and Forest Aesthetic Handbook 2431.5.

830.2 LOCALLY UNCOMMON TREES

The presence or lack of a particular plant species is dependent on the land's capabilities, climate, and natural (e.g. fire, browsing) and/or man-caused (e.g. logging, farming) disturbances. The present scarcity of the listed species makes them a source of concern.

The following are considered uncommon on the Forest and perhaps to some extent across the regional landscape:

830.2.1 American Elm (*Ulmus americana*) is scarce primarily due to mortality caused by the introduction of Dutch elm disease. [Existing elm will normally be left uncut in hopes that they may continue in the landscape as potential resistant seed source individuals. Where possible during silvicultural operations, efforts will be made to encourage regeneration of American elm.]

830.2.2 Butternut (*Juglans cinerea*) occurs on the County Forest primarily in the southeast block. Due to butternut decline, fewer individuals are present than in previous years. [Existing healthy butternut will normally be left in hopes that they may continue in the landscape as potential resistant seed source individuals. Where possible during silvicultural operations, efforts may be made to encourage regeneration of butternut. This may include cutting to encourage stump sprouts in certain situations].

830.3 TREES LOCALLY DIFFICULT TO REGENERATE

There are certain tree species whose home ranges are within the County Forest that are difficult to regenerate. In many cases this difficulty is related to the exclusion of fire from the environment. In other cases this may be due to browsing by deer. The following species, normally found within the county, are found to be difficult to regenerate:

830.3.1 White birch

White birch (also referred to as paper birch) is a shade intolerant species and is generally found in stands of timber of similar age. A mineral seedbed appears to be necessary to regenerate white birch and it is assumed that most white birch present on the forest is of fire origin. Drought conditions of 1989 and 1990, coupled with unseasonably warm temperatures and secondary pathogens, resulted in mortality to nearly 50% of the white birch on the Forest.

Existing stands of white birch should be considered for scarification coupled with shelterwood harvests. Initial trials using this method have proven successful.

830.3.2 Northern red oak

The red oak type is widespread across the County Forest outside of the low fertility sandy soils. Red oak tends to favor habitat types that are also suitable for northern hardwood species. On many sites, normal thinning practices tend to promote these other species. In many cases regeneration under nearly pure red

oak stands tends towards red maple and poor quality sugar 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, it is important to retain red oak on the Oconto County 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.

830.4 EXOTIC PLANT SPECIES OF CONCERN

Exotic or non-indigenous invasive plant species can cause significant ecological and economic damage to the Forest. Some invasive species, such as common and glossy buckthorn, eliminate not only wildflowers but also limit the regeneration of tree species. Keeping them from dominating the understory is critical to the long-term health and economic viability of the forest. Currently, Oconto County Forest has few significant infestations of invasive plants. With training, vigilance, and control efforts, new infestations can be managed or eliminated. There are many highly invasive plants that are threatening to invade much of the northern forests in Wisconsin.

830.4.1 GLOSSY BUCKTHORN

Both common and glossy buckthorns are tall shrubs or small trees reaching 20-25 feet in height and 10 inches in diameter. Most often they grow in a large shrub growth form, having a few to several stems from the base. The shrubs have spreading, loosely-branched crowns. Their bark is gray to brown with prominent, often elongate, lighter-colored lenticels. The buckthorns share a very distinctive

winter appearance having naked, hairy terminal buds and gracefully curving, or arched, twigs with closely-spaced, prominent leaf scars that give the twigs a warty or bumpy silhouette. Cutting a branch of either species exposes a yellow sapwood and a pinkish to orange heartwood. Both species of buckthorn are distinctive enough from other native species to be identified at all times of the year once their characteristics have been learned.

DISTRIBUTION AND HABITAT: Common buckthorn and glossy buckthorn are two closely related species originating in Eurasia and were introduced to North America as ornamentals. They were planted in hedgerows in Wisconsin as early as 1849. They have become naturalized from Nova Scotia to Saskatchewan, south to Missouri, and east to New England. They are well established and rapidly spreading in Wisconsin. Although their aggressively invasive growth patterns have created problems in many areas, exotic buckthorns are still legally sold and planted as ornamentals.

Glossy buckthorn is an aggressive invader of wet soils. It has become a problem in wetlands as varied as acidic bogs, calcareous fens, and sedge meadows. It is capable of growing both in full sun and in heavily shaded habitats. The species is not confined to wetlands, however, and grows well in a wide variety of upland habitats, including old fields and roadsides. Neither species is adversely affected by nutrient-poor soils.

