COUNTY FOREST COMPREHENSIVE LAND USE PLAN

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CHAPTER 800

INTEGRATED RESOURCE MANAGEMENT

800 CHAPTER OBJECTIVES

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 Marinette County Forest during this planning period.

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

810.1 TOOLS IN INTEGRATED RESOURCE MANAGEMENT

810.1.1 Compartment Recon

The County will support and utilize the compartment reconnaissance procedures as set forth by the DNR Public Forest Lands Handbook 2460.5. 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.

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),
Marinette 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 erodable soil types, close proximity to streams or lakes, or steep slopes may require mitigating measures in excess of those outlined in the manual. All Marinette County employees practicing forestry will receive BMP training. Additionally, Marinette County will require BMP training of all logging contractors that operate on County timber sales.

810.1.7 Forest Fire Management

Any issues regarding forest fire management will be addressed in consultation with DNR forestry/fire control staff since DNR has primary jurisdiction in the prevention, detection and suppression of forest fires.

810.1.7.1 Uncontrolled Fire Refer to Chapter 605.7

All uncontrolled fires will be promptly reported to and suppressed by DNR 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 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 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).

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 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:

White Birch – Strip cuts and seed tree with scarifications

Red Oak – Shelterwood with scarification and TSI removal of competition

Aspen – Thinning

Cedar – Strip cuts with varying residual stocking of cedar

Pine – Growth based on varying levels of post thinning basal area

Jack Pine – Scarification for natural regeneration

Information on these trials can be obtained from the Marinette County Forestry Department.

A compilation of silvicultural trials 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 Marinette 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.

810.1.11 Integrated Resources Management Units

Integrated resource management units have been identified on the Marinette County Forest and are referred to as Wildlife Habitat Units (WHU). This nomenclature originated from the primary use of these management units which is for wildlife habitat management, specifically forest opening management. WHU were assigned in the early 90’s using the framework in State of Wisconsin Department of Natural Resources Manual Code 2112. MC2112 sets a goal of 6,000 acres for each habitat unit, groups of existing compartment were utilized to

create the current WHU. The Marinette County Forest is divided into 39 WHU (see map Ch. 925.4).

Beyond forest opening evaluation and management Wildlife Habitat Units are not currently utilized for management decision. With the recent digitizing of the forest recon a WHU will likely be used as planning units for forest age and composition decisions. Wildlife management will work closely with foresters to develop this information.

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 Marinette County Forest cover approximately 88% of the Forest.

Forest cover types associated with the County Forest are:
Aspen - 43%. Consisting of primarily aspen species often found in combination with paper birch and red maple

Northern Hardwoods - 10%. Consisting of a mixture of upland hardwood species including sugar maple, yellow birch, basswood, ash and red maple

Hemlock Hardwoods - <1%. More than 50% hemlock associated with northern hardwood species

Oak - 5%. Dominated by red oak, white oak, black oak and associated with other hardwoods.

Swamp Hardwoods - 6%. More than 50% swamp hardwood species including black ash, red maple, and elm.

Red Maple - <1%. More than 50% red maple. Often associated with aspen and white birch.

White Pine - <1%. More than 50% white pine.

Red Pine - 6%. More than 50% red pine.

Jack Pine - 4%. More than 50% jack pine.

Fir-Spruce - 1%. Consisting of swamp border or upland types with mixed species, predominately balsam fir and spruce associated with white pine, cedar, red maple, aspen, and birch

Swamp Conifer - 2%. Lowland type typified by balsam fir, cedar, and spruce in combination with red maple and other lowland hardwoods.

Black spruce - 1%. More than 50% swamp conifer species with black spruce predominating.

Tamarack - <1%. More than 50% swamp conifer species with tamarack predominating.

White cedar - 3%. More than 50% swamp conifer species with white cedar predominating.

Scrub oak - 2%. Consisting of a majority of poorer quality oak (often northern pin oak) capable of only fuelwood or cellulose fiber production.

Bottomland hardwoods - <1%. Typically floodplain species including silver maple, river birch, elm, cottonwood, and green ash.

White birch - 1%. Consisting of a majority white birch. Often found in combination with aspen and red maple.

820.2 NON-FORESTED COMMUNITIES

Non-forested communities within the Marinette County Forest cover approximately 12% of the forest. In broad categories, they are: upland (4%), wetland (8%) and water (<1%).

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.

The following provides a general description of the non-forested communities:

820.2.1 Upland Non-Forest (4%)

Upland Non-Forest areas of the County Forest include:

Grass openings – consists of upland grasses, such as brome, quack, bluegrass, timothy and big and little bluestem.

Herbaceous vegetation - ground cover predominated by herbaceous species with bracken fern, yarrow, hawkweed, blazing star, wild bergamot, upland aster, goldenrod, and wild strawberry being common.

Shrub openings - primarily upland sites less than 10% stocked with tree species but having 50% or more of the area stocked with taller growing, persistent shrubs. This includes, but is not limited to, shrubs such as hazel, prairie willow, juneberry, and wild black cherry.

Rock outcrops and sand banks - rock outcrops include rocky tallus, and bedrock material.

