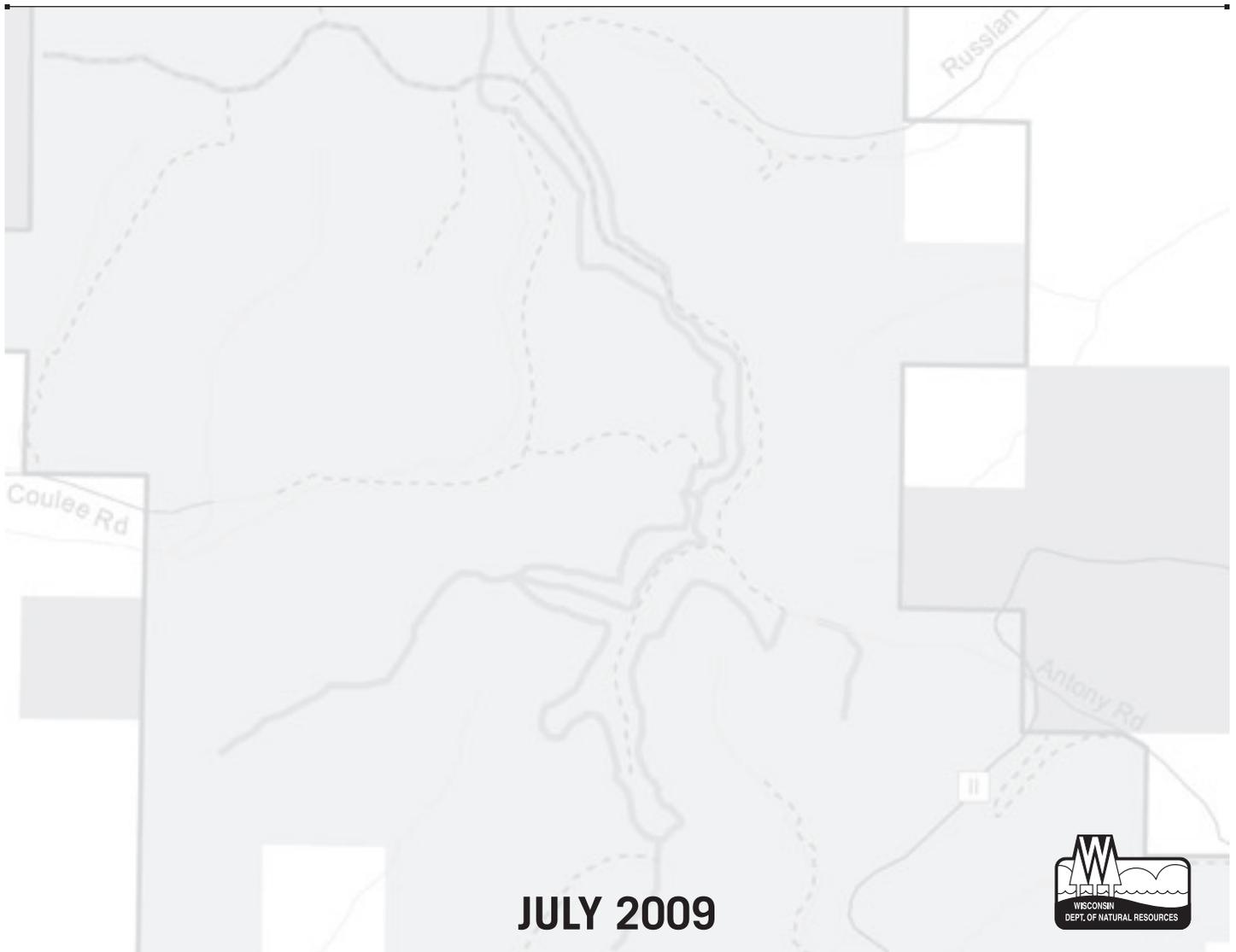


COULEE EXPERIMENTAL STATE FOREST



JULY 2009

COULEE EXPERIMENTAL STATE FOREST



JULY 2009



ACKNOWLEDGEMENTS

Many individuals from the Department of Natural Resources have developed this plan through an integrated planning process. Through their hard work and expertise and with the input from the public, these people have developed a plan that will guide the Coulee Experimental State Forest into the future.

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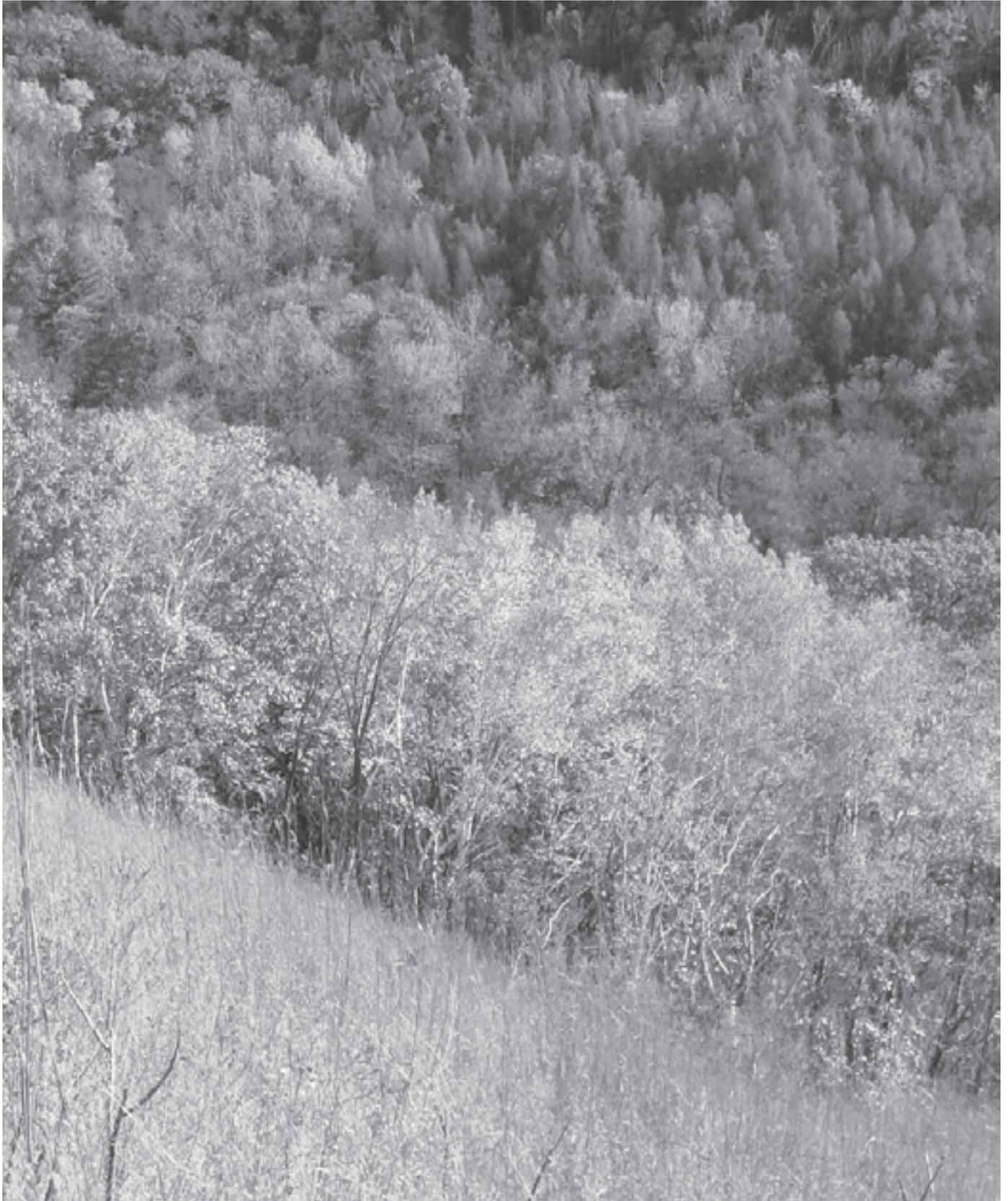
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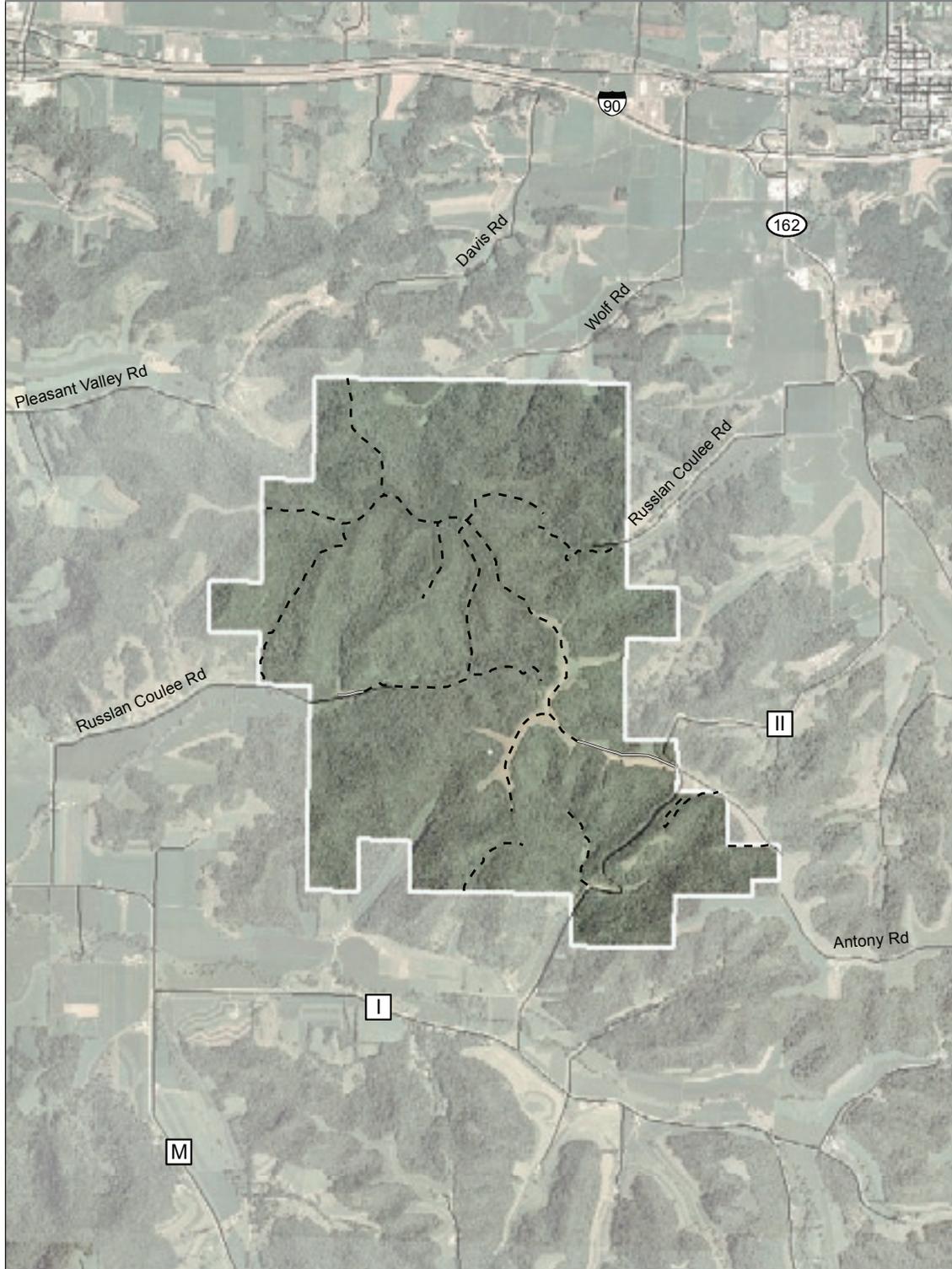
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COULEE EXPERIMENTAL STATE FOREST





INTRODUCTION AND PLAN OVERVIEW

The Coulee Experimental State Forest (CESF) plays an important role in providing and sustaining many ecological, economic and social benefits in western Wisconsin. The forest contributes to local and statewide economies through certified forest products, helps provide habitat for a range of native plant and animal species, and offers a variety of recreational opportunities.

The property supports a range of forest types and habitats. Oak, central and northern hardwoods, and aspen are common forest types that help to sustain healthy and diverse wildlife populations. The forest supports over 25 acres of Dry Prairie as part of the complex ecosystem that provides habitat to many birds, plants, and rare species.

In addition to providing large forest with diverse natural habitats, the Coulee Experimental State Forest supports local communities by providing outdoor recreation for local citizens and tourists. Hunting is one of the more popular recreational activities on the CESF. Many forest visitors also enjoy hiking, horseback-riding, wildlife viewing and cross-country skiing on the forest.

Purpose of the Master Plan

The Coulee Experimental State Forest Master Plan articulates a shared vision for the future use and management of the forest and lays out the objectives and management prescriptions to achieve the vision. The plan, based on two years of assessment and planning, is designed to sustain the ecological, economic, and social benefits valued by the citizens of Wisconsin. The plan spells out how the property will be managed and the benefits it will provide over the next 15 year period. It outlines forestry and land management practices, recreational uses, and other aspects of the property's future use and development.

The Coulee Experimental State Forest Master Plan:

- Provides a vision and framework for the use, development, management, and acquisition of the forest well into the future with an emphasis on the next 15 years.
- Identifies land management areas and plans for their future management.
- Describes general and specific management objectives and prescriptions for each management area.
- Makes recommendations for forest production, habitat conservation, recreation, and boundary expansion to meet current and future needs.
- Provides for continuing public involvement during plan implementation.

Overview of Planning Process

There are several major phases in the planning process as well as opportunity for public input and participation. These phases include completing the Regional and Property Analysis, establishing the property vision and goals, considering management alternatives, and finally creating a plan and an environmental analysis.

Public input plays an important role throughout the master planning process. The public's involvement starts with reviewing and commenting on the Regional and Property Analysis, Vision and Goals, and a list of important property issues. Based on the comments received, a draft plan is developed and presented for additional public feedback. Finally, the Master Plan is refined and presented to the Natural Resources Board for approval.

Plan Content and Organization

The Master Plan is presented here in three chapters. Chapter one provides an overview of the forest, the purpose of the Master Plan, and a planning process overview. Chapter two provides the plan for the use and management of the property. Chapter three provides background information on the region and the property.

The Environmental Analysis

The Environmental Analysis (EA) analyzes the potential impacts of actions recommended in the Master Plan, ranging from land acquisition and facility development to forest management and operations. The EA for this plan concludes that the implementation of the Master Plan provides positive recreational, ecological, social, and economic benefits to the region with minimal adverse impacts.

The Public Involvement Process

Public involvement has been crucial to the development of this plan. A variety of tools were used to give information on the planning process and solicit public input, including news releases, mailings, surveys, annual reports, and a website. In addition, two public open house meetings were held at various stages throughout the planning process. Public comment showed support for the recreational opportunities provided by the forest especially hunting, skiing, and hiking. Generally public comments supported state purchase of lands around the Coulee Experimental State Forest, a move that would keep more of the area in the public domain open to a variety of recreation uses and protected from increasing development pressure.

OVERVIEW OF THE PLAN

The Coulee Experimental State Forest (CESF) is relatively small compared to other State Forests, but it represents a significant block of publicly owned, upland forest in a region dominated by agriculture and non-industrial private forests. The property's character is typical of the Driftless Area of Wisconsin in terms

of its geology, topography, and ecology. Unique ecological features create multiple opportunities in forest management and research, wildlife habitat, and the promotion of rare species and natural communities.

The CESF is unique in Wisconsin due to its extensive research history. This research has helped inform and improve forest and watershed management practices across the entire region. With renewed interest from the USDA Forest Service and other research partners, additional research opportunities exist that may yield more information on sustainable management in the Driftless Area. The CESF offers an opportunity not available on other state lands in the region to increase our knowledge of sustainable forestry practices and to demonstrate best management practices that educate non-industrial private forest landowners. Research and demonstration will continue to be an important emphasis on the CESF.

Changes in Forest Cover

Oak, central hardwoods, northern hardwoods, and aspen are the most common forest cover types on the CESF and will continue to be a dominant part of the forest. However the forest will continue to change over time. Central and northern hardwood cover types will increase in acreage due to natural succession, however a management priority will be to maintain a portion of existing oak cover type and improve the age class distribution of this important species. The existing early successional forests of aspen and white birch will be maintained to provide habitat for game and non-game wildlife species. Red pine and European larch stands that are in poor health will



be slowly converted to better adapted conifer and hardwood types. The abundance of older trees and course woody debris will increase, offering more old forest attributes to some areas of the CESF.

Land Management Areas

The Coulee Experimental State Forest has been divided into 4 land management areas: one Forest Production Management Area and three Native Community Management Areas. Each management area describes a unique landscape or management focus that considers soils, topography, community type and other factors which shape the management for each area. Each management area has specific short and long-term objectives that articulate the future desired condition based on the ecological capabilities of the area and the property goals. Because forests and landscapes change slowly, actions taken (or not taken) over the next 15 year planning horizon may require 50-100 years to affect the forest as a whole.

The general management objective for Forest Production Management Areas is the sustainable production of forest products. However, forest production areas also meet a wide range of ecological and recreation objectives. In these cases, management practices are modified to be compatible with and support these multiple objectives. The primary management objective for Native Community Management Areas is the representation and perpetuation of native plant communities and other aspects of native biological diversity. Management activities are designed to achieve land management objectives through natural processes whenever possible. Only those areas of highest value for protection or community restoration were selected.

State Natural Area Designation

Two State Natural Areas have been identified on the Coulee Experimental State Forest; the Northeast Coulee Woods, and the Berg Prairie and Billy Goat Ridge (377 acres in total).

Recreation

The plan maintains all existing recreational opportunities. The current designated ski trail system will be enhanced through trail alterations and a minor reroute. The entire property will continue to be open to hunting, hiking and horseback riding. Existing public access points will be improved through parking area and signage upgrades. Education and outreach opportunities will continue to be provided on the Coulee Experimental State Forest by encouraging environmental education of school groups, conservation groups, and landowner organizations.

Boundary Expansion

The master plans calls for an expansion of the CESF project. Particular areas of the expansion were selected based on their ability to sustain additional ecological, economic and social

LAND MANAGEMENT AREA

Forest Production Management Areas

Area 1: Forest Coulee and Ridges 2,299 acres

Native Community Management Areas

Area 2: Northeast Forest and Cliffs* 285 acres

Area 3: Southwest Ruslan Coulee Woods 296 acres

Area 4: Berg Prairie and Billy Goat Ridge* 92 acres

TOTAL 2,972 acres

*Designated State Natural Area

value for the property and region. The expansion surrounds the existing boundary and totals approximately 3,500 acres. If the boundary expansion were acquired in its entirety, the property would be approximately 6,500 acres in size.

Research

The master plan continues to promote collaboration in forest research and demonstration that advances forest and watershed management of the Driftless Area. The plan develops and demonstrates sustainable forest management practices that protect and enhance water quality, soils, wildlife habitat and natural communities.

Public Involvement

People of varied interests and backgrounds participated in Coulee Experimental State Forest master planning activities. Some of these "stakeholders" in the future of the Coulee Experimental State Forest include local property owners, conservation organizations, recreation clubs, civic groups, state and federal agencies and various members of the local business community. Government-to-government contact was maintained with local towns and county representatives in addition to involvement by the general public.

HOW THE STATUTORY AND OTHER PURPOSES AND BENEFITS OF THE STATE FOREST WILL BE REALIZED THROUGH THE PLAN

Purpose of State Forests

State forests are defined by Wisconsin Statutes 28. The purposes and benefits of state forests are outlined in the following language of 28.04 (2):

(a) The Department shall manage the state forests to benefit the present and future generations of residents of this state, recognizing that the state forests contribute to local and statewide economies and to a healthy natural environment. The Department shall assure the practice of sustainable forestry and use it to assure that state forests can provide a full range of benefits for present and future generations. The

Department shall also assure that the management of state forests is consistent with the ecological capability of the state forest land and with the long-term maintenance of sustainable forest communities and ecosystems. These benefits include soil protection, public hunting, protection of water quality, production of recurring forest products, outdoor recreation, native biological diversity, aquatic and terrestrial wildlife, and aesthetics. The range of benefits provided by the Department in each state forest shall reflect its unique character and position in the regional landscape.

(b) In managing the state forests, the Department shall recognize that not all benefits under par. (a) can or should be provided in every area of a state forest.

(c) In managing the state forests, the Department shall recognize that management may consist of both active and passive techniques.

Local and Statewide Economies

Under the plan, the forest will maintain its contribution to the state and local economies through forest products and tourism. Annual revenues from logging activities on the forest could be expected to average about \$750-\$1000 revenue per harvested acre per year at a harvest rate of about 75-125 acres

per year. Providing scenic beauty, wildlife habitat, and a variety of recreational opportunities will ensure the forest's role as a destination in the region.

A Healthy Natural Environment and the Long-Term Maintenance of Sustainable Forest Communities and Ecosystems

Due to the variety of resources located on the Coulee Experimental State Forest, many of the prescribed benefits of a state forest may be realized on the property. By managing for these benefits, the goals of achieving a healthy natural environment and the long-term maintenance of sustainable forest communities and ecosystems will be realized.

Full Range of Benefits

Protection of Soils and Water Quality

Soils and water quality will continue to be protected by maintaining the major portion of the forest in an undisturbed condition and by following erosion control practices, such as the Best Management Practices for Water Quality (BMPs), when conducting forest and other management activities. Expansion of the forest boundary provides opportunities to expand protection to new areas.



Production of Recurring Forest Products

Under the proposed plan, 90% of the potentially productive lands will be under active sustainable management producing forest products.

Outdoor Recreation

The Coulee Experimental State Forest Master Plan will continue to provide hunting, hiking and horseback riding opportunities, within a uniquely large block of public lands in the region.

Native Biological Diversity

Native biological diversity will be maintained through enhanced forest structure and species composition in some areas. Dry Prairies and other unique habitats will be protected. Endangered and threatened species will continue to be protected.

Terrestrial Wildlife

The forest and wildlife management prescriptions in this plan have been developed to ensure that habitat and ecosystems for wildlife will be sustained and improved.

Aesthetics

Over time, forest health and scenic qualities will be enhanced as longer-lived trees such as oak and central hardwoods become more common through forest management. The scenic quality of all trails and forest roads will be maintained and enhanced through the application of aesthetic management techniques.

This is your plan. The Coulee Experimental State Forest master plan addresses people's desires for the future. Wisconsinites want their forest resources sustained for future generations. At the same time, they expect a full range of environmental, social, and ecological benefits today and in the future. This plan attempts to achieve that balance in a scientifically credible and sustainable way. It was developed with countless hours of public input and several rigorous scientific and technical reviews. Many hands were involved in shaping it.

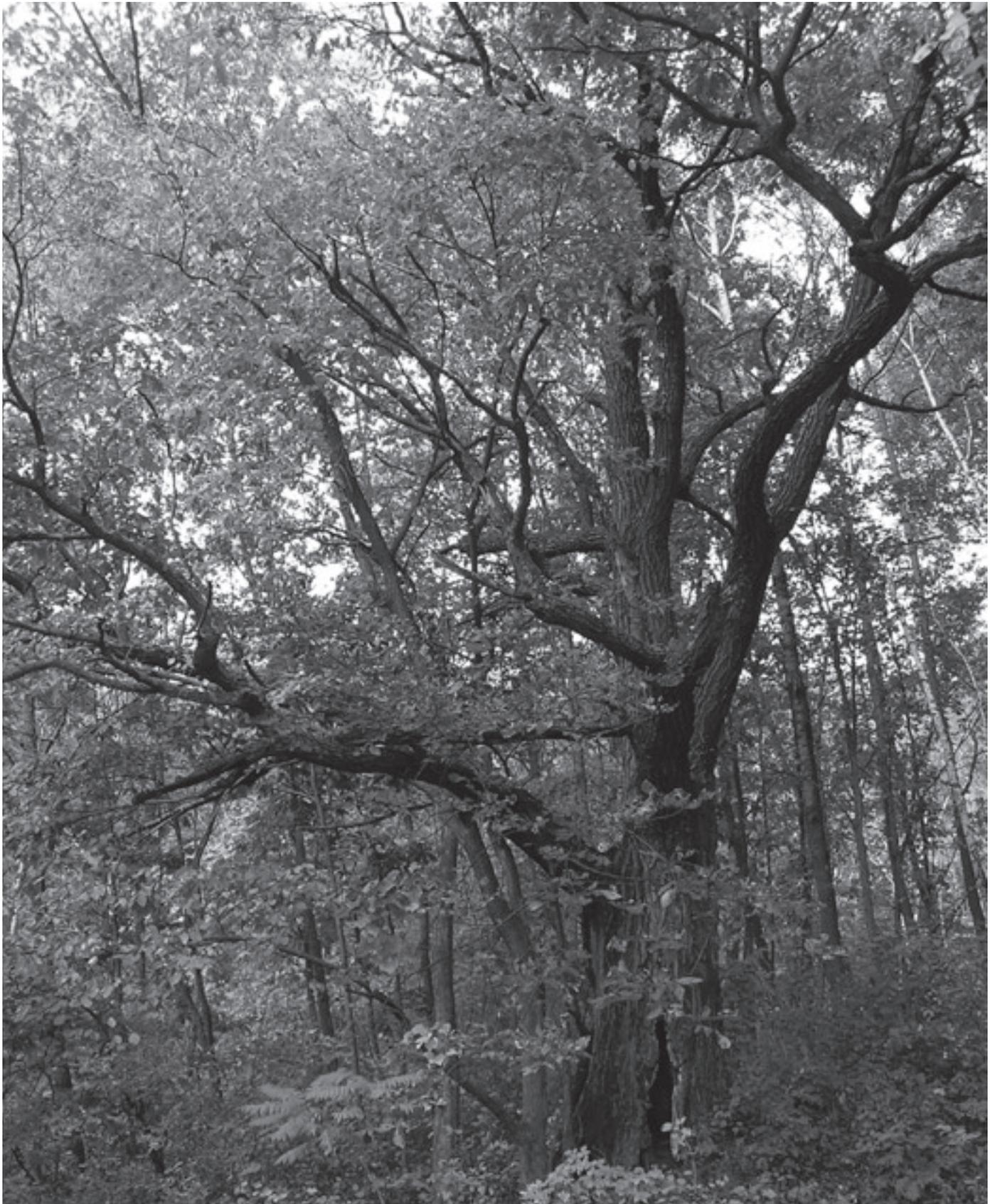
This is a visionary plan. The Coulee Experimental State Forest master plan captures an idealized view of the state forest's long-term future. This points general direction for short-term actions. The diversity of the forest structure is enhanced over time, providing for a broad range of social and ecological values important to Wisconsin citizens, including recreation. Diverse forest communities contribute to the range of wildlife habitats necessary for all native species, and contribute to broad biodiversity.

This is a focused plan. The plan calls for active and passive management across the landscape and over time to achieve its goals and objectives. It relies on integrated and adaptive management of the forest resources and focuses on the compatibility of forest uses over time.

This is a flexible and adaptive plan. The plan calls for adaptive management and monitoring the response of the forest to strategies outlined in the plan. The responses are evaluated against the objectives. The plan calls for continuous monitoring and regular public reviews and a major review every 15 years.

This is a sustainable plan. A sustainable forest requires flexibility and adaptability. This plan will assure sustainable forest products, continued recreation opportunities as well as a sustainable ecosystem and healthy watersheds.

MANAGEMENT AND DEVELOPMENT





MANAGEMENT AND DEVELOPMENT

VISION STATEMENT

The Coulee Experimental State Forest is a locally historic and dynamic property that contributes to the diversity of plant and animal communities in the region. The forest is managed for present and future generations to provide ecological, cultural, social and economic benefits within its capabilities. Special emphasis is given to forest research and field demonstrations that promote sustainable land management practices within the Driftless Area.

PROPERTY GOALS

1. Manage the property within the ecological capability of the land using principles of ecosystem management and sustainable forestry.
2. Collaborate in forest research and demonstration to advance sustainable forest land management practices within the Driftless Area.
3. Provide renewable forest products by practicing sustainable forest management.
4. Provide a diversity of natural communities and wildlife habitats consistent with the forest's capabilities, including diverse forest types and age classes, large and contiguous forest blocks and non-forested communities such as dry prairies and cliff communities.
5. Protect endangered and threatened species, biological diversity and areas of geological or cultural significance.
6. Manage invasive plants, animals, insects and diseases that affect overall forest health.
7. Provide opportunities for hunting and wildlife viewing.
8. Provide a variety of outdoor, non-motorized recreational activities that are compatible and can be sustained without harm to the trail network and forest ecosystems.
9. Maintain and enhance the undeveloped scenic beauty of the state forest, especially those areas visible from trails and public roadways.
10. Prevent and minimize conflicts between diverse interests, by seeking to balance research, forest management and recreational uses.

OVERVIEW OF THE FOREST

The forests of the Coulee Experimental State Forest are part of a complex ecosystem, with a mix of biotic communities that provide habitat for a diversity of plants and animals. Today the forests of the CESF are mainly comprised of oak and central hardwood species (i.e., hickory, elm, black cherry, etc.) located along ridges and within narrow valleys. Many of the oak forests were subject to grazing and harvesting after European settlement, and have since developed into a more dense mixture of oak and central hardwoods. Aspen and birch stands have developed in areas that were abandoned field or pasture. Some of the ridge tops and valleys that were once cleared for farming have either been planted to red pine and white pine, or been used for experimental plantings and progeny tests with European larch, Norway spruce, balsam fir, red oak, and others.