LIFE HISTORY AND EFFECTS OF INVASION: Both buckthorns are characterized by long distance dispersal ability, prolific reproduction by seed, wide habitat tolerance, and high levels of phenotypic plasticity (adjusting physical appearance to maximize environmental conditions). Under full sun conditions, they can begin to produce seed a few years after establishment. Fruit production may be delayed for 10 to 20 years in shaded habitats. Common buckthorn flowers from May through June and fruit ripens August through September; glossy buckthorn blooms from late May until the first frost and produces fruit from early

July through September. The abundant fruits are eaten birds, thus encouraging the long-distance dispersal of horticultural plantings. Seedlings establish best in high light conditions, but can also germinate and grow in the shade. The exotic buckthorns have very rapid growth rates and resprout vigorously after they have been cut. Typical of several non-native understory shrub species, buckthorns leaf out very early and retain their leaves late in the growing season, thereby shading out native wildflowers.

The first few individuals established in a natural area are usually from seeds transported by birds. Once these individuals begin to produce seed, the buckthorns can rapidly form dense thickets. The vigor of buckthorns is positively correlated to light availability.

Once established, both buckthorn species have the potential to spread very aggressively in large numbers because they thrive in habitats ranging from full sun to shaded understory. Both species cast a dense shade as they mature into tall shrubs. This shading has a particularly destructive effect on herbaceous and low shrub communities, and may prevent the establishments of tree seedling.

Currently, Oconto County Forest has a heavy infestation of Glossy Buckthorn in Compartment 84. Following timber sale close out, site will be evaluated, and appropriate action taken.

CONTROLLING THE EXOTIC BUCKTHORNS: As with all invasive species, buckthorns in natural areas are most effectively controlled by recognizing their appearance early and removing isolated plants before they begin to produce seed. With large infestations, the largest seed-producing plants should be removed first.

Mechanical Control: Prescribed burns in early spring and fall may kill seedlings (especially in the first year of growth), larger stems, and top-killed mature buckthorns, although this method has met with mixed results. Burning is preferable for fire-shaped communities, but should not be used if it adversely affects the community. Burning annually or biannually to control buckthorns may

have to be continued for several years depending on the extent of establishment and the seedbank, which generally lasts two to three years. It is generally difficult to burn in dense buckthorn stands as the understory is typically well-shaded, allowing little fuel build-up.

In high quality natural areas where the use of chemicals is a concern, small patches of plants up to 0.4 inch diameter can be pulled when the soil is moist. Larger plants 0.5 inch to 1.5 inch diameters can be dug or pulled using a weed wrench. Disturbed soil will result from these techniques, and should be tamped down to minimize seeding.

Girdling (removed phloem connection of roots to shoots while retaining the xylem connection of shoots to roots) or cutting stems between December and March may not be very effective unless followed by an application of glyphosate herbicide.

Chemical Control: Chemical control methods are best done during the fall when most native plants are dormant yet buckthorns are still actively growing. This lessens the risk of affecting nontarget plants. The buckthorns' green leaves will provide easy recognition and allow for a thorough treatment at this time. Control methods are also effective in the growing season, but there is more risk of affecting non-target plants, and the effectiveness of the treatment is generally lower. Winter application of chemicals has proven to be successful as well, and further lessens the risk of damaging non-target species.

During the growing season, cutting stems off near ground level and treating them with glyphosate successfully curbs sprouting. Immediately after cutting, a 20%-25% active ingredient (a.i.) glyphosate should be applied to the stumps. Resprouts should be cut and treated again, or sprayed with a hand sprayer of 1.5% a.i. glyphosate (approved for use over water) solution to the foliage. Foliar application of glyphosate herbicide using a backpack sprayer is effective, but less selective.

For severely disturbed sites, a 25-50% a.i. triclopyr solution diluted in water can be sprayed with a low pressure hand sprayer, a spray bottle, or sponge applicator

to freshly cut stumps. A 12.5% a.i. triclopyr (formulated for oil dilution) solution is also effective as a cut stump treatment. Basal bark application of 6% a.i. triclopyr (formulated for oil dilution) solution or 2-4-D (12.5% a.i.) in diesel fuel also effectively controls buckthorns.

Treatment for common buckthorn in the spring and fall with a mixture of 25% a.i. triclopyr (formulated for oil dilution), a spreading agent (10%), and diesel fuel (65%) has been successful in Missouri . The triclopyr concentration may be increased to 30% in the dormant season. For stems larger than 2 inches, spray all the way around the stem. For smaller stems, spraying one side is sufficient. This treatment may not be effective on larger trees.

Fosamine, a non-selective bud inhibitor for woody species, can be applied as a basal bark treatment in the fall at 3% a.i. concentration in winter.

In wetlands with artificially lowered water tables, restoring the water to its historical levels will often kill glossy buckthorns. Standard formulations of glyphosate cannot be used in standing water: glyphosate formulated for use over water must be used.