Developed areas – this includes park, picnic and parking areas.

Right of Way - roads, railway, gas, and electrical right of ways. These do contain some unknown amount of wetland acreage (have not been mapped separately).

820.2.2 Wetlands (8%)

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 Marinette 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. They presently make up a total of 8% of the County Forest. Wetlands are made up of 14 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.

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 of 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.

820.2.3 Open Water Habitats (<1%)

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 <1% 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.

830 PLANT COMMUNITIES MANAGEMENT

Marinette 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*. An additional reference *is Wisconsin's Forest Management Guidelines* (PUB_FR-226-2003). 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.

Marinette County manages the timber resource on a sustainable basis. Factors considered include economics, ecosystem diversity, aesthetics, wildlife habitat, recreation and watershed protection.

830.1.1 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 clear-cutting. 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 large portion of the County Forest revenue is generated through the management of aspen. Marinette County is committed to maintaining its aspen acreage and will accomplish this by regenerating the mature aspen stands through the use of clear-cuts and other even-aged harvesting techniques. Aesthetic concerns can be mitigated by retaining pine and/or hardwood tree species on the sites, limiting the size of the harvests, and creating irregularly shaped sale boundaries.

830.1.2 Northern Hardwood Management

The northern hardwood timber type consists mainly of sugar maple, basswood, red maple, white ash and yellow birch. Other species found in the northern hardwood type are red oak, white birch, red and white pine and white spruce.

Northern hardwood stands are managed on an uneven-aged basis to produce quality hardwood timber. Individual tree selection is the most common method of harvesting in northern hardwood.

830.1.3 Red Pine Management

Red pine on the Marinette County Forest is typically of plantation origin. Plantations were established starting in the 1930's by the Civilian Conservation Corps and have continued to be established as conditions warrant. Natural stands of red pine also occur on the County Forest, however, the stands are typically small in size.

Red pine is managed for high quality timber production. Typical management of red pine plantations consists of row thinning followed by a combination or row and individual tree removal or simply individual tree removal. Red pine stands on higher quality sites will be managed on rotations beyond 100 years as long as growth and yield continue.

830.1.4 Jack Pine Management

Jack pine occurs throughout the Marinette County Forest and is dominant on very dry, sandy soils. The best growth occurs on well-drained loamy sands. A large portion of the original jack pine type is plantation origin from the 1940's. Some of these stands have been converted to red pine but most have been replanted to jack pine following clear-cutting. Jack pine occurs naturally over large areas, usually in association with scrub oak.

Jack pine is managed primarily for pulpwood production although higher quality stands produce high percentages of bolt wood for lumber. Typical management of jack pine involves clear-cutting and replanting following herbicide application to reduce competition. Alternative methods include:

1. Strip clear-cuts: All trees are harvested in strips 66-132 feet wide with alternating strips being left uncut. The uncut strips are harvested when adequate regeneration has been established in the original cut strips.

2. Seed Tree Harvest: Individual quality jack pine are left on a determined spacing (usually 12-25 per acre) and all other trees removed.

3. Shelterwood: Initial harvest leaves 50-60 square feet of basal area, with over-story to be removed when adequate regeneration is established.

All of the alternative methods involve some form of soil scarification and may include supplemental seeding.

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. Butternut (Juglans cinerea) occurs on the County Forest but due to butternut decline, fewer individuals are present than in previous years. Both of these species are associated with other species and forest types. Existing elm and butternut are managed as a part of the larger stand, essentially they will remain on the landscape if the health at the time of evaluation indicates it will survive.

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 strip clear cuts or shelterwood harvests with scarification. Initial trials using this method have been inconclusive to date.

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 Marinette County Forest

Silvicultural trials using shelterwood harvests have had mixed success. Timber stand improvement removing competing red maple through cutting and herbicide treatment on shelterwood harvests has shown good results. However, this is a labor-intensive management. Scarification, prescribed burns and other methods will continue to be investigated.

830.3.3 White Cedar

White cedar is found throughout the Marinette County Forest primarily in lowland swamp type. White cedar is the primary timber type on roughly 7,000 acres of County Forest land and an associated tree species on another 7,000 acres. Most of the white cedar stands had their origin in the early 1900's. White cedar is in demand for lumber, posts and pulpwood. It is also a valuable tree species for wildlife, providing winter cover and browse, especially for white-tailed deer.

Historically attempts to regenerate white cedar have been made through use of strip clearcuts. Regeneration success to date has been unreliable. Current research suggests that the use of shelterwood harvests, with 60 to 80% crown closure may better meet the germination and early growth needs of white cedar. The current population levels of white-tailed deer in most of the county is substantially higher than in the early 1900's, this can limit the success of any attempts to regenerate white cedar.

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, Marinette 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 Buckthorn

Common buckthorn (*Rhamnus cathartica*) and glossy buckthorn (*Rhamnus frangula*) 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 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.

Common buckthorn is a problem species mainly in the understory of southern oak, oak-beech, maple, and riparian woods, prairies, and savannas. It also occurs in thickets, hedgerows, pastures, abandoned fields, roadsides, and on rocky sites. It aggressively competes with local flora, mainly on well-drained soils.