LAND MANAGEMENT AREAS



LAND MANAGEMENT AREAS

The Coulee Experimental State Forest has been divided into two land management classifications consisting of a total of four land management areas: one Forest Production Management Area and three Native Community Management Areas. Each management area describes a unique landscape or management focus that considers soils, topography, community type, and other factors which shape the recommended management for each area. All of the management areas are shown on Map 2.1 and 2.7.

Soils and habitat types are similar throughout most of the Coulee Experimental State Forest; however, there are subtle management differences based on what species will best be supported in each area. The Coulee Experimental State Forest is comprised largely of Southern Dry-mesic Forest and Southern Dry Forest interspersed with dry prairies and various tree and agricultural plantings (See Map 2.10: Property Land Cover Map). Oak, Central Hardwoods and Aspen are the most common forest cover types and many stands are beginning to exhibit old forest characteristics. Bedrock outcroppings occur as low cliffs or ledges at a number of locations on the upper slopes.

Each Management Area has specific short and long-term objectives that articulate the future desired condition based on the ecological capabilities of the area and other factors. Because forests and landscapes change slowly, actions taken (or not taken) over the next 15 years may require 50-100 years to affect the forest as a whole.

Each Land Management area contains the following information:

- Overview and Summary of the area
- Description of the Forest Resource
- Soils and Habitat Types
- Map of each area
- Current and Projected Land Cover
- Short and Long Term Objectives
- Management Prescriptions

State Natural Area Designation

Two State Natural Area Designations have been established on the Coulee Experimental State Forest, the Northeast Coulee Woods, and the Berg Prairie and Billy Goat Ridge. State Natural Areas (SNAs) are part of a statewide system of sites identified for the purposes of ecological research, education, and to assure the full range of ecological diversity for future generations. SNAs are consistent with the management objectives and prescriptions for each area and do not prescribe additional actions or restrictions.

LAND MANAGEMENT AREAS

Forest Production Management Areas

Area 1: Forest Coulee and Ridges 2,299 acres

Native Community Management Areas

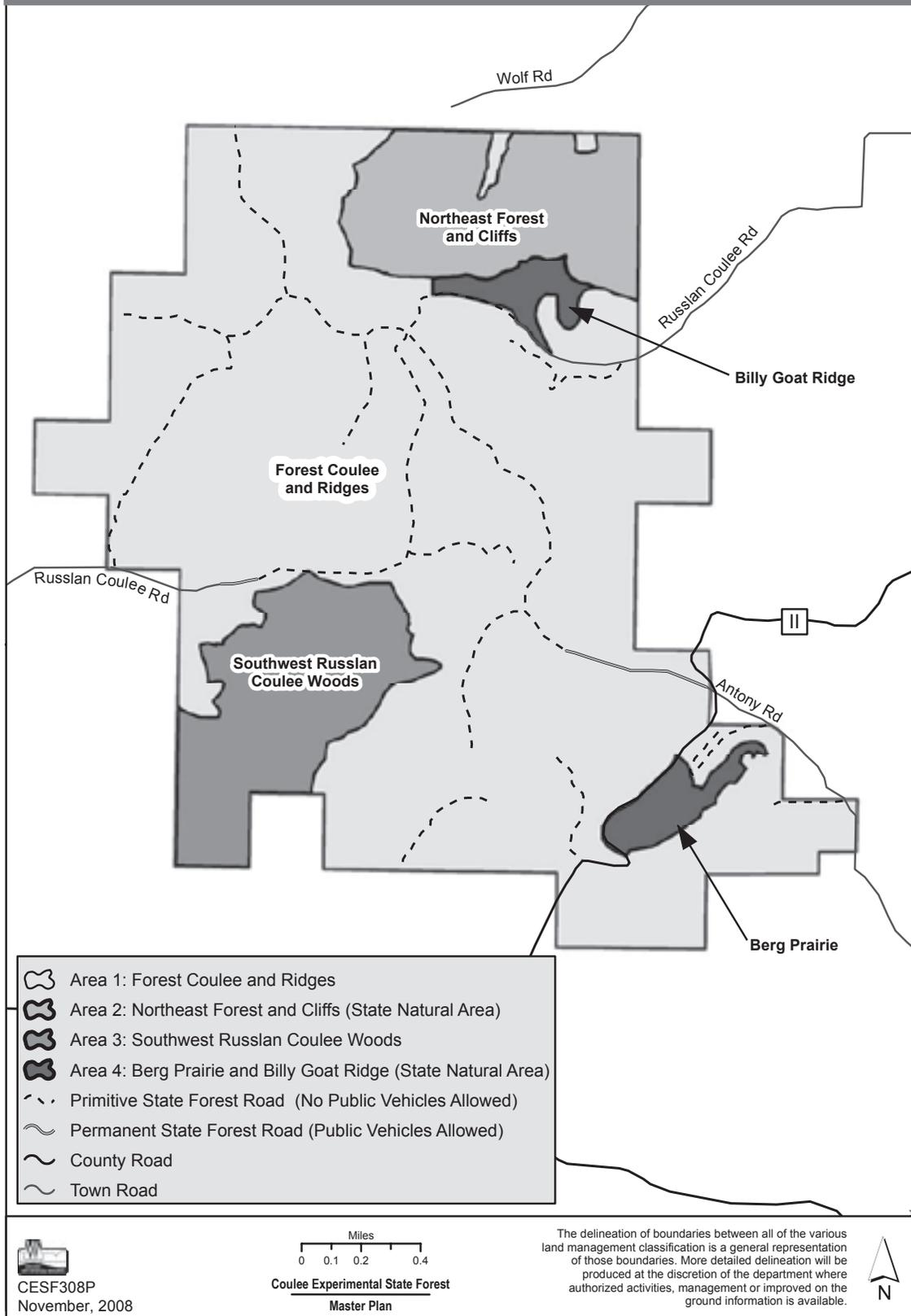
Area 2: Northeast Forest and Cliffs* 285 acres

Area 3: Southwest Russlan Coulee Woods 296 acres

Area 4: Berg Prairie and Billy Goat Ridge* 92 acres

*Designated State Natural Area

MAP 2.1 COULEE EXPERIMENTAL STATE FOREST MANAGEMENT AREAS




 CESF308P
 November, 2008

Miles
 0 0.1 0.2 0.4
 Coulee Experimental State Forest
 Master Plan

The delineation of boundaries between all of the various land management classification is a general representation of those boundaries. More detailed delineation will be produced at the discretion of the department where authorized activities, management or improved on the ground information is available.



FOREST PRODUCTION MANAGEMENT AREA



FOREST PRODUCTION MANAGEMENT AREA

The general management objective of a forest production area is the sustainable production of forest products. However, forest production areas also meet a wide range of ecological and recreation objectives. The specific objectives for any given management area may vary depending on site capability, forest types, and societal needs. Sites with high recreational

use or scenic value, or sites with special ecological needs are often inclusions within forest production areas. In these cases management practices are modified to be compatible with and support these multiple objectives. Research and demonstration could modify management practices within the forest production areas.

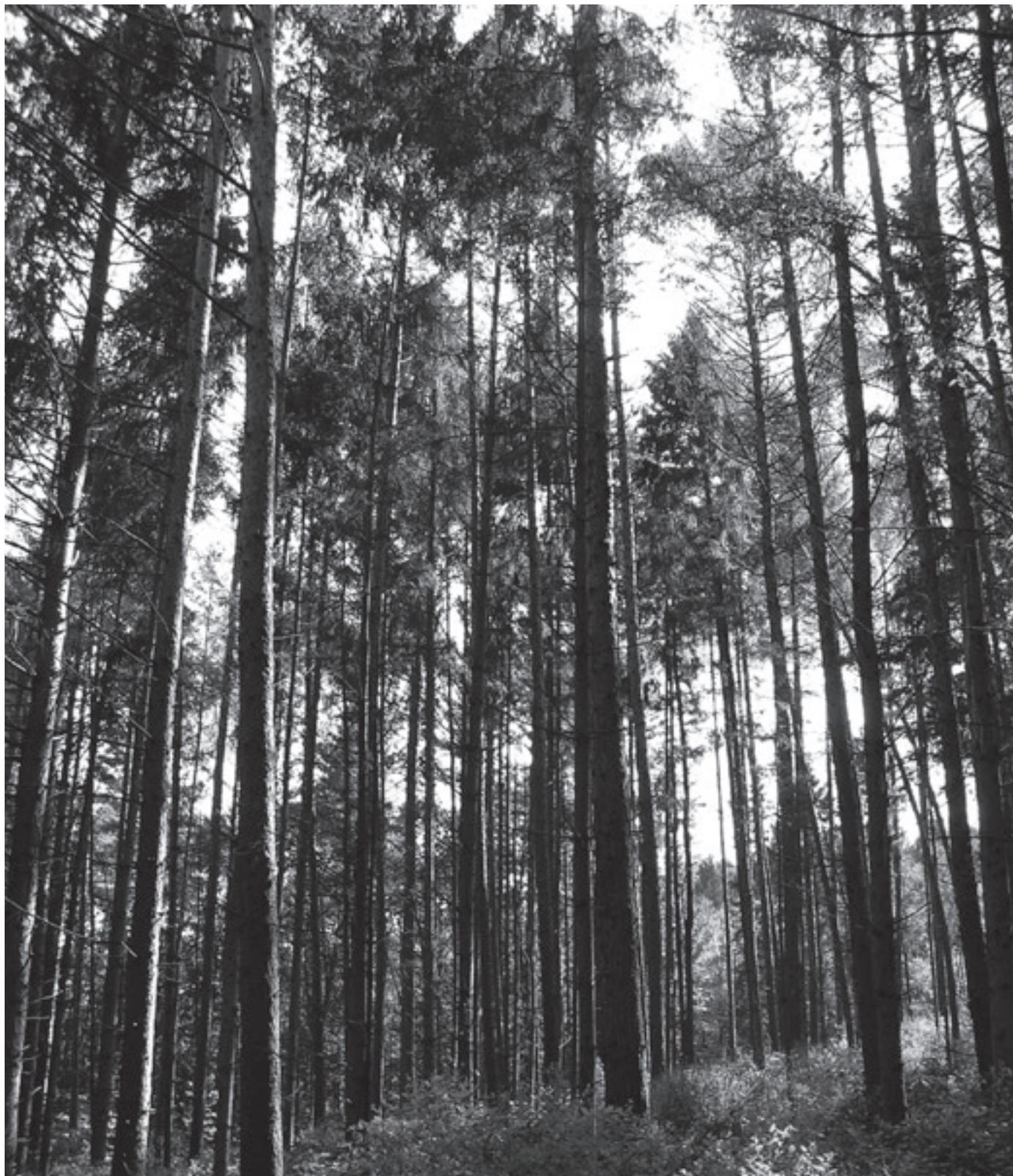
LAND MANAGEMENT AREAS

Forest Production Management Areas

Area 1: Forest Coulee and Ridges 2,299 acres



FOREST PRODUCTION MANAGEMENT AREA





This area is comprised of 2,299 acres. It encompasses the majority of mixed hardwood forests, conifer plantations, and open fields along the main ridge and adjacent to the former Russlan Coulee town road.

Description of the Forest Resource

The Forest Coulee and Ridges Forest Production Area is comprised largely of oak and central hardwood forests located along ridges and within narrow valleys. Oak (e.g., northern red oak, white oak, bur oak) is the dominant forest type at 1,103 acres, however the variable aspects and past land use practices have created a diversity of other forest and non-forest types as well. Many of the oak stands were subject to grazing and harvesting after European settlement, but have since developed into a more dense mixture of oak and central hardwood species. Approximately 58% of the oak stands are considered mature, averaging 100-150 years old. The central hardwood component tends to be less than 75 years old. Northern hardwood species, such as sugar maple, basswood, red maple, and white ash, are slowly becoming more abundant as the older oak trees die and are replaced by northern hardwood reproduction that is established in the understory. More commonly however, advanced regeneration in the understory consists of central hardwood species, such as black cherry, elm, bitternut hickory, and shagbark hickory. Oak regeneration is generally lacking in the understory except on dry, south-facing slopes and ridge tops or within areas that were more recently harvested. See Table 2.1 for a breakdown of the current forest cover in the area

This area contains 155 acres of red pine, white pine, larch, white and Norway spruce, and balsam fir plantations. Some of these conifer plantations were established for research experiments and others were established for forest production. The original research purpose for most of the plantations has been served and periodic thinnings have been started to maintain the health and vigor of these stands. Plantation ages range from 25-50 years old. Forest health issues may prevent long-term viability of European larch due to larch needlecast disease and red pine due to adaptability problems with the heavy soils and southerly climate. The relatively small conifer component of the forest adds to the diverse wildlife habitat and aesthetic beauty of the property.

Prior to becoming a public property in 1961, many ridge top and valley bottoms were either pastured or farmed. After these land use practices were stopped, the open land was quickly invaded by early successional forest types, such as aspen and white birch. Today the CESF contains 277 acres of aspen and 59 acres of white birch cover types. These stands are generally 40-60 years of age and are considered mature. Most of these stands have developed an understory of central hardwood seedlings and saplings and upland brush species and

AREA 1 SUMMARY

- ▲ This area contains 2,299 acres.
- ▲ Maintain oak forests while still allowing for succession to central and northern hardwoods.
- ▲ Sustainably manage for a diversity of forest cover types and age classes, including oak, central and northern hardwoods, aspen, pine and birch.
- ▲ Promote research and demonstration of sustainable forest and watershed management practices on sites representative of the Driftless Area.
- ▲ Permanent forest cover will be maintained to provide a large block of interior forest habitats.
- ▲ Improve forest health through control of invasive species.

will slowly succeed to central hardwoods without disturbance. Some aspen and white birch stands have been regenerated in recent years through timber harvests.

Soils and Habitat Types

The soils in this production area are primarily silt loams and loams located on the slopes and in valley bottoms, with some sandy loams located along narrow ridges with rock outcroppings. The most common soil map units are the Churchtown silt loam (20-30 percent slopes, moderately eroded) and the Dorerton, very stony – Elbaville complex (30-60 percent slopes). Soils in this area are often classified as eroded, reflecting the steep topography, erodible nature of the soils, and history of intensive agriculture.

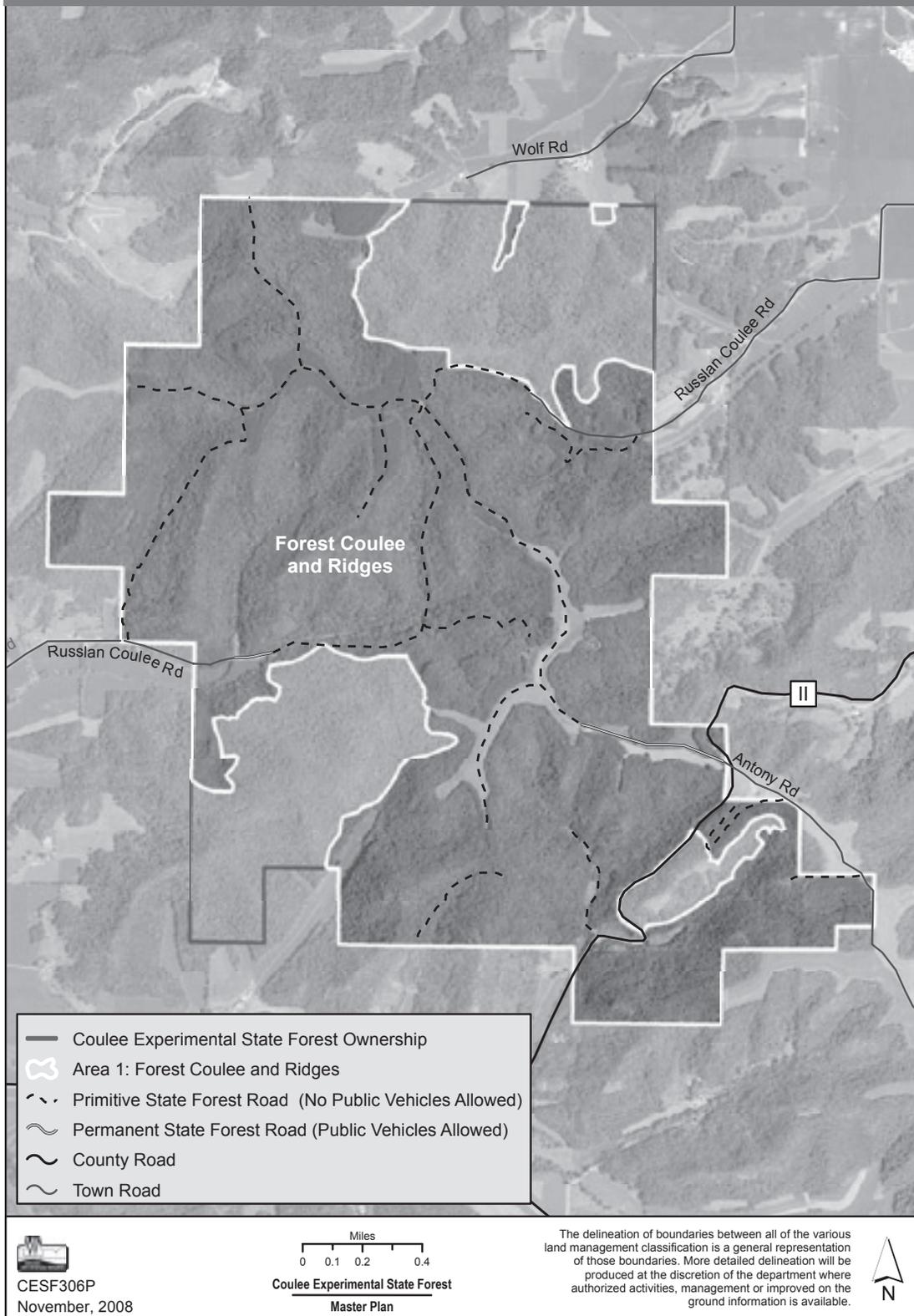
Based on the Forest Habitat Type Classification System (FHTCS) the most common habitat types found in this forest production area are ArCi-Ph (*Acer rubrum*/*Circaea*, *Phryma* variant) and ATiDe(Pr) (*Acer saccharum*-*Tilia*/*Desmodium*, *Prunus serotina* phase).

ArCi-Ph represents a dry-mesic moisture regime with medium to rich soil nutrient levels. This type is commonly located in areas with shallow silt loam soils over bedrock. The dominant shrubs of this habitat type include blackberry/raspberry, gooseberry, gray dogwood, hazel, service berry, and choke cherry. The dominant ground flora includes enchanter's nightshade, Virginia creeper, pointed-leaved tick trefoil, sweet cicely, and wild geranium. The climax tree species are red maple and sugar maple if a seed source is present.

ATiDe(Pr) represent a dry-mesic moisture regime with a rich soil nutrient level. This type is commonly located in areas with deeper silt loam soils on valley walls of all aspects. The dominant shrubs include gooseberry, blackberry, hazel, and gray



MAP 2.2 FOREST COULEE AND RIDGES





dogwood, with black cherry seedlings as a common component. The dominant ground flora includes pointed-leaved tick trefoil, wild geranium, lopseed, black snakeroot, Virginia creeper, hog peanut, and sweet cicely. The climax tree species are sugar maple and basswood if a seed source is present.

Long Term Management Objectives (100 years)

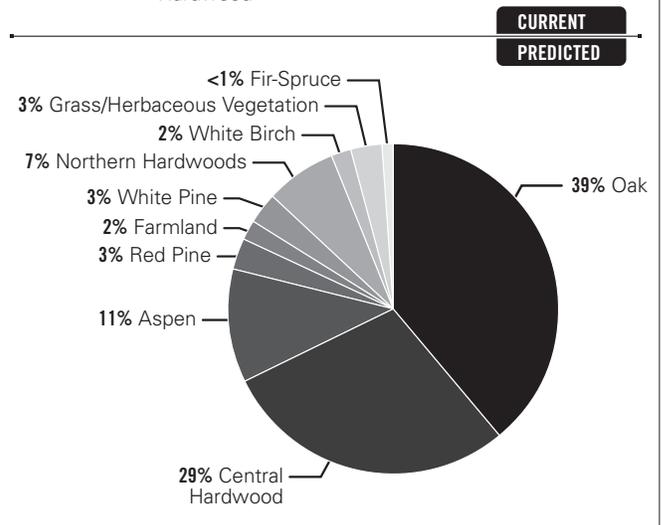
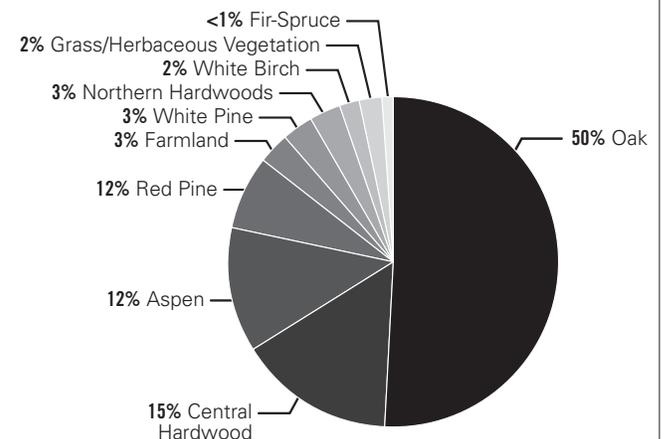
The forests within this production area will change significantly over the next 100 years. Management will strive to maintain a diversity of forest cover types and age classes for overall forest health, sustainable forest production, aesthetic appeal, wildlife habitat and to provide sites for diverse research and demonstration opportunities. Dominant cover types will still include oak, central hardwoods, northern hardwoods, aspen/birch, and pine/spruce, but in different proportions than today. Central and northern hardwood forests will increase in acreage due to natural succession, however a management priority will be to maintain at least half (550 acres) of the existing oak cover type and improve the age class distribution of this important species. The existing early successional forests (aspen and white birch) will be maintained to provide habitat for game and non-game wildlife species. Red pine and unhealthy European larch stands will be slowly converted to better adapted conifer and hardwood types. Healthy larch, white pine, and spruce

plantations will mature and develop some old forest characteristics. The abundance of older trees and coarse woody debris will increase within central and northern hardwood stands as well. The non-forest cover types will be maintained or slightly reduced if additional research plantings are established. Permanent forest cover will be maintained to benefit interior forest songbirds. This production area will continue to be used by a variety of research institutions and will develop a legacy of documented experiments and demonstration projects that will benefit land management within the Driftless Area.

TABLE 2.1 FOREST COULEE AND RIDGES CURRENT AND FUTURE LAND COVER

Land Cover	CURRENT		PREDICTED 50 YEAR	
	Acres	% of Total Area	Acres	% of Total Area
Oak	1,103	50%	825	39%
Central Hardwoods	346	15%	675	29%
Aspen	277	12%	250	11%
Red Pine	155	7%	75	3%
Farmland	77	3%	40	2%
White Pine	69	3%	90	3%
Northern Hardwoods	66	3%	165	7%
White Birch	59	2%	45	2%
Grass/Herbaceous Vegetation	58	2%	65	3%
Fir-Spruce	20	<1%	20	<1%
Other	40	2%	39	<1%
Tamarack	29	1%	10	<1%
Total	2,299		2,299	

FIGURE 2.1 FOREST COULEE AND RIDGES CURRENT AND FUTURE LAND COVER





Short Term Management Objectives (50 years)

- Maintain and preserve historical research field plots and associated information. Promote and establish additional forest and watershed research and demonstration projects consistent with the property-wide goals and management objectives for this area.
- Maintain oak as a primary cover type (i.e., refer to Table 2.1 for estimated future acreage) and improve its age class distribution within the area. Regenerate oak stands where feasible and promote oak in young mixed hardwood stands. Identify opportunities and conduct research and silvicultural demonstrations using various oak regeneration techniques.
- Promote the health and vigor of existing conifer plantations through periodic thinning. Preserve the integrity of plantations with special research value, such as those established for genetic trials.
- Increase understory development in red pine and European larch plantations to promote natural conversion to hardwoods where appropriate. Convert poor performing conifer plantations to better adapted species through artificial regeneration where appropriate.
- Maintain existing stands of aspen and white birch.
- Protect and maintain water quality, especially through the maintenance of forest roads and the protection of spring heads and associated drainages.
- Eradicate populations of the invasive species, primarily garlic mustard and black locust. Prevent further spread of autumn olive populations and reduce the number of established autumn olive plants. Prevent introduction of new invasive species.
- Improve saw timber quality of central hardwood and northern hardwood stands.
- Minimize potential impacts of gypsy moth and emerald ash borer by modifying silvicultural prescriptions as appropriate.
- Maintain existing open areas to provide watershed research and future tree planting opportunities, recreation and aesthetic enjoyment, and wildlife habitat.
- Maintain the designated cross-country ski trail and public road corridors in an aesthetically pleasing and safe condition.

Resource Management Prescriptions

Forest Coulee and Ridges:

ALL STANDS

- Identify and eradicate populations of the invasive species garlic mustard and black locust. Prevent the further spread of autumn olive populations by treatments that focus on large seed producing plants along forest edges and fence rows. Annually monitor for new invasive species and implement appropriate control measures.
- Retain snags and coarse woody habitat whenever their retention does not conflict with other forest management objectives, such as the removal of hazard trees along trail corridors.
- Minimize the visual impact of forest management along designated ski trail and public road corridors by using aesthetic management techniques for timber harvests, such as modifying the size and shape of harvests, conducting partial harvests, managing harvest slash, and retaining and promoting large, long-lived tree species.
- Utilize DNR Best Management Practices for water quality to protect spring heads and associated drainages when designing and maintaining forest roads.
- Promote forest research and demonstration in all management activities. Strengthen and expand research partnerships with the USDA Forest Service, universities, and other research organizations. New and innovative management prescriptions may vary from standard practices, but still will be consistent with overall property objectives. Properly document and retain records for research and demonstration projects on the forest.
- Salvage trees damaged by wind, ice, fire, insects, and disease as long as the salvage meets the overall objectives of the area.
- The rotation ages for some stands of oak and central/northern hardwoods may be extended in order to increase the acreage of older age classes available for future research projects and wildlife habitat. Extended rotation is especially appropriate adjacent to the Native Community Management Areas in order to provide a softer transition between management regimes. The DNR Silviculture and Forest Aesthetics handbook will provide guidance on appropriate extended rotation silviculture.



OAK DOMINATED FOREST

Oak forests historically developed or regenerated following significant disturbance, such as the prairie and oak savanna fires that were once common to this area prior to European settlement. Disturbance is required to regenerate existing stands and to maintain an oak component in mixed stands. Management will typically involve even-aged harvest practices of various types and sizes occurring at intervals of 100-150 years. This forest type is particularly valuable for a wide variety of game and non-game wildlife species.

General Management Prescriptions

- Assess degree of succession to central or northern hardwoods and advanced regeneration density prior to prescribing oak regeneration harvests. Natural conversion to these species may be prescribed if oak regeneration seems unlikely.
- Consider the surrounding landscape when planning stand level management prescriptions for oak. A variety of age classes and stand sizes across the landscape is beneficial for wildlife and aesthetics.
- Natural regeneration systems of oak include overstory removal when sufficient advanced regeneration is present or clear cutting when stump sprout potential is adequate. Shelterwood or group selection systems may be used when advanced regeneration or stump sprout potential is not adequate. Research prescriptions may vary somewhat from standard silvicultural practices however.
- Long-lived reserve trees will be left as individuals or in groups to provide timber, wildlife, and aesthetic value whenever their retention does not conflict with regeneration and other forest management objectives.
- Artificial regeneration from seed or seedlings may be used to establish oak reproduction prior to or after timber harvests when natural regeneration is not adequate.
- Other management techniques to help regenerate oak stands include soil scarification, herbicide treatments, and prescribed fire where feasible and safe.
- Intermediate treatments, such as release or crown thinning, will be used to develop young stands and improve composition and timber quality.

ASPEN & WHITE BIRCH DOMINATED FOREST

These early successional forest types require disturbance and abundant sunlight to regenerate. They are typically managed using even-aged harvests of various shapes and sizes occurring at intervals of 45-60 years. White birch may also be regenerated through seed tree and shelterwood systems. These early successional forest types are particularly valuable to local game bird populations, such as the ruffed grouse.

General Management Prescriptions

- Natural regeneration for aspen will be achieved primarily through coppice (i.e., root sprouts). Stands of various shapes and sizes will be completely harvested to allow full sunlight to the forest floor in order to stimulate sprouting.
- Natural regeneration systems of white birch may include coppice, clearcut (i.e., seed origin), seed tree, or shelterwood.
- In stands where the objective is to develop or maintain mixed species, harvest areas will retain individual longer-lived trees, such as oak. These trees can improve stand structure, wildlife habitat, aesthetic beauty, and increase the diversity of the stand.
- Natural conversion to other forest types, such as central hardwoods, may be prescribed if adequate aspen and birch regeneration is unlikely. Harvest aspen, birch, and other short-lived species, leaving the long-lived species to develop.

CONIFER DOMINATED FOREST PLANTATIONS

The CESF plantations include red pine, white pine, European larch, Japanese larch, Norway spruce, white spruce, and balsam fir in pure and mixed stands. The trees were planted 25-50 years ago in numerous plantations throughout the forest. Even-aged management practices will be used to maximize the health, vigor, and quality of these stands. Although a relatively small percentage of the overall forest cover, the conifer plantations provide increased forest diversity and aesthetic beauty.



