Wisconsin DNR

Sandhill-Meadow Valley Work Unit
Master Plan

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Master Plan

Sandhill Wildlife Area

Wood County Wildlife Area

Meadow Valley Wildlife Area

Approved by the Natural Resources Board

December 2011

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CHAPTER ONE

The Sandhill-Meadow Valley Work Unit is located in west central Wisconsin, mainly in Wood and Juneau Counties with additional parcels in Monroe and Jackson Counties. The approximately 90,000-acre Work Unit consists of **Sandhill, Wood County and Meadow Valley Wildlife Areas**. They are grouped together for planning based on their proximity to each other, and similarities in cover type, management, and use. ***Refer to Map A.***

PURPOSE AND MANAGEMENT AUTHORITY

Property master planning is a process that is used to determine how a property will be managed and developed. The development of master plans is governed by NR 44, Wis. Admin. Code, the master plan rule. This rule defines master planning, and sets forth its purposes, specifies the general planning process and the content of a master plan. This rule also establishes a uniform land management classification system to be applied in the master plan. By administrative code, the master plan is the controlling authority for all actions and uses on a property.

Wildlife areas are managed under the authority of Section 23.09(2)(d)3, Wis. Stats., and NR 1.51, Wis. Admin. Code. Wildlife areas are set aside to enhance and maintain habitat for wildlife and as places where people can hunt, trap, hike, watch wildlife, and fish. Wildlife habitat needs and wildlife-based recreation shall receive major consideration in management planning for wildlife areas; however, fishery, forestry, wild resources, and outdoor recreation objectives will be accommodated where compatible and do not detract significantly from the primary objectives.

While the Wisconsin Department of Natural Resources (Department) has management responsibility for all three properties, only Sandhill is entirely under Department ownership. Wood County Wildlife Area is owned by Wood County and managed by the Department under a long-term lease with Wood County. Meadow Valley Wildlife Area is federal land managed by the Department since 1940 under a Cooperative Agreement with the US Fish and Wildlife Service. Refer to ***Appendices A*** *and* ***B*** for lease agreements.

SIGNIFICANCE OF THE WORK UNIT

The Sandhill-Meadow Valley Work Unit is located in the vegetative Tension Zone and supports diverse habitats including forest, emergent marshes, sedge meadows, pine and oak barrens, and extensive flowages. The Work Unit's large wetlands with open bogs, shrub swamps, impoundments and sedge meadows are of Upper Midwest/Regional Significance (*Wildlife Action Plan* 2005). The wetlands, part of a larger central Wisconsin landscape containing the highest concentration of wetlands in the state, play a key role in defining the properties from both an ecological and recreation standpoint.

Regionally, the properties are important for their location among other significant tracts of public land such as Necedah National Wildlife Refuge, Jackson County Forest, and the Black River State Forest. The extensive public ownership provides unique large-scale management opportunities.

Sandhill Wildlife Area is a unique property in that it is enclosed by 16 miles of a 10-foot high deer fence. This creates one of the largest areas in North America with an enclosed white-tailed deer population, and provides wildlife researchers with a tremendous opportunity to study deer and other wildlife populations under controlled conditions. Sandhill's Outdoor Skills Center is also a unique and important attribute and a statewide resource for outdoor education. Finally, Sandhill's Trumpeter Trail is a popular 14-mile auto tour that allows users to view wetland and forest wildlife, the captive bison as part of the oak barrens restoration, and the waterfowl that use the marshland.

OVERVIEW OF THE PLAN

The Sandhill-Meadow Valley Work Unit Master Plan outlines how Sandhill, Wood County, and Meadow Valley Wildlife Areas will be managed, used and developed. The plan reflects that management of the Work Unit properties will emphasize forest and wetland wildlife conservation with an emphasis on habitat management.

Resource Management

Emergent marsh communities are the focus of continuing wetland management providing critical nesting, brood-rearing, and migratory stopover habitat for waterfowl, cranes and other wetland dependent species. Migratory and nesting birds found on the Work Unit include: woodcock, Canada goose, Sandhill crane, whooping crane, American bittern, sora, green heron, wood duck, mallard, blue-winged teal, common loon, great blue heron, bald eagle, American widgeon, green-winged teal, ring-necked duck and American coot. Flowage management also supports geese and ducks as well as muskrat, mink and beaver. Refer to ***Appendix C*** for a list of some of the common species found on the Work Unit.

An aspen management component has been incorporated to support ruffed grouse as well as provide excellent habitat for deer, wild turkey, woodcock, golden-winged warblers, numerous amphibians and reptiles, and other species of special concern. The master plan continues barrens management to enhance the ecological function of the barrens community with emphasis on prairie flora to support Karner blue butterflies and two other rare butterflies. It also provides for management of old forest habitat that offers significant opportunities for protection, management or restoration of floodplain forest, white pine-red maple swamp, and Central Sands pine-oak forest.

Recreation Management

As wildlife areas, the properties are managed to provide a full range of traditional outdoor recreation and education activities. Upland hunting, waterfowl hunting, trapping and wildlife viewing are significant draws for recreation users. Management to support these activities focuses largely on habitat management; no additional facility development is proposed. Primitive camping will continue to be provided on Meadow Valley and Wood County Wildlife Areas, however, use will be limited to the spring turkey and fall hunting seasons.

Boundary Modifications

The NRB approved the following three boundary expansions:
Total Expansion = 2,513 acres *Refer to Real Estate Management p.41 for information on Department acquisition policies.*

Sandhill Wildlife Area

Expand the boundary to include **1,668 acres** along the Yellow River corridor between Dexterville and Babcock and between County Hwy X and Hwy 80, excluding residential areas. The expansion encompasses nearly five miles of river corridor and associated uplands, and coincides with the Yellow River Floodplain Forest SNA (No. 580). Management will be compatible to that of the Yellow River Old Forest.

The Yellow River is a stream of extremely low gradient, with many meanders, oxbows, sloughs, and ponds. Floodplain forest, also known as bottomland hardwoods, is the predominate natural community. Also present are scattered populations of native conifers in a lowland hardwood ecosystem. This situation is extremely rare in Wisconsin and adds much diversity to the floodplain. The Yellow River corridor is noted for its conservation significance in both the *Biotic Inventory* and *Land Legacy* reports.

Wood County Wildlife Area

The **481-acre** expansion creates a corridor that ties together Wood County Wildlife Area, Jackson County Forest Land, and a large Meadow Valley parcel to the west. Public access to the Jackson County Forest lands and the isolated Meadow Valley Unit is very limited. Currently, the only access is from the north via Eckern Road. The expansion allows non-motorized access from the east along Cranberry Road.

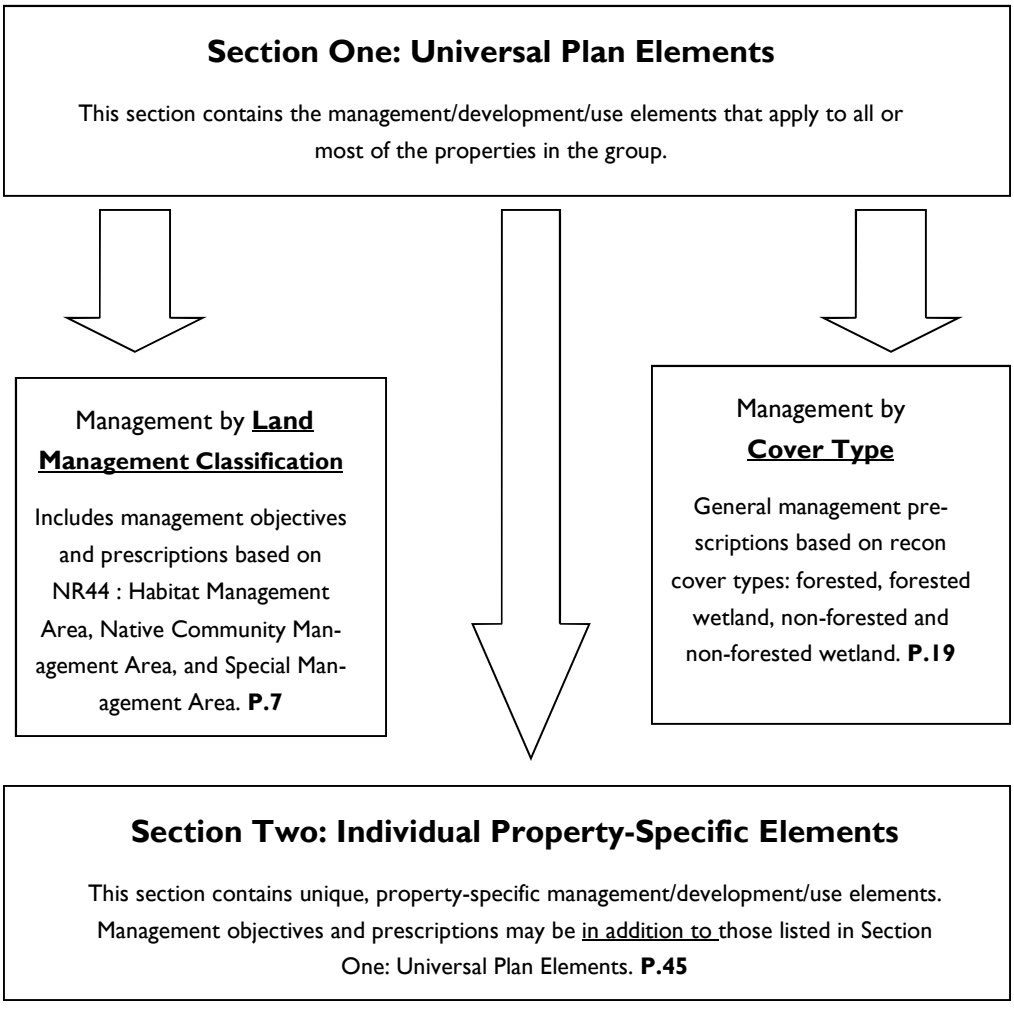
The expansion would also protect a conifer swamp community, including black spruce and tamarack swamp. As noted in the *Biotic Inventory*, Central Wisconsin conifer swamps constitute highly significant habitat for many northern birds, some of which are rare or highly localized in southern Wisconsin. This conifer swamp community also provides habitat for a viable population of snowshoe hare on the southern fringe of its range in Wisconsin. The expansion is adjacent to an existing SNA, Hog Island Tamaracks.

Meadow Valley Wildlife Area

Expand the boundary approximately **364 acres** to secure a portion of Dead Creek Old Forest Area (NHI Primary Site MV07, *Biotic Inventory*) not currently included in the property boundary. This site contains Monroe County's most intact occurrence of the regionally restricted white pine-red maple swamp community, and several rare plants, and will be managed similar to Dead Creek Old Forest Area.

CHAPTER TWO

The purpose of Chapter Two is to provide clear and specific guidance on the goals, objectives, management activities, and public use of the properties. As a multi-property master plan, the plan addresses management of similar features at a property group level, and management of property-specific issues on an individual property basis. This chapter is organized into two main parts. **Section One** covers universal plan elements, which apply to all the properties in the planning group. **Section Two** focuses on each individual property, including a property description followed by management objectives and prescriptions unique to that property.



VISION

The Sandhill-Meadow Valley Work Unit properties maintain a rich biological environment distinguished by an interspersion of large blocks of upland forest and wetlands. These properties are of statewide significance for migratory birds and for conservation of rare species and natural communities, as well as serving as a regional destination for hunters, trappers, and wildlife watchers. In addition, the Sandhill Wildlife Area plays an important, unique role as a wildlife research area and as a statewide resource for outdoor education.

GOALS

Management goals to meet the vision for this group of properties are:

- Maintain the extensive flowages and associated wetlands critical for migratory and resident wildlife populations.
- Provide abundant early succession forest habitat important for primary game and non-game species; with the secondary benefit of producing forest products to support the local economy.
- To support wildlife Species of Greatest Conservation Need (SGCN), protect, maintain, and restore rare natural communities and habitats including: dry pine-oak forest, pine/oak barrens, white pine-red maple swamp, peatlands and shrub swamp.
- Provide abundant, high quality opportunities for hunting, trapping, wildlife viewing and other compatible outdoor recreation activities; with opportunities to experience these pursuits in a remote setting with limited vehicle access.
- Provide on-site training and education opportunities at Sandhill Wildlife Area to sustain and enhance outdoor recreation skills and appreciation.
- Promote research at Sandhill Wildlife Area that is relevant and valuable to statewide and national resource management.

SECTION ONE:
UNIVERSAL ELEMENTS FOR ALL PROPERTIES

RESOURCE MANAGEMENT BY LAND MANAGEMENT CLASSIFICATIONS

Management of these properties is generally described by a specific **land management classification per NR 44 that indicates the primary management objective for an area within the property.** All lands covered under this plan fall within the following land management classifications. The total acreage of these management areas by property is shown in **Table 2.1**; locations are shown on ***Map B Series***. Note: The land management classifications are further defined in Chapter NR 44.06 and 44.07, Wisconsin Administrative Code.

Habitat Management Areas are managed to provide or enhance habitat, whether upland, wetland or aquatic, to support specific species of plants and animals.

Table 2.1: Land Management Classifications on the Work Unit.

Land Management Classification	Sandhill Wildlife Area (Acres)	Wood County Wildlife Area (Acres)	Meadow Valley Wildlife Area (Acres)
Habitat Management Area (78,251 ac)	8,604	21,140	48,507
***General Habitat* (68,393 ac)**	*8,604*	*15,940*	*43,849*
***Ruffed Grouse* (9,858 ac)**	—	*5,200*	*4,658*
Native Community Management Area (8,548 ac)	635	—	7,913
Barrens (2,816 ac)	*405*	—	*2,411*
Old Forest (5,732 ac)	*230*	—	*5,502*
Special Management Area (24 ac)	24	—	—
TOTAL (86,823ac)*	**9,263**	**21,140**	**56,420**

***Source:** *Land Management Classification acreages are extracted from the DNR Managed Lands GIS spatial database and may vary from the acreages represented in the property deed legal descriptions.*

Native Community Management Areas are managed to represent, restore and perpetuate native plant and animal communities, whether upland, wetland or aquatic, and other aspects of native biological diversity.

Special Management Areas are managed to provide and maintain areas and facilities for special uses not included under other land management classifications.

HABITAT MANAGEMENT AREAS

The following general habitat and ruffed grouse management objectives and prescriptions apply, as appropriate to the site, to all the properties covered under this plan. Additional management objectives and prescriptions for specific habitats and management areas on individual properties are included under the individual property sections.

General Habitat Management

As illustrated on ***Map B***, the majority of Sandhill-Meadow Valley Work Unit is classified as General Habitat Management **(68,393 ac).** The Work Unit is significant for contributing some of the largest blocks of forest and open wetland habitats remaining in the southern half of the state. Refer to **Table 2.2** for cover type and acreages.

The extent of the aspen- and oak-dominated forests plays an important role ecologically for the primary game species present (ruffed grouse, woodcock, and white-tailed deer) and the hunting opportunities they provide. Other forest species also benefit from aspen with the greatest species diversity occurring early in the regeneration stages (generally 6-15 years).

Sandhill-Meadow Valley Work Unit has approximately 8,600 acres of emergent wetland habitat within 42 primary flowage sites. These emergent marsh communities are the focus of wetland management on Sandhill, Wood County, and Meadow Valley Wildlife Areas. They provide critical nesting, brood-rearing, and migratory stopover habitat for waterfowl, cranes and other wetland dependent species. These properties are of regional significance for waterfowl production, and have statewide

Table 2.2: General Habitat Management Area Cover Type Acreages.

Type	Acres	Percent
FORESTED UPLAND		
Aspen	13,364	20
Oak	11,016	16
Upland Conifer	9,252	13
Upland Hardwood	195	<1
FORESTED WETLAND		
Bottomland Hardwood	52	<1
Swamp Conifer	391	<1
Swamp Hardwood	574	1
NON-FORESTED UPLAND		
Grassland	727	1
Shrub	467	1
NON-FORESTED WETLAND		
Emergent Vegetation	6,385	9
Lowland Brush	7,901	12
Lowland Grass	8,670	13
Muskeg Bog	861	1
Wetland	2,297	3
WATER	3,144	5
DEVELOPED	535	1
UNKNOWN	2,562	4
TOTAL	**68,393**	**100**

significance as a migration stop for ducks, geese and as a staging area for cranes.

Three of the larger flowage complexes have either an established closed area or refuge to provide resting areas for migrating waterfowl, cranes and other wetland associated migratory birds: Sandhill's Gallagher Marsh (2,000 acres), Wood County's Ball Road Flowages complex (250 acres), and Meadow Valley's Meadow Valley Flowage (1,175 acres). **These flowage complexes are significant in terms of their size and relatively high waterfowl use. Greater management emphasis is placed on these sites.**

Objectives

- Provide hunting, trapping and wildlife viewing opportunities.
- Establish and maintain linkages between similar habitat blocks to create travel corridors for the movement of species over time.
- Protect, manage, and enhance natural communities, including the wetland complexes, for ecological values and rare species habitat needs.
- Maintain isolated islands of old white and red pine forest.
- Actively manage the aspen- and oak-dominated forests to provide habitat diversity for primary game and certain non-game species.
- Maintain and manage forested and non-forested wetlands to maximize habitat for waterfowl nesting, brood rearing, and migratory stopover.
- Maintain the primary flowages to maximize wildlife benefits; consider additional wetland enhancement projects to augment functional wetland base.
- Maintain current acreage of lowland brush (shrub-carr) wetlands that provide important wildlife habitat to a broad range of animals including American woodcock, golden-winged warblers, willow flycatchers and Blanding's turtles.
- Maintain current acreage of sedge meadow to provide habitat that supports many species such as sedge wrens, swamp sparrows, and northern harriers.
- Maintain current open landscape condition of sedge meadow sites.

- Maintain tamarack acreage and develop older, larger diameter trees to benefit species that require this community type.
- Protect hydrology of connected wetland basins, headwater streams, seeps, and other associated hydrologic features.
- Protect water quality through protection and maintenance of wetland habitat and seeps.

Prescriptions

Unless specifically addressed below, management will be in accordance with the "Prescriptions by Cover Type" as provided later in this section.

- Manage for larger blocks of habitat and a continuum of habitats from lowland to upland.
- Use commercial and non-commercial methods to accomplish forest management objectives.
- Conduct annual dike and water control structure inspections and repair as necessary.
- Conduct regular dike maintenance activities to include mowing, patching, and control of invasive vegetation.
- Conduct periodic water manipulations as necessary to control woody vegetation, reduce monotypic sedge areas, enhance plant diversity, and promote establishment of desirable waterfowl foods.
- Plan and implement major maintenance of dikes on approximately 20-year rotations.
- Attempt to establish wild rice in flowages with appropriate site conditions to enhance available food resources for waterfowl and other wetland species.
- Control beaver and muskrat populations to mitigate dike damage and damming of control structures.
- Conduct waterfowl population surveys such as weekly migration counts and brood surveys to evaluate success of management.
- Mow and brush access trails and associated openings on a rotating

schedule of periodic maintenance. ***Refer to Map B-2 for Intensive Management Openings.***

Ruffed Grouse Management

Four areas totaling 9,858 acres have been selected for ruffed grouse management due to a substantial aspen component. Wood County Wildlife Area includes 5,200 acres; Meadow Valley Wildlife Area includes 4,658 acres. ***Refer to Map B Series.***

Aspen management is central to ruffed grouse management in Wisconsin (and elsewhere) and also provides critical habitat for woodcock, golden-winged warblers, numerous amphibians and reptiles, and other species of special concern. Aspen and associated timber types within this area will be intensively managed to promote early succession structure. Aspen accounts for approximately 28% of the Ruffed Grouse Management Area cover type. Of the aspen acreage, approximately 46% is less than 30 years of age. Current cover type is listed in **Table 2.3.**

Table 2.3: Ruffed Grouse HMA Cover Type Acreages.

Type	Acres	Percent
FORESTED UPLAND		
Aspen *(Age 30 and less=1,279ac)* *(Age >30=1,521 ac)*	2,800	28
Oak	1,622	17
Upland Conifer	438	5
FORESTED WETLAND		
Bottomland Hardwood	<1	<1
Swamp Hardwood	15	<1
NON-FORESTED UPLAND		
Grassland	91	1
Shrub	33	<1
NON-FORESTED WETLAND		
Emergent Vegetation	337	4
Lowland Brush	2,937	30
Lowland Grass	1,014	10
Wetland	141	1
WATER	117	1
DEVELOPED	74	<1
UNKNOWN	239	2
TOTAL	**9,858**	**100**

Objectives

- Produce optimum ruffed grouse habitat including nesting, forage and brooding environments.
- Provide desirable habitat for other common species (i.e.

white-tailed deer and cottontail rabbits) as well as Species of Greatest Conservation Need (i.e. American woodcock and golden-winged warbler).

- Provide high quality hunting opportunities for species such as ruffed grouse and woodcock.

Prescriptions

Unless specifically addressed below, management will be in accordance with the "Prescriptions by Cover Type" as provided later in this section.

- Maintain a high proportion (goal = 50%) of the aspen acreage in the < 25 year-old timber class.
- Secondarily, maintain native jack, red and white pine cover type wherever practicable to benefit common wildlife species such as white-tailed deer and ruffed grouse.
- Create a mosaic of age classes and patch sizes across the landscape with scheduled harvests.
- Maintain current forest openings and establish other openings, especially in areas with barrens/prairie vegetation.
- Use commercial and non-commercial methods to accomplish management objectives.
- Limit harvest blocks (generally) to 40 acres in size and irregular shapes; larger harvests may be used if circumstances are appropriate.
- In stands in which aspen is the primary/dominant type, perform timber harvesting under frozen ground conditions. However, limited harvesting may be performed under non-frozen conditions to the extent that rutting/root damage is minimal.
- Routinely mow access roads and openings.

NATIVE COMMUNITY MANAGEMENT AREAS

The following barrens and old forest management objectives and prescriptions apply, as appropriate to the site, to all the properties covered under this plan. Additional management objectives and prescriptions for specific habitats and management areas on individual properties are included under the individual property sections. **Table 2.4** lists the barrens NCMAs and **Table 2.6** lists the old forest NCMAs on the Work Unit. Management activities shall be designed to achieve land management objectives through natural processes and management techniques that mimic those processes whenever possible.

Barrens

The pine/oak barrens natural community type is considered imperiled globally because of rarity, as defined by the Wisconsin Natural Heritage Inventory Program. This community is typically characterized by scattered jack pines, or less commonly, red pines, sometimes mixed with northern pin and bur oaks. Scattered trees or groves are interspersed with openings in which shrubs such as hazelnuts, sand cherry, and prairie willow are prominent, along with prairie grasses and forbs. The ground layer often contains species characteristic of "heaths", such as blueberries, bearberry, and sweet fern. Other characteristic plants include dry sand prairie species (June grass, little bluestem, silky and azure asters, lupine, blazing-stars, and western sunflower).

During the recent development of the state's Comprehensive *Wildlife Action Plan* (2005), 28 vertebrate Species of Greatest Conservation Need (declining in Wisconsin and or throughout their range) were identified as moderately or significantly associated with pine barrens. Numerous invertebrate species are also dependent on this community type including the federally endangered Karner blue butterfly, the state endangered phlox moth, and the state threatened frosted elfin. In addition, barrens openings provide habitat for many game species such as white-tailed deer, American woodcock, and the wild turkey.

Land management in areas of oak/pine barrens primarily focuses on simulating the natural disturbances that historically functioned to maintain structure and diversity in these communities. Management approaches used on individual

parcels will vary based on the management potential and opportunities for the site, which in turn are derived from site-based factors such as soils, topography, hydrology, and cover type, parcel size and surrounding land uses.

In addition to the designated barrens habitat areas, the Sandhill-Meadow Valley Work Unit has numerous other opportunities within jack pine/scrub oak stands and along roadside right-of-ways for the management of this rare type and associated species.

Table 2.4 lists the seven separate areas that combine for a total of 2,816 acres of barrens community. Refer to **Table 2.5** for cover type and acreages; ***refer to Map B* Series** for locations.

Table 2.4: Barrens—Native Community Management Areas on the Work Unit.

Barrens (property)	Acres
Bison Barrens (Sandhill WA)	389
Westfield Barrens (SWA)	16
Silver Creek (Meadow Valley WA)	1,712
Broadhead (MVWA)	198
Eisfeldt (MVWA)	125
Norway (MVWA)	215
Norway West (MVWA)	161
TOTAL	**2,816**

Objectives

- Maintain, expand, and enhance the ecological function of the approximately 2,816 acres of barrens community within the management area with specific emphasis on prairie flora, especially wild lupine which is the sole food source for larvae of the Karner blue butterfly (Kbb), and two other rare butterflies.
- Manage for Kbb recovery objectives based on delisting goals stated in the Federal Recovery Plan (USFWS 2003) and the Karner Blue Butterfly Habitat Conservation Plan (HCP) (WDNR 2010b).
- Protect and maintain animals associated with barrens habitat, with specific emphasis on invertebrates, rare birds, and reptiles.
- Increase connectivity between patches of barrens vegetation.
- Manage this type as a shifting mosaic of habitat in the context of dry forest to sand prairie.

Prescriptions

- Identify and designate high quality barrens vegetation sites to be maintained as permanent openings of variable size. Attempt to dovetail

these sites where rare species are concentrated. These sites may be incorporated into the Karner Blue Butterfly HCP. Periodically use prescribed fire, mechanical brushing, and selective use of herbicides using DNR guidelines to minimize impacts on sensitive species.