Any chemical application will be conducted only by trained, certified pesticide applicators in strict compliance with herbicide label instructions.

830.5 LEGALLY PROTECTED PLANT SPECIES

There are some plants in Wisconsin that are afforded protection under the Federal Endangered Species Law, the State Endangered and Threatened Species Law (s. 29.604 Wis. Stats. and NR 27 Wis. Adm. Code), or both. Under Wisconsin State Law, no one may possess or sell any wild plant that is listed without a valid endangered or threatened (ET) species permit. On public lands or lands one does not own, lease or have permission of the landowner, one may not cut, root up, sever, injure, destroy, remove, transport, or carry away a listed plant without an ET species permit. There is an exemption on public lands for forestry, agriculture and utility activity under the state law.

In the Natural Heritage Inventory (NHI) program the DNR tracks information on these species in the State. Below is a list of legally protected plants known to occur in Oconto County (on or near the County Forest).

Scientific Name	Common Name	Federal Status	State Status
ASCLEPIAS OVALIFOLIA	DWARF MILKWEED		THR
BOTRYCHIUM MORMO	LITTLE GOBLIN MOONWORT		END
PLATANThERA FLAVA VAR. HERBIOLA	PALE BREEN ORCHID		THR
POLYSTICHUM BRAUNII	BRAUN'S HOLLY-FERN		THR
TIARELLA CORDIFOLIA	HEART-LEAVED FOAM- FLOWER		END
VACCINIUM CESPITOSUM	DWARF HUCKLEBERRY		END
AMERORCHIS ROTUNDIFOLIA	ROUND-LEAVED ORCHIS		THR
CALYPSO BULBOSA	FAIRY SLIPPER		THR
CYPRIPEDIUM ARIETINUM	RAM'S-HEAD LADY'S- SLIPPER		THR
PETASITES SAGITTATUS	ARROW-LEAVED SWEET- COLTSFOOT		THR

**Key -Federal Status:* LE- listed endangered; LT- listed threatened; LT,PD- listed threatened, proposed for de-listing; LE-LT- listed endangered in part of its range, threatened in another part; C- candidate for future listing

***Key -State Status:* END- endangered; THR- threatened

830.6 OTHER PLANT SPECIES AND NATURAL COMMUNITIES OF CONCERN – NHI

The NHI program at the DNR also tracks information on rare species and natural communities, in addition to legally protected species.

830.6.1 Special Concern Plants

Special Concern Species are those species in 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. Below is a list of Special Concern plant species known to occur in Oconto County (on or near the county forest).

Scientific Name	Common Name	Federal Status	State Status
ARABIS MISSOURIENSIS VAR. DEAMII	DEAM'S ROCKCRESS		SC
BOTRYCHIUM ONEIDENSE	BLUNT-LOBE GRAPE-FERN		SC
CAKILE EDENTULAQ	AMERICAN SEA-ROCKET		SC
CARDAMINE PRATENSIS	CUCKOOFLOWER		SC
CAREX BACKII	ROCKY MOUNTAIN SEDGE		SC
CLEMATIS OCCIDENTALIS	PURPLE CLEMATIS		SC
DESCHAMPSIA FLEXUOSA	CRINKLED HAIRGRASS		SC
MEDEOLA VIRGINIANA	INDIAN CUCUMBER- ROOT		SC
PLATANThERA HOOKER	HOOKEr ORCHIS		SC
PLATANThERA ORBICULATA	LARGE ROUNDLEAF ORCHID		SC
RIBES HUDSONIANUM	NORTHERN BLACK CURRANT		SC
VIBURNUM NUDUM VAR. CASSINOIDE	NORTHERN WILD-RAISIN		SC
ARETHUSA BULBOSA	SWAMP-PINK		SC
CALAMAGROSTIS STRICTA	SLIM-STEM SMALLREEDGRASS		SC
CARES CRAWEI	CRAWE SEDGE		SC
CARES GYNOCRATES	NORTHERN BOG SEDGE		SC

CAREX SYCHNOCEPHALA	MANY-HEADED SEDGE		SC
CAREX TENUIFLORA	SPARSE-FLOWERED SEDEGE		SC
CAREX VAGINATA	SHEATHED SEDGE		SC
CYPRIPEDIUM REGINAE	SHOWY LADY'S-SLIPPER		SC
ELEOCHARIS OLIVACEA	CAPITATE SPIKERUSH		SC
ELEOCHARIS QUINQUEFLORA	FEW-FLOWER SPIKERUSH		SC
ELEOCHARIS ROBBINSII	ROBBINS SPIKE RUSH		SC
EPILOBIUM STRICTUM	DOWNY WILLOW-HERB		SC
EQUISETUM VARIEGATUM	VARIEGATED HORSETAIL		SC
GALIUM PALUSTRE	MARSH BEDSTRAW		SC
MALAXIZ BRACHYPODA	WHITE ADDER'S-MOUTH		SC
OPHIOGLOSSUM PUSILLUM	ADDER'S-TONGUE		SC
PLATANThERA DILATATA	LEAFY WHITE ORCHIS		SC
SALIX SERICEA	SILKY WILLOW		SC
THALICTRUM REVOLUTUM	WAXLEAF MEADOWRUE		SC
TRIGLOCHIN MARITIMA	COMMON BOG ARROW- GRASS		SC
TRIGLOCHIN PALUSTRIS	SLENDER BOG ARROW- GRASS		SC
UTRICULARIA PURPUREA	PURPLE BLADDERWORT		SC
UTRICULARIA RESUPINATA	NORTHEASTERN BLADDERWORT		SC