General Management Prescriptions

- Thin plantations on a recurring basis (8-20 year intervals), according to prescriptions outlined in the DNR Silvicultural and Forest Aesthetic Handbook. Gradually develop understory and stand structure similar to that of a naturally occurring conifer stand. At biological maturity, 100 - 200 years depending on the species, harvest and replant or naturally regenerate.
- Lateral branch pruning will be used to improve sawlog quality.
- Forest genetic and tree improvement plantings will be maintained for long term research. Thinning of these stands will occur in consultation with the DNR Forest Geneticist.
- Red pine and European larch plantations may be harvested early to address health problems with larch needlecast disease and red pine decline. Promote understory development to allow natural conversion to hardwoods where appropriate. Forced conversion to white pine and/or hardwoods may be preferred in some areas for aesthetic and wildlife habitat purposes. When planting occurs, hand or machine plant seedlings following site preparation by mechanical and/or herbicide application. Use hand or herbicide release following planting to maintain growth and vigor and increase survival of planted trees.
- Ground disturbance or prescribed fire may be used to promote regeneration of white pine where feasible and safe.

CENTRAL & NORTHERN HARDWOOD DOMINATED FOREST

Central hardwood tree species, such as black cherry, American elm, black walnut, bitternut hickory, and shagbark hickory tend to grow in partial shade to full sun, whereas northern hardwood tree species, such as sugar maple and basswood, tolerate more shady conditions. This variation in shade tolerance means that either even-aged or uneven-aged regeneration systems may be used depending upon the preferred species. Even-aged methods, such as overstory removal or shelterwood, tend to keep all the trees approximately the same age by harvesting the entire stand at 80-150 year intervals. Uneven-aged methods, such as single-tree or group selection, tend to create a stand with trees of three or more distinct age classes. The central and northern hardwood types offer opportunities to produce fine quality sawtimber, improve forest health, and diversity wildlife habitat on the CESF.

General Management Prescriptions

- Assess the degree of succession to central or northern hardwoods prior to prescribing regeneration system for stand.
- A variety of age classes and stand sizes across the landscape is beneficial for wildlife and aesthetics. Consider the

surrounding landscape when planning stand level management prescriptions.

- Natural regeneration systems of central hardwoods can utilize both even and uneven-aged methods, including overstory removal, shelterwood, group selection, single-tree selection, coppice, and clearcut. The DNR Silviculture and Forest Aesthetics Handbook will provide guidance on selecting the appropriate regeneration system based on stand composition, advanced regeneration, site, and other factors.
- Natural regeneration systems of northern hardwoods will typically be group and single-tree selection, however overstory removal and shelterwood will also be considered.
- Intermediate treatments, such as release or crown thinning, will be used to develop young stands and improve composition and timber quality.
- Walnut trees will be pruned to improve sawlog quality.
- Artificial regeneration from seed or seedlings may be used to establish desirable trees where seed source and advanced regeneration is lacking.
- Other management techniques to help regenerate stands include soil scarification, herbicide treatments, and prescribed fire where feasible and safe.

NON-FORESTED AREAS

The Forest Ridges and Coulee Area 1 includes 135 acres of agricultural fields, grassy openings, and native grassland plantings. These open areas have grown to be an important land feature on the CESF, providing watershed research and tree planting opportunities, recreation and aesthetic enjoyment, wildlife habitat, hunting opportunities. Long-term management objectives on the CESF include maintenance of non-forest cover types.

General Management Prescriptions

- Utilize agricultural crops as an interim cover in order to prevent encroachment of woody vegetation. Cropped areas will be maintained in a condition easily planted to trees in order to facilitate future research plantings.
- Research projects, including watershed experiments and tree plantings, will be allowed if consistent with overall property objectives. Research requirements in the future may result in the reduction of non-forested cover types to less than 100 acres.
- Current native grassland plantings will be maintained through mowing and prescribed fire. Additional native grassland plantings may be established with management techniques including, seeding, herbicide treatments, mowing, and prescribed fire. Future cover type conversions should favor tree planting over grassland to increase interior forest habitat and minimize the "sink" affect on grassland birds nesting in these small fields.

NATIVE COMMUNITY MANAGEMENT AREAS



NATIVE COMMUNITY MANAGEMENT AREAS

Native community areas are managed with the primary objective of representing and perpetuating native plant communities whether upland, wetland or aquatic, and other aspects of native biological diversity. Native community areas will be managed to provide the full range of native plant and animal communities found on the Coulee Experimental State Forest.

Only those areas of highest value for protection or community restoration were selected. Whenever possible, management activities in native community management areas achieve their objectives through natural processes (passive management) and active management techniques that mimic natural processes.

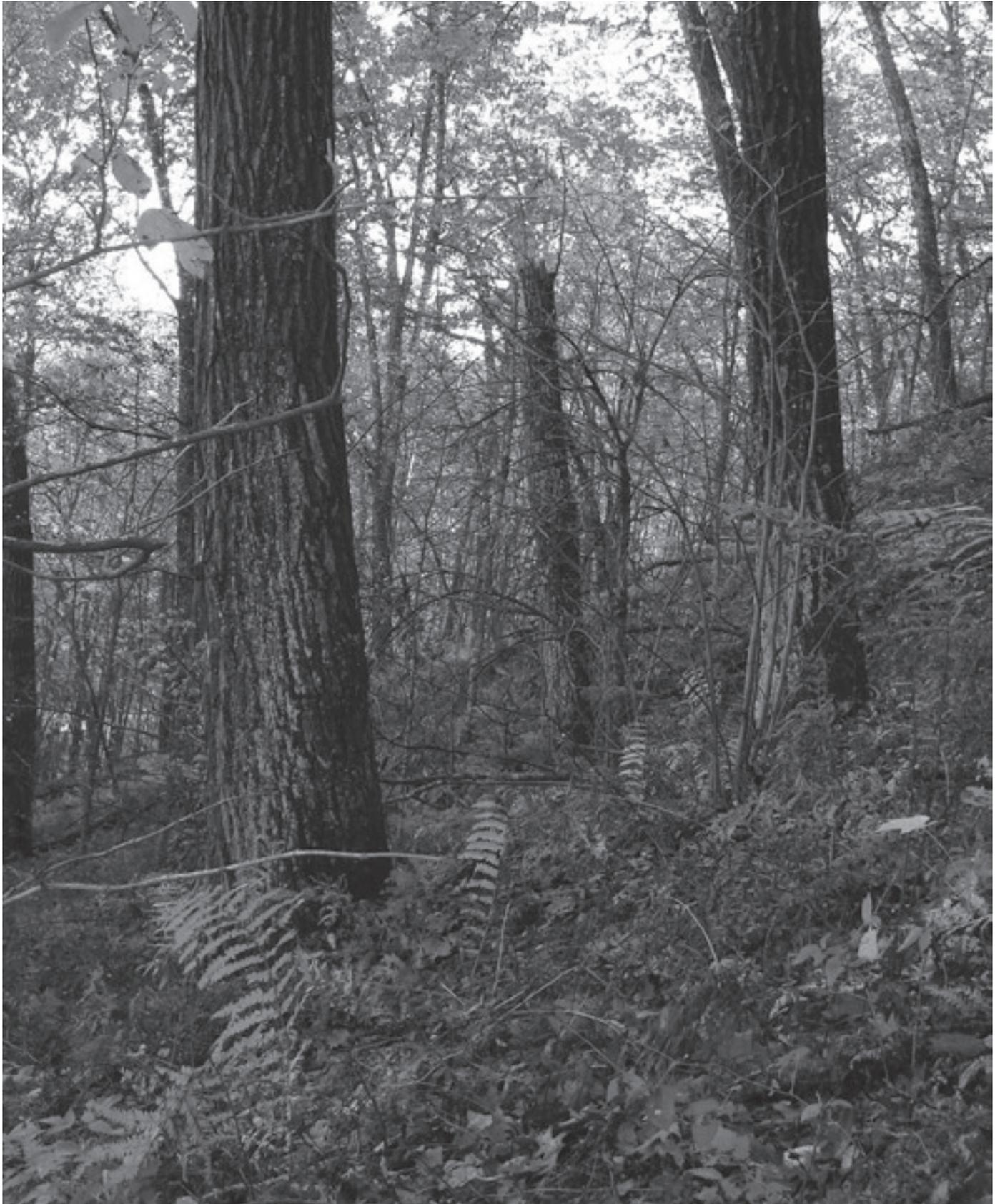
NATIVE COMMUNITY MANAGEMENT AREAS

- Area 2:** Northeast Forest and Cliffs* 285 acres
- Area 3:** Southwest Russlan Coulee Woods 296 acres
- Area 4:** Berg Prairie and Billy Goat Ridge* 92 acres

*Designated State Natural Area



NATIVE COMMUNITY MANAGEMENT AREAS





This 285 acre Native Community Management Area is located in the northeast portion of the property between east Russlan Coulee Road to the south and Wolf Road to the north. This forested area occurs on a north facing slope of a sandstone ridge and is dominated by medium to large diameter red oak and white oak, with basswood, red maple, white ash, bitternut hickory, and black cherry also common. The upper slope features an intermittent concentration of the Moist Cliff natural community type. The lower slope features the Southern Dry-Mesic Forest natural community type supporting a relatively rich assemblage of understory species. The area is developing old-growth characteristics such as large diameter trees (up to 45" in diameter), coarse woody debris, and supports three known Species of Greatest Conservation Need.

Description of the Forest Resource

The most common forest cover type is oak, with the predominant tree species being red oak. Associated tree species include white oak, basswood, bitternut hickory, white ash,

black cherry, and red maple. The oak stands within this area are considered mature, with some very large trees reaching diameters up to 45". This area includes stands of younger white birch, central hardwoods, and northern hardwoods that developed after past land uses such as grazing and agriculture or after other disturbances such as timber harvests or wind storms. See Table 2.2 for a breakdown of the current forest cover in the area.

AREA 2 SUMMARY

- ▲ This area contains 285 acres.
- ▲ Maintain and develop older, closed canopy forest representing later forest successional stages through natural processes and limited active management.
- ▲ Provide research opportunity to study older unmanipulated oak stands.
- ▲ Protect, manage and enhance these natural communities for ecological values and rare species habitat.

FIGURE 2.2 NORTHEAST FOREST AND CLIFFS CURRENT AND FUTURE LAND COVER

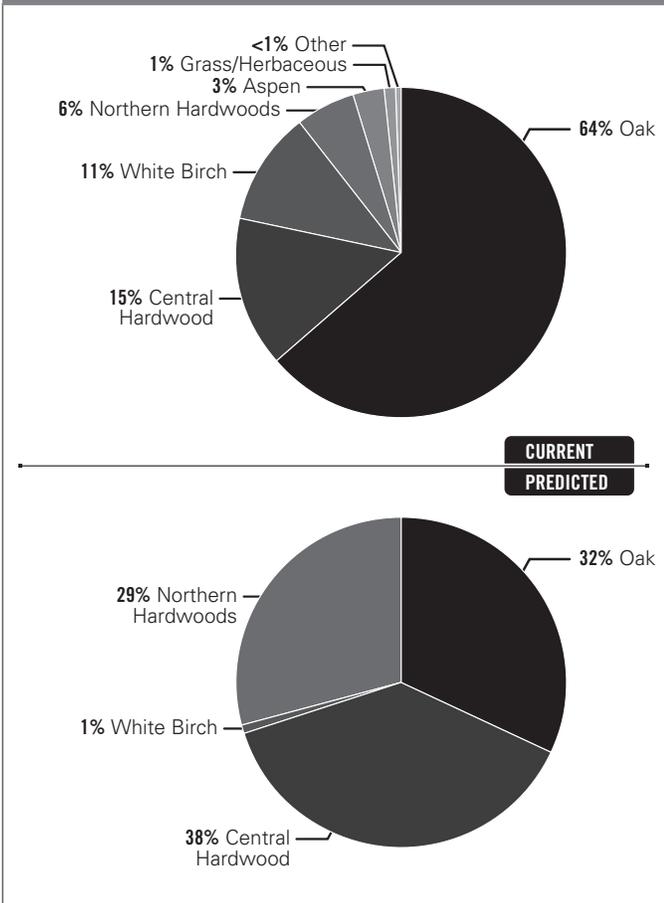
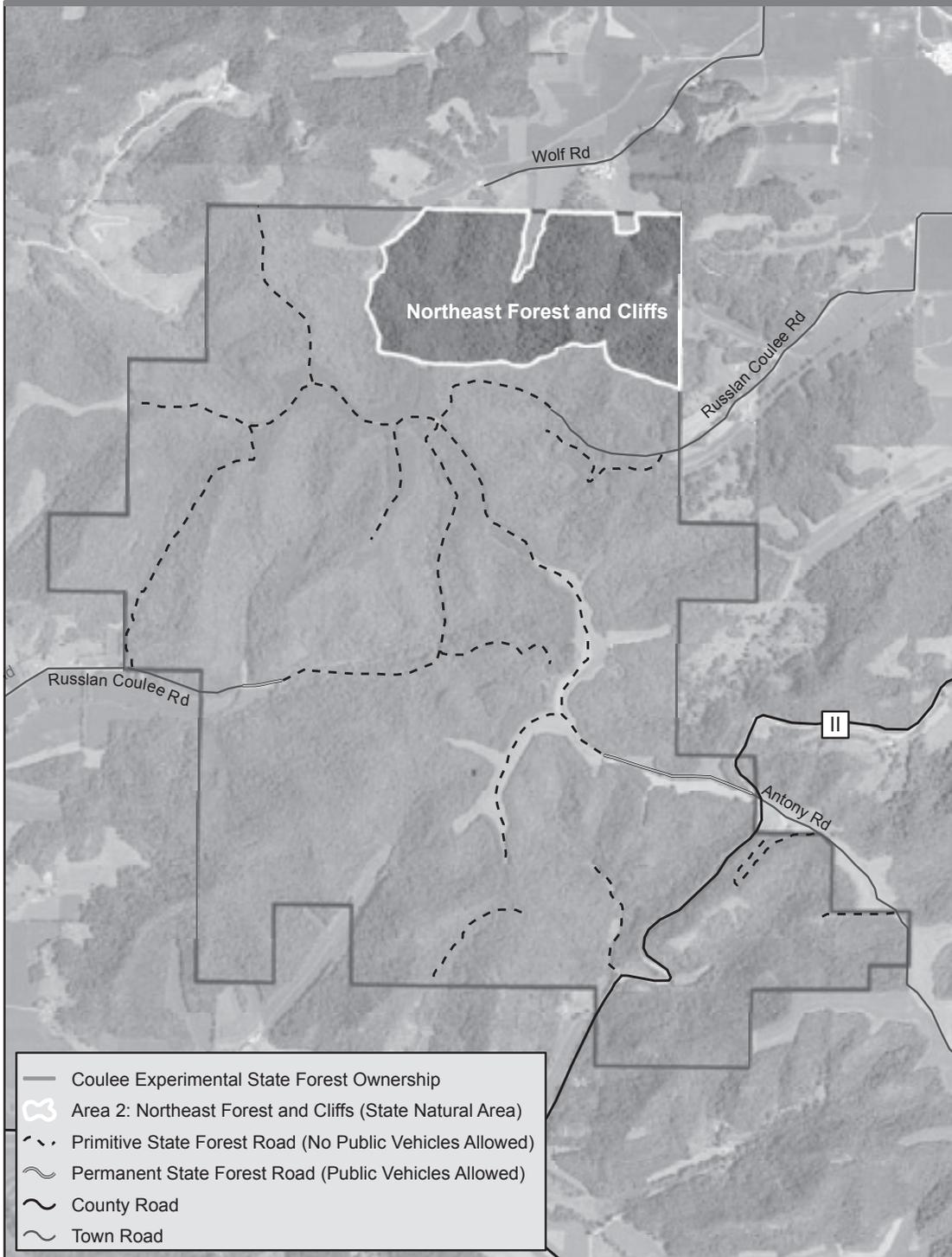


TABLE 2.2 NORTHEAST FOREST AND CLIFFS CURRENT AND FUTURE LAND COVER

Land Cover	CURRENT		PREDICTED 50 YEAR	
	Acres	% of Total Area	Acres	% of Total Area
Oak	181	64	90	32
Central Hardwoods	44	15	110	38
White Birch	31	11	5	1
Northern Hardwoods	16	6	80	29
Aspen	8	3	0	0
Grass/Herbaceous	4	1	0	0
Other	1	<1	0	0
Total	285		285	



MAP 2.3 NORTHEAST FOREST AND CLIFFS



CESF303P
November, 2008

Miles
0 0.1 0.2 0.4
Coulee Experimental State Forest
Master Plan

The delineation of boundaries between all of the various land management classification is a general representation of those boundaries. More detailed delineation will be produced at the discretion of the department where authorized activities, management or improved on the ground information is available.





Commercial logging has been somewhat limited here within the last 50 years due to steep topography and access issues. Exceptions to this include an approximately 20 acre research clearcut/seed tree harvest conducted in 1966 and a three acre salvage harvest of blown down trees that occurred in 1999.

Soils and Habitat Types

The upland soils in this native community management area are predominantly silt loam and sandy loam. The most common soil map units include Churchtown and Norden silt loam (20-30 percent slopes, moderately eroded) and the Council-Elevasil-Norden complex (30-60 percent slopes) and the Gaphill-Rockbluff complex (30-60 percent slopes).

The most common forest habitat types are ArCi-Ph (*Acer rubrum*/*Circaea*, *Phryma* variant) and ATIDe(Pr) (*Acer saccharum*-*Tilia*/*Desmodium*, *Prunus serotina* phase). These types represent a dry-mesic moisture regime with a medium to rich soil nutrient level. Dominant ground flora includes pointed-leaved tick trefoil, nightshade, enchanter's nightshade, wild geranium, lopseed, black snakeroot, Virginia creeper, hog peanut, and sweet cicely.

Long Term Management Objectives (100 Years)

Provide a large area of reserved old-growth forest, primarily affected by natural processes, with limited active management. The area will serve as a research and ecological reference site for a minimally manipulated Southern Dry-Mesic Forest.

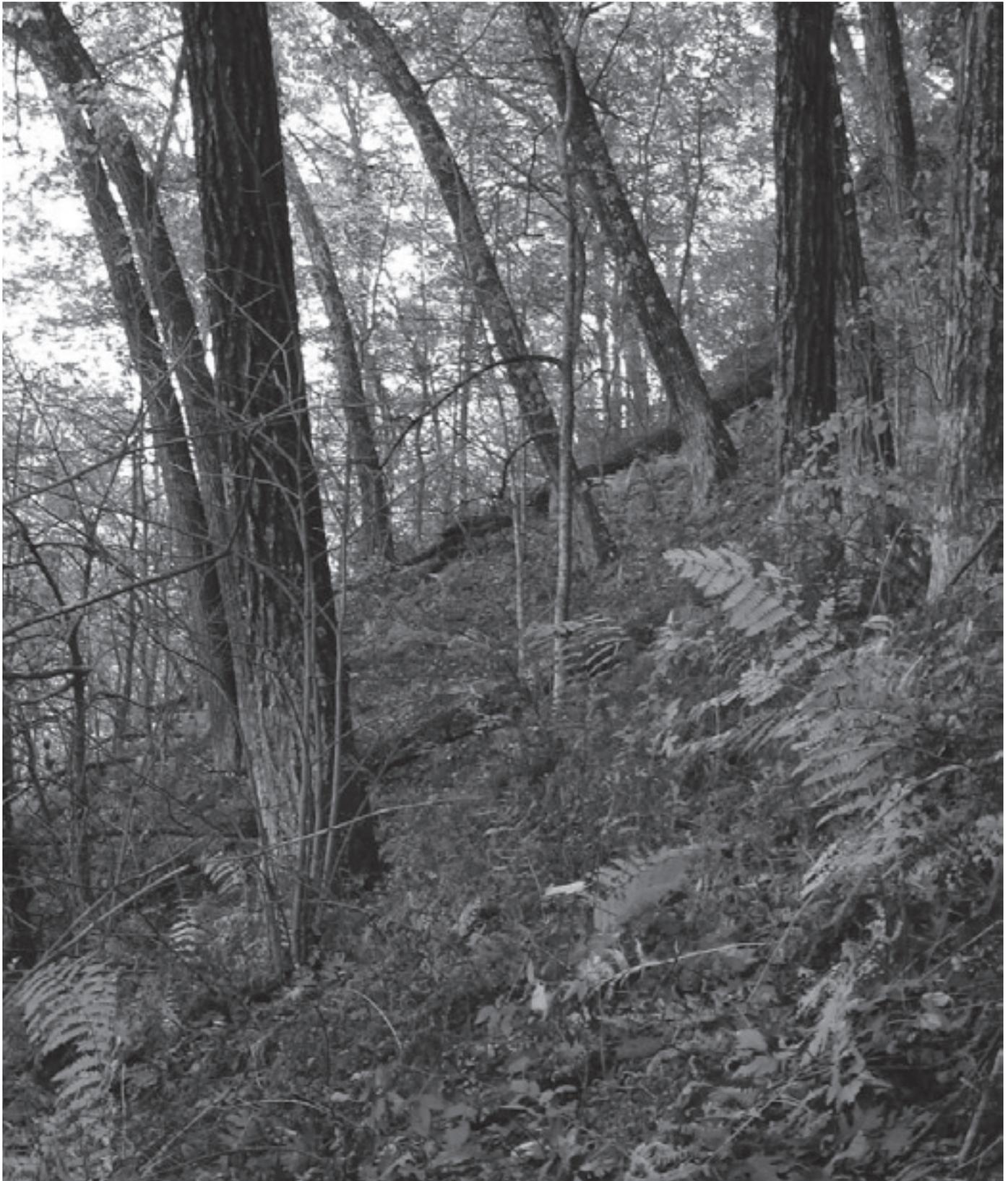
Short Term Management Objectives (50 Years)

- Develop structural and functional attributes of old growth, including biologically mature trees, large diameter trees, standing and down course woody debris, and an uneven canopy.
- Provide closed canopy or near closed canopy conditions to benefit interior forest songbirds.
- Allow the original even-aged oak and white birch stands to senesce and transition to multi-aged central and northern hardwood cover types.
- Promote existing oak regeneration within young stands in order to maintain a component of these species.
- Maintain the aesthetic qualities of old forest habitat.
- Enhance water quality through protection of forested seeps.
- Support scientific research that is compatible with the ecological objectives.
- Eradicate populations of garlic mustard. Monitor and manage other invasive species that may threaten the native plant and animal populations.

Resource Management Prescriptions

In the majority of this area, natural processes will be allowed to direct forest compositional and structural change. The original even-aged stands of oak and white birch will likely succeed to a mixture of central and northern hardwood species. Specific authorized management prescriptions are outlined below.

- Allow old-growth and old forest to develop through natural processes, passive management, and limited active management.
- Control of invasive species, non-commercial forest manipulation, and prescribed fire may occur.
- Intermediate treatments, such as release or crown thinning, may be used to develop existing oak regeneration within young stands.
- Use monitoring information on changes in composition and structure to aid in future management decisions.
- Retain snags and coarse woody debris.
- Salvage of trees is generally not permitted, unless required for safety or forest health reasons and only after consultation with managers from affected DNR programs.





This 296 acre Native Community Management Area is located in the southwest portion of the property between west Russlan Coulee Road to the northwest and County Trunk "I" to the south. This forested area is centered on a ridge with northwest and southeast aspects and is dominated by medium to large diameter red and white oak, shagbark hickory, black cherry, basswood and red maple also common. The site features a relatively undisturbed block of older forest embedded within a predominantly younger forest matrix. The primary natural community is Southern Dry-Mesic Forest with the most intact portions of excellent quality and composed of entirely native species.

The area is known to contain two state threatened forest "interior" birds and one plant species of Special Concern. This Native Community Management Area provides a unique opportunity to manage and maintain a large area of unfragmented upland hardwood forest with old forest attributes. Management techniques will be developed and demonstrated using the managed old forest guidelines outlined in the DNR Old-growth and Old Forest Handbook. This overall management strategy will protect and enhance the native community for ecological values and rare species habitat in concert with active forest management.

Description of the Forest Resource

The most common forest cover type in this area is oak at 215 acres, with the predominant tree species being red and white oak. Associated tree species include shagbark hickory, basswood, elm, black walnut, aspen, sugar maple, and red maple. Many of the oak stands are considered mature, averaging 100-140 years old. A large central hardwood stand dominates the upper ridge, along the west ski trail. The area also has small inclusions of aspen and northern hardwoods. See Table 2.3 for a breakdown of the current forest cover in the area. Commercial logging has been somewhat limited here within the last 50 years, however two timber harvests have occurred. The first harvest was a wind storm salvage in 1982 and the second was set up along the west trail in 1983.

Soils and Habitat Types

The upland soils in this native community management area are predominantly silt loam. The most common soil map units include Churchtown and Norden silt loam (20-30 percent slopes, moderately eroded) and the Dorerton, very stoney – Elbaville complex (30-60 percent slopes).

The most common forest habitat types are ArCi-Ph (*Acer rubrum*/*Circaea*, *Phryma* variant) and ATIDe(Pr) (*Acer saccharum*-*Tilia*/*Desmodium*, *Prunus serotina* phase). These types represent a dry-mesic moisture regime with a medium

AREA 3 SUMMARY

- ▲ This area contains 296 acres.
- ▲ Manage for old forest characteristics with both active and passive management techniques.
- ▲ Promote research and demonstration that balance the development of old forest characteristics with active forest management practices that maintain mid-successional species, such as oak.

to rich soil nutrient level. Dominant ground flora includes pointed-leaved tick trefoil, enchanter's nightshade, wild geranium, lopseed, black snakeroot, Virginia creeper, hog peanut, and sweet cicely.

Long Term Management Objectives (100 Years)

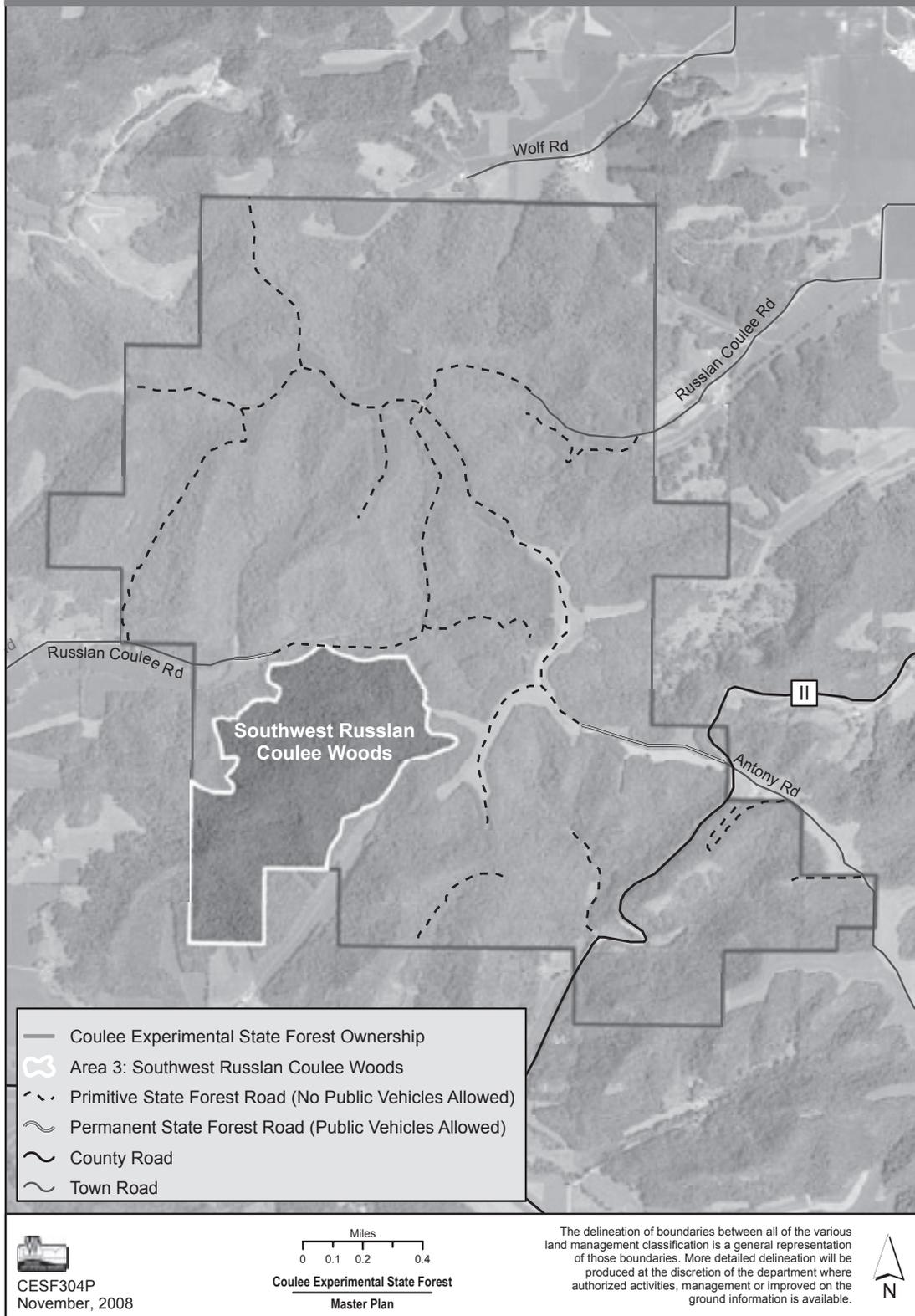
Sustain a managed old forest with characteristics of old growth, including biologically mature trees, large diameter trees, structural diversity, standing and down coarse woody debris, and an uneven canopy. Promote research and demonstration projects that seek to balance the development of old forest characteristics with active forest management practices that maintain mid-successional species such as oak.

Short Term Management Objectives (50 Years)

- Develop and maintain old forest characteristics, including biologically mature trees, large diameter trees, structural diversity, standing and down coarse woody debris, and an uneven canopy.
- Regenerate oak (along with other mid-successional tree species) on a small scale in order to maintain the species within oak-dominated or mixed cover types. Improve the oak age class distribution for long-term sustainability of the species.
- Maintain at least 50% in mature forest with closed canopy or near closed canopy conditions to benefit interior forest songbirds.
- Develop old forest attributes through natural processes and active management that mimics natural disturbance.
- Maintain the aesthetic qualities of old forest habitat.
- Conduct scientific research and silvicultural demonstrations that are compatible with the ecological objectives.
- Eradicate populations of garlic mustard. Monitor and manage other invasive species that may threaten the native plant and animal populations, such as autumn olive.



