

Sugar River Planning Group Final Master Plan and Footville Wildlife Area Feasibility Study



May, 2016 Approved by the Natural Resources Board
Wisconsin Department of Natural Resources
DNR PUB-LF-083



Cathy Stepp - Secretary

Natural Resources Board

Terry Hilgenberg, Chair
Gregory Kazmierski, Vice Chair
Julie Anderson, Secretary
William Bruins
Preston D. Cole,
Dr. Frederick Prehn
Gary Zimmer

Wisconsin Department of Natural Resources

101 S. Webster St. P.O. Box 7921
Madison, Wisconsin 53707-7921



DNR PUB-LF-083

*The Wisconsin Department of Natural Resources provides equal opportunity in its employment, programs, services, and function under an Affirmative Action Plan. If you have any questions, please write to Equal Opportunity Office, Department of Interior, Dane, Green and Rock, D.C. 20240. **This publication is available in alternative format (large print, Braille, audio tape, etc.) upon request.** Please contact the Department of Natural Resources, Bureau of Facilities and Lands at (608) 266-2135 for more information.*

Photos (from upper right clockwise)

Yahara River (DNR Flickr)
White-tailed Deer (DNR Flickr)
Bird Watching at Avon Bottoms (DNR Flickr)
Pheasant Hunting (DNR Flickr)

Master Plan Team Members

Plan Acceptance Team

Sanjay Olson – Administrator, Lands Division
Thomas Hauge - Director, Bureau of Wildlife Management
Erin Crain - Director, Bureau of Natural Heritage Conservation
Steve Miller - Director, Bureau of Facilities and Lands
Dan Schuller - Director, Bureau of Parks and Recreation
Paul Cunningham - Director's designee, Bureau of Fisheries
Jim Warren - Director, Bureau of Forest Management

Sponsor Team

Eric Lobner – Southern Regional Supervisor - Wildlife Management

Core Team

Eric Lobner – Southern Regional Supervisor, Wildlife Management
Sharon Fandel – District Ecologist, Natural Heritage Conservation
Ed Jepsen – Planner, Lands and Facilities
Kurt Welke – Fisheries Biologist, Fisheries Management
Nick Koltz – Forester, Forest Management
Brigit Brown – Parks and Recreation Specialist, Parks and Recreation

Technical Team

Mike Foy - Wildlife Biologist, Wildlife Management
Andy Paulios - Wildlife Biologist, Wildlife Management
Mike Dieckhoff – Conservation Warden, Law Enforcement
Mike La Bissoniere – Real Estate Specialist, Facilities and Land
Mark Dudzik – Archaeologist, Facilities and Lands

GIS/Map Production

Mark Binder - Information Systems Data Services Specialist, Facilities and Lands
Kaylin Helm – Information Systems Data Services Specialist, Facilities and Lands

Other Contributors

Nate Fayram - District Ecologist, Natural Heritage Conservation
Brian Buenzow – Wildlife Technician, Wildlife Management (retired)
Steve Holaday – Forester, Forest Management
Cory Secher – Forester, Forest Management
James Amrhein – Water Resources Management Specialist, Water Quality
Nathan Kroepflin – Conservation Warden, Law Enforcement

TABLE OF CONTENTS

TABLE OF CONTENTS	2
TABLES.....	4
FIGURES	4
MAPS	5
LIST OF ACRONYMS.....	6
EXECUTIVE SUMMARY	7
CHAPTER ONE THE MASTER PLANNING PROCESS.....	12
<i>Planning and Management Background.....</i>	<i>12</i>
<i>Prior Conservation Efforts</i>	<i>13</i>
<i>Public Support and Input.....</i>	<i>15</i>
<i>Wildlife Communities.....</i>	<i>15</i>
<i>Fish Communities</i>	<i>16</i>
RECREATIONAL OPPORTUNITIES AND CHALLENGES	17
<i>Investments in Public Lands, Recreation and Conservation.....</i>	<i>19</i>
ECOLOGICAL SIGNIFICANCE.....	22
CHAPTER TWO - SECTION ONE GENERAL PROPERTY MANAGEMENT AND USE	24
<i>Planning Group Recommendations</i>	<i>25</i>
<i>General Authority</i>	<i>26</i>
<i>Land Management Classifications.....</i>	<i>26</i>
RECREATION MANAGEMENT AND USE.....	29
<i>Recreation Trends.....</i>	<i>31</i>
GENERAL HABITAT MANAGEMENT OBJECTIVES	34
AND PRESCRIPTIONS	34
<i>Active and Passive Management.....</i>	<i>38</i>
WETLANDS, GRASSLANDS AND AGRICULTURAL HABITATS	41
<i>Wetland Habitats (non-forested).....</i>	<i>41</i>
FOREST HABITATS	46
<i>Management Objectives for all Forest Types</i>	<i>46</i>
<i>Management Prescriptions for all Forest Types.....</i>	<i>46</i>
<i>Forested Wetlands</i>	<i>50</i>
FISHERY HABITATS AND WATER QUALITY	53
PROPERTY ADMINISTRATION AND POLICIES.....	57
<i>Real Estate Management</i>	<i>62</i>
<i>Public Communications and Plan Monitoring</i>	<i>64</i>
CHAPTER TWO- SECTION TWO INDIVIDUAL PROPERTY PLANS.....	65
WILDLIFE AREA RECOMMENDATIONS	65
<i>Albany Wildlife Area and Scattered Wildlife land.....</i>	<i>65</i>
<i>Avon Bottoms Wildlife Area.....</i>	<i>69</i>
<i>Badfish Creek Wildlife Area</i>	<i>76</i>
<i>Brooklyn Wildlife Area, Streambank Protection-Story Creek and Scattered Wildlife/Extensive Wildlife Parcel.....</i>	<i>80</i>
<i>Evansville Wildlife Area & Streambank Protection-Allen Creek.....</i>	<i>84</i>
<i>Hook Lake/Grass Lake Wildlife Area and State Natural Area and Extensive Wildlife Habitat.....</i>	<i>87</i>
<i>Liberty Creek Wildlife Area</i>	<i>91</i>
<i>Footville Wildlife Area Feasibility Study.....</i>	<i>93</i>
<i>Extensive Wildlife Habitat - Rock County.....</i>	<i>95</i>
FISHERY AREA RECOMMENDATIONS	97
<i>Streambank Protection-Anthony Branch</i>	<i>97</i>
PARKS AND RECREATION AREA RECOMMENDATIONS	101
PROJECT BOUNDARY AND ACREAGE GOAL ADJUSTMENTS.....	103
<i>Project Boundary and Acreage Goal Adjustments</i>	<i>105</i>

CHAPTER THREE FINDINGS AND CONCLUSIONS 108
 Recreational Needs, Opportunities and Capacity..... 109
 Ecological Significance and Habitat Capabilities..... 114
 Summary 118
INFORMATION SOURCES AND REFERENCES..... 119
APPENDIX A – SHOOTING RANGE 123

TABLES

Table ES-1	Sugar River Planning Group Properties	7
Table 2-1	Approved Land Management Classifications	28
Table 2-2a	Albany Wildlife Area Planned Cover Types	66
Table 2-2b	Scattered Wildlife parcel Planned Cover Types	66
Table 2-3	Avon Bottoms Wildlife Area Planned Cover Types	70
Table 2-4	Badfish Creek Wildlife Area Planned Cover Types	77
Table 2-5a	Brooklyn Wildlife Area & Streambank Protection-Story Creek Planned Cover Types	81
Table 2-5b	Scattered Wildlife and Extensive Wildlife Habitat Planned Cover Types	81
Table 2-6	Evansville WA & Streambank Protection-Allen Creek Planned Cover Types	85
Table 2-7a	Hook Lake/Grass Lake WA and SNA Planned Cover Types	88
Table 2-7b	Extensive Wildlife Habitat Planned Cover Types	88
Table 2-8	Liberty Creek Wildlife Area Planned Cover Types	91
Table 2-9	Footville Wildlife Area – Scattered Wildlife and Extensive Wildlife Habitat parcels Current and Planned Cover Types	94
Table 2-10	Scattered Wildlife & Extensive Wildlife Habitat-Rock County Planned Cover Types	95
Table 2-11	Streambank Protection-Anthony Branch Planned Cover Types	98
Table 2-12	Montrose State Ice Age Trail Area Planned Cover Types	101
Table 2-13	Approved Wildlife Project Boundary and Acreage Goal Adjustments	105
Table 2-14	Approved Footville Wildlife Area Project Boundary and Acreage Goal	105
Table 2-15	Approved Fishery Project Boundary Adjustments	106
Table 2-16	Land Cover in the Approved Boundary Adjustment Areas	107

FIGURES

Figure A-1	Areas Identified as Having a Need for a Public Shooting Range	124
Figure A-2	Generic Shooting Range Configuration and Facilities	125

MAPS

	<u>Map Series</u>
Regional Locator	A
Albany Wildlife Area	B-Series
Avon Bottoms Wildlife Area	C-Series
Badfish Creek Wildlife Area	D-Series
Brooklyn Wildlife Area and Streambank Protection Area-Story Creek	E-Series
Evansville Wildlife Area and Streambank Protection Area-Allen Creek	F-Series
Hook Lake/Grass Wildlife Area and State Natural Area	G-Series
Liberty Creek Wildlife Area	H-Series
Footville Wildlife Area (Approved)	I -Series
Extensive Wildlife Habitat-Rock County	J-Series
Streambank Protection Area-Anthony Branch	K-Series
Ice Age Trail – Montrose State Ice Age Trail Area	L-Series

Each series consists of the following maps, unless the information could be represented on a combined map or the map was not needed.

1= public lands

2A= infrastructure – existing and approved

2B = motorized access (if warranted)

3= current cover types

4= planned cover types

5= land classifications and state natural areas

6= Natural Resources Board Action Items (if warranted)

LIST OF ACRONYMS

ADA	Americans with Disabilities Act
BMPs	Best Management Practices
COA	Conservation Opportunity Area
CREP	Conservation Reserve Enhancement Program (federal NRCS program)
CTH	County Trunk Highway
EAB	Emerald Ash Borer
EL	Ecological Landscape
FA	Fishery Area (DNR managed)
FM	Fishery Management (DNR bureau)
HMA	Habitat Management Area
IATA	Ice Age Trail Alliance
LAWCON	Land and Water Conservation Fund Act (federal open space acquisition program)
NAWCA	North American Wetlands Conservation Act
NCMA	Native Community Management Area
NHC	Natural Heritage Conservation (DNR bureau)
NHI	Natural Heritage Inventory (DNR NHC database)
NR	Wisconsin Administrative Code (rules governing the management and assessment of natural resources properties and actions)
NRCS	Natural Resources Conservation Service, agency of the US Department of Agriculture
NSSF	National Shooting Sports Foundation
ORAP	Outdoor Recreation Act Program (former State of Wisconsin land acquisition program)
PR	Parks and Recreation (DNR bureau)
REA	Rapid Ecological Assessment. A DNR document that describes the native communities and biological resources on the planning group properties.
RMA	Recreation Management Area
RPA	Regional and Property Analysis. A DNR document that describes the regional setting and the physical, biological and cultural assets of the properties in the planning group.
SBP	Streambank Protection – A statewide fishery program to acquire lands along water-bodies either in fee title or as easements.
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SGCN	Species of Greatest Conservation Need
SIATA	State Ice Age Trail Area
SNA	State Natural Area
ss.	Wisconsin State Statutes
STH	State Trunk Highway
US FWS	US Fish and Wildlife Service
WA	Wildlife Area (DNR managed)
WDNR	Wisconsin Department of Natural Resources
WDOT	Wisconsin Department of Transportation
WisFIRS	Wisconsin Forest Inventory and Reporting System (DNR Forestry Division)
WM	Wildlife Management (DNR bureau)

EXECUTIVE SUMMARY

The Sugar River Planning Group includes 14,154 acres of fee title and trust land in southcentral Dane County, eastern Green County and western Rock County. The planning group includes seven wildlife areas (WA) and fifteen smaller parcels acquired under statewide authority containing 12,299 acres, three streambank protection areas (SBP) with 1,118 acres, a 219 acre state Ice Age Trail area, and 115 acres of fee title and 403 acres of trust land at Hook Lake Bog State Natural Area (SNA) (**Map A-1**) (**Table ES-1**). In addition, 903 acres of easements have been acquired of which 751 acres are open to the public.

Another important public access program has been the Voluntary Public Access leases acquired with federal funds. Over 10,000 acres of working farm land provides pheasant, deer and dove hunting in the planning area. A significant majority of these leased lands are located in Rock County. They provide about 40% of the public access lands in the planning area. All of these leases will expire by 2017.

The fee title, easement and lease lands of this planning group provide about 36% of the public lands available for hunting in Dane, Green and Rock counties.

Table ES-1 Fee Title Lands	
Wildlife Areas	Acres
Albany WA	1,427
Avon Bottoms WA	3,402
Badfish Creek WA	1,147
Brooklyn WA	2,608
Evansville WA	707
Statewide Authority Areas	1,720
Hook Lake/Grass Lake WA	745
Liberty Creek WA	563
Streambank Protection	
Anthony Branch	637
Allen Creek	223
Story Creek	258
Natural Area	
Hook Lake Bog SNA	115
Parks and Recreation	
Ice Age Trail - Montrose SIATA	204

This plan builds upon the foundation laid by previous property master plans, the Statewide Comprehensive Outdoor Recreation Plan, the Wisconsin Wildlife Action Plan, the Wisconsin Waterfowl Strategic Plan, the Land Legacy Report, the Important Bird Areas Plan and fishery management plans. Other department efforts considered in this planning process include the regional Eco-Summit priorities, program strategic plans, species reports and federal-state joint plans for migratory species. Consistency with county comprehensive, open space and agricultural protection plans was also considered.

This plan received input from local sporting groups, local officials, federal agencies, UW-Extension, friends groups, land trusts, and the general public.

Implementation - The recreation and habitat management recommendations described in this master plan will be implemented over the next 15-20 years. Availability of staff, equipment and resources will drive the timing and amount of progress toward the stated goals. Progress will be documented through the annual master plan implementation reports, property management meetings, grant reporting and reports to stakeholders and the public.

Management Goals - The primary recreational and habitat goals for the planning group include:

- Providing sustainable hunting, fishing, trapping, hiking and nature-based recreation;
- Improving habitat quality and productivity for game and non-game species; and
- Coordinating with partners to improve regional recreational opportunities, provide quality habitats on a landscape scale, and increase the management efficiency on state lands.

This plan recommends a significant majority of the current recreation and habitat management activities be continued into the future. This plan also seeks to implement the strategic initiatives that have been approved for these programs. The major changes approved in this plan include improved site accessibility, expanded dog training opportunities, an increase in the number and size of the state natural areas, increased habitat restoration activities and adjusting project boundaries to improve user experiences and increase management efficiency.

Recreation Management – These properties are within an hour drive of over one million people. Their appeal is expected to increase as our population grows, rural land ownership becomes more fragmented, and access to private lands becomes more difficult. It is expected that the number of users and the diversity of uses will increase over the next 20-30 years.

Currently, nearly 69,000 fishing licenses, 64,000 hunting licenses and 1,400 trapping licenses are sold annually in Dane, Green and Rock counties. The favorite game species for these hunters include white-tailed deer, turkey, pheasant and waterfowl. Even though less than 3% of the land in the planning area is publicly owned over 8% of the harvested deer are taken on public lands indicating their productivity, use by hunters and the importance of managing the deer population.

The primary recreation goal for this planning group is providing diverse and satisfying opportunities for hunting, fishing, trapping and the other traditional nature-based activities in predominantly natural and somewhat-remote recreational settings.

Access is provided by parking lots on the periphery of the properties and walk in access provided by the service roads, stocking lanes, burn breaks and volunteer trails. The Ice Age Trail will continue to provide opportunities for hiking, nature enjoyment and dispersed backpack camping.

Designated boat or carry in launch sites are provided on the Sugar River, Little Sugar River, Badfish Creek and at Grass Lake. Water trails are approved for the Sugar and Little Sugar rivers.

Story Creek and Anthony Branch are popular Class 2 trout streams. Allen Creek (a Class 2-3 trout stream) also offers fishing opportunities for local anglers. This plan recommends improvements in in-stream and riparian habitats as well as access for anglers to these streams.

Bird and wildlife watching, hiking the Ice Age Trail, and canoeing the Sugar and Little Sugar rivers and Badfish Creek are all growing in popularity. The Class 2 dog training site at Badfish Creek WA will be moved and substantially expanded. Snow shoeing, cross-country skiing, berry picking and dog walking are enjoyed as well. These later activities are allowed, but limited management actions are taken to promote them (e.g., groomed ski trails are not provided).

Non-motorized recreation is the primary use on these properties, but connecting snowmobile trails as part of regional systems are considered a compatible use.

All of the properties were screened to assess their suitability as potential target shooting range sites. Avon Bottoms WA, Evansville WA/Streambank Protection Area-Allen Creek, and two Extensive Wildlife Habitat parcels in Rock County may have potential sites (see Appendix A).

Public Access - Currently there are 62 parking lots, 2 improved boat landings and 5 carry-in landings on these properties. This plan recommends constructing an additional six parking lots and two carry-in boat landings. Adding more access points may be warranted depending on project boundary adjustments, future property acquisitions, easements and collaboration with partners that own adjacent lands.