***Key -State Status: SC-special concern*

830.6.2 Natural Communities

Similarly, specific records of natural communities are also tracked. The following natural communities have been recorded in Oconto County (on or near the County Forest).

Scientific Name	Common Name	Federal Status	State Status
BEDROCK GLADE	BEDROCK GLADE		NA
FELSENMEER	GLACIERE TALUS		NA

INLAND BEACH	INLAND BEACH		NA
NORTHERN DRY FOREST	NORTHERN DRY FOREST		NA
NORTHERN DRY-MESIC FOREST	NORTHERN DRY-MESIC FOREST		NA
NORTHERN MESIC FOREST	NORTHERN MESIC FOREST		NA
OAK WOODLAND	OAK WOODLAND		NA
PINE BARRENS	PINE BARRENS		NA
SOUTHERN DRY-MESIC FORREST	SOUTHERN DRY-MESIC FOREST		NA
ALDER THICKET	ALDER THICKET		NA
BOREAL RICH FEN	BOREAL RICH FEN		NA
EMERGENT MARSH	EMERGENT MARSH		NA
FLOODPLAIN FOREST	FLOODPLAIN FOREST		NA
HARDWOOD SWAMP	HARDWOOD SWAMP		NA
LAKE-DEEP; HARD; DRAINAGE	LAKE—DEEP; HARD; DRAINAGE		NA
LAKE—DEEP; HARD; SEEPAGE	LAKE—DEEP; HARD; SEEPAGE		NA
LAKE—DEEP; SOFT; SEEPAGE	LAKE—DEEP; SOFT; SEEPAGE		NA
LAKE—HARD BOG	LAKE—HARD BOG		NA
LAKE—SHALLOW; HARD; DRAINAGE	LAKE—SHALLOW; HARD; DRAINAGE		NA
LAKE—SHALLOW; HARD; SEEPAGE	LAKE—SHALLOW; HARD; SEEPAGE		NA
LAKE—SHALLOW; SOFT; SEEPAGE	LAKE—SHALLOW; SOFT; SEEPAGE		NA
LAKE—SOFT BOG	LAKE—SOFT BOG		NA
MUSKEG	MUSKET		NA
NORTHERN SEDGE MEADOW	NORTHERN SEDGE MEADOW		NA
NORTHERN WET FOREST	NORTHERN WET FOREST		NA
NORTHERN WET-MESIC FOREST	NORTHERN WET-MESIC FOREST		NA
OPEN BOG	OPEN BOG		NA
SHRUB-CARR	SHRUB-CARR		NA
SPRING POND	SPRING POND		NA

STREAM—FAST; HARD; COLD	STREAM—FAST; HARD; COLD		NA
STREAM—FAST; SOFT; COLD	STREAM—FAST; SOFT; COLD		NA

***Key -State Status: SC-special concern*

840 WILDLIFE SPECIES MANAGEMENT

840.1 BACKGROUND

For the purpose of this plan, wildlife will include all native birds, mammals, fish, amphibians, reptiles, and insects with a strong focus on the natural communities in which they live. Wildlife biologists will emphasize habitat management that interrelates and benefits wildlife, and complements sound forestry practices. Concerns about the biological diversity of the County Forest and how it fits into the regional, continental and global perspective, may cause wildlife management to place increased emphasis on segments of the forest community. Practices such as old growth, snag and den tree management, access management, forest openings maintenance, oak management, and aspen maintenance, can be priorities in the dynamics of forest management. A primary goal of wildlife management on the Oconto County Forest is to provide a diversity of healthy ecosystems necessary to sustain native populations for their biological, recreational, cultural and economic values.

840.1.1 Technical Planning

Planning will be a cooperative effort of the administrator, DNR liaison forester and wildlife biologist in formulating management plans and utilizing wildlife management techniques for the overall protection and enhancement of the forest community, of which wildlife is a key component.