MAP 2.4 SOUTHWEST RUSSLAN COULEE WOODS





Resource Management Prescriptions

Generally, the management prescriptions will allow natural processes or active management that mimics natural processes in order to sustain and enhance the old forest characteristics. Specific authorized management prescriptions are outlined below.

- Maintain oak species through management techniques that mimic natural disturbance of limited size and scale relative to the size of the management area (i.e., see area canopy objectives). Natural regeneration systems of oak will include overstory removal when sufficient advanced regeneration is present or coppice when stump sprout potential is adequate. Shelterwood and group selection systems will be used when advance regeneration or stump sprout potential is not adequate. These regeneration systems will be modified somewhat to accommodate the overall old forest objectives, such as through the retention of reserve trees for better stand structure or by limiting the size of regeneration patches to maintain canopy.

- Artificial regeneration from seed or seedlings may be used to establish oak reproduction prior to or after timber harvests when natural regeneration is not sufficient.
- Other management techniques that may be used to help regenerate preferred species include soil scarification, herbicide treatments, and prescribed fire.
- Assess the degree of succession to central or northern hardwoods. Natural conversion to these species may be prescribed if oak regeneration seems unlikely.
- Natural regeneration systems for central and northern hardwoods can utilize both even and uneven-aged methods, however uneven-aged methods will be preferred to create diverse stand structure and maintain canopy. Allowed regeneration systems include single tree selection, group selection, overstory removal, shelterwood, coppice, and clearcut.
- Light intermediate treatments, such as release or crown thinning, will be used to manipulate composition, maintain vigor of selected trees, and accelerate old forest structural development.
- Promote and retain standing and down coarse woody debris, except for hazard trees adjacent to the ski trail.
- Salvage of trees damaged by wind, fire, ice, disease, and insects may occur if consistent with the objectives of the area. Salvage operations will seek to retain coarse woody debris and “legacy” trees in order to improve old forest structural attributes.
- Utilize DNR Best Management Practices for water quality to protect spring heads and associated drainages when designing and maintaining forest roads.
- Promote research and demonstrations that integrate old forest objectives and active forest management.
- Follow the DNR Old Growth and Old Forest Handbook management guidelines, particularly related to “Managed Old Forest” forests. Monitor composition and structure changes to aid in future management decisions.

FIGURE 2.3 SOUTHWEST RUSSLAN COULEE WOODS CURRENT AND FUTURE LAND COVER

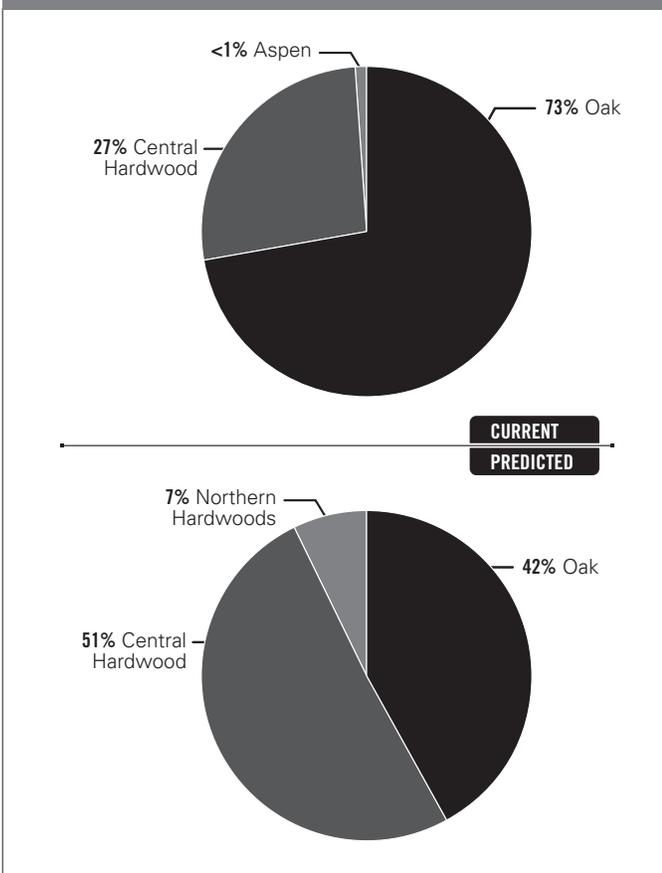


TABLE 2.3 SOUTHWEST RUSSLAN COULEE WOODS CURRENT AND FUTURE LAND COVER

Land Cover	Current		Predicted 50 Year	
	Acres	% of Total Area	Acres	% of Total Area
Oak	215	73	125	42
Central Hardwoods	79	27	151	51
Aspen	2	<1%	0	0
Northern Hardwoods	0	0	20	7
Total	296		296	



SOUTHWEST RUSSLAN COULEE WOODS





This 92 acre Native Community Management Area consists of two sites on the CESF. The Billy Goat Ridge site is primarily a wooded area with small, scattered prairie openings and is located in the northeastern portion of the property north of Russlan Coulee Road. The Berg Prairie, the largest dry prairie found on the CESF, is located in the southeast portion of the property adjacent to County Highway 11. Both areas contain remnant flora associated with Dry Prairie and Oak Opening natural community types as well as more common species associated with southern dry-mesic forest. The Oak Opening community is considered state and globally imperiled and the Dry Prairie community is considered state and globally rare. The areas combined are known to contain one State Endangered and one State Threatened animal species, as well as several Special Concern species and Species of Greatest Conservation Need.

Description of the Forest Resource

Berg Prairie Site (50 acres)

Berg prairie is the forest's largest dry prairie remnant (i.e., approximately 10 acres of open prairie) and is located along a ridge top and steep south-facing slope. The site contains a mosaic of dry mesic forest, open oak woodland, and prairie vegetation. There is a 3-acre pine plantation in the middle of the prairie that was established as part of a research experiment in the 1960's. The diversity of native plant species is moderate at this time due to the history of heavy grazing adjacent to the original Berg farmstead. Common species include little blue stem, side oats grama, prairie dropseed, silky aster, indian grass and big blue stem. The forested portions of this site contain a few scattered, small prairie openings as well.

Billy Goat Ridge Site (42 acres)

Billy Goat Ridge contains a complex of small, dry prairie openings and dry cliffs located along a steep east to west ridgeline.



AREA 4 SUMMARY

- ▲ This area comprises two sites totaling 92 acres containing Dry Prairie, Dry Cliff, and Oak Opening natural community types.
- ▲ Protect, manage, and increase quality Dry Prairie and Oak Opening types for ecological values and rare species habitat.
- ▲ Manage native plant communities with prescribed fire where feasible and safe.

The current prairie openings are small and embedded within a primarily forested area dominated by white birch, aspen, black oak, red oak, white oak, bur oak, American elm, shagbark hickory, and American basswood. See Table 2.4 for a breakdown of the current forest cover in the area. The birch and aspen trees are approximately 40-60 years old, but scattered, open-grown oak trees are much older. Common prairie species found here include little bluestem, side-oats grama, lead plant, silky aster, and gray goldenrod. Some of the open oak woodland and savanna plant species are lacking due to past grazing of livestock and the encroachment of woody vegetation. However, the presence of some quality understory species, prairie species, and open-grown bur and black oak indicate potential for savanna and native grassland restoration.

Soils and Habitat Types

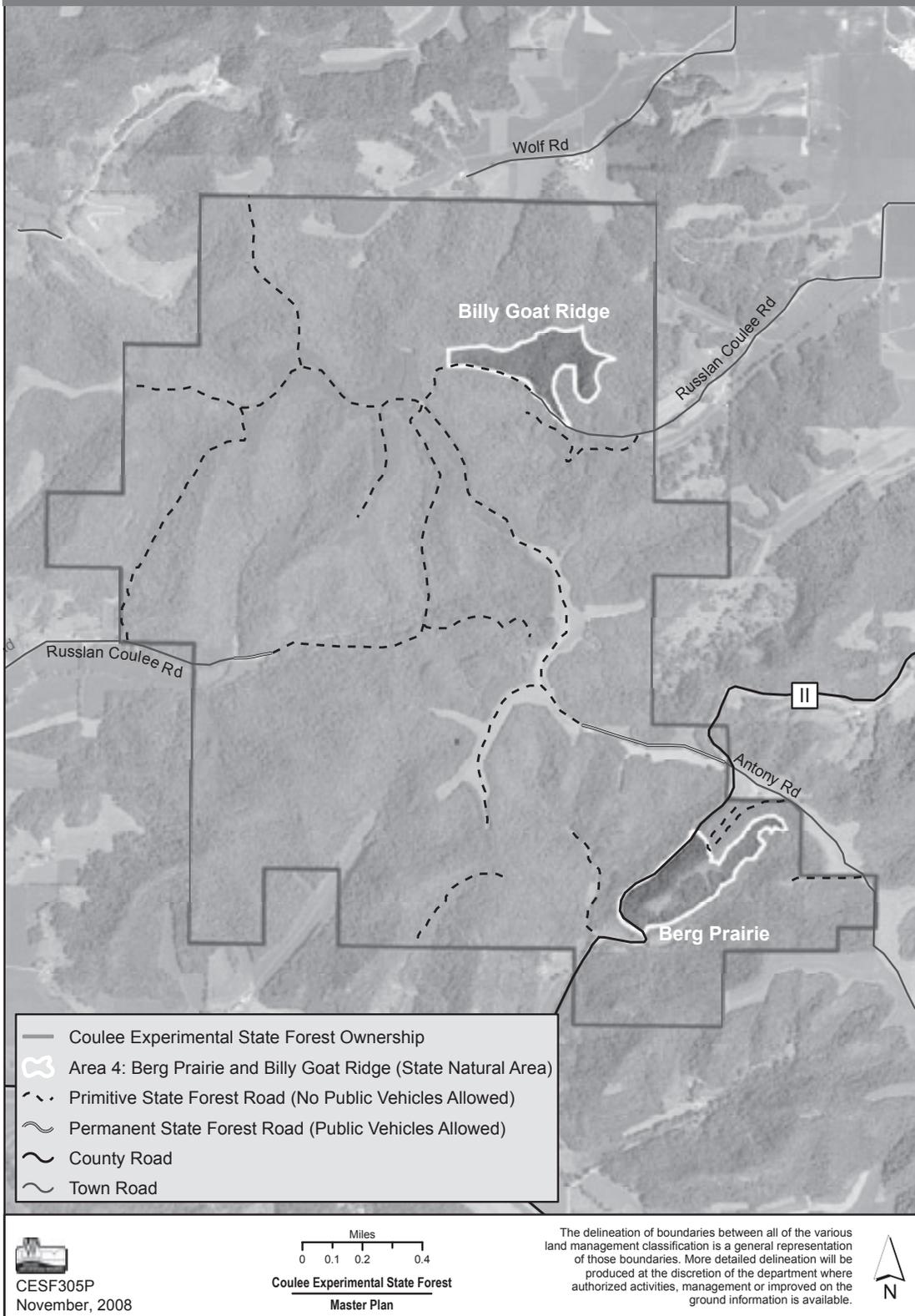
The soils of Billy Goat Ridge are mainly a Gaphill-Rock bluff complex with 30-60% slopes. The parent material is loamy colluvium and/or loamy slope alluvium over sandy colluvium and/or sandy residuum. Soil depths range from shallow to 80 inches deep. The top layer is sandy loam over sand over weathered bedrock. Other soils include Dorerton, very stony-Elbaville complex with 30-60% slope and Churchtown silt loam with 20-30% slopes and moderately eroded.

Berg Prairie area contains Brodale-Bellechester-Rock outcrop complex with 60-90% slopes. Soils are loam over very fine sandy loam over weathered bedrock. The woodland area surrounding the dry prairie soils are of Dorerton, very stony-Elbaville complex with 30-60% slopes. The complex below the dry prairie is of Churchtown silt loam with 20-30% slopes and moderately eroded.

The most common forest habitat type is ArCi-Ph (*Acer rubrum*/ *Circaea*, *Phryma* variant). This type represents a dry-mesic moisture regime with a medium to rich soil nutrient level. Dominant ground flora in the woodland areas include pointed-



MAP 2.5 BERG PRAIRIE AND BILLY GOAT RIDGE





leaved tick trefoil, enchanter’s nightshade, wild geranium, lopseed, black snakeroot, Virginia creeper, hog peanut, and sweet cicely.

Long Term Management Objectives (100 Years)

Maintain and expand high quality Dry Prairie remnants and Oak Openings to provide habitat for native plants and animals.

Short Term Management Objectives (50 Years)

- Expand the size of prairie openings on Billy Goat Ridge to maintain conditions favorable to native prairie vegetation.
- Expand the size of Berg Prairie. Remove the pine plantation.
- Increase the diversity and abundance of native prairie vegetation and associated animal species with emphasis on rare species.
- Increase connections between patches of grassland vegetation.
- Eradicate populations of autumn olive. Monitor and manage other invasive species that may threaten the native plant and animal populations.
- Conduct scientific research that is compatible with the ecological and aesthetic attributes of the site.

Resource Management Prescriptions

Specific authorized management prescriptions include:

- Maintain and expand Dry Prairie and Oak Opening natural communities through the use of mechanical and chemical treatments and prescribed fire where feasible and safe. Commercial harvesting may be used to facilitate the removal of woody vegetation if consistent with the objectives of the area.
- Remove the pine plantation from Berg Prairie through the use of cutting, herbicide, or prescribe fire.
- Use existing DNR screening guidance to minimize impacts on sensitive species.
- Contain and eradicate invasive exotic species through the use of department approved chemical, biological, and mechanical practices.
- Salvage of trees damaged by wind, fire, ice, disease, and insects may occur if consistent with the objectives of the area.

FIGURE 2.4 BERG PRAIRIE AND BILLY GOAT RIDGE CURRENT AND FUTURE LAND COVER

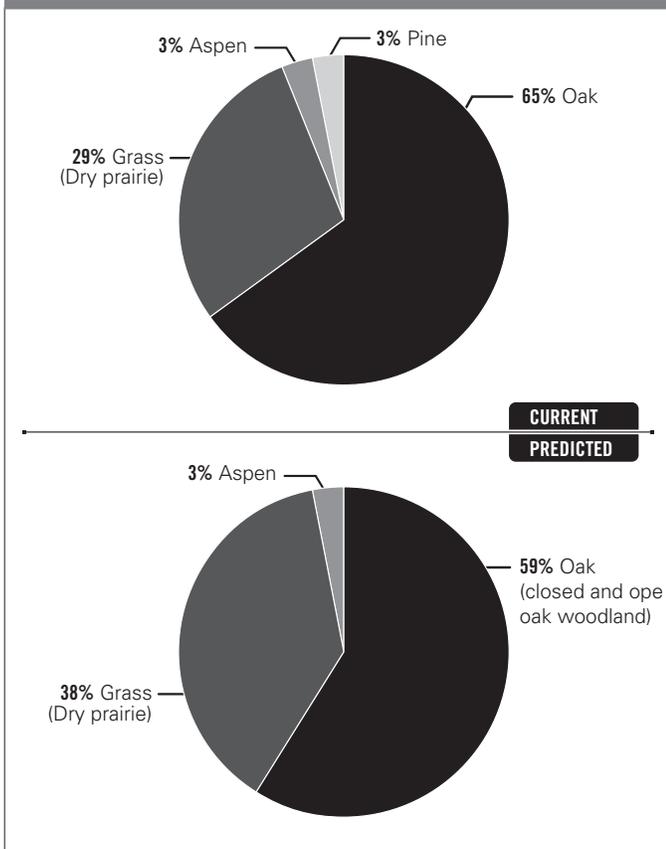


TABLE 2.4 BERG PRAIRIE AND BILLY GOAT RIDGE CURRENT AND FUTURE LAND COVER

Land Cover	Current		Predicted 50 Year	
	Acres	% of Total Area	Acres	% of Total Area
Oak (closed and open oak woodland)	60	65%	55	59%
Grass (Dry prairie)	27	29%	35	38%
Pine	3	3%	0	0%
Aspen	2	3%	2	3%
Total	92	100%	92	100%



STATE NATURAL AREA DESIGNATIONS



STATE NATURAL AREA DESIGNATIONS

State Natural Areas (SNAs) are part of a statewide system of sites identified for the purposes of ecological research, education, and to assure the full range of ecological diversity for future generations. There are two State Natural Area designations on the Coulee Experimental State Forest; Berg Prairie and Billy Goat Ridge and Northeast Coulee Woods. State Natural Areas are considered as overlay zones, not separate management areas. The State Natural Area designation does not change the underlying management objectives, prescriptions, or authorized activities outlined in this master plan for each land management area. There are no additional management prescriptions associated with these State Natural Areas. See the Native Community Management Areas for detailed maps showing the location of SNA overlay zones.

State Natural Area #1.**Northeast Coulee Woods (285 acres)**

The Northeast Coulee Woods State Natural Area has the same boundary and acreage as the Northeast Forest and Cliffs Native Community Management Area. This area features a mature Southern Dry-Mesic Forest natural community type supporting stands of red oak and white oak that are developing old growth characteristics, such as large diameter trees, coarse woody debris, and structural diversity. The upper slope features an intermittent concentration of the Moist Cliff natural community type. The area also supports three known Species of Greatest Conservation Need.

State Natural Area #2.**Berg Prairie and Billy Goat Ridge (92 acres)**

The Berg Prairie and Billy Goat Ridge State Natural Area has the same boundary and acreage as the Berg Prairie and Billy Goat Ridge Native Community Management Area. The two sites that make up this SNA have somewhat different habitats and management objectives, but generally feature dry prairie remnants, small oak openings, oaks savanna, dry cliffs, and

closed oak woodlands. Large, quality examples of these natural community types are rarely found away from the Mississippi River valley. The two sites combined are known to contain one State Endangered and one State Threatened animal species, as well as several Special Concern species and Species of Greatest Conservation Need.

State Natural Area Program Objectives

Locate, establish, and preserve a system of SNAs that as nearly as possible represents the wealth and variety of Wisconsin's native landscape for education, research, and long-term protection of Wisconsin's biological diversity for future generations. Provide the full range of forest types and age classes by promoting mature Southern Dry-Mesic Forest and Dry Prairie natural community types on the CESF.

State Natural Area**Management and Recreational Activities**

All management activities identified in the respective Native Community Management Areas are authorized. All day-use recreational activities identified in this master plan are also authorized, such as, but not limited to, hunting, hiking, cross-country skiing, bird watching, and nature study. Horseback riding is prohibited in the Native Community Management Areas, except on the west ski trail in Southwest Russlan Coulee Woods.

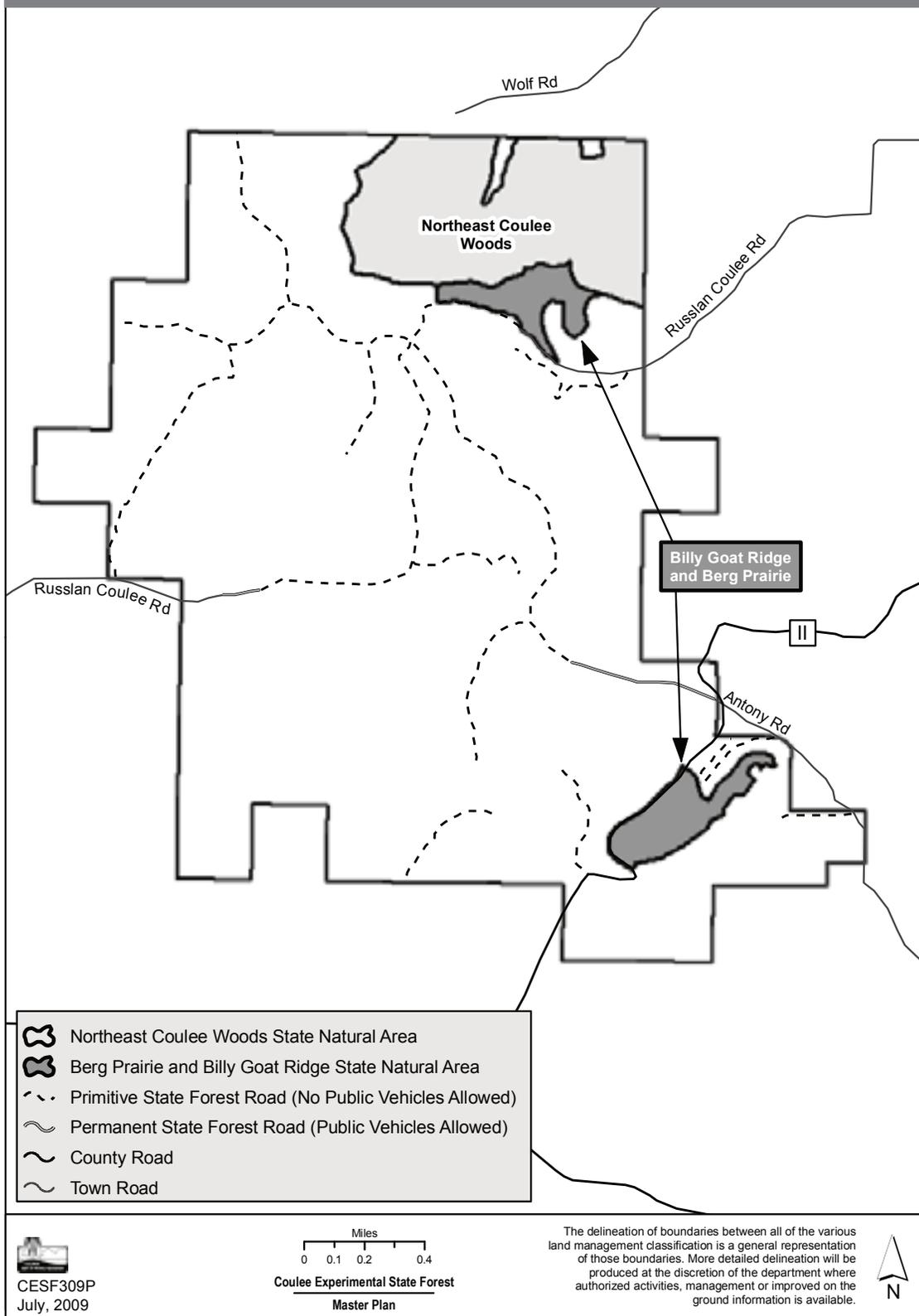
Designation Process and Authority

The process for selecting and designating SNAs is determined by cooperative efforts between the Division of Forestry and the Bureau of Endangered Resources. The master planning process for State Forests requires that the goals set by the Division of Forestry be considered before the Bureau of Endangered Resources submits candidate sites for SNA designation. The Wisconsin State Natural Areas Program oversees the establishment of SNAs and is advised by the Natural Areas Preservation Council.

See Appendix A for a description of the State Natural Area designation process.

STATE NATURAL AREA DESIGNATIONS

MAP 2.6 STATE NATURAL AREAS



CESF309P
July, 2009

Miles
0 0.1 0.2 0.4
Coulee Experimental State Forest
Master Plan

The delineation of boundaries between all of the various land management classification is a general representation of those boundaries. More detailed delineation will be produced at the discretion of the department where authorized activities, management or improved on the ground information is available.





WILDLIFE MANAGEMENT

The Coulee Experimental State Forest supports a diversity of wildlife species, including game, non-game, furbearer, and bird species common to southwest Wisconsin. Many other bird species migrate through the CESF as well. Common game species include white-tailed deer, eastern wild turkey, ruffed grouse, gray and fox squirrels, and rabbits. There are 10 rare or declining bird species, 2 rare invertebrates, and 1 rare reptile documented on CESF (Table 2.5). There are also numerous Species of Greatest Conservation Need (SGCN) that may be found on the forest (See Appendix B).

TABLE 2.5: RARE OR DECLINING ANIMAL SPECIES ON THE CESF

Common Name	Scientific Name	State Status
Acadian Flycatcher	<i>Empidonax vireescens</i>	Threatened
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	No Status
Cerulean Warbler	<i>Dendroica cerulea</i>	Threatened
Hooded Warbler	<i>Wilsonia citrina</i>	Threatened
Kentucky Warbler	<i>Oporornis formosus</i>	Threatened
Louisiana Waterthrush	<i>Seiurus motacilla</i>	Special Concern
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	No Status
Wood Thrush	<i>Hylocichla mustelina</i>	No Status
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Special Concern
Veery	<i>Catharus fuscescens</i>	No Status
Western slender glass lizard	<i>Ophisaurus attenuatus</i>	Endangered
Smooth coil	<i>Helicodiscus singleyanus</i>	Special Concern
Wing snaggletooth	<i>Gastrocopta procera</i>	Threatened

WILDLIFE HABITAT MANAGEMENT

The wildlife management program on the Coulee Experimental State Forest focuses on maintaining and enhancing habitat and assessing the population status of the important game, non-game, and listed species. The diversity of wildlife on the CESF is supported by the diverse forest and non-forest habitats found here. The forest habitats include a variety of cover types and successional stages from very young to old growth. The non-forest cover types include remnant dry prairies, warm-season grass plantings, and cropland. Diverse and healthy wildlife populations will be maintained by managing the composition and structure of these forest and non-forest habitats. Wildlife management objectives have been integrated with the objectives and activities outlined for each management area in the Land Management section of this plan. Most of the forest habitat work on the Coulee Experimental State Forest occurs through timber sales, prescribed burning, planting, and removal of undesirable species. Activities associated with timber sales that directly impact wildlife habitat will be reviewed by wildlife biologists in order to provide recommendations to maintain and enhance wildlife habitat.

Vegetation for the CESF is characterized by extensive areas of upland hardwood forests, interspersed with small native prairies, old fields, and various tree and agricultural plantings. There are plantations of various tree species throughout the property.

Forested Habitat

Oak is the dominant forest type on the CESF; currently 54% of the forest. Oaks are considered one of the most important wildlife trees in Wisconsin. Numerous wildlife species benefit from the mast (acorns) they provide. Oak trees also make good den trees for cavity-dwelling birds and mammals. Oak cover types will be maintained and regenerated on the CESF to benefit wildlife for years to come.

Aspen and white birch types are a smaller component on CESF at 14% of the forest, but they provide a critical food source for ruffed grouse and other bird species (e.g., northern finches). Mammals such as deer and rabbits eat the young stems, buds, and leaves. In young stands aspen and birch provide many wildlife species with dense cover from predators and weather. Vigorous stands of aspen and white birch will be scheduled for regeneration in order to maintain a component of these early succession habitats.

Conifer plantations are scattered throughout CESF and are typically small in size. These areas provide thermal cover for wildlife in winter. Different tree species provide a variety of seeds for small mammals and birds. Large trees provide nesting sites for birds of prey or roosts for turkeys or grouse. As conifer forests age, they also develop good cavities for cavity-dwelling wildlife.

Periodic thinning of conifer plantations will help maintain the health of these forests as well as improve structure for wildlife.

Central and northern hardwood forest types provide a diversity of tree species that results in a variety of food sources and cover for wildlife. If one tree species has a poor seed crop, another species with a better seed crop will provide the needed food source for wildlife. Central and northern hardwood types currently occupy approximate 18% of the forest, but through natural succession and forest management practices this cover type will be expanded to approximately 36% of the forest during the next 50 years.

Forest structure plays a key role for wildlife and wildlife diversity. There are many different types of structure found on CESF. Structure can be as simple as standing or down course woody debris, which provides habitat and food for numerous insects, small mammals, and herptiles. Examples of stands with significant amounts of course woody debris can be found in the Northeast Forest and Cliffs Native Community Management Area and in other stands throughout the property. Another structural element is the small scattered openings found within the forest. These openings provide nesting and brooding areas for turkeys. The height and/or density of the trees in an area may provide the cover, feeding areas, or nesting sites that support particular types of wildlife. It is important to maintain and develop a variety of forest structure in order to maintain diverse wildlife populations. Forest management on the CESF will integrate wildlife structure needs with other forest management

objectives. Snags and course woody habitat will be maintained and developed consistent with the objectives of the management area. Long-lived reserve and den trees will be retained on appropriate sites. Age class diversity will be improved, providing a diversity of structure from very young forests to old growth.

The CESF represents one of the largest contiguous blocks of forest in the area, including significant stands of oak with old forest characteristics. These large interior forest habitats support numerous neo-tropical migratory song birds. Common examples identified on the property include, red-eyed vireo, ovenbird, Eastern wood pewee, scarlet tanager, and veery. In addition, SGCNs identified on the forest include Acadian flycatcher, Cerulean warbler, black-billed cuckoo, hooded warbler, Kentucky warbler, and Louisiana waterthrush. Interior forest habitat will be maintained and expanded through tree planting of some non-forest lands and through the planned acquisition and conservation of adjoining forest lands. In addition, areas of the forest will be managed for old forest characteristics that benefit interior forest song birds.

Non-Forested Habitat

Dry Prairies and Oak Openings occur on the upper slopes of several ridges with steep southern and western exposures. Conditions vary based on site characteristics, past land use, and the amount of active management that has occurred. There are a few examples of Dry Prairie and Oak Openings on the property that have retained a suite of native species that are characteristic of these community types. Many herp-



tile and invertebrate species are dependent on this habitat. The smooth coil, a Special Concern land snail, and the wing snaggletooth, a State Threatened land snail, were documented on the CESF dry prairies. The Western slender glass lizard, a State Endangered species, was also found. Game species such as deer and turkey also benefit from these habitats. Turkeys use them for brooding and nesting areas while deer use them for food (legumes) and cover. Management prescriptions for these important native communities are outlined in the Land Management Section of this plan.