Walking access on these properties is provided by 8.2 miles of service roads, about 7 miles of designated Ice Age Trail at Brooklyn WA and Montrose SIATA, and 38 miles of burn breaks/stocking lanes. There are about 1.8 miles of connector snowmobile trails on these properties as well.

Enhanced opportunities for mobility impaired individuals to participate in wildlife observation, hunting and trout fishing were considered, but additional study is needed to identify sites and potential partners.

Due to the abundance of wetlands, the desired recreational setting and the size of these properties no additional motorized access to the interior of these properties was approved.

Habitat Management and Land Management Classification - Wetlands constitute nearly 58% of the land cover on these properties. They protect some of the largest blocks of high quality upland and floodplain forests in southern Wisconsin. The highest priority management area is the protection of the floodplain forests, aquatic communities and grasslands along the lower Sugar River in Avon Bottoms WA.

The primary habitat management goal is to provide landscapes that promote productive and sustainable wildlife populations. This goal can be best achieved by creating larger habitat blocks, protecting native plant and animal communities, and promoting natural ecological processes important to both game and non-game species. See the individual property descriptions in Chapter Two for more details.

Nearly 80% of the fee title lands (~11,200 acres) will be classified as **Habitat Management Areas (HMA)**. Important objectives include maintaining or restoring emergent wetlands, grasslands, floodplain forests and cool/cold water streams. These habitats provide the foraging, nesting/spawning and/or cover needed for deer, turkey, pheasants, small game, woodcock and trout. Many non-game species, including grassland, forest and shore birds will also utilize these habitats.

The cover types with the largest acreage increases are Bottomland Hardwoods (180 acres), Oak Woodlands (85 acres) and Oak Savanna (80 acres). Agricultural practices are currently used on about 20% of the non-forested uplands and will continue to be an important management practice in the future.

About 19% of the fee title lands (~2,740 acres) will be classified as **Native Community Management Areas (NCMA)**. This classification seeks to protect or enhance the quality and acreage of the relatively intact native wetlands, prairies, savanna and Oak communities on these properties. Important native wetland communities in this planning group include Floodplain Forests, Southern Sedge Meadow, Wet-mesic Prairie, Calcareous Fen and Bog Relict. These native communities provide valuable nesting, foraging and resting cover for both game and non-game species.

This plan recommends the creation of one large state natural area focused on protecting the floodplain forests, sloughs and oxbows along the Sugar River in Avon Bottoms and establishing two new state natural areas at Albany WA and Badfish Creek WA on existing state lands.

This plan recommends the 219 acres of the Ice Age Trail - Montrose State Ice Age Trail Area be classified as a **Recreation Management Area (RMA)**. This setting is intended to provide scenic and satisfying hiking and nature enjoyment experiences.

The **Special Management Area (SMA)** classification is applicable to the management unit dedicated to a specific recreational or habitat use. This classification would be applicable to the unit where a target shooting range is established.

Budget - The estimated habitat and infrastructure management budget for these programs ranges from \$85-100,000/year. These costs would be covered by ongoing appropriations and stamp funds. Federal, local and private funds such as NRCS easement funds, NAWCA grants, stakeholder donations and other funding sources provide additional revenues to complement the state funding.

Costs to manage new parcels will depend on the need for active management, property blocking, fiscal returns (e.g., farm agreements and timber harvests), and access to tools that improve management efficiency. Future operational costs are anticipated to remain similar to or increase slightly above current costs with improved efficiency offsetting some of the costs of managing additional land.

Stakeholder Support - Since 2000 these properties and adjacent lands have been awarded an estimated \$1.5 million dollars for conservation activities, with the USDA-NRCS being a significant source of funding. Volunteers have donated about 500 hours/year of labor to manage habitats and improve infrastructure. Interest groups like Pheasants Forever, the Ice Age Trail Alliance, Ducks Unlimited, Trout Unlimited, the Natural Heritage Land Trust, and local groups have been valuable partners in these conservation efforts. Local governments have also contributed to these efforts by providing complementary recreation facilities and conservation land.

NRB Action Items - Project Boundary and Acreage Goal Adjustments

The following project boundary and acreage goal adjustments were approved to meet the recreation and habitat goals described earlier:

- Contract project boundaries collectively by 2,645 acres and the acreage goals by 450 acres.
- Expand wildlife areas project boundaries by 6,390 acres and the acreage goals by 5,600 acres. These adjustments are primarily located in Rock and Green counties where public lands are relatively scarce. Within the approved expansion areas the department owns 734 acres and the USDA-Natural Resources Conservation Service (NRCS) has easements on approximately 3,400 acres including 724 acres of approved gift land from Pheasants Forever. These lands represent over 60% of the approved project boundary expansion. The NRCS has restored and assists with maintaining these wetland and grassland easements. While all of the NRCS easements provide valuable ecosystem services, over 75% of the acres are not open to public access thus they provide no public recreation.
- Create a project boundary of 13,000 acres for the Footville Wildlife Area to acquire 3,000 acres of permanent public access easements. The NRCS has management easements and has restored grasslands/wetlands on about 2,000 acres within the approved project boundary. As noted in the previous bullet, the federal easements do not provide public access.
- Expand the fishery area project boundaries by 80 acres with no expansion of the acreage goals. The department owns 60 acres within the approved project boundary and no expansion of the acreage goal is requested.

- Expand the State Natural Areas as follows:
 - Avon Bottoms State Natural Area – Create a new 1,978 acre state natural area. This natural area will encompass two existing state natural areas - Avon Bottoms (168 acres) and Swenson Wet Prairie (40 acres).
 - Designate two new state natural areas (180 acres total) on existing department lands. A 80 acre Sand Prairie and Oak Savanna natural area at Albany WA and a 100 acre Wet Prairie and Spring Seeps natural area at Badfish Creek WA.

The land uses within the project boundary expansion areas approved for fee title acquisition are 49% wetlands, 29% cropland, 8% forest/shrubs, 12% grasslands and 2% developed.

The approved project boundary and acreage goal adjustments seek to achieve the following:

1. Address the expected growth in recreation demand while also improving the quality of the hunting, fishing, trapping and nature based outdoor recreation experiences. The changes should also reduce user confusion about property lines and minimize trespass issues.
2. Increase productivity by creating larger contiguous blocks of higher quality nesting, foraging and/or cover habitat for deer, turkey, and pheasant as well as many other migratory and resident game and non-game species. It is also intended to improve the efficiency and effectiveness of habitat management activities and the monitoring and managing of invasive species.
3. Protect current recreational activities from non-compatible land uses. Gun hunting is not allowed within 100 yards of a home unless the resident provides permission. Expanding boundaries to roads will provide greater certainty these lands can be used for all of the intended purposes.
4. Protect the quality and quantity of surfacewater and groundwater flowing to these properties. It will reduce erosion, sedimentation and nutrient loads, particularly important for trout streams and the Conservation Opportunity Area along the Sugar River.
5. Coordinate management activities with partners to maximize habitat benefits, leverage limited resources, and improve recreational opportunities to achieve the greatest conservation benefit.

These proposals are also consistent with NR 1.40 as they emphasize the acquisition of recreational land adjacent to existing projects and are close to heavily populated areas of the state.

Leveraging Investments - The NRCS has acquired land management rights and restored habitats on nearly 5,300 acres in Rock County and Green County. These easements were acquired through the federal Wetland Reserve and Emergency Watershed Protection programs. As noted earlier these easements provide valuable ecosystem services (e.g., wildlife habitat, enhance water quality, etc.), but a limitation is they do not provide public access and some of the easements are only 20-30 year in duration.

The NRCS has purchased a significant fraction of the value of these parcels with their easements. This creates an opportunity for the department to collaborate with partners and willing land owners to acquire public access rights and/or purchase the land in fee title at a substantially reduced price (e.g., potentially half the price or less compared to land not under easement) near the Avon Bottoms WA, Albany WA and the approved Footville PHG.

CHAPTER ONE

THE MASTER PLANNING PROCESS

Introduction

The approved management objectives and prescriptions, and the adjustments to the project boundaries and acreage goals in this draft master plan are intended to provide quality habitats and satisfying recreational opportunities over the next 15-20 years.

General Recreation Objectives

1. Provide quality hunting, fishing, trapping and nature based recreation opportunities in predominantly natural-appearing landscapes in somewhat remote settings with little development and an emphasis on non-motorized activities.
2. Improve access by adding parking areas and carry in boat access. Assess opportunities for adding accessible facilities for hunting, fishing and nature enjoyment. Provide connecting trails for regional snowmobile networks as appropriate.

General Habitat Objectives

1. Promote habitats used by deer, turkey, pheasant, waterfowl, small game, woodcock and migrating birds.
2. Create larger habitat blocks to improve management efficiency. Increase the acreage of grasslands, prairies, oak woodlands, floodplain forests and savanna.
3. Protect or restore native plant and animal communities as practicable. Monitoring and managing invasive species will be a difficult, but important task due to the presence and abundance of multiple invasive species on several of the properties. Prioritization and coordination of these efforts between programs is needed to most effectively address this challenge.
4. Protect and/or enhance trout habitat in the coldwater (trout) fisheries at Story Creek, Anthony Branch and Allen Creek. Enhance warmwater fishery habitat and populations to the extent resources are available.
5. Develop habitat management strategies to protect forest ecosystem health and diversity. Notable management concerns include Emerald Ash Borer (EAB) impacts on forest communities and maintaining remnant tamarack communities.

Planning and Management Background

This planning effort considered, and sought to accommodate the broader goals and objectives of statewide and regional wildlife management planning efforts. Planning documents and their conservation or recreation goals considered in this plan include the following:

- **The Statewide Comprehensive Outdoor Recreation Plan (SCORP)** is a planning process that identifies outdoor recreation issues and evaluates the supply of and the demand for outdoor recreation resources and facilities on a 10 year cycle. Providing increased public access is a need identified in the most recent SCORP.

- **Wisconsin Strategy for Wildlife Species of Greatest Conservation Need** (*WDNR August 2005*) – This plan identifies native wildlife species with low or declining populations, the habitats they are associated with, where they occur across the state, and a menu of conservation actions to help restore viable populations.
- **Upper Mississippi River and Great Lakes Region Joint Venture - Wisconsin Plan**, (*US FWS, March 1992*), **Waterfowl Habitat Conservation Strategy**, (*US FWS, December 2007*) and other shore, water and land bird conservation reports – The Joint Venture planning approach emphasizes establishing explicit regional goals by federal and state partners for waterfowl populations and habitat conservation.
- **Wisconsin Waterfowl Strategic Plan 2008–2018** (*WDNR December 2007*) - This plan presents six primary objectives and associated strategies for the department to provide waterfowl habitat, monitor populations and improve hunting experiences.
- **Eco-Summits** – The Eco-summits were developed between 2005 and 2010 by department staff. These summits identified landscape scale habitat needs for wildlife in general and special concern species and native communities specifically.
- Species management reports as well as published and unpublished research results were also considered (e.g., FWS 2008).

Previous property master plans approved by the Natural Resources Board (NRB) were considered during this planning process. These properties include: Albany WA (1982), Avon Bottoms WA (1986), Badfish Creek WA (1984), Brooklyn WA (1984) and Evansville WA (1988). No NRB approved master plans exist for Liberty Creek WA and Hook Lake Bog SNA/Grass Lake WA. The fishery areas have Fish Management approved work plans dating to the early 1990's. The previous plans are not as detailed or as rigorous as current NR 44 master plans. However, they provide valuable background regarding prior habitat and recreation management goals and objectives for these properties.

County and local comprehensive land use, open space and agriculture plans were evaluated to assess the consistency of the recommendations in this plan with the objectives of these local plans.

Prior Conservation Efforts

Native grasslands and wetlands have been substantially diminished in size and quality since European settlement. It is estimated that over 99% of Wisconsin's original grasslands have been converted to agricultural use (*WDNR Addis et al. 1995*). The availability of surrogate grasslands (pastures, grass hay, and small grains) for duck nesting has also decreased as row-crop agriculture has intensified (*Sample and Mossman 1997*). Wisconsin is fortunate to have many quality wetlands. However, there has been a significant loss of wetlands since pre-settlement periods. It is estimated that Wisconsin has lost about 50% of its original 10 million acres of wetlands (*WDNR 2007*). Currently, over 75% of Wisconsin's remaining wetlands are in private ownership.

Many of our river systems, especially the larger ones, have dams or water control structures that limit fish movement, impact natural water level fluctuations, and can significantly affect shoreline habitats (*Baker et al. 2000*). Albany WA has riverine wetlands that are affected by both department management activities as well as water level management of the dam at the Village of Albany.

Flood control and agricultural development in the early and mid-1900s took its toll on wetland habitat across the state. Draining and filling activities, shoreline development, aquatic plant control practices, the introduction of carp, and pollution/sedimentation adversely affected wetlands and waterfowl habitats (*Jahn and Hunt, 1964*). The 14 southeast counties alone experienced a 2% per year loss in wetlands (*Kabat 1972*). Factors such as existing drainage ditches, on-going shoreline development, filling and altered hydrology for infrastructure, declining water quality and non-native species continue to impact the quantity and quality of waterfowl habitat in Wisconsin.

Wisconsin has been a leader in obtaining funds and implementing cooperative projects for the restoration and enhancement of wetlands and waterfowl habitat. The Wisconsin state waterfowl stamp program generated on average over \$500,000 per year during the period 2000–2006 for waterfowl habitat work.

Since 1991, the department and partners have obtained \$20 million in federal grants for waterfowl habitat. This was matched by \$50 million in partner or state funds, resulting in 97,000 acres of waterfowl habitat protected and/or enhanced. Ducks Unlimited (DU) has been a valuable partner in these efforts and has invested \$11.5 million in wetland and habitat protection in Wisconsin.

These actions have immediate and long-term benefits to Wisconsin duck hunters and those who enjoy watching waterfowl. According to recent studies in Wisconsin, duck nesting success on federally funded CRP grasslands and state wildlife lands were 30% and 20% respectively, which are at or above the 15–20% success rate needed to maintain duck populations (*Gatti personal communication*). Depending on annual conditions, 50–70% of the total ducks harvested in Wisconsin are produced in the wetlands of our state (*Wisconsin Waterfowl Strategic Plan 2008–2018, p.16*).

Numerous state, federal, local, private and non-profit groups have undertaken efforts to address these losses, and protect or maintain the remaining wildlife habitats. Some of these efforts have and will continue to directly affect these properties. Others will protect or restore habitat on private lands through programs such as the federal Conservation Reserve and Wetland Reserve programs.

The federal Conservation Reserve Program (CRP) has offset grassland losses and promoted permanent grass cover on highly erodible soils. During peak participation in the mid-1990s over 710,000 acres were enrolled in Wisconsin. However, there has been a significant reduction in CRP enrollment since that time. Enrollment dropped to less than 320,000 acres by 2013 with additional losses expected.

Enrollment in the CRP has also declined in the planning group counties. From the mid-1990s to 2013 enrollment dropped nearly 50% (i.e., a reduction from 82,300 acres to 40,000 acres). This is a net loss of 42,000 acres of permanent cover to cropland or other uses. The approved boundary adjustments and habitat management objectives in this master plan seek to compensate for this loss of grasslands to promote cover for pheasant and provide habitat for duck production and grassland birds.

In contrast, the 1992 federal-state Joint Venture plan identified a wetland restoration goal of 288,750 acres for Wisconsin due to the importance of the state as a waterfowl production area and an important flyway (*US-FWS, 1992*). With 75% of Wisconsin's wetlands in private ownership, achieving this goal required a private-public collaboration. A substantial part of this goal was achieved by 2006 and this success was due in part to collaboration with over 75 partner organizations (*WDNR, 2007*).

Public Support and Input

Federal sources like the Land and Water Conservation Fund Act, the North American Wetlands Conservation Act (NAWCA) grants, the Pittman- Robertson and Dingell-Johnson firearm/ammunition and fishing equipment excise taxes, and federal waterfowl stamps have provided significant funding for habitat acquisition, protection and management over the decades. Wisconsin has also generated conservation funding through the Outdoor Recreation Act Program, the Stewardship fund, license sales and duck or trout stamps. Counties have also provided conservation funds for land acquisition (e.g., Dane County Stewardship Fund).

This master plan recognizes the valuable contributions of Pheasants Forever (PF), the Ice Age Trail Alliance (IATA), Ducks Unlimited, Trout Unlimited, land trusts, friends/sporting groups, snowmobile clubs, local governments and citizens to these properties and this planning process. For example, Pheasants Forever (PF) has been a very active partner in Dane, Green and Rock counties. They have donated 1,079 acres to the department in Rock County. The Rock River Valley PF chapter has averaged 500 acres/year of prescribed burns, planted about 25 acres/year of food plots and restored about 40 acres/year of grasslands (*Foy, DNR email, 2015*). Ice Age Trail volunteers have donated thousands of hours and have been instrumental in developing and maintaining trail sections and providing habitat management along the trail in the Brooklyn Wildlife Area and the Montrose State Ice Age Trail Area.

Significant amounts of grants and financial donations, almost \$1,500,000 since 2000, have been awarded to the planning group properties.

Wildlife Communities

These properties provide important habitat for both resident and migratory species. They provide good to excellent habitat for white-tailed deer, turkey, waterfowl, ring-necked pheasants, mourning doves, woodcock and other small game. Generalist species like deer and turkey are well adapted to the mix of agricultural lands, woodlands, grasslands and wetlands in the region. The approved habitat management objectives and prescriptions will provide improved forage and cover for these species as well as grassland game birds such as pheasant.