840.1.2 Guidelines

DNR manual codes on Endangered and Threatened Species Permits Issue (1724.5), Feasibility Studies and WEPA Analyses for Establishing or Modifying Property Project Boundaries (2105.1), Guidelines for Defining Forest-Wildlife Habitat Management (2112), Forest Opening Maintenance and Construction (2112.1), the Public Forest Lands Handbook (2460.5), and Wisconsin's Strategy for Wildlife Species of Greatest Conservation Needs are important references and guidelines in wildlife planning efforts.

840.1.3 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.

840.2 RESOURCE MANAGEMENT AND AREAS OF FOCUS

In applying this Plan to the forest, the following areas of focus were identified in achieving Plan objectives:

840.2.1 General Management Policies

Forest management practices may require modification to benefit wildlife and biodiversity in certain situations. The following will be considered in forest management planning:

- 1) Even-aged regeneration harvests (clearcuts) should vary in size and shape.
- 2) A diversity of stand age, size and species.
- 3) Mast-bearing trees and shrubs, den trees, and an adequate number and variety of snags.
- 4) Cull trees (future snag or den trees) not interfering with specific high value trees.
- 5) Timber types, habitat conditions and impacts on affected wildlife.
- 6) Access management.
- 7) Best management practices for water quality (BMP's).

840.3 HABITATS OF IMPORTANCE

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:

Habitats of Importance will also be included in the section on High Conservation Value Forests 530.1 and 850.3.

840.3.1 Aspen

The aspen type is recognized as providing habitat values to a wide variety of wildlife species. This type will continue to be regenerated, with consideration given to reserving scattered den and mast-producing trees in the process.

840.3.2 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 on the Forest as conversion to other tree species occurs on private lands. Jack pine habitat maintenance will be a high priority.

840.3.3 Forest openings

Permanent grass openings are essential to well-balanced wildlife habitat. Openings will be maintained where they exist or be developed where needed.

840.3.4 Lowland conifer

Cedar, hemlock, and balsam fir types are important for winter cover for many wildlife species. These forest types will be maintained where practical.

840.3.5 Oak

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.

840.3.6 Forest Game Species

The management of forest game (white-tailed deer, ruffed grouse, black bear, turkey, snowshoe hare, and numerous furbearers) is centered on maintaining early successional species such as aspen, jack pine, white birch, and scrub oak; with aspen and oak being the primary species of importance.

Manual Code 2112 is a Wisconsin DNR document that establishes guidelines for measuring forest game habitat. It has been used like a barometer to measure changes in forest wildlife habitat. While the scope of Manual Code 2112 can be narrow (deer habitat units compared with landscapes and ecoregions) by today's management standards, the impacts are broad.

Foresters, in concert with wildlife biologists, will continue to monitor forest game species and adjust land management prescriptions where appropriate. Specific Management modifications include:

- 1) Pine roost trees for turkey management.
- 2) Leave oak trees for mast production.
- 3) Aspen betterment work.
- 4) Creating for edge in aspen area's
- 5) Not harvesting cedar stands.

840.3.7 Forest Non-Game Species

Efforts will be made with the DNR to inventory existing populations, identify needs, and maintain valuable habitat types.

840.3.7.1 Neotropical Migrant Birds

Neotropical migrant birds (NTMB) are songbirds that breed in North America and winter in Central and South America. There are over 120 species of NTMBs that spend a portion of each year in Wisconsin. Different NTMBs utilize a wide variety of habitats including forests, shrubs, and grasslands. Warblers, tanagers, vireos, thrushes, swallows, blue-winged teal and hummingbirds are just some examples of NTMBs. In addition, these species play an important role in forest health by consuming large amounts of insects, including forest pest species such as gypsy moths and forest tent caterpillars.

In recent years, several neotropical species have experienced significant declines in population. These declines likely reflect a reduction in suitability, or a loss of habitat where these species breed, overwinter and/or migrate. Grassland birds seem to be experiencing the most precipitous declines range wide, due to a loss of habitat both in North America and on the wintering grounds in South America. However, species that nest in forests or shrublands, such as the cerulean warbler, golden-winged warbler, and veery are also declining nationwide.

In some cases these declines may be tied to forest fragmentation. There are really two forms of forest fragmentation, each with different impacts on forest birds. One form of forest fragmentation occurs when portions of a forest are converted into non-forest cover types (urbanization and agricultural). This is permanent fragmentation and poses the greatest threat to all forest wildlife. The second type is the fragmentation of habitat or cover type. This habitat fragmentation occurs naturally due to local geological features or can be a result of human activity (harvest activity). Both kinds of forest fragmentation have impacts on neotropical birds including changes in competition for resources, predation rates, and perceived quality of habitat. Each species of NTMB respond to forest disturbance differently. Since there are so many neotropical migrants that utilize a wide variety of habitats and successional stages it's difficult to make generalizations as

to the impacts of forest management on the health of certain bird populations. Species such as chestnut-sided warblers and mourning warblers benefit from early successional species produced by clearcutting. Species that rely on more mature forests or interior forests, such as ovenbirds or black-throated blue warblers, will be negatively impacted by intensive forest management. To assure a rich diversity of NTMBs in Wisconsin's forests, emphasis should be placed on forest management guidelines that promote habitat for NTMBs with the most specialized habitat needs.