- Manage consistent with existing (and future) federal recovery goals of one viable Kbb population at Sandhill (3,000 for 10 years) and one large viable Kbb population at Meadow Valley (6,000 for 10 years), with less surveying after 5 years once populations have met the 3,000 or 6,000 level for 5 years (USFWS 2003).
- Identify high quality barrens vegetation sites to be maintained in conjunction with timber production. Maintain open areas with timber harvesting, mechanical brushing, and selective use of herbicides. Consider prescribed fire for site preparation and to stimulate understory species diversity. These sites may be incorporated into the Karner Blue Butterfly HCP. Use existing DNR screening guidance to minimize impacts on sensitive species.
- Develop and maintain structural diversity including open treeless areas, shrub savanna, savanna, and near-closed canopy woodlands of jack pine and/or oak.
- Periodically monitor disturbed habitats for invasive species.
- Use timber harvesting, brushing, and selective use of herbicides along roadsides and between stands to increase and maintain width of open

Table 2.5: Barrens-NCMA Cover Type Acreages.

Type	Acres	Percent
FORESTED UPLAND		
Aspen	276	10
Oak	1,194	42
Upland Conifer	889	32
FORESTED WETLAND		
Bottomland Hardwood	16	<1
Swamp Hardwood	<1	<1
NON-FORESTED UPLAND		
Grassland	113	4
Shrub	1	<1
NON-FORESTED WETLAND		
Emergent Vegetation	<1	<1
Lowland Brush	109	4
Lowland Grass	108	4
Wetland	57	2
DEVELOPED	50	2
UNKNOWN	2	<1
TOTAL	**2,816**	**100**

areas and control invasive species.

- Design silviculture activities to avoid or minimize impacts to the Kbb.
- Consider augmenting plant species diversity by direct seeding or other means that would benefit rare species maintenance and dispersal.
- Salvage of trees is permitted through consultation from affected DNR programs.
- Place special emphasis on removal of white pine within designated barrens areas.
- Enhance and create open areas with timber harvesting (including biomass), mechanical brushing, and selective use of herbicides. Use habitat following logging for species dispersal and to connect existing openings.
- Consider prescribed fire for site preparation and to stimulate understory species diversity.
- Follow existing WDNR screening guidance and Biomass Harvesting Guidelines when managing these sites.

Old Forest

The 5,732 acres of old forest areas listed in **Table 2.6** include several important natural communities having significant opportunities for protection, management or restoration: floodplain forest, white pine-red maple swamp, and Central Sands pine-oak forest. ***Refer to Map B Series.*** Additional information is included in the individual property plan sections.

Table 2.6: Old Forest—Native Community Management Areas on the Work Unit.

Old Forest (property)	Acres
Yellow River (Sandhill WA)	148
North Bluff (SWA)	82
Kingston (Meadow Valley WA)	2,457
Hog Island (MVWA)	900
Dead Creek (MVWA)	1,051
Blueberry Trail (MVWA)	255
Dandy Creek (MVWA)	664
Norway (MVWA)	175
TOTAL	**5,732**

Objectives

- Develop and maintain approximately 5,700 acres of an older forest of longer lived species to benefit forest interior wildlife species.
- Passively manage for forested wetland habitats.

- Enhance forest structural diversity and development of old forest attributes such as standing dead snags, coarse woody debris, and large diameter trees.
- Develop and maintain old forest habitat for scenic and aesthetic purposes.
- Protect water quality and hydrology.

Prescriptions

Unless specifically addressed below, management will be in accordance with the "Prescriptions by Cover Type" as provided later in this section.

- Decrease short-lived species and increase white pine, red pine, and oak primarily through natural conversion and thinning.
- Promote the growth and retention of large white pine, red pine, and oak, through thinning, extended rotation, and passive management.
- Thin stands in a way that limits regeneration of short lived tree species and allows natural aging.
- Passively manage lowland/ moist site tamarack and white pine.
- Manage red pine plantations primarily through thinning to

Table 2.7: Old Forest-NCMA Cover Type Acreages.

Type	Acres	Percent
FORESTED UPLAND		
Aspen	1,602	28
Oak	928	17
Upland Conifer	1,585	28
Upland Hardwood	12	<1
FORESTED WETLAND		
Bottomland Hardwood	90	2
Swamp Conifer	145	3
Swamp Hardwood	21	<1
NON-FORESTED UPLAND		
Grassland	19	<1
Shrub	19	<1
NON-FORESTED WETLAND		
Emergent Vegetation	163	3
Lowland Brush	118	2
Lowland Grass	613	11
Muskeg Bog	134	2
Wetland	53	1
WATER	4	<1
DEVELOPED	31	1
UNKNOWN	46	1
TOTAL	**5,586**	**100**

create stands with a natural appearance and large diameter trees.

- Follow the DNR Old Growth and Old Forest Handbook management guidelines for actively managed areas. Monitor composition and structure changes to aid future management decisions.
- Retain snags and coarse woody debris.
- Allow the maintenance of openings in close proximity to power lines and roadside right-of-ways containing wild lupine and other prairie species.
- Salvage of trees is permitted through consultation from affected DNR programs.
- Protect and maintain wet areas and seeps.

NOTE: The **Special Management Area** is discussed in the Sandhill Wildlife Area section of the plan.

RESOURCE MANAGEMENT PRESCRIPTIONS BY COVER TYPE

The Department commonly uses several classification systems when considering resource management.

- *Natural Community Types* refer to an assemblage of a plant species that are repeated across a landscape in an observable pattern. The NHI Program uses a natural community classification system based strongly on the work of John Curtis.
- *Habitat Type* usually refers to the Forest Habitat Types developed by John Kotar, et al. The Habitat Type Classification System is based on the floristic composition of plant communities. The system depends on the identification of potential climax associations, repeatable patterns in the composition of the understory vegetation, and differential understory species.
- *Forest Cover Type (or "Cover Type")* includes the data collected for forest reconnaissance and stored in Wisconsin Forest Inventory & Reporting System (WisFIRS). A stand is designated as a certain cover type if 50% of its basal area is dominated by a particular species.

The property cover type maps are based on WisFIRS data. **Table 2.8** lists some of the common species found in the forested and non-forested areas of the Work Unit. ***Refer to Maps D 1-3.***

Table 2.8: Property Cover Type Descriptions based on WisFIRS.

	FORESTED p.20	NON-FORESTED p.25
UPLAND	**Aspen** **Oak** –scrub oak **Conifer**—jack pine, red pine, white pine, white spruce **Hardwood**—white birch, central hardwood, red maple, northern hardwood	**Grassland** **Shrub**—low growing shrub, herbaceous vegetation, upland brush
WETLAND	**Bottomland Hardwood** **Swamp Conifer**—white cedar, black spruce, tamarack **Swamp Hardwood**	**Emergent Vegetation** **Lowland Brush**—alder, bog birch, dogwood, willow **Lowland Grass** **Muskeg Bog** **Marsh**

Forested Types

All forest management activities follow the guidelines in the DNR Silvicultural and Aesthetic Handbook (2431.5), the Public Forest Lands Handbook (2460.5), the Timber Sale Handbook (2461), and the Old Growth and Old Forest Handbook (2480.5). Consult the handbook for additional details and management considerations (visit dnr.wi.gov; search "Forestry Handbooks"). The prescriptions listed below are for the primary forest types found on the Sandhill-Meadow Valley Work Unit. The prescriptions include an overview of the general management methods and guidance from the Silvicultural Handbook as well as some additional considerations to be applied to this group of properties.

General Management Prescriptions for All Types of Forest Stands:

- Retain snags and course woody habitat whenever their retention does not conflict with other management objectives.
- Leave long-lived reserve trees 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.
- Salvage trees damaged by wind, ice, fire, insects, and disease as long as the salvage meets the overall objectives for the area.
- Where appropriate, extend the rotation age for some stands of oak, red pine and white pine in order to increase the abundance of older-age forest habitat, which is highly limited in this ecological landscape.
- Use intermediate forest treatments, such as release or crown thinning, where appropriate to develop young stands and improve composition and timber quality.
- Follow Wisconsin's Forestland Woody Biomass Harvesting Guidelines when conducting forest management.

Aspen Dominated Mixed Forest

This early successional forest type requires disturbance and abundant sunlight to regenerate. Aspen dominated forests provide habitat for wildlife species including woodcock and ruffed grouse which have been declining in numbers

statewide. Aspen stands are typically managed using complete even-aged harvests at 40 to 60 year intervals.

General Management Prescriptions

- In pure stands, harvest and regenerate aspen naturally through clear cutting at staggered intervals of 30-60 years to produce the greatest age class diversity. Rely on coppice reproduction.
- In mixed stands where wider diversity is also the future objective, use "coppice with standards" as the primary management strategy. This method removes aspen trees but retains individual oak or pine within the stand, thereby enhancing diversity.
- Design timber sales to provide a variety of age classes and stand sizes across the landscape for wildlife habitat benefits, ecological diversity, and aesthetic value.

Oak Dominated Mixed Forest

Disturbance is required to regenerate and maintain oak forests. If fire is excluded from an area, subsequent stands tend to be mixed with other species. Scrub oak, consisting of northern pin oak and black oak occurs on some dry to very dry sandy sites. Red oak with a mix of white and black oak is dominant on dry-mesic sites. Clearcut and shelterwood systems are used to regenerate these stands. This forest type has high value for aesthetics, wildlife, and forest products.

General Management Prescriptions

- Regenerate scrub oak naturally through clearcut harvests on rotation intervals of 60 to 80 years, and in conjunction with jack pine regeneration harvests. Rely on coppice reproduction and advance regeneration.
- On good quality sites, consider managing on an extended rotation up to 100 years using Big Tree Silviculture prescriptions. Regenerate by clearcut or shelterwood methods. Use pre-harvest and post-harvest treatments such as scarification, herbicides, and residual tree removal where appropriate to obtain natural regeneration.
- Manage mixed stands of oak, pine and maple on an even-aged basis

favoring long lived species to maintain natural diversity.

- Follow management options outlined in the state forest's Gypsy Moth Management Plan to encourage retention of an oak component during outbreak periods.
- To provide wildlife habitat, aesthetic values, and diversity, seek a variety of age classes and stand sizes. Leave reserve trees as individuals or groups as ecological legacies.
- Retain openings created by oak wilt where beneficial.

Jack Pine Dominated Forest

This is an early successional forest type that requires disturbance and full sunlight conditions to regenerate. Historically, jack pine stands regenerated following fire or insect infestation/fire events. Harvest and ground disturbance not only provide for good regeneration of jack pine but also support the development of a diverse mix of grasses, forbs and shrubs, which are important during successional stages of this forest community.

General Management Prescriptions

- On dry sites, clearcut jack pine at biological maturity (45-75 years).
- In mixed stands with white pine, oak, red maple or aspen, clearcut (with reserves) the entire stand at biological maturity (45-75 years) and regenerate to a mixed species composition; supplemental planting of jack pine may be needed to ensure adequate stand stocking.
- Seed tree and shelterwood systems may have application on limited sites and, if implemented, should be closely monitored for results. Post-sale and pre-sale scarification may be required.
- Re-establish jack pine stands through natural regeneration, mechanical scarification, planting, and post-harvest scarification. Use direct seeding as needed to supplement natural regeneration. Herbicide treatments, before or after establishment, may be necessary to maintain this type.

Red Pine Dominated Forest

Only a few patches of natural red pine forest exist on these properties. Most red pine is found in plantations established between 1930-1970; many have been selectively thinned three or four times to provide forest products and to make these stands more desirable to wildlife.

General Management Prescriptions

Several management activities will be used to manage red pine stands toward desired conditions of large, older trees with diverse understories.

- Periodically thin on a recurring basis at 10-20 year intervals following guidelines in the DNR Silviculture and Forest Aesthetics Handbook. The retention of other tree species within red pine plantations will be encouraged throughout the thinning process in order to enhance stand diversity.
- Implement Big Tree Silviculture on good quality sites.
- Manage red pine plantations to biological maturity at which time selective harvesting may be performed to promote regeneration.
- Promote and maintain native red pine stands.

White Pine Dominated Forest

An opportunity exists to restore a pre-settlement "pinery" condition on these properties similar to what existed prior to the logging era. This may be implemented through protection of natural communities, limiting some harvesting practices, managing for old growth characteristics, or intensively managing for timber products while applying Big Tree Silviculture at high quality sites.

Natural regeneration is fostered by retaining white pine stands or reserves across the property. Natural conversion occurs when white pine has been a significant component in the under-story and the over-story trees are removed during a commercial harvest at maturity.

General Management Prescriptions

Depending on origin, composition, and site, several management activities will be used to manage the white pine forest toward desired objectives:

- Begin thinning pole-size stands, whether plantations or natural stands, at age 35-40 years when the stocking is at or near the "A" level. Overstocked stands should be thinned from below to not less than "B" level on the stocking guides in trees making up the overstory canopy. Conduct thinnings at 12-20 year intervals, never removing more than 50% of the stand's stocking.
- Manage mixed white pine stands of oak, red maple, aspen, or jack pine to maintain natural diversity as long as possible. Thinning should favor crop trees of various species, including those with wildlife value.
- Manage white pine stands to biological maturity at which time a shelterwood harvest may be performed to promote regeneration.

Forested Wetland

Two types of wetland forest exist on the Sandhill-Meadow Valley Work Unit. **Swamp conifers**, which contain tamarack, black spruce, jack pine, and white pine growing on sphagnum moss; and **bottomland hardwoods** consisting primarily of black ash, green ash, swamp white oak, American elm, silver maple and red maple. Trees within this forest type tend to be slow growing and of poor quality.

General Management Prescriptions

- Conduct no forest management activities within wetlands with small sized, slow growing, non-merchantable trees, lowland brush, or open bogs and marshes. However, access across these areas may be necessary periodically for temporary roads. These roads will be limited to frozen ground conditions.
- Productive stands on wetlands capable of producing merchantable timber within their accepted rotation age may be regenerated by limited harvest

following guidelines outlined in the DNR Silviculture and Forest Aesthetics Handbook.

- Conduct timber harvests only under frozen ground or very dry conditions, using techniques and equipment that prevent rutting.

Swamp Conifers

- Passively manage except for cultural use.

Bottomland Hardwood Forest

The primary species associated with the bottomland hardwood forest include swamp white oak, silver maple, river birch, green ash, American elm, cottonwood and an array of upland associated species. These hardwood forests typically occur on floodplains and some terraces.

General Management Prescriptions

- Because this forest type is rare on the property, it will be managed primarily for aesthetic and ecological values.
- Manage and maintain this type at a landscape scale and promote its natural type diversity.
- Harvest and regenerate a mixture of species in accordance with the DNR Silvicultural and Forest Aesthetics Handbook.
- Conduct timber harvests only under frozen ground or very dry conditions to prevent rutting and potential soil damage.

Non-forested Types

Emergent Marsh/Flowage

Emergent marsh wetland communities have persistent to permanent water typically with low flow. The habitat type is dominated by emergent, rooted-floating, and submergent vegetation. Some of the common species present often include wild rice, cattail, Bulrush, burr reed, water lilies and pond weeds. These

deep water marshes can be permanent wetlands or maintained through the use of a combination of berms, dams, or other water control structures for the flexibility to artificially manipulate seasonal water levels. Emergent marshes, alone or in conjunction with adjoining upland habitat, provide critical habitat for wildlife species such as waterfowl, furbearers, herptiles, songbirds, shorebirds and marsh birds. Water level manipulations are important in maintaining basin productivity and function. Additional flowage prescriptions are included in the Universal General Habitat Management Objectives and Prescriptions (pp. 9 and 10).

General Management Prescriptions

- Remove invasive and woody species through the use of mowing, cutting, burning, herbicide, bio-control or a combination thereof.
- For non-flowage areas, maintain or restore the hydrology of wetlands where applicable.
- Where possible, use prescribed fire to maintain the health of vegetative communities.
- On wetlands where water level management is possible, seasonally manipulate water levels to improve and enhance waterfowl use, to improve shorebird habitat, to benefit wetland floral and faunal communities, and to facilitate vegetative management practices. In particular, as needed, conduct periodic partial and/or complete drawdowns to promote the resurgence of desirable wetland species like smartweeds, arrowheads, and bidens.
- Planting wetland vegetative species is not normally necessary, but could be done if needed.
- Conduct annual dike and water control structure inspections and repair as necessary.
- Conduct regular dike maintenance activities to include mowing, patching, and control of invasive vegetation.
- Conduct periodic water manipulations as necessary to control woody vegetation, reduce monotypic sedge areas, enhance plant diversity, and

promote establishment of desirable waterfowl foods.

- Plan and implement major maintenance of dikes on approximately 20-year rotations.
- Attempt to establish wild rice in flowages with appropriate site conditions to enhance available food resources for waterfowl and other wetland species.
- Control beaver and muskrat populations to mitigate dike damage and damming of control structures.
- Conduct waterfowl population surveys such as weekly migration counts and brood surveys to evaluate success of management.
- Mow and brush access trails and associated openings on a rotating schedule of periodic maintenance.

Sedge Meadow, Open Bog and Central Poor Fen

The wetland natural communities of sedge meadow, open bog, and central poor fen support many species such as bobolink, blue-winged teal, willow flycatcher and rare herptiles. Today, these open wetlands are much less abundant than they once were. Historically, fire played a key role in maintaining these open habitats. Many of these community types have been lost or severely degraded by drainage, flooding, lack of fire, or invasive species.

General Management Prescriptions

- In places undergoing conversion from open areas to shrubs and brush use prescribed fire, mowing, and herbicide to remove the woody vegetation.
- Control phragmites and purple loosestrife with available means.
- Restore the site's hydrology, where possible and compatible with the other primary objectives.

Shrub-carr

This lowland brush wetland community is dominated by shrubs such as red-osier dogwood, silky dogwood, meadowsweet and various willows. Typical shrub-carr

wetlands are habitat types that are in a state of succession due to a lack of fire. Historically, shrub-carr rarely formed in the presence of periodic fire events. In the absence of this natural disturbance, maintenance of this habitat type requires periodic management treatments. Shrub-carr wetlands provide important wildlife habitat to a broad range of animals including American woodcock, golden-winged warbler, willow flycatcher, and Blanding's turtle.

General Management Prescription

- Use prescribed fire, tree cutting, chemical treatments, and mowing to maintain shrub-carr.

GENERAL RECREATION MANAGEMENT AND USE

The Sandhill-Meadow Valley Work Unit includes Sandhill, Wood County and Meadow Valley Wildlife Areas. State Wildlife Areas are managed to provide an area where people can hunt, trap, and fish [under the authority of Sec. 23.09(2)(d)(3) and (15) Wis. Stats.]. Hiking, wildlife viewing, nature study, berry picking, and other low-impact recreational activities are also permitted. The type and extent of recreation uses and facility development are very limited by the predominately wet soil conditions of the properties. ***Refer to Map C Series.***

Recreational Use Objectives for All Properties

- Provide high quality opportunities for upland game and waterfowl hunting, and trapping.
- Provide high-quality wildlife viewing opportunities for a broad range of migratory and resident species, including Sandhill cranes and two high priority SGCN – whooping crane and trumpeter swans.

Recreation Management Prescriptions for All Properties

- The habitat and flowage management prescribed in the universal resource management by land management classification of this plan is geared to provide a range of high quality hunting and trapping opportunities.
- Maintain the closed areas and wildlife refuges to benefit migrating waterfowl species as well as resident wildlife species.

Sandhill Wildlife Area is unique in that the property includes 9,150 acres of state-owned land fully fenced in by 16 miles of 10-foot tall deer fence. Management and use of Sandhill Wildlife Area is guided by additional regulations and permits per NR 10.22. As such, Sandhill will only be described within the "Individual Property" section; **the following recreation opportunities refer to those offered at Meadow Valley and Wood County Wildlife Areas.**

Recreation Management for Wood County and Meadow Valley Wildlife Areas

Hunting and Trapping

The primary recreational uses for Meadow Valley and Wood County Wildlife Areas are hunting, trapping and wildlife observation. Meadow Valley and Wood County Wildlife Areas are open to all hunting and trapping opportunities per state regulations and seasons. Hunting restrictions apply as posted on the designated wildlife refuges and closed areas. Refer to individual property sections.

The properties are popular for deer, turkey, small game, bear and waterfowl hunting; trapping and hunting (where applicable) for terrestrial and aquatic furbearers includes, but is not limited to muskrat, beaver, mink, otter, raccoon, fox, coyote and fisher. Hunting and trapping seasons for resident and migratory wildlife species are designed to help meet population management objectives as well as provide public recreation.

Prescriptions

- Maintain optimum upland habitat for game species such as ruffed grouse, woodcock and white-tailed deer.
- Conduct dike maintenance and water manipulation activities to enhance emergent marsh habitats.
- Conduct wildlife and user surveys to meet property or statewide priority inventory needs.
- Maintain areas with limited vehicle access to provide remote hunting and trapping experiences.

Wildlife Observation

Prescriptions

- Maintain the 250-acre closed area on Ball Road Flowages and the 1,175-acre wildlife refuge area on Meadow Valley Flowage as resting/viewing areas for migrating waterfowl.

- Facilitate opportunities for wildlife viewing using the existing system of dikes to aid foot travel and public access roads for vehicle travel.
- Establish observation sites with interpretive signs at appropriate locations, which may be moved from time to time as habitat conditions and wildlife use change.
- Produce information materials to improve opportunities for wildlife observation.

Access and Trails

Approximately 78 miles of road on Meadow Valley and 20 miles of road on Wood County Wildlife Areas are managed by the Department. Permanent access roads are open to the public for vehicle use (at the discretion of the property manager); however, not all roads are regularly mowed or plowed year round. Refer to **Table 2.9, page 35** for mileage of existing road development on the Work Unit.

Limited snowmobile use is allowed on 25 miles of county snowmobile trail on the southern portion of Meadow Valley Wildlife Area. Snowmobile clubs in Juneau and Monroe Counties maintain the trail under a land use agreement. The trail links the Valley Junction area with Necedah via Eagle Nest Flowage. Snowmobiles are prohibited on the MVWA except on this trail. ***Refer to Map C-3.***

Prescriptions

- Maintain Ditchbank and South Bluff Roads on Wood County WA.
- Maintain dikes to secondarily provide pedestrian access for hunters and trappers.

Fisheries Management

Sandhill-Meadow Valley Work Unit contains 42 primary flowages. Fish species common to the properties include bullheads, some panfish, sticklebacks, and fathead minnows. The majority of these shallow flowages are subject to "winterkill", and consequently, they have no significant fishery or potential for a fishery. However these areas are used for minnow trapping, which helps support

recreational use and the local economy. No fishery management plans are proposed at this time; the Department may explore fishery restoration options on those Meadow Valley flowages where conditions are appropriate.

Prescriptions

- Work with Fisheries to evaluate the restoration potential for sustainable fisheries. If conditions and demand dictate, the Department may pursue a plan variance to implement the study findings and recommendations.
- Prohibit motorized boats on waters of Meadow Valley and Wood County Wildlife Areas (per NR 45.11(4)).

Camping

Camping is not one of the primary purposes of state wildlife areas. However, some wildlife areas have traditionally provided limited primitive camping to provide for "hunting camps" during the fall hunting seasons and in some cases, the spring turkey season. The Department's objective is to provide limited primitive camping opportunities on Wood County and Meadow Valley Wildlife Areas that support traditional hunting use patterns and do not interfere with the primary purpose of the property. Several key policies that guide camping on wildlife areas include:

- NR 1.51, Management of state wildlife areas (NR 1.51(3)(d))
- NR 45, Use of Department Properties (NR 45.10)
- DHS 178 (DHS 178.02(2), which led to an MOU between DHS-DNR signed in 2001)

Prescriptions

- Designate dispersed camping areas that will be available by permit during the fall hunting seasons (September – December) and the spring turkey season.
- Provide and maintain two designated dispersed camping areas on Wood County WA: the Ball Road and Amundson Road campgrounds. ***Refer to Map C-2.***

- Provide and maintain a maximum of nine designated dispersed camping areas on Meadow Valley WA. ***Refer to Map C-3.***
- If, based on use levels, the Department determines the need to provide camping facilities, the Department may convert the dispersed camping areas to semi-primitive camping areas (per NR 44) for health and environmental protection reasons.

Unique, property-specific management and developments are detailed in the individual property-sections of this chapter.

GENERAL ADMINISTRATION, AND MANAGEMENT POLICIES OR PROVISIONS

The following section describes general property administration, and management policies or provisions that apply to all state managed lands on the properties.

Funding Constraints

Implementation of the master plan is dependent upon staffing and funding allocations that are set by a process outside of the master plan. Operational funding for the Department is established by the state legislature. Development projects also follow an administrative funding and approval process outside of the master plan. Many of the initiatives contained within 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 at which this master plan will be implemented. Additionally, federal requirements enumerated in the Cooperative Agreement ***(Appendix B)*** between the Wisconsin DNR and the US Fish and Wildlife Service stipulate that expenses associated with management of the Meadow Valley Wildlife Area be commensurate with or exceed revenues from the management of that property.

Facility Management Authority

The property manager may relocate or temporarily close road and trail segments or other public use facilities as deemed necessary after appropriate authorization by normal Department approval processes. Any new road or trail (or other facility) location and design must be consistent with the land classification requirements (NR 44) and the management objectives for the management area in which it is located.

Public Health and Safety

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

concerns. In designated public use areas, such as designated 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.

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.