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.

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 by 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.

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 seedlings.

830.4.2 Honeysuckle

Tartarian honeysuckle (*Lonicera tatarica*), Morrow's honeysuckle (*Lonicera morrowii*) and Bella honeysuckle (*Lonicera x bella*) are all exotic invasive honeysuckle species collectively referred to as bush honeysuckles. The exotic bush honeysuckles are easily separated from native *Lonicera* species. All native honeysuckles of the *Lonicera* genera are woody vine-like twining species. The exotics are stout, erect shrubs. *Diervilla* species are native bush honeysuckles with yellow flowers found in dry or rocky sites.

Bush honeysuckles can live in a broad range of plant communities with varying moisture and shade levels. Most natural communities are susceptible to invasion by one or more of the species, with or without previous invasions. Woodlands are most affected, and are particularly vulnerable if the habitat is already disturbed. Bush honeysuckles thrive in sunny, upland habitats, including forest edges, roadsides, pastures, and abandoned fields.

Bush honeysuckles are native to Asia and western Europe. Tartarian honeysuckle was introduced to North America as an ornamental in 1752. The others were introduced in the late 1800's. Distribution is typically near large urban areas, but rural infestations have occurred where the species were introduced to provide wildlife with cover and a food source. Exotic honeysuckles have become widespread in Wisconsin. Their proliferation is due largely to horticultural plantings, especially in more urban southern and eastern Wisconsin. However, there are pockets of infestation in rural areas where honeysuckles were planted to improve wildlife habitat.

The widespread distribution of bush honeysuckle is aided by birds, which consume the ripened fruit in summer and disperse the seeds over long distances. The seeds appear to require a cold stratification period to break dormancy. Seedlings establish in sparse vegetation, and are usually found growing under tall shrubs or trees. Their vigorous growth inhibits development of native shrub and ground layer species; eventually they may entirely replace native species by shading and depleting soil moisture and nutrients. The early leafing of these species is particularly injurious to spring ephemerals, which have evolved to bloom before trees and shrubs have leafed out.

830.4.3 Garlic Mustard

Garlic mustard is an exotic species introduced from Europe presumably by early settlers for its supposed medicinal properties and for use in cooking. In Wisconsin, the plant is currently concentrated in the southeastern and northeastern counties, although distribution records indicate its presence is nearly statewide.

Garlic mustard grows in upland and floodplain forests, savannas, yards, and along roadsides, occasionally in full sun. It is shade-tolerant, and generally requires some shade; it is not commonly found in sunny habitats. The invasion of forests usually begins along the wood's edge, and progresses via streams, campgrounds, and trails.

This species is a biennial that produces hundreds of seeds per plant. The seeds likely are dispersed on the fur of large animals such as deer, horses, and squirrels, by flowing water and by human activities. In our areas, seeds lie dormant for 20 months prior to germination, and may remain viable for five years. Seeds germinate in early April. First-year plants appear as basal rosettes in the summer season. First-year plants remain green through the following winter, making it

possible to check for the presence of this plant in your woods throughout the year. Garlic mustard begins vegetative growth early in the spring, and blooms in southern Wisconsin from May through early June. Fruits begin to ripen in mid-July, and are disseminated through August. Viable seeds are produced within days of initial flowering.

Garlic Mustard is a rapidly spreading woodland weed that is displacing native woodland wildflowers in Wisconsin. It dominates the forest floor and can displace most native herbaceous species within ten years. This plant is a major threat to the survival of Wisconsin's woodland herbaceous flora and the wildlife that depend on it. There are two modes of spread: an advancing front, and satellite population expansion possibly facilitated by small animals. Unlike other plants that invade disturbed habitats, garlic mustard readily spreads into high quality forests.

830.4.4 Spotted Knapweed

This plant was probably introduced in the 1890's as a contaminant in alfalfa or hay seed from Europe and Asia. In recent years, the species has invaded relatively undisturbed natural areas in Wisconsin as well as heavily disturbed sites. The extent of the invasion and the communities potentially affected are not well known. Until recently, spotted knapweed was presumed to inhabit only heavily disturbed areas such as road ditches, agricultural field margins, railroad beds, pipelines, and recently installed utility lines; the plant has now been found in dry prairie sites, oak and pine barrens, and on lake dunes and sandy ridges. It seems to be especially problematic in the central sands, northern Wisconsin, and near the Great Lakes.

Spotted knapweed reproduces solely by seed. Individual flower heads bloom from late June through August for 2-6 days each. The bracts reopen after about 20 days and scatter seeds. Plants average about 1,000 seeds per plant. Seeds are viable for seven years, and germinate throughout the growing season. Seedlings emerging in fall develop into a rosette of leaves that resume growth in spring.

Spotted knapweed often attains high densities on sunny wild lands--even ones undisturbed by human or livestock activity. Knapweed tends to dominate sites at the expense of community diversity or forage production. Knapweed infestation can also increase surface run-off and sedimentation.