Common furbearing animals on these properties include raccoon, striped skunk, coyote, fox, opossum, muskrat, mink, otter and beaver. These species will benefit from the recommendations as well.

The federal-state Joint Venture plan has identified the upper Midwest as an area with substantial potential for a net increase in waterfowl habitat (*US FWS, 2007*). That plan indicates these properties can contribute to efforts to increase mallards, blue-winged teal and wood duck populations. This can be done by preserving and restoring wetlands and grassland in the adjoining landscapes.

The Natural Resources Board approved the *Wisconsin Waterfowl Strategic Plan 2008–2018 (WDNR December 2007)* and several of the objectives are pertinent to this plan:

- Provide and expand habitats and management necessary to meet the year round ecological needs of Wisconsin's diverse waterfowl community and other wetland species.
- Recognize Wisconsin's role as a waterfowl production state and our waterfowl hunting heritage. Specific recommendations in the plan include:
 - Seek a 5% increase in mallards and wood ducks and a 20% increase in blue-winged teal breeding populations.

- Land acquisition and habitat programs should focus attention on both ecologically important waterfowl habitat and lands near population centers to address hunter's desires for more hunting lands.
- Increase grassland nesting habitat for waterfowl on public and private lands.
- Invasive plant and animal species impact waterfowl and wetlands habitat. Continue to work across programs on control efforts for invasive plants and animals.

Avon Bottoms WA and Brooklyn WA are also noted as important bird habitat areas in the Great Wisconsin Birding and Nature Trail – Southern Savanna Region (*WDNR web references*).

Fish Communities

The following coldwater (trout) fisheries are found on the properties: Anthony Branch (Dane County), Story Creek (Dane and Green Counties), Allen Creek (Rock County) and Liberty Creek (Green County). About 11.1 miles of Class 2 trout waters (Anthony Branch Creek with 2.1 miles, Story Creek with 6.8 miles, and Allen Creek with 2.2 miles) and 2.8 miles of Class 3 trout waters (Allen Creek with 0.7 miles and Liberty Creek with 2.1 miles) flow through these fee title or easement lands. These waters sustain both brown and brook trout populations as well as a variety of native forage species.

Avon Bottoms WA contains an estimated at 14 miles of stream frontage, along the Sugar River. The river provides fishing opportunities for northern pike, walleye, largemouth and smallmouth bass, catfish and panfish.

Avon Bottoms WA, Albany WA and several of the smaller statewide acquisition authority parcels contain numerous oxbows, sloughs and restored wetlands that provide essential habitat for the various life stages of fish and other aquatic and semi-aquatic wildlife. These floodplain habitats sustain seasonal migrations, biodiversity and the healthy functioning of the river ecosystems. A recent report (*WDNR, 2010c*) indicated many of the oxbows in southern Wisconsin are degraded and their biological function is threatened by sedimentation, floodplain aggradation, lost storage capacity and lost connectivity to groundwater. This is a threat to the stability and diversity of many minnow and forage species that inhabit these ecosystems.

Recreational Opportunities and Challenges

Southcentral Wisconsin landscapes are dominated by agricultural uses followed by urban and suburban lands. Public hunting and fishing lands comprise less than 5% of Dane County land use, slightly more 2% of Rock County and less than 2% of Green County. Population growth, increasing development and habitat fragmentation will place increasing recreational pressure on the existing fish and wildlife areas. The aging 'baby boomer' population is also creating an active, older demographic cohort that is anticipated to result in a growth of quiet sports with a greater need for accessible infrastructure.

Increasingly diverse recreational pursuits are also occurring on these properties. The traditional users are hunters, anglers, hikers, birders and winter sport enthusiasts with more contemporary activities including such as walking for exercise, dog walking, geocaching and even using drones on state land.

Nearly 20% of Wisconsin's population engages in some form of hunting. Wisconsin hunters typically hunt several different wildlife species (*WDNR, 2006a*). Studies have shown that access to land and the quality of the experience are both important in maintaining participation rates for outdoor recreational activities.

User perception of crowding has been shown to lower the satisfaction of participants engaging in their favored outdoor activity (*OAI, 2012*). The Wisconsin Waterfowl Strategic Plan 2008–2018 (*WDNR December 2007*) noted that the quality of the waterfowl hunting experience is affected by interactions (both positive and negative) with other hunters as well as seeing and harvesting birds. The negative interactions with other hunters included crowding at hunting areas, high hunting pressure and interference from other hunters. The most important variables mentioned by duck hunters for improving their waterfowl hunting experiences included more hunting locations to reduce crowding and more opportunities to see ducks.

A number of these properties have limited upland acreage. This has led to crowding, particularly during opening weekend for certain pursuits such as pheasant and deer hunting. Long-term, regional demand for hunting and other outdoor activities, such as hiking and birding, are expected to increase the recreational pressure on the already popular properties.

Distance traveled also affects user participation rates and satisfaction. The 1991-96 SCORP and the 1985 National Survey of Hunting, Fishing, and Wildlife-Associated Recreation found that 65-70% of outdoor recreation occurs within 50 miles of home. The National Shooting Sports Foundation (*NSSF, 2010*) found the median distance Wisconsin hunters travel to hunt their primary game species is 25 miles.

A report published by Responsive Management and the National Shooting Sports Foundation (*NSSF, 2010*) provided the following insights on hunting access and satisfaction in Wisconsin.

- The majority of the licensed hunters in Wisconsin primarily hunt deer (77%) followed in popularity by waterfowl (8%), upland game birds (6%), and wild turkey (6%). (*Note: for these three counties the local license sales were as follows: deer (46%), waterfowl (18%), small game (14%), turkey (14%) and pheasants (8%)*).
- About 46% of hunters use public lands at least half the time they hunt.
- Upland game bird and waterfowl hunters have a greater propensity to hunt on public land.
- Hunters indicate they mostly hunt their primary species on the same land each year (68%).

Factors that stood out as most important in hunters' decisions regarding where to hunt their primary species included: Land is not crowded with other sportsmen (80% say this is very important), familiarity with the land (60%), and easy access by foot (54%).

Constraints to hunting access deemed major problems in the NSSF report included:

- Loss of previously open private land due to posting,
- Loss of hunting land due to new housing and other land use changes, and
- Travel cost (i.e., gasoline prices).

Local participation in hunting, fishing and trapping can be estimated based on resident license sales for Dane, Green and Rock counties. From 2009-2012 licenses and stamp sales averaged as follows: 33,400 gun and 11,000 archery deer licenses, 13,000 goose permits, 9,100 small game licenses, 10,250 patron and sports licenses, 9,900 turkey licenses, 4,900 pheasant stamps, 1,400 trapping licenses and nearly 69,000 fishing licenses, including 9,750 inland trout stamps, were purchased. The *Sugar River Planning Group Regional and Property Analysis (WDNR, 2014)* document provides additional information about public use, public lands and deer harvests on these properties.

In addition to hunting, fishing and trapping, these properties are used for a broad spectrum of traditional, nature based recreational pursuits such as bird watching, hiking, watching wildlife, nature photography, foraging for berries and nuts, canoeing and kayaking.

Bird watching is a popular activity in the region. The eBird web page (*ebird.org, 2015*) indicates over 350 species of birds have been observed in Dane County, 305 in Rock County, and 243 species in Green County. The eBird web page indicates thousands (Green County) to tens of thousands (Dane County) of bird lists have been submitted for these counties.

Brooklyn WA, Hook Lake WA/SNA and Badfish Creek WA are used by birders in Dane County with 175, 110 and 102 bird species reported respectively. In Rock County, Avon Bottoms WA is the number one hotspot for birders with 192 species reported. Avon Bottoms WA is identified as an Important Birding Area and also recognized as a stop on the Southern Savanna Region Auto Trail (*WDNR, 2007*). Albany WA with 145 species, Liberty Creek WA with 79 species and several of the other fish, wildlife and natural areas in the planning group also show up as birding sites.

More recently, walking for exercise and dog walking activities are becoming more prevalent on the properties, especially near developing areas. Dogs should be on leash from April 15 to July 31 to protect nesting wildlife.

A relatively new activity is the growing popularity of geocaching (*Wisconsin Geocaching Association, 2014*). Geocaching is an outdoor pursuit where the participants use a Global Positioning System (GPS) device and other navigational techniques (e.g., compass settings) to hide and/or seek containers, called "caches". Geocaching shares many aspects with traditional orienteering, treasure-hunting and way-marking. There are over 40 recorded caches on these properties with Albany WA, Liberty Creek WA and Brooklyn WA the most popular sites.

Target Shooting Ranges – Shooting ranges more broadly considered can include rifle ranges of different lengths, patterning ranges for shot guns, short distance pistol ranges, and ranges for archery and cross bows. A broad range of users may be found at target shooting ranges including hunters, shooting sports enthusiasts, law enforcement agencies and hand gun owners.

Siting recreational infrastructure or designating a potentially high intensity activity on public lands may meet certain recreational needs, but it may also lead to conflicts with existing users and neighbors. Providing target shooting ranges has been a recent focus for the department. The Alternatives chapter has a section on shooting ranges as does Appendix A. These sections describe range siting criteria, range facilities, social and environmental concerns, and alternative actions that will be assessed in the detailed site selection and assessment process. This detailed site assessment will be undertaken following this master planning process.

Dog Training - The only designated Class 2 training site in the planning group is located at Badfish Creek WA. This training area is approved to be moved to the north end of the property (Map D-2) to improve the size of the training area and add water training sites. No other Class 2 training sites were approved for these properties.

Investments in Public Lands, Recreation and Conservation

In Wisconsin, our natural resources are not just a part of our landscape; they are a part of our heritage. Wisconsin residents value their rich traditions of hunting, fishing, trapping, camping, hiking and enjoyment of nature. They also value their access to our public recreational land and wild places.

The state owns and manages about 1.6 million acres of forests, wetlands, rivers, lakes and grasslands across Wisconsin. Of the 13,551 acres of fee title land in this planning group, over 11,500 acres of fee title lands have been purchased through the ORAP and Stewardship programs with smaller amounts acquired as gifts or exchange lands. Hunters and anglers have also been major contributors to land purchases through license sales and the federal excise taxes on hunting and angling equipment. Conserving these resources is an investment that pays many economic and environmental dividends similar to our investments in other public infrastructure.

Our \$12 billion tourism industry (*Tourism Federation of Wisconsin*) and \$23 billion forest industry (*WDNR 2009*) are inextricably linked to our abundant natural resources and, in part, to our public lands. The Outdoor Industries Association indicates outdoor recreation accounts for 142,000 direct Wisconsin jobs, \$3.6 billion in wages and salaries and contributed \$844 million in state and local tax revenue (OIA 2011).

The U.S. Fish and Wildlife Service's *National Survey of Fishing, Hunting and Wildlife Report (2006)* indicates a total of 2.9 million residents and non-residents, 16 years old and older, fished, hunted and/or watched wildlife in Wisconsin.

Wisconsin is second in the nation in terms of both resident hunters (763,000) and non-resident hunters (131,000) (*Southwick Associates. 2012*). These hunters participated in an estimated 12.2 million hunting days in 2011. The total economic contribution in Wisconsin is estimated at \$3.95 billion dollars generating \$228 million in state and local tax revenues.

The American Sportfishing Association and the Outdoor Industry Association estimated the national multiplier effect of recreation expenditures was \$1.5 to \$2 for every dollar spent on these activities. The American Sportfishing Association (SFA) indicates Wisconsin is the ninth in the nation in terms of angler expenditures. Their report further states that 1.25 million participants had estimated expenditure of about 1.46 billion dollars (*SFA, 2013*). Wisconsin ranked third in the nation with 337,000 non-resident anglers and it was estimated they spent an estimated \$445 million. The report estimated angling alone contributed about \$132 million toward state and local tax revenues.

With an estimate of over \$48 million spent annually on duck hunting alone, waterfowl hunters have a significant financial impact in Wisconsin (WDNR, 2007). According to Ducks Unlimited, Wisconsin ranked 2nd in the nation for numbers of members (45,222) and 1st in the nation for grassroots fundraising in 2005 (\$3,175,000).

The following studies are not based on this planning group specifically or the Wisconsin fish and wildlife properties generally, but they do provide a sense of the economic value of nature based recreation:

- A 2002 study of the Wisconsin State Park System indicated visitor expenditures and the multiplier effect of dollars flowing into the state accounted for roughly \$650 million annually (WDNR, 2002).
- A 2006 report for the National Parks Conservation Association showed that for every \$1 appropriated in the annual national parks budget, the national park system generates at least \$4 for state and local economies (Hardner and McKenney, 2006).
- A University of Minnesota study found that for every \$1 invested in conserving natural areas in Minnesota, there is a return of up to \$4 (Minnesota Environmental Partnership, 2010).
- The National Wildlife Refuge System generated almost \$1.7 billion in total economic activity, almost four times the federal appropriation to the refuge system in fiscal 2006 (Greenwire, 2007).
- In 2009, more than 1.4 million people visited the eight national wildlife refuges and the numerous waterfowl production areas in Wisconsin to hunt, fish, participate in interpretive programs, and view wildlife (FWS, 2012). These FWS properties provide more than 182,000 acres for public access and recreation. By comparison, the department provides public access to more than 645,000 acres of fishery and wildlife lands statewide, many of which are heavily used and several are companion properties (e.g., Horicon Marsh) to federal lands.

There is also a growing appreciation of resources being harvested sustainably from both public and private lands. Department lands are certified as being sustainably managed by two third-party audit firms (WDNR web references). Certification means the management practices meet the social, ecological, and economic rights and needs of the present generation without compromising those of future generations. This certification allows the department to market the timber as sustainably managed and enhances the market value.

Natural lands provide valuable services by filtering pollutants and maintaining water quantity and quality for both surface and groundwater. Wetland protection and restoration can help reduce flood peaks and damage, protect human health and safety, and reduce the need for expensive projects such as levees, detention ponds and the reconstruction of flood-damaged roads.

The estimated value of basic “ecosystem services” for the US Fish and Wildlife Service National Wildlife Refuges in the contiguous United States amounted to \$2,900/acre/year (Ingraham and Foster, 2008). The “ecosystem services” include the value they provide for wildlife, carbon sequestration, disturbance prevention (e.g. flood control), freshwater management and supply, nutrient regulation and waste management. Using the same approach, Wisconsin’s public land provides a total return of \$3.33 billion/year or \$2,400/acre/year.

Our public lands also provide cultural and historical connections. They invoke a sense of place in the landscape and are important habitats for people as well as wildlife. The majority of Americans agree that preserving undeveloped land for outdoor recreation is important (Outdoor Foundation, 2011).

Evidence suggests that children and adults benefit from contact with nature, therefore land conservation can be viewed as a public health strategy (*Frumkin and Louv, 2007*). They also play an important role in providing access to the outdoors for people with varied physical abilities, support environmental education, and build a public commitment to environmental conservation.

Concerns over the cost of purchasing and managing public land need to be balanced with the long-term recreation, economic, environmental, human health and cultural benefits. Conservation expenditures are best considered as investments that pay increasingly valuable dividends long into the future (*Gies, 2009*).

Ecological Significance

Sites of High Conservation Significance – Primary Sites

The *Rapid Ecological Assessment for the Sugar River Watershed Planning Group (REA)* (WDNR, 2013) identified seven Primary Sites on six properties. Primary Sites are parcels that offer opportunities to protect rare and representative natural communities, and/or harbor rare species.

These sites were identified through field visits and information provided in previous studies such as the *Wisconsin's Strategy for Wildlife Species of Greatest Conservation Need* (WDNR, 2005) and the follow-up implementation plan *Wisconsin's Wildlife Action Plan (2005-2015)* (WDNR, 2008).

The Natural Heritage Conservation program conducted a gap analysis to inform decision making on the number of native communities and potential state natural areas needed to meet the critical ecological reference area requirements for forest certification, ecosystem/species preservation, research, and education goals of the program. The Primary Sites selected for state natural area status will help fill the needs identified in the gap analysis.

Open Marshes and Wetland Forests

Several of these properties have high quality wetlands and/or large wetland complexes over 1,000 acres in size. Wetland quality and quantity varies considerably between properties as well as within properties. For example, Hook Lake/Grass Lake has high quality emergent wetlands and bog relict communities. Opportunities exist to enhance or protect black tern, rail and heron habitat at Hook Lake/Grass Lake WA. Avon Bottoms WA contains one of the largest continuous blocks of floodplain forest in southcentral Wisconsin. It also has a diverse river-floodplain fish community with endangered species present.

The wetlands at Badfish Creek WA have been heavily disturbed by drainage, farming activities and invasive species, but it still retains one area of high quality emergent marsh and springs complex. Evansville WA, Liberty Creek WA and Anthony Branch SBP also have wetlands that provide valuable habitat for breeding grassland birds, breeding marsh birds, reptiles, amphibians, and invertebrates.

Oxbows and Sloughs

Oxbows and sloughs occur naturally within the floodplains of larger river systems. In this planning group a continuous floodplain forest canopy occurs in conjunction with these oxbows and sloughs. Relatively undisturbed oxbows, sloughs and forests are under-represented in this region due to development activities along the river corridors. The oxbows and sloughs are periodically connected to the rivers thus behaving as drainage systems when water levels are high. When water levels are low they are temporarily isolated and behave like lakes. Oxbow lakes form when a wide meander from the main stem of a river is cut off, creating a free-standing body of water. These floodplain communities provide valuable energy and habitat for important life stages to the aquatic communities.