Road Management Plan and Public Vehicle Access Policy

The properties have a network of primitive, lightly and moderately developed roads that are used for management purposes and public access. All permanent Department maintained service roads that are not open to public vehicles will be maintained as primitive or lightly developed roads [NR 44.07(3)]. On primitive roads, which are seasonal and not regularly maintained, ruts and downed trees may be present. Maintenance is done on primitive roads as needed. Public access roads managed by the Department shall be constructed and maintained as either lightly developed or moderately developed roads. The property manager may determine which of these road standards to apply on a case by case basis. **Table 2.9** identifies the miles of existing road development on the Work Unit. ***Refer to Map C Series.***

Table 2.9: Sandhill-Meadow Valley Work Unit Miles of Existing Road Development.

Land Management Classification	Sandhill Wildlife Area (Miles)	Wood County Wildlife Area (Miles)	Meadow Valley Wildlife Area (Miles)
Department Managed Roads	24.4	20.2	78.3
Service Roads (gated primitive)	*1.7*	*19.0*	*37.5*
Access Roads (ungated primitive)	*22.7*	*1.2*	*40.8*
Local Town Roads	—	23.4	90.2
County Roads	—	—	12.7
State Highway	—	1.6	20.2

Source: Public road data from WI DOT GIS spatial data, various collection dates; DNR managed road data collected via digitization using 2008 digital orthographic photometry.

The following management prescriptions apply to Department managed roads:

- Maintain a map showing the designated development level for each Department managed road or road segment.
- Maintain roads at the assigned development level [NR44.07(3)] for each road or road segment.
- Maintain permanent service roads and public access roads in a sustainable condition according to Wisconsin Forestry's Best Management Practices for Water Quality.
- Regularly inspect active roads, especially after heavy storm events. Clear debris as needed from the road surfaces, culverts and ditches to maintain safe conditions and prevent damage.
- Maintain stable road surfaces to facilitate proper drainage and reduce degradation from traffic during wet or soft conditions; or close the road when these conditions exist.
- Restore roads used in timber harvests to non-erosive conditions, in accordance with Wisconsin Forestry's Best Management Practices for Water Quality.
- Monitor soil disturbance and take measures to prevent excessive damage.
- Maintain parking areas.
- Motor vehicle and horse use are prohibited on the properties; however, horses and bicycles may be ridden on local public roads open to vehicles.

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.

State Natural Areas

State Natural Areas (SNAs) protect outstanding examples of native natural communities, significant geological formations, and archaeological sites. They harbor natural features essentially unaltered by human-caused disturbances or that have substantially recovered from disturbance over time. SNAs also provide the last refuges in Wisconsin for rare plants and animals. Laws establishing the State Natural Areas Program are found in Wisconsin Statutes Chapters 23.27, 23.28 and 23.29. Rules governing the use of SNAs are found in Wisconsin Administrative Code, Chapter NR 45. Rules governing the general management and use of SNAs are outlined in Wisconsin Administrative Code, Chapter NR 1.32.

Endangered, Threatened and Species of Special Concern Protection

Implementation of all management prescriptions in the master plan will be carried out with consideration of the needs of endangered, threatened, and species of special concern and the potential impacts to the species and their habitat. Management actions planned during plan implementation will be checked against a database of listed species to assure that no department actions result in the direct taking of any known endangered or threatened resource.

Best Management Practices for Water Quality

All forest management activities will comply with the most recent version of the guidelines in the Wisconsin Forestry's Best Management Practices for Water Quality (BMPs).

Forest Pest Control

Wisconsin Statute 26.30 states: "It is the public policy of the state to control forest pests on or threatening forests of the state." 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, including but not limited to the Emerald Ash Borer, may include timber salvage or pesticide treatments. Any response to a significant pest outbreak or threat of a significant pest outbreak will be evaluated by an interdisciplinary team of scientists and communicated through press releases and notices to interested parties. If necessary, an immediate emergency response to prevent a major outbreak may be authorized by the State Forester.

Invasive Species Management

Invasive plants will be managed to ensure the long term limitation of spread, reproduction, and impact of existing invasives, and to prevent introduction of new invasive species. A database indicating distribution and management of invasives is available at Sandhill headquarters. Current problematic species with large infestations include spotted knapweed and glossy buckthorn; minor infestations include purple loosestrife, leafy spurge, autumn olive, phragmites, black locust and non-native honeysuckle. Reed canary grass is common in disturbed locations, however, control efforts for this species are impractical. Invasive plants will be controlled using appropriate and effective methods, including but not limited to the use of bio-control, herbicides, cutting, hand removal, or fire. Control methods may be restricted in certain sensitive management areas.

Invasive Species—Control

This may include pulling, digging, smothering, girdling, cutting, herbicide application, burning and DATCP-approved biocontrol agents. A variety of approaches may be effective for any single invasive species; the choice of method depends on the manager's specific site goals and available resources. For recommendations on controlling specific invasive species, visit dnr.wi.gov and search "invasive species"; search "forest certification" for a list of Forest Stewardship Council prohibited chemicals. Consider using Forestry BMPs for invasive species. Search "Governor's Council on Forestry."

In addition, the NR 40 Invasive Species Identification, Classification and Control Rule establishes two legal categories ("prohibited" and "restricted"), which

regulate invasive species in Wisconsin. Visit dnr.wi.gov; search "NR 40" for additional information.

Invasive Species—Slowing the Spread

Some actions that may slow the spread include:

- Close or reroute roads/trails that pass through infestations
- Clean mowing/maintenance equipment after operating in invasive plant zones
- Adjust roadside/trail mowing schedule to avoid invasive seed production time
- Conduct management operations in clean areas first and infested areas last

Invasive Species—Preventing New Introductions

Monitor site annually. Site-wide inspections are ideal, but not always feasible or realistic. If not feasible, inspect typical entry points such as trails, roads, waterways, and areas where soil has been disturbed. If new invasive species are located, control of new invaders should be implemented.

Chemical Use

Herbicides and pesticides may be used for various purposes such as the control of invasive plants or to control plant competition in vegetation 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. Annually, the Department contacts the USFWS refuge manager for an approved chemical list.

Forest Certification

In 2004, Wisconsin State Forests gained dual Forest Certification from the Forest Stewardship Council (FSC) and Sustainable Forestry Initiative (SFI). In 2009, State Forests were re-certified under FSC and SFI and the balance of DNR-owned land was added to the certification. Independent, third-party certification

means management of Wisconsin's DNR-owned land meets strict standards for ecological, social, and economic sustainability. Forest certification helps Wisconsin remain competitive in global markets that increasingly demand certified raw materials. Management of multi-use lands involves balancing the goals of conserving forestland, supporting economic activities, protecting wildlife habitat, and providing recreational opportunities. Objective review is also instrumental in improving how we care for the land we manage.

Prescribed Fire

Prescribed fire may be used as a management tool where feasible and safe except when restricted by management area prescription. It may be used to help regenerate forest cover types such as oak types. It may also be used to create and maintain grassland/prairie habitat, wildlife habitat, to reduce fuels to lessen fire hazard and to control undesirable vegetation.

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 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 will be taken to protect public health and safety, or as directed by the State Forester to prevent a catastrophic insect or disease outbreak from spreading to adjacent forest lands. Appropriate management responses to catastrophic events are determined on a case by case basis, and action will be taken as appropriate. At a minimum, salvage of trees damaged by

wind, fire, ice, disease, or insects may occur if consistent with the objectives of the management area or as prescribed in the plan for the management area. Salvage may also occur as part of an emergency response plan authorized by the State Forester.

Nonmetallic 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."

Nonmetallic mining 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 considered where they would impact geological or ecological features of significance or within any designated State Natural Area.

Real Estate Management

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.

Staff may periodically contact landowners within the property boundary to explain the Department's land acquisition program and to see if they have an interest in selling their property. Acquisition priorities for the properties vary from year to year and are based on a number of factors, such as resource management or recreation needs and available funding, which may be from a variety of sources.

Aides in Lieu of Taxes

Under current law (Wis. Stats. 70), land acquired by the DNR is not subject to property taxes. Instead, DNR makes annual payments in lieu of taxes (PILT) to municipalities for the parcels that the DNR owns within those municipalities. For more detailed information on how the Department pays property taxes, visit dnr.wi.gov; search "PILT".

Future Boundary Adjustment Process

From time to time adjustments in property boundaries are needed. In some cases parcels of land are removed from the boundary. In other cases it may be desirable to add parcels adjacent to the property so they can be purchased for resource protection or to meet expanding recreational needs. Property boundary changes where more than 40 acres are outside of an established project boundary 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 property boundary.

Easements, Access Permits, and Land Use Agreements

Easements provide access across state property for utilities, town roads, or county highways. Easements are permanent and will continue to be upheld under the master plan. Access permits provide access across state property to private ownership within the property boundary. Land use agreements provide for a variety of uses on a Department property, such as snowmobile trails.

General Authorized Management Activities or Tools

All activities listed above in the management prescriptions and those listed below are authorized on the properties as appropriate, unless restricted by a general habitat type prescription or any property-specific management prescription.

- Prescribed Fire
- Chemical Application
- Mechanical/mowing
- Hand cutting – chainsaw
- Bio-fuel harvest
- Timber harvest – even aged and uneven-aged silvicultural systems, including clear-cutting
- Drawdowns
- Placement of nest boxes, platforms or similar devices to enhance reproduction of desired wildlife species

PUBLIC COMMUNICATIONS PLAN

The public and other governments may be provided opportunities to have 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 Sandhill-Meadow Valley Work Unit, and it provides information on how the public will be notified of opportunities for involvement when significant, new issues related to management of these properties arise.

Annually the Department 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 up-coming year, outline any planned 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 properties. Some of the additional types of information that may be included from time to time are: the status of forest insect or disease problems, storm damage, new information on endangered or threatened species, recreational management problems or new opportunities, and recreational use changes or trends. The annual monitoring report will be available at dnr.wi.gov; search "Master Planning".

In the event the Department considers a change to the master plan (plan variance or amendment) the public will be informed of the proposal and the review and comment process. As appropriate, news releases will be used to announce master plan amendment/variance proposals and review procedures. The Department will also maintain a contact list of persons, groups, and governments who have requested to be notified of potential plan changes.

WDNR Contact Person

The following Department staff may be contacted regarding questions about the Sandhill-Meadow Valley Work Unit or the master plan. At the time of this publication, the contact information is:

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CHAPTER TWO

SECTION TWO: INDIVIDUAL PROPERTY PLANS

Section Two provides a description of each property of the Sandhill-Meadow Valley Work Unit as well as the management and development specific to each property.

SANDHILL WILDLIFE AREA

SANDHILL WILDLIFE AREA
Current State Ownership : 9,455 acres
Current Leased Land: 0 acres
Current Acquisition Authority: 11,123 acres
Current Project Boundary: 11,148 acres

PROPERTY DESCRIPTION

Located in central Wisconsin's Wood County, Sandhill Wildlife Area lies within the bed of extinct Glacial Lake Wisconsin. The property features low, sandy uplands of oak, aspen, and jack pine forests, large marshes and many flowages.

Early settlers to the Sandhill Wildlife Area found expansive marshes and uplands of white and red pine, and oak. Logging removed the timber between the 1850s and 1880s, leaving the land barren. Farmers and cranberry growers, impressed with the black marsh soils, moved in to carve out a living. Steam powered dredges created hundreds of miles of drainage ditches in the early 1900s to produce croplands out of the "useless" marshes. Acidic soils, short growing seasons, wild fires and killing summer frosts caused economic hardships for area farmers and some vacated their farms. Finally, high drainage tax levies and the Great Depression of the 1930s drove even the most persistent farmers from the land.

In the late 1930s and 1940s, Wallace and Hazel Grange purchased 9,150 acres of the abandoned, tax delinquent "wastelands." They enclosed the land with an 8-foot tall deer-proof fence and named it the Sandhill Game Farm. Grange, a contemporary of the noted conservationist Aldo Leopold, nurtured the scarred landscape, raising deer, grouse and waterfowl for commercial purposes. In 1962, after 24 years in the game farm business, the Granges sold Sandhill to the State of Wisconsin specifying that it was to be used as a wildlife demonstration area. The

50-year Grange agreement is set to expire in 2012.

Per the Granges' request, the Sandhill Wildlife Area was established as a wildlife demonstration area, serving as a living laboratory not only to test management techniques for wildlife, but to test the effects of manipulating hunter and trapper numbers, their harvest methods, and season length and bag limits. These studies are evaluated for application elsewhere in the state. The property is also designed to provide a setting for outdoor skill instruction. Management has emphasized forest wildlife species and waterfowl (WDNR 1979).

In 2011, the Natural Resources Board approved a 1,668 acre boundary expansion along the Yellow River corridor, which increased the acquisition authority from 9455 to 11,223 acres, and the project boundary from 9,480 to 11,148 acres. The expansion encompasses nearly five miles of the Yellow River corridor and associated uplands. The area is located between Dexterville and Babcock, and between County Hwy X and Hwy 80. The expansion area contains mostly private lands with a few scattered parcels of Wood County Forest property. Both the *Land Legacy Report* (2006) and the *Wildlife Action Plan* (2005) note the area's conservation significance. The Yellow River area provides a unique opportunity to protect and manage a large, biologically functional block of southern floodplain forest, an important natural community in the ecological landscape, as well as the Species of Greatest Conservation Need present. ***Refer to Map B-1.***

Forest Type

Forested upland is comprised largely of aspen, scrub oak and oak. Aspen provides cover for early successional wildlife species; oak is also highly valuable for a wide variety of game and non-game wildlife species for mast production, cover, and denning and nesting sites. These habitats provide ideal conditions for white-tailed deer, the primary species for research on Sandhill. **Table 2.10** on the next page illustrates the acreage of each cover type present on the property.

Non-forest Type

Flowages and the associated wetlands are prominent features of Sandhill Wildlife Area, with 16 flowages totaling an estimated 1,722 impounded acres. These wet-

Table 2.10: Sandhill Wildlife Area Current and Predicted Cover Type. ***Refer to Map D-1.***

COVER TYPE (Refer to Table 2.8, p. 19)	Current Acres	Current % of Total Cover	Predicted 50 yr Acres	Predicted 50 yr % of Total Cover
FORESTED UPLAND				
Aspen	2,610	28	2,610	28
Oak	700	7	689	7
Scrub Oak	1,111	12	1,105	12
White Birch	27	<1	27	<1
Red Maple	23	<1	23	<1
Jack Pine	24	<1	41	<1
Red Pine	74	<1	74	<1
White Pine	12	<1	12	<1
FORESTED WETLAND				
Bottomland Hardwood	102	1	102	1
Tamarack	16	<1	16	<1
Swamp Hardwoods	4	<1	4	<1
Sub-total	***4,703***	***50***	***4,703***	***50***
NON-FORESTED UPLAND				
Upland Grass	22	<1	22	<1
True Grasses	65	<1	65	<1
Low Growing Shrub	2	<1	2	<1
NON-FORESTED WETLAND				
Emergent Vegetation	1,184	13	1,184	13
Lowland Brush	1,363	14	1,363	14
Marsh	1,428	15	1,428	15
Muskeg Bog	3	<1	3	<1
Lowland Grass	672	7	672	7
Sub-total	***4,739***	***50***	***4,739***	***50***
TOTAL	**9,442**	**100%**	**9,442**	**100%**

Source: WDNR—Division of Forestry, Recon. 07 January 2011.

lands, along with the large sedge meadows, fens and prairies of Wood County and Meadow Valley Wildlife Areas, are recognized in the *Wildlife Action Plan* (WDNR 2005) for their Upper Midwest/Regional Significance. Natural precipitation is the main source of water that collects in Sandhill's many marshes and flowages, which points to the importance of dikes, ditches and water control structures. The dependence on rainfall and the excessively drained landscape create wetland management limitations.

Notable among these wetland complexes is Sandhill's Gallagher Flowage, an area of extensively ditched and diked peatlands. Gallagher Flowage is significant for the large numbers of migratory birds that use the site as a staging area. Waterfowl, cranes, shorebirds, raptors, and other groups all utilize the area heavily. Gallagher serves as an important continental staging site for Sandhill cranes during fall migration with peak numbers exceeding 5,000 birds. Sandhill flowages provide critical wetland habitat to a broad range of migratory and resident species, including two high priority SGCN – whooping cranes and trumpeter swans.

As agreed to in the original purchase from the Granges', an area of approximately 4,500 acres, including the Gallagher Flowage, is set aside as a closed area for wildlife. All hunting (except special deer hunts) is prohibited; the land serves as a migratory stopover site to migratory birds. Further, all hunting, fishing and furbearer trapping is prohibited from October 1 to November 15 in the waters and marshland areas within the wildlife refuge (per the Sanctuary Agreement in the deed restrictions).

The Trumpeter Trail, a 14-mile auto tour, offers users improved access to the property and serves as an education tool. The auto tour includes interpretive signs along the trail with information on area wildlife, habitat management, and unique features. Three observation towers are accessible from the Trumpeter Trail. Bison Barrens Tower overlooks the enclosed 234-acre oak barrens supporting a small bison herd. The captive bison herd, some of which are descendants of bison the Granges' acquired in the late 1940s, is part of a management strategy for barrens restoration at this site. Barrens are a globally rare community with restoration potential on the outwash plains of extinct Glacial Lake Wisconsin. Barrens habitat restoration efforts also benefit the endangered Karner blue butterfly, which depends on the wild lupine plant found in barrens for nectar

and a place to lay their eggs. The Karner blue butterfly requires large patches of this plant for its continued survival.

North Bluff Tower offers an impressive panoramic view of several nearby bluffs and a sweeping view that takes in a 20-mile vista. Gallagher Marsh Tower provides an unobstructed view of Sandhill's vast marshlands. Gallagher Flowage is a big draw for visitors during the spring and fall to view impressive flocks of Sandhill cranes, geese, ducks and many other forms of wetland wildlife that use the area. The Trumpeter Trail and observation towers are noted in the "Great Wisconsin Birding and Nature Trail" guide as a regionally important wildlife viewing location.

Demonstration Area and Research

Per the Granges' request, the Sandhill Wildlife Area was established as a wildlife demonstration area, and to date is guided by NR 10.22. Sandhill serves as a living laboratory not only to test management techniques for wildlife, but to test the effects of manipulating hunter and trapper numbers, their harvest methods, and season length and bag limits. The results of these studies are evaluated for application in Wisconsin and other states.

Since its acquisition in 1962, Sandhill has offered researchers a unique opportunity to conduct deer research on 9,150 acres of fully fenced land. Enclosed by 16 miles of 10-foot tall deer fence, this is one of the largest areas in North America with an enclosed white-tailed deer herd regulated by controlled public hunting, making Sandhill an invaluable "outdoor living laboratory" (Kubisiak et al. 2001).

In the past, studies on ruffed grouse were also conducted, and monitoring of spring populations continues to this day. The deed restriction agreed upon between the DNR and the Granges to use Sandhill as an experimental outdoor laboratory and demonstration area provided ideal conditions to study ruffed grouse population ecology and the impacts of harvesting this population. The southern half of Sandhill is open to small game hunting (including grouse) while the northern half is a refuge where grouse hunting is prohibited.

Recent research includes evaluating how hunters see and react to radio collars on white-tailed deer, determining the maximum fence height that white-tailed deer can jump, and the use of remote sensing to detect wild lupine presence. Future research of deer biology and management will be prioritized based on management implications for Wisconsin and elsewhere.

Outdoor Skills Center

The property is also designed to provide a setting for outdoor skills instruction. In 1989, the Sandhill Outdoor Skills program was created. As originally envisioned, the Skills Center program would provide an avenue through which youth could gain the skills necessary to hunt, trap and observe wildlife. The Skills Center program targets individuals, youth organizations, schools and universities, and conservation and environmental organizations. The mission of the Sandhill Outdoor Skills Center is to develop outdoor skills emphasizing hunting, trapping, observing and related manners of enjoying Wisconsin's wildlife resources, and providing interpretive and educational services that create an appreciation for wildlife and their management. The Outdoor Skills Center serves as a significant draw to the property, and as an important statewide resource in educating a new generation of hunters, trappers and other outdoor enthusiasts. Refer to the "Special Management Area" for additional information.

State Natural Area

One SNA is designated within the Sandhill Wildlife Area. In 2008, the Department designated the 86-acre Yellow River Floodplain Forest State Natural Area (SNA No. 580) to protect habitat for floodplain forest species and to focus education and research opportunities. ***Refer to Map E-1.*** Situated outside of Sandhill's fenced area, along the meandering Yellow River, this mature, intact floodplain forest is dominated by silver maple with river birch, basswood, and red oak. The canopy is composed of large trees with a good mix of size and age classes. Protection of intact stands of bottomland forest is a high priority along this river corridor. This assemblage of understory plants is highly localized and relatively rare within this area.

The Yellow River flows through the site and is of extremely low gradient, with

many meanders, oxbows, sloughs, and ponds. This stretch of river is an important component of a highly significant riverine corridor. These 86 acres are maintained in a natural condition. Refer to Native Community Management Area – Old Forest for management objectives and prescriptions. For additional information on the State Natural Areas program, refer to Section One, page 37.

LAND MANAGEMENT CLASSIFICATION

Table 2.11 on the next page illustrates the majority of Sandhill Wildlife Area is classified as **General Habitat Management Area** (8,604 acres). The 635-acre **Native Community Management Area** consists of two barrens areas totaling 405 acres, and two old forest areas totaling 230 acres. Sandhill's remaining 24 acres are classified as **Special Management Area**, which includes the administrative area and facilities associated with the Outdoor Skills Center. ***Refer to Map B-1.***

Table 2.11: Sandhill Wildlife Area Land Management Classifications.

Habitat Mgmt Area	**8,604 acres**
General	*8,604*
Native Community Mgmt Area	**635 acres**
Barrens	*405*
Old Forest	*230*
Special Mgmt Area	**24 acres**
TOTAL	**9,263**

Resource Management, Development, and Protection

Habitat Management Area—General

Objectives

Unless specifically addressed below, management will be in accordance with the universal plan elements as provided in Section One of this chapter.

- Place special management emphasis on the Gallagher Marsh complex due to its importance as a waterfowl management site.
- Conduct deer research with sound management implications. Projects consistent with statewide deer management priorities will rank higher.
- Conduct other resource-related research to fully utilize the opportuni-

ties that Sandhill offers.

- Maintain the 4,500-acre closed area (NR 10.22, NR 11.13) on the north half of Sandhill Wildlife Area to provide food and shelter for migratory and resident wildlife population.

Prescriptions

- Manage the cover types listed in **Table 2.10** as described in "Management Prescriptions by Cover Type."
- Focus on infrastructure maintenance (major or routine) to ensure optimum water level management.
- Maintain the Sandhill deer population with an overwinter goal of 25 deer/ mi^2 habitat (~300 deer).
- Develop and maintain forest and wetland habitat components as they relate to research and management needs.
- Promote and develop cooperative partnerships to support research working with other government agencies and universities.
- Monitor perimeter fence and make necessary repairs.
- Maintain posting of perimeter, compartments and refuge annually.

Native Community Management Area—Barrens

This 405-acre Native Community Management Area is dedicated to sand prairie/ oak barrens restoration and includes two separate barrens areas: **Westfield** (16 acres) and **Bison Barrens** (389 acres). Westfield Barrens contains a strong component of sand prairie vegetation, and is known to harbor three rare species.

The Bison Barrens site is significant for the captive herd of bison found grazing there. Viewing the bison is cited as one of the primary reasons people visit the property. Additionally, the bison represent a hands-on attempt to restore rare biotic communities—sand prairie and oak barrens. Grazing and wallowing are effective methods of seed dispersal, including lupine which is important to the federally listed Karner blue butterfly. Also present are one state threatened animal species, one state threatened plant species, numerous Species of Special

Concern, and numerous Species of Greatest Conservation Need.

Objectives

Unless specifically addressed below, management will be in accordance with the universal plan elements as provided in Section One of this chapter.

Prescriptions

- Maintain bison herd management (goal=10 bison).
- Maintain the bison-related infrastructure.
- Maintain the divided parcels or burn units on the 260-acre Bison Barrens area.

Native Community Management Area – Old Forest

This 230-acre Native Community Management Area includes two areas: **North Bluff Old Forest** and **Yellow River Old Forest.**

The 82-acre **North Bluff Old Forest** includes a primary site identified in the *Biotic Inventory* (WDNR 2005). North Bluff contains a transitional Southern Dry-Mesic Forest community, which includes conifers and several "northern" understory species such as Penn sedge, bracken fern, big-leaved aster and wild sarsaparilla. Unprotected Southern Dry-Mesic Forest communities are uncommon in the central sands landscape. *North Bluff Old Forest is managed according to the general management objectives and prescriptions provided in Section One of this chapter.*

The passively managed 148-acre **Yellow River Old Forest** provides breeding habitat for numerous species including a number of Species of Greatest Conservation Need. These species find suitable habitat along the river. In addition, numerous migrant birds use the floodplain as a refueling stop during their migration. The 86-acre Yellow River Floodplain Forest (State Natural Area No. 580) is included in this management area.

Objectives

Unless specifically addressed below, management will be in accordance with the universal plan elements as provided in Section One of this chapter.

- Maintain as a floodplain forest reserve, an aquatic reserve and wetland protection site, and as an ecological reference area.
- Provide closed canopy or near closed canopy to benefit area sensitive species.
- Protect intact stands of bottomland forest.
- Provide opportunities for research and education on the highest quality native floodplain forests.
- Protect scenic and aesthetic qualities of the Yellow River.

Prescriptions

Unless specifically addressed below, management will be in accordance with the "Management Prescriptions by Cover Type" as provided in Section One.