830.4.5 Leafy Spurge

Leafy spurge is a deep-rooted, Eurasian perennial that is adapted to a wide range of conditions. The species was first recorded in the U.S. in 1827, and was probably introduced accidentally in a mix of agricultural seed stock, or intentionally for its attractive, yellow, heart-shaped bracts. The plant occurs primarily in non-cropland habitats, including roadsides, prairies, savannas, and woodlands. It is tolerant of a wide range of habitats, from damp to very dry soils. In Wisconsin it is usually found in lighter, dry soils. Leafy spurge prefers sunny conditions, but can also grow in savanna habitats. The related cypress spurge

(*Euphorbia cyparissias*) has also invaded some dry grasslands in western Wisconsin. Little is known about control techniques.

Leafy spurge appears to be allelopathic and spreads rapidly, crowding out desirable species. There are a number of spurges that hybridize with leafy spurge. Often these hybrids are collectively referred to as "leafy spurge." The plant can reach densities of up to 1,800 stems per square yard. Its deep root system makes eradication of the species extremely difficult. Roots are woody, tough, and can reach depths up to 15 feet, and lateral spread of up to 35 feet. Vegetative reproduction from both crown and root buds contribute to the weeds persistence. Even if the foliage of the plant is destroyed, the roots will regenerate new shoots.

The plant's extraordinary seed dispersal mechanisms also contributes to the plant's success. Leafy spurge reproduces readily from seed dispersed by explosive ejection from the seed capsule. The plant can expel its seeds to distances of 15 feet, and has a high germination rate. Once established, the plant reproduces and spreads rapidly via vegetative reproduction. Shoots emerge in late March. Leafy spurge is most easily recognized by its yellow-green bracts that exist from May to the end of July. Seed development continues for up to six weeks. This species usually ceases to grow during the hottest and driest weeks of July and August.

Leafy spurge can be catastrophic to grasslands and barrens for both economic and ecological reasons. The species outcompetes other vegetation by shading competitors and dominating available moisture and nutrients. In natural areas, leafy spurge reduces species diversity and habitat for wildlife, and has the ability to displace native grasses and forbs in the course of only a few years.

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 Marinette County (on or near the County Forest).

Scientific Name	***Common Name***	***Federal Status****	***State Status*****
Botrychium mormo	Little Goblin Moonwort		END
Vaccinium cespitosum	Dwarf Huckleberry		END
Armoracia lacustris	Lake-cress		END
Asclepias ovalifolia	Dwarf Milkweed		THR
Cypripedium arietinum	Ram's-head Lady's-slipper		THR
Eleocharis rostellata	Beaked Spikerush		THR
Parnassia palustris	Marsh Grass-of-parnassus		THR
Petasites sagittatus	Arrow-leaved Sweet-coltsfoot		THR
Valeriana sitchensis ssp. *uliginosa*	Marsh Valerian		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; SC- special concern

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 Marinette County (on or near the county forest).

Scientific Name	**Common Name**
Adlumia fungosa	Climbing Fumitory
Arabis missouriensis var. *deamii*	Deam's Rockcress
Asplenium trichomanes	Maidenhair Spleenwort
Botrychium oneidense	Blunt-lobe Grape-fern
Botrychium rugulosum	Rugulose Grape-fern
Cardamine pratensis	Cuckooflower

Cirsium flodmanii	Flodman Thistle
Clematis occidentalis	Purple Clematis
Deschampsia flexuosa	Crinkled Hairgrass
Dryopteris fragrans var. *remotiuscula*	Fragrant Fern
Leucophysalis grandiflora	Large-flowered Ground-cherry
Medeola virginiana	Indian Cucumber-root
Penstemon hirsutus	Hairy Beardtongue

Scientific Name	**Common Name**
Platanthera hookeri	Hooker Orchid
Platanthera orbiculata	Large Roundleaf Orchid
Vaccinium pallidum	Blue Ridge Blueberry
Verbena simplex	Narrow-leaved Vervain
Viburnum nudum var. *cassinoides*	Northern Wild-raisin
Viola rostrata	Long-spur Violet
Arethusa bulbosa	Swamp-pink
Bartonia virginica	Yellow Screwstem
Cakile edentula	American Sea-rocket
Calamagrostis stricta	Slim-stem Small-reedgrass
Carex assiniboinensis	Assiniboine Sedge
Carex gynocrates	Northern Bog Sedge
Carex livida var. *radicaulis*	Livid Sedge
Carex vaginata	Sheathed Sedge
Cypripedium parviflorum var. *makasin*	Northern Yellow Lady's-slipper
Cypripedium reginae	Showy Lady's-slipper
Deschampsia cespitosa	Tufted Hairgrass
Eleocharis olivacea	Capitate Spikerush
Eleocharis quinqueflora	Few-flower Spikerush
Epilobium strictum	Downy Willow-herb
Equisetum variegatum	Variegated Horsetail
Galium palustre	Marsh Bedstraw
Malaxis monophyllos var. *brachypoda*	White Adder's-mouth
Myriophyllum farwellii	Farwell's Water-milfoil
Ophioglossum pusillum	Adder's-tongue
Triglochin maritima	Common Bog Arrow-grass
Triglochin palustris	Slender Bog Arrow-grass