Forests and associated wetlands of the western Great Lakes, including Wisconsin, support some of North America's highest densities and most diverse assemblages of breeding birds (Howe et al. 1996). While some forest/shrub species mentioned above are decreasing, according to the Federal Breeding Bird Survey (BBS), the majority of forest/shrub species that breed in Wisconsin are increasing. Wisconsin's private, County, State, and National Forests are still relatively intact and have regained much of their structural and compositional diversity that was once reduced in the big "Cutover" in the early 1900's.

As habitat is lost and fragmented by development on private lands, Wisconsin's County Forests continue to provide increasingly important habitat to numerous NTMB species that occur in a wide variety of forest types and age classes.

840.4 LEGALLY PROTECTED ANIMAL SPECIES

The Federal Endangered Species Act of 1973 and the Lacey Act together provide for the protection of wild animals threatened with extinction. The State Endangered and Threatened Species Law also requires that the State assume responsibility for conserving wild animals by restricting and regulating the taking, possession, transportation, processing, or sale of endangered or threatened wild animals within its jurisdiction. Further, the Federal Migratory Bird Act and the Eagle Protection Act provide additional protection for certain species of birds. Because animals usually travel freely from one property to another, they belong to

everyone. Therefore, if a species is legally protected, it is protected anywhere it occurs in Oconto County.

Scientific Name	Common Name	Federal Status	State Status
LYCAEIDES MELISSA SAMUELIS	KARNER BLUE BUTTERFLY	LE	SC/FL
CHARADRIUS MELODUS	PIPING PLOVER	LE	END
HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	LT	SC/FL
LEPOMIS MEGALOTIS	LONGEAR SUNFISH		THR
LYTHRURUS UMBRATILIS	REDFIN SHINER		THR
MOXOSTOMA VALENCIENNESI	GREATER REDHORSE		THR
CLEMMYS INSCULPTA	WOOD TURTLE		THR
EMYDOIDEA BLANDINGII	GLANDING'S TURTLE		THR
THAMNOPHIS PROXIMUS	WESTERN RIBBON SNAKE		END
LYCAEIDES IDAS NABOKOVI	NORTHERN BLUE BUTTERFLY		END
ALASMIDONTA VIRIDIS	SLIPPERSHELL MUSSEL		THR
CALEPHELIS MUTICUM	SWAMP METALMARK		END
OPHIOGOMPHUS HOWEI	PYGMY SNAKETAIL		THR
LANIUS LUDOVICIANUS	LOGGERHEAD SHRIKE		END
BUTEO LINEATUS	RED-SHOULDERED HAWK		THR
COTURNICOPS NOVEBORACENSIS	YELLOW RAIL		THR
PANDION HALIAETUS	OSPREY		THR
PIDICEPS GRISEGENA	RED-NECKED GREBE		END
STERNA CASPIA	CASPIAN TERN		END
STERNA FORSTERI	FORSTER'S TERN		END
STERNA HIRUNDO	COMMON TERN		END

*Key- Federal Status: LE- listed endangered, LT- listed threatened, LT,PD- listed threatened, proposed for de-listing, LE-LT- listed endangered in part of its range, threatened in another part, C- candidate for future listing

840.5 OTHER ANIMALS OF SPECIAL CONERN - NHI

Just as with plants, the DNR tracks information on rare animal species when some problem of abundance or disturbance 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. Below is a list of Special Concern animal species known to occur in Oconto County (on or near the County Forest).