- Allow old forest to develop primarily through natural processes, using passive management and limited active management.
- Control of invasive species, non-commercial forest manipulation and prescribed burning may occur.
- Retain snags and course woody debris.
- Salvage of trees is permitted through consultation from affected DNR programs.
- Manage red pine plantations primarily through thinning to create stands with a natural appearance and large diameter trees.

Special Management Area

The management objective of a Special Management Area is to provide and maintain areas and facilities for special uses not included under other land management classifications per NR 44.06. Public use of Sandhill Wildlife Area is more restricted than that typically permitted in "Recreation Management Areas", therefore, the Special Management Area designation of this area.

The **24-acre Special Management Area** includes the following:

- Administrative Area (Headquarters and three storage sheds)

- Visitor kiosk at the head of the Trumpeter Trail
- Outdoor Skills Center (Anderson Classroom Center)
- Dormitory
- Skills course range
- Grange (Marsh) Cabin

Administrative Facilities

The administrative area includes the headquarters building and three storage sheds, and serves the entire Sandhill-Meadow Valley Work Unit. The storage sheds are used for the repair, maintenance, and storage of equipment.

Outdoor Skills Center

The Outdoor Skills Center program is operated from the Don Anderson Education Center, which was constructed in 1992. This single story building contains a 30x30 ft learning/dining room; kitchen area; office; 5x12 ft storage room; male and female bathrooms; utility room; and a 10x30 ft conference/break/prep room.

Built in 2002-03, the 55x75 ft dormitory houses guest participants of Skill Center events, and provides housing for researchers working on approved wildlife research work within the region. It consists of eight 12x15 ft guest rooms containing two bunks and storage closets. Capacity is 32 people (four per guest room). The dormitory also includes three storage rooms, a laundry room with one washer and two dryers, bathrooms with shower facilities, and a utility room. Both the Skills Center and dormitory are handicapped accessible.

The skills course range is located about 2.5 miles northwest of the headquarters complex. It consists of a rifle range, obstacle course and orienteering course. The rifle range is located within a gravel pit. Ten targets are available at 25 and 50 yards; five targets extend to 100 yards. The range is designed as a pistol, small bore and large bore range. An obstacle course consists of several log and fence obstructions, and tree stands. An orienteering course consists of 24 numbered posts scattered throughout a wooded area.

The Grange Cabin is located at the end of an approximately 1/3 mile gated trail that leads from the Trumpeter Trail. The primary use of the 24X16 ft cabin and

its setting has been to accommodate day-use by participants of the Outdoor Skills workshops, especially the Sandhill crane workshops in the fall.

Use of the Sandhill Wildlife Area via the Outdoor Skills Center is focused on day-use and extended-use activities. Participants use the rifle range, orienteering course and obstacle (safety skills) course. School groups use the entire property. The 14-mile long Trumpeter Trail offers opportunities to yield information on wildlife and wildlife management practices.

Two seasonal program peaks presently occur: during the months of April and May, and September through November. Generally, summer months are used to repair, order, and replace educational equipment, and prepare administratively for the Learn to Hunt Deer program. The summer months are not ideal for conducting outdoor educational programs due the substantial populations of biting insects.

Clinics and Workshops - Approximately 250-300 citizens are served annually at the 15-20 workshops that are offered at the Skills Center. Topics are selected based on demand, and/or significant wildlife issues or events. From 1998-2009, over 2,700 citizens attended clinics and workshops offered at Sandhill.

School Group Visits - About 600-2,200 students visit the Outdoor Skills Center and partake in wildlife educational events coordinated between staff and teachers each year. From 1998-2009, an estimated 14,200 students have visited the Outdoor Skills Center.

High School Independent Studies - At its peak, four wildlife research programs were offered to qualified juniors and senior high school students. Four hundred-ninety students participated in this program between 1995-1996 and 2009-2010.

Learn to Hunt Deer - Over 2,600 students participated in this unique program between 1991 and 2009, harvesting 906 deer for an overall success rate of 35 percent. This popular program is the flagship of Sandhill's Outdoor Skills Center.

The education program at the Outdoor Skills Center will continue to adapt to the ever-changing needs and challenges of the students and citizens it serves. Its operation will be consistent with the public education goals and objectives of the

Sandhill-Meadow Valley Work Unit Master Plan and the Bureau of Wildlife Management's statewide conservation education plan.

Objectives

- Provide areas and facilities to support operations and administration needs and provide facilities to help deliver public services.
- Provide educational programs that develop outdoor skills emphasizing hunting, trapping, observing and other manners of enjoying wildlife resources and the outdoors.
- Provide interpretive and educational services that create an appreciation for wildlife resources and their management.
- Provide opportunities for education consistent with the statewide conservation education plan.
- Partner with Necedah National Wildlife Refuge on mutually beneficial education and outreach programs.

Prescriptions

- Schedule management and programming for the Outdoor Skills Center to be compatible with the Bureau of Wildlife Management's "Wildlife Conservation Education Strategic Plan" as it is updated.
- Maintain the rifle range including providing needed improvements to meet safety standards.
- Conduct routine maintenance on the obstacle and orienteering courses.
- Provide shop and storage facilities for use by Department staff. New shop and storage facilities may be constructed or existing facilities redeveloped as deemed appropriate by the Department.
- Maintain native landscape plantings around buildings to provide screening, improved aesthetics, and visitor education through interpretation. Also, maintain small, turf areas around buildings as appropriate.
- Maintain the visitor kiosk at the Trumpeter Trail entrance.
- Maintain existing parking areas.

Public Use Management and Development

The following support the general public use objectives presented in the Universal Plan Section at the beginning of this chapter. ***Refer to Map C-1.***

Hunting and Trapping

Because Knowles-Nelson Stewardship funds were not used to acquire lands for the Sandhill Wildlife Area, the property is not subject to s. 23.0916 Stats. and NR 52, which require that the lands be open to five nature-based outdoor activities (NBOAs) including hunting and trapping. Although not required by statute, the intent is to offer hunting and trapping opportunities to the extent that they are compatible with ongoing research and educational events.

Currently, permits are required to hunt on Sandhill. Limited permits are available for squirrels, rabbits, ruffed grouse, woodcock and waterfowl. Permits are based on population numbers and to limit hunter density to minimize interference. Additional hunting opportunities are being considered for wild turkey. Bear hunting is not being considered because of the potential for damage to the deer fence if bear are attracted to the wildlife area by baiting; unlimited bear hunting opportunities exist on adjacent public lands.

Hunting opportunities and permit levels will be determined annually based on compatibility with other activities at the property, the population status of the species, and whether regulated harvest is desirable for habitat management. Information on hunting and trapping opportunities will be made available to the public by August 1st each year per NR 10.22(3)(e).

Objectives

- Provide hunting and trapping opportunities for small game, waterfowl and deer consistent with the experimental needs and educational goals of the property.

Prescriptions

- Provide regulated hunting opportunities (per NR 10.22(3)(a)).
- Provide regulated trapping opportunities (per NR 10.22(4)(a)).

- Provide waterfowl hunting opportunities in accordance with posted dates.
- Prohibit motorized boats on waters of the Sandhill Wildlife Area (per NR 45.11(4)).
- Conduct special antlerless deer hunts as necessary to achieve herd density goals (overwinter goal of 25 deer /mile^2 of range).
- Conduct the "Learn to Hunt Deer" program as offered through the Outdoor Skills Center.

Wildlife Observation

Prescriptions

- As existing wildlife viewing towers become unusable, replace with universally accessible viewing structures that blend with the natural landscape, compliment local culture, and meet viewer needs.

Trails

Prescriptions

- Maintain the 14-mile auto tour route referred to as the Trumpeter Trail.
- Maintain interpretive signs located along the trail to provide information on area wildlife, habitat management and unique features.
- Maintain the primitive 3.5-mile Swamp Buck Hiking Trail that meanders to the tower atop North Bluff.
- Maintain a minimum of three observation towers and approach paths accessible from the Trumpeter Trail to improve wildlife viewing opportunities.

WOOD COUNTY WILDLIFE AREA

WOOD COUNTY WILDLIFE AREA
Current State Ownership: 1,079 acres
Current Leased Land: 18,123 acres
Current Acquisition Authority: 1,440 acres
Current Project Boundary: 21,717 acres

PROPERTY DESCRIPTION

The Wood County Public Hunting and Fishing Grounds were established in 1939 by the Wood County Board of Supervisors. The Board set aside approximately 23,000 acres of contiguous tax delinquent land in the Township of Remington for public recreation purposes. That same year it was recommended the lands be leased to the Wisconsin Conservation Commission (now the Department of Natural Resources) and "operated and used only as public hunting, fishing and trapping grounds."

In 1939, the State Conservation Commission negotiated a long-term lease with Wood County for the purpose of operating a large contiguous tract of land as public hunting and fishing grounds. The 1939 lease was renegotiated in 1947 and again in 1965. Under the 1965 agreement, the Conservation Commission agreed to pay an annual per acre rental fee to the County. This lease agreement commenced on July 1, 1965, and extended for a period of 99 years with a termination date of June 30, 2064. Additionally, there was a land use agreement signed in 1961 granting diking and flooding rights to the Amundson Cranberry Company for cranberry culture on public hunting ground lands located in the southwest corner of the property in exchange for similar Department diking and flooding rights. ***Refer to Appendix A.***

The management goal of the approximately 20,000-acre Wood County Wildlife Area is to manage a wildlife area complex consisting of state-owned and leased lands for optimum production of forest and wetland wildlife with special consideration towards endangered species, and to provide compatible recreational and

educational opportunities (WDNR 1981).

In 2011, the Natural Resources Board approved a 481 acre boundary expansion, which increased the acquisition authority from 959 to 1,440 acres, and the project boundary from 21,236 to 21,717 acres. The expansion on the western boundary of Wood County Wildlife Area connects state, county and federal lands. The approximate 481 acres includes a corridor that ties together Wood County Wildlife Area with county and federal lands, provides access to county land, and protects a conifer swamp community. ***Refer to Map B-2***

Forest Type

The eastern two-thirds of the property is largely forested upland mixed with small marshes. As illustrated in **Table 2.12**, the upland forest is dominated by aspen and oak with scattered stands of natural or planted jack pine, red pine, and white pine. Common upland shrubs and perennial green herbs include hazelnut, dewberry, blueberry, strawberry, blackberry, wintergreen, and speckled alder.

A large portion of the Wood County Wildlife Area offers the potential to manage habitat with a focus on ruffed grouse. The areas identified on ***Map B-2*** as "Ruffed Grouse Management Area" support diverse habitats ranging from emergent marshes, sedge meadows, forest, pine and oak barrens and encompass approximately 5,200 acres. Thirty-five percent of this area is aspen in a variety of age classes, ranging from 1-80 years. Oak and scrub oak are the most common secondary types within the aspen type. Most stands support average growth potential for both aspen and oak; however, lack of access due to lowland conditions of surrounding area present potential problems for management. The non-forested habitats are mostly lowland brush – alder, willow or sedge meadows. Lowland brush–willow accounts for approximately 33% cover type with lowland grass representing 16%.

The natural habitat diversity of Wood County Wildlife Area is conducive to a wide variety of wildlife. Principal game species include white-tailed deer, ruffed grouse, woodcock, squirrels, rabbits, snowshoe hares, ducks and geese. Muskrat, beaver, mink, otter and coyotes are the primary furbearers. Numerous other protected species attracted to the area include Sandhill cranes, golden-winged

Table 2.12: Wood County Wildlife Area Current and Predicted Cover Types. ***Refer to Map D-2.***

COVER TYPE (Refer to Table 2.8, p.19)	Current Acres	Current % of Total	Predicted 50 yr Acres	Predicted 50 yr % of Total Cover
FORESTED UPLAND				
Aspen	5,342	26	5,337	26
Oak	859	4	901	4
Scrub Oak	1,090	5	1,052	5
White Birch	14	<1	14	<1
Red Maple	49	<1	49	<1
Northern Hardwood	0	<1	10	<1
Jack Pine	207	1	203	1
Red Pine	94	<1	116	<1
White Pine	135	<1	135	<1
White Spruce	3	<1	3	<1
FORESTED WETLAND				
Swamp Hardwoods	51	<1	51	<1
Tamarack	639	3	639	3
Sub-total	***8,483***	***42***	***8,510***	***42***
NON-FORESTED UPLAND				
Upland Grass	25	<1	25	<1
True Grasses	60	<1	60	<1
Low Growing Shrub	86	<1	59	<1
NON-FORESTED WETLAND				
Emergent Vegetation	5,240	26	5,240	26
Lowland Brush	3,937	19	3,937	19
Lowland Grass	1,373	7	1,373	7
Marsh	1,006	5	1,006	5
Sub-total	***11,727***	***58***	***11,700***	***58***
TOTAL	**20,210**	**100**	**20,210**	**100**

Source: WDNR—Division of Forestry, Recon. 07 January 2011

warbler, great blue herons, eagles, hawks, owls, shorebirds and songbirds.

Two areas are specifically identified as tamarack management areas within Wood County Wildlife Area: South Bluff Tamaracks (NHI Primary Site WC02), and Wood County Tamaracks (NHI Primary Site WC05), a portion of which is included in the Hog Island Tamaracks SNA No.579. ***Refer to Map E-2.*** These are two sites that primarily feature forested peatlands dominated by tamarack with inclusions of black spruce, muskeg, and alder thicket as well as open patches of boggy fen dominated by sphagnum mosses, narrow leaved sedges, blue joint reed grass and hardhack.

These sites have significant ecological qualities including rare species and/or contain some of the best examples of representative natural features. Although detailed animal surveys have not been conducted, the sites are known to support Nashville warbler (common), white-throated sparrow, golden-winged warbler, sharp-shinned hawk, hermit thrush, and snowshoe hare, all "northern" species that are approaching their southern range limits in central Wisconsin. In addition, the sites support a number of rare or otherwise notable plant and animal species.

Hunting, trapping and wildlife viewing are the primary purposes of the property. Limited primitive camping is permitted on Wood County Wildlife Area.

Non-forest Type

The western one-third of Wood County Wildlife Area has an open, almost treeless aspect dominated by wetlands. The majority of the extensive marsh complexes are comprised primarily of very poorly drained Dawson peat muck or Newson-Meehan soils interspersed with fine sandy loam islands or ridges dominated by Plainfield, Friendship soils. **Table 2.12** illustrates the importance of non-forest type acreage, which is dominated by various species of sedge, bluejoint grass, hardhack, meadow sweet and peat mosses. Scattered rush and wool grass communities exist throughout the type. Lowland brush areas are dominated by willow and bog birch.

Current resource management on Wood County Wildlife Area focuses on the extensive marsh complexes, most notably Ball Road Flowages. The large size and

context of the Ball Road Flowages makes this site highly significant for breeding and migrating waterfowl as well as many wildlife species, particularly grassland birds, and species dependent on conifer swamps. A number of the animals found here are rare or uncommon, and are quite specialized in their habitat needs. Among these are the northern harrier, American bittern, golden-winged warbler, Connecticut warbler, bobolink and LeConte's sparrow.

The trumpeter swan present on the Ball Road Flowages is listed among Wisconsin's special concern birds. Ideal habitat for trumpeters includes shallow wetlands 1-3 feet deep in isolated areas away from human disturbance with a diverse mix of emergent vegetation and open water that support a rich variety of submergent plants. Several rare plants have been documented in the site's wetlands.

A 250-acre closed area is associated with the eastern most pool of Ball Road Flowages. The closed area is posted closed to access for wildlife management purposes (NR 11.13).

State Natural Area

In March 2008, the Department designated a 462-acre northern wet forest (Hog Island Tamaracks No.579) in three units as a State Natural Area to focus education and research opportunities without compromising the traditional hunting, fishing, and trapping uses. Two units are in the Wood County Wildlife Area (306 acres); one unit is in the Meadow Valley Wildlife Area (156 acres). ***Refer to Maps E-2 and E-3.***

The 462-acres of tamarack and black spruce provide habitat for numerous species found at their southern range limit. Species of Greatest Conservation Need, including Canada warbler, Connecticut warbler, and veery, find suitable habitat in these conifers . In addition, several bird species with northern affinities, such as hermit thrush, white-throated sparrow, yellow-rumped warbler, and Nashville warbler nest in these conifers. These 462-acres will be maintained to provide habitat and help conserve the noted species. Management objectives and prescriptions are included in the Habitat Management Area descriptions. For additional information on the State Natural Areas program, refer to Section One, page 37.

LAND MANAGEMENT CLASSIFICATION

All of Wood County Wildlife Area is classified as Habitat Management Area: 15,940 acres are considered **General Habitat Management,** and 5,200 acres are **Ruffed Grouse Management**. ***Refer to Map B-2.***

Table 2.13: Wood County Wildlife Area Land Management Classifications.

Habitat Mgmt Area	**21,140 acres**
General	*15,940*
Ruffed Grouse	*5,200*
TOTAL	**21,140**

Resource Management, Development, and Protection

Habitat Management Area

Objectives

Unless specifically addressed below, management will be in accordance with the universal plan elements as provided in Section One of this chapter.

- Maintain the current aspen acreage as the dominant cover type.
- Manage the Ball Road Flowages and the Ditchbank Road wetlands as emergent marshes.
- Place special management emphasis on the Ball Road Flowages and the Ditchbank Road wetlands due to their importance as waterfowl management sites.
- Maintain the established closed area (NR 11.13) to provide resting areas for migrating waterfowl.
- Cooperatively manage South Bluff Tamaracks with Wood County to retain a relatively intact stand of regionally important forest community.

Prescriptions

Unless specifically addressed below, management will be in accordance with the "Management Prescriptions by Cover Type" as provided in Section One of this chapter.

- Manage cover types listed in **Table 2.12** as described in "Management Prescriptions by Cover Type."
- Focus on infrastructure maintenance (major or routine) to ensure optimum water level management.
- Maintain the larger, better-developed conifer swamps with emphasis on older, larger diameter trees.
- Work cooperatively with adjacent landowners and other partners to resolve water management issues that have negative effects on the wildlife area.

MEADOW VALLEY WILDLIFE AREA

MEADOW VALLEY WILDLIFE AREA
Current State Ownership: 1,212 acres
Current Leased Land: 57,225 acres
Current Acquisition Authority: 2,157 acres
Current Project Boundary: 58,893 acres

PROPERTY DESCRIPTION

Meadow Valley Wildlife Area (MVWA) lies in the bed of extinct Glacial Lake Wisconsin; the majority of acreage is in Juneau County with additional parcels in Wood, Jackson and Monroe Counties.

During the late 1800s, settlers logged the large white and red pine that dominated the upland forest. With the pine forests removed, the land clearing operation was expanded and some of the wetlands were drained in a short-lived attempt to farm the area. However, a short, unpredictable growing season, poor soil, and excessive drainage taxes caused most of the farms to be abandoned by the 1930s. The federal government purchased large tracts of these tax delinquent lands under the Jones-Bankhead Farm Tenant Act.

In 1940, Meadow Valley Wildlife Area (Central Wisconsin Conservation Area) was leased to the State of Wisconsin and administered under a Cooperative Agreement with US Fish and Wildlife Service. The initial agreement period expired in 1990. Three, 15-year automatic renewal periods follow this initial period. The US Fish and Wildlife Service and Wisconsin Department of Natural Resources recently agreed to the second 15-year renewal period.

Based on the Cooperative Agreement, revenue generated on the Meadow Valley Wildlife Area is not specifically earmarked to be returned to the property for management. Wisconsin state law requires timber sale revenue from all state wildlife areas to be deposited in the Fish and Wildlife Account. Biannually, the Legislature allocates funding from the Fish and Wildlife Account back to the Department for activities including property management. Our obligation under the

Cooperative Agreement is to spend resources equal to or greater than the revenue generated on the property. The Department accounts for that obligation in an annual report required by the Cooperative Agreement and submitted to the USFWS by July 31 of each year. ***Refer to Appendix B***.

The entire Meadow Valley Wildlife Area encompasses approximately 59,000 acres with most of the land area (57,225 acres) under federal ownership. Over the years, the Department has acquired in-holdings totaling 1,212 acres. The MVWA is currently managed to provide a diverse landscape with a good interspersion of habitat types and stages of succession. Another important management objective is to provide examples of pre-settlement communities such as old growth forests, oak barrens, sand prairies, and sedge meadows.

In 2011, the Natural Resources Board approved a 364 acre boundary expansion, which increased the acquisition authority from 1,793 to 2,157 acres, and the project boundary from 58,529 to 58,893 acres. The expansion secures a portion of Dead Creek Old Forest Area (NHI Primary Site MV07, *Biotic Inventory,* Map E-3). This site contains Monroe County's most intact occurrence of the regionally restricted white pine-red maple swamp community, contains several rare plants, and exceptional habitat for forest interior species. ***Refer to Map B-3.***

Forest Type

As illustrated in **Table 2.14**, aspen, scrub oak and jack pine represent the majority of the property's forested land. This habitat type plays an important role ecologically for the primary game species present (ruffed grouse, woodcock, and white-tailed deer) and the hunting opportunities they provide.

The extent of oak and aspen helped in defining the Ruffed Grouse Management Area illustrated on ***Map B-3.*** Grouse Management Areas represent the best areas suited to managing early succession forest to support ruffed grouse. This area is not only important to ruffed grouse, but its ability to support high species richness at the same time. This area provides substantial amounts of aspen, oak, and alder for wildlife including ruffed grouse, American woodcock, beaver, deer, golden-winged warbler and many other species of special concern. It supports a variety of aspen age classes to provide for a diverse wildlife community.

Blocks of older forest also exist scattered throughout the property's forested land. Some areas that have relatively large blocks or concentrated patches containing older white and red pine, and/or oak helped to define the Old Forest Native Community Management Areas. These sites represent some of the best areas suited to development and management of later successional forest types including old growth. Attributes of old forest including large trees, large coarse woody debris, large standing dead snags, furrowed and loose bark, and high basal area are generally limited on the landscape, and patch sizes containing them tend to be small and are also limited. These attributes provide quality habitat in the form of food, maternity sites, escape cover, and winter dens for many mammals, birds, plants, and invertebrates. In addition, area sensitive forest interior species such as the rare red-shouldered hawk and cerulean warbler benefit by the establishment of large blocks of old forest. Old forests also provide inspirational, aesthetic and philosophical values to humans and are a key part of Wisconsin's heritage.

Table 2.14: Meadow Valley Wildlife Area Current and Predicted Cover Types. ***Refer to Map D-3.***

COVER TYPE (Refer to Table 2.8, p. 19)	Current Acres	Current % of Total Cover	Predicted 50 yr Acres	Predicted 50 yr % of Total Cover
FORESTED UPLAND				
Aspen	8,226	15	8,279	16
Oak	3,675	7	3,103	6
Scrub Oak	10,363	19	9,369	18
White Birch	24	<1	24	<1
Central Hardwoods	0	<1	30	<1
Red Maple	608	1	733	1
White Spruce	4	<1	4	<1
Jack Pine	6,696	13	7,144	13
Red Pine	2,158	4	2,192	4
White Pine	2,583	5	3,588	7
FORESTED WETLAND				
Bottomland Hardwoods	143	<1	143	<1
Black Spruce	166	<1	166	<1
Tamarack	340	<1	292	<1
Swamp Hardwoods	426	1	426	<1
Sub-total	***35,412***	***67***	***35,493***	***67***

Non-forest Type

Non-forested acreage is dominated by lowland grass, emergent vegetation and lowland brush, especially willow.

Table 2.14 cont. COVER TYPE	Current Acres	Current % of Total Cover	Predicted 50 yr Acres	Predicted 50 yr % of Total Cover
NON-FORESTED UPLAND				
Upland Grass	91	<1	88	<1
True Grasses	357	<1	305	<1
Herbaceous Vegetation	63	<1	37	<1
Low Growing Shrub	139	<1	139	<1
Upland Brush	52	<1	52	<1
NON-FORESTED WETLAND				
Emergent Vegetation	5,365	10	5,365	10
Lowland Brush	4,041	8	4,041	8
Marsh	628	1	628	1
Muskeg Bog	606	1	606	1
Lowland Grass	6,411	12	6,411	12
Sub-total	***17,753***		***17,672***	
TOTAL	**53,165**	**33**	**53,165**	**33**

Source: WDNR—Division of Forestry, Recon. 10 January 2011.

Six flowages impound approximately 1,400 acres of open water on the Meadow Valley Wildlife Area. The flowages include: Meadow Valley (includes eight pools), Kingston, Beaver, Scott, Dandy Creek, and Monroe County. (Eagle Nest Flowage is within the property boundary, but is in private ownership.) These sites provide important wetland habitat to a broad range of migratory and resident species, including two high priority SGCN - whooping crane and trumpeter swan.

The 3000-acre emergent wetland complex known as Meadow Valley Flowage is a key area for waterfowl migration and brood-rearing, and is one of the most heavily used public use areas at Meadow Valley Wildlife Area. A 1,175-acre waterfowl refuge is associated with the Meadow Valley Flowage (NR 15.022(5)(a)) as a no entry wildlife refuge from September 1 through December 31, except to hunt deer during the open gun and muzzleloader seasons.

Although most of the property's shallow flowages are subject to "winter kill", and consequently have no significant fishery or potential for a fishery, one exception is Meadow Valley's Monroe County Flowage where the Department may explore fishery restoration options. Monroe County Flowage has a history of providing fishing opportunities for northern pike, largemouth bass, and several pan fish species. Unfortunately, the flowage has experienced recent winter kills

that have decimated this fishery. To maintain a fishery, minor dredging of existing impoundments is needed to create deeper pools where fish can overwinter. Fishery restoration efforts also need to consider the importance of this flowage to breeding (particularly ring-necked ducks) and migrating waterfowl.