The CESF includes approximately 137 acres of old fields, native grassland plantings, and agricultural lands. Corn and alfalfa are currently the main agricultural crops, providing food sources and seasonal cover for a variety of wildlife. The old fields and native grassland plantings also provide beneficial food sources and cover. Edge habitat between the forest and non-forest areas benefits some of the important game species found on the property. Long-term management objectives include the maintenance of approximately 100 acres of non-forest cover types to provide these wildlife benefits. Non-forest areas will be maintained using a combination of mowing, cutting, herbicides, prescribed fire, and agricultural crops. Research projects, including watershed experiments and tree plantings, will be allowed if consistent with overall property objectives.

WILDLIFE POPULATION MONITORING

At present, no populations of important game species will be monitored through annual surveys directly on the Coulee Experimental State Forest, however these surveys do occur nearby to provide valid population information. Populations of endangered, threatened, and species of special concern will be monitored periodically through surveys and field checks conducted by DNR resource professionals. New occurrences of these species are reported through staff and citizens and are documented in the Bureau of Endangered Resources' NHI database.

WILDLIFE POPULATION MANAGEMENT

Game species are managed through hunting and trapping seasons. Hunting and trapping regulations and population goals are not set through the Master Planning process. Game populations are managed through regulations and goals set by the Natural Resources Board. The public is involved in all stages of this review and implementation process.

WILDLIFE RESEARCH AND DEMONSTRATION

Consistent with the Coulee Experimental State Forest's research vision, wildlife research will be encouraged that enhances our understanding of habitat management in the Driftless Area. Examples of research and demonstration projects include invasive species control, deer browse impacts, ruffed grouse population dynamics, and other wildlife/habitat interrelationships. Wildlife diseases will be monitored, studied, and managed as threats to wildlife populations emerge. Federal, State, Tribal, and University-sponsored wildlife research may occur on the CESF as long as the projects are consistent with the overall property objectives.



RECREATION MANAGEMENT

BACKGROUND

The Coulee Experimental State Forest supports a variety of day-use recreational opportunities that have limited availability elsewhere in the region. The forest is a popular destination for hunting, hiking, cross-country skiing, horseback riding, nature study and wildlife viewing. Certain activities have been limited because of property size, topography and soils, conflicts with other users, incompatibility with research goals and limited DNR resources for management. Today the balance between the capabilities and limitations of recreation on the CESF is more important than ever as the population and demand for public land increases. Future recreational activities on the forest must remain compatible with the over-arching research and forest management goals.

RECREATION MANAGEMENT OBJECTIVES

- Provide opportunities for a variety of quiet day-use activities which include hiking, sight-seeing, and wildlife viewing.
- Provide a variety of hunting opportunities on the property, in particular for upland game species.
- Maintain and improve 12 miles of designated cross-country ski trails for skate and tradition skiers.
- Provide access for horseback riding, while protecting ecologically sensitive habitats and soils.
- Improve degraded trail conditions, especially in highly eroded areas.
- Control the movement of invasive species caused by recreational uses throughout the property.
- Provide public access points and parking areas.
- Provide forestry, wildlife, and natural resource education opportunities to schools, forest landowner organizations, conservation organizations, and resource professionals.
- Manage conflicts between various forest users.

How these objectives will be achieved is discussed by recreation type on the following pages. Refer to Map 2.8: Property Recreation.

GENERAL DAY-USE ACTIVITIES

The Coulee Experimental State Forest provides a variety of quiet day-use activities including hiking, sight-seeing, wildlife viewing, snowshoeing, and nature study. Mushroom, berry

gathering and geo-caching are allowed on the entire property. Camping and fires are prohibited on the CESF.

The Coulee Experimental State Forest will continue to offer designated cross-country ski trails that are also available during non-snow conditions for other day-use recreational activities. Designated trails are designed and maintained for a specific use. They are identified by signage and shown on the official map of the forest. In addition to designated trails, the CESF contains numerous miles of primitive roads which are open to hiking, hunting, horseback riding, and snowshoeing, unless posted closed. Motorized recreational use is prohibited on the CESF. Bicycles are allowed only on public roads open to vehicle use.

CROSS-COUNTRY SKIING

Current Status and Policy

Cross-country skiing has been a popular recreational use on the property for many years. Presently, local volunteers groom the 12 miles of lightly developed trail system, while DNR staff maintains the trail signage.

Prescriptions

- Encourage continued agreements with volunteers to groom the 12 miles of designated ski trails.
- Improve trail grade and drainage to facilitate grooming, prevent erosion, and increase skier safety.
- Modify routes, designations and trail segments to minimize contact between traditional and skate-skiing styles, reduce conflicts with other recreational and management uses of main forest roads and improve snow retention. Two miles of new skate-skiing trail may be added.
- Improve trail signage for users while discouraging vandalism.
- Remove hazard trees and improve clearance in compliance with the DNR Trail Handbook.
- Monitor and manage invasive plants species where necessary.
- Maintain the trail with periodic mowing.

HORSEBACK RIDING

Current Status and Policy

The Coulee Experimental State Forest provides limited horseback riding opportunities. While no trails have been designated for horseback riding, all primitive roads are open to the activity unless posted as closed. Horseback riding is prohibited in Native Community Management Areas, except on the west ski trail of the Southwest Russlan Coulee Woods Area and on all designated ski trails during snow covered conditions.

Prescriptions

- Monitor and close riding areas when necessary to avoid erosion or general degradation.
- Enhance conditions on steep slopes by improving erodible areas.

RECREATION MANAGEMENT

PUBLIC ACCESS INFRASTRUCTURE

Current Status and Policy

The Coulee Experimental State Forest provides a variety of access points and parking areas for recreational users. The property currently has two designated parking areas and several pull-offs that offer limited parking.

Prescriptions

- Improve general property signage for greater visibility from public roads.
- Maintain gravel base of designated parking areas.
- Renovate main entrance road off County Highway II.
- Maintain barriers in parking areas to restrict vehicle access and prevent unsafe parking.
- Improve and maintain the scenic vista at Bostwick Overlook.

EDUCATION

Current Status and Policy

As one of the largest publicly owned forests in the coulee region, the Coulee Experimental State Forest provides many forest-based research and educational initiatives. The property is currently used for educational events with conservation and forest landowner organizations, resource professionals, university classes and local schools.



Prescriptions

- Continue to encourage partnerships with local schools and conservation organizations and help facilitate future environmental education events, as compatible with other forest management objectives.
- Demonstrate sound forestry and watershed management principles to landowners within the Driftless Area through research and demonstration of sustainable forestry and land management practices. Transfer this information through educational events with conservation and forest landowner organizations and resource professions.

HUNTING

Current Status and Policy

The CESF provides one of the few large, publicly owned, upland forests in La Crosse County suitable for hunting a variety of game species. The Coulee Experimental State Forest will continue to offer public hunting and trapping according to state regulations, though trapping is not common on the property. Property managers will address potential conflicts between various users to provide safe, enjoyable hunting opportunities.

Prescriptions

- Encourage safe hunting practices and foster sound relations between users through regular patrolling of the property and effective use of informational signs.
- Provide habitat for game species through forest management practices.
- Encourage public participation in habitat improvement projects such as partnering with conservation groups on volunteer work days.
- Maintain hunter access through periodic mowing.



RESEARCH

The CESF was originally established to provide a Driftless Area land base for forestry and watershed research conducted by the USDA Forest Service. Many signs of the historical experiments are visible on the landscape today. Partnerships with the Forest Service, universities, forest products industry and others have fostered a rich tradition of forestry and watershed research on the property. Research results have helped to guide land managers in the region and educate a generation of resource professionals. Opportunities exist to conduct further research in collaboration with the Forest Service, universities and others, that will help inform the public and improve land management in the Driftless Area. The Forest Service recently renewed its 15-year research lease on the property and, with the help of WDNR staff, generated a list of potential topics to study. Potential areas of forestry research on the CESF are listed below.

General Research Opportunities

Continued forestry and watershed research on CESF will build a larger knowledge base that foresters, resource managers and educators can use to share improved management practices with area landowners and other groups. Demonstrations at original research sites and published presentations transfer information to the public. Educational events and tours for interested groups will utilize research project areas and results. General forest management on the property will seek opportunities to continue demonstrating new and innovative land management practices.

In order to capitalize on the extensive CESF research history the Department will develop and maintain a suitable record keeping system that will make historical projects more accessible. Field data and results of published and un-published projects will be organized and summarized. A comprehensive GIS-map library will accurately locate project areas on the CESF and allow new projects to be entered easily.

A research planning procedure for the CESF will be developed by Department and Forest Service staff to set the tone for new research inquiries and projects. The new procedure will insure that future projects are compatible with CESF attributes and objectives. Researchers will be required to submit a project plan that details the experiment and clarifies the responsibili-

ties and procedures to be observed in the course of siting and completing their project. The research planning procedure will help ensure that proposed projects are consistent with general property and management area objectives and appropriate records and documentation are kept.

Some of the historical research sites still contain study materials that were not cleaned up when the projects were completed. The Department plans to remove these materials following consultation with a Department Archeologist, differentiating between historically significant structures that will remain and miscellaneous items to be removed from the woods.

Maintain diverse cover types within the CESF that are representative of the Driftless Area in order to facilitate research that is meaningful to the region's landowners.

Link CESF research opportunities with other related initiatives in Driftless Area. Migratory bird habitat, oak forest restoration and interior forest habitat are examples of issues currently being examined in the region that could also be studied within the CESF.

POTENTIAL RESEARCH TOPICS

- Land use (agriculture/forest) interactions in the Nitrogen Cycle
- Upland field conversion to forest and carbon storage responses of species
- Tree growth responses in the context of climate change and seed origins
- Aquatic studies in degraded streams and springs
- Long term forest productivity
- Recreational use impacts on forest composition and structure
- Restoration of oak stands with new forestry practices and prescribed burning
- Soil frost depth changes by land cover over decades of time
- Driftless Area shifts in ecological community interactions (ecotones)
- Techniques for managing for old forest conditions
- Managing interior forest song bird habitat
- Climate change effects on forest vegetation and other driftless area native communities



ROAD MANAGEMENT

Public roads within the Coulee Experimental State Forest are limited to County Road II that passes through the southeast corner of the property, portions of Russlan Coulee Road that end within both the east and west property boundaries and 1.25 miles of moderately developed, permanent gravel roads that lead to parking lots.

The steeply sloped Russlan Coulee Road was formally abandoned within the property boundaries by two townships as prescribed in the 1978 Master Plan. Vandalism and other un-authorized activities within the CESF decreased sharply when the road was then gated and closed to vehicular traffic by the Department. The steep, soil based roadway is vulnerable to erosion and has been reshaped with updated water drainage structures and seeding to prevent erosion and sedimentation damage.

Primitive single-lane dirt roads totaling 7.3 miles within CESF are closed to public vehicular access, but are used in property management, timber harvesting, research, agricultural and educational activities, as well as the majority of non-motorized recreational activities. They consist of field roads used by local farmers with sharecropping agreements, old farm and logging roads that traverse slopes from valley to ridge and the well-used access road located on the ridge that extends the length of the property. Some of these primitive roads are not routinely maintained; washouts and ruts can be encountered. The long ridge road also provides access for emergency and law enforcement vehicles from south to north.

ROAD CLASSIFICATION AND GENERAL ROAD MANAGEMENT

Primitive roads are closed to public vehicles by gates and rock barriers. Primitive and permanent roads may be temporarily closed by the State Forest Superintendent to the public if deemed unsafe due to the condition of the road or because of potential conflicts with timber harvesting equipment or other management activities occurring in the area.



State, county and town roads within the state forest boundary will continue to be managed by their respective jurisdictions and are outside the scope of the CESF Master Plan.

A road Inventory was completed in 2007 to identify and classify roads and trails within the property. Road classifications are outlined in NR44.07 (3) and reflect a range of development and maintenance standards.

SCENIC ROADWAY CORRIDORS

Forested hillsides along Russlan Coulee Road and County Road II were established in the 1978 Master Plan as scenic zones for management purposes. Forest management activities have been carried out in these zones using techniques that preserve visual qualities of the forest. Scenic zones are not specifically identified in this master plan; however, maintaining undeveloped scenic qualities is a property goal. Appropriate measures will be taken to protect and enhance scenic values during forestry and other activities, particularly along roads where public use is highest.

ROAD MANAGEMENT OBJECTIVES

- Provide a network of roads on the CESF that meet land management and recreational objectives, while minimizing the environmental impacts.
- Maintain Department managed roads within the CESF in a sustainable condition.
- Protect scenic values along road corridors in balance with management area objectives.
- Manage the spread of invasive plant species along road corridors.

GENERAL ROAD MANAGEMENT PRESCRIPTIONS

- Department managed roads within the CESF will be managed using Wisconsin's Forestry Best Management Practices for Water Quality and include the following practices:
- Regularly inspect active roads (especially after heavy rain or wind storms). Clear debris from the road surfaces, culverts and ditches to prevent damage.
- Maintain stable road surfaces to facilitate proper drainage and reduce degradation from traffic during wet or soft conditions.
- Monitor soil disturbance and take measures to prevent excessive damage on primitive roads used for recreation and during timber harvest operations.
- Restore roads used in timber harvests to non-erosive conditions.
- Forest aesthetic management practices will be applied along roads where public use is highest, including interior primitive roads used for recreation, utilizing practices from the Silviculture and Forest Aesthetics Handbook and the Wisconsin Forest Management Guidelines.
- Monitor and manage the spread of invasive plant species along roads using the Wisconsin's Forestry Best Management Practices for Invasive Species. The CESF Invasive Plant Management Plan will guide annual activities to meet the problems created by invasive plants along road corridors
- Maintain visibility and clearance at forest gates and along roads adequate for the road classification and use.
- Improve base and grade on the forest road leading to the ridge parking lot and ski trailhead.



NON-METALLIC MINING POLICY

The Department may use gravel, sand, fill dirt or other fill material from department-owned lands for Department use. Under certain circumstances other government bodies or agencies may also have access to these materials. Section 23.20 of the Wisconsin Statutes states, "the department may permit any town, county, or state agency to obtain gravel, sand, fill dirt or other fill material needed for road purposes from any department-owned gravel pit or similar facility if this material is unavailable from private vendors within a reasonable distance of the worksite. The Department shall charge a fee for this material commensurate with the fee charged by private vendors."

Any nonmetallic mining on State Forests is regulated under the requirements of NR 135 Nonmetallic Mining Reclamation, Wis. Adm. Code, except for sites that do not exceed one acre in total for the life of the mining operation. Site reclamation under NR 135 is administered by the county. NR 135 requires mining

sites to be located appropriately, operated in a sound environmental manner, and that all disturbed areas be reclaimed according to a reclamation plan. Department of Transportation (DOT) projects are exempt because DOT projects have their own reclamation requirements. New sites will not be permitted where a Geological Feature of Importance has been identified. For a list of features, please see the Important Geological Features section below.

IMPORTANT GEOLOGIC FEATURES

The Coulee Experimental State Forest is located within the "Driftless Area" of Wisconsin, where no glacial deposits occur. The property is characterized by rugged, deeply dissected ridge and valley topography with shallow soils over sandstone and dolomite bedrock. Deeply incised, steep-walled valleys and ridgetops with outcrops of Paleozoic bedrock are present throughout the region. Bedrock exposed in the La Crosse area was deposited during the Cambrian and Ordovician periods. Precambrian igneous rock lies beneath the Paleozoic formations, an important feature constraining aquifers. The Department recognizes the importance of setting aside and preserving representative examples of these non-renewable geological features to serve as a base for geological and ecological educational programs and as a baseline against which to compare sites that become disturbed in various ways. Non-metallic mining opportunities are limited on the CESF.





REAL ESTATE MANAGEMENT

FOREST BOUNDARY EXPANSION

The project boundary for the Coulee Experimental State Forest (Map 2.9) has been expanded from the previous master plan. The new project boundary surrounds the existing CESF which is currently 2,972 acres in size, and if acquired in its entirety, the property would total 6,482 acres. The expanded boundary was selected to enhance ecological, economic, and social values through protection and management of large areas of forest adjacent to the current property. Additional benefits will be realized through this boundary expansion and are described in detail below.

The northern portion of the project boundary would provide better public access to the property as well as create a buffer from future housing development along Interstate 90. This expansion would also provide a small portion of contiguous forest and open land to be used for research, wildlife habitat and recreation.

Acquiring land to the northwest of the present boundary would increase the contiguous interior forest adjacent to existing forested blocks. The addition would significantly increase forest recreational opportunities as well as provide a buffer from development pressure. This expansion would provide additional access to the western portion of the forest, reduce forest fragmentation, provide additional forest management and research opportunities as well as protect wildlife habitat. Conservation of these lands would also provide protection of the La Crosse River watershed.

Obtaining additional lands to the south of the current boundary would increase the continuous interior forest and provide potential for additional recreational opportunities. This addition would create a well defined property boundary along County Highway I and improve access to the southern portions of the forest. It would also provide an increase in grassland habitat (including additional dry prairies), reduce forest fragmentation, provide additional forest management and research opportunities and protect wildlife habitat. Conservation of these lands would provide watershed protection along Bostwick Creek.

ACQUISITION POLICIES

It is the policy of the Natural Resources Board and the DNR to acquire lands from willing sellers only. As required by state and federal laws, the Department pays just compensation for property, which is the estimated market value based on an appraisal. At times, it is in the interest of the Department and the landowner for the Department to acquire only part of the rights to a property, or an easement. The Department has a number of easement options available to address these situations.

Landowners within the state forest boundary will be contacted periodically by Department staff to explain the Department's land acquisition program and to see if they have an interest in selling their property. Acquisition priorities within the state forest vary from year to year and are based on a variety of factors, such as resource management or recreation needs and available funding.

Master plan amendments will be done as required by Wisconsin Administrative Code NR 44.04 when adding newly acquired lands to the Forest Plan.

AIDES IN LIEU OF TAXES

For all State properties purchased after 1992, the Department makes an annual payment to the taxing authority in lieu of property taxes that would have been paid if the property had remained in private ownership.

FUTURE BOUNDARY ADJUSTMENT PROCESS

From time to time adjustments in the Forest boundary are needed. In some cases parcels of land are removed from the boundary to allow alternative, necessary public uses by local governments. In other cases it may be desirable to add small parcels adjacent to the Forest so they can be purchased for resource protection or to meet expanding recreational needs. Property boundary changes of 40 acres or more require approval by the Natural Resources Board. Wisconsin Administrative Code Ch. NR 44 provides a plan amendment process that may be used to make adjustments in the Forest boundary.

EASEMENTS, ACCESS PERMITS, AND LAND USE AGREEMENTS

The plan recognizes that the CESF, like most Department properties, has a number of land use agreements in place. These property encumbrances will continue to be upheld under the Master Plan. The property manager may grant access permits and land use agreements that are not in conflict with the

purpose and objectives of the property. Land use agreements will be evaluated on a case by case basis and agreements must be in the best interests of the Department and provide public benefits.

Easements provide access across state property for utilities, town roads, or county highways. Access Permits provide access across state property to private ownership within the forest boundary. Land use agreements provide for a variety of uses on state forest property, such as snowmobile trails and other recreational facilities open to the public.

SHARECROPPING

The property manager may develop sharecropping agreements with private landowners for those management areas with objectives for maintaining open lands. Sharecrop agreements will be evaluated periodically and continue until such time as deemed unnecessary to maintain open lands using crops. Sharecrop agreements will follow Department Manual Code 2310.5 Chapter 20.



GENERAL ADMINISTRATION AND MANAGEMENT POLICIES AND PROVISIONS



GENERAL ADMINISTRATION AND MANAGEMENT POLICIES AND PROVISIONS

The following section describes general policies and provisions that are applied to all lands of the Coulee Experimental State Forest that are under state ownership.

FOREST PEST CONTROL

As stated in Wisconsin Statute 26.30, "It is the public policy of the state to control forest pests on or threatening forests of the state..." Within the Coulee Experimental State Forest, any significant forest pest events will be evaluated with consideration given to the property management goals and the potential threat of the pest to other landowners. Infestations of the non-native gypsy moth caterpillar will be managed according to the Forest's Gypsy Moth Management Plan. Responses to significant infestations from other forest pests may include timber salvage or pesticide treatments. Any response to a significant pest outbreak will be evaluated by an interdisciplinary team of scientists and communicated through press releases and notices to interested parties.

FIRE SUPPRESSION

As stated in Wisconsin Statutes 26.11, "The Department is vested with power, authority and jurisdiction in all matters relating to the prevention, detection and suppression of forest fires outside the limits of incorporated villages and cities in the state except as provided in sub (2), and to do all things necessary in the exercise of such power, authority and jurisdiction." Forest fire suppression actions within the state forest will consider the property management goals and the threats of the fire to life and property. Appropriate techniques will be used in each event to provide effective fire suppression while minimizing resource damage.

AUTHORIZED RESPONSE TO CATASTROPHIC EVENTS

Wildfires, timber diseases and insect infestations shall be controlled to the degree appropriate to protect the values of each management area. Necessary emergency actions may be taken to protect public health and safety. Appropriate management responses to catastrophic events are determined on a case-by-case basis, and action will be taken as appropriate.

INVASIVE SPECIES CONTROL

If detected, invasive plants may be controlled using appropriate and effective methods, including but not limited to the use of herbicides, cutting, or hand removal. Control methods may be

restricted in certain sensitive management areas. The property will develop and maintain an invasive species inventory and control plan.

PRESCRIBED FIRE

Prescribed fire may be used as a management tool where feasible and safe except when restricted by management area prescriptions. It may be used to help regenerate forest cover types such as the pine and oak types. It may also be used to create and maintain prairie habitat, wildlife habitat, to reduce fuels to lessen fire hazard and to control undesirable vegetation. Prescribed burning is done in accordance with the Department's Prescribed Burn Handbook and all burns have an approved burn plan.

CHEMICAL USE

Approved herbicides and pesticides may be used for various purposes on the forest, such as the control of invasive plants or to control plant competition in forest regeneration areas and insect control except as restricted in the management prescriptions in this master plan. All department procedures and herbicide and pesticides label requirements will be followed.

BEST MANAGEMENT PRACTICES FOR WATER QUALITY

All management activities within the state forest follow, as a minimum standard, the most recent version of the guidelines in the Wisconsin's Forestry's Best Management Practices for Water Quality (BMPs).

ENDANGERED, THREATENED AND SPECIES OF SPECIAL CONCERN PROTECTION

All management prescriptions in the proposed master plan will consider the needs of endangered, threatened, and species of special concern and the potential impacts to the species and their habitat. Management actions being planned on the state forest are checked against an up-to-date database of listed species to assure that no department actions results in the direct taking of any known endangered or threatened resource.

FOREST INVENTORY AND RECONNAISSANCE

The State Forest uses a forest inventory system to gather and record information on their lands. The database created from the inventory captures the physical description of these areas (dominant forest cover type, soils, ecological attributes, stand origin, restrictions and goals). Reports are then generated to show forest stands that are listed for management review. The acreage listed for review is considered the forest's "sustainable harvest" meaning that the lands are due for a decision regarding management. Some stands inventoried in the reconnaissance are excluded from active management, for example, passive management zones contained in some of the native community management areas. Forestry staff then examines stands potentially due for management and verifies

GENERAL ADMINISTRATION AND MANAGEMENT POLICIES AND PROVISIONS

the information with a field visit. If the stand is not ready for management, their information is updated in the reconnaissance database and rescheduled for another review in the future. Those areas not ready for management and rescheduled are considered managed and counted as part of the forest's sustainable harvest acreage. If the forested areas are ready for management, then the forestry staff consults with other Department programs such as endangered resources, fisheries, and wildlife to integrate a multifaceted approach to the proposed management and subsequent sustainable harvest. After a management practice occurs, the forest reconnaissance is updated.

In the future, the State Forest will be using a Continuous Forest Inventory system in conjunction with the reconnaissance system. This system will track growth, mortality, and management of forested lands and allow for more concise management of state forest lands. Using the Continuous Forest Inventory system will not change the objectives stated in the master plan.

PROTECTION OF HISTORIC AND ARCHAEOLOGICAL FEATURES

Approved future facility development sites (parking lots, buildings, etc.) will be inspected prior to construction to locate and evaluate any evidence of significant archaeological or historic material in compliance with federal laws and state guidelines on historic preservation.

FACILITY MANAGEMENT

Limited recreational facilities exist on the Coulee Experimental State Forest. The Forest Superintendent may relocate trail segments as deemed necessary when authorized by normal Department facility approval processes. Relocated trail location and design must be consistent with the land classification requirements (NR 44) and the management objectives for the Area in which it is located.

INSPECTION OF DESIGNATED USE AREAS

All designated use areas must be inspected semiannually (Wis. Statutes s.23.115). Vegetation inspections in designated use areas must be performed semiannually with one of the inspections performed by a person trained in the identification of hazard trees. Monitoring will pay particular attention to forest infestations that pose a serious threat to forest resources such as: oak wilt, pine bark beetles, gypsy moth, forest tent caterpillar, two-lined chestnut borer, and emerald ash borer. Control measures will be performed as needed.

FOREST CERTIFICATION

In 2004, Wisconsin State Forests gained dual Forest Certification from the Forest Stewardship Council (FSC) and Sustainable Forestry Initiative (SFI). Independent, third-party

certification means management of Wisconsin's forests meets strict standards for ecological, social, and economic sustainability. In 2009, State Forests were re-certified under FSC and SFI. The State Forest program will continue to participate in forest certification. The status of certification corrective actions will be shared annually.

REFUSE MANAGEMENT

Visitors are required to carry out any refuse they bring in because no designated refuse or recycling receptacles are available. Burying of refuse is not allowed anywhere on the property.

DISABLED ACCESSIBILITY

All new construction and renovation of infrastructure will follow guidelines set forth within the Americans with Disabilities Act and also be done in a manner consistent with NR 44 standards of the land use classification of the site where the development is located. Across the Coulee Experimental State Forest, the State Forest Superintendent has the authority to make reasonable accommodations for people with disabilities, consistent with the requirements of the area's land use classification.

PUBLIC HEALTH AND SAFETY

All facilities will comply with federal, state, and local health and sanitation codes. The Forest Superintendent has the authority to close trails and other facilities on the forest when necessary due to health, safety, or environmental damage concerns.

Within designated public use areas such as parking lots and designated trails, trees or other natural elements that are deemed public hazards will be removed. Safety inspections are done at least twice per year.

EMERGENCY ACTION PLAN

The property maintains on file an emergency action plan that describes staff response and coordination with other agencies to natural disasters as they affect public safety and facilities. It is reviewed annually.

FUNDING CONSTRAINTS

Implementation of the master plan is dependent upon staffing and funding, which are set outside of the master plan. Operational funding for state forests is established biannually by the state legislature. Development projects also follow an administrative funding and approval process outside of the master plan. Many of the initiatives proposed in the plan are dependent upon additional funding and staffing support. Therefore, a number of legislative and administrative processes outside of the master plan will determine the rate this master plan can be implemented.

PUBLIC COMMUNICATIONS PLAN**PUBLIC COMMUNICATIONS PLAN**

The public and other government agencies will be provided opportunities to have an on-going involvement in the implementation of this master plan. This communication plan describes how the public will be periodically informed about activities and developing issues on the Forest and it provides information on how the public will be notified of opportunities for involvement when significant issues related to management of the Coulee Experimental State Forest arise.

Annually the Forest Property Manager will issue a report that summarizes the following:

- For the past year, the primary management and development activities that were completed and other significant issues that were addressed.
- For the following year, outline any proposed management and development activities and any changing management actions or approaches.

The annual report may also include other information of interest to the public on various topics related to management and use of the Forest. Some of the additional types of information that may be included are: the status of forest insect or disease problems, fire or storm damage, new information on endangered or threatened species, recreational management problems or new opportunities, and recreational use changes or trends.

The Property Manager will maintain a list of persons, groups, and governments interested in receiving information about on-going management of the Forest. The annual report will be made available via mail or e-mail to persons on the list. The annual report will also be available to other potentially interested parties on the WDNR Internet Web site.

In the event the Department considers a change to the master plan (plan variance or amendment) all parties on the mailing list will be advised of the proposal and informed of the review and comment process. As appropriate, news releases will also be used to announce master plan amendment and variance proposals and review procedures.

CONTACT PERSON

The Coulee Experimental State Forest Property Manager should be contacted regarding questions about the State Forest or the master plan. At the time of this publication, the Coulee Experimental State Forest Property Manager may be contacted at:

Jim Dalton**Coulee Experimental State Forest Property Manager**

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La Crosse, WI 54601
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608/785-9007

PROPERTY DESCRIPTION



BACKGROUND AND AFFECTED ENVIRONMENT

PROPERTY OVERVIEW

The Coulee Experimental State Forest is located in the east central portion of La Crosse County, comprising approximately 3,000 acres of publicly owned, upland forest. Situated in Wisconsin's "Driftless Area", the CESF topography and ecology are characteristic of the state's unglaciated region. The forest was established in 1958 as a site for watershed and forestry research. Since its establishment, activities on the CESF have included forest management, research, day-use recreation, agricultural sharecropping, education events and general property administration and maintenance. The following property analysis will provide a detailed examination of the CESF ecology and management.

PAST MANAGEMENT AND USE

The Coulee Experimental State Forest has its beginnings in the mid-1950s when a need was identified for long term studies to investigate forest watershed problems in the unglaciated areas of southwestern Wisconsin, southeastern Minnesota, and northeastern Iowa (often called the "Driftless Area"). It had long been recognized that the Driftless Area had many land and resource management challenges due to its generally steep "ridge and coulee" topography. Up to that time, a great deal of research had been done in the Driftless Area by resource agencies focusing strictly on agricultural lands.