An important variable affecting the fish communities is the amount of groundwater input to these oxbows and sloughs. Panfish, largemouth bass and suckers are common inhabitants. Grass pickerel, many minnows and some endangered species, such as the starhead topminnow (*Fundulus dispar*), are associated with oxbows that have significant groundwater input. Central mudminnow and golden shiner are associated with the floodplain sloughs and lakes where there is little groundwater influence.

Species Richness

The planning area is noted for its diverse natural communities and species richness in the *REA (WDNR, 2013)* and *Wisconsin's Strategy for Wildlife Species of Greatest Conservation Need (SGCN) (WDNR, 2005)*. These properties support numerous rare and endangered plant and animal species as noted in the *Sugar River Watershed Regional and Property Analysis (WDNR, 2014)* including rare invertebrates such as the federally endangered Hine's emerald dragonfly and the state endangered swamp metalmark butterfly are found in the planning group.

Migratory Bird Habitats

The properties offer important resources for many bird groups. The habitats range from large wetlands, floodplain forests, streams and shrub and grasslands. These properties provide foraging areas of emergent aquatic plants such as smartweed, arrowheads and cattails; open water areas that teem with amphibians, fish, and aquatic invertebrates; and mudflats with abundant invertebrates and insect larvae. Habitats range from seasonal mudflats to flooded areas that provide food for invertebrates and attract waterfowl and shorebirds. Lowland shrubs in these wetlands offer migrating songbirds protection from severe weather and predators during a critical time in their life cycle. Shrubs offer perches for capturing emerging aquatic insects in spring and feeding on fruit in fall. Fruits and seeds on plants are utilized by migrants to build fat reserves necessary for sustaining long migratory flight.

Invasive Species

Invasive species are a growing threat to our native plant and animal communities. Numerous invasive species are found on these properties and some are well established. These species can dominate a community to the detriment, and perhaps the exclusion, of native species. Invasive species can alter natural ecological processes by reducing the biodiversity and the complex interactions of a native system to a simplified system with only a few species. These infestations can reduce the quality of the habitat for wildlife as well.

In upland habitats buckthorn, black locust, box elder, Tatarian honeysuckle, garlic mustard, Japanese knotweed, Japanese hedge parsley and other woody and herbaceous invasive species can present management challenges.

In lowlands, glossy buckthorn, phragmites, cattails and purple loosestrife can dominate wetlands while curly pondweed and Eurasian milfoil are issues in open waters or deep water marshes.

Reed canary grass is an aggressive invasive species found in many of the lowlands that were previously farmed and disturbed wetlands. It is one of the few invasive species that has been quantitatively assessed on a statewide basis. Satellite imagery analysis indicated almost 500,000 acres (about 10% of all Wisconsin's wetland acres) are dominated by reed canary grass making this species the most extensive wetland plant invader (*Hatch and Bernthal, 2008*).

CHAPTER TWO - SECTION ONE

GENERAL PROPERTY MANAGEMENT AND USE

The Sugar River Planning Group includes 14,154 acres of fee title and trust land in south central Dane, eastern Green and western Rock counties. The regional and county context for these properties is shown on **Map A-1**. The seven wildlife areas (WA) and 15 statewide acquisition authority parcels contain 12,299 acres, the three streambank Protection areas (SBP) have 1,118 acres, an Ice Age Trail property (Montrose State Ice Age Trail Area) has 219 acres and the Hook Lake Bog State Natural Area (SNA) includes 115 acres of fee title land and 403 acres of trust land. In addition, 903 acres of public access and closed access easements have been acquired.

As of April, 2016 nearly 9,000 acres of working farmland were being leased in western Rock County. Many of these acres have provided valuable hunting opportunities, primarily for pheasant, for many decades.

These lands encompass diverse habitats ranging from large open marshes to hardwood forests and highly productive trout streams. These properties are managed by or receive technical and/or financial assistance from the following programs: Wildlife Management (WM), Fishery Management (FM), Natural Heritage Conservation (NHC), Forestry (FR), Facilities and Lands (FL), and Parks and Recreation (PR).

The properties in this planning group provide about 36% of the land available for hunting, fishing, trapping and other nature based recreation in these counties. The lightly developed character of these properties is expected to have growing appeal as the population continues to expand and access to private lands becomes more difficult. These properties are within an hour drive of more than 1,000,000 people.

The following Vision and Goals for the planning group were developed after considering the statutory designation of these properties, the strategic objectives of the respective programs, the public input received, and the ecological and recreational characteristics of these properties.

Vision

The Sugar River Planning Group properties will provide abundant outdoor recreational opportunities in lightly developed settings for current and future users. These opportunities will be provided in a mosaic of high quality and ecologically diverse habitats including open waters, wetlands, grasslands and forests. These natural communities will be managed for user enjoyment consistent with the purpose and ecological capacity of these properties. The most effective and sustainable management efforts include citizens, private landowners and resource management agencies working together.

Goals

1. Provide diverse opportunities for hunting, fishing, trapping, birding, wildlife viewing and other compatible outdoor activities with an emphasis on non-motorized recreation.
2. Protect native plant and animal communities, especially the unique floodplain forests, fens, wet prairies, savannas, and oak woodland communities.
3. Promote habitats to sustain game and non-game wildlife including rare and special concern species.
4. Promote sustainable game fisheries with an emphasis on enhancing coldwater habitat to encourage natural reproduction of trout.

The vision and goals in this master plan builds upon the achievements of past master plans and general program management priorities. Similarly, the specific objectives and prescriptions for each property incorporate the many successful management activities, both active and passive, already used to provide recreational opportunities, manage habitats and protect native communities.

Factors considered when developing the management objectives and prescriptions in this chapter include recreation uses and trends, habitat distribution and quality, habitat needs of both game species and species of greatest conservation need, land use trends, and public input.

Planning Group Recommendations

To achieve the vision and goals, the recommendations in this plan lay out management objectives and propose project boundary adjustments intended to provide satisfying recreational experiences; sustain abundant resident and migratory game and non-game populations, and enhance management efficiency.

The public will continue to have ready access to the lands and waters of these properties from parking areas and boat launches located immediately off the local road system. Walking access to the interior of these properties is gained by using the service roads, mowed burn breaks and/or volunteer trails radiating from the parking lots. Seasonal motorized access is provided to snowmobiles on regional trail systems and boat access to portions of the Sugar River.

Recreational uses vary with the seasons and are often dispersed across the properties. The properties offer natural appearing landscapes where contact with other users is typically low to moderate, except during peak use periods (e.g., opening weekend of hunting seasons). Some users may also experience a sense of remoteness and wildness on certain properties (e.g., Sugar River in Avon Bottoms). The infrastructure is lightly developed and has a rustic character consistent with the intended uses.

The habitat management and project boundary recommendations are intended to protect and/or enhance the habitats needed to sustain the game and non-game species on these properties. Habitats in this region, especially grasslands and upland forests, are highly fragmented by croplands, highways, and other developments. Fragmentation adversely impacts wildlife migration and dispersal, reduces the amount of habitat available for critical life cycle needs, and enhances the spread of invasive species. This fragmentation can also affect habitat management on the state lands.

These properties provide valuable habitat for deer, turkey, waterfowl, doves, woodcock, small game, furbearers and trout. Protecting rare species and native communities is an important goal to the extent practicable and sustainable. While the minimum area required for maintaining viable populations of many species is not known, it is largely accepted that larger blocks of habitat provide more benefits to wildlife. Importantly, the ease and efficiency of habitat management also increases as patch size increases. Department managers will be working with partners (e.g., state and federal agencies, local units of government, sporting groups, non-profits and individuals) to restore larger blocks of native habitats to promote both game and non-game species.

Appropriately sized properties can enhance recreational experiences by minimizing overcrowding, reducing trespass issues, and providing abundant fish and wildlife populations.

Both active and passive habitat and recreation management activities are used on these properties. Active management includes a direct action (e.g., stocking pheasants, planting trees and adding boat launches) to promote a resource or a recreational activity. Passive management indicates no or very limited action is taken to direct the structure and composition of a habitat or encourage a specific recreational pursuit. The passive approach allows users to explore the properties as they desire and allows natural processes to guide the changes in plant and animal communities.

General Authority

The scope of use and management of a state property is governed by its official designation. The planning group is an assemblage of designated Wildlife, Fishery and State Natural Area properties. Wildlife Areas are acquired and managed under the authority of ss. 23.09 (2) (d) 3 and NR 1.51. Wildlife and Fishery Areas are set aside to provide habitat for wildlife and the primary recreational focus is hunting, trapping and fishing. These areas are also open for traditional outdoor uses of hiking, skiing, snow shoeing, nature study and berry picking. As directed by NR 1.51 and NR 1.61, other recreational uses are allowed by the master plan if those uses do not detract from the primary purpose of the property.

The Federal Aid in Wildlife Restoration Act (i.e., Pittman-Robertson Act) authorizes an excise tax on sporting arms and ammunition to provide funds for acquiring, developing and managing wildlife areas. This funding prohibits a state fish and wildlife agency from allowing recreational activities and related facilities that would interfere with the primary purposes (e.g., hunting, fishing and trapping) for which the land was acquired, developed, or managed.

Natural Areas are defined and authorized in ss. 23.27-23.29 and NR 1.32 as "an area of land or water which has educational or scientific value or is important as a reservoir of the state's genetic or biological diversity and includes any buffer area necessary to protect the area's natural value". Section 23.27 (1) Wis. Statutes defines natural areas as "reserves for native biotic communities...habitat[s] for endangered, threatened, or critical species...or areas with highly significant geological or archaeological features". Section 23.28(1) provides authority to designate areas as State Natural Areas and Section 23.29 provides authority to legally dedicate and protect State Natural Areas in perpetuity.

The State Natural Areas program preserves the best examples of the state's diverse natural communities. They are valuable for research and educational use, the preservation of genetic and biological diversity, and for providing benchmarks for determining the impact of use on managed lands. They also provide some of the last refuges for rare plants and animals. Traditional recreational uses such as hunting and hiking are allowed if those uses do not threaten the natural values designated for protection.

Land Management Classifications

The land management classification of a property or a management unit within a property is assigned during the master planning process. These classifications describe the general recreation and habitat management goal(s) for a property. The classification guides the selection of active and/or passive management actions to achieve the desired goals. Those management activities or techniques that are compatible with the desired recreational experience or ecological capability are pursued. The following classifications are applicable to these properties:

Habitat Management Area (HMA) – Nearly 80% (~11,200 acres) of the lands in this planning group are classified as HMAs. The emphasis is on providing habitats needed to promote productive game and non-game populations. However, a portion of these lands may be managed for focused species production and protection (e.g., waterfowl production or pheasant cover). Land that initially does not have the desired habitat conditions, but has a reasonable potential to be restored may be included under this classification. This management regime is further described in NR 44.06(5).

Native Community Management Area (NCMA) – All of the existing and approved state natural areas and several other smaller management units (~2,740 acres in total) are classified as NCMA's. These areas are managed to perpetuate plant and animal communities typical of pre-settlement landscapes. The intent is to protect the biological diversity of these native communities. Land that initially does not have the desired community conditions, but has a reasonable potential to be restored may be included in this classification. This management regime is further described in NR 44.06(6).

All of the traditional recreational uses (e.g., hunting, fishing, trapping and nature enjoyment) are allowed except if an area needs to be closed during breeding season or to protect a fragile habitat.

The management objectives and prescriptions for a NCMA or a HMA may significantly overlap, but the desired end point may be decidedly different. For example, a former pasture might be restored under both classifications using herbicides, seeding and mechanical mowing. The desired end point for a NCMA could be to re-establish native plant and animal communities so local native seed sources would be used to maintain genetic diversity. In contrast, an HMA might be planted with non-native cool season grasses, or a mix of native and non-native grasses and forbs, or leased under a farm agreement to provide food plots.

Special Management Area – The Special Management Area classification is applied to an area that provides a single use and requires a specific set of management objectives and prescriptions. For example, several properties may have sites suitable for hosting a public target shooting range. If one of these properties is selected (see Appendix A) to host a shooting range, a 5-10 acre portion of the property will be classified as a Special Management Area through a plan variance process.

Recreation Management Area – This classification is applicable to the 219 acres of fee title land at the Montrose State Ice Age Trail Area. This recreational setting emphasizes a primitive trail set in a natural appearing landscape that emphasizes native plant communities, scenic views and a moderate level of solitude. An opportunity for dispersed camping is also provided.

Parcels acquired after this plan is approved will generally be classified as a Habitat Management Area unless another classification is warranted. A master plan variance or amendment will be required if the desired management of the acquired parcel does not fit into an existing land management classification or management objective or prescription for the property.

The Land Management Classifications for the fee title lands are shown in Table 1-1. The spatial extent of these classifications can be viewed in the respective property map series for each property.

Table 2-1 Approved Land Management Classifications by Property (fee title acres)			
Property Name	Habitat	Native Community	Recreation
Albany WA	1,347	80	
Avon Bottoms WA *	1,587	1,815	
Badfish Creek WA	1,047	100	
Brooklyn WA/Streambank Protection-Story Creek	2,786	80	
Evansville WA/ Streambank Protection-Allen Creek*	905	25	
Liberty Creek WA	513	50	
Statewide Acquisition Authority*	1,700	0	
Streambank Protection-Anthony Branch	567	70	
Hook Lake-Grass Lake WA and SNA	745	518**	
Montrose State Ice Age Trail Area			219
TOTAL	11,197	2,738	219

* A 5-10 acre Special Management Area may be applicable to one or more of the wildlife or fishery areas if selected to host and a shooting range is actually constructed.

** This acreage includes 403 acres of trust lands (Hook Lake Bog basin)

Recreation Management and Use

The properties in this planning group are popular destinations for deer, turkey, waterfowl, pheasant and other small game hunting. Several are also popular for trout and warm water sport fishing and trapping furbearers. Several sites also have qualities that make them especially attractive to non-hunting recreational users such as bird watching, ecosystem research and environmental education.

The recreational management objective for these properties is to provide ready access to a variety of high quality recreational experiences in a rustic setting. Recreational facilities are simple, dispersed and provide a modest level of user conveniences while meeting environmental protection needs.

These properties have some (or a number of) limitations that constrain efforts to improve recreational experiences for a broad range of activities. Wetlands and open water are the most common cover types (about 70% of the total) on these properties. The wet areas are generally surrounded by small, non-contiguous uplands. This pattern of ownership limits the acreage available for upland deer and turkey hunting as well as other recreational pursuits (e.g., hiking). In addition, some of the upland areas are land locked or have limited access. Importantly, the popularity of these properties can result in overcrowding, especially on opening day of the various hunting seasons. This presents both a management challenge as well as detracting from user enjoyment.

Active and passive recreation management activities will occur on these properties. **Active management** includes installing and maintaining parking lots, boat launches and other infrastructure needed to pursue a recreational activity. **Passive management** indicates an activity can be pursued on the property, but no specific infrastructure or maintenance will be pursued to promote the activity. For example, users may hike; berry pick and bird watch, but designated trails, berry patches and bird watching blinds will not be developed or maintained.

The properties will be managed as Type 2 and 3 recreational settings (*WDNR, NR 44*). These settings provide users with predominantly natural-appearing landscapes that may provide a feeling of being somewhat remote with limited number of primitive to lightly developed infrastructure elements (e.g., roads, parking lots) and an emphasis on non-motorized access. Interactions with other users are low to moderate. The properties have parking lots on the periphery that provide walking access to the interior on service roads, burn breaks and designated and volunteer hunter trails. They provide a variety of dispersed recreational uses and experiences that vary with the seasons and place. Snowmobile use on connector trails as part of a regional trail system is considered a compatible use as is small motors on small craft along the Sugar River.

Only those management activities or techniques identified or referenced in this master plan and compatible with the site's ecological capability will be pursued on these properties. Many of these activities are described in department handbooks for property management, fisheries guidance and silvicultural handbooks.

Public Use and Recreation Management

These properties are open to the recreational activities identified in the funding sources used to purchase and maintain these lands (e.g., federal - Land and Water Conservation Fund Act (LAWCON), and state - Outdoor Recreation Act Program (ORAP) and Stewardship). These uses are managed to be consistent with the capacity and character of the natural resources on these property.

These properties are open to hunting, fishing and trapping. Certain types of hunting opportunities (e.g., dove and pheasant) may occur on all properties, but habitat management to increase hunting opportunities may be focused on selected properties as noted in the individual property descriptions. The majority of the state natural areas are open to the public though access may vary due to use restrictions for public safety, protection of endangered or threatened species, or unique natural features.

Other activities allowed on these lands include hiking, cross country skiing, snowshoeing, wildlife viewing, nature study and paddling (e.g., canoeing and kayaking). Edible fruits and nuts, wild mushrooms, wild asparagus, and watercress may be removed by hand without a permit for the purpose of personal consumption by the collector (*Note: collection of seeds, roots, or other plant parts is prohibited*). These activities are allowed, but except as noted in the specific property descriptions, no designated infrastructure will be established nor are these activities considered recreational priorities.