830.6.2 Natural Communities

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

Common Name		
▪Bedrock Glade	▪Talus Forest	▪Lake--Spring
▪Boreal Forest	▪Alder Thicket	▪Northern Sedge Meadow
▪Bracken Grassland	▪Boreal Rich Fen	▪Northern Wet Forest
▪Glaciere Talus	▪Emergent Marsh	▪Northern Wet-mesic Forest
▪Great Lakes Beach	▪Floodplain Forest	▪Open Bog
▪Moist Cliff	▪Hardwood Swamp	▪Shrub-carr
Common Name		
▪Northern Dry Forest	▪Lake--Deep, Hard, Seepage	▪Spring Pond
▪Northern Dry-mesic Forest	▪Lake--Deep, Soft, Seepage	▪Springs and Spring Runs, Hard
▪Northern Mesic Forest	▪Lake--Deep, Very Soft, Seepage	▪Stream--Fast, Hard, Cold
▪Pine Barrens	▪Lake--Shallow, Hard, Seepage	▪Stream--Fast, Soft, Cold
▪Southern Mesic Forest	▪Lake--Shallow, Soft, Seepage	▪Stream--Slow, Hard, Warm

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 Marinette 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), and the Public Forest Lands Handbook (2460.5), 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:

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. A harvest strategy to diversify age classes of thousands of acres of large stands of aspen (>100 acres) will be implemented during the duration of this plan utilizing forest GIS data.

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. Natural regeneration will be implemented on suitable sites using techniques such as scarification.

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, openings one acre or larger are preferred. The use of chemical, mowing, prescribed fire and hand cutting are methods that will be utilized to maintain openings.

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. Careful consideration will be given prior to harvest in stands designated as traditional deer yards.

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. A strategy to regenerate and retain the current acreage of oak will be developed and implemented during the duration of this plan. All feasible management techniques will be considered.

840.3.6 Barrens

Barrens are sparsely timbered open areas of grasses, bracken fen and low shrubs such as blueberry and sweet fern. This habitat was once common in the sand country of Wisconsin but is now rare due to the need to control wild fire. Barrens will be maintained and restored where biologically and physically feasible.

840.3.7 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.

840.3.8 Forest Non-Game Species

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

1)Leaving present and future mast, den, snag and dead down trees.
2)Identifying and protecting forest raptor nest sites.
3)Identifying and protecting wolf den and rendezvous sites
4)Identifying and managing habitats critical to endangered/threatened species

840.3.8.1 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 succesional 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 Marinette County.

Scientific Name	**Common Name**	**Federal Status***	**State Status****
Canis lupus	Gray Wolf	LE	
Haliaeetus leucocephalus	Bald Eagle	LT, PD	SC/FL
Sterna forsteri	Forster's Tern		END
Lycaeides idas	Northern Blue		END
Thamnophis sauritus	Northern Ribbon Snake		END
Ammodramus henslowii	Henslow's Sparrow		THR
Dendroica cerulea	Cerulean Warbler		THR
Buteo lineatus	Red-shouldered Hawk		THR

Ophiogomphus howei	Pygmy Snaketail	THR
Clemmys insculpta	Wood Turtle	THR
Emydoidea blandingii	Blanding's Turtle	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, 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

840.5 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 Marinette County (on or near the County Forest).

Scientific Name	***Common Name***
Cicindela patruela patruela	A Tiger Beetle
Accipiter gentilis	Northern Goshawk
Bartramia longicauda	Upland Sandpiper
Bubulcus ibis	Cattle Egret
Chlidonias niger	Black Tern
Nycticorax nycticorax	Black-crowned Night-heron
Callophrys henrici	Henry's Elfin
Hesperia comma	Laurentian Skipper
Hesperia leonardus	Leonard's Skipper
Hesperia metea	Cobweb Skipper
Oeneis chryxus	Chryxus Arctic
Phyciodes batesii	Tawny Crescent Spot
Boloria frigga	Frigga Fritillary

Erebia discoidalis	Red-disked Alpine
Lycaena dorcas	Dorcas Copper
Pieris virginiensis	West Virginia White
Aeshna eremita	Lake Darner
Aeshna tuberculifera	Black-tipped Darner
Aeshna verticalis	Green-striped Darner
Cordulegaster diastatops	Delta-spotted Spiketail
Gomphurus lineatifrons	Splendid Clubtail
Gomphurus ventricosus	Skillet Clubtail
Lestes eurinus	Amber-winged Spreadwing
Lestes vigilax	Swamp Spreadwing
Libellula incesta	Slaty Skimmer
Nannothemis bella	Elfin Skimmer
Nasiaeschna pentacantha	Cyrano Darner
Neurocordulia yamaskanensis	Stygian Shadowfly
Ophiogomphus carolus	Riffle Snaketail
Somatochlora elongata	Ski-tailed Emerald
Somatochlora ensigera	Lemon-faced Emerald
Somatochlora forcipata	Forcipate Emerald
Somatochlora franklini	Delicate Emerald
Somatochlora kennedyi	Kennedy's Emerald
Stylogomphus albistylus	Least Clubtail
Stylurus scudderi	Zebra Clubtail
Tramea carolina	Violet-masked Glider
Williamsonia fletcheri	Ebony Bog Haunter
Psectraglaea carnosa	Pink Sallow
Acipenser fulvescens	Lake Sturgeon
Etheostoma microperca	Least Darter
Fundulus diaphanus	Banded Killifish
Notropis texanus	Weed Shiner
Napaeozapus insignis	Woodland Jumping Mouse
Sorex hoyi	Pigmy Shrew
Baetisca obesa	An Armored Mayfly
Alasmidonta marginata	Elktoe
Pleurobema sintoxia	Round Pigtoe
Planogyra asteriscus	Eastern Flat-whorl
Vertigo elatior	Tapered Vertigo
Vertigo paradoxa	Mystery Vertigo
Vertigo tridentata	Honey Vertigo