Scientific Name	Common Name	Federal Status	State Status
ACIPENSER FULVESCENS	LAKE STURGEON		SC/N
ETHEOSTOMA MICROPERCA	LEAST DARTER		SC/N
HEMIDACTYLIUM SCUTATUM	FOUR-TOED SALAMANDER		SC/H
RANA CATESBEIANA	BULLFROG		SC/H
CICINDELA PATRUELA HUBERI	A TIGER BEETLE		SC/N
CICINDELA PATRUELA PATRUELA	A TIGER BEETLE		SC/N
HESPERIA LEONARDUS LEONARDUS	LEONARD'S SKIPPER		SC/N
OENEIS JUTTA	JUTTA ARCTIC		SC/N
PHYCIODES BATESII	TWANY CRESCENT SPOT		SC/N
POANES VIATOR	BROAD-WINGED SKIPPER		SC/N
SATYRODES EURYDICE FUMOSA	SMOKEY EYED BROWN		SC/N
AESHNA EREMITA	LAKE DARNER		SC/N
AESHNA TUBERCULIFERA	BLACK-TIPPED DARNER		SC/N
AESHNA VERTICALIS	GREEN-STRIPED DARNER		SC/N
CORDULEGASTER OBLIQUA	ARROWHEAD SPIKETAIL		SC/N
EUPHYES DION	DION SKIPPER		SC/N
GOMPHURUS VENTRICOSUS	SKILLETT CLUBTAIL		SC/N
ISOPERLA BILINEATA	A PERLODID STONEFLY		SC/N
ISOPERLA MARLYNIA	A PERLODID STONEFLY		SC/N
LESTES EURINUS	AMBER-WINGED SPREADWING		SC/N
LESTES VIGILAX	SWAMP SPREADWING		SC/N
LYCAENA EPIXANTHE	BOG COPPER		SC/N
NASIAESCHNA PENTACANTHA	CYRANO DARNER		SC/N
POANES MASSASOIT	MULBERRY WING		SC/N
STYLOGOMPHUS ALBISTYLUS	LEAST CLUBTAIL		SC/N
STYLURUS SCUDDERI	ZEBRA CLUBTAIL		SC/N
MYOTIS SEPTENTRIONALIS	NORTHERN MYOTIS		SC/N
NAPEOZAPUS INSIGNIS	WOODLAND JUMPING		SC/N

	MOUSE		
SOREX HOYI	PIGMY SHREW		SC/N
ACCIPITER GENTILIS	NORTHERN GOSHAWK		SC/M
BUBULCUS IBIS	CATTLE EGRET		SC/M
CARDUELIS PINUS	PINE SISKIN		SC/M
DENDROICA CAERULESCENS	BLACK-THROATED BLUE WARBLER		SC/M
EMPIDONAX FLAVIVENTRIS	YELLOW-BELLIED FLYCATCHER		SC/M
FALCO COLUMBARIUS	MERLIN		SC/M
AMMODRAMUS LECONTEII	LE CONTE'S SPARROW		SC/M
CHLIDONIAS NIGER	BLACK TERN		SC/M
CIRCUS CYANEUS	NOTHERN HARRIER		SC/M
GAVIA IMMER	COMMON LOON		SC/M
NYCTICORAX NYCTICORAX	BLACK-CROWNED NIGHT-HERON		SC/M

**SC- special concern SC/P- fully protected, SC/N- no laws regulating use, possession or harvesting, SC/H- take regulated by establishment of open/closed seasons, SC/FL- federally protected as endangered or threatened, but not designated by WDNR, SC/M- fully protected by federal and state laws under the Migratory Bird Act.

840.6 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.

840.6.1 Technical Planning

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.

840.6.2 Water Surveys

Comprehensive lake and stream surveys on the County forest will be conducted by the DNR fisheries biologist as required. The publication, “Surface Water Resources of Oconto County”, contains additional information relative to these waters.

840.6.3 Population Surveys

Surveys of fish populations in waters within the County Forest will be conducted by the DNR as required and will generally run concurrently with water surveys. Fish management programs will be guided by these surveys.

840.6.4 Lake Management

Management of lakes within the County Forest will be consistent with the capability of the resource and any unique aspects associated with that resource.

840.6.5 Stream Management

Trout streams on the County Forest will be managed to protect and enhance their quality. Streams containing warm water or cool water species will be managed to perpetuate their inherent qualities. Corresponding land and water use practices will be consistent with this policy. Maps inventorying water resources can be found in the appendix to this plan (Chapter 900).

840.6.6 Best Management Practices for Water Quality

Protection of water resources in the county will be consistent with the “Wisconsin Forestry Best Management Practices (B.M.P.s) for Water Quality”. Examples of these protective measures are:

1. Uncut riparian zones
2. Erosion control measures

3. Stream bank protection

840.6.7 Oconto County Ordinance Shoreland Zoning (See Chapter 900)

840.6.8 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.

840.6.9 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. An “erosion susceptibility map” identifying these more sensitive areas of the Forest can be found in the Appendix – Chapter 900. 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 Oconto County Forest include:

- 1.) South Branch of the Oconto River
- 2.) Peshtigo Brook
- 3.) Brehmer Creek
- 4.) Cooley Lake

850 LANDSCAPE MANAGEMENT

850.1 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. It also refers to ecological structures, functions, and processes that occur in ecosystems to sustain the system as viable entities. The forest landscape, a mosaic of plants and animals

of various sizes and ages, are in constant flux due to succession from both natural and planned events.

Opportunities to manage Oconto 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.).