In 1956, the Wisconsin Forestry Advisory Committee recommended a research center for the area. The Wisconsin Conservation Commission and the USDA Forest Service (USFS) came to agreement that a suitable tract of forested land would be purchased by the Commission, and the Forest Service would conduct research to investigate forest watershed problems and develop forest and land management practices designed to improve water quality and forest yields.

By 1958, a suitable tract of land had been identified in La Crosse County, and land acquisition began. Although acquisition continued until 1964, a formal dedication of the property was conducted in June of 1960. The property was originally administered by the Black River State Forest manager, but responsibility was transferred in 1970 to the La Crosse Area Forester. Timber volumes at this time were estimated at over two and a half million board feet of timber and almost 6,000 cords of pulpwood.

**FIGURE 3.1:
LOCATION OF THE COULEE
EXPERIMENTAL STATE FOREST**



The La Crosse field unit of the USDA Forest Service's Lake States Experiment Station was established in 1958. Research was conducted out of that office until its' closing in 1975. Over 60 studies regarding soil and water erosion, soil freezing, spring flow, groundwater and reforestation were conducted by Director Richard Sartz between 1960 and 1975. The original 15 year research lease between the USFS and the WDNR was renewed in 1972, 1987 and in 2004. The USFS has recently reiterated its' interest in continued research projects on the CESF.



PHYSICAL ENVIRONMENT

GEOLOGY, SOILS, AND TOPOGRAPHY

The location of the Coulee Experimental State Forest was selected because the landscape was representative of the Driftless Area. This rough topography is the result of geomorphic processes that eroded ridges, cut into the underlying Cambrian rock, and transported soil and rock debris to adjacent streams. These processes were active during the last glacial period when vegetation was absent, but have also been active during the past century due to poor agricultural practices. The result is a dissected landscape with narrow to broad ridges (broader in the southern part of the county), narrow sloping shoulders, steep to very steep valley sides, escarpments and narrow to broad valley floors. A thin to thick mantle of silt covers most of the landscape with the thickest being in the valleys. Stream cutting and deposition formed floodplains, terraces, sloughs, and marshes along rivers on valley floors.

The most common soil map unit on the CESF is the Dorerton, very stony-Elbaville complex, 30-60 percent slopes. These soils formed in loamy loess and erosional sediments on shoulders and sideslopes of hills. They are deep and very deep soils, well drained, with dolomite fragments of various sizes making up as much as 80% of the lower horizons. Elbaville soils are finer-textured, with silt loam and clay loam in the upper horizons. Another common soil unit is the Churchtown silt loam, 20-30 percent slopes, moderately eroded. These soils formed in loamy sediments from loess and sandy bedrock residuum. They are deep and very deep soils, well drained, and found on side slopes or foot slopes. Soils on the CESF are often classified as eroded, reflecting the steep topography, erodible nature of the soils and history of intensive agriculture. As a result, careful consideration must be given to soil conservation and water quality issues when planning resource and recreation management on the property.





UPLAND AND LOWLAND VEGETATION AND NATURAL COMMUNITIES OR HABITATS

A variety of tools are available to land managers engaged in forest planning and management. Using multiple sources of data, managers are better able to assess site capabilities, identify ecological and silvicultural alternatives, predict the effectiveness of possible silvicultural treatments, evaluate feasible management alternatives, and choose appropriate management objectives. These tools are an integral part of the master planning process and are used for sound forest management. A description of each source is provided below:

- The General Land Office's Public Land Survey data (GLO PLS) was utilized to assess historic vegetation. These surveys conducted between the 1830s and 1870s, divided the state into 6 by 6 mile townships and 1 by 1 mile sections so that the land could be homesteaded. In order to mark the corners of each section, the surveyors blazed up to 4 witness trees around the corner, and noted tree species, diameter, and distance and direction from the corner post. While the intent of these surveys was not ecological in nature, it does provide researchers with some ecological data about species composition and tree density at the time of the surveys.
- WISCLAND land use/land cover data are a source of generalized information on vegetation. These data were developed by the WDNR with support from a consortium of other users. The data are an interpretation of the state's land cover from LANDSAT satellite images taken in 1992. This vegetation classification provides non-detailed information on several categories of forested and non-forested land.
- Wisconsin DNR Forest Reconnaissance provides data at the stand level and current composition, but does not provide data on successional trends.
- Forest Inventory and Analysis (FIA) data from the U.S. Forest Service are primarily used to assess the timber resource.
- The FIA uses statistical sampling at selected plots. These are the most accurate data for showing amounts (acreage and volume) of different forest types at the county level or a larger area. The data are not presented spatially, although information from sample points has occasionally been extrapolated to produce forest type maps.
- The Forest Habitat Type Classification System (FHTCS), The FHTCS identifies potential climax associations based on repeating patterns in the composition of the understory vegetation and different understory species. Individual

forest cover types usually encompass a wide range of environmental conditions and do not accurately reflect site potential or respond predictably to given management techniques.

- Natural Heritage Inventory (NHI)³ The NHI programs focus on rare plant and animal species, natural communities, and other natural features. The Wisconsin NHI Working List is the official list of Endangered, Threatened, and Special Concern plants and animals for Wisconsin. The Working List also includes a list of natural communities known to occur in Wisconsin. The list changes over time as the populations of species change and as knowledge about species status and distribution increases.

HISTORIC VEGETATION

Data from the original Public Land Surveys are often used to infer vegetation cover types for Wisconsin prior to European settlement. Public Land Surveys for the portion of La Crosse County containing the CESF were conducted in the late 1840s. Finley's Original Vegetation Map (1976) described the area that now comprises the CESF as dominated by oak openings (bur oak, white oak, and black oak) with small areas of prairie, prior to European settlement. The majority of La Crosse County was characterized as oak forest, oak opening, or prairie representing a continuum between these types. The only notable exceptions to this vegetation pattern were the lowland areas, particularly near the La Crosse and Mississippi rivers.

Similar to the surrounding region, the ridge tops and valleys of the CESF were cleared for agriculture by the new settlers. The steep slopes, unsuitable for raising crops, grew into oak-dominated forests after wildfires were suppressed. Many of the CESF's forests show signs of grazing by livestock during this settlement period.

CURRENT VEGETATION AND NATURAL COMMUNITIES

Today the forests of the CESF are mainly comprised of oak and central hardwood species (i.e., hickory, elm, black cherry, etc.) located along ridges and within narrow valleys. Many of the oak forests were subject to grazing and harvesting after European settlement, and have since developed into a more dense mixture of oak and central hardwoods. Aspen and birch stands have developed in areas that were abandoned field or pasture. Some of the ridge tops and valleys that were once cleared for farming have either been planted to red pine and white pine, or been used for experimental plantings and progeny tests with European larch, Norway spruce, balsam fir, red oak, and others.

Based on the Forest Habitat Type Classification System (FHTCS) the most common habitat types on the CESF are ArCi-Ph (*Acer rubrum*/*Circaea*, *Phryma* variant) on dry mesic, medium to rich sites and lower elevations with elements of ATiDe and ATiDe(Pr) (*Acer saccharum*-*Tilia*/*Desmodium*, *Prunus serotina* phase) on dry-mesic, nutrient rich sites of all slope

UPLAND AND LOWLAND VEGETATION AND NATURAL COMMUNITIES OR HABITATS

aspects. Dry south and west slopes, rocky ridges and outcrops are unclassified due to heavy disturbance during European settlement. Though native forest site quality is generally high, there is a noticeable absence of sugar maple in the woods. This can be attributed to historical fires, grazing and timber harvesting that favored intolerant species and eliminated sugar maple seed sources. White ash and basswood are common in many regenerating stands, but are eclipsed by black cherry, slippery elm, bitternut and shagbark hickory, thus moving these stands to central hardwoods rather than a sugar maple – basswood climax condition. Table 3.1 describes the most common cover types based on recent forest reconnaissance data.

TABLE 3.1: CURRENT COVER TYPES FOR THE COULEE EXPERIMENTAL FOREST

Community Type	Acreage	Percent of Total Forest
Oak	1,600	54%
Central Hardwoods	460	15.5%
Aspen	250	8.4%
White Birch	170	5.7%
Red Pine	150	5.0%
Grass / Herbaceous	78	2.6%
Agriculture / Other	77	2.5%
Northern Hardwoods	70	2.4%
White Pine	67	2.3%
Fir, Fir-Spruce	20	.7%
Tamarack	20	.6%
Upland Brush	10	0.43%
Total	2,972	100%

WDNR Forest Reconnaissance data

UNIQUE HABITATS AND FEATURES

The Coulee Experimental State Forest contains several large blocks of ecologically intact, contiguous forest. In some areas there are stands that are beginning to exhibit characteristics associated with old-growth forests, such as the presence of large, biologically mature trees, standing snags, tip-ups, and coarse woody debris. The Rapid Ecological Assessment for the Coulee Experimental Forest (WDNR 2007) identified two major blocks of forestland, the Northeast Forest and Cliffs and Russlan Coulee Woods West, with these characteristics. Some of these areas feature rich soils on cool, moist, north-facing slopes. Numerous fern species and other mesic understory plants are present. Northern red oak is the dominant tree species in these stands. Many red oak stands are biologically mature with an average stand age of 100-140 years old and the trees are beginning to experience significant mortality. Little or no oak regeneration is present in these stands to perpetuate the oak cover type. Some succession to shade tolerant hardwoods, such as basswood and red maple, is occurring here. Sugar maple is still a minor component.

Within the Coulee Experimental State Forest, the Natural Heritage Inventory has documented three natural community types that merit maintenance and protection: Southern Dry Forest, Southern Dry-mesic Forest and Dry Prairie.

THREATENED, ENDANGERED AND SPECIAL CONCERN PLANT SPECIES

Several rare plant species have been documented on the CESF (Table 3.2). Yellow gentian (*Gentiana alba*) is the only state designated threatened species. In addition to the species listed, American ginseng (*Panax quinquefolius*) is found in small numbers on the property, a species that is not actively tracked by NHI but for which information is collected and maintained in manual files. The existence of rare plant species, as well as good representation of more common species in the proper ecological context generally indicates the quality of the natural communities in which they exist. Many locations within the CESF (both forested and non-forested) display a healthy combination of both common and rare plants.

TABLE 3.2: RARE AND THREATENED PLANTS ON THE CESF

Common Name	Scientific Name	Year Last Observed	State Rank	Global Rank	State Status
Autumn Coral-Root	<i>Corallorhiza odontorhiza</i>	2006	S3	G5	special case
Jewelled Shooting Star	<i>Dodecatheon amethystinum</i>	2006	S2	G4	special case
Purple-Stem Cliff-Brake	<i>Pellaea atropurpurea</i>	2006	S2	G5	special case
Shadowy Goldenrod	<i>Solidago sciaphila</i>	1976	S3	G3G4	special case
White Camas	<i>Zigadenus elegans</i> var. <i>glaucus</i>	2006	S2S3	G5T4T5	special case
Yellow Gentian	<i>Gentiana alba</i>	2007	S3	G4	threatened

WILDLIFE RESOURCES**WILDLIFE RESOURCES**

The Coulee Experimental State Forest has numerous natural communities that provide habitat for a variety of game and non-game wildlife species. The primary game animals include deer, ruffed grouse, gray and fox squirrels, turkeys, and rabbits. Other game birds found on the property but in less abundance include mourning dove, quail, crow, and woodcock. Furbearers found on CESF are raccoons, coyotes, foxes, opossum, skunk, mink and weasel. Some wildlife species like bear, bobcat, wolf, and fisher are expanding their populations regionally, ranging southward in the state and may be in the area in the near future, if not already.

There are numerous neo-tropical migratory song birds that use the CESF for breeding areas, summer range or migration stops. Common examples identified on the property include,

red-eyed vireo, ovenbird, Eastern wood pewee, scarlet tanager and very. There are also common song bird species that live on CESF year round, such as black-capped chickadee and white-breasted nuthatch. Birds of prey include red-tailed hawk, harrier, turkey vulture, barred owl, screech owl and great horned owl.

There is some evidence that timber rattlesnakes historically inhabited the CESF, but as of the time of this analysis, there have been no recent confirmed reports. The CESF does support many common herptile species such as garter snakes, American toads, and several frog species.

THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES AND HABITATS

Several rare animal species have also been documented on the CESF (Table 3.3). As noted with rare plant species, the occurrence of rare animals may indicate the health of the habitats they rely on, or it may indicate that there are relatively few habitats in the larger area such that rare animals are concentrated where suitable habitat exists. On the CESF, the rare animals listed are most often associated with older, closed canopied interior forest or dry prairies.

TABLE 3.3: RARE AND THREATENED PLANTS ON THE CESF

Common Name	Scientific Name	Year Last Observed	State Rank	Global Rank	State Status
Acadian Flycatcher	<i>Empidonax vireescens</i>	2006	S3B	G5	threatened
Cerulean Warbler	<i>Dendroica cerulea</i>	2006	S2S3B	G4	threatened
Kentucky Warbler	<i>Oporornis formosus</i>	1995	S1S2B	G5	threatened
Louisiana Waterthrush	<i>Seiurus motacilla</i>	2006	S3B	G5	special case
Smooth Coil	<i>Helicodiscus singleyanus</i>	1986	S3	G5	special case
Western Slender Glass Lizard	<i>Ophisaurus attenuatus</i>	2006	S1	G5	endangered
Wing Snaggletooth	<i>Gastrocopta procera</i>	1986	S3	G5	threatened

RECREATIONAL FACILITIES AND USE**RECREATIONAL FACILITIES AND USE****EXISTING FACILITIES AND SERVICES**

Many tourists come to “Coulee Country” to drive along the Mississippi River, fish or boat on several rivers, and pedal or hike the state trails. However, the CESF is not well-known as a recreation destination, as many other State Forests are in their particular regions. The early emphasis on research on the property did not lead to the more common recreational infrastructure developments seen on many other State Forests. Recreational facilities have been limited to access parking lots and primitive hiking and cross-country skiing trail systems. As a result the property is most commonly used by local users and especially those seeking quiet day-use activities.

Current users visit for specific activities such as hunting, hiking, cross-country skiing, or horse-back riding. The CESF has approximately 12 miles of designated cross-country ski trails. Unlike other State Forests, visitors do not need to purchase a State Parks and Forests sticker to enter the property, or a trail pass to use the ski trail. The eastern parking lot provides access to the ski trailhead. No designated bridal trails exist on the property; however horseback riders are allowed access on existing ski trails, field edges and forest roads. Many visitors explore the property on foot or horseback by utilizing the ski trail system during non-snow conditions. Except for County Road II and roads leading to public parking lots, no mountain biking or public motorized vehicles are allowed on the property. Overnight camping is also not allowed.

It is likely that repeat users frequent the property looking for a quiet day use activity, with relatively few new visitors. There are no surveys or counts to determine actual use of the property today.

The forest has two designated parking areas, one on the eastern side and one on the western side of the property. To access the eastern parking lot and ski trailhead: from Bangor take Hwy. 162 south to County Road II, (approximately 1.5 miles) turn right on the forest road at the top of the hill, parking area is at the end of the road. To reach the western side parking lot: take Hwy. 33 east from La Crosse, then north on County Road M, right on Russlan Coulee Road (just east of Barre Mills), parking areas are at the end of the road. In addition to the two designated parking lots, pull-offs located next to forestry road gates offer limited parking.

Based on SCORP’s description of the recreational activities Wisconsin residents are looking for when they visit the Mississippi River Corridor (notably boating, fishing and camping), the CESF does not provide those recreational needs. However, with no motorized vehicle uses allowed, the property is suitable to visitors who are looking for hiking, hunting, horseback riding, sight-seeing, bird watching, nature study and other quiet, day-use activities.

HORSEBACK RIDING

Horseback riding has been allowed on the CESF since development of the first Master Plan in 1978, however there are no designated bridal trails on the property. Public horseback riding trails are not extensive in the region surrounding the CESF. The property provides fairly accessible, but short trail rides. While overall use has been low to moderate, management estimates there is someone riding on the property most days of the week except during the winter season. Riders commonly request to have fallen trees cleared from pathways to enhance horseback riding on the property. At least one large annual riding event is organized by private citizens. Anecdotal evidence suggests that overall rider use has been increasing, as evidenced by noticeable horse paths forming on the major forest roads. Continued heavy usage on the steeper road grades and the ski trail have led to management concerns over erosion and increased trail maintenance costs. These problems may become more serious as ridership increases. Another issue identified by the recent invasive plant survey was the presence of “satellite” populations of the invasive species, garlic mustard, concentrated along well-used horseback and hiking trails.

CROSS-COUNTRY SKIING

Cross-country skiing is the most significant recreational use that requires developed infrastructure on the property. The local ski club has groomed the 12 mile trail system for many years, while DNR staff has maintained the trail signage. Grooming during snow conditions for classical and skate skiing continues under a volunteer agreement. The current CESF ski trail system requires improvements in terms of Department standards for clearance and hazard tree removal. Some areas of the trail also require improvements to the trail grade to make skiing more enjoyable. Some improvements have been made to date, however progress has been limited by staff and property resources. Since portions the ski trail system also serve as the major forest road system, occasionally conflicts arise with other trail users (i.e., timber harvesting, hikers, horseback riders, law enforcement access, etc.). Sometimes conflicts arise between the skiers themselves who prefer different types of cross-country styles (i.e., classical skiers vs. skate skiers). Maintaining trail signage has been difficult due to vandalism from target shooting.

RECREATIONAL FACILITIES AND USE

HUNTING

Hunting is probably the recreational use that draws the most people to the CESF. Species that are commonly hunted include white-tailed deer, ruffed grouse, squirrels, turkeys, and rabbits. The period of heaviest use is during the traditional 9-day gun deer season. Most of the hunters are from the local vicinity, but DNR staff has had contact with turkey and deer hunters from many other parts of the state as well as from surrounding states. The overall hunting safety record for the property has been good, but there have been minor accidents and conflicts. Conflicts could often be avoided by the appropriate use of blaze orange during hunting seasons, by hunting and non-hunting users alike. There are opportunities to address potential conflicts before they arise and make sure the property maintains safe, enjoyable hunting opportunities. Habitat improvement projects implemented by public volunteers (organized by DNR law enforcement, wildlife and forestry staff) might educate new hunters and exemplify the role hunters may take in the sustainability of their sport. Improved relations between hunters may also result from "a community project.

There are currently a total of 1,899 acres of privately owned lands in the Managed Forest Law program open to public hunting in La Crosse County (WI DNR Smart Growth stats, 2006). This is only 10% of the total MFL acres in the county. This is a growing trend across the state; fewer private landowners are allowing public access to their forests. In an area of the state dominated by private ownership, access to public recreation lands, such as the CESF, is crucial. The demand placed on public fishing, hunting, and recreation land will increase as more private land is purchased by owners not willing to keep their property open to the public. The CESF represents one of the few large, publicly owned, upland forests in La Crosse County suitable for hunting a variety of forest game species.

MOUNTAIN BIKING

Mountain or off-road biking is not currently allowed on the CESF; however management has seen evidence of unauthorized biking on the property. Steep slopes and erodible soils limit the capability of CESF to safely provide this type of recreation.

MOTORIZED RECREATION

There is no motorized vehicle use allowed on the property except for forestry and farming machinery, law enforcement

and service vehicles. Occasionally, ATVs have entered the property from neighboring lands but violations have been rare in recent years. Since the CESF is small and somewhat isolated, there are no good opportunities to connect to other ATV corridors within the region. Prior to gating the major forest roads in the 1970s, damage from vehicle rutting, dumping of trash, and illegal camping were commonly reported problems on the property. These problems have all but been eliminated in the interior of the property since motorized vehicles have been restricted. Additional gates may be needed on minor forest roads to further control vehicle access. Some maintenance is needed on the major forest roads and parking areas to improve visitor vehicle access. The main eastern entrance road and parking lot is in need of frequent re-grading to remove potholes. The CESF is one of the few public properties in the region without motorized vehicle access. This situation offers excellent quiet recreational opportunities.

ENVIRONMENTAL EDUCATION

The CESF has frequently been used for educational events with local schools, conservation organizations, university classes and forest landowner organizations. A youth turkey hunt, public tree plantings, woodland owner field days, university astronomy classes and habitat restoration projects are few examples of past events. Forest management practices and research projects have also served as important educational opportunities for professional foresters and resource professionals across the state. The CESF is the largest publicly managed, accessible forest in the region and could provide forest based educational opportunities. The lack of Department resources required for this type of education is a limiting factor. Partnerships with local schools and organizations would need to be established to facilitate environmental education events. There are four nature centers and two registered school forests in the vicinity of the CESF at the present time.

BERRY, FRUIT, NUT AND MUSHROOM GATHERING

The gathering of nuts, berries and mushrooms has long been popular on the CESF.

CAMPING

Overnight camping and fires are not allowed on the property. Violations sometimes occur, but are less frequent since the installation of gates on all main forest roads. Campfires and vandalism are more common problems in the designated parking areas.



SOCIAL/CULTURAL RESOURCES

LAND OWNERSHIP

There are no private in-holdings within the property boundary, but there are 77 acres under sharecropping agreements with 4 local farmers who operate farms near the CESF boundary. The original master plan found mutual benefit for the forest and area farmers with the continuation of these agreements. These areas of row crops and hay provide open space, wildlife food and cover, maintain field sites for future tree planting and avoid establishment of invasive species and violation of local noxious weed ordinances on CESF.

Private property borders the CESF on all sides with minor trespass infringements. Four quarter-quarter sections remain in private ownership within the original CESF project boundary. As of 2006, there were 19,106 acres of forestland enrolled in the Managed Forest Law program in La Crosse County and seven of these private forests are adjacent to the CESF. The majority of land adjacent to the CESF is either in forest or agriculture and is zoned "Exclusive Agriculture." However, the number of nearby residential homes has increase somewhat over the past decade. Due to its proximity to La Crosse and West Salem, the lands surrounding the CESF are under increasing development pressure.

HISTORICAL/ARCHEOLOGICAL

There were two historical sites on the property. One of the historical structures is a storage building that has not been assessed for listing on the National Register of Historic Places (NRHP). The other structure, a residence, was not NRHP eligible, and was removed.

There is one archeological site, a lithic scatter, which is just outside of the forest boundary to the southwest. There were no specific artifacts identified in the remains and they are dated generally from prehistoric (pre-1634) times (Dudzick 2007). There may be more historical or archeological sites on the property, but no others have been identified.

ADMINISTRATIVE AND OTHER FACILITIES

The management of the CESF is headed by the DNR Forester for La Crosse County with guidance and assistance from the DNR Conservation Warden, Wildlife Biologist, Regional Ecologist and Area Forestry Leader. These specialists are located at the La Crosse Service Center and there is no full time official

Department presence on the forest. Facilities on the forest consist of access roads, ski trail markers and kiosk, one storage building, nine parking areas, ten gates and fence around the much of the perimeter. Vandalism, alcohol use and litter have been noted as problems, probably due to the remote nature of the property. Continued maintenance (e.g., grading, gravel, etc.) is needed on the access roads, parking areas and gates to maintain safe and reasonable access to the property.

RESEARCH PARTNERSHIPS

The CESF was originally established as a research forest and a history of the experiments are visible on the landscape today. Partnerships with the USDA Forest Service, universities, forest products industry, the Aspen/Larch Genetics Cooperative and others have fostered a rich tradition of forestry and watershed research on the property. This research has in turn helped guide resource management practices in the region and helped educate a generation of resource professionals. Research has declined since the mid seventies and current studies are intermittent. However, opportunities exist to foster further research, in cooperation with the Forest Service, universities and others, that will help inform and improve land management in the Driftless region. For example, the Forest Service recently renewed its 15-year research lease on the property. Additional

TABLE 3.4: REGIONAL COUNTY POPULATION ESTIMATES AND PROJECTED INCREASES

County	Population Estimate 2004	Projected Increase 2010-2020
La Crosse	109,616	5,035
Trempealeau	27,765	1,286
Monroe	42,626	3,310
Vernon	28,928	2,193

SCORP, 2005

TABLE 3.5: REGIONAL HOUSING UNIT CHANGE

County	Percent Change in Total Housing Units 1990-2000
La Crosse	13.7%
Trempealeau	13.7%
Monroe	17.9%
Vernon	14.6%
Statewide	12.9%

MRPC County Profiles, 2007

SOCIAL/CULTURAL RESOURCES

opportunities exist to maintain and build upon past research through the preservation of overgrown research plots and the maintenance of research data.

LANDSCAPE SCALE MANAGEMENT

It is important to consider management at a landscape scale, and to consider stand level opportunities within the larger context of the surrounding landscape. The CESF offers an excellent opportunity within the Driftless area to manage for large blocks of contiguous forest and expand dry prairie communities. Maintaining larger areas of these natural community types will improve the long-term viability of the plant and animal populations that reside here. There are a number of properties adjacent to the CESF that are under the Managed Forest Law program. This potentially offers the opportunity to sustainably manage for a larger forested area, intermingled with other community types (i.e. cliffs and prairies). In order to manage on a landscape scale, it is important to increase cooperation and coordination across administrative boundaries. Management interest and emphasis may vary between public and private land ownerships, but there are still many opportunities to work cooperatively in conserving the region's resources on a landscape scale.

PROJECT BOUNDARY EXPANSION

Another way to conserve lands surrounding the CESF and increase the ecological, social, and economic benefits associated with a large, upland forest is to increase the number of acres in public ownership. Most of the land within the original CESF project boundary, except for four quarter-quarter sections, has been purchased by the state. If a new project boundary was considered, additional opportunities may exist to expand the contiguous state forest lands. A project boundary designation allows the DNR to make offers to willing sellers of land only.

FOREST MANAGEMENT PRACTICES FOR WATER QUALITY

The entire Driftless region presents forest and agricultural management challenges in terms of the steep topography and erodible soils. The protection of the hydrology and water quality in the Driftless area is a major priority. The CESF in particular contains several springs that feed into nearby streams. The CESF provides many opportunities to develop and demonstrate "best management practices" for harvesting, erosion control and water quality that can help inform private lands management in the region. The property has already been a model for this type of research with the "ditch-saver" study that demonstrated a method to stabilize forest gully erosion.





REGIONAL CONTEXT

LAND OWNERSHIP AND LAND-USE PATTERNS

At almost 3,000 acres, the CESF is one of the largest publicly owned properties in La Crosse County and is the largest block of contiguous upland forest under public ownership. The Van Loon Wildlife Area is approximately 4,000 acres and is located northwest of Holmen along the Mississippi River. There are three State Natural Areas in La Crosse County. The largest publicly owned property is the 200,000 acre Upper Mississippi River National Fish and Wildlife Refuge. La Crosse County has two small county forests, the Hoeth Forest and the Raymond C. Bice Preserve. These publicly owned resources overall make up a small percentage of the land ownership in the region.

The majority of southwestern Wisconsin is privately owned agricultural land. Agriculture constitutes more than 60% of the land area in southwestern Wisconsin and approximately 30% of the land value. Forests make up another 23% of the region's area and 5% of the land value (Marcouiller and Mace 1999). In La Crosse County, 45% of the land acreage is forested (WDNR 2006a). There are 12,553 acres of publicly owned forestland and 118,994 acres of privately owned forestland in La Crosse County.

The area of La Crosse County was first inhabited by Native Americans about 12,000 years ago and the first Euro-Americans did not begin settling the area until the 1850's (La Crosse

County Historic Preservation Sites Commission 1995). The lumber industry of the north gave rise to the communities in the La Crosse Valley because it was a prime location for sawmills along the flat Mississippi River route and as a port at the terminus of the Black River bringing logs from the north. This was a short lived boom because the timber lands were soon depleted which directly affected sawmills and secondary lumber industry in the region. Focus was then placed on the agricultural potential of the region and this continues today.

The Wisconsin Department of Administration estimates that La Crosse County will develop over 5,000 acres of land and grow by 8,000 new households over the next 20 years. By 2025, it is estimated that over 1,300 acres of current agricultural/open space in the Townships of Bangor, Barre, Greenfield, Hamilton and Washington (surrounding the CESF) will be developed (La Crosse County 2006a). The growth development is projected to be highest around the city of La Crosse and the communities along the interstate corridor. Between 1990 and 1997, close to eight percent of the agricultural acreage around the La Crosse area was converted to other uses (La Crosse County 2006b). The steep slopes in the area pose development constraints and results in more development along flat ridge tops and valley bottoms.

Housing and population density in the region are relatively high compared to other parts of the state. La Crosse County's population has grown between 10 and 15 percent each of the past several decades. In 2005, the population was 110,302 (La Crosse County 2006a) with a population density of 236.5 persons per square mile, while the statewide average was 98.8 persons per square mile. It is roughly a twenty to thirty minute drive from the CESF to La Crosse. The CESF is directly south of the Village of Bangor (population 1,474) and roughly three miles southeast of the Village of West Salem (population

REGIONAL CONTEXT

4,540), one of the fastest growing communities in the area (La Crosse County 2006a).

The La Crosse County Development Plan and the Coulee Visions Plan (2006c) recommend a “planned development center” approach to growth. Some key components of this growth alternative that are relevant to the CESF are:

- Maintain and preserve “greenbelts” or existing open spaces between communities.
- Protect additional bluff lands from development.
- Limit the rezoning of “Exclusive Agricultural Lands”.
- Allow limited growth in rural areas. Prohibit rezoning for new subdivisions (5 or more lots).
- Use “conservation” design principles for low-density, rural development.
- Develop ordinances that allow the “clustering” of rural housing.

REGIONAL TRANSPORTATION NETWORK

The CESF lies along the major east-west transportation route of Interstate 90 which connects Chicago, Madison, La Crosse and the Twin City metropolitan area of Minnesota. State Highways 162, 16, and 33 run near the property and are used mainly for inter-county travel. The CESF is accessed most directly from Interstate 90 and State Highway 162.