Foot travel is allowed on all service roads, burn breaks and berms unless a restriction is posted (e.g., temporary closure during a prescribed burn) or safety concerns (e.g., flood periods). Lands may be temporarily closed when specific management activities (e.g., controlled burns) are occurring. Portions of the properties closed to the public or closed to specific use are posted.

Motorized vehicle access is restricted on these properties to the designated public access roads and parking lots. This master plan conducted an inventory of existing open and closed roads and then classified and mapped them to fulfill Wisconsin Statute 23.116(2). A department motorized access team is finalizing the criteria and a process for evaluating motorized use on department lands. This process will include opportunities for evaluating future plan variances/amendments regarding open/closed roads.

Motorized recreational craft (i.e., boats) may be used on flowages and impoundments unless posted, and snowmobiles are allowed on designated snowmobile trails. Requests to route a new connector snowmobile trail through a property are directed to the property manager for consideration.

Motorized access for persons with mobility impairments is provided by the Power Driven Mobility Device regulations under the American Disability Act. Please refer to the specific language under "Disabled Accessibility" in the General Property Administration, Management Policy and Provisions section.

Other prohibited activities on state fish, wildlife and natural areas as described in NR 45 include:

- Horseback riding and wheeled dog sleds.
- Rock climbing
- Mountain biking, ATVs, aircraft and model aircraft and rocketry.
- Snowmobiles
- Collecting seeds, roots or other parts of herbaceous plants such as wildflowers or grasses.
- Camping and campfires.

Horseback riding and snowmobiling are allowed on trails and service roads designated for their use or if allowed under a permit (i.e., horses may be used at dog trailing events). Snowmobile trails are allowed at the discretion of the property manager if it is part of a regional trail system. Snowmobile trails are not allowed on natural areas unless the trail was in place prior to parcel acquisition.

Collection of animals, fungi, rocks, minerals, fossils, archaeological artifacts, soil, downed wood or any other natural material, alive or dead may be allowed, but a permit or approval may be needed from the property manager. Property managers should be contacted prior to collecting materials. Collecting for scientific research requires a permit issued by the department. Information on rules governing public use of department-owned lands is found in NR 45.

Recreation Trends

Three important trends will affect future usage, recreational pursuits and infrastructure needs on these properties. These trends include:

1. Aging of the general population. The quality and character of access to our sites will change as our user base changes. For example, there will be an increased need to provide some accommodation to individuals with mobility impairments.
2. There has been a slow decline in the number of hunters and trappers statewide that could negatively impact game population management and program revenues. However, bird watching has increased and a new cohort of non-traditional, non-revenue generating recreational activities (e.g., walking, pet walking, biking and geocaching). Many of these new uses will probably be compatible with the primary purposes of these properties, but may contribute to crowding or conflicts during hunting season or at peak use periods.
3. The growth and diversity of outdoor activities will probably result in increasing year round usage of the properties and present additional management opportunities and maintenance challenges.

In addition, ongoing population growth and non-compatible land uses immediately adjacent to wildlife and fishing areas (e.g., the addition of housing on the boundaries of state properties) can adversely affect the management, use and enjoyment of these public lands. For example, gun hunting is not allowed within 100 yards of a home unless the resident agrees.

Recreation and Public Use Objectives:

- Provide quality hunting and trapping opportunities for the primary game species: deer, turkey, waterfowl, pheasant and small game.
- Provide fishing opportunities consistent with the capacity and character of the waterbodies.
- Provide opportunities for wildlife observation, birding, hiking, non-groomed cross country skiing, snow shoeing, nature study, berry picking, canoeing, nature education and other outdoor activities as practicable given the physical characteristics of the property and passive management for these activities.
- Promote safe and enjoyable compatible recreational opportunities with an emphasis on off trail, non-motorized activities in a non-congested and rustic setting.
- Improve accessibility and recreational opportunities for mobility impaired individuals.
- Provide opportunities for research and educational activities consistent with the primary management purposes and user safety.

Recreation and Public Use Management Prescriptions:

- Install, maintain and monitor parking lots, access roads, boat launches and signage consistent with department policies and rules.
- Access shall be provided appropriate to the management objectives of the property with a focus on providing dispersed access to less congested areas and enhance the experience of users.
- Stock pheasants immediately prior to and during the pheasant hunting season on sites with suitable cover to supplement natural pheasant production and provide improved opportunities for hunting success. Maintain a network of stocking lanes to provide department vehicular access for pheasant stocking, habitat and facilities management, and hunter foot access.

- Provide improved trout fishing, boating access and wildlife observation opportunities and infrastructure for mobility impaired individuals as determined practicable.
- Manage the riparian vegetation along classified trout streams to protect in-stream habitat while also providing improved fishing opportunities for anglers.
- Service roads, non-designated trails and dikes may be walked by hunters, anglers and hikers to access the property unless within a closed area, a refuge or an area closed for maintenance or other habitat management activities.
- Stock trout in suitable streams according to Fisheries Management guidelines and criteria.
- Stock warmwater species in suitable waters according to Fisheries Management guidelines and criteria.

Ice Age Trail Routes

The Ice Age Trail is a Wisconsin State Trail and one of eleven National Scenic Trails in the United States. It is a long-distance hiking and backpacking trail. A seven mile segment of the Ice Age Trail (IAT) passes through the Montrose SIATA and the Brooklyn WA. The habitat, infrastructure and recreation resources will be managed in accordance with NR1.29 and the relevant portions of General Management Objectives and Prescriptions.

The following criteria will be used to assess the suitability of a property to host new trail segments or relocating an existing IAT segment:

- soil suitability
- habitat management priorities
- natural heritage inventory information
- compatibility with other recreational uses and cultural resources
- development and maintenance considerations

Additional criteria may be applicable during the IAT planning process.

Water Trails

The following management objectives and prescriptions apply to the approved water trails at the Avon Bottoms and Albany Wildlife Areas. The goal is to identify the Sugar River and Little Sugar River as resources that provide a variety of motorized and non-motorized recreational opportunities for hunting, fishing and nature enjoyment.

These rivers provide the following recreational paddling experiences:

Gateway experiences – The Sugar River between STH 11 and CTH T at normal flow provides the most predictable conditions for inexperienced paddlers. It provides an introductory trail for beginners on moving waters. The trip is about five (5) miles in length. Stream current speeds are usually slow and hazards such as downed trees and eddies, if present, can easily be navigated around by novice paddlers. Portages around hazards are not required. The put in (Clarence Bridge Park – Green County Parks) and take out point (the department carry-in landing at CTH T) are on public land. The vast majority of this river segment passes through private lands on both banks.

Recreational experiences - The following river segments pass almost exclusively through public lands:

- Sugar River from the department carry-in landing at CTH T to the Beloit–Newark Road bridge (1.8 miles). NOTE: *The Beloit-Newark bridge has a low profile and must be portaged. Boaters need to approach the bridge cautiously.*
- Sugar River from Stokes Ditch to the state line (1.1 miles).
- Little Sugar River from the department carry-in landing at Tin Can Road to the department landing off Conservation Road or the Village of Albany landing (~ three miles to either landing).

A Recreational river section requires an intermediate level of paddling skill. At normal flow, river current speeds may be light to moderate. These river segments are more sinuous and in-stream hazards, such as moderately spaced downed trees and eddies, may be present that require solid, basic boat handling skills to navigate safely. Portages around hazards may be required.

Challenge experiences - The following river segments provide a challenging experience:

- Sugar River from the department boat launch at the Beloit–Newark Road bridge to approximately 7.5 miles downstream. The Sugar River Park (a Rock County park) is located downstream of the Nelson Road bridge and is about half way along this segment.
- Little Sugar River from Silver Road to Tin Can Road.

These sections are not recommended for beginning paddlers. Due to strong moving water intermediate to expert boat handling skills are recommended. At normal flow conditions, paddlers will experience a very sinuous river course with a moderate to high number of hazards including downed trees, logjams, narrow passage-ways, multiple channels, and eddies. Multiple short portages may be required. The distances between access points are typically longer than in the previous categories.

The department maintained launch sites with parking lots and take out points will provide a primitive to lightly developed landings with gently sloping access to the river. The river edge above the take out point at the department landings will be signed. Additional amenities at parking areas may include signage on property uses, local amenities, sanitation facilities, and a map showing river miles, landings, take out points and recommended skill level for different river segments.

It is the intent of these recommendations to provide the public with a variety of water trail experiences and adequate information for planning a suitable and enjoyable trip. An important management and recreation objective is to maintain the natural to “wild”, character of these segments by not providing on stream signage, except at the landings or take out points. Users need to understand the challenges of the river segment they intend to traverse and plan accordingly.

General Habitat Management Objectives

and Prescriptions

The habitat recommendations in this master plan seek to achieve the following three major goals:

- Protect or enhance the habitats on these properties that sustain the recreational activities.
- Protect high quality native plant and animal communities, and increase the acreage of high value and under-represented habitats (e.g., grasslands).
- Optimize management efficiency by improving habitat boundaries.

The first goal is intended to benefit deer, turkey, pheasants and other game and non-game species. This can be achieved by providing a desirable mosaic of habitats that meet or exceed habitat quality Class 2 (see page 37), especially in the priority management areas, and provide the essential food, cover, water and life cycle needs for both resident and migratory wildlife. Food plots and flowages will complement the other habitats by providing for the nutrition needs of wildlife when the quantity or quality of native foods is low. For example, food plots can help deer by providing supplemental nutrition during pregnancy, lactation or when bucks are growing antlers. However, food plots should never be considered a substitute for managing the native vegetation to provide quality food sources for wildlife.

Wetlands comprise about 58% of the overall land cover on these properties. The wetlands are a mix of non-forested (e.g., submergent, marsh, sedge meadow, fen and lowland brush) and forested habitats (bottomland hardwoods and swamp conifers). Non-forested wetlands are the most common and make up about two thirds of the wetland cover. On the forested wetlands, hardwoods are the most common cover type with swamp conifer being a minor, but important component, especially at Hook Lake.

The second goal seeks to create or maintain more diverse and sustainable native communities, especially for grassland cover types. Grass, prairie and shrub lands make up about 25% of the upland cover on these properties with the remaining acres primarily in hardwood forests and a very small amount of conifer plantations or wind breaks. In the future, some of the upland shrub communities and cropped parcels will be converted to grasslands. The current grassland to wetland ratio for these properties is about 0.9:1 with a desired minimum of 1:1 to promote grassland nesting duck habitat.

Prescribed fire is the favored management prescription for the grassland and oak communities with mowing and herbicide used as needed to limit brush and invasive species encroachment.

The management of the state natural areas is and will continue to be focused on protecting and restoring natural plant and animal communities.

Agricultural practices will continue to be an integral part of managing wildlife lands in southern Wisconsin. Currently these practices are used on about 20% of the non-forested uplands. These practices are used to provide food plots and are routinely used to establish, maintain and rejuvenate grasslands.

The third goal seeks to improve efficiency by improving boundaries so habitat blocks can more easily be burned, harvested or managed by staff. Properties with significant amounts of private and public boundaries also require more staff time to post boundaries, address trespass concerns, resolve encroachment issues and monitor for invasive species.

Finally, the following general wildlife objectives and prescriptions apply to the wildlife and fishery properties and often apply to state natural areas and Ice Age Trail properties too. These objectives and prescriptions are described in more detail in the property manager and program management handbooks (*WDNR, web references*). These references also include best management practices (BMPs) for achieving the desired outcome while minimizing potential adverse impacts.

The following objectives and prescriptions will be applied contingent upon the availability of staff and material resources, or modified as needed to respond to unpredictable or catastrophic events (e.g., storm damage or severe insect/disease infestations).

General Wildlife Management Objectives

- Promote sustainable wildlife populations on these properties by maintaining permanent native and managed cover types for common and rare wildlife species.
- Manage plant communities to maintain or create larger blocks (i.e., landscape scale to the extent practicable) to enhance their habitat value.
- Maintain or create as appropriate a mosaic of lowland to upland habitats.
- Establish and maintain travel corridors for species movement between habitat blocks.
- Protect and/or enhance the grassland and oak communities.
- Improve the value of surrogate grasslands, sedge meadows, shrub-carr and forest habitats for area sensitive bird species.
- Improve the quality of Habitat Management Areas for waterfowl nesting and brood rearing, pheasants and grassland birds.
- Increase habitat quality of the stopover and resting habitats used by migratory species.
- Maintain shrub-carr in wetlands that do not have high potential for sedge meadow management.
- Protect, and enhance as practicable, the quality and extent of the wetland communities classified as Native Community Management Areas. Communities of interest include wet and wet-mesic prairie, sedge meadow, calcareous fen, emergent marsh, southern tamarack bog relict.
- Protect and enhance habitats and populations of threatened and endangered species and species of greatest conservation need (SGCN).
- Reduce the threat of invasive species to protect the biodiversity of these properties.
- Provide opportunities for habitat and species research and public education consistent with the approved habitat management and species objectives.
- Collaborate with public and private partners to efficiently manage the state owned properties and promote sound management on adjacent lands.

General Wildlife Habitat Prescriptions and Actions

The following management prescriptions and actions are authorized on all wildlife properties statewide, unless there is a property specific restriction or the activity is not relevant to the property. Additional authorized prescriptions are described in the General Management Objectives and Prescriptions by Habitat and Forest Type sections of this master plan.

- Actively manage old fields to create larger habitat blocks of grasslands by removing fence lines, conifer plantations and encroaching brush or trees.
- Create additional native or cool season grasslands on cropped lands except where farming agreements and/or food plots are being used to aid habitat restoration efforts or are being used to enhance wildlife populations and hunting opportunities, especially for doves and pheasants.
- Manage forests to provide cover, denning/nesting and food for wildlife and provide permanent cover to protect the watersheds.

- Manage water level in flowages and impoundments to improve wildlife habitat and food sources.
- Restore wetlands by filling/blocking ditches, breaking tile lines and removing soil.
- Use nest boxes, platforms or similar devices to enhance reproduction of desired wildlife.
- Control beaver and muskrat populations to mitigate dike damage and damming of water control structures, and flooding of neighboring private lands.
- Passively manage large and small game populations except for the stocking of farm raised pheasants and providing food plots for doves to enhance hunting opportunities.

Vegetation Management Actions

Prescribed burns are the most important management prescription used to maintain and enhance grasslands, oak woodlands and sedge meadow wetlands. A number of the pre-settlement plant and animal communities are fire dependent communities that were shaped over thousands of years by wildfires caused by lightning or set intentionally by Native Americans.

Prescribed burns mimic natural fire disturbance and help control many woody plants and invasive weeds, improve the quality of wildlife habitat, reduce fuels to lessen fire hazard, and liberate nutrients tied up in dead plant material. Upland nesting cover used by pheasants, waterfowl and songbirds is more productive if periodically burned. Even wetlands, such as sedge meadows, benefit from fire. Burning is also the most cost-effective treatment compared to the other management prescriptions.

Burns are typically conducted in spring or fall, but burns may be conducted at other times if conditions are favorable. They may be conducted annually or on an as needed basis. Fire management for a given unit will depend on the plant community present, the habitat restoration or maintenance objectives, the physical characteristics of the site, and most importantly, on safety and fire control conditions. Prescribed fires may be used in other plant communities as deemed appropriate by the property manager in consultation with the Natural Heritage Conservation ecologist and Forestry staff.

Other management actions that can be used to implement these prescriptions include:

- Mechanically cut (e.g., mowing and brushing), hand cut, pull, bulldoze and/or smother.
- Chemical control of vegetation or pests using approved products and application techniques.
- Bio-control measures may be used as deemed appropriate, safe and effective.
- Haying and grazing.
- Agricultural activities may be used to provide crop rotations for food patches, hunting or nesting cover, brush and invasive species control, and site preparation for native community restoration.
- Biomass harvests that follow approved Wisconsin Biomass Harvesting Guidelines.
- Seeding or planting native woody and herbaceous species.
- Forestry practices as described in department manuals and guidance. This may include salvage of trees after a major natural disturbance if the volume of downed trees inhibits fire or other approved habitat or recreation management prescriptions. Natural Heritage Conservation shall be consulted before harvests are planned in state natural areas or primary sites.

Habitat Quality Classes

Maintaining the productivity and ecological integrity of the habitats and providing safe and reasonable public access as described in the *Managed Lands Needs Assessment report (WDNR, 2010d)* are important management objectives for these properties.

The *Managed Lands Needs Assessment report* divided habitats into three quality classes:

- **Class 1** habitat meets wildlife productivity and ecological integrity objectives (e.g., habitat composition, structure and function meets the needs of the desired species).
- **Class 2** habitat generally provides the desired productivity and ecological integrity, but some loss of quality is apparent (e.g., community composition, structure and function is diminished by one or more of the following – abundance of invasives, lack of species diversity, poor structure, etc.).
- **Class 3** habitat productivity and ecological integrity are compromised and the intended purpose is not being achieved.

This planning group has a management goal to provide Class 1 and 2 quality habitats where native plant and animal communities are relatively intact and in the priority management units on these properties. Maintaining or enhancing the quality and acreage of grasslands, fens and sedge meadows, and oak communities are the highest priority habitats.

Restoring or renovating Class 3 habitat requires careful consideration. Achieving Class 1 or 2 status is often not feasible at the current time. Some habitats are compromised by former land management activities (e.g., ditched and drained farmlands), invasive species (e.g., reed canary grass, hybrid cat-tails, nettles, ash mortality, etc.), and/or restoration activities might impact adjacent private lands (e.g., wetland restoration). It should be noted that Class 3 habitats still offer habitat for some species and they provide environmental services (e.g., flood water retention).