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 Marinette 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 925.5 and 925.6). Reference 130.1.8.

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 Shoreland Zoning

See 905.2.3

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. 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 Marinete County Forest include Spur Lake, Pike River, Peshtigo River and other waters described in 850.3.1.4.

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 Marinette 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

High Conservation Value Forests (HCVF) is a term that identifies those areas possessing unique qualities locally, regionally or nationally. Marinette County’s focus in managing these areas will be to maintain or enhance the qualities that make these areas special. In some instances, this may involve altering

management practices to mitigate impacts and in others, it may entail no active management.

Exceptional Resources contain such things as high conservation value forests, wild rivers and lakes, significant geological features, natural areas, ruffed grouse management areas, historical and archeological sites. HCVF contain such communities as relict old-growth forest; habitat for endangered, threatened, and species of greatest conservation need; oak and pine barrens, natural origin pine stands; rare natural communities, such as forested seeps, bedrock glades, large muskegs, shorelines of wild rivers and lakes, and animal concentration spots. It is the policy of Marinette County to manage these types of resources and protect their individual exceptional features.

850.3.1 Areas High in Locally, Regionally or Nationally Significant Biodiversity Values.

850.3.1.1 Wisconsin Natural Areas

Marinette County manages a variety of property designations including Wisconsin State Natural Areas (SNA). The SNA 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. The Wisconsin SNA program works with counties to further recognize outstanding native biotic communities that Marinette County is presently managing as exceptional areas. SNA's are unique in that they can exist as stand alone properties or be designated within the boundaries of another property type. Marinette County maintains its land ownership, management and decision-making authority, but with cooperative recognition of these sites the county can enhance its ability to provide a broader range of opportunities for the citizens.

DNR State Natural Areas staff will work cooperatively with the County Forest by coordinating educational, monitoring, and research activities. Assistance on management projects can provide the county with more resources to accomplish necessary management. Management will protect the unique character of the area. The importance of the Wisconsin State Natural Areas has been recognized on the County Forest by cooperating with the Department through designating and

managing 40 acres of the County forest for 1 SNA site, the Marinette County Beech Forest.

The Beech Forest NA is a 40-acre northern mesic forest that has been a designated State Natural Area since 1967. This is an excellent example of a beech outlier with exceptional research values. The site is part of the Goodman Parkway, which attracts numerous visitors each year. A map of the site is found in Chapter 900.2.

850.3.1.2 Species concentration areas (e.g. bat hibernacula, bird rookeries, etc.) *No known sites.*

850.3.1.3 Special Management Areas

SPUR LAKE

This 27-acre site contains unusual water chemistry and therefore provides conditions for several very restricted species. Featured are hard water springs and spring runs, a hard water drainage lake, and a cedar swamp. Rare species found here include Slender and Common Bog Arrow-grass (Triglochin palustre and T. maritimum), Variegated Scouring-rush (Equisetum variegatum), Delta-spotted Spiketail (Cordulegaster diastatops), Elfin Skimmer (Nannothemis bella), Green-striped Darner (Aeshna verticalis), Kennedy's Emerald (Somatochlora kennedyi), Forcipate Emerald (Somatochlora forcipata), Delicate Emerald (somatochlora franklini), Dion Skipper (Euphyes dion), Dorcas Copper (Lycaena dorcas) and Tawny Crescentspot (Phycoides batesii). The marly nature of the littoral areas makes this site unique in Marinette County. The county forest has designated the site as a county natural area to extend special protection to the site. The Wisconsin DNR Natural Areas has expressed an interest in designating the site as a state natural area. This designation does not affect timber management in the surrounding uplands. The designation would focus on the aquatic feature and best management practices for water quality in the surrounding forest should assure the water features are maintained. Positive aspects of cooperation would include: assistance with management by removing invasive exotic species, providing cost share funds to keep vehicles off the shoreline, and provide interpretive information for Spur Lake users. Local wildlife management staff encourages the inclusion of Spur Lake into the Wisconsin DNR state natural areas program with the understanding that this would occur by committee’s approval. A map of the site is found in Chapter 900.2.