850.2 HABITAT FRAGMENTATION

The adoption of management plans and strategies developed cooperatively with neighboring forest owners and managers will help to consider fragmentation on a landscape level. A continued program of encouraging land acquisition within the forest blocking will decrease negative impact of forest fragmentation by land uses other than forestry.

850.3 HIGH CONSERVATION VALUE FORESTS / AREAS (HCVF) AND EXCEPTIONAL RESOURCES

850.3.1 AREAS HIGH IN LOCALLY, REGIONALLY, OR NATIONALLY SIGNIFICANT BIODIVERSITY VALUES

850.3.1.1 Wisconsin State Natural Areas

Oconto County manages a variety of property designations and is considering some Wisconsin State Natural Area(s) (SNA). The SNA system represents the wealth and variety of Wisconsin's biological diversity. SNA's are unique in that they can exist as stand alone properties or be designated within the boundaries of another property type. DNR Endangered Resources staff will work cooperatively with the County Forest by coordinating educational, monitoring, and research activities. Management will protect the unique character of the area. The importance of Wisconsin State Natural Areas has been recognized on the

County Forest by cooperating with Department staff in considering designating and managing 2,000 acres of the County Forest for (a) SNA site(s).

850.3.1.2 Species Concentration Areas

Examples may include bat hibernacula, herp hibernacula, bird rookeries or other habitat areas that concentrate wildlife.

850.3.1.3 Other

850.3.2 RARE, THREATENED, OR ENDANGERED ECOSYSTEMS

850.3.2.1 Relic Old Growth stands:

850.3.2.2 Old Growth

850.3.2.3 Savannas including oak openings & oak barrens –

- 1) T31N R18E, Sec. 33 SWSE

850.3.2.4 Natural origin pine relics

850.3.2.5 Pine barrens

850.3.2.6 Geological Features of Significance

- 1.) Butler Rock

850.3.2.7 Eastern Hemlock Stands

850.3.2.8 Habitat for Species Identified as Rare, Threatened, Endangered, or Greatest Conservation Need

850.3.2.9 Rare & Geographically Restricted Natural Communities
May include mesic cedar forest, boreal rich fen, calcareous fen, shore fen, coastal plain marsh, forested seeps, alkaline bogs / swamps, dry prairie, dry-mesic prairie, bedrock glade, clay seepage bluff, felsenmeer, talus forest.

850.3.2.10 Other

850.3.3 CULTURALLY SIGNIFICANT SITES

850.3.3.1 Burial Mounds – Indian Burial Mounds are in the North Peshtigo Brook Unit, identifies aesthetic zones.

1) Off North White Potato Lake Road, these mounds are closed and considered a non –harvesting area.

850.3.3.2 Logging camps

850.3.3.3 Landmarks

850.3.3.4 Other

850.3.4 LOCALLY SIGNIFICANT SITES

Currently, there are no sites, but will be added as necessary.

It is the policy of Oconto County to manage these type resources to enhance and protect their individual exceptional features. A review of the State Historical Society database will be conducted on all timber sales.

860 INTEGRATED RESOURCE MANAGEMENT UNITS

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

The "Integrated Resource Management Units" will summarize natural resources of special concern, management considerations and land uses for each geographic unit. Resource managers may use these units as a tool, which will assist them in communicating resource management needs and accomplishments in the future.

Land use and management activities that occur within each unit are dynamic and may evolve with time as more is learned about each unit. An adaptive management approach will apply to the units and will allow flexibility to adjust or modify management practices when the Committee, the forestry staff or cooperating resource managers recognize change.

Each "Integrated Resource Management Unit" includes a map of the area, the unit name and number, and includes the following summary information:

- (1) Compartment #'s and County Forest acreage in the unit.
- (2) Predominant forest cover types existing, scheduled and proposed (if different than scheduled).
- (3) Landforms, geology and soils.
- (4) Land Type Association (LTA).
- (5) Surface water resources inventory.
- (6) Recreation uses.
- (7) Historical, cultural and historic sites.
- (8) Surrounding land uses.
- (9) Protection needs.
- (10) Special use and management zones.
- (11) Access, roads, firelanes and trails.

- (12) Land capabilities.
- (13) Landscape management direction.
- (14) Management opportunities

Individual Integrated Resource Management Units are compiled in Chapter 4000 of this plan.

- 1) North Peshtigo Brook/Charles Fleischman Memorial Unit
(Compartments 1-25)
- 2) South Peshtigo Brook (Compartments 26-50)
- 3) South Branch (Compartments 51-62)
- 4) Machickanee (Compartments 63-78, & 89)
- 5) North Bay Shore (Compartments 79-83, & 88)
- 6) South Bay Shore (Compartments 84-87)
- 7) How (Compartment 90)