Waterfowl and Shorebird Habitat Management

Protecting and enhancing waterfowl habitat is a wildlife management priority both statewide and these properties. Wetlands constitute nearly 58% of the land cover on these properties so management of the wetlands and impoundments is important for maintaining the productive waterfowl populations desired by both hunters and wildlife viewers. A number of these properties have high quality wetlands that provide valuable breeding and staging area benefits for waterfowl.

However, the nesting habitat on some properties is limited by the lack of permanent upland grass cover for grassland nesting ducks (e.g., mallards). The most desirable ratio of grassland to wetland is 3:1, but a ratio of 1:1 can be productive as well. Some properties have upland grassland to wetland ratios as low as 0.33:1 (e.g., Badfish WA and Evansville WA), while the property grouping as a whole has an average ratio of 0.8:1. These ratios indicate the properties as a whole have a shortage of upland grass cover.

A landscape mosaic that contains large blocks of wetlands and hemi-marsh conditions adjacent to large blocks of permanent upland grass cover provides quality breeding, brooding and nesting habitat. These conditions can improve nesting success by reducing predation and losses due to mowing and other human disturbances.

Waterfowl research conducted in Wisconsin (*WDNR Gatti – personal communication*) indicates mallards and blue-winged teal strongly prefer to nest in blocks of permanent grasslands. They prefer to nest in grasslands twice as much as in wet meadows and 5-6 times more than in alfalfa fields. Their nesting success was 28% in larger blocks of permanent upland grass compared to 6% in wet meadows, 4% in linear grasslands and 3% in active alfalfa fields. Nesting success on state owned upland grasslands has equaled or exceeded the values indicated above.

Pheasant Management

The department stocked approximately 75,000 game farm pheasants on 92 properties statewide during the 2014 fall pheasant season (*WDNR web references*). About 10,000 birds were stocked on the properties in this planning group in 2014. It is anticipated that similar stocking levels will be pursued in the future.

The management of ring-necked pheasants in Wisconsin is in large part funded by revenues generated from the sale of pheasant stamps with valuable assistance provided by volunteers (e.g., Pheasants Forever). Habitat management on several of these properties emphasizes grassland and wetland development and maintenance. Maintenance activities prescribed burning, mowing for weed control and brush cutting, particularly on the grasslands. Habitat development activities are especially important given the decline in CRP acreages.

Woodcock Management

Woodcock are a Species of Greatest Conservation Need and a desirable game bird. While the properties often have some of the habitat needed by woodcock the desired size and mosaic of habitats needed to warrant dedicated woodcock management is often absent. These birds need a mosaic of small clearings for courtship, dense shrub land or young forest thickets on moist soils for daytime foraging, early successional forests for nesting and brood rearing, and clearings for summer roosting.

Specific management prescriptions for woodcock follow the guidelines found in the best management practices for Woodcock and Associated Bird Species (*Wildlife Insight (2010), Upper Great Lakes Woodcock and Young Forest Initiative*). Mating and nesting woodcock need 500 – 1000 acres of suitable habitat. Greater than 80% of the core area needs to be managed for dense shrub/sapling growth (i.e., wetland shrubs and early successional forest types such as young aspen). The uplands adjacent to the core habitat should also be managed in early successional tree species, like aspen, or upland shrubs. The core area should also provide about 20% open grasslands for roosting fields and numerous small openings (~0.5 acres) as singing grounds. The open areas can be maintained through burning, mowing, timber harvest or farming agreements on public and/or private lands.

Active and Passive Management

Active management includes the direct manipulation of the plant and animal communities. Examples include seeding a parcel to re-establish grasslands, conducting prescribed burns, harvesting timber, stocking fish or pheasants, or adding lunger structures in trout streams. Active management activities span a significant range of time scales. Fish may be stocked every year, prescribed burns may occur every three to five years while timber harvests may occur on 15-50 year cycles or even longer.

Passive management indicates no or very limited direct action is taken to manage a resource. Passive management is often used on habitats with the following characteristics:

- Size - management activities may be too expensive or difficult to conduct due to small size,
- Location – isolated or difficult to reach habitats (such as small islands or land locked properties),
- Habitat quality - Units with good to excellent habitat may be stable thus requiring little to no intervention. Conversely, sites with poor habitat (e.g., a large, ditched wetland containing a monoculture of reed canary grass) may be of a size and/or complexity that our current tools and resources would have limited effectiveness.

Passive management is often applied to Ecological Reference Areas on state natural areas. Natural processes are allowed to direct the structure, composition and function of these natural communities. These areas provide interested parties an opportunity to study changes in natural systems.

The majority of the game species, including deer, turkey, small game, waterfowl, woodcock and furbearers, are passively managed. Many of these species are considered generalist and are very adaptable and productive in the current landscape that is dominated by agricultural activities. Their populations are enhanced not by stocking, but by providing habitat that meets critical life cycle needs such as breeding, nesting, foraging and winter cover.

Even where active management is conducted on a property (e.g., prescribed burns, timber harvests, adjusting water levels on a flowage), plant communities are often allowed to evolve based on natural succession. For example, grasslands may be burned, but the species composition is allowed to succeed based on the competitiveness of the native grasses and forbs occurring at the site. This type of management seeks to promote stable and productive communities while minimizing the need for unnecessary and potentially expensive human intervention. For more information about active and passive management refer to the department Forestry *Passive Management Report (WDNR, 2010e)*.

Biotic and Cultural Surveys and Research

Surveys and monitoring to address management issues and educational opportunities may be included in the property plans, especially for the state natural areas. The Rapid Ecological Assessment (*WDNR, 2013*) identified species and communities that may warrant additional study. Surveys not covered by this master plan or the REA, but intended to improve habitat or species management, enhance educational activities or increase our understanding of the resources on a property shall be reviewed and approved by the property manager in consultation with the district ecologist and relevant experts.

Invasive Species Management Actions

The threat of exotic and/or invasive plants, animals, insects and diseases represent a significant and growing threat to our native plant and animal communities. To address this concern, invasive species inventory, monitoring and control actions are included in the annual property planning for each property and the guidance provided in the department *Property Managers Handbook (WDNR, web references)*.

Key management activities include:

- Inventory properties annually to detect new infestations. Property-wide inspections are ideal, but not practicable. At a minimum, inspections should be conducted at entry points such as trails, roads, waterways, rights-of-way, and areas where soil has been disturbed.
- Control new or existing invasive species populations as practicable.
- Mowing should avoid dispersal of invasive plant seeds and equipment should be cleaned prior to and post mowing activities.
- Monitor control activities to assess effectiveness and determine if follow-up is needed.

Infestations of buckthorn, honeysuckle, garlic mustard, spotted knapweed, wild parsnip, sweet clover, burdock, black locust, autumn olive, crown vetch, Japanese hedge parsley, Japanese knotweed and other invasive species have been noted on these properties. Reed canary grass is a very common invasive on disturbed wetlands. Other wetland invasives include cattails, purple loosestrife, common reed and phragmites. Native species with invasive habits, such as red cedar, sumac, prickly ash and box elder, are also a management challenge on several properties.

Emerald Ash Borer (EAB) is an invasive species that puts ash at considerable risk of mortality. Of particular concern are woodlands where ash trees are a major component of the forest canopy. Rapid mortality can adversely affect the diversity, health and overall value of these forests. A range of adverse impacts are anticipated over the next 10-20 years including loss of mature canopy trees, degraded habitat for game and non-game species, and increased potential for infestation by other invasive plant species such as reed canary grass along floodplains where emerald ash borer mortality is high.

Many of the forests with sizeable ash populations are located on wet soils making control of or slowing the spread of this pest difficult and expensive. Specific actions to minimize EAB impacts include:

- Conducting sanitation cuts of infected trees or trees at significant risk of infection;
- Under plant with desired species to promote regeneration and maintain closed canopy conditions.
- Conduct salvage harvests and replant to other desirable tree species.
- Harvesting the ash component while promoting other desirable canopy species;
- Plant desired non-ash species to minimize the adverse effects of catastrophic canopy loss;
- Utilizing approved chemical or bio-control methods as applicable; and
- Using other standard practices identified in the Forestry handbooks.

Wildlife Outreach Activities

As time and resources allow, wildlife staff may inform, educate and share information with volunteers, users and private landowners, especially on parcels adjacent to department properties. Issues of particular concern include collaborative habitat management to protect and enhance critical habitat for key game species and species considered Endangered, Threatened or Species of Greatest Conservation Need, and monitoring and controlling invasive species.

Wetlands, Grasslands and Agricultural Habitats

A general objective for all of the properties is to increase the extent and quality of the native communities. This will provide permanent cover for deer, turkeys, waterfowl, songbirds, and other wildlife species in the increasingly developed landscape of southcentral Wisconsin. These habitats provide critical nesting and brood-rearing habitat for waterfowl, marshbirds, Blanding's turtle and other species of concern.

These communities will be managed on a landscape scale as practicable. Protecting watersheds to reduce sedimentation, nutrient inputs and excessive runoff is important too. Maintaining groundwater recharge is critical for protecting the cold water springs and seeps feeding trout streams.

Both natural processes (e.g., passive management) and active manipulations (e.g. plantings, seeding, controlled burns, brushing and herbicide applications) will be used to manage the structure and composition of these habitats. Historically, fire played a key role in maintaining many of the plant communities in southern Wisconsin so prescribed fire is a primary management tool used to mimic natural disturbance patterns and promote native communities.

The following general habitat descriptions, objectives and prescriptions provide several of the prominent characteristics of these habitats and common management objectives and prescriptions. For more detailed descriptions on habitats and management options please refer to information contained in department web sources for wildlife management, inland fisheries management, native communities and forest management (*WDNR web references*).

Wetland Habitats (non-forested)

Sedge Meadows

Southern Sedge Meadow habitats support many rare species such as bobolink, willow flycatcher and rare herptiles. These open wetlands are much less abundant than they once were. Many of these wetlands have been lost or severely degraded by drainage, flooding, lack of fire, or invasive species. Degraded Sedge Meadows are often dominated by reed canary grass as a result of grazing and/or ditching or are being invaded by woody vegetation due to the lack of disturbance (e.g. fire on the site). Reed canary grass is less desirable for wildlife because it replaces native plant species and creates a monotype with low habitat value. Restoring Sedge Meadows infested with reed canary grass is a difficult task given the tools currently available. Development of cost-effective, environmentally safe methods for removing reed canary grass would significantly benefit the protection and restoration of native wetland communities.

Management Objective:

- Increase the extent and/or quality of the Sedge Meadows on all sites as practicable.

Management Prescriptions:

- Use prescribed fire, mowing and herbicides, where practicable, to remove or reduce competition from invading woody species and reed canary grass.
- Farming agreements are used as a cost-effective way to manage sedge meadows, control reed canary grass and willow shrubs, and provide habitat for migratory waterfowl and shorebirds.
- Restore the original hydrology of disturbed wetlands if compatible with other primary objectives and practicable given adjacent ownership, land uses and agency resources.

Calcareous Fen

Fens have much in common with sedge meadow, wet prairie, and wet-mesic prairie communities. However, fens have attributes such as unique plant species that are supported by the special hydrological conditions that set them apart. Only 87 fens have been identified in Wisconsin and they cover less than 1,000 acres statewide. The statewide gap analysis conducted by the State Natural Areas Program indicates the need to protect and manage fens for future generations and scientific inquiry.

The primary threats to calcareous fens are disruption of hydrology and invasion by woody species and reed canary grass. Ditching, damming, dredging, tiling, pumping, and quarrying can all affect the quantity and quality of groundwater needed by fens. Invasive species can be serious threats to calcareous fens, with glossy buckthorn, reed canary grass, narrow-leaved cattail, giant reed grass, and purple loosestrife among the potential offenders. Grazing, vehicular traffic, and overuse by hikers or other recreationists can physically damage the surface and destroy sensitive vegetation. The lack of fire in the present landscape has contributed to the encroachment of woody species on open fen habitat, with the consequent suppression or loss of some of the more light-demanding herbs.

Habitat Management Objective:

- Maintain and restore the fen community type on all sites where it occurs.

Habitat Management Prescriptions:

- Manage the surrounding lands and groundwater resources, as practicable, to preserve the fen's hydrologic function.
- Use fire management (and brushing and herbicides as needed) to control encroaching woody species and invasive species, especially reed canary grass, to protect native plant communities. Woody vegetation should be kept short in stature, scattered and toward the periphery of the fen. Prescribed burns should be used to mimic natural disturbance patterns and achieve desired compositional and structural characteristics.
- Routine management with heavy equipment should only occur on frozen ground.
- Other management activities, such as ground layer augmentation, should only occur after consultation with NHC staff and other science experts.
- Where possible, manage fens as an element in wetland complexes that include marsh, wet meadow, low prairie, shrub-carr, and southern tamarack swamp.

Marshes and Submergent Aquatics

Marsh and Submergent Aquatic communities are found in areas with permanent water. These communities are associated with both natural water bodies (e.g., Hook Lake) and native wetlands.

Submergent Aquatics occur in deeper water and may include coon's-tail, common bladderwort, pondweeds, water-shield, water lilies, native water-milfoil, and water-marigold. Submergent aquatic communities are typically passively managed.

Marshes, also Emergent Vegetation, are typically dominated by species such as common bur-reed, common reed grass, bulrush, pickerel-weed, and wild rice. The invasive narrow-leaved cattail can be a management challenge in these marshes. Marshes can benefit from both active and passive management. For example, periodic water level reductions provide mudflats for shorebirds and increase the amount of submergent and emergent vegetation once water levels are restored.

Marshes and Submergent Aquatics are critical habitats for wildlife species such as ducks, muskrat and numerous songbirds, shorebirds and marsh birds. The value of these habitats can be increased substantially, especially for ducks, if they adjoin grassy uplands that provide nesting habitat.

A 50:50 mix of open water to emergent vegetation, called hemi-marsh, is a desired management objective and provides optimal habitat for breeding migratory birds, including most waterfowl, black and Forster's terns, American coots, and certain blackbirds (*US FWS, Waterfowl Management Handbook*).

A potential challenge in these habitats is the spread of cat-tails. Cattails can quickly dominate a hemi-marsh. Monotypic stands of cattails are generally less productive, but do provide cover for wintering white-tailed deer and ring-necked pheasants and habitat for breeding marsh wrens, least bitterns, and various species of blackbirds.

Habitat Management Objectives:

- Maintain the extent and protect or restore the quality and diversity of the marsh and submergent aquatic plant communities.
- Manipulate water levels to enhance waterfowl use, to improve shorebird habitat, to benefit native wetland floral and faunal communities, and to facilitate vegetative management practices. Manipulating water levels can also be used for carp management.

Habitat Management Prescriptions:

- Maintain or restore the original hydrology of the wetlands to the extent practicable.
- Where water control infrastructure provide the capacity, conduct periodic partial and/or complete drawdowns every few years, or as needed, to promote the resurgence of desirable wetland species like smartweeds, arrowheads and bidens as a food source for wildlife.
- Coordinate water level management with cutting, crushing, shearing and discing in late spring; prescribed fires in winter; grazing in spring; timely herbicide applications; and grading on sites dominated by invasive species (e.g., cattails) where practicable and desirable,
- Passively manage the native aquatic communities and allow natural processes to determine the ecological characteristics (i.e., composition and structure of the communities) unless the existing native plant community and/or seed bank in restoration areas does not provide the desired diversity and density of native species.
- Monitor and control invasive plant and animal species that degrade native plant communities and habitat quality to the extent practicable. Invasive species of concern include cattails, purple loosestrife, Eurasian milfoil and some pondweeds.

Shrub Wetlands (Shrub-carr)

Shrub-carr wetlands provide important wildlife habitat, especially as winter cover for ring-necked pheasants and white-tailed deer. Shrub-carr wetlands often encroach on sedge meadows and wet prairie due to a lack of fire or disturbed hydrology (e.g., lower water levels due to ditching and tiling). This habitat type requires periodic management treatments to maintain the health and vigor of the shrub community and prevent encroachment on other wetland types.

Management Objective:

- Maintain existing shrub-carr wetland in areas that do not have high potential for management as Sedge Meadow, Wet Prairie, or Wet mesic Prairie.

Management Prescription:

- Use prescribed burns, cutting, herbicide treatments and mowing to maintain shrub-carr habitat.

Grasslands, Prairies and Oak Savanna

Most of the grasslands on these properties have been actively managed by replanting croplands, old fields or pastures to a mix of native and introduced grasses and forbs. These habitats provide important habitat for grassland nesting waterfowl, grassland birds and cover for pheasants. Fields dominated by introduced species are often referred to as cool season grasslands and those dominated by native species are referred to as warm season grasslands. The term Surrogate Grasslands is occasionally used to refer to land under agricultural management (e.g., corn fields, hayland and pasture).

Native Prairie, Oak Savanna and Oak Openings are rare communities and Mesic Prairies are virtually non-existent on these properties. While restoring these communities may not achieve the same biodiversity present in undisturbed native communities, they do provide important habitat for many wildlife species. Other Prairie types found on these properties include Dry mesic Prairie and Dry Prairie.

Management Objectives:

- Maintain and restore prairies and enhance grassland communities wherever practicable with an emphasis on promoting native species and controlling invasive and woody species.
- Wherever practicable restore or enhance Oak Savanna including Oak Openings.