State Natural Areas

Five State Natural Areas are designated within the Meadow Valley Wildlife Area. Each is discussed below. ***Refer to Map E-3.*** For additional information on the State Natural Areas program, refer to Section One, page 37.

Hog Island Tamaracks (State Natural Area No. 579)

Hog Island Tamaracks consists of three units; one unit is in Meadow Valley Wildlife Area (156 acres) and two units are in Wood County Wildlife Area. The 462-acre SNA is situated within the flat, sandy bed of Glacial Lake Wisconsin. Hog Island Tamaracks features a northern wet forest of tamarack and black spruce. Low sandy ridges are interspersed within the flat plain. The shrub layer is dominated by huckleberry with winterberry and mountain holly. The herb and low shrub layer is typical of this community type and includes Canada bunchberry, swamp dewberry, cinnamon fern, and tawny cotton-grass. This peatland community provides habitat for numerous Species of Greatest Conservation Need found at their southern range limit. Species include Canada warbler, golden-winged warbler, Connecticut warbler, and veery. In addition, several bird species with northern affinities such as hermit thrush, white-throated sparrow, yellow-rumped warbler, and Nashville warbler nest within this coniferous forest. Hog Island Tamaracks is owned by Wood County and the US Government. It was established as a State Natural Area in 2008.

Kingston Pines (State Natural Area No. 578)

The 535-acre Kingston Pines features a mature pine and oak forest of red pine, white pine, northern pin oak and black oak. The oldest pines occur on nearly flat ground between Big Lake and the Kingston Flowage. Both the pine and oak species are reproducing well. The shrub layer is variable and consists of huckleberry, American hazelnut, and prairie willow. Drier portions of the site have typical cen-

tral pine-oak ground layer species, whereas the wetter places contain botanical disjuncts such as long sedge and Massachusetts fern. Other ground layer species include early low blueberry, whorled yellow loosestrife, and bracken fern. Scattered around the site are extensive patches of running prairie sedge and Pennsylvania sedge. Boggy areas have good populations of central poor fen indicators such as yellow screw-stem and clustered sedge. Several Species of Greatest Conservation Need nest in the older pine and bog including least flycatcher, Canada warbler, and the state-threatened red-shouldered hawk. Many bird species are found at or near their southern range limit including northern raven, hermit thrush, black-throated green warbler, yellow-rumped warbler, and white-throated sparrow. Patches of old-growth white pine are evident within the site. Kingston Pines is owned by the US Fish and Wildlife Service and leased by the DNR. It was designated a State Natural Area in 2008. Management objectives and prescriptions are included in the Native Community Management Area – Old Forest descriptions.

Meadow Valley Barrens (State Natural Area No. 576)

Situated in the bed of Glacial Lake Wisconsin, the 631-acre Meadow Valley Barrens supports an oak-dominated barrens with scattered jack pine throughout. White and red pines are also present. Shrubs are moderately dense with early low blueberry, huckleberry, and sweet fern. Pennsylvania sedge is dominant in many areas. However, with canopy thinning and prescribed fire many barrens plants are favorably competing including big bluestem, little bluestem, gray goldenrod, sky-blue aster, flowering spurge, and poverty panic grass. Three rare insects occur here including the federally listed Karner blue butterfly, a barrens specialist. Meadow Valley Barrens is owned by the US Fish and Wildlife Service and leased by the DNR. It was designated a State Natural Area in 2008. Management objectives and prescriptions are included in the Native Community Management Area - Barrens descriptions.

Blueberry Trail Complex (State Natural Area No. 577)

The 251-acre Blueberry Trail Complex features a relatively undisturbed floodplain forest along a meandering, free-flowing stretch of Beaver Creek. The stream is deeply embedded in sand, with steep banks. Dominant trees are river

birch, oak, pine, and red maple. In places, the forest grades into sedge meadow/ poor fen, bluejoint meadow, and tamarack swamp. Just north of the creek is a white pine-red maple swamp, a community type that is restricted to the central sand plains area. Common understory plant species include huckleberry, cinnamon fern, skunk cabbage, yellow bluebead lily, and bracken fern. Rare plants include yellow screw-stem, long sedge, crossleaf milkwort, and bog fern. Two rare birds, the cerulean warbler and Louisiana waterthrush, have been present during the breeding season. Other birds include whip-poor-will, least flycatcher, golden-winged warbler, Nashville warbler, ovenbird, mourning warbler, and scarlet tanager. Blueberry Trail is owned by the US Fish and Wildlife Service and leased by the DNR. It was designated a State Natural Area in 2008. Management objectives and prescriptions are included in the Native Community Management Area – Old Forest descriptions.

Suk Cerney Peatlands (State Natural Area No. 575)

The 3,610-acre Suk and Cerney Peatlands is found southwest of the intersection of Sixteenth Street West and Sixth Avenue, adjacent to the Necedah National Wildlife Refuge. This vast near-level saturated peatland in the bed of glacial Lake Wisconsin is a complex mosaic of Central Poor Fen and young xeric forests of oak and pine on low, sandy "islands" and "peninsulas."

These patchwork-patterned uplands are the remnants of dunes formed thousands of years ago following the natural drainage of now extinct Glacial Lake Wisconsin. The dominant plants in the open wetlands are narrow-leaved sedges and Canada bluejoint grass. Other common species are hardhack, cotton-grasses, and bog birch. The wetlands generally have the aspect of a sedge meadow, though some areas support a deep layer of sphagnum mosses, ericaceous shrubs, and insectivorous plants and should be considered Poor Fen or Open Bog. Pitcher plants, orchids, and a more diverse complement of sedges occupy these more acidic sphagnous peatland patches. There are scattered individuals or copses of tamarack (and rarely, black spruce).

The wetland margins tend to be occupied by a zone of tall shrubs composed of speckled alder, winterberry holly, bog holly, chokeberry, bog birch, and willows. The sandy islands and ridges often support dense stands of jack pine or black/

northern pin oak over a Penn sedge-dominated groundlayer. Huckleberry, early blueberry, bracken fern, and a few barrens-associated plants are also typically present.

This site is significant for its large size, relatively intact hydrology, complex mosaic of natural communities representative of this ecoregion, and the rare or otherwise important species that it supports. Though detailed animal surveys have not yet been conducted throughout this site, the residents include sedge wren, Nashville warbler, golden-winged warbler, northern harrier, sharp-shinned hawk, and southern bog lemming. Suk Cerney Peatlands was designated a State Natural Area in 2008. Management objectives and prescriptions are included in Section One, universal plan elements and "Management Prescriptions by Cover Type".

LAND MANAGEMENT CLASSIFICATION

The majority of Meadow Valley Wildlife Area is classified as **Habitat Management Area** (48,507 acres). Approximately 7,900 acres are **Native Community Management Area**, which includes barrens and old forest management. ***Refer to Map B-3.***

Table 2.15: Meadow Valley Wildlife Area Land Management Classifications.

Land Management Classification	Acres
Habitat Mgmt Area	**48,507**
General	*43,849*
Ruffed Grouse	4,658
Native Community Mgmt Area	**7,913**
Barrens	*2,411*
Old Forest	*5,502*
TOTAL	**56,420**

Resource Management, Development, and Protection

Habitat Management Area

Objectives

Unless specifically addressed below, management will be in accordance with the universal plan elements and "Management Prescriptions by Cover Type" as provided in Section One of this chapter. Suk Cerney Peatlands State Natural Area

(No. 575) lies within this Habitat Management Area.

- Place special management emphasis on the Meadow Valley Flowage complex due to its importance as a waterfowl management site.
- Manage the Meadow Valley Flowage as an emergent marsh complex.

Prescriptions

- Manage the cover types listed in **Table 2.14** as described in "Management Prescriptions by Cover Type".
- Manage for emergent marsh as described in "Management Prescriptions by Cover Type".
- Focus on infrastructure maintenance (major and routine) to ensure optimum water level management.
- Maintain the 1,175-acre wildlife refuge in the Meadow Valley Flowage (NR 10.01, NR 15.022) complex to provide resting areas for migrating waterfowl.
- In areas adjacent to open wetlands and the Necedah National Wildlife Refuge, manage for younger forests and/or savanna structure to benefit early successional, savanna, and open landscape species, where appropriate.
- Work cooperatively with adjacent landowners and other partners to resolve water management issues that have negative effects on the wildlife area.

Native Community Management Area – Barrens

This 2,411-acre Native Community Management Area is primarily located within the southern half of the property and is comprised of several non-connected parcels, including several roadside right-of-ways. The area is known to contain one federally listed animal species, one state threatened animal species, one state threatened plant species, numerous Species of Special Concern, and numerous Species of Greatest Conserva-

NCMA—Barrens:

- *Silver Cr = 1,712 ac*
- *Eisfeldt = 125 ac*
- *Brodhead = 198 ac*
- *Norway = 215 ac*
- *Norway W = 161 ac*

TOTAL = 2,411 ac

tion Need.

Meadow Valley Barrens State Natural Area (No. 576) lies within this Native Community Management Area.

Objectives

Management will be in accordance with the universal plan elements as provided in Section One of this chapter.

Native Community Management Area – Old Forest

The Native Community Management Area includes 5,502 acres designated as Old Forest. It is comprised of six primary non-connected blocks containing concentrations of existing older age class forest with approximately one-fourth of this acreage representing younger age classes with reasonable potential to be restored to older community conditions. They are the **Kingston, Hog Island, Norway Ridge, Dead Creek, Blueberry Trail, and Dandy Creek Old Forest Management Areas.** The conifer-dominated areas support many northern birds and mammals, including northern raven, hermit thrush, red-breasted nuthatch, pine, yellow-rumped, and Canada warblers, fisher, and porcupine. Combined, these areas are known to contain three State Threatened animals, and numbers of Species of Special Concern.

NCMA—Old Forest:

- *= 2,457 ac*
- *Hog Island = 900 ac*
- *Norway Ridge = 175 ac*
- *Dead Creek = 1,051 ac*
- *Blueberry Tr = 255 ac*
- *Dandy Creek = 664 ac*

TOTAL = 5,502ac

The 2,457-acre **Kingston Old Forest Area** is the largest, and is located in the northwest corner of Meadow Valley. The primary natural community type represented here is the **Central Sands Pine-Oak Forest,** which contains medium-sized white pine and large to medium-sized black oak with some red pine plantation on the southeastern ridge of the complex dating back to the early 1930s. The shrub layer is variable in density and consists of brambles, huckleberry and American hazelnut. The low shrub and herb strata support early blueberry, whorled loosestrife, bracken fern, and locally extensive sods of sedges.

The site also contains a tamarack swamp, a central poor fen southwest of King-

ston Flowage, and a small wet-mesic forest of swamp hardwoods and white pine-red maple along one of the few free-flowing stretches of the East Branch of Beaver Creek. The area is known to support a number of rare plants and animals, and the Kingston Pine State Natural Area (No. 578) is located within this Native Community Management Area.

Another area with **Central Sands Pine-Oak Forest** is the 900-acre **Hog Island Old Forest Area,** also located in the northwest corner of Meadow Valley. Compositionally, it is very similar to the Kingston area with medium to large white pine and oak along a ridge that rises 100 feet above the Meadow Valley Flowage, known as Hog Island. The area contains quality habitat for rare and uncommon species and one of three units of the Hog Island Tamaracks State Natural Area (No. 579).

An area in the southwest corner of Meadow Valley called **Dead Creek Old Forest Area** (1,051 acres), is centered around a second-growth **White Pine-Red Maple Swamp,** which contains patches of older forest that are developing important structural features such as large trees, tip-ups, snags, and coarse woody debris. The shrub layer of the swamp is composed primarily of winterberry holly and speckled alder. Frequent understory species of the swamp include skunk cabbage, goldthread, Canada mayflower, starflower, and swamp dewberry. The portion south of Buckley Road contains an infestation of the exotic shrub glossy buckthorn; however, the extent of this shrub in the highest quality portion of the swamp north of Buckley Road is very limited at the time of this writing. Roadside right-of-ways and a small area of jack pine/scrub oak contain wild lupine and prairie species. The site is known to contain several rare plants and one rare animal species, and contains Monroe County's most intact occurrence of the regionally restricted White Pine-Red Maple Swamp community.

The **Blueberry Trail Old Forest Area** (255 acres) is located in the southern portion of Meadow Valley. **Floodplain Forest** is an important component of the Blueberry Trail Complex (State Natural Area No. 577) previously discussed. The area encompasses the floodplain of Beaver Creek, and lands to the north that include small incursions of saturated peatland, tamarack swamp, and white pine-red maple swamp. Blueberry Trail is significant for its stretch of free-flowing, meandering stream, numerous rare plants, and uncommon animals that

benefit from blocks of older forest.

Dandy Creek (664 acres) and **Norway Ridge Old Forest Areas** (175 acres) are located near Highway 173, Crescent Road and Dandy Creek Flowage. It is a relatively even mix of both upland and wetland. The wetland portions contain a mix of forested wetlands dominated with tamarack with scattered peatland openings dominated by wire-leaved sedges, bluejoint reed grass and, in some places sphagnum mosses. The upland portion contains a mix of many species including black oak, white, red, and jack pine, red maple, paper birch, and aspen, and several small red pine plantations occur within the area. The area also supports a number of rare plants and animals. Although the area contains a significant amount of short-lived tree species, opportunities to develop old forest attributes and potential areas of future old growth exist.

Management Objectives

Unless specifically addressed below, management will be in accordance with the universal plan elements as provided in Section One of this chapter.

- Develop and maintain an older, closed canopy or near-closed canopy forest of longer lived species, such as white pine, red pine, and oak to benefit forest interior species.
- Enhance forest structural diversity and development of old growth characteristics, such as large diameter trees, standing dead snags, and coarse woody debris.
- Protect water quality through protection and maintenance of wet areas and seeps.
- Maintain free flowing, naturally meandering stretch of the West Branch of Beaver Creek near Kingston and Beaver Creek near Blueberry Trail.
- Protect the aesthetic qualities of old forest habitat, such as large diameter trees.
- Protect, manage, and enhance natural communities for area sensitive and rare species habitat needs.

Management Prescriptions

Unless specifically addressed below, management will be in accordance with the "Management Prescriptions by Cover Type" as provided in Section One.

- Decrease short-lived species and increase white pine, red pine, and oak primarily through natural conversion and thinning.
- Promote the growth and retention of large white pine, red pine, and oak, through passive management, extended rotation, and thinning.
- Thin upland stands in a way that maintains closed canopy conditions within the majority of the upland stands in each separate Old Forest Management Area.
- Passively manage the White Pine-Red Maple Swamp community at Dead Creek Old Forest between Brunswick and Buckley Avenues, and Copper Road. Active management within these roads can take place in portions containing lupine (western portion).
- Passively manage the Blueberry Trail Old Forest Area.
- Passively manage lowland tamarack.
- Manage red pine plantations primarily through thinning to create stands with a natural appearance and large diameter trees.
- Follow the DNR Old Growth and Old Forest Handbook Management guidelines for actively managed areas. Monitor composition and structure changes to aid future management decisions.
- Retain snags and coarse woody debris.
- Salvage of trees is permitted through consultation from affected DNR programs.
- Allow the maintenance of openings in close proximity to power lines and roadside right-of-ways containing wild lupine and other prairie species at Dandy Creek and Norway Ridge Old Forest.
- Slow the spread and attempt to control glossy buckthorn within the White Pine-Red Maple Swamp community at the Dead Creek Old Forest Area between Bruswick and Buckley Avenues and Copper Road.

CHAPTER THREE

Material for this chapter is taken from the Regional and Property Analysis: Sandhill-Meadow Valley Work Unit (Pub LF-0056 2010). *It may be viewed on the web at: http://dnr.wi.gov, search Sandhill Master Planning, or a paper copy is available by request. Refer to this document for additional data and analysis on Sandhill, Wood County and Meadow Valley Wildlife Areas and their ecological and economic context.*

ANALYSIS OF THE REGIONAL CONTEXT

BIOLOGICAL RESOURCES AND ECOLOGICAL CAPABILITY

Central Sand Plains Ecological Landscape

Located in central Wisconsin, the Central Sand Plains Ecological Landscape occurs on a flat, sandy plain and supports agriculture, forestry, recreation and wildlife management. The ecological landscape formed in and around what was once Glacial Lake Wisconsin, which contained glacial meltwater extending over 1.1 million acres at its highest stage. Soils are primarily sandy lake deposits, some with silt-loam loess caps. Sandstone buttes, carved by rapid drainage of the glacial lake or by wave action when they existed as islands in the lake, are distinctive features of this landscape.

Historically, this landscape was composed of extensive pine and oak forests on the uplands and numerous black spruce-tamarack swamps in the lowlands. The vegetation included extensive wetlands of many types such as open bogs, shrub swamps and sedge meadows. Open pine barrens occurred where periodic wildfires removed or reduced the tree canopy. An area of more mesic forest with white pine and hemlock was found in the northwest portion, including a significant pinery in eastern Jackson County.

Today, much of this landscape is characterized by lower human population and road density, and is less fragmented by development, than most other areas in southern Wisconsin. It also has more extensive public ownership than other locations in the southern half of the state, which provides unique large-scale management opportunities. Plants, animals, and natural communities that are geographically limited and highly localized in Wisconsin are well represented within the area.

The large acreage of County Forest, Federal Fish and Wildlife, and State lands, including the Sandhill-Meadow Valley Work Unit, support some of the largest and least fragmented blocks of forest and open wetland habitat remaining in the southern half of the state. The interface between upland forest and wetland communities are of ecological significance for the rich edge habitat created.

Extensive forests of oak and pine create opportunities for management at all scales and age classes, and to manage successfully for edge- and area-sensitive species. The sandy, and/or wet soils of this area may limit forest growth potential yet are suitable for early succession species such as aspen, jack pine and scrub oak. Large blocks of early succession forest are declining statewide and are of ecologic importance for the game and non-game species supported.

Wetlands, both natural and flowages, are abundant, and the area is part of a larger central Wisconsin landscape containing the highest concentration of wetlands in the state. Among the wetland communities are the large peatland complexes containing poor fen, muskeg, and tamarack-black spruce swamp. Peatlands are more extensive here than anywhere else in southern Wisconsin, especially in and around extinct Glacial Lake Wisconsin. The central Wisconsin peatlands support many species that are rare or absent from similar habitats in northern Wisconsin. The extensive wetlands are of regional significance for waterfowl production, and have statewide significance as a migratory stop over. They are important for open wetland bird types, rare aquatic invertebrates, and for area sensitive species that require large patches.

The Central Sand Plains is one of only three ecological landscapes in the state where extensive and large-scale management for oak and pine barrens communities and associated species may be possible. This ecological landscape is

an important place to manage for them because of the amount of suitable habitat, the extensive public land holdings, and the significant restoration opportunities that are present. While not as extensive, the Sandhill-Meadow Valley Work Unit's pine and oak barrens contribute to the overall protection and restoration efforts of this globally rare community type.

Overall, the Central Sand Plains is a major concentration area for rare species, contains globally imperiled species, unusual disjuncts, and many species that are at or near their southern or northern range limits. Lands in this region, including the Sandhill-Meadow Valley Work Unit, provide critical habitat for many species of breeding, feeding, migrating and wintering birds. The landscape context of both rare and common communities here offers better opportunities for long-term population and habitat viability than almost any other location in southern Wisconsin.

To better assess management opportunities and priorities, the Department considers those Species of Greatest Conservation Need (SGCN) and natural communities present within each ecological landscape. The full report for the Central Sand Plains is available at: dnr.wi.gov; search "Central Sand Plains".

Approximately 97 SGCN (plants excluded) are either significantly or moderately associated with the Central Sand Plains Ecological Landscape, based on findings in the Wisconsin *Wildlife Action Plan*. Of the vertebrate SGCN, 35 birds, one fish, five reptiles and amphibians, and two mammals are significantly associated with the Central Sand Plains.

Natural Community Management Opportunities

Within each ecological landscape the Department surveys to identify opportunities for protection, restoration and/or management of natural communities. The Central Sand Plains Ecological Landscape offers 44 Natural Community Management Opportunities; 33 are considered significant. Several of these major natural community types are present on the Sandhill-Meadow Valley Work Unit and offer management potential: **Central Sands pine-oak forest, white pine-red maple swamp, floodplain forest, northern sedge meadow, open bog, central poor fens, and pine and oak barrens.**

Conservation Opportunity Areas

As part of the *Wildlife Action Plan*, the Department considered the issues and threats facing each of the vertebrate Species of Greatest Conservation Need and the natural communities they inhabit. The implementation effort of the plan focuses on identifying conservation actions and conservation opportunity areas critical to the state's long-term goal of conserving SGCN. The intent is to focus management actions in conservation opportunity areas to achieve the most effective and efficient approach to conserve SGCN with limited resources.

Conservation Opportunity Areas (COA) are identified places on the landscape that contain ecological features, natural communities or species habitat for which Wisconsin has a unique responsibility for protecting, or that contain habitat with dominant responsibility for conservation when viewed from the global, continental or in the upper Midwest perspectives. There are eight terrestrial and eight aquatic Conservation Opportunity Areas within the Central Sand Plains Ecological Landscape.

The Sandhill-Meadow Valley Work Unit contains part of two of them, one terrestrial and one aquatic. The terrestrial Meadow Valley Sandhill COA contains large wetlands with open bogs, shrub swamps, impoundments and sedge meadows including northern wet forest, alder thicket, shrub-carr, white pine-red maple swamp, floodplain forest, and northern sedge meadow. The COA is of Upper Midwest/Regional Significance. Forty-four SGCN have been identified to be associated with the communities within this COA.

The aquatic Yellow River-Hemlock Creek COA is noted for its diverse Aquatic Communities of State Significance. This COA includes the main stem of those rivers and stream side communities of floodplain forest and emergent marsh. Twenty-seven SGCN are present.

LAND USE AND SOCIO-ECONOMIC CHARACTERISTICS

Population

The properties of the Sandhill-Meadow Valley Work Unit are located in Jackson, Juneau, Monroe and Wood Counties with the majority of acreage in Juneau and Wood Counties. Each of the counties is predominately rural with fewer people per square mile than the statewide average. Wood County is the most populous (73,756), including the two major population centers of the City of Marshfield (18,848) in the northwest part of the county, and the City of Wisconsin Rapids (18,435) in the southeast.

Land Use and Trends

Juneau, Wood, Monroe and Jackson Counties each support agriculture as part of their economies. Dairy is the top agricultural commodity produced in each county. However, from a statewide perspective, these four counties play a major role in Wisconsin being ranked number one in cranberry production. In 2007, cranberries were produced on about 18,000 acres in 19 of Wisconsin's 72 counties; Wood, Monroe, Jackson and Juneau Counties have the greatest acreage devoted to cranberry production (Roper 2008). Wood, Jackson and Monroe Counties rank as the state's top three in cranberry production, respectively. In celebration of the importance of cranberries to the local economy, both Wood and Monroe Counties focus tourism on annual cranberry festivals.

Significant tracts of public land are present in the region. In addition to the Sandhill-Meadow Valley Work Unit, major public lands include Necedah National Wildlife Refuge (44,696 ac), Black River State Forest (68,000 ac), Quincy Bluff and Wetlands State Natural Area (5,102 ac), Buckhorn State Park (5,900 ac), and Jackson County Forest (118,000 ac). ***Refer to Map A.***

The region remains largely rural, yet is influenced by outside tourism demands from the Chicago and Twin Cities metropolitan areas. Easy highway access and relatively cheap land prices within the region have made it a popular location for seasonal home development. Based on Statewide Comprehensive Outdoor

Recreation Plan (SCORP) data, both Wood and Monroe Counties are estimated to have less than 3% of housing for seasonal or recreation use; Jackson County is listed in the 3-9.99% range. Juneau County is the highest in the 10-24.99% of housing for seasonal or recreation use (WDNR 2006).

RECREATION RESOURCES, USE AND DEMAND

SCORP

The primary source of information on outdoor recreation in Wisconsin is the Statewide Comprehensive Outdoor Recreation Plan (WDNR 2006). The Department revises the plans periodically to determine status, trends and needs for outdoor recreation in the State. The current plan is for the period 2005-2010. Information for the document is obtained through public surveys, listening sessions and interviews. For purposes of evaluation, the State is broken into eight regions of similar size. Sandhill-Meadow Valley Work Unit lies within the Western Sands Region, which is located in the west-central part of the state and encompasses Adams, Chippewa, Clark, Eau Claire, Jackson, Juneau, Marathon, Monroe, Portage, and Wood Counties.

The SCORP report identifies needs in each of the regions. ***Needs*** *identified for the Western Sands Region:*

- *More biking trails*
- *More boating access*
- *More camping opportunities*
- *More fishing opportunities*
- *More hiking trails*
- *More horse trails*
- *More trails (all types)*

Outside of northern Wisconsin's abundant park and water resources, the Western Sands Region has the largest amount of public lands and water in the state. These areas include the Black River State Forest, Jackson County Forests, the Necedah National Wildlife Refuge, the Wisconsin River, the Chippewa River, the Black River, and many other smaller state and county parks. The SCORP report identified the Black River, Upper Chippewa River, Central Wisconsin Grasslands, Robinson Creek Barrens and the Yellow (Chippewa River) as Regional Land Legacy Areas for high recreation demand.

Hunting and Trapping

Over 500,000 acres of land are open for public use in the four-county region.