SHRINE ROAD OPENINGS

This site features habitat for two endangered species; the northern blue butterfly and dwarf huckleberry; and the inornate ringlet, a species of special concern. Several male northern blue butterflies were seen in 2003 puddling near the road and nectaring in the openings. Several 1990's surveys produced over 100 northern blues and it also found them occupying four adjacent openings. Dwarf huckleberry is the only known food plant for the northern blue in Wisconsin and it occurs in small patches in the openings in this area. The butterflies and the dwarf huckleberry are found on level terrain or frost pockets on Menahga sands. These

small openings contain the largest known population for the northern blue in Wisconsin with an estimated population of 4-5,000.

The openings are partially maintained by cutting, but also due to frost action. The poor growing conditions should have little to no effect on the county forest timber production. Special management area recognition does not affect timber management on the surrounding forest land, except that landings will not be placed in the openings. Wildlife management and the State Natural Areas Program would provide funds to maintain the openings through brushing, invasive species removal and limited small-scale use of prescribed fire. Local wildlife management staff encourages the inclusion of the Shrine Road Openings into the Wisconsin DNR state natural areas program with the understanding that this would occur by committee's approval. A map of the site is found in Chapter 900.2.

NORTH MARINETTE BEDROCK FEATURES

Northern Marinette County contains an abundance of surface bedrock features. These five small sites in combination capture the variety rock outcrops, waterfalls, glades, and talus that harbor distinctive and often out of range species. These exposed rocks harbor specialized plants, able to tolerate the rigorous conditions, form an unusual plant community, the acid bedrock glade.

The five units include about four acres around Long Slide Falls. This falls is the most complex of the numerous waterfalls in Marinette County with many plunges and cascades. The continuously moist cliff walls harbor rare fern and liverwort species. Spikehorn Canyon covers about 28 acres and features a series of bedrock glades and cliffs on both sides of Spikehorn Creek. Rare ferns and snails live in Spikehorn Canyon. Twin Lakes Headwaters gorge features three distinct areas, each with much different bedrock attributes. Dry glades (two units) encompassing about 37 acres lie near the North Branch and harbor many prairie species. A gorge just northeast of Twin Lake features savanna-like forest on talus slopes and a high quality sedge meadow along the stream. About ½ mile farther east lies another gorge. This one features moist talus forest and a very rare boreal rich fen. The fen forms when sphagnum grows under the influence of mineral rich water and usually harbors many rare plant species, especially orchids.

Management is limited due to the thin soils, poor tree growth and disruption of rare plants by equipment. The timber value is extremely marginal, due to the extremely poor growing conditions, however, ecological management to maintain the glade community may require thinning to achieve tree density goals. If tree growth indicates harvest is needed, the State Natural Areas Program can assist the county in planning and possibly conduct the harvest. Other management activities would be removal of invasive exotic species and potentially very small experimental prescribed burns. Local wildlife management staff encourages the inclusion of Northern Marinette Bedrock Features as described into the Wisconsin DNR state natural areas program with the understanding that this would occur by committee's approval. A map of the site is found in Chapter 900.2.

850.3.1.4 AREAS HIGH IN LOCALLY SIGNIFICANT BIOLOGICAL DIVERSITY

The remaining communities listed contain locally important exceptional or unique resource values.

FRYING PAN LAKE SPRUCE BOG features a deep, hard water, seepage lake and a northern wet forest. A large black spruce dominated conifer swamp occurs north of this mostly privately owned lake. The lake has hard water and it's slightly alkaline. Conifer areas with this type of mineral water influence usually harbor significant populations of rare orchids.

ATHELSTANE BARRENS features pine barrens, alder thicket and a fast, hard, cold stream. The barrens openings have closed in and are now mostly forested however, there are areas containing openings with abundant sedges and prairie forbs. A dragonfly of special concern, Kennedy's Emerald, was collected near the stream.

HOBACHEE LAKE is a shallow, hard water seepage lake with slightly acid dark brown water. The littoral zone is all muck and the shoreline contains conifer and cedar swamps.

PORCUPINE LAKE is a shallow, hard water, seepage lake and a northern wet forest. The lake has medium hard water of medium brown color and a littoral zone of 60% silt, 30% rubble, and 10% gravel. A large conifer bog extends to the south and west, while a maple/hemlock woods occurs on the surrounding uplands.

McCLINTOCK HEMLOCKS features a stretch of the Peshtigo River and a strip of northern mesic forest along the stream banks. This stand is within a developed County Park.

PERCH LAKE WETLANDS has been described as a high quality seepage lake with surrounding sedge meadow, open bog, northern wet forest, and emergent aquatic communities. The bottom is all muck. The communities are interspersed permitting the development of diverse species assemblages.

KIDD LAKE is a shallow, hard water, seepage lake surrounded by County Forest land. The shallow lake supports only minnows for fish and therefore receives little public use.

NORTH FORK PIKE RIVER WATERFALLS: Featured in this area are several waterfalls along the Pike River. The Pike is slightly alkaline with clear water and flows over sand, gravel, and rock outcrops. Along the shore are small areas of older growth pine forest. The north fork of the Pike has a diverse dragonfly fauna

including six special concern species: Kennedy's Emerald (Somatochlora kennedyi), Riverine Clubtail (Stylurus amnicola), Zebra Clubtail (Stylurus scudderi), Least Clubtail (Stylogomphus albistylus), Skillet clubtail (Gomphurus ventricosus), and Rapids Clubtail (Gomphus quadricolor)

BEST THICKET features northern sedge meadow, alder thicket, shrub-carr, and boreal forest. The shrub communities are undisturbed with a diverse composition. The higher ground supports a second growth boreal forest.