Due to the idyllic rural nature and undulating topography of La Crosse County, driving for pleasure is a popular past time that draws tourists to the area. The county has three State designated Rustic Roads and the Great River Road which runs along the Mississippi River. These roads offer beautiful vistas of the Mississippi River Valley, rolling farmland, forested valleys and coulees.



BIOLOGICAL RESOURCES AND ECOLOGICAL NEED



BIOLOGICAL RESOURCES AND ECOLOGICAL NEEDS

REGIONAL GEOLOGY AND SOILS

The Western Coulee and Ridges Ecological Landscape is characterized by its highly eroded, un-glaciated topography and relatively extensive forests. Soils are wind-blown silt loams (loess) and sandy loams over sandstone residuum over dolomite. Several large rivers including the Wisconsin, Mississippi, Chippewa, Kickapoo and Black flow through or border the Ecological Landscape.

Historical vegetation in the Western Coulee and Ridges consisted of southern hardwood forests, oak savanna, prairie, and floodplain forests and marshes along the major rivers. With Euro-American settlement, most of the land on ridge tops and valley bottoms was cleared for agriculture, eliminating much of the oak savanna and prairie. The steep slopes between valley bottom and ridge top, unsuitable for raising crops, grew into oak-dominated forests after the ubiquitous wildfires were suppressed. This pattern is also true of La Crosse County. Historically, the majority of La Crosse County was characterized as oak forest, oak opening or prairie. The only notable exceptions to this vegetation pattern were the lowland areas, particularly near the La Crosse and Mississippi rivers.

Figure 3.2: The Western Coulee and Ridges Ecological Landscape shaded in gray

Current vegetation in the Western Coulee and Ridges Ecological Landscape is a mix of forest (40%), agriculture (36%), and grassland (14%) with some wetlands in the river valleys. La Crosse County also has a similar mix of forest (40%), agriculture (32%) and grassland (8%) with wetland types in the La Crosse and Mississippi river valleys. The primary forest cover is oak-hickory (51%), dominated by oak species in association with shagbark and bitternut hickory. Maple-basswood forests (28%), dominated by sugar maple, basswood and red maple, are common in areas that were not subjected to repeated pre-Euro-American settlement wildfires. Bottomland hardwoods (10%) are common in the valley bottoms of major rivers and are dominated by silver maple, ash, elm, cottonwood, and red maple. Relict conifer forests of white pine or hemlock are rare natural communities found on the cooler, steep, north-slope microclimates. A small number of dry prairies still exist around rock outcroppings and steep bluff faces, but most have become overgrown by forest cover.

There are no natural lakes in this Ecological Landscape, but there are a number of impoundments. There are many cold-water streams and larger river systems. Levels of stream and groundwater pollution are worse than average, according to Wisconsin DNR watershed rankings.

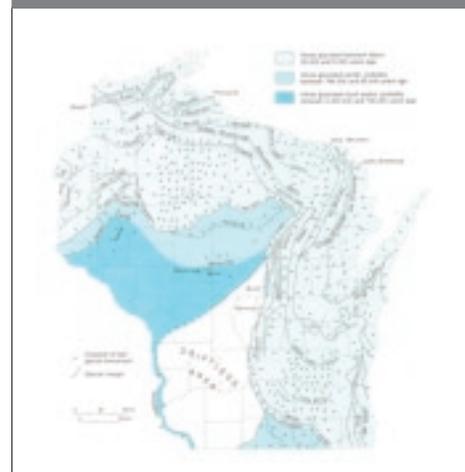
Eco-regions

The National Hierarchical Framework of Ecological Units (NHFEU) defines eco-regions as geographic areas of similar physical, chemical, and biological characteristics in a hierarchical framework (Avers et al 1994). The CESF is located within Province 222, Eastern Broadleaf Forest. It lies within Section 222L, the North Central U.S. Driftless and Escarpment Section, and Subsection 222Lc, the Mississippi/Wisconsin River Ravines. It also lies entirely within the Rountree Ridges,

**FIGURE 3.2:
THE WESTERN COULEE AND
RIDGES ECOLOGICAL LANDSCAPE**



**FIGURE 3.2:
DRIFTLESS AREA OF WISCONSIN**



BIOLOGICAL RESOURCES AND ECOLOGICAL NEEDS

Tunnel City Hills, and Valleys-South Land Type Association (LTA 222Lc13). The characteristic landform pattern of this LTA is hilly with wide summits surrounded by lower hills and very narrow valleys.

ECOLOGICAL SETTING AND CAPABILITY

Forest Resource

The Western Coulees and Ridges Ecological Landscape is noted for relatively extensive forest cover, compared to other parts of southern Wisconsin that have a larger percentage of agricultural land. These forests have long been prized for their high quality hardwood sawtimber, especially for Northern red oak and black walnut logs. In 2005 northern red oak removals were 164% of their annual growth in the Driftless region. As the oak timber has been harvested over past few decades, many forest sites have converted to a mixture of central hardwoods (e.g., hickory, black cherry, elm) and northern hardwoods (e.g., sugar maple, basswood, ash.). The region still supports an active forest products industry, with many locally owned sawmills specializing in fine hardwood lumber.

Wildlife Resource

The region is home to both common and rare wildlife species. Perhaps the most common game species in the region are white-tailed deer, gray and fox squirrel, wild turkey, and migratory waterfowl. The abundance of these species has fostered a strong hunting tradition within the local communities.

The extensive forest cover is also known to support significant populations of neo-tropical migratory songbirds. Several rare species, not found in other parts of southern Wisconsin, thrive within the large, contiguous blocks of forest cover.

Rare Animals

The region contains a diverse set of habitats that support wildlife not found in other regions of Wisconsin. The Natural Heritage Inventory (NHI) program has recorded 170 rare animal species in the Western Coulee and Ridges Ecological Landscape, including 5 mammals, 28 birds, 17 herptiles, 26 fish, and 94 invertebrates. Also recorded were 5 different "Miscellaneous Elements" including bat hibernacula, herptile hibernacula, bird rookeries, mussel beds, and a migratory bird concentration site.

State Endangered or Threatened Animals

There are 33 documented State endangered species in the Western Coulee and Ridges Ecological Landscape, including 5 birds, 5 herptiles, 7 fishes, and 16 invertebrates. There are also 31 documented State threatened species including 11 birds, 2 herptiles, 9 fishes, and 9 invertebrates.

Federal Endangered or Threatened Animals

There are 6 documented animals that are federally listed in the Western Coulee and Ridges Ecological Landscape including 2 endangered (Karner Blue Butterfly, Higgins' Eye Mussel), 1 threatened but being considered for delisting (Bald Eagle) and 3 species being considered for listing (Eastern Massasauga Rattlesnake, Spectacle Case Mussel, Bullhead Mussel).

Natural Communities

The diverse and unglaciated topography supports natural communities that are uncommon elsewhere in the state, such as dry prairies, hemlock and pine relicts, oak savannas, dry and moist cliffs and coldwater streams. These communities in turn support a host of rare plants.

Rare Vascular Plants

The NHI program has recorded 122 rare plant species in the Western Coulee and Ridges Ecological Landscape. Of those, 2 species (Northern Wild Monkshood and Prairie Bush-clover) are federally listed as threatened, 17 are listed as Wisconsin endangered, 26 are listed as Wisconsin threatened and 77 are listed as Wisconsin special concern species. Twenty-three of the 122 species have only been documented in the Western Coulee and Ridges Ecological Landscape, and 31 others have at least 50% of their documented populations in this Ecological Landscape.

Grassland and Prairie Habitats

Dry prairies were once common, generally along exposed ridge tops and on steep south and west facing slopes. Some good quality remnant prairies still exist and the Western Coulees and Ridges Ecological Landscape offer some of the best opportunities to manage for this prairie community. Also, there are many examples of "surrogate grasslands", often old agricultural fields which have been planted to native or non-native grasses, which offer habitat for many species such as grassland birds.

BIOLOGICAL RESOURCES AND ECOLOGICAL NEED**Streams and Rivers**

The region is well-known for its abundant rivers and streams. Major rivers include the Mississippi, Wisconsin, Black, Kickapoo, La Crosse and Chippewa. Spring-fed coldwater streams are common within most primary valleys and feed the major river systems. Several are considered world-class trout fishing streams. The CESF however, has no significant water resources.

Soils and Geology

The Western Coulee and Ridges Ecological Landscape in southwestern and west central Wisconsin is within the "Driftless Area" or unglaciated portion of the state (Figure 3.2). The dissected topography of this erosional landscape is characterized by deeply incised, steep-walled valleys and ridgetops with outcrops of Paleozoic bedrock. Rivers in the area carried meltwater from glaciation further to the north, filling some of the major valleys with glacial outwash materials.

Soils on the hills are formed in loess (i.e., wind-blown silt), silty alluvium, loamy to clayey residuum, and loamy colluvium over limestone or sandstone. They range from well drained to moderately well drained and typically have silt loam to sandy loam surface textures, moderate permeability, and moderate available water capacity. Some of the larger valleys in the La Crosse area contain stream terraces deposited by outflow from glaciation, where soils formed in outwash sands. Soils of the narrower valleys that occur within the CESF are mostly silty and loamy residuum and alluvium. These soils range from well drained to very poorly drained, and have areas subjected to periodic flooding. The soils of this area are generally very productive in terms of forest growth and agriculture. However, many ridge tops and slopes have been severely eroded since Euro-American settlement due to agriculture and grazing practices. The erosive nature of these soils combined with the steep topography, still presents challenges to agriculture and forest management.



RECREATIONAL RESOURCES AND USE



RECREATIONAL RESOURCES AND USE

La Crosse County is included in the Mississippi River Corridor (MRC) region as described in the Statewide Comprehensive Outdoor Recreation Plan (SCORP) along with the other counties that border the Mississippi River from St. Croix County in the north to Grant County in the south. As part of the SCORP process, outdoor recreation participation surveys were broken down to the regional level. Regional participation is based on a number of factors including environmental resources, seasonal variation, and demand of residents ages 16 and older. Participation rates in the Mississippi River Corridor range from 0% to 100% depending on the recreational activity (WDNR 2006).

The Mississippi River, which runs along La Crosse County’s western border, is the primary recreational resource in the region. The river is used for a variety of water-based recreational activities such as boating, swimming and fishing. Streams extending off the Mississippi and its backwaters support an excellent coldwater fishery, with 16 streams classified as trout waters.

Due to the unique topography in this part of the state, the region also provides many opportunities for scenic drives on rustic roads such as the Great River Road, a thoroughfare that follows the Mississippi for 250 miles and connects over 50 local parks and beaches.

According to the SCORP survey, the forest-based recreational activities having the highest percentage of participants in Mississippi River Corridor region include: walking for pleasure (86%), family gathering (79%), driving for pleasure (59%), and picnicking (52%). When compared to other regions, the forest-based recreational activities in Mississippi River Corridor region that rated as having the highest percentage of participants include: visiting a farm or agricultural setting (40%), developed camping (38%), off-road driving with an ATV (35%), and hunting upland birds (19%). Activities popular with residents are somewhat different from non-Wisconsin residents. Non-residents visiting from both the Chicago area and the Twin Cities had 3 of the top 5 activities in common which were sightseeing, picnicking, and camping (WDNR 2006). Table 3.6 shows a list of the top four highest demanded recreation activities by resident or non-resident.

The Wisconsin Land Legacy Report identifies places considered most important to meet Wisconsin’s conservation and recreation needs over the next 50 years. The places in this area that were identified in the report include the Kickapoo River, Upper Mississippi River National Fish and Wildlife Refuge, Lower Chippewa River and Prairies, Coulee Coldwater Riparian Resources and the Black River (WDNR 2006). There are also a number of specialized recreation areas in the County consisting of golf courses, rod and gun clubs, fair grounds, a ski resort, heritage and nature centers, which total 2,620 acres (La Crosse County 2006c).

SCORP has projected that the MRC region will see a 0.78% population increase by 2010. This rate of growth is second highest out paced only by the Southern Gateways region which includes Dane, Jefferson, Green, Rock, Richland, Sauk, Columbia and Dodge Counties. This population increase will place a greater demand on regional recreational opportunities (WDNR 2006).

PUBLIC LAND OPEN TO RECREATION

La Crosse County is home to numerous federal and state recreational areas that provide a variety of recreational activities. Over 12,000 acres of land area (22,000 total land and water acres) of the 240,000 acres which make up the Upper Mississippi River Fish and Wildlife Refuge (UMRFWR) is located in La Crosse County. The refuge includes portions of the Mississippi River shoreline, the Black River Delta, and Mississippi River islands. The area is open to fishing, hunting, wildlife observation, interpretation and photography.

The Van Loon State Wildlife Area is also in La Crosse County and offers around 4,000 acres of sloughs, marsh and forest which are open for hunting duck, deer, squirrels, raccoons, waterfowl, and turkey. This area is also open for hiking, fishing, canoeing, wildlife observation and plant study.

The CESF represents the largest block of upland forest under public ownership in La Crosse County, with approximately 3,000 acres.

TABLE 3.6: HIGHEST DEMANDED FOREST-BASED RECREATION

Wisconsin Residents	Non-Wisconsin Residents (Twin Cities)	Non-Wisconsin Residents (Chicago)
Walking for Pleasure	Bird-watching	Downhill Skiing
Family Gathering	Sightseeing	Sightseeing
Driving for Pleasure	Hiking	Picnicking
Picnicking	Picnicking	Camping

WDNR Scorp, 2006

RECREATIONAL RESOURCES AND USE

Although most of the public land in the county is within fishery or wildlife areas, there are approximately 2,200 acres of county and municipal parks (WDNR 2006).

The CESF represents one of the few large, publicly owned, upland forests in La Crosse County. As such, the property meets the needs of users looking for an upland habitat, such as deer and small game hunters, hikers, morel mushroom hunters, cross-country skiers, snowshoers and horseback riders. Although no formal recreational-use statistics have been collected on the CESF, Department staff has reported seeing a steady increase in use over the past decade. Given the close proximity to growing population centers, such as La Crosse, Onalaska and West Salem, the CESF will continue to be an important part of the region's recreational resources.

RECREATION

Horse Trails

A supply shortage at the county level and on a larger regional scale was identified by both SCORP and the La Crosse County Recreation Plan. For comparison, in nearby Jackson County there are 44 miles of state-owned trails designated for horseback riding.

Cross-country Ski Trails

Demand in the region is low with only 8.3% of the population participating in this activity. Within La Crosse County there are 27 county, 39 municipal and 5 state-owned trail miles. There are also two regional trails, the Great River State Trail at 24 miles, and the La Crosse River State Trail with 21.5 miles. All together there are a total of 117.5 miles in the County. When compared to neighboring Trempealeau and Vernon counties who have 40 and 20 miles respectively, La Crosse County has almost three times as many miles within a smaller area. However, a supply shortage was identified by SCORP at the regional level with a 7% participation rate (WDNR 2006).

Mountain Bike Trails

When comparing neighboring counties, La Crosse County's total of 11 miles falls below Vernon and Trempealeau which have 12 miles and 27 miles respectively. According to Human Powered Trails Inc., a La Crosse area nonprofit organization, it plans to add an additional 8-10 miles of trails to the upper Hixon Forest. Monroe and Jackson Counties make up part of the Western Sands region and have 1 mile and 64 miles respectively. It is clear that there is a wide range of available trail miles within these two regions. With a low regional participation rate of 25%, the supply of mountain bike trails was considered by SCORP to be sufficient (WDNR 2006).

Hunting

There are approximately 7,000 acres of state-owned land in the county including state forest, wildlife, fisheries and streambank protection areas. Most of these acres are open to hunting. Of those total acres, almost 4,000 of them are located within the Van Loon Wildlife Area and almost 3,000 within the Coulee Experimental State Forest. Waterfowl hunting is popular at the Van Loon Wildlife Area, as well as within the larger river corridors. Deer and small game hunting are popular at the CESF and the La Crosse County forests.

Camping

Camping is a popular recreational activity within the county with just under 400* campsites in 8 different campgrounds (WDNR 2006) available on 1,277 acres (La Crosse County Plan). Within La Crosse County, there are roughly 115 more electric sites than non-electric with the emphasis on trailer or camper-style camping. The campgrounds are located throughout the county and provide residents and visitors with excellent opportunities to enjoy the outdoors in La Crosse County.

When looking at the surrounding counties, La Crosse County is the second highest provider of campsites (see public and

TABLE 3.7: COMPARISON OF REGIONAL PUBLIC LAND ACREAGE BY COUNTY

Public Conservation and Recreation Lands	La Crosse	Jackson	Monroe	Trempealeau	Vernon
Federally-owned acres	12,192	1,697	15,529	4,207	6,863
State-owned acres ¹	7,145	75,592	5,149	6,545	5,582
Municipally-owned acres ²	5,328	122,996	7,578	489	1,624
Total acres	24,665	200,285	28,256	11,241	14,069

SCORP, 2005 Appendix D: Conservation and Recreation Lands in Wisconsin

RECREATIONAL RESOURCES AND USE

private campsites table). However, at the regional level, the Mississippi River Corridor has the greatest demand for developed camping across all planning regions state-wide with over 36% of the population reporting participation in this activity. It was also identified as a nature-based supply shortage in the region (WDNR 2006).

Snowmobile

There are 1,959 miles of trails in public ownership and numerous more miles that are privately maintained within the Mississippi River Corridor. This is slightly less than the 2,856 miles found in the Western Sands Region (WDNR 2006). About 130 of those miles are within La Crosse County. SCORP reported that regional participation for snowmobiling was low, at 22% in the Mississippi River Corridor and 25% in the Western Sands. There were no issues identified in SCORP related to demand for this activity.

TABLE 3.8: NUMBER OF PUBLIC AND PRIVATE CAMPSITES BY COUNTY

Counties with Public & Private Campsites	Electrical Campsites	Non-electrical Campsites	Total Sites
Monroe	389	386	775
La Crosse	256	142	398
Jackson	62	57	119
Trempealeau	50	54	104
Vernon	65	15	80

SCORP, 2005

All-Terrain Vehicles

In La Crosse County there are currently no designated trail miles. On the regional level, the Mississippi River Corridor also has no designated summer or winter use ATV trails on public land. The Western Sands region has 227 summer-use and 944 winter-use trail miles. Across the Mississippi River in Minnesota there are 39 miles of trails within the closest 3 counties to La Crosse County.

With a participation rate of 34.6%, the Mississippi River Corridor scored the highest rate of participation in all SCORP planning regions across the state. Western Sands reported the second highest level of use at 34.1%. The supply of trails available in the region was identified by SCORP as an issue (WDNR 2006). The Quad County Trail in northern Trempealeau County has about 38 miles of year-round trail, but it is not recognized in SCORP data. ATVs are not allowed on the snowmobile trails in La Crosse County during the winter months.

Nature Centers and Outdoor Education/Interpretation

County there are four locations for environmental education including the Hixon Forest Nature Center, Stry Nature Center, Norskedalen Nature and Heritage Center, and the Upper Mississippi River National Fish and Wildlife Refuge. These centers provide educational experiences geared toward plants and wildlife (explorewisconsin.com & amethyst-dragon.com). At the regional level, the Mississippi River Corridor has a total of 18 nature centers compared to the Western Sands region which only has 14. Even with only 8% of the population reporting that they participated in this activity, nature centers were included in the list of recreational supply shortages for the Mississippi River Corridor (WDNR 2006).





SOCIO-ECONOMIC TRENDS

La Crosse County provides a wide range of recreation options and draws a great number of tourists to the area. Tourists visiting for forest-based recreation, including quiet recreationists, hunters and motorized recreationists, have different effects on the local economy. Marcouiller and Mace (1999) found quiet recreationists prefer state public land whereas motorized recreationists prefer a wider range of types of forest ownership to recreate on. The CESF only allows quiet, non-motorized recreation and hunting; eliminating motorized users as a visitor. Quiet recreationists were found to spend a greater proportion of their household expenditures in the local area they recreate in. Overall, motorized recreationists spend more on all aspects of recreation than other user groups. A large portion of this is in their home community, not the recreation destination. (Marcouiller and Mace 1999).

Marcouiller and Mace (1999) found that southwestern Wisconsin's tourism sensitive economic sectors' output was almost twice as great as its wood-based economic sector. Even though the wood sector does not generate a large portion of the region's output, the economic impact of the primary and secondary wood processing industry on: 1) industry output, 2) personal income, and 3) employment is one of the highest in the state. This is explained by the remarkably high value of hardwoods in the region. Comparatively, the economic impact of the region's tourism sector is one of the lowest for the same three variables. The region's forests offer an interesting

TABLE 3.9: LA CROSSE COUNTY MAJOR OCCUPATIONS

La Crosse County Major Occupations	Percent Employed
Management, professional and related	30.8%
Service	16.8%
Sales and office	27.4%
Farming, fishing, and forestry	0.3%
Construction, extraction, and maintenance	7.6%
Production, transportation, and material moving	17%

U.S. Bureau of the Census 2000

blend to the wood and tourism economy. The forests may not be producing a high volume of timber, but the impacts of the processing are great. Whereas the tourism sector generates a proportionally greater economic output for the region but its impact is not as high as other areas of the state.

State Forests in Wisconsin are certified sustainable by two independent, third party forest certification systems: Sustainable Forest Initiative (SFI) and Forest Stewardship Council (FSC). The demand for certified wood products is a growing trend internationally, nationally, as well as locally. The CESF offers wood industries in the region a source for certified wood products.

ECONOMIC TRENDS

La Crosse County has a diverse workforce which is well balanced between various sectors due to the strong business development in the city of La Crosse. In the greater region (i.e., Trempealeau, Monroe, Vernon Counties), a much higher percentage of the workforce is in the farming and manufacturing sectors.

The forest industry in the counties surrounding the CESF is well established but is primarily made up of sawmills. There is a competitive market in this region for the quality sawtimber but a limited demand for the pulpwood and lower quality timber. There is also a very large population of Amish sawmills located in these counties which are not included in the data bases. We estimate there could be as many as 60 small sawmills and related secondary operation in the Amish community.

TABLE 3.10: PRIMARY AND SECONDARY WOOD USING INDUSTRY IN THE REGION

County	Primary	Secondary
Jackson	4 sawmills, 1 chip plant	5 firms
La Crosse	1 sawmill, 1 wood treating and post/poles firm	13 firms
Monroe	4 sawmills	13 firms
Trempealeau	4 sawmills, 2 shavings firms	12 firms
Vernon	13 sawmills	2 firms

WI DNR, 2006

SOCIO-ECONOMIC TRENDS

In the southwest region of Wisconsin, growth to removal ratios of hardwood is extremely high for public lands and there is a declining hardwood resource base on privately owned lands (Marcouiller and Mace 1999). The public lands in the southwest are providing a valuable and sustainable hardwood resource. The USDA Forest Service's Forest Inventory and Analysis (FIA) data are often used to assess the timber resource. The FIA uses statistical sampling at selected plots. FIA data showed

private non-industrial forest lands in the southwest produced over \$51 million of average annual sawtimber removals—the greatest value for all regions of the state. In comparison, state forests in this region produced over \$500,000 in sawtimber removals during the same period. For softwoods in the southwest, private lands have an expanding resource base (i.e., more softwood tree planting) and public lands are currently at an above average growth to removal rate.



PROPERTY CAPABILITIES, LIMITATIONS, AND OPPORTUNITIES



PROPERTY CAPABILITIES, LIMITATIONS, AND OPPORTUNITIES

MANDATORY MANAGEMENT REQUIREMENTS

State Forest Designation

The Regional and Property Analysis presented here is an important step in the process of developing a master plan for the Coulee Experimental State Forest. The Department's master planning rule (Wisconsin Administrative Code NR44) identifies that this analysis and the final property master plan must meet the statutory purpose of the property's designation. In this case, the property is a state forest as defined in Wisconsin Statutes 28.

State forests such as the CESF are an important part of the Department's broader mission to provide leadership in "all matters pertaining to forestry within the jurisdiction of the state—and advance the cause of forestry within the state" (§28.01). In order to define this mission, the purposes and benefits of state forests are outlined in the following language of 28.04 (2):

(a) The department shall manage the state forests to benefit the present and future generations of residents of this state, recognizing that the state forests contribute to local and statewide economies and to a healthy natural environment. The department shall assure the practice of sustainable forestry and use it to assure that state forests can provide a full range of benefits for present and future generations. The department shall also assure that the management of state

forests is consistent with the ecological capability of the state forest land and with the long-term maintenance of sustainable forest communities and ecosystems. These benefits include soil protection, public hunting, protection of water quality, production of recurring forest products, outdoor recreation, native biological diversity, aquatic and terrestrial wildlife, and aesthetics. The range of benefits provided by the department in each state forest shall reflect its unique character and position in the regional landscape.

(b) In managing the state forests, the department shall recognize that not all benefits under par. (a) can or should be provided in every area of a state forest.

(c) In managing the state forests, the department shall recognize that management may consist of both active and passive techniques.

Forest Certification

In addition, state forest management is now guided by dual forest certification under the Forest Stewardship Council (FSC) and the Sustainable Forest Initiative (SFI). To maintain this certification, the state of Wisconsin must manage our state forests using strict environmental, social, and economic standards as outlined in the certification agreement.

USDA Forest Service

In the particular case of the CESF, the USDA Forest Service holds a lease in order to "conduct forestry, research and related studies—with the object of supplying practical forest-land-management information to the owners of similar land". The lease further states: "The lands herein leased shall be available to the Department of Natural Resources for normal State Forest uses, provided that such uses do not hinder or interfere with the use of the lands for the purposes herein set forth".



ECOLOGICAL SIGNIFICANCE AND CAPABILITY OF THE COULEE EXPERIMENTAL STATE FOREST

The Coulee Experimental State Forest is relatively small compared to other State Forests, but it represents a significant block of publicly owned, upland forest in a region dominated by agriculture and non-industrial private forests. The property's character is typical of the Driftless Area of Wisconsin in terms of its geology, topography, and ecology. Unique ecological features include mature oak forests, dry prairies, cliff communities, and a legacy of forest research. This diversity creates multiple opportunities in terms of forest management and research, wildlife habitat, and the promotion of rare species and natural communities.

The CESF is unique in Wisconsin due to its extensive research history. This research has helped inform and improve forest and watershed management practices across the entire region. With renewed interest from the USDA Forest Service and other research partners, additional research opportunities exist that may yield more information on sustainable management in the Driftless Area. The CESF offers an opportunity not available on other state lands in this region to increase our knowledge of sustainable forestry practices and to demonstrate best management practices that educate non-industrial private forest landowners. The research lease with the Forest Service does allow for normal State Forest uses, but it may also limit some recreation and management alternatives to be considered in the master planning process.

FOREST MANAGEMENT CAPABILITY

Supporting Relevant Forest Research

The original mission of the CESF was to support forest and watershed research to help guide better land management practices within the Driftless Area and this mission remains a central theme for the property. In many ways the property is still representative of the regional landscape and offers great opportunities to continue supporting this type of applied research. The combination of diverse upland forest types and agricultural lands provides research potential in the areas of hardwood forest management, forest hydrology, plantation management, natural community restoration and more. Opportunities also exist to maintain historical research information and field plots.

Promoting Contiguous Blocks of Forestland

At just under 3,000 acres of forestland, the CESF represents one of the largest blocks of publicly owned, upland forest in the region. The size and quality of this forested ecosystem allows management opportunities for a diverse mix of forest types and age classes. This in turn supports a diversity of plant and animal species not found on smaller parcels. There may be future opportunities to improve and expand the effective size of this sustainably managed forest through cooperative efforts with neighbors (e.g., Managed Forest Law program, tree planting, etc.) and/or through widening the CESF project boundary.

Forest Certification

The CESF is certified sustainable by two independent, third party forest certification systems. Forest certification ensures that the CESF remains sustainably managed and continues to provide a source of certified forest products to local industry that in turn supports the regional economy. Participation in forest certification programs provides the opportunity to monitor and continuously improve forest management practices on the state forest.

High Conservation Value Forests

Property assessments have identified high quality examples of Southern Dry-mesic and Southern Dry Forests, including the associated Dry Prairies. Some forest characteristics that are ecologically important here include; large stand size, biologically mature trees, relatively intact canopies, standing snags, tip-ups and coarse woody debris. Large, contiguous stands with these old growth characteristics are uncommon and declining in the Driftless Area and are particularly critical habitat for forest interior songbirds. Most of these stands contain biologically mature oak trees with little or no oak regeneration in the understory. Forest management opportunities exist to feature techniques that sustain and enhance these high conservation values. This a potential opportunity for forest research on the CESF.

Maintaining the Oak Forest

Despite the fact that 54% of the CESF is currently dominated by oak forests, oak regeneration is not present or is limited within most stands, especially on north-facing slopes where the cool, moist growing conditions favor shade-loving trees, such as basswood and maple. The natural succession away from oak towards central and northern hardwood forests is a common occurrence throughout the region since the suppression of prairie and forest fires. Excellent opportunities exist on the CESF to experiment with various oak regeneration techniques, including the introduction of prescribed fire where feasible and safe. Sustaining the oak forests through active management would not only benefit this valuable timber and wildlife resource, it would provide research and demonstration ideas to benefit the entire region.

ECOLOGICAL SIGNIFICANCE AND CAPABILITY OF THE COULEE EXPERIMENTAL STATE FOREST**Maintaining Early Successional Forests**

Early successional forest types, such as aspen and white birch, provide habitat for a variety of game and non-game wildlife species. Forest management opportunities exist to maintain a component of these forest types on the property.

Managing Pine Plantations

The CESF has a legacy of red pine, white pine, European larch, Norway spruce, white spruce and northern red oak plantations established over the past 50 years for forest management and research purposes. Since many of the plantations are no longer part of an active experiment, periodic thinning has been conducted to maintain tree vigor and health. Thinning allows the trees to increase in size and eventually will promote understory development and structure within the stand. Some plantations, often based on genetic trials, should be carefully maintained to preserve important plant material for future research.