Counties control most of this public land (33%), closely followed by the State (32%), then Federal (24%), private open MFL (9%) and private FCL (2%). Management of much of this land is aimed at establishing and maintaining the forest, grassland and wetland habitat for ducks, wild turkey, deer, and numerous other wildlife species present. Popular activities include hunting for deer (bow and gun), spring and fall turkey, black bear, and small game including gray and fox squirrel, rabbit, ruffed grouse, waterfowl and raccoon. Hunting for white-tailed deer and small game species is permitted in certain areas of the Necedah National Wildlife Refuge during portions of the state hunting season (contact Necedah Wildlife Refuge for information). The Wood County Rifle Range is open year-round and includes eight shooting stations.

In addition to the available public lands, each of the four counties includes private land in the Managed Forest Law (MFL) program that is designated "open" for public access. Landowners with open MFL land allow the public to hunt, fish, hike, sight-see, and cross-country ski on the property in exchange for a lower tax rate. Approximately 45,000 acres are designated "open" in the MFL program in the four-county region. Each county also includes land in the Forest Crop Law (FCL) Program; nearly 9,000 acres is open to public access for hunting and fishing only.

Fishing and Water-based Activities

Each of the four counties has a number of lakes, warm-water streams and miles of trout streams that offer fishing and other water-based recreation opportunities. Access is provided at boat launches ranging from hand carry-in only to trailerable.

The Wisconsin River provides many year-round recreation opportunities in the region. It flows through the southeast corner of Wood County through the cities of Wisconsin Rapids, Port Edwards and Nekoosa offering numerous opportunities for access and use. Fishing along the Wisconsin River, Juneau County's eastern border, is well-known for its walleye, bass and musky opportunities.

Juneau and Adams County's Petenwell Flowage (2nd largest lake in Wisconsin)

and Castle Rock Flowage (5th largest lake in Wisconsin), created by power dams along the Wisconsin River, have many boat launches at both flowages. Petenwell is the more secluded of the two and is known as the "fishing flowage" including walleye, bass (both largemouth and smallmouth), panfish and muskellunge. Castle Rock touts boating, water-skiing and jet-skiing, and has many campsites, resorts and boat launches surrounding the flowage, including Buckhorn State Park on the northern shore. Both counties have experienced rapid development along these flowages.

Necedah National Wildlife Refuge provides fishing opportunities on many flowages, primarily for northern pike, bullheads, crappie, yellow perch and sunfish. Fishing is primarily from shore or via canoe given the shallow depths. Boats without motors may be used for fishing on Sprague and Goose Flowages. Boats with motors may be used for hunting and fishing on Suk Cerney Flowage.

Canoeing and fishing are among the recreation opportunities offered at Meadow Valley's flowages. However, due to the shallow water depths of the flowages and the resulting winter kills, fishing opportunities are limited. Most flowages on Wood County Wildlife Area are shallow (less than 3 feet deep) and therefore unsuitable for game or panfish. No fishing is allowed in any of the flowages, ponds or ditches on Sandhill Wildlife Area. No motorized boats (including electric motors) are allowed on Meadow Valley Wildlife Area per NR 45.11(4)(bm). Swimming is not listed among the recreation opportunities provided on these properties.

Wildlife Viewing and Outdoor Education

Wildlife viewing is a popular outdoor activity that draws users to the area. Perhaps most notable is the Necedah National Wildlife Refuge, over 44,000 acres of wetlands and open water areas, pine, oak and aspen forests, grasslands, and savannas, all of which support a rich diversity of fish and wildlife.

As stated in the *Necedah NWR Comprehensive Conservation Plan* (2004), wildlife observation, including the observation of plants and other natural features, is the single most popular recreational use of the Refuge, with over 154,000 visits made in 2001. The plan further notes the popularity of wildlife photography with over

25,000 visits made in 2001. Visitors can take advantage of the Refuge's observation tower, observation platforms, and photo blinds to view and photograph wildlife and nature. The Refuge is designated as an "Important Bird Area" and is a noted site along the "Great Wisconsin Birding and Nature Trail," a mapped auto tour highlighting some of the state's premier wildlife viewing opportunities. (For additional information: http://www.wisconsinbirds.org; search "Birding and Nature Trail".)

Necedah National Wildlife Refuge and Sandhill WA (seasonal access) both have interpretation and education programs (e.g. self-guided auto tours and trails, interpretive materials and numerous "special events" days). Necedah offers the public opportunities to learn about and view trumpeter swan, whooping crane, and Karner blue butterfly, and their habitat management. Black River State Forest sponsors outings for the public focusing on a variety of subjects. Sandhill has the Outdoor Skills Center offering weekend workshops, Learn to Hunt Deer events, wildlife-based interpretive services for students, and opportunities for students to participate in educationally designed wildlife research projects. All these outreach and education activities bring people into the area to partake in programs and view wildlife (some found nowhere else in the state), and secondarily, increase revenue for local businesses.

Camping

Camping is offered at hundreds of sites at the state-owned Buckhorn State Park, Mill Bluff State Park, and Black River State Forest as well as at county sites such as Juneau County's Castle Rock Park and Wilderness Park, and the Jackson County Forest. Wood County offers camping at North Wood County Park, South Wood County Park and Dexter County Park, which is just upstream on the Yellow River from Sandhill Wildlife Area. Each county also has private campgrounds that offer a range of opportunities.

While not a primary use of the Sandhill-Meadow Valley Work Unit, primitive camping is offered. Currently, Meadow Valley allows year-round camping at nine primitive campsites, four of which provide pit-toilet restrooms. Similarly, Wood County Wildlife Area offers a couple of primitive campgrounds with pit toilets and picnic tables. These sites are free, on a first-come, first-served basis, and

open year-round. Sandhill Wildlife Area only allows camping through programs administered by Sandhill's Outdoor Skills Program.

Trails

The extent of federal, state and county forest land offers hundreds of miles of trail and logging road opportunities. Cross-country skiing, snow shoeing and hiking/walking are popular low impact outdoor activities that are permitted on most public lands. Major recreation trails in the area open to bicycling, walking and snowmobiling include the 32.5-mile Elroy-Sparta Bike Trail and the 22-mile 400 State Bike Trail. Juneau County's 12.5-mile asphalt Omaha Bike Trail connects Camp Douglas to Elroy, the trailhead for the two state trails.

Each of the counties offers hundreds of miles of groomed snowmobile trail. Juneau County has approximately 240 miles of designated snowmobile trails that are part of the State snowmobile aid program, along with approximately 65 miles of club trails. Wood County has approximately 268 miles of snowmobile trails. Ten clubs make up the Wood County Snowmobile Alliance and maintain the trails. A snowmobile trail is located on the Meadow Valley property under a land use agreement with Juneau and Monroe Counties. Snowmobile clubs maintain the trail, which links the Valley Junction vicinity with Necedah via Eagle Nest Flowage.

ATV use is provided in Wood County at the Seneca ATV Intensive Use Area with 10 miles of trail southwest of Wisconsin Rapids. The Jackson County Forest/Black River State Forest offer approximately 98 miles of trail on state and county forest lands. Juneau County has approximately 200 miles of ATV route. ATV use is prohibited on the Sandhill-Meadow Valley Work Unit per NR 45.05 (1)(h). However, a small number of Class A and Class C handicap permits are issued each year to aid accessibility for hunting purposes. While not permitted on the Meadow Valley property, two local townships do allow ATV use on designated township roads. The townships are responsible for all management activities related to ATV use on these designated routes.

Jackson County Forest offers horseback riding opportunities. The Black River State Forest includes an Equestrian Campground that has 12 sites designated strictly for horse camping available on a first-come, first-served basis. Approximately 20 miles of designated horse trail are provided. Horseback riding is currently offered at several private operations in the region. Horseback riding is not provided on the Sandhill-Meadow Valley Work Unit.

ANALYSIS OF THE WORK UNIT

Collectively, the Sandhill, Wood County, and Meadow Valley Wildlife Areas represent the largest block of state-managed wildlife lands in Wisconsin. Nearly 90,000 acres of public lands are found in the Sandhill-Meadow Valley Work Unit. **Table 3.1** illustrates the ownership and acreage per property.

Table 3.1: Sandhill-Meadow Valley Work Unit Acreage Overview.

	Sandhill WA (ac)	Wood County WA (ac)	Meadow Valley WA (ac)
Current State Ownership	9,454.55	1,079	1,212.12
Current Leased Land	0	18,123.44	57,225.10
Current Acquisition Authority	9,454.55	959	1,793
Property Master Plan	1979	1981	none

Source: WDNR, Bureau of Facilities and Lands, Land Records. 31 March 2010.

The Sandhill-Meadow Valley Work Unit is located within 100 miles of the population centers of Madison, Wausau and Eau Claire; it is approximately 190 miles from the Twin Cities and 230 miles from Chicago. Interstate Highway 90/94 travels through the area as do other major roadways including State Highways 21, 80, 173 and 54.

PHYSICAL ENVIRONMENT

The Sandhill-Meadow Valley Work Unit lies within the former Glacial Lake Wisconsin in what is referred to as the unglaciated "Driftless Area." Glacial Lake Wisconsin was 70 to 150 feet deep and covered over 1,800 square miles. Streams and rivers draining from the glacier into the lake carried enormous loads of sand, silt, and clay that settled onto the lake bottom. Approximately 14,000 years ago, the lake is believed to have drained catastrophically, in an estimated 7 to 10 days, when the ice dam along its southern end failed.

Retreat of the glaciers and subsequent draining of Glacial Lake Wisconsin produced a sandy plain pitted by a series of various sized lowland marshes. The topography of the Sandhill-Meadow Valley Work Unit is flat with a mixture of large marshes and low sandy ridges. The major exceptions are North Bluff, a 200-foot high sandstone outcropping located on the Sandhill Wildlife Area, and the 170-foot high South Bluff Cambrian sandstone outcrop on Wood County Wildlife Area.

Soils on the Sandhill-Meadow Valley Work Unit are generally classed as either sandy or organic. Natural fertility of the sandy soils is low and these soils are medium to strongly acidic through the soil layers. The sandy soils on Sandhill Wildlife Area are considered suited to the growth of red maple, red oak and white pine tree species. Wetness coupled with late spring and early fall frosts present severe limitations to agricultural use of these soils. The deep, poorly drained, sandy soils on Wood County Wildlife Area have low available water capacity and rapid permeability; natural fertility is low and the soils are subject to frost late in spring and in early fall. The somewhat poorly drained soils on low rises are suited to the growth of Norway pine, jack pine and white spruce; second growth hardwood forests are common on this soil type. Upland soils on Meadow Valley are generally sand and have a poorly developed organic layer. Silt loam and clay soils are found on the property, but appear to occur only in localized areas.

Extensive areas of organic soils are associated with the abundant wetlands. The organic soils are nearly level, poorly drained, very acidic and were formed in basins and depressions from decomposing plant remains. They are characterized

by a high water table and have a low bearing capacity when wet. Some use of these soils is made in the local area for cranberry culture and sphagnum moss production. As with the sandy soils mentioned previously, agricultural production is greatly limited by wetness, acidity, and later spring-early fall frosts. Miles of drainage ditch on the properties are remnants of the abandoned drainage districts, which were important during the "farming era" of the early 1900s.

On the Sandhill Wildlife Area, a large number of gravel deposits were sold by the previous owner and utilized for local road construction projects. In the 1970s, the Department also utilized a portion of the gravel resources on the area for the development and maintenance of access roads throughout the Sandhill-Meadow Valley Work Unit. An active Department-owned quarry still exists west of the Sandhill Wildlife Area rifle range; material from this quarry is used to patch dikes. Past exploitation of gravel and sand resources on the area left several unreclaimed pit areas on the property, primarily near the rifle range.

WATER RESOURCES AND AQUATIC HABITATS

The water resources of Sandhill-Meadow Valley Work Unit are characterized by natural wetland communities including northern sedge meadow, open bogs and central poor fen as well as by numerous man-made flowages. **Table 3.2** lists the impounded acres, number of water control structures, and miles of dike and drainage ditch for each property.

Table 3.2: Summary of Water Resources on the Sandhill-Meadow Valley Work Unit.

	Sandhill WA	Wood County WA	Meadow Valley WA
Flowages	16	8	6
Impounded (ac)	1,722	1,500	1,400
Wildlife refuge (ac)	2,000	250	1,175
Miles of dike	7.7	11	20.5
Miles of drainage ditch	25	69	132
Water control structures	20	21	35

Source: Property inventory; these numbers are being reviewed during the master planning process.

Following the failures of the farming era, drainage ditches were utilized to develop and reestablish wetland areas. Wooden bulkheads were installed for water control at strategic locations along the ditches. Existing concrete dams were manipulated to provide a back flow of water into lowland areas by restricting water flows and trapping runoff thereby creating impoundments on surface water areas. The intent was to use these flooded lowlands for wildlife management purposes.

While the numerous drainage ditches provide the means by which to manipulate and/or control water, they do not provide a secure source of water. Some water is provided through groundwater flows into ditches; the main source of water for the property is surface runoff. This dependence on runoff (and rainfall) limits the wetland management potential on many impoundments due to the extended length of time necessary to refill impoundments following drawdown. Most property impoundments range in depth from 2-3 ft, if and when full pool can be attained. Most ditches average 4 ft in depth.

Wetlands are carefully managed through water level regulation and controlled burns. Generally, in spring and summer the Department draws down the water level to encourage a lush growth of green seed-bearing plants that are important to migratory birds that stop at the flowages in fall. Where possible, the Department drains wetlands on a 3-4 year cycle to mimic natural drought conditions. Water clarity and plant nutritional value typically increase following a draw down.

In late summer, marshes that have been drawn down are burned, if weather permits. Fire helps reduce rank weed growth and the spread of shrubs that would eventually choke out plant life beneficial to wetland wildlife. Prescribed burns also clean out stagnant areas clogged with dead, decaying plant matter while releasing valuable nutrients trapped in the duff. These nutrients are then available for use by living plants and animals. Following the draw downs and prescribed burns, the Department refloods the basins in later summer after the plant seeds have ripened. These reflooded marshes and flowages provide a well-stocked resting spot for a wide variety of migratory birds.

Waters throughout the Sandhill-Meadow Valley Work Unit are naturally dark in

color and acidic, which is caused, for the most part, by the decay of organic soils in impoundment basins. Some vegetative (aquatic) growth and invertebrate abundance important to waterfowl productivity is limited by this water quality. However, these acidic wetlands provide the right conditions for other plants such as cattails, arrowhead, and marsh marigold.

Current Uses

The flowages and associated aquatic habitats are important from both an ecologic and recreation standpoint. While man-made, the impoundments have restored or enhanced the wetlands that had previously been ditched, and provide more open water habitat than the wetlands that are still hydrologically intact. These hemi-marsh wetland communities provide important habitat for aquatic furbearers, waterbirds, and waterfowl including noted Species of Greatest Conservation Need. Muskrat, beaver, otter, mink and raccoon populations are well dispersed and common throughout these lowland areas.

Resident populations of Canada geese and Sandhill cranes utilize the areas for nesting and brood rearing. The flowages provide important wetland habitat to a broad range of migratory and resident species such as the whooping crane and trumpeter swan. The flowages and extensive wetlands support the hunting, trapping and wildlife viewing opportunities popular on the Sandhill-Meadow Valley Work Unit.

Notable Aquatic Features

Sandhill Wildlife Area's **Gallagher Flowages** are extensively ditched and diked peatlands. In open water areas, the flowage vegetation currently consists of stands of submergent and emergent aquatic macrophytes. Away from the influences of the ditches and dikes, sedge-dominated wet meadows and shrub swamp are typical vegetation types. The boggy meadows are characterized by various sedges, Canada bluejoint grass, hardhack, and other plants adapted to saturated, acidic peat and relatively low nutrient levels. Sphagnum mosses form the substrate in some areas. Shrub swamps are composed primarily of willows, bog birch, speckled alder, bog holly, and chokeberry. Gallagher Flowage is significant for the large numbers of migratory birds that use the site as a staging

area. The associated wetlands also provide significant breeding habitat for a number of sensitive species.

The **Yellow River** corridor is significant for the impressive array of wildlife supported by the extensive forests, oxbows and shallow marshes. It is noted as part of the Yellow River-Hemlock Creek Conservation Opportunity Area, a Diverse Aquatic Community of State Significance. It is also a highly significant riverine corridor important in creating southern floodplain forest. An approximate one-half mile of the Yellow River flows through the Sandhill Wildlife Area's Yellow River Floodplain Forest State Natural Area.

The heavily ditched **Ball Road Flowages** on Wood County Wildlife Area are part of a larger 13,000-acre peatland. The least altered area of the flowages is an 831-acre central sedge poor fen located to the north of the most ditched area and to the east of an extensive cranberry cultivation area. The poor fen is dominated by sphagnum mosses, various sedges, hardhack, bog birch, woolgrass, and cottongrass. There is some ditching even in this area (running east-west), with service roads on the dike berms. There is a muskeg or tamarack swamp inclusionary community in the west-central part of the site; surrounding this is a narrow fringe of open bog with pitcher plants and other typical species. To the south, the fen grades into more of a northern sedge meadow community with grasses, sedges, rushes and forbs dominant. A number of animal species found here are rare or uncommon, and are quite specialized in their habitat needs.

Beaver Creek, a tributary of the Lemonweir River, is the principal drainage way through the Meadow Valley Wildlife Area. It originates in southeastern Jackson County and enters the property just west of the Meadow Valley Flowage and exits along the southern boundary near the Monroe-Juneau county line. Beaver Creek was channelized and is the principal source of water for Meadow Valley, Kingston, Beaver Creek and Eagle Nest Flowages. (Eagle Nest Flowage is within the property boundary, but is in private ownership.)

The approximate 3000-acre emergent wetland complex known as **Meadow Valley Flowage** is a key area for waterfowl migration and brood-rearing, and is one of the most heavily used public use areas at Meadow Valley Wildlife Area. A 1,175-acre waterfowl refuge is associated with the Meadow Valley Flowage.

Several rare plant and animal species have been recorded here as well as important natural communities such as northern dry-mesic forest, northern wet forest, southern sedge meadow, and tamarack (poor) swamp.

Monroe County Flowage is an approximately 800-acre artificial impoundment located in the bed of extinct Glacial Lake Wisconsin. The flowage has northern pike, largemouth bass and panfish in its fishery although winterkill may be a problem. There is public access to the lake. Monroe County Flowage contains one of the region's largest examples of emergent marshes. Overall diversity of aquatic macrophytes is high, several rare plants are present, and the site provides suitable breeding habitat for nesting American bittern, ring-necked duck, common loon, green-winged teal, marsh and sedge wrens, and northern harrier. Bald eagle and osprey frequently forage here.

PROPERTY COVER TYPES

Information for this section is based on the best available data from the Division of Forestry's Wisconsin Forest Inventory and Reporting System (WisFIRS). The Department is in the process of updating its recon data and will adjust the cover type values as appropriate.

In very general terms, the Work Unit cover types can be considered as either forested (43.7%) or non-forested (56.3%). At the property level, Meadow Valley is more forested (64%) than non-forested (36%). Both Sandhill and Wood County are more non-forested. Sandhill is 53% non-forested and 47% forested; Wood County is 60% non-forested and 40% forested. ***Refer to Map D Series.***

Forested

A breakdown of the forested cover types in **Table 3.3** shows the prominence of aspen and oak on each of the properties. On the Meadow Valley Wildlife Area, oak, aspen and jack pine are the most abundant forest types. Nearly half of the oak (primarily black/northern pin) is between 71-90 years of age. Most of the aspen is in the 16-40 year age range; jack pine tends to have a more even age distribution. Forested areas are managed to provide a mixture of young, middle,

and old age timber that is most conducive to wildlife production. This forest management scheme will also maintain a sustained yield of forest products.

Though much of Meadow Valley Wildlife Area is forested, intact examples of old forest communities are now scarce and localized. Larger occurrences of mature and older forest are concentrated in several remote areas, all of them important to species that favor interior forest conditions and associated structural features. A significant example of old forest with patches of old growth occurs near the Kingston Flowage (Kingston Pines State Natural Area).

Table 3.3: Summary of Forested Acres on the Sandhill-Meadow Valley Work Unit.

Forest Type Description	Sandhill WA (%)	Wood County WA (%)	Meadow Valley WA (%)
Aspen	57	70	25
Bottomland Hardwoods	2	<1	<1
White Birch	1	<1	<1
Red Maple	<1	<1	1
Oak	14	8	4
Scrub Oak	23	14	35
Jack Pine	1	2	21
Red Pine	1	1	6
White Pine	<1	1	5
Black Spruce	<1	1	1
Swamp Hardwoods	<1	<1	1
Tamarack	<1	2	1
TOTAL	99%	99%	100%

Source: WI DNR Division of Forestry, WisFIRS, March 2010. Percentages may not sum to 100% due to rounding; Table does not include those cover types present at less than 1%.

On Sandhill and Wood County Wildlife Areas, aspen is the predominant forest type with trembling aspen comprising the majority of this type. The aspen age distribution on Sandhill Wildlife Area includes 20% of the acreage less than 20 years of age; 53% between 21-40 years; and 27% over 41 years of age. Wood County Wildlife Area has an aspen age distribution of 21% less than 20 years of age; 38% between 20-40 years; and 40% over 41 years of age. Oak, primarily black and northern pin, is the second most abundant forest type on both of these properties.

Early succession forest is present on the properties with aspen, red maple, jack pine, and black/northern pin oak the most common species. Forest management activities have focused on maintaining these early succession forests. However, the aspen forest type has steadily declined in recent decades. The resulting habitat loss plays a role in the declining numbers of 20 associated bird Species of

Greatest Conservation Need as well as declining trends in high profile game birds such as American woodcock and ruffed grouse.

Non-forested

Non-forested wetlands include marsh and sedge meadow, wet prairie, and lowland shrub communities. **Table 3.4** indicates that marsh (herbaceous wetlands) represents over half of the non-forested acreage on each of the properties. This can include emergent vegetation such as cattails, river bulrush or tall sedges; lowland grasses such as canary grass, bluejoint, or big bluestem; or lowland herbaceous vegetation such as lowland asters or stinging nettle. It can also include muskeg-bog such as sphagnum moss, leatherleaf or cranberry.

Lowland brush makes up roughly one-third of the non-forested acres on each of the properties. Lowland brush areas are dominated by willow, tag alder and bog birch. Tag alder and winter berry are the dominant brush species found in the ecotone between the open marsh and upland forest type.

Table 3.4: Summary of Non-forested Acres on the Sandhill-Meadow Valley Work Unit.

Non-forest Type Description	Sandhill WA (%)	Wood County WA (%)	Meadow Valley WA (%)
Grass	1	2	2
Marsh	61	63	60
Lowland Brush	26	30	24
Water	11	5	11
TOTAL	99	100	97

Source: WI DNR Division of Forestry, WisFIRS, March 2010. Percentages may not sum to 100% due to rounding; Table does not include those cover types present at less than 1%.

WILDLIFE RESOURCES

The Sandhill-Meadow Valley Work Unit's location within the vegetative tension zone and the habitat diversity created by the mixture of wetlands and forests provides the properties with a great variety of resident and migratory wildlife species. Forest wildlife and waterfowl are the primary species managed on the properties.

Common mammal species include white-tailed deer, gray squirrel, fox squirrel, cottontail rabbit, raccoon, coyote, red fox, otter, beaver, muskrat and mink. In recent years, the formerly extirpated timber wolf and fisher have moved back into the area and are now considered resident.

In addition to those common species, the oak, pine, aspen, and mixed forests of the Meadow Valley provide excellent habitat for ruffed grouse, wild turkey and black bear. Work that has been done to improve ruffed grouse and deer habitat also benefits several nongame species, particularly the warbler group. Some mature forest species, like the pileated woodpecker, are also common.

The flowages provide hunting and viewing opportunities for geese and ducks as well as trapping for muskrat, mink, and beaver. Furbearers are a very important resource on the properties. Muskrat and mink receive the most trapping attention followed by beaver, raccoon, fox, coyote and otter.

Due to the diversity of habitat types and interspersion of these types, many species of birds are found on the property, either permanently or seasonally. Common game and non-game birds that benefit from management activities include the year-round ruffed grouse, and a number of migratory and nesting birds such as woodcock, Canada goose, Sandhill crane, American bittern, sora, green heron, wood duck, mallard, blue-winged teal, common loon, great blue heron, bald eagle, American widgeon, green-winged teal, ring-necked duck and American coot.

Sandhill cranes are common and the large sedge marshes provide optimum breeding habitat. Large sedge marshes on Meadow Valley Wildlife Area provide nesting habitat for a minimum of 15-20 pairs of Sandhill cranes; groups of 75-100 cranes are a common sight on the Meadow Valley Flowage during the fall

migration. Sandhill Wildlife Area is a major central Wisconsin staging area and has a peak fall concentration of over 5,000 birds.

The whooping crane, one of two crane species native to North America, is a Species of Greatest Conservation Need that depends on large, open wetland ecosystems to eat, roost, and make their nests. They were extirpated from the Midwest and are federally listed as endangered. The Wisconsin DNR, along with other members of the Whooping Crane Eastern Partnership (WCEP), is working to restore an eastern migratory population of whooping cranes that migrates annually between its Wisconsin breeding grounds and its wintering habitat in the southern United States. The Sandhill-Meadow Valley Work Unit, and the neighboring Necedah National Wildlife Refuge, provide critical wetland habitat necessary for the future whooping crane recovery effort. For more information visit dnr.wi.gov; search "Migratory Whooping Crane Reintroduction".

Fish species common to the property include bullheads, some panfish, sticklebacks and fathead minnows. While excellent populations of minnows exist most years, fish populations in general are severely limited by frequent winter kills caused by oxygen depletion due to shallow water. Limited potential exists for game fish management due to these factors; the exception would be Monroe County Flowage, which has had a history of providing respectable fishing opportunities.