DUNBAR SWAMP: Dominant trees are black spruce and tamarack with an undisturbed ground layer.

PESHTIGO RIVER: Reaches of the Peshtigo run through Marinette County Forest land. This river has a diverse dragonfly fauna. Most of the species of concern are found in areas of fast moving water. One state-endangered species, the Pygmy Snaketail (Ophiogomphus howei), and three special concern species; Skillet Clubtail (Gomphurus ventricosus), Rapids Clubtail (Gomphus quadricolor), and Cyrano Darner (Nasiaeschna pentacantha), have been recorded from the upper reaches in the county.

850.3.2 Rare, threatened, or endangered ecosystems

850.3.2.1 Relic old growth stands

Eastern hemlock and white cedar stands will be maintained. Hemlock is important to the diversity of our northern hardwood stands and provides needed habitat for many species, including migratory songbirds and a seed source for regeneration. 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 needed habitat for many species, including migratory songbirds and a seed source for regeneration. 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.

850.3.2.2 Savannas including oak openings and oak barrens

See 850.3.2.4

850.3.2.3 Natural origin pine relics

850.3.2.4 Pine barrens

850.3.2.4.1 ATHELSTANE BARRENS

Located several miles northeast of Athelstane this area historically supported extensive oak and pine barrens and jack pine forests. Today this same area contains a landscape with groves of dense forest bounded by openings containing only scattered trees. Scattered grassy areas still harbor many prairie species, indicating a more open landscape in the past. Adding to the diversity are numerous rock outcrops. This area represents one of the best opportunities in the state for large-scale barrens restoration in the northeast part of the state. An area large enough to support a viable population of sharp-tailed grouse could be restored here. These areas could support significant populations of grassland/shrub bird species, several of which are of management concern in the Midwest.

In the last ten year plan the committee had approved active restoration for 65 acres that has been managed with the use of prescribed fire. An additional 57 acres directly adjacent the initial barrens management unit has been designated for barrens restoration with the first prescribed fire planned for 2006. County forestry staff and DNR wildlife biologists will continue to plan for future barrens management opportunities in the Athelstane Barrens area for review and approval by the committee.

850.3.2.5 Geologic features of significance (e.g. gorges, dells, waterfalls)

Marinette County is known as the waterfall capital of Wisconsin. Many of these waterfalls are located on the Marinette County Forest lands. They include Veteran's Falls on the Thunder River; McClintock Falls and Strong Falls on the Peshtigo River; Carney Rapids, Four Foot Falls, Eighteen Foot Falls, Twelve Foot Falls, Eight Foot Falls and Horseshoe Falls on the Pike River; Smalley Falls and Long Slide Falls on Pemebonwon River.

850.3.2.6 Eastern hemlock stands

See 850.3.1.4: McClintock Hemlocks

850.3.2.7 Habitat for species identified as rare, threatened, endangered or of greatest conservation need (e.g. Karner blue butterfly areas, important bird areas, etc.)

See 850.3.1.3

850.3.3 Culturally significant sites

850.3.3.1 Burial mounds / cemeteries

850.3.3.2 Logging camps

Many former logging camps are present on the forest. Several have signs indicating locations of these camps (Right of Way Road and CCC Camp). No comprehensive list or map of these sites currently exists.

850.3.3.3 Landmarks

Lake Mary fire tower is the only remaining fire tower on forest property still in use. The Girard tower was dismantled over 30 years ago but the foot print of this site still remains.

850.3.3.4 Other Cultural Sites

St. Hubert Shrine

Lost Hunter's Shrine

Rail Grades from settlement logging era

850.3.4 Locally significant sites

850.3.4.1 PIKE RIVER

State statue 30.26 designated the Pike River of Marinette County as a wild river with the intent of preserving, protecting and enhancing the natural beauty and values of the river. Section (3)(c)of the original legislation directed the Department of Natural Resources to collaborate with county and town government to meet the objectives of the Wild River. In 1991 Marinette County entered into a cooperative agreement with the Wisconsin Department of Natural Resources (see 915.7). The agreement defines how forest management within the Pike River protection zone will be implemented on the Marinette County Forest. In addition to the agreement, the Pike Wild

River property manager reviews all county forest timber sales that are proposed within 400 feet of the Pike River.

850.3.4.2 DEER YARDS

Several important winter deer yarding areas are present on the county forest. The Eagle Creek deer yard consists of rolling topography and hemlock forest type provide excellent winter cover for white-tailed deer. The Long Swamp/Spur Lake area, Lake Mary Swamp, the Brazeau Swamp in the Butler Rock Area, and Holmes Creek deer yards also have historically been known to be winter deer yards but due to size, changes in forest composition and unknown reasons yarding has not been as prevalent recently. Management in these areas will protect and maintain the yard's forest composition and structure for continued winter deer yarding.