Management Prescriptions:

Management approaches used on individual parcels will vary based on the management potential and opportunities at the site. In turn, these are derived from site-based factors such as topography, hydrology, soils, cover type, parcel size and surrounding land uses. The following management practices are to be applied on grassland, prairie and oak restoration sites:

- Remove hedgerows, fence lines, small conifer plantations and small low quality forest and brush patches to increase the size of grassland/prairie blocks. Remove trees in grasslands that serve as perch trees for raptors. Retain or plant oaks for savanna restorations and oak opening sites.
- Use prescribed fire to invigorate native grasses and forbs, suppress the encroachment of woody species, control non-native invasive plants and simulate natural disturbances.
- Use haying, grazing, cutting, mowing, brushing and herbicides (when necessary) to remove trees, shrubs and invasive species. Both commercial and non-commercial timber cutting may be used to achieve the desired structural and compositional characteristics.
- Selective biomass harvests may be used if consistent with the management objectives.
- Plant a diversity of native prairie and savanna species on grassland, prairie and savanna restoration sites from local seed sources to maintain genetic diversity, especially on state natural areas and in management units classified as Native Community Management Areas.
- Where preservation of local genetic diversity is not a management priority, a variety of cool season grasses, legumes or forbs may be planted on sites targeted as cool-season grass habitat.
- NHC staff shall be consulted during the planning phase for any habitat management activities in Native Community Management Areas.
- Follow the department Grassland/Savanna Protocol to minimize impact on sensitive plants and animals.

Upland Shrub

Upland Shrub communities are a minor cover type on these properties. They are typically found along old fence lines or scattered across the properties on former pastures or in unmanaged woodlands. Deer, pheasant and other wildlife will use Upland Shrub for cover and browse. These shrub communities may contain desirable native tree and shrub species, but they may be impacted by aggressive, invasive species making restoration difficult or impracticable with current tools.

Management Objectives:

- Maintain native shrub communities where needed to provide a range of habitats for game species, especially game birds such as pheasants.
- Convert Upland Shrub communities dominated by invasive species to grassland, savanna or forest as practicable.

Management Prescriptions:

- Use prescribed burns, mowing and other approved techniques to maintain the vigor and diversity of the desirable native shrub communities. Passively manage species composition and allow natural processes to determine the ecological composition and structure of these communities.
- Convert parcels infested with invasive species to adjacent native communities using prescribed burns, cutting, herbicides or other approved technique as practicable. Actively manage species composition to develop the desired composition and structure of these communities.

Agriculture Cropland, Farming Practices and Food Plots

Parcels on the wildlife and fishery areas may be temporarily, or permanently, used for agricultural practices compatible with the management purposes of the property. Approximately 600-800 acres, almost 25% of the non-forested upland areas, is cropped every year on these properties. Most of these lands are farmed for 3-5 years and then converted back to permanent cover (e.g., upland grassland cover) or used on an extended rotation as food plots for game species. Farming practices, such as row crops, mowing grasslands for hay, or grazing to remove exotic species, may be conducted if consistent with the habitat objectives. Food plots, haying and an occasional 3-5 year rotation of grasslands into row crops can provide food for wildlife, aid habitat restoration efforts (e.g., control of invasive species), and can improve walking access on a property.

Management Objectives:

- Provide a food source for game and non-game wildlife species, especially pheasant and doves.
- Provide brush and weed control prior to conversion to grasslands, prairies, savannas or woodlands or when compatible as an ongoing management activity.
- Develop permanent cover if parcels are not needed for food plots or habitat restoration purposes.

Management Prescriptions:

- Plant food plots or leave agricultural crops (e.g., farming agreement lands) standing to provide winter food for game species.
- Annually plant a total of 100 to 150 acres of wildlife food plots in 5-20 acre units on the planning group to attract doves and other game birds. For example, mow portions of sunflower fields when mature to disperse the seeds and create open areas where doves prefer to forage.
- Utilize farming practices to control weeds and prepare the site for native habitat restoration.
- Use farming agreements on 150 – 200 acres of managed impoundments as a cost-effective way to maintain cover types (surrogate sedge meadows) for migratory waterfowl and shorebirds.

Forest Habitats

All forest management activities shall follow the guidance in the department Silviculture 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), except for southern tamarack swamp. The prescriptions listed below are for the primary forest types found on these properties. The prescriptions include an overview of the general management methods and guidance from the Silviculture Handbook as well as considerations applicable to these properties. Consult the Silviculture Handbook for more details and management considerations. Where management prescriptions alter or eliminate harvest rotations, the Wisconsin Forest Inventory and Reporting System (WisFIRS) will be adjusted accordingly.

The WisFIRS data base indicates the most recommended forest management activities is thinning and improvement cuts on about 690 acres of hardwood and conifer stands over the next 15 years. Single tree selection harvests is recommended on 225 acres of oak and a variety of other hardwoods stand with coppice cutting recommended to regenerate aspen stands on 3 acres. On average about 50 acres of forestry treatments would be conducted each year through 2030.

Additional information about all of these cover types can be found at the department web site using the following key words – forestry handbooks, forest habitat type classification system, endangered resources, ecological landscapes, natural communities.

Management Objectives for all Forest Types

- Manage oaks as a large-scale mosaic of patches along a successional gradient that includes Oak Forest, Oak Woodland, Oak Opening and Oak Savannas. Enhance and expand mature oak forest patches as an element of the oak continuum.
- Retain aspen consistent with management objectives for that property.
- Maintain the extent and enhance the quality of Northern and Central Hardwoods, Bottomland Hardwoods, Swamp Hardwoods, and southern tamarack swamps with an emphasis on providing wildlife habitat and protecting aesthetic values unless there is a property specific objective and/or prescription stating otherwise.
- Convert Red and Scotch pine and Norway spruce plantations to native grasslands or desired forest types to increase wildlife values and increase ecosystem diversity.
- Retain patches of white pine to provide cover and food for wildlife and site aesthetics.
- Harvest timber using silvicultural systems such as even aged and uneven-aged management. This can be achieved using selective harvests, shelterwood cuts, improvement and thinning prescriptions, and salvage harvests to achieve the desired forest composition and structure.

Management Prescriptions for all Forest Types

- Use harvest and thinning prescriptions to regenerate desirable woody and herbaceous species in a manner that reduces the spread of harmful insects, diseases and invasive species.
- Where appropriate, extend the rotation age for some stands of oak and central/northern hardwoods to increase the abundance of older-age forest habitat, which is highly limited in the Southeast Glacial Plains ecological landscapes.
- Leave long-lived reserve trees as individuals or in groups to provide wildlife cover (e.g., denning and nesting sites and as a food source), timber and aesthetic values whenever their retention does not conflict with regeneration and other forest management objectives.

- Use intermediate forest treatments, such as release or crown thinning, to develop young stands, improve the species composition of the forest and increase timber quality.
- Phase out conifer (e.g., red pine and spruce) plantations except where desired for roosting habitat using thinning and sanitation cuts. Convert to cover types that increase wildlife and/or native community habitat values.
- Retain white pine for wildlife mast and cover values and allow natural regeneration as prescribed.
- Retain snags and coarse woody habitat if it does not conflict with other management objectives.
- Trees damaged by wind, ice, fire, insects and disease may be salvaged if it meets the property or unit management objectives and the amount of woody debris would inhibit prescribed fires.
- Under plant forested wetlands with desired woody species particularly where the threat of Emerald Ash borer could lead to invasion by undesirable species, such as reed canary.

Central and Northern Hardwoods

Central Hardwood tree species, such as black cherry, American elm, black walnut, bitternut hickory, and shagbark hickory tend to grow in partial shade to full sun, whereas Northern Hardwood tree species, such as sugar maple and basswood, tolerate shady conditions. This variation in shade tolerance means that either even-aged or uneven-aged regeneration systems may be used depending upon the tree species being favored. Even-aged silvicultural methods, such as overstory removal or shelterwood, will keep all the trees in a similar age range by harvesting the entire stand at 80-150 year intervals. Uneven-aged methods, such as single-tree or group selection, create a stand with trees of three or more distinct age classes. In this master plan these forest types have been labeled as Upland Hardwoods on the maps.

Management Objective:

- Maintain the health, vigor and diversity of central and northern hardwood stands to provide wildlife habitat and aesthetic value, and secondarily for forest products.

Management Prescriptions:

- Consider the forest conditions on the surrounding parcels when planning stand level management prescriptions, as a variety of age classes and stand sizes across the landscape is beneficial for wildlife and aesthetics.
- Assess the degree of succession to central or northern hardwoods prior to prescribing regeneration system for stand.
- Natural regeneration systems of central hardwoods can utilize both even and uneven-aged methods, including overstory removal, shelterwood, group selection, single-tree selection, coppice, and clearcut.
- Follow the department Silviculture and Forest Aesthetics Handbook guidance on selecting the appropriate regeneration system based on stand composition, advanced regeneration, site, and other factors.
- Use intermediate treatments, such as release or crown thinning, to develop young stands and improve composition and timber quality.
- Artificial regeneration by seeding or planting seedlings of desirable species may be used where seed source and/or advanced regeneration is lacking.
- Other management techniques that can be used to help regenerate stands include soil scarification, herbicide treatments, and prescribed fire where feasible and safe.

Oak

Oak woodlands historically developed or regenerated following significant disturbance, such as fires that were common prior to European settlement. Oak provides valuable habitat for many game and non-game wildlife species because of the mast production, cover and denning/nesting sites such as turkeys, deer and habitat for brown thrasher, red-headed woodpecker, American woodcock and other special concern species.

Generally, site disturbance is required to regenerate or maintain oak in mixed stands. Silvicultural oak management typically involves even-aged harvest practices depending on the species present. For example, harvest intervals for northern red oak are in the 90-125 year range while white oak may have harvest cycles 150 years or longer. The type of harvest and the size of the cut will depend on stand composition, potential for oak regeneration site quality and other management variables.

Management Objective:

- Enhance the quality and extent of oak stands as practicable.

Management Prescriptions:

- Maintain oak stands using management techniques appropriate for the stand and site conditions.
- Natural regeneration involves techniques and/or pre harvest cultural activities designed to favor oak reproduction over less desirable species. Oaks differ in their ability to produce seed, germinate and the seedlings to endure shade, drought, and other stresses. Oak has a relatively high light requirement to regenerate successfully so a combination of techniques, such as prescribed fire, harvesting or herbicide treatments, may be needed to provide adequate sunlight. Advanced regeneration from seedling and saplings, seed tree sources and/or planting seedlings can be used to regenerate or produce an oak stand. Where oak is naturally invading a site (e.g., adjacent grasslands) prescribed burns, brushing and/or chemical treatments may be used to promote oak succession.
- Silvicultural regeneration systems of oak include even-age management techniques, clearcutting, and shelterwood harvesting techniques.
- Oak regeneration by seeding or planting seedlings may be used prior to or after timber harvests when natural regeneration is not adequate. Other management techniques that can be used to help regenerate oak include soil scarification, herbicide treatments, and prescribed fire where feasible and safe. Intermediate treatments, such as release or crown thinning, may be used to enhance young oak stands, improve their composition and timber quality.
- Assess the degree of succession to central hardwood species and advanced regeneration density prior to prescribing oak regeneration harvests. Natural conversion to these species may be prescribed if oak regeneration seems unlikely. If successful regeneration of an existing oak stand is questionable, allow the stand to convert, but retain the oak as long as possible. It may be more feasible and desirable to establish an oak stand on a new site through planting.
- On non-forested sites naturally succeeding into oak, passively manage the site (use fire where appropriate) and allow it to convert to oak woodland or oak savanna. If a more rapid conversion is desired oak may be planted. Oak acreage may also be expanded by planting suitable sites (e.g., agricultural fields) adjacent to forested uplands.
- Research prescriptions are allowed though they may vary from standard silvicultural practices.
- Manage all oak woodlands in a manner that limits the spread of oak wilt and other pests.
- Encourage regeneration of other cohort trees, such as hickory and black cherry, and other desirable woodland understory species to provide food and habitat.

Aspen

Aspen is a small component of the forests on these properties. Aspen provides cover for early successional wildlife species, including woodcock and ruffed grouse, which have declined in numbers as woodlands have matured. This early successional forest type requires disturbance and abundant sunlight to regenerate. It is typically managed using complete even-aged harvests at intervals of 30-60 years.

Management Objective:

- Expand or retain aspen stands and aspen as a component of other forest habitat types where practicable, except where it negatively impacts sedge meadow, grassland and savanna habitats.

Management Prescriptions:

- Regenerate aspen primarily through coppice (i.e., root sprouts) cutting with a management emphasis on its habitat value for deer, turkey, ruffed grouse and woodcock populations.
- Where the objective is to develop or maintain a stand of mixed tree species, retain individual longer-lived species, such as oak. These trees can improve stand structure, wildlife habitat, aesthetic beauty, and increase the diversity of the stand.
- Natural conversion to other forest types, such as central hardwoods, may be prescribed if aspen regeneration is unlikely or other forestry goals take precedence. Harvest aspen and other short-lived species, leaving the long-lived species to develop.

Upland Conifers

A number of coniferous species are found on these properties. White pine is native to the area, but has also been planted widely to provide wildlife food and cover and contribute to cover type diversity. White pines were planted on several of the properties in combination with other conifers and hardwoods. .

Small plantations or shelter belts of red pine, Norway spruce and Scotch pine are found on a number of the properties. These are often monotypic stands with noticeable populations of invasive species in the understory. These small stands offer very little benefit to wildlife species, are a hindrance to managing larger blocks of more desirable cover types and often have poor productivity due to insects and diseases.

Management Objectives:

- Convert conifer plantations and fencerows to another forest or other suitable habitat type, except where they provide the desired roosting habitat.
- Maintain white pine to biological maturity and retain as a component of future mixed hardwood and conifer stands as desired.

Management Prescriptions:

- Use even-aged management practices (e.g., thinning and improvement cuts) to maximize the stands health, vigor and quality until the plantations are harvested.
- Fencerows should be removed during timber harvests or when doing other habitat improvements such as burning, herbicide application or other approved techniques.
- White pine should be actively managed by thinning and improvement cuts to attain biological maturity and then harvested. White pine may be retained through natural recruitment.

Forested Wetlands

The Forested Wetlands on these properties primarily consist of bottomland hardwood and swamp hardwood forests with very smaller acreages of tamarack /conifer wetlands at Hook Lake SNA. These forests are associated with wet soils in flood plains, depressions and stream/river bottoms.

Forested wetlands are intricate and variable ecosystems due to species richness, flooding, ice movement and internal drainage patterns. The pattern of deposition and development of soils in these stands is complex. Given the variability of these site conditions, as well as the species mix and silvicultural characteristics, multiple regeneration prescriptions may be pursued on these stands.

The ash component of these forests is threatened by emerald ash borer (EAB). The General Management Objectives and Prescriptions for EAB should be followed on forested wetlands.

Invasive exotic species, wet soil conditions and high water tables can make forest management in these cover types a challenge. Deer browsing can hinder stand regeneration where deer populations are high.

Wildlife that utilizes these habitats includes common species such as raccoon, white-tailed deer and turkey and Species of Greatest Conservation Need such as cerulean warbler, Prothonotary warbler, red-shouldered hawk and yellow-billed cuckoo.

Bottomland Hardwoods

Management Objectives

- Protect and enhance the extent and quality of the bottomland hardwood stands.
- Encourage the major hardwood species of eastern cottonwood, sycamore, swamp white oak and silver maple.
- Silvicultural management requires consultation between the wildlife/fishery manager and the forester with input from the Natural Heritage Conservation biologist if needed.

Management Prescriptions:

- Plant bottomland hardwood species to increase corridor width to one quarter mile on either side of this river, especially along the Sugar River and Little Sugar River where habitat and management opportunities present themselves.
- Retain snags, cavity trees and coarse woody debris as denning and nesting habitat.
- Retain trees on the bank, especially on outer bends, to add coarse woody debris as fish habitat.
- Riparian zone management will incorporate relevant BMP's and shall implement measures to protect the scenic and aesthetic qualities of woodlands bordering waterways.
- Silvicultural and other management activities must avoid as practicable the introduction and/or spread of invasives (especially reed canary grass) in the understory of these communities.

Swamp Hardwoods

Management Objectives

- Promote the stability and diversity of these forested wetlands by favoring other desirable hardwood species and increase the cedar and tamarack component where practicable.
- Silvicultural management requires consultation between the wildlife/fishery manager and the forester on all Habitat Management Areas and the Natural Heritage Conservation biologist as needed. The wildlife/fishery manager and the Natural Heritage Conservation biologist shall be consulted on silvicultural management for all Native Community Management Areas.
- In stands lacking desirable hardwoods and/or conifers, succession to lowland brush or sedge meadow may be pursued with the demise of ash.

Management Prescriptions

- Retain and regenerate swamp white oak whenever possible.
- Retain snags, living and dead cavity trees and coarse woody debris as denning habitat and encourage the recruitment of natural woody debris into the water channels to provide fish habitat.
- Riparian zone management will incorporate relevant BMP's and shall implement measures appropriate to protect the scenic and aesthetic qualities of the woodlands and water courses.
- Silvicultural and other management activities must avoid the introduction and/or spread of invasives (especially reed canary grass) in these communities.