SITES OF HIGH CONSERVATION SIGNIFICANCE

The *Biotic Inventory* completed by the Bureau of Endangered Resources (2005) identified selected inventory sites, referred to as "primary sites", which represent the best examples of both rare and representative natural communities. Among the highly significant sites are Sandhill's **Yellow River Bottoms**, Wood County's **Ball Road Flowages**, and Meadow Valley's **Blueberry Trail** and **Suk and Cerney Peatlands**. The complete list of primary sites for each property can be found in the *Biotic Inventory* or *Regional and Property Analysis*. ***Refer to Map E Series.***

THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES

The primary sites on the Sandhill-Meadow Valley Work Unit contain over 189 documented element occurrences, defined as a natural community, a rare plant population, a rare animal population, or other feature tracked by the Natural Heritage Inventory Program. Several species are discussed below. *Refer to the Regional and Property Analysis* for a complete list of current element occurrences on the properties.

At least 14 species designated as state threatened or endangered are found on the Sandhill-Meadow Valley Work Unit. The loggerhead shrike and red-necked grebe are among the birds listed as endangered. The loggerhead shrike is more apt to be found in open country with scattered trees and shrubs, and edge habitat such as open areas in forests. The red-necked grebe is more associated with emergent and submergent marsh. Cerulean warbler and red-shouldered hawk are listed as threatened and are associated with older floodplain forests.

Spotted pondweed is a Wisconsin endangered plant species and is considered critically imperiled in Wisconsin. Another submerged aquatic, algae-pondweed, is a threatened species as are dwarf milkweed found on the Bison Prairie and County Highway X sand prairie, and pale green orchid found in Yellow River Bottoms. Warpaint emerald and northern cricket frog are listed as endangered while several turtle species are considered threatened. Most of the listed animal species prefer the shallow marshes and wetland habitats.

Less common wetland dependent bird species include the trumpeter swan, least bittern and American bittern. Ideal habitat for trumpeters includes shallow wetlands 1-3 feet deep in isolated areas away from human disturbance with a diverse mix of emergent vegetation and open water that support a rich variety of submergent plants. Least bittern prefers a similar marsh habitat. The American bittern is associated with open water marshes, northern and southern sedge meadow and open bog.

Less common bird species associated with uplands include Le Conte's sparrow and northern harrier. Both are often found in old field habitat, northern sedge meadow or restored prairies.

The gray wolf and Karner blue butterfly are both Wisconsin special concern species that are federally protected and listed as endangered. Remote, contiguous, mixed forest blocks along with large conifer swamps play a role in the wolf habitat. The Karner blue butterfly prefers the pine barrens and oak savanna habitat. Lupine found in this habitat is a required larval plant food for the Karner blue.

The sharp-tailed grouse, a special concern bird in Wisconsin, requires a mosaic of dense grass and shrubs with rich forb and insect foods during nesting and brood-rearing and a bare open area for lekking. This species, as well as several others already listed, are considered "area sensitive" requiring large blocks of appropriate habitat such as large open grassland/wetland complexes or large blocks of older, more mature forests.

Clustered sedge, water-purslane and water-thread pondweed are among the Wisconsin special concern plants. Each has special habitat needs. Clustered sedge is found in disturbed areas in barrens of Glacial Lake Wisconsin, including borrow pits, roadsides, sphagnous boggy woods, or wooded sandstone bluff tops. Water-purslane is found in shallow water and muddy shores of Mississippi River sloughs, as well as sandy-peaty shores of cranberry reservoir ponds. Water-thread pondweed is a submergent aquatic found in shallow waters. Twining screwstem, strongly associated with Glacial Lake Wisconsin, is also present and is considered critically imperiled in Wisconsin.

Sandhill-Meadow Valley's barrens and wetlands also provide important habitat for other Wisconsin special concern species including Persius dusky wing, two-spotted skipper, Midwestern fen buckmoth, spotted-winged grasshopper, and ringed boghaunter.

RECREATIONAL USE AND FACILITIES

Hunting, trapping and wildlife viewing are popular activities that draw recreation users to the Sandhill-Meadow Valley Work Unit. For this discussion, Meadow Valley and Wood County Wildlife Areas will be grouped based on similar opportunities offered; Sandhill is the more developed property within the Work Unit and will be discussed separately.

Meadow Valley and Wood County Wildlife Areas

In general, primary use of wildlife areas focuses on hunting, trapping and fishing. Hunting opportunities on the Meadow Valley and Wood County Wildlife Areas include deer (bow and gun), bear, wild turkey, waterfowl, ruffed grouse, woodcock, squirrel, rabbits, raccoon, and coyotes. Trapping opportunities include muskrat, beaver, mink, otter, raccoon, fox, coyote, and fisher.

Both properties include flowages that provide hunting opportunities for migratory waterfowl, and trapping for muskrat, mink and beaver. However, no person may hunt waterfowl at any time on the 1,175-acre wildlife refuge on the Meadow Valley Flowage per NR 15.022. A 250-acre closed area is also associated with Wood County Wildlife Area. ***Refer to Maps C-2 and C-3.***

Due to the shallow water depths of the flowages and the resulting winter kills, fishing opportunities are limited. In addition, State Administrative Code (NR 45.11(4)(bm)) dictates that no motors of any kind are permitted on boats operating on the waters of the Meadow Valley Wildlife Area.

Currently, primitive camping is permitted year-round on the Meadow Valley Wildlife Area at nine sites, four of which provide pit-toilet restrooms. Two primitive campgrounds with a total capacity of 25 campsites offer year-round opportunities on the Wood County Wildlife Area. Campers are required to self-register at the campsite's kiosk; no fee is charged. Hunters represent the majority of campers.

In addition, the size and diversity of the properties provide opportunities for hiking, berry picking, and observing wildlife in a natural setting. On the Meadow Valley Wildlife Area, the Department maintains approximately 78 miles of Department managed roads (***Refer to Table 2.9)***. This includes 20.5 miles of dike mowed annually that provide access for waterfowl hunters, deer hunters, and non-consumptive users. Wood County Wildlife Area includes 20 miles of mowed roads or trails. Hiking and cross-country skiing are permitted, but there is no formal trail network in place.

Snowmobile clubs in Juneau and Monroe counties maintain 25 miles of snowmobile trail on the southern portion of MVWA under a land use agreement. The trail links the Valley Junction area with Necedah via Eagle Nest Flowage.

Snowmobiles are prohibited on the MVWA unless on this trail. ATV use is prohibited on the MVWA as there are no designated trails (NR 45.05(1)(h)). However, a small number of Class A and Class C handicap permits are issued each year to aid hunting accessibility. While not permitted on the Meadow Valley property, the Town of Kingston and the Town of Cutler do allow ATV use on designated township roads. The townships are responsible for all management activities related to ATV use on these designated routes.

Sandhill Wildlife Area

Sandhill's Outdoor Skills Center is a unique facility statewide with goals to promote responsible wildlife recreation and to develop an understanding of wildlife management. The Center offers hands-on learning programs on hunting, camping, tracking and interpretation of animal sign, wildlife watching, trapping, hiking, and orienteering.

The Outdoor Skills Center is equipped with a heated classroom, kitchen and dormitory, meeting and office space. Outdoor facilities include a shooting range, trails, orienteering course, and opportunities for supervised hunting, trapping and wildlife viewing experiences. No camping is allowed on Sandhill, however, the dormitory and learning center are available to workshop participants and school groups through reservation. In 2009, 18 school districts made on-site visits. Additionally, the Department held 14 workshops with a total of 274 attendees.

A wide variety of hunting and trapping activities on Sandhill Wildlife Area are only allowed by daily issued permits available on a first-come, first-served basis as outlined in NR 10.22(3). Permits are to hunt waterfowl, woodcock, ruffed grouse, rabbits, gray and fox squirrels, and deer during educational and special hunts. Walking trails are posted and gated for walk-in hunting only. Hunting is allowed only in the south half of the property. The north half of the property is a wildlife refuge posted closed to hunting.

Wildlife viewing is an important draw to the Sandhill Wildlife Area. Common mammals include white-tailed deer, coyote, cottontail, beaver, muskrat, mink, otter, raccoon, badger, porcupine, tree squirrels, and Eastern chipmunk. Some of the more common birds include: Sandhill crane, Canada goose, heron, bitterns, eagles, hawks, owls, ruffed grouse, red-winged blackbirds, marsh wrens,

bluebirds as well as a large variety of warblers and other songbirds. Other unique wildlife includes the endangered Karner blue butterfly.

To aid in viewing wildlife at Sandhill, the Department has established the "Trumpeter Trail", a 14-mile auto tour that includes interpretive signs along the trail with information on area wildlife, habitat management, and unique features. The Trumpeter Trail is open from sunrise to sunset April (usually mid-April) through the end of October and is an important draw for recreation users. The trail is closed to ATV use and horseback riding. The trail is also closed during the winter; however, the unplowed Trumpeter Trail is available for cross-country ski use. ***Refer to Map C-1.***

Three observation towers are accessible from the Trumpeter Trail. Bison Barrens Tower, the first observation tower, overlooks the enclosed 234-acre oak barrens supporting a small bison herd. Throughout the growing season, the Bison Barrens is colored in hues of blue, yellow, white, and orange from the blooms of various prairie wildflowers. Bluebirds, badger, red-tailed hawks, Eastern kingbirds, coyotes and deer also thrive in this oak barrens habitat.

North Bluff Tower, the second observation tower along the Trumpeter Trail, offers an impressive panoramic view of several nearby bluffs and a sweeping view that takes in a twenty-mile vista. The rugged North Bluff Trail leads from the parking lot to the summit of North Bluff, a lone sentinel that rises 200 feet above the expanse of surrounding flat land.

The third observation tower, Gallagher Marsh Tower, is tucked into a corner of the 2,100 acre marsh. Gallagher Flowage is a big draw for visitors, especially for viewing Sandhill cranes. Those wishing to view the expansive Gallagher Flowage can park at the small parking lot and take a short hike to the observation tower which provides an unobstructed view of Sandhill's vast marshlands. During spring and fall, impressive flocks of Sandhill cranes, geese, ducks and many other forms of wetland wildlife use the area. Gallagher Flowage is closed to waterfowl hunting.

Nestled on an oak upland between two marshes is the trailhead of Sandhill's rustic Swamp Buck Hiking Trail. The trailhead is located at a parking lot pullout on the Trumpeter Trail about one mile west of the headquarters' entry. This

trail crosses through a variety of habitats, ranging from open sedge marshes and flowages, to lowland alder/aspen and upland oak forest communities. The trail meanders on a westerly course for 3.5 miles to the North Bluff.

Logging roads, service roads, dikes and other unmarked trails provide additional opportunities for public use of Sandhill. All horse-based recreation and off-road vehicular recreation activities are prohibited in Sandhill WA per NR 45.06(6)(b) and NR 45.05(1)(h), respectively.

SOCIAL/CULTURAL RESOURCES

A cultural review indicates the presence of several recorded prehistoric sites (including habitation and burial/mound sites), an historic Ho-Chunk campsite, and a Euro-American cemetery on the Meadow Valley Wildlife Area; there are no recorded historic structures reported for the property. The cultural review also indicates there are no recorded archaeological sites or historic structures within the Sandhill Wildlife Area or the Wood County Wildlife Area. Management policy requires that any activities with potential to disturb archaeological sites will only be undertaken after consultation with the Departmental Archaeologist (see also Wis. Stats. 44.40 and Manual Code 1810.10) (Dudzik 2009).

ADMINISTRATIVE AND OTHER NON-PUBLIC USE FACILITIES OR STRUCTURES

Department personnel for the Sandhill-Meadow Valley Work Unit are stationed at the Sandhill Wildlife Area Headquarters. The Sandhill Wildlife Area has three storage sheds near the headquarters and one storage shed near the rifle range. Neither the Meadow Valley Wildlife Area nor the Wood County Wildlife Area has any non-public use facilities or structures.

The deer contained within Sandhill's enclosed 9,150 acres are considered farm-raised deer per Wis. Stats. 95.001(1). Further, Wis. Stats. 90.21(2) states that "no person may keep a farm-raised deer if any of the farm-raised deer are white-tailed deer unless all the farm-raised deer are contained in a fenced area for which the person holds a valid fence inspection certificate issued by the Department under this section." Sandhill Wildlife Area complies with the deer

farm fence standards as outlined in NR 16.45. Sandhill also submits an annual deer harvest plan and tests all dead deer that leave the property for chronic wasting disease.

Each of the properties has miles of dike and a number of water control structures, as discussed in the Water Resources section. Major maintenance on property dikes has been a recent high priority. Specifically, the Department has been addressing the declining condition of the West and Northeast pools of the Meadow Valley Flowage.

Since the late 1980s the integrity of the infrastructure including levees and water control structures associated with the West and Northeast pools has forced DNR staff to lower water levels to prevent failure. Current water levels within these pools do not allow for maximized use of the existing gravity water delivery system.

SIGNIFICANT MANAGEMENT ISSUES AND CONSTRAINTS

Below is a selected list of management issues and constraints common to the Sandhill-Meadow Valley Work Unit. Issues include those items that are short-term and can be addressed (i.e. degraded dike) versus constraints that are long-term limitations (i.e. wet soil conditions).

- **Flowage management** – unreliable water supply (annual precipitation is the primary source); degraded dikes; monotypic sedge mats within flowage basins;
- **Public use and facility development** – extensive areas of organic soil are associated with the abundant wetlands. These soils are characterized by a high water table and a low bearing capacity when wet thus limiting the type and extent of potential development;
- **Open upland habitats (grasslands and barrens)** – Fire is an important management tool; however, the properties' location within the Intensive Fire Protection Area can limit management opportunities;

- **Early succession forest** – declining aspen acreage due to a lack of disturbance, either fire suppression or lack of management; in some cases, wet soils make access for commercial harvesting difficult;
- **Globally rare barrens acreage** – declining acreage primarily due to succession and fire suppression;
- **Upland forest** – there are management capabilities to develop larger blocks of older forest, which are scarce and localized;
- **Invasive species** – Invasive plants are a management issue within the Work Unit. Spotted knapweed, leafy spurge, purple loosestrife, glossy buckthorn, and phragmites are invasive plant species currently on the properties. Without active management to control these species, they will out-compete native vegetation and dominate habitats. The primary means of control is with herbicide. Other control measures that have been used include mechanical, hand pulling, prescribed fire, and bio-control agents; and
- **Hardwood Bombing Range**—potential impacts of overflights on waterfowl use.

FINDINGS AND CONCLUSIONS

PROPERTIES' ECOLOGICAL SIGNIFICANCE AND CAPABILITY

Overall, the Sandhill-Meadow Valley Work Unit is significant ecologically for its extensive acreage of public land and the unique large-scale management opportunities it affords. Located in the Central Sand Plains ecological landscape amidst other significant blocks of public land, this area has some of the largest blocks of forest and open wetland habitats remaining in the southern half of the state. The interface between upland forest and wetland communities is of ecological significance for the rich edge habitat created.

Wetlands

The extensive flowages and natural wetlands on the Work Unit properties, in association with the adjacent wetland complexes on the Necedah National Wildlife Refuge, provide critical habitat for a broad range of migratory waterfowl, a number of breeding waterfowl, and a wide range of furbearers. These properties are of regional significance for waterfowl production, and have statewide significance as a migration stop for ducks, geese and as a staging area for cranes.

Upland Forest

Early succession forest types (aspen and oaks) represent the strong majority of the properties' forested lands. Across the region and the state this habitat type has experienced long-term declines (Trani et al. 2001, Dessecker and McAuley 2001). Early succession forest plays an important role ecologically for the primary game species present (ruffed grouse, woodcock, and white-tailed deer) and the hunting opportunities they provide. Other forest species including beaver, chestnut-sided warbler, golden-winged warbler, and rufous-sided towhee also benefit from aspen forests. The greatest species richness occurs early in the regeneration stages (generally 6-15 years).

Rare Species

The Central Sand Plains Ecological Landscape is biologically rich and supports at least 97 SGCN, excluding plants. Many of these, totaling over 189 element occurrences, are found on the properties' primary sites. These occurrences include rare plant populations, rare animal populations, natural communities, or other features tracked by the Natural Heritage Inventory Program.

Major Natural Communities

The Central Sand Plains also supports 33 significant natural community management opportunities. The Work Unit properties have significant opportunities for the protection, management and restoration of several rare or important natural communities including: central pine-oak forest, floodplain forest, wetland complexes and white pine-red maple swamp. While not as extensive, the properties' pine and oak barrens contribute to the overall protection and restoration efforts of this globally rare community type.

Sandhill Wildlife Area Research

The "outdoor living laboratory" created by Sandhill's enclosed 9,150 acres provides an invaluable resource for wildlife management. Research at Sandhill has proven especially valuable in refining methods to determine deer population size and assessing population parameters, factors fundamental to proper deer management. Results from such tests produce a better understanding of deer-habitat relationships and are essential in modifying deer population surveys conducted throughout Wisconsin as well as in other states.

Sandhill Wildlife Area Sites

Among Sandhill's highly significant sites are the **Yellow River Bottoms**. Located within and adjacent to the Sandhill Wildlife Area, the floodplain forest along the Yellow River northwest of Babcock is relatively undisturbed, mature, has significant old-growth attributes, and a rich flora. This stretch of the Yellow is an important component of a highly significant riverine corridor that is threatened by intensive timber harvest and, in some areas, cranberry farm

development. Maintenance of mature, intact stands of floodplain forest is a high priority for the Yellow River Bottoms and along the entire Yellow River corridor.

Wood County Wildlife Area Sites

The large size and context of the **Ball Road Flowages** makes this site highly significant for many wildlife species, particularly for certain grassland birds, and species dependent on conifer swamps. A number of the animals found here are rare or uncommon, and are quite specialized in their habitat needs. Among these are the northern harrier, American sparrow. Several rare plants have been documented in the site's wetlands. Maintaining the area of open wetland is a key management consideration, as is maintenance of the larger, better-developed conifer swamps.

Meadow Valley Wildlife Area Sites

The Meadow Valley sites of Blueberry Trail Complex and Suk and Cerney Peatlands are among those that rank as highly significant. The **Blueberry Trail** site is significant for its stretch of free-flowing, meandering stream, and relatively undisturbed stands of floodplain forest, white pine-red maple swamp, tamarack swamp, and open bog/poor fen. A number of rare species were documented here, including red-shouldered hawk, Cerulean warbler, golden-winged warbler, and meadow beauty. This site contains a relatively intact complex of both rare and representative natural features, some of which occur at few other sites in central Wisconsin. Maintenance of a core area of older, closed canopy forest is important to maintain sensitive forest wildlife and provide for under-represented forest successional stages.

Suk and Cerney Peatlands is significant for its large size, relatively intact hydrology, complex mosaic of communities representative of this ecoregion, and the rare or otherwise important species that it supports. The site also has the management potential to promote the development and maintenance of the globally rare pine barrens and sand prairie communities adjacent to and even within the site.

PROPERTIES' RECREATIONAL SIGNIFICANCE AND CAPABILITY

Sandhill Wildlife Area

One of the significant and unique recreation aspects of the Sandhill-Meadow Valley Work Unit is Sandhill's Outdoor Skills Center. This outdoor training center offers programs on a variety of wildlife-related educational and recreational activities. Outdoor programs are enhanced by a learning center, a dormitory allowing for extended educational opportunities, a shooting range, trails, orienteering course, and opportunities for supervised hunting and trapping experiences. The Outdoor Skills Center is not only a significant draw to the property; it is also an important statewide resource in educating a new generation of hunters, trappers and other outdoor enthusiasts.

The Sandhill Wildlife Area's Trumpeter Trail plays an important role in wildlife viewing. The 14-mile auto tour is a popular activity and allows users to view wetland and forest wildlife, the captive bison as part of the oak barrens restoration, and the waterfowl that use the marshland. The trail is closed during the winter; however, the unplowed Trumpeter Trail is available for cross-country skiing.

Overview of Resources on the Sandhill-Meadow Valley Work Unit

Upland hunting, waterfowl hunting, trapping and wildlife viewing are significant draws for outdoor users. The Sandhill-Meadow Valley Work Unit is especially attractive to hunters and trappers due to its remoteness, size and abundant wildlife populations. The oak, pine, aspen, and mixed forests provide excellent upland habitat for ruffed grouse, woodcock, deer, squirrels, wild turkey, black bear, and furbearers. The flowages provide hunting opportunities for geese and ducks as well as trapping for muskrat, otter, mink, and beaver. Although the properties are known for their extensive flowages, shallow water levels (and resulting winter kills) limit fishing opportunities.

The flowages are also highly popular for wildlife viewing. Marshlands covered by

grasses, sedges, bulrushes, and cattails attract a wide variety of animal life. Waterfowl, herons, bitterns, red-wing blackbirds, marsh wrens, frogs and reptiles are common. Flowages provide critical wetland habitat, and therefore viewing opportunities, to a broad range of migratory and resident species, including two high priority SGCN - whooping cranes and trumpeter swans.

Additional recreational uses of the properties include hiking, berry picking and cross country skiing. The properties have extensive trails used for management purposes, which also serve as access to the property for hunting, hiking and wildlife viewing. The Swamp Buck Trail, on Sandhill Wildlife Area, provides hikers with an opportunity to follow a marked trail with some interpretive information.

Camping opportunities are limited to the designated minimally developed campgrounds on the Meadow Valley and Wood County Wildlife Areas. Hunters represent the majority of campers. Sandhill Wildlife Area only allows camping through programs administered by the Outdoor Skills Program.

State Wildlife Areas are generally closed to motorized vehicles and horses. Exceptions include the Trumpeter Trail auto tour and limited use on Meadow Valley (25 miles of county-maintained snowmobile trail on the southern portion of Meadow Valley links the Valley Junction area with Necedah). Opportunities for ATV use are offered on other public lands in the region.

SUMMARY

The Sandhill-Meadow Valley Work Unit's large wetlands with open bogs, shrub swamps, impoundments and sedge meadows are of Upper Midwest/Regional Significance. The wetlands, more extensive here than anywhere else in southern Wisconsin, play a key role in defining the properties from both an ecological and recreation stand point. The wetland complexes support many Species of Greatest Conservation Need, provide critical habitat necessary for whooping crane recovery efforts, as well as provide a significant draw for waterfowl hunting, trapping and wildlife viewing.

The properties have an additional capability to provide important forest habitat for many game and nongame species. Hunting for deer, turkey, ruffed grouse and

other species represents a significant use of the properties. Early succession forest, such as aspen, is particularly important for the primary game species present and the hunting opportunities it provides. While the wetlands are a defining asset to the properties, the associated lowland conditions can limit the range of forest management capabilities.

The Work Unit properties offer significant opportunities for the protection, management and restoration of several rare or important natural communities including: central pine-oak forest, floodplain forest, and white pine-red maple swamp. The Work Unit's pine and oak barrens, although not extensive, provide restoration potential. Maintaining remnants of this globally rare community type contributes to the overall protection and restoration efforts, and provides habitat required of the federally endangered Karner blue butterfly and other rare species.

The type and extent of recreation uses and facility development are limited by the predominantly wet soil conditions on the properties. The organic soils associated with the wetlands are characterized by a high water table and low bearing capacity when wet.

Sandhill's Trumpeter Trail is important for the auto access it provides to the property and flowages. Owing to its importance in improving access to wildlife viewing opportunities, the Trumpeter Trail is a noted location along the "Great Wisconsin Birding and Nature Trail" in the Central Sands Prairie Region.

Sandhill's Outdoor Skills Center stands out as a statewide resource for the outdoor education and recreation opportunities it affords. The outdoor facilities, including a shooting range, trails, orienteering course, and opportunities for supervised hunting, trapping and wildlife viewing make this a unique facility.

Finally, Sandhill Wildlife Area, with one of the largest deer enclosures in North America, continues to provide valuable research results to wildlife management in Wisconsin and elsewhere.

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APPENDIX A: WOOD COUNTY LEASE AGREEMENT

Excerpt from Wood County Wildlife Area Master Plan Concept Element, 17 June 1981.

APPENDIX A

STATE CONSERVATION COMMISSION OF WISCONSIN
MADISON, WISCONSIN
LEASE AND AGREEMENT

THIS INDENTURE of lease and agreement entered into this 23d day of February, 1965, between Wood County, Wisconsin, hereinafter referred to as County and the State Conservation Commission of Wisconsin hereinafter referred to as Commission. NOW WHEREAS, the County is the owner of a large contiguous tract of land, (which is described in Exhibit "A" hereto attached and made a part of this lease and agreement;) that said lands have been leased by the Commission from the County be lease dated April 13, 1939, and by lease dated September 23, 1947, amended January 16, 1948, for the purpose of operating the same as a public fishing and hunting grounds, and

WHEREAS, the County and Commission mutually agree to terminate the lease dated September 23, 1948, as of July 1, 1965.

NOW THEREFORE,

WITNESSETH: That the County, for and in consideration of the covenants, terms and conditions hereinafter set forth does hereby demise and lease unto the Commission the land described.

1. The annual rental to be paid by the Commission to the County is thirty cents ($0.30) per acre payable on July 1 of each year, first payment due July 1, 1965, for the year 1965.

2. That this lease commences July 1, 1965, and shall run for a term of ninety-nine (99) years terminating June 30, 2064.

3. It is understood and agreed that the only use of these lands by the Commission shall be as a public fishing and hunting grounds. This use is understood to permit fish and game management by the Commission using all facilities and techniques for such management including but not limited to construction of dikes and dams, flooding or draining of lands, manipulation of water levels, clearing and treatment of land by mechanical or chemical means, controlled burning, limited public camping, and establishment of fish or game refuges or closed areas as the Commission deems necessary.