Central Hardwood Forests

The second most abundant cover type (16% by area) on the CESF is central hardwoods. These diverse hardwood stands offer the opportunity to manage for fine quality hardwood sawtimber, improve forest health through increased resistance to gypsy moth and other pests, diversify wildlife habitat and develop and demonstrate effective forest management techniques that can be applied to similar forests throughout the region.

Controlling Invasive Species

A variety of invasive forest plant species have been found on the CESF. Most of these plant populations are considered well established, but have not yet spread across the entire property. Control measures are needed to prevent further spread of these populations and the degradation of native forest communities. Management options should be considered on recreational trails that appear to be a pathway for the spread of garlic mustard.



REGIONAL ECOLOGICAL NEEDS AND OPPORTUNITIES



REGIONAL ECOLOGICAL NEEDS AND OPPORTUNITIES

NATIVE COMMUNITIES

The CESF is notable for its large blocks of Southern Dry and Southern Dry-mesic Forest communities within a matrix of generally agricultural land. Several rare plants and animals are found on the property, which speaks to the ecological quality of the forest. This is particularly important with the occurrence of rare birds with affinities for older, forest interior habitats (e.g., Cerulean Warbler) for which habitat in the region is limited. Opportunities exist to coordinate forest management and research efforts that investigate methods to sustain and enhance old forest qualities and at the same time sustain desirable forest composition.

The CESF includes several smaller areas of rare natural communities, including Dry Prairie and Cliff communities. Opportunities exist to restore and expand the dry prairie communities that have been overgrown by woody vegetation. Clearing and prescribed burning can be used to restore native prairie vegetation where safe and feasible.

THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES

The rare plants and animals found on the CESF, such as yellow gentian or Cerulean warbler, are most often associated with the interior forest, dry prairie and cliff habitats. Management consideration for the natural communities that support these species will hopefully help sustain viable populations within the forest.

WILDLIFE SPECIES OF GREATEST CONSERVATION NEED

Species of Greatest Conservation Need (SGCN) are associated with natural communities within the Western Coulee and Ridges Ecological Landscape and those identified on the CESF. Stand level management that considers the entire forest and surrounding landscape in order to maintain a balance of common, uncommon and rare forest types will benefit these species. Managers should be cognizant that healthy natural communities support a wide variety of different species, and maintenance of healthy natural communities may encourage the success of many species.

SOIL AND WATER RESOURCES

The CESF contains topography, soils and hydrology comparable to much of the Driftless Area. These conditions provide both challenges in terms of forest and recreation management and opportunities to develop and demonstrate “best management practices” for harvesting, erosion control and water quality that can help inform land management in the region.



RECREATIONAL SIGNIFICANCE AND CAPABILITY OF THE COULEE EXPERIMENTAL STATE FOREST**RECREATIONAL SIGNIFICANCE
AND CAPABILITY OF THE COULEE
EXPERIMENTAL STATE FOREST**

The Coulee Experimental State Forest supports a variety of day-use recreational opportunities that are compatible with the property goals and have limited availability elsewhere in the region. The forest is a popular destination for hunting, hiking, cross-country skiing, horseback riding, nature study and wildlife viewing. Certain activities have been limited because of property size, topography and soils, conflicts with other users, incompatibility with research goals and limited DNR resources. Today the balance between the capabilities and limitations of recreation on the CESF is more important than ever as the population and demand for public land increases. Future recreational activities on the forest must remain compatible with the overarching research and forest management goals for the CESF.

HUNTING

Hunters are the main recreational users on the CESF. The region has a limited supply of upland forest that is open to public hunting and the property continues to be a popular spot to hunt deer, turkey, squirrel, rabbit and grouse. Demand for public hunting land will likely increase as the population increases and access to private lands becomes more difficult. Opportunities exist on the CESF to improve habitat for popular game species such as turkey, grouse and squirrel through forest management practices that are consistent with the other property goals. Maintenance of entrance roads, parking areas, gates and forest roads open to foot travel will allow good access for most hunters and at the same time control unwanted vehicle access and vandalism within the interior of the forest. Education can be used to promote safe hunting practices (e.g., use of blaze orange by all forest users) and reduce conflicts between user groups. Habitat improvement projects that involve public participation may introduce new hunters to the sport, exemplify hunter responsibilities and foster sound relations between hunters.

HIKING AND SIGHT-SEEING

The entire forest is open to year-round hiking. Many visitors enjoy a quiet hike for exercise, viewing wildlife and scenery, searching for morels and/or nature study. The designated ski trail and other forest roads are the primary access corridors used by most hikers. Maintenance of these corridors will allow for continued use by the public, with minimal impact to the forest resources. The main town and county roads around the property also provide good sight-seeing opportunities. The 1978 master plan identified Scenic Areas along these roads where consideration was given to the maintenance of aesthetics.

CROSS-COUNTRY SKIING

The 12 miles of designated ski trails remain a popular recreational draw to the CESF. The trail system has been groomed each winter by citizen volunteers and signage has been maintained by DNR staff. The trail system needs continual maintenance and improvements to meet Department standards for clearance and hazard tree removal. Trail grading is also needed in some areas to make skiing more enjoyable. Opportunities may exist to make skiing conditions better and reduce conflicts between user groups by improving the condition and layout of the trail system.

HORSEBACK RIDING

Horseback riding has been allowed on the CESF for many years, but there are no designated bridal trails on the property. Horseback riding opportunities are considered limited within the region. Riders primarily take short rides on the CESF using the designated ski trail and forest roads for access. Overall use has been generally low to moderate, however DNR staff have observed increased use over the past several years. Concerns with trail maintenance, erosion on steep road grades and movement of invasive species will need to be considered in planning, especially if ridership increases.

ENVIRONMENTAL EDUCATION

The CESF can continue to provide environmental education opportunities for the region, especially by building off of its research history. Research and forest management demonstrations can continue to help guide better land management practices within the Driftless Area. Department resources for educational efforts are limited, so partnerships with local schools and conservation organizations would be critical in making this a reality.

MOTORIZED RECREATION, MOUNTAIN BIKING AND CAMPING

Motorized recreation, mountain biking and camping have not been allowed on the CESF due to several factors, including the small property size, erodible nature of the soils, conflicts with other users, incompatibility with research priorities and limited DNR resources to manage intensive recreation. Because the CESF is a relatively small and isolated property, it offers no

good opportunities to connect with other motorized recreational corridors or provide desirable overnight camping. The CESF has rather found a niche supporting quiet, day-use recreation that is compatible with research and forest management and has limited availability elsewhere in the region. This recreational niche appears consistent with the property's overall capabilities and limitations and is consistent with the property's primary vision and goals.



RECREATIONAL SIGNIFICANCE AND CAPABILITY OF THE COULEE EXPERIMENTAL STATE FOREST**SUMMARY**

The Coulee Experimental State Forest is relatively small compared to other State Forests, but it represents a significant block of publicly owned, upland forest in a region dominated by agriculture and non-industrial private forests. The property's character is typical of the Driftless Area of Wisconsin in terms of its geology, topography, and ecology. Unique ecological features include mature oak forests, dry prairies, cliff communities, and a legacy of forest research. This diversity creates multiple opportunities in terms of forest management and research, wildlife habitat, and the promotion of rare species and natural communities.

The CESF is unique in Wisconsin due to its extensive research history. This research has helped inform and improve forest and watershed management practices across the entire region. With renewed interest from the USDA Forest Service and other research partners, additional research opportunities exist that may yield more information on sustainable management in the Driftless Area. The CESF offers an opportunity not available on other state lands in this region to increase our knowledge of sustainable forestry practices and to demonstrate best management practices that educate non-industrial private forest landowners. The research lease with the Forest Service does allow for normal State Forest uses, but it may also limit some recreation and management alternatives to be considered in the master planning process.





APPENDIX

A. COULEE EXPERIMENTAL STATE FOREST MASTER PLAN DESIGNATION PROCESS FOR STATE NATURAL AREAS

Generally, natural areas are tracts of land or water harboring natural features that have escaped most human disturbance and that represent the diversity 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. State Natural Areas may also contain exceptional geological or archaeological features. The finest of the state's natural areas are formally designated as State Natural Areas. The Wisconsin State Natural Areas Program oversees the establishment of SNAs and is advised by the Natural Areas Preservation Council. The stated goal of the program is to locate, establish, and preserve a system of SNAs that as nearly as possible represents the wealth and variety of Wisconsin's native landscape for education, research, and to secure the long-term protection of Wisconsin's biological diversity for future generations. SNAs are unique in state government's land protection efforts, because they can serve as stand alone properties or they can be designated on other properties, such as a State Forest. By designating SNAs within the boundary of the Coulee Experimental State Forest (CESF), we are helping to accomplish two different, legislatively mandated Department goals. This arrangement makes abundant fiscal sense because the state does not have to seek out willing sellers of private lands to meet the goals of multiple Department programs. This avoids duplicating appraisal and negotiation work and provides dual use of land that is already in public ownership.

The process to establish a SNA begins with the evaluation of a site identified through field inventories conducted by DNR ecologists including the Biotic Inventory and Regional Analysis. Assessments take into account a site's overall quality and diversity, extent of past disturbance, long-term viability, context within the greater landscape, and rarity of features on local and global scales. Sites are considered for potential SNA designation in one or more of the following categories:

- Outstanding natural community
- Critical habitat for rare species
- Ecological reference (benchmark) area
- Significant geological or archaeological feature
- Exceptional site for natural area research and education

DESIGNATION PROCESS OF SNAS AND CESF MASTER PLAN DEVELOPMENT

Step 1: Assessments	Step 2: Preferred Alternative	Step 3: Proposed Master Plan
Biotic Inventory and SNA GAP analysis	The highest rated biotic sites and those with potential for filling gaps.	Native community sites Forest Production Area

Step 1: Results from both the SNA GAP analysis and the Biotic Inventory, which were conducted on the CESF within the last few years, were used to decide which areas would be SNA opportunity areas.

Data gathered via the Biotic Inventory identifies and evaluates the natural communities, significant plant and animal populations, and selected aquatic features and their associated biotic communities. This report emphasized important protection, management, and restoration opportunities, focusing on both unique and representative natural features of the CESF property and surrounding landscape.

The SNA GAP analysis looks at representation for each primary natural community in each Ecological landscape and determines if an adequate number of ecological reference areas are in place to capture the variation across the landscape.

Step 2: Using both the Biotic Inventory and SNA GAP analysis, the CESF Preferred Alternative took sites ranked high and proposed Native Community Management Areas.

Step 3: These opportunity areas were then designated Native Community Management Areas. After the management goals were developed, the team reassessed the boundaries to

assure that each forest stand was in the correct management area. Experts worked together to ensure that these sites were also given consideration as potential State Natural Areas.

Once approved by the Natural Resources Board, sites are formally “designated” as SNAs and become part of the Wisconsin State Natural Areas system. Designation confers a significant level of recognition of these sites natural values through state statutes, administrative rules, and guidelines.

IMPACT TO MASTER PLAN PROCESS

The process for selecting and designating SNAs is determined by cooperative efforts between two programs within the DNR: The Division of Forestry and the Bureau of Endangered Resources. The master planning process for State Forests requires that the goals set by the Division of Forestry be considered before the Bureau of Endangered Resources submits candidate sites for SNA designation. This is done so that all sites are evaluated for timber production, which is outlined as a Division of Forestry priority. As a result SNAs are considered overlays to Land Management Areas. The same piece of land can achieve the goals of two different Department programs. Management activities for each proposed SNA reflect the general management prescriptions proposed for the area in which the SNA is located. For example, an SNA located within an area managed as an old unmanipulated oak stand, will follow the native community objectives for that type of stand, rather than a separate SNA management plan. The exact same forest management would occur with or without SNA Designation.

LAND MANAGEMENT IMPACT BY NATIVE COMMUNITY MANAGEMENT AREAS AND DESIGNATION OF SNAS

Native Community Management Areas emphasize aspects of the ecosystem that provide the full range of forest types and age classes as promoted by the property goals. Areas are designated to manage for old-growth characteristics, oak woodlands and dry prairie.

SNA MANAGEMENT ACTIVITIES

State Natural Areas are not exclusively passive management. Within the past five years, over 200 SNAs all over Wisconsin have had some type of active management. Examples of management activities include exotic species removal, burning and fuel reduction, brushing, trail development, ditch filling and planting. Timber harvesting is not a primary focus of an SNA, but it is often necessary to achieve the desired ecological goals of a specific habitat. During the same five years, 29 commercial timber operations were conducted on SNAs to achieve the ecological goals of the site. Regardless of any designation, wildfires on state forests would be actively suppressed, safety

measures would occur in developed areas and insect and disease outbreaks would be considered for control.

RECREATIONAL IMPACTS

Impacts would be minimal because the recreation opportunities for any given area were determined before consideration as an SNA. State Natural Areas are not appropriate for intensive recreation and such areas were automatically ruled out as potential sites. However, SNAs can accommodate low-impact activities such as hiking, bird watching, and nature study.

BENEFITS FOR A PARTNERSHIP BETWEEN STATE FORESTS AND THE STATE NATURAL AREAS PROGRAM

The SNA program has standardized methods for conducting long-term monitoring of ecosystems and also has a network with a broad range of researchers, from aquatic biologists and botanists to zoologists that can be encouraged to conduct research on the State Forest to enhance our understanding of the CESF ecosystem. The experts in the Division of Forestry have experience in monitoring the trees and other plants, while SNA ecologists have expertise in monitoring terrestrial invertebrates, fungi and lichens, ground layer plants, mammals, reptiles and amphibians, and birds. Together an exceptional collaborative monitoring program could be developed.

The SNA program can bring a broad range of educators together to assist in understanding and interpreting the ecology of the CESF.

The SNA Program can lend its expertise to help create ecological interpretive signs and trail guides for better understanding of the full range of biological diversity on the CESF.

The SNA Program can assist in conducting land management activities such as invasive exotic species control, brushing and conducting prescribed burns.

The Division of Forestry would not lose any of its management or decision-making authority, but gain the ability to provide a broader range of opportunities that would help fulfill its mission by collaborating with the SNA Program.

With a joint consideration, the same piece of land can achieve the goals of two different programs. If there were a lack of teamwork, the SNA Program would still pursue sites to fulfill its goals. Such a venture could duplicate an additional 377 acres of land with a cost of \$1,300,000 or more to the state of Wisconsin. Cooperation makes abundant fiscal sense. An outside forest certification audit of the State Forest Program concluded that cooperation between the Division of Forestry and the State Natural Areas Program was commendable. This cooperation should continue to maintain such a high rating by future auditors.

PROPOSED STATE NATURAL AREAS

Following is a list of proposed SNA sites on the CESF. Each of these sites encompasses the entire boundary of a Native Community Management Area. The number correlates to the site number on the Proposed SNA Sites map.

#1 Northeast Coulee Woods SNA (285 acres): This site combines the attributes of both the forest and cliff communities. It covers the full extent of the Northeast Forest and Cliffs Native Community Area. The two different natural community types, however, are both managed passively. The site features old southern dry-mesic forest, oak woodland, and cliffs.

#2 Berg Prairie and Billy Goat Ridge SNA (92 acres): These sites contain a relatively large dry prairie remnant that can easily be expanded to a much larger prairie and oak woodland complex. The composition is diverse and larger examples such as this site are rarely found away from the Mississippi River Valley. These sites will see active management to maintain the prairie and woodland communities.

B. SPECIES OF GREATEST CONSERVATION NEED WITHIN THE COULEE EXPERIMENTAL STATE FOREST

B.1: HIGH PROBABILITY OF OCCURRING IN THE WESTERN COULEE AND RIDGES ECOLOGICAL LANDSCAPE

	Dry Cliff	Dry Prairie	Moist Cliff	Oak Opening	Oak Woodland	Southern Dry Forest	Southern Dry-mesic Forest	Surrogate Grasslands
Acadian Flycatcher						L	S	
American Woodcock				L		L		L
Bell's Vireo		M		L				M
Black Rat Snake	S	S		M	S	S	S	
Black-billed Cuckoo				L				
Blanding's Turtle		S		S	M		M	
Blue-winged Teal		L						M
Blue-winged Warbler				M	M	M	M	
Bobolink				L				S
Brown Thrasher		M		S				M
Bullsnake	S	S		S	S	M	M	
Cerulean Warbler					M	L	S	
Dickcissel		L		L				S
Eastern Massasauga Rattlesnake		S						
Eastern Meadowlark		M		M				S
Field Sparrow		S		S				M
Four-toed Salamander			L					
Goldeye								
Grasshopper Sparrow		S		L				S
Henslow's Sparrow				M				S
Hooded Warbler							S	
Kentucky Warbler							M	
Lark Sparrow		M						
Least Flycatcher					L	L	L	
Louisiana Waterthrush							S	
Northern Bobwhite		M		M	L			S
Northern Harrier		M						S
Northern Long-eared Bat				L	M	M	M	
Northern Prairie Skink	M	S		S	M	M	M	

CHART CONTINUED ON PAGE 98

S = significant association; M = moderate association; L = low association

CHART CONTINUED FROM PAGE 97

B.1: HIGH PROBABILITY OF OCCURRING IN THE WESTERN COULEE AND RIDGES ECOLOGICAL LANDSCAPE (CONTINUED)

	Dry Cliff	Dry Prairie	Moist Cliff	Oak Opening	Oak Woodland	Southern Dry Forest	Southern Dry-mesic Forest	Surrogate Grasslands
Ornate Box Turtle		S		S	S	S	S	
Peregrine Falcon								
Pickereel Frog	S							
Prairie Racerunner		S		S				
Prairie Ringneck Snake		S		S	M	M	M	
Prothonotary Warbler								
Red-headed Woodpecker				S	S	M	M	
Red-shouldered Hawk							M	
Timber Rattlesnake	S	S		S	S	S	S	
Veery					L		M	
Vesper Sparrow		S		M				L
Western Meadowlark		M						S
Western Sand Darter								
Western Slender Glass Lizard		S		M				
Western Worm Snake		S				M	M	
Whip-poor-will					S	S	S	
Willow Flycatcher		L		L				M
Wood Thrush					M	M	S	
Wood Turtle		S		M	M			
Worm-eating Warbler						M	S	
Yellow-bellied Racer	M	S				M	M	
Yellow-billed Cuckoo					L	L	M	

S = significant association; M = moderate association; L = low association

B.2: MODERATE PROBABILITY OF OCCURRING IN THE WESTERN COULEE AND RIDGES ECOLOGICAL LANDSCAPE

	Dry Cliff	Dry Prairie	Moist Cliff	Oak Opening	Oak Woodland	Southern Dry Forest	Southern Dry-mesic Forest	Surrogate Grasslands
American Golden Plover								M
Buff-breasted Sandpiper								M
Eastern Red Bat				M	M	M	M	
Franklin's Ground Squirrel		L		S	M			M
Hoary Bat				L	L	L	L	
Prairie Vole		S		M				M
Short-eared Owl		M						S
Silver-haired Bat				L	L	L	L	
Upland Sandpiper		S		L				S
Woodland Vole				S	S	S	S	
Yellow-throated Warbler							M	

S = significant association; M = moderate association; L = low association

C. GLOSSARY

Adaptive Management: A dynamic approach to forest management in which the effects of treatments and decisions are continually monitored and used, along with research results, to modify management on a continuing basis to ensure that objectives are being met.

Basal Area: The basal area of a tree is usually defined as the cross-sectional area at breast height in square feet.

Biological Diversity: The variety and abundance of species, their genetic composition, and the communities, ecosystems and landscapes in which they occur. Biological diversity also refers to the variety of ecological structures, functions, and processes at any of these levels.

Community Restoration: The practice recognizes that communities, species, structural features, microhabitats, and natural processes that are now diminished or absent from the present landscape have a valuable role to play in maintaining native ecosystems. Under some definitions, community restoration means moving the current composition and structure of a plant community to a composition and structure that more closely resembles that of the pre-settlement vegetation.

Driftless Area: The unglaciated areas of southwestern Wisconsin, southeastern Minnesota, and northeastern Iowa generally characteristic of a steep "ridge and coulee" topography.

Extended Rotation Stands: Stands that can be either even or uneven aged. They are managed well beyond the economic rotation to capture ecological benefits associated with mature forests. These stands are carried beyond their normal economic rotation age and are harvested before reaching pathological decline.

Forest Cover Type: A category of forest usually defined by its vegetation, particularly its dominant vegetation as based on percentage cover of trees.

Forest Structure: Forest stands can be characterized by their structural features, including type and density of dominant tree species, type of understory (ground vegetation), and amount of standing and fallen dead trees. These attributes undergo a predictable pattern of change as stands age, and together they can be used to classify stands into young, mature, and old stages.

Forest Songbird: bird species associated with areas of unfragmented forest to breed successfully and maintain viable populations

Invasive Species: These species have the ability to invade natural systems and proliferate, often dominating a community to the detriment and sometimes the exclusion of native species. Invasive species can alter natural ecological processes by reducing the interactions of many species to the interaction of only a few species.

Managed Old Forest: Designated forests (relict, old-growth, or old forests) where future active management limited, and the primary management goal is the long-term development and maintenance of some old-growth or old forest ecological attributes within environments where limited management practices and product extraction are allowed.

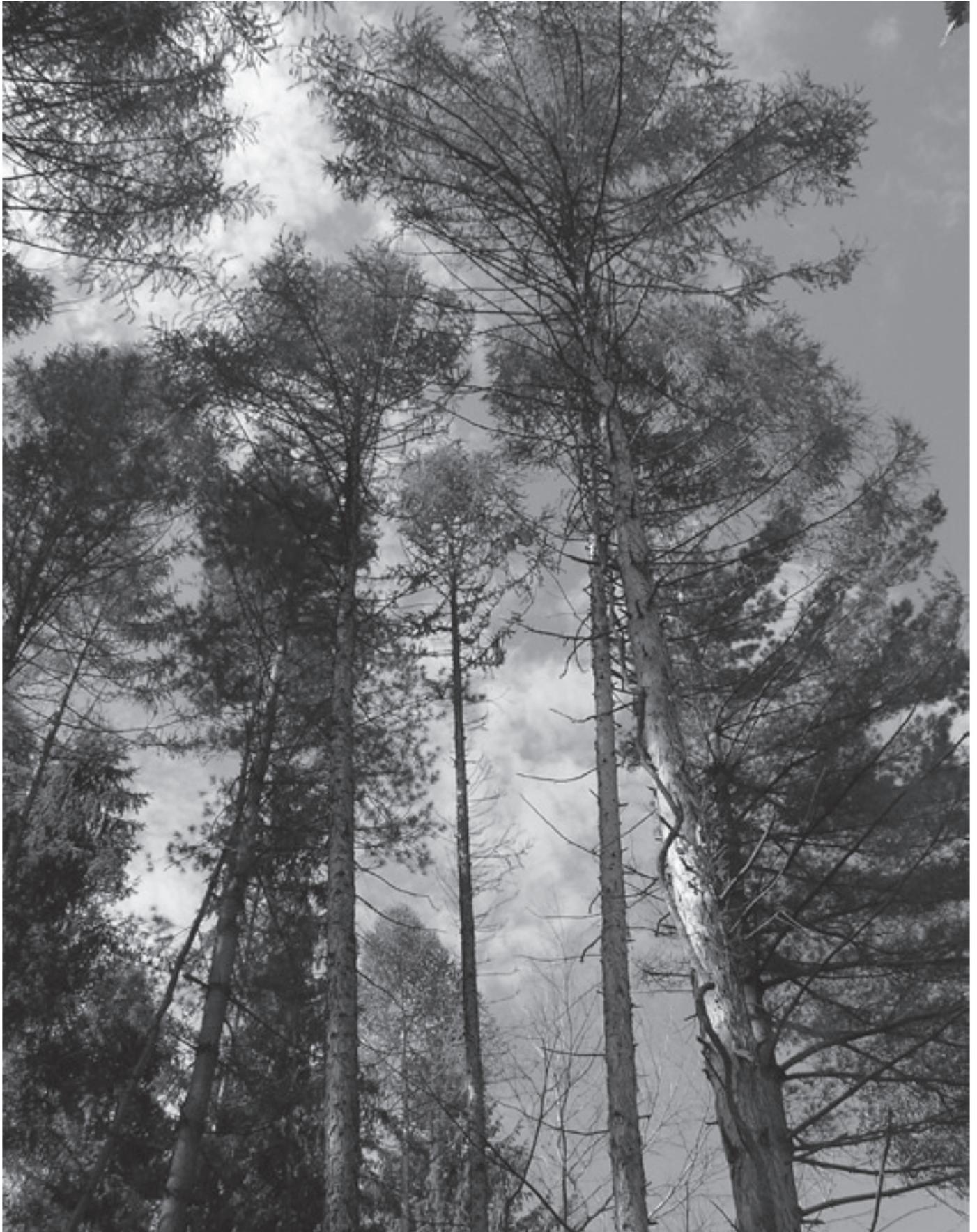
Reserved Old Forest: Designated forests (relict, old-growth, or old forests) where future active management is very limited, and the primary management goal is the long-term maintenance of relict forest or the development and maintenance of old-growth forest within a minimally manipulated environment.

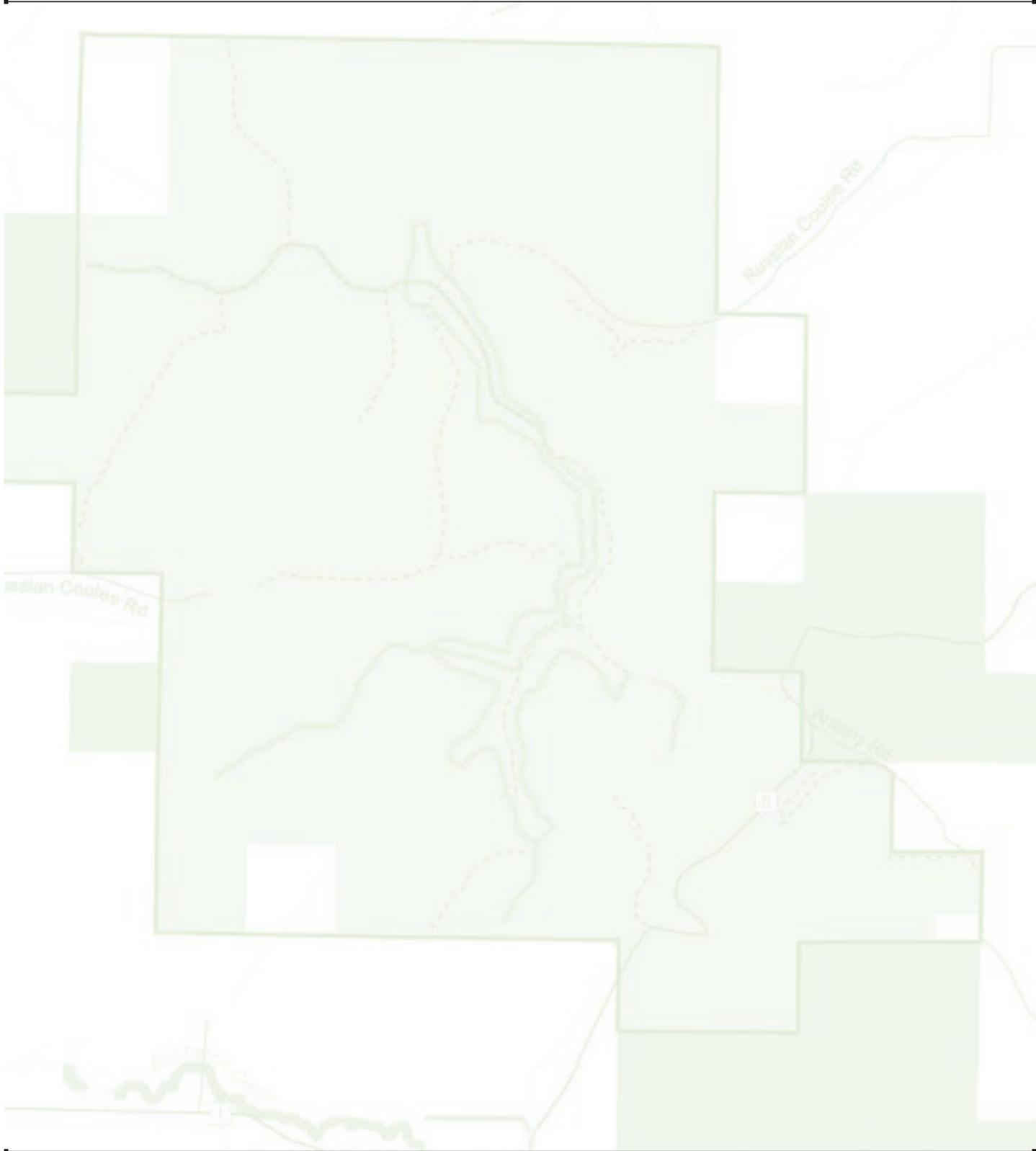
Passive management: A management technique that means the goals of the native community management area are achieved primarily without any direct action. Nature is allowed to determine the composition and structure of the area. For example, patches of large woody debris and the accompanying root boles (tip-up mounds) that are characteristic of old-growth structure are best achieved through natural processes. Passive management, however, does not mean a totally hands off approach. Some actions are required by law, such as wildfire suppression, consideration of actions when severe insect and disease outbreaks affect trees, and hazard management of trees along trails and roads. Other actions, such as removal of invasive exotic species, are necessary to maintain the ecological integrity of the site.

Sustainable Forestry: The practice of managing dynamic forest ecosystems to provide ecological, economic, social, and cultural benefits for present and future generations.

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PRINTED ON RECYCLED PAPER
PUB- FR-445-2009