4. The Commission, its agents and employees and the public at such times as are determined proper by the Commission shall have the right of ingress and egress over the lands of the County to the lands described.

5. The Commission will mark the boundaries of the lands described by posting signs.

6. Additional lands owned or hereafter acquired by the County may be included within the terms of this lease and agreement from time to time, by endorsing upon the original descriptions thereof, with the approval of both parties.

7. Mineral rights including sand and gravel remain in the County. The Commission may use any such minerals including sand and gravel at no cost but only for development and maintenance of the area.

8. Either party to this lease and agreement may make use of limited areas for experimental operations, provided such use is not detrimental to the primary purpose of public fishing and hunting. Such experimental use must be approved in writing by both parties.

9. This lease shall be subject to review by both parties at the request of either party.

10. All income or revenue from the sale of products of the lands described shall go to the Commission. This is meant to include, but not be limited to, sale of timber, trees and cultivated or natural growing plants on the land.

11. It is further understood that if during the period of this lease and agreement, laws are enacted materially affecting public fishing, hunting and trapping grounds, the parties hereto shall provide for such changes in this lease and agreement as will conform to the requirements of such law.

The State agrees not to assign or sublet any of the rights under this agreement without the consent of the County.

APPENDIX A: WOOD COUNTY LEASE AGREEMENT

APPENDIX B

A G R E E M E N T

This agreement is to certify that the Amundson Cranberry Company of Babcock, Wisconsin, is hereby permitted and authorized by the Wisconsin Conservation Commission, Madison 1, Wisconsin, to use the following described lands of the Wood County Public Hunting Grounds, located in the Town of Remington, Wood County, Wisconsin:

NW SW & SW NW, Section 28)
SE NE, Section 29) Township 21 North, Range 2 East

for the purpose of diking and flooding and to use the resulting impounded water for cranberry culture on lands under their jurisdiction in Sections 28, 29, 32, 33, and 34, in Township 21 North, Range 2 East, in exchange for the right of the Wisconsin Conservation Commission to construct or to improve the existing ditch plug in the S 1/2 NE NE of Section 33 and to construct an adequate dike in said description to impound waters. The Amundson Cranberry Company also grants to the Wisconsin Conservation Department the right to place a culvert-dam in the above ditch-plug and also to place a culvert tube across the Amundson road in Section 33, Township 21 North, Range 2 East and to utilize the Amundson outlet ditch to carry off surplus waters or waters desired for the better management of Meadow Valley Flowage.

This permit is granted with the understanding on the part of the Conservation Commission and the Amundson Cranberry Company of Babcock, Wisconsin, that the primary use of the land described heretofore is for wildlife management purposes and all other land uses will be conducted in such manner that wildlife or wildlife habitat will not be unnecessarily disturbed or molested. It is also understood that cooperation will be extended in the protection of wildlife.

It is understood that this permit does not give to the permittee any rights pertaining to hunting or trapping on the NW SW and SW NW, Section 28, and the SE NE, Section 29, Township 21 North, Range 2 East, which rights remain under the control of the State Conservation Commission.

It is also understood by the Wisconsin Conservation Department that the permittee will grant public pedestrian trespass rights over their lands in the S 1/2 NE, NE, Section 33, for access to the newly improved impoundment in Sections 33 and 28 all of Township 21 North, Range 2 East.

It is also agreed by the Conservation Commission that waters will not be discharged by them in the Amundson ditch at such times or in such manner as to interfere with the operation of the cranberry marsh.

This agreement is to be considered valid only after approval has been obtained from the Wood County Board of Supervisors or their designated agents.

This agreement is valid for the term of lease of the Wood County Public Hunting Grounds.

APPENDIX B: MEADOW VALLLEY COOPERATIVE AND LICENSE AGREEMENT

Meadow Valley

COOPERATIVE AND LICENSE AGREEMENT

Between

THE UNITED STATES OF AMERICA

and

THE STATE OF WISCONSIN

THIS AGREEMENT, made and entered into between the UNITED STATES OF AMERICA, acting by and through the Secretary of Agriculture, pursuant to Title III of the Bankhead-Jones Farm Tenant Act, (hereinafter referred to as the United States), and the STATE OF WISCONSIN, acting by and through the State Conservation Commission, pursuant to Sections 23.09 and 1.056, Wisconsin Statutes, 1937, (hereinafter referred to as the State),

WITNESSETH:

The parties hereto, for themselves and their respective successors and assigns, do hereby mutually covenant and agree as follows:

1. The United States hereby grants a license upon and makes available to the State, for the purposes and subject to the terms and conditions hereinafter set forth, such portions of the real property acquired or to be acquired by the United States in connection with the Necedah Project, LA-WI 5, as may be described in the exhibits hereinafter referred to, together with all improvements which are located thereon (hereinafter referred to as the property). The property already acquired by the United States in connection with said project, which is to be made subject to the terms and conditions of this license and agreement, is described in Exhibit A, and the property to be acquired by the United States in connection with said project, which is to be made subject to the terms and conditions of this license and agreement, is described in Exhibit B, such exhibits being attached hereto and expressly made a part hereof. The property described in Exhibit B, or any part of such property,

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shall become subject to all of the terms and conditions of this license and agreement, or any renewal thereof, when title thereto has vested in the United States, but not before such time. The United States shall notify the State in writing when title to any of the property described in Exhibit B has vested in the United States.

2. The State shall use said property in accordance with the following purposes and management practices:

(a) FORESTRY:

Forestry practices shall be of such character as to maintain the forest lands in a productive condition; the lands shall be managed to produce sustained or periodic growths of forest products; utilization practices shall be administered to prevent waste; management practices shall be applied so as to secure the best growth of desirable species; a planting program consistent with the wildlife and recreational purposes of the project shall be established to provide appropriate forest cover on existing open land, the planting to be carried forward as rapidly as funds permit. The State shall provide adequate forest protection, including a satisfactory system of truck trails, fire breaks and other essential protection improvements, and fire suppression equipment.

The sale of timber or any other forest products shall be made in conformity with Subsection (4), Section 28.02, Wisconsin Statutes, 1937.

(b) WILDLIFE:

Wildlife management practices shall be of such character as to maintain the lands in a productive condition from the standpoint of wildlife; the lands shall be managed to effectuate

a balanced wildlife population; the forest management practices shall be so planned as to assure reproduction of desirable species; a planting program shall be established to provide appropriate food and cover. In effectuating these purposes, adequate provision shall be made for controlled public hunting and fishing. (The State shall annually close to hunting an area not to exceed twenty per cent of the entire acreage covered by this license and agreement.)

The State shall regulate the taking of fur bearing animals on the property in accordance with such game management practices as shall be deemed most beneficial for the entire property, making provisions at all times to leave an adequate breeding stock on the property so that a relatively uniform crop may be harvested consistent with climatic and food conditions.

No trapping shall be permitted on duck nesting areas during the months of April and May of any year.

(c) RECREATION:

The State shall operate, maintain, and administer the existing and subsequently developed recreational facilities for the use and benefit of the general public. Any recreational facilities that may be subsequently developed shall be consistent with the other uses of the land.

(d) The State shall maintain the water level in the various flowages at as constant a stage as possible, each flowage to be held as near as practicable to the height for which the dams and dikes were designed. It is understood that in

complying with the above provisions the rules and regulations of the State Public Service Commission, or other duly authorized regulatory body, will govern.

(e) Vacant buildings acquired with the land and not required in the operation of the property and which may be occupied by squatters or may be a source of other hazards are to be removed or demolished. The salvage material or entire buildings may be used or disposed of by the State in effectuating the purposes set forth in the preceding paragraphs of this section. Any of these salvage materials or buildings may be used by the State on lands owned or controlled by it in the administrative area of which the lands included in this agreement are a part. Any revenue received by the State from the disposal of salvage material or buildings shall be considered as income from the property to be expended in accordance with Section 10 below.

(f) The combined uses, purposes and management practices, including forestry, recreation, and wildlife, shall be effectuated in accordance with sound technical practices.

(g) The provisions set forth in this section may be modified from time to time by mutual consent of the United States and the State.

3. Those items of equipment, which the United States leaves on the property after completing its developmental program as provided in Section 5 below, shall be available to the State for use in the administration of the property in accordance with the terms of this agreement. (Such items of equipment shall be listed in Exhibit C, which shall be attached hereto and made a part of this agreement at the time the United States completes its developmental program as provided in Section 5 below.) When such equipment, through normal usage or through

render an accurate statement of the facts to the United States, which shall then provide for its disposition. Attached to the annual report rendered to the United States, in accordance with Section 10 below, shall be an inventory of the equipment and a statement of its condition.

4. The use of said property shall be subject to all easements, rights-of-way, licenses, leases, and outstanding interests in, upon, across or through said property which have heretofore been granted or reserved by the United States or its predecessors in title.

5. The United States reserves:

(a) All rights to the oil, gas, coal, and other minerals or mineral ores whatsoever, upon, in, or under said property, together with the usual mining rights, powers and privileges, including the right of access to and use of such parts of the surface of the premises as may be necessary for mining and saving said minerals. The State, however, shall have the right to use stone, gravel, and similar substances from said property, provided such materials are used for construction purposes upon or in connection with said property. In the event the United States determines that the exercise of said mining rights would be inconsistent with the purposes referred to in Section 2 above, it agrees not to exercise such rights during the term of this license and agreement without the written consent of the State. In the event the United States or the State determines that the use of stone, gravel, and similar materials by the State for construction purposes would be inconsistent with the purposes referred to in Section 2 above,

the State agrees not to exercise such rights or to permit third persons to exercise such rights during the term of this license and agreement without the written consent of the United States.

(b) The right, but not the duty, to prosecute developmental work on the property, and to do any and all things which it deems necessary or desirable in connection therewith. However, any improvements or developments to be undertaken are to be approved by the State before being initiated.

6. The term of this license and agreement shall be fifty (50) years beginning with the 29th day of June, 1940, and ending on the 29th day of June, 1990, and shall automatically be renewed for three (3) successive terms of fifteen (15) years each unless written notice to the contrary is given by either party to the other not less than ninety (90) days prior to the termination of this instrument, or any renewal thereof, and each renewal shall be subject to all the terms and conditions of this license and agreement.

7. At any time the annual income and revenue derived from the property exceeds the annual cost to the State of operating the property, the Wisconsin Conservation Commission is hereby authorized, to the extent of the excess income and revenue available, to use an amount equal to that which has been expended on the property from State funds during the preceding years covered by this agreement. These funds may be used by the Wisconsin Conservation Commission in the same manner as funds appropriated by the State Legislature.

If at any time the United States should determine from the information contained in the reports referred to in Section 10 below, or

otherwise, that the total income and revenue received by the State from the use and operation of the property exceeds the total cost to the State of operating the property, the United States may request a conference to determine:

(a) the rental to be paid during the remainder of the term of this agreement, or any renewal thereof;

(b) the sums which should be paid by the State, out of the net revenue derived from the property, to counties or other local governmental subdivisions of the State; and

(c) the use to be made of any such excess income or revenue which has been accumulated.

This determination shall be made by mutual agreement and shall not preclude either the United States or the State from requesting subsequent redeterminations if the amount of net revenue from the operation of the property should materially change.

8. The State shall not use or permit, and shall take such measures as may be necessary to prevent, the use or occupancy of said property, or any portion thereof, for any purpose which is inconsistent or incompatible with the purposes set forth in Section 2 above. Nor shall the State, except with the written consent of the United States, assign any of its rights or obligations under this license and agreement, or grant or create any rights in favor of third persons with reference to said property. This provision shall not be construed to apply to such employees of the State as are engaged in administration and management of the property during the period they are actually so engaged.

The State shall not, except with the written consent of the United States, authorize or permit third persons, including employees of the State engaged in the administration and management of the property,

to erect dwellings on the property, whether such authorization or permission creates any rights in such third persons or not.

9. The State shall give preference to the full or part-time employment of suitable persons now residing on said property with the consent of the United States, where the operation, maintenance or administration of said property provides opportunities for employment; it is understood, however, that where such employment is in the competitive division of the classified service under the civil service laws of the State of Wisconsin, this preference shall be given only insofar as permissible under the law.

10. All income and revenue which the State may receive from the use of said property shall be and is hereby impressed with a trust for the following purposes: during the term of this license and agreement, or any renewal thereof, such income and revenue shall be expended by the State for making repairs and replacements on said property and for the administration of the property in effectuating the purposes set forth in Section 2 above. Any such income and revenue which remains unexpended upon the expiration or termination of this license and agreement, or any renewal thereof, shall be expended for making repairs and replacements which the State has undertaken to make under Section 11 hereof, and which have not been made prior to the expiration or termination of this license and agreement, or any renewal thereof. Insofar as such unexpended income and revenue is not needed for the above purposes, or not otherwise distributed in accordance with Section 7 above, it may be expended, as shall be mutually agreed upon by the State and the United States, for the acquisition by the State of additional lands to block in, round out, or enlarge said property, of additional lands to block in, round out, or enlarge other conservational areas already established by and under the jurisdiction of the State, and of lands

for the establishment of new conservational areas, for the development of any such lands acquired, or for the development of any lands in conservational areas already under the jurisdiction of the State by virtue of ownership or otherwise. The income and revenue received from the use and operation of said property shall be expended only for those purposes outlined in this section, and for no other purposes, except as may be mutually agreed upon by the United States and the State in accordance with Section 7 above.

Not later than the 31st day of July of each year during which this instrument is in effect, the State shall furnish the United States with an annual report, in such detail as may be prescribed by the Secretary of Agriculture, showing all income and revenue received from the use of said property, and the disposition made thereof.

11. The State shall assume and defray all costs, charges, expenses, and obligations incident to the use of said property for the purposes provided herein, and shall maintain said property (including equipment left on the property as provided in Section 3 above) in good condition and repair, making all repairs and replacements necessitated by deterioration, damage, use, negligence, or any other cause whatsoever, provided, however, that the State shall be obligated to make repairs and replacements necessitated by defects in the original design, material, or construction or necessitated by the violent forces of nature only to the extent that income and revenue received from the use and operation of the property is available therefor, and provided further that the State shall be obligated to make repairs and replacements on developments and improvements only to the extent that such improvements are essential in effectuating the purposes of the property in accordance with Section 2 of this license and agreement. The State shall not remove any improvements,

except in accordance with the provisions of Section 18 below, or alter any major improvements, without the written consent of the United States.

The funds referred to in Section 10 above, and the proceeds of any insurance which the State may secure to indemnify itself against damage or loss of the property, shall be used by the State to discharge its obligations under this section.

In the event the State fails to secure such funds as may be necessary for the purpose of discharging the State's obligations under this section, the United States shall have the right to terminate this license and agreement, or any renewal thereof, in accordance with the provisions of Section 16 below.

12. In any publications, except press notices of momentary and local interest, covering the results of the program referred to in Section 2 above, the State shall recognize that such program was conducted on land acquired and developed in connection with the land conservation and land utilization program of the United States Department of Agriculture.

13. The State shall make adequate provision for sanitation and pure water and shall enforce such other measures as may be necessary for the protection of the public health on the property in accordance with the regulations of the Wisconsin State Board of Health.

14. The State shall save the United States harmless from any liability arising out of any accident or occurrence causing injury to any person or property and due directly or indirectly to the use or occupancy of the property by the State.

15. The State shall submit not later than one year after the effective date of this license and agreement, and annually thereafter,

a general plan of operation and development, setting forth the measures to be taken by the State during the ensuing year to effectuate the purposes of this license and agreement. The State shall furnish the United States with such information in regard to the use and management of said property as may be requested from time to time. The State shall also permit at all times any duly authorized representative or representatives of the United States to enter upon and inspect said property.

16. This agreement may be terminated by the United States if all or any part of the land involved hereunder is needed by the United States for military or other use of a kind not provided for herein, but such termination shall not be made without the consent of the State, unless the United States has funds available which may be used to reimburse and does reimburse the State for such of the expenditures it has incurred, over and above the income and revenue derived from the property, for the purpose of developing, protecting, and administering the land involved, as are deemed by the United States to have been reasonably necessary for this purpose.

In the event the State shall fail, neglect, or refuse to fulfill or perform any of the terms and conditions of this agreement, the United States shall have the right to terminate this agreement by giving notice addressed to the State that the term of this agreement shall cease and determine twelve (12) months subsequent to the date of such notice, and upon the expiration of the twelve (12) months specified in said notice, said term shall cease and determine. However, before any notice of termination is given, a meeting shall be requested for discussions between officials of the State and the United States to be held at such time and place as shall be mutually agreed upon by the State and the United States.

17. Upon the expiration or termination of this license and agreement, or any renewal thereof, the State shall quietly and peaceably remove from said property and surrender possession thereof, and the United States may immediately, or at any time thereafter, reenter and take possession of the property and remove all persons therefrom. The term "reenter" shall not be restricted to its technical legal meaning. The United States may also take any action in law or in equity which it may deem necessary to regain possession of the property or to assure the fulfillment of the purposes of this instrument.

18. Upon the expiration or termination of this license and agreement, or any renewal thereof, the State shall have the right to remove only those improvements which have been erected exclusively with funds specifically or generally appropriated by the State Legislature, and which have not been erected in any part with funds derived from income and revenue received from the use of said property, provided, however, that unless such improvements are removed by the State within eighteen (18) months from the date this license and agreement, or any renewal thereof, expires or is terminated, title to such improvements shall automatically vest in the United States; and provided further that the United States shall have the option to purchase such improvements upon the expiration or termination of this license and agreement, or any renewal thereof, or within six (6) months thereafter. In the event this option is exercised, the purchase price shall be the fair value of the improvements as of the time of the expiration or termination of this license and agreement, or any renewal thereof.

19. The United States shall have the right, but shall be under no duty, to prosecute or defend, in the name of the United States of America, or in the name of the State, any actions or proceedings appro-

priate or necessary for the protection of the title to, possession of, or any other interest in said property.

20. The invalidity of any provision of this instrument, or of any part thereof, shall not affect the validity of the remaining provisions or the rights and obligations of the parties thereunder.

21. The failure of the United States to insist upon the strict performance of any of the terms, covenants, agreements and conditions herein contained shall not constitute a waiver or relinquishment of the right of the United States to enforce thereafter such terms, covenants, agreements, or conditions, but the same shall continue in full force and effect.

22. Any notice, consent, or other action to be given or done by the United States under this license and agreement, or any renewal thereof, shall be valid only if in writing and executed or performed by the Secretary of Agriculture or his duly authorized representative, or in the case of a successor to the rights of the Department of Agriculture hereunder, by the chief administrative officer of such successor or his duly authorized representative. All notices to be given under this license and agreement, or any renewal thereof, shall be delivered or forwarded by mail, addressed, in the case of the State to the Wisconsin Conservation Commission, Conservation Department, Madison, Wisconsin, and in the case of the United States, to the United States Department of Agriculture, or to its successor hereunder, Washington, D. C.

23. No member of or delegate to Congress or Resident Commissioner shall be admitted to any share or part of this license and agreement, or any renewal thereof, or to any benefit to arise therefrom.

24. This license and agreement shall become effective when duly executed by all the persons indicated below:

IN WITNESS WHEREOF, the parties hereto have hereunto subscribed their names as of the dates indicated.

THE UNITED STATES OF AMERICA

Date June 29, 1940. By H A Wallace
Secretary of Agriculture

THE STATE OF WISCONSIN.

Date May 27, 1940 By Jas. G. Cavanaugh
Chairman, Wisconsin State Conservation Commission

Attest:

Date May 29, 1940 By P. A. Hamlin
Secretary, Wisconsin State Conservation Commission

APPENDIX C: SPECIES LIST

The following Species List is excerpted from the USFWS, Necedah National Wildlife Refuge: Comprehensive Conservation Plan and Environmental Assessment (2004).

Bird List, Necedah NWR

Common loon
American bittern
Great blue heron
Tundra swan
Snow goose
Green-winged teal
Northern pintail
Gadwall
Redhead
Greater scaup
Hooded merganser
Ruddy duck
Northern harrier
Northern goshawk
Red-tailed hawk
Bald eagle
Peregrine falcon
Virginia rail
Northern bobwhite
Sandhill crane
Lesser golden plover
Greater yellowlegs
Spotted sandpiper
Baird's sandpiper
Dunlin
Long-billed dowitcher
Wilson's phalarope
Herring gull
Forster's tern
Pied-billed grebe
Green heron
Great egret
Trumpeter swan
Canada goose
American black duck
Blue-winged teal
American wigeon
Ring-necked duck
Common goldeneye
Red-breasted merganser
Turkey vulture
Sharp-shinned hawk
Red-shouldered hawk
Rough-legged hawk
American kestrel
Ring-necked pheasant
Wild turkey
Sora
Whooping crane
Semipalmated plover
Lesser yellowlegs
Semipalmated sandpiper
Pectoral sandpiper
Stilt sandpiper
Common snipe
Bonaparte's gull
Caspian tern
Black tern
Double-crested cormorant
Least Bittern
Black-crowned night-heron
Greater white-fronted goose
Wood duck
Mallard
Northern shoveler
Canvasback
Lesser scaup
Bufflehead
Common merganser

(continued) Bird List, Necedah NWR

Osprey
Cooper's hawk
Broad-winged hawk
Golden eagle
Merlin
Ruffed grouse
King rail
American coot
Black-bellied plover
Killdeer
Solitary sandpiper
Least sandpiper
Western sandpiper
Short-billed dowitcher
American woodcock
Ring-billed gull
Common tern
Rock dove
Mourning dove
Eastern screech owl
Barred owl
Short-eared owl
Whip-poor-will
Belted kingfisher
Yellow-bellied sapsucker
Northern flicker
Eastern wood-pewee
Least flycatcher
Eastern kingbird
Tree swallow
Cliff swallow
American crow
Tufted titmouse
Brown creeper
Sedge wren
Ruby-crowned kinglet
Veery
American robin
Bohemian waxwing
European starling
Warbling vireo
Golden-winged warbler
Yellow warbler
Black-throated blue warbler
Palm warbler
Common yellowthroat
Rose-breasted grosbeak
Eastern towhee
Clay-colored sparrow
Black-billed cuckoo
Great horned owl
Great gray owl
Northern saw-whet owl
Chimney swift
Red-headed woodpecker
Downy woodpecker
Pileated woodpecker
Alder flycatcher
Eastern phoebe
Horned lark
Northern rough-winged swallow
Barn swallow
Common raven
Red-breasted nuthatch
House wren
Marsh wren
Blue-gray gnatcatcher
Swainson's thrush
Gray catbird
Cedar waxwing
Solitary vireo
Red-eyed vireo
Tennessee warbler
Chestnut-sided warbler
Blackburnian warbler

(continued) Bird List, Necedah NWR

American redstart
Scarlet tanager
Indigo bunting
American tree sparrow
Field sparrow
Yellow-billed cuckoo
Snowy owl
Long-eared owl
Common nighthawk
Ruby-throated hummingbird
Red-bellied woodpecker
Hairy woodpecker
Olive-sided flycatcher
Willow flycatcher
Great crested flycatcher
Purple martin
Bank swallow
Blue jay
Black-capped chickadee
White-breasted nuthatch
Winter wren
Golden-crowned kinglet
Eastern bluebird
Wood thrush
Brown thrasher
Northern shrike
Yellow-throated vireo
Blue-winged warbler
Nashville warbler
Yellow-rumped warbler
Pine warbler
Ovenbird
Northern cardinal
Dickcissel
Chipping sparrow
Vesper sparrow
Henslow's sparrow
Song sparrow
Boblink
Western meadowlark
Common grackle
Purple finch
Savannah sparrow
Swamp sparrow
Dark-eyed junco
Red-winged blackbird
Rusty blackbird
Brown-headed cowbird
American goldfinch
Fox sparrow
White-throated sparrow
Snow bunting
Eastern meadowlark
Brewer's blackbird
Northern oriole
House sparrow

APPENDIX C: SPECIES LIST

Mammal List

- Virginia Opossum
- Big brown bat
- Little brown bat
- Coyote
- Red fox
- Gray fox
- Gray wolf
- Black bear
- Common raccoon
- Northern river otter
- American Mink
- American badger
- Long-tailed weasel
- Least weasel
- Fisher
- Ermine
- Striped skunk
- Bobcat
- Southern flying squirrel
- Northern-flying squirrel
- Eastern gray squirrel
- Eastern fox squirrel
- Thirteen-lined ground squirrel
- Red squirrel
- Eastern chipmunk
- Woodchuck
- Muskrat
- White-footed mouse
- Deer mouse
- Meadow vole
- Meadow jumping mouse
- Southern red-backed vole
- Northern short-tailed shrew
- Masked shrew
- Arctic shrew
- American beaver
- Common porcupine
- White-tailed deer
- Snowshoe hare
- Eastern cottontail
- Eastern mole
- Southern bog lemming

Herptile List

- Blue-spotted salamander
- Central newt
- Mudpuppy
- Eastern American toad
- Western chorus frog
- Northern spring peeper
- Eastern gray treefrog
- Bullfrog
- Green frog
- Northern leopard frog
- Wood frog
- Common snapping turtle
- Blanding's turtle
- Western painted turtle
- Midland painted turtle
- Midland smooth softshell turtle
- Five-lined skink
- Eastern hognose snake
- Smooth green snake
- Western fox snake
- Eastern garter snake
- Northern water snake
- Cope's gray tree frog
- DeKay's snake
- Red-bellied snake