Southern Tamarack Swamp (Rich)

Tamarack is found on moist organic soils, peats and mucks of swamps and muskegs, especially at the limits of its range in southern Wisconsin. This is a rare habitat and is valuable for many species such as American woodcock and black billed cuckoo and provides escape cover for white-tail deer. These are remnant northern forests from the post glacial age that have persisted in the fire-prone southern Wisconsin landscape due to the wetness of the swamps. Following the recession of the glaciers, fires transformed the boreal forests on dryer sites to prairies/savannas. It is likely that fire did occasionally reach these areas during drought years and set these generally fire intolerant plant communities back for decades, or perhaps longer. It is also likely that pests and wind-throw occasionally decimated these single-species dominated stands.

There are significant challenges in managing southern tamarack swamps. This species does not reproduce under its own shade so some naturally occurring events had to set them back periodically – thus, providing an opportunity for tamarack to regenerate. Importantly, these stands are at the southern fringe of their range so they may be more susceptible to changes in critical climate variables.

Hydrologic changes can convert this community to a shrub swamp. Invasive plants may also pose a serious threat to the southern tamaracks swamp communities. The diverse factors affecting the health and vigor of this community make it difficult to identify the reason(s) for the decline of a tamarack swamp.

Management Objectives:

- Passively manage and allow natural processes to direct the structure and composition of these communities.

Management Prescriptions:

- Where feasible, manage this forest type in conjunction with other complementary forest and wetlands communities. Isolated sites should be buffered from land uses that degrade them.

- Use management practices that limit soil damage, erosion, sedimentation, and hydrologic changes on these sites and adjacent lands. Convert adjacent upland crop land to grassland cover whenever possible.
- Management activities following a catastrophic natural event or significant insect/disease infestation shall be determined after consultation between the staff of the Wildlife, Forestry and Natural Heritage Conservation programs.
- Periodically monitor for and manage invasive species.
- Bio-control methods may be used for purple loosestrife, or other species as deemed appropriate, safe, and effective.

Fishery Habitats and Water Quality

A critical element in the management of and the sustainability of healthy fish populations is providing the various habitat and food resources needed during the various life stages of the fish populations. Cold water streams often harbor simple communities consisting of 3-6 fish species while warmwater streams may have species diversity ranging from 20+ species (e.g. Yahara River) to as many as 50 species in portions of the Sugar River. Maintaining fish species diversity can be best achieved by providing a continuity of access along the main stem as well as between the main stream channel and the adjacent wetlands and tributaries.

The riparian zones often provide the energy, food and spawning habitat needed by the aquatic systems. Maintaining and/or enhancing the connectivity between streams and their riparian zones are a major habitat management goal for a number of these properties.

The Sugar River above Rock County and all of the trout streams are classified as Exceptional Resource Waters (ERW). Surface waters designated as an ERW provide outstanding recreational opportunities, support valuable fisheries and wildlife habitat, have good water quality, and are not significantly impacted by human activities. ERW waters warrant additional protection from the effects of pollution.

Several rivers and streams are also designated as or have a pending designation as a 303d waterbody indicating one or more water quality criteria is impaired (*WDNR web references*). The 303d designations are primarily related to non-point sources of pollution (e.g., elevated sediment, nutrient loads and habitat destruction) and one stream is impacted by point source and contaminated sediments. The 303d portions of the Sugar and Little Sugar rivers still have diverse aquatic ecosystems, but a reduction of the non-point pollution would improve the capacity of these rivers to provide enhanced recreational opportunities. See the individual property descriptions for specific details.

Coldwater Streams

Protecting or rehabilitating cold water (trout) stream habitats is the highest fish management priority for this planning group. The most important trout streams going forward are Story Creek, Anthony Branch and Allen Creek. Wisconsin's trout habitat management program has been a national leader in this field for many decades. The program has evolved over time and is currently focusing on less intensive, more natural-like methods to improve in-stream habitat for specific trout species and life stages (*WDNR 2011-13 Biennial Report*). The objectives and prescriptions in this master plan incorporate these methods.

Coldwater streams are dominated by groundwater inputs and can sustain communities adapted to cold, oxygen rich, flowing water conditions. Important species include the native brook trout and introduced game fish (brown trout and rainbow trout) as well as other native species such as white sucker, mottled sculpin, American brook lamprey and minnows. Coldwater streams often support diverse communities of macro-invertebrates including environmentally sensitive mayflies, stoneflies and caddis flies.

The physical habitat of a trout stream can be quite variable and is generally determined by watershed and landscape characteristics, specifically soils and geologic parent material as well as watershed size and gradient. Larger, lower gradient streams are often sinuous and have bottom material composed of fine grained sands, silts and organic sediments. Smaller, higher gradient streams tend to be defined by riffles and runs with gravel, rock and mineral sediments. Habitat enhancements in both stream types can increase the carrying capacity, growth and natural recruitment of trout and forage species.

Coldwater streams often rely on riparian zone vegetation to provide cover and energy, such as leaves, branches and fallen trees, to sustain the aquatic food web. These streams have invertebrates adapted to eating leaves and detritus from terrestrial sources. Managing the stream side vegetation to allow some sunlight to directly reach portions of the stream can increase the productivity of algae and phytoplankton needed by invertebrates and fish while providing sufficient shade to maintain cold water needed by trout.

Protection of the coldwater streams and the trout fishery requires working with partners to reduce thermal and non-point pollution, protecting or restoring spawning habitat, and stocking, as needed, with appropriate wild parentage stock.

Management Objectives:

- Manage riparian vegetation along classified trout streams to enhance in-stream habitat quality and the productivity of the coldwater communities.
- Maintain, and increase as practicable, the extent and quality of Class 1 and Class 2 trout streams for brown and brook trout populations.
- Protect rare/endangered aquatic species and species of greatest conservation need.

Management Prescriptions:

- Manage near stream vegetation to enhance the trout fishery, protect water quality and quantity, and enhance the aesthetics of the stream corridor.
- Install and maintain department approved streambank protection measures and in-stream habitat enhancements. These measures include livestock fencing, bank stabilization using rock rip rap and vegetation to restore eroded areas. In-stream enhancements to improve habitat quality and diversity could include lunger and boom cover installations, revetments and current deflectors, brush bundles and other approved measures.
- Remove beaver dams to maintain the free flowing environment coldwater streams required to maintain robust trout populations.
- Consult with NHC during the planning of in-stream and riparian habitat enhancement projects.
- Monitor and classify trout streams according to monitoring data and trend data.
- Follow the Bureau of Fisheries Management guidance on stocking rates of species per acre of surface water.

The following management prescriptions apply to the 132 feet riparian corridor (66 feet on either side of the center line of the stream):

- Fishery Management staff will, as needed, manage vegetation in the streamside corridor on trout streams to maintain high quality trout habitat and self-sustaining trout populations. Activities to protect in-stream and near stream habitats include the planting of desired native species as needed or removal of understory and young successional vegetation such as tag alder, aspen, box elder, black willow and invasive species to minimize bank erosion, excessive stream shading or degraded habitat quality. Typical riparian zone vegetation management tools include fire, mechanical cutting and chemical control. Vegetation on the upland portions of the fishery areas will follow the Wildlife Management prescriptions.
- Maintain and encourage mature hardwoods in the riparian corridors, specifically swamp white oak, hackberry, hickory, elm and red maple.

Warmwater Streams

The rivers and streams on or adjacent to these properties provide management opportunities for warmwater game fisheries and habitats for diverse semi-aquatic and aquatic plant and animal communities. The Sugar and Little Sugar rivers provide a thermal continuum from cold /cool water streams (e.g., trout waters) in their headwaters to warmwater sport fisheries (e.g. northern pike and bass) in the slow moving and meandering lower stream reaches. Adjacent wetlands provide spawning, rearing and feeding habitat important in meeting the lifecycle needs of both game and non-game species.

A number of the rivers/streams, including several trout streams, have value as smallmouth bass waters. Smallmouth bass waters provide ecological diversity and recreational value. The most significant portions are along the Sugar River and Allen Creek with juvenile populations using the lower portions of Badfish Creek WA, lower Story Creek and the Little Sugar River. This resource is passively managed, but this plan recommends the coarse woody debris and stable banks smallmouth bass prefer be provided as resources allow.

The remaining larger streams include the Yahara River and Badfish Creek. Other smaller streams in this group include small portions of Willow Creek, Raccoon Creek, Taylor Creek and Bass Creek. Sections of these streams have been dredged, ditched and substantially affected by these drainage activities.

Currently, limited funding for warmwater fishery management, especially in free flowing streams and rivers, means passive management is generally pursued on these riverine ecosystems. For example, limited fish stocking is occurring and minimal habitat manipulations are being conducted on these warmwater resources.

Management Objectives:

- Promote riparian zone plant communities that protect water quality and quantity.
- Enhance littoral and riparian zone habitats for game and non-game species.
- Promote native plant and animal species as practicable.
- Control aquatic invasive and nuisance species that degrade habitat for native communities.

Management Prescriptions

- Allow natural processes to generally direct the composition and structure of the native warmwater fisheries, but stocking of game fish is allowable under department stocking protocols.
- Passively manage riparian areas, unless resources are available to conduct riparian and in-stream protection or enhancements (see next bullets). Allow natural processes and native floodplain communities to shape the character and quality of the in-stream and riparian habitats. Riparian plant communities are important sources of wood and leaf litter that provide food and habitat for aquatic and semi-aquatic game and non-game species.
- Conduct generally accepted in-stream and riparian zone habitat management activities (e.g., fish cribs, shoreline protection, invasive species control, etc.) as resources allow. In-stream habitat improvements may be implemented if they follow Chapter 30 guidelines and are permitted under a general permit, individual permit and/or manual code approval.
- Allowable physical and biological changes include improving the connectivity of the stream to the adjacent floodplain and restoring wetlands. Typically this consists of re-meandering the main stem and tributary streams, re-grading ditch edges, plugging or filling of smaller ditches, and breaking tile lines.

Fishery Outreach Activities

Work with partner groups to improve and maintain fishery habitats. Inform and educate landowners, agricultural interests and communities about the adverse impacts of excessive nutrient inputs, sedimentation, stormwater runoff, and reduced groundwater inputs to surfacewaters, especially to trout waters. Activities that lead to high summer water temperatures, lower stream flows, low winter water temperatures and degraded in-stream habitats diminish efforts to sustain high quality, self-sustaining trout fisheries.

Water Quality

Surface waters designated as an Exceptional Resource Waters (ERW) have good water quality and are not significantly impacted by human activities. They can provide outstanding recreational opportunities, support valuable fisheries and wildlife habitat. ERW status identifies waters that warrant protection from the effects of pollution.

This designation can change over time based on point and non-point sources of pollution and various restoration efforts within the watershed. This designation can also change based upon changes in water quality standards.

Property Administration and Policies

Funding Constraints

Implementation of the master plan actions is dependent upon staffing and funding allocations set by processes outside of the master plan. Funding for land acquisition can come from a variety of federal (e.g., Pittman-Robertson and others), state (e.g., Stewardship), local and private (e.g., land trusts) sources as well as land donations. Capital and operational funding for department programs are established biennially by the state legislature. Funds are also provided by federal programs and occasionally from private sources. Therefore, these legislative and administrative processes outside of the master plan will determine how and when the actions in this master plan are implemented.

Facility Management

All infrastructure used for habitat management and public access shall be inspected and maintained as required in program guidance and manual codes. This infrastructure includes, but is not limited to, dikes, spillways, water control devices, roads, gates, parking lots, boat launches and buildings.

The property manager may relocate or temporarily close road and trail segments or other public use facilities as deemed necessary after appropriate authorization by department approval processes. The location and design of new roads or trails must be consistent with the land classification requirements (NR 44) and the management objectives for the area in which they are to be located.

Dikes and water control structures are essential for controlling water levels in flowages and enhancing emergent marsh habitats. The following routine activities apply to the maintenance of dikes and water control structures:

- Conduct dike maintenance and approved water manipulation activities;
- Maintain dikes to secondarily provide pedestrian access for hunters and trappers;
- Control beaver and muskrat populations to mitigate burrowing and damming; and
- Plan and implement major maintenance of dikes on approximately 20-year rotations.

Water control structures at dikes or impoundments that cannot provide the range of water fluctuations needed to optimize habitat for wildlife and enhance the native wetland plant communities should be replaced or improved.

NR 17.10(1) authorizes the designation of department lands for hunting dog field trials, year-round, except hunting shall have priority.

Public Health and Safety and Emergency Action Plan

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 wildlife areas and state natural area when necessary due to health, safety, or environmental damage concerns. Trees and other natural elements deemed public hazards will be removed within designated public use areas (e.g., parking lots and designated trails). Safety inspections of designated public use areas are done at least twice per year.

Refuse Management

Visitors are required to carry out any refuse they produce. Refuse and recycling receptacles are not provided because experience has shown it encourages dumping of household trash. Burying of refuse is not allowed on the properties.

Motorized Access

State properties typically have primitive or lightly to moderately developed service roads for management purposes. All department service roads not open to public vehicles will be maintained as primitive or lightly developed roads (NR 44.07(3)). Primitive roads, such as old farm roads used for management purposes, may not be routinely maintained.

Service roads are open to public walking access, but are closed to public vehicle access except for those leading to public parking lots or boat access sites. Closed roads are gated or signed.

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.

The following management prescriptions apply to department managed roads:

- Maintain permanent service roads and public access roads within the wildlife areas in a sustainable condition by following department road standards and considerations for Wisconsin's Forestry 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 decrease unsafe conditions and prevent damage.
- Maintain stable road surfaces to facilitate proper drainage and reduce degradation from traffic during wet or soft conditions.
- Minimize the manipulation/removal of vegetation and soil disturbance to the extent practicable to prevent erosion.
- Design, route and construct roads to minimize habitat fragmentation and impacts to endangered, threatened and species of special concern.
- Restore roads used in timber harvests to non-erosive conditions, in accordance with Wisconsin's Forestry Best Management Practices for Water Quality.
- Roadsides of county and town roads will be managed by county and township staff on their maintenance schedules.

The department will collaborate with municipal, town and county roadside maintenance crews to protect and enhance the quality of roadside easement areas, especially to control the spread of invasive species.

Public Access on Service Roads, Fire Breaks, Dikes and Paths

The public may hike on service roads, game stocking lanes, fire breaks and dikes to gain access for all of the approved recreational activities. This infrastructure is not designed, designated or maintained as designated hiking trails, but users can utilize them unless posted closed to the public. Non-designated primitive paths formed by years of use by hunters or anglers are found on all the properties. Non-hunters may use these paths as well. Designated hiking trails, such as the Ice Age Trail, may be used by hunters and trappers to gain access to those properties open to hunting.

Snowmobile Trails

A snowmobile trail is allowed to cross wildlife/fishery areas if it provides the most feasible route to maintain a regional snowmobile trail system, does not degrade habitat, is not routed through important winter habitat areas, and is signed and maintained according to applicable state statutes and administrative codes.

Disabled Accessibility

The department is committed to providing high quality outdoor recreation opportunities for people with mobility impairment. All new construction and renovation of infrastructure will follow guidelines set forth within the Americans with Disabilities Act and be done in a manner consistent with the NR 44 land use classification for the development site.

The property manager has the authority to provide access accommodations for people with disabilities. Users with mobility impairment may be allowed to use power-driven mobility devices (PDMD) with a permit issued by the department. Approval will depend on factors including: (i) the physical characteristics of the device; (ii) the volume of pedestrian traffic at the location; (iii) the design and operational characteristics of the site; (iv) safety considerations; and (v) whether the approved use creates substantial risk of serious harm to environmental, natural or cultural resources.

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 will be checked against a database of known occurrences of listed species to assure that no department actions results in the direct taking of any known endangered or threatened resource during the plan implementation phase.

Protection of Archaeological Features

Property managers will prevent physical disturbance of the archeological features (e.g., mounds) on properties. This includes controlling woody species invading the mound. Managers will follow department guidelines outlined in "Burials, Earthworks and Mounds Preservation Policy and Plan". The following federal cultural resource regulations should be referenced as applicable:

National Historic Preservation Act of 1966, as amended (16 U.S.C. 470-470t) - This act establishes as policy that the Federal Government is to provide leadership in the preservation of the Nation's prehistoric and historic resources. Historic preservation is defined in the Act as the protection, rehabilitation, restoration, and reconstruction of sites, buildings, structures, and objects significant in American history, architecture, engineering, and archaeology. Sections 106 and 110 of the Act define the primary requirements Federal agencies will follow to identify evaluate and protect significant cultural resources.

Archaeological and Historic Preservation Act of 1974 (16 U.S.C. 469-469c) - This Act directs the preservation of historic and archaeological data in Federal construction projects. The Act authorizes Federal agencies to seek future appropriations, to obligate available funding, or to reprogram existing appropriations to provide for the identification and preservation of data.

Archaeological Resources Protection Act of 1979, as amended - This Act protects materials of archaeological interest from unauthorized removal or destruction, and requires Federal managers to develop plans and schedules to locate archaeological resources.

Best Management Practices for Water Quality

All forest management and construction activities shall comply with the most recent guidelines for Best Management Practices for Water Quality (BMPs). Natural shorelines will be maintained in vegetative cover to hold the soil from erosive forces. On banks more difficult to vegetate, other forms of protection should be used ranging from bioengineered banks to hard armoring (e.g., riprap).

Forest Certification

Wisconsin State Forests gained Forest Certification from the Forest Stewardship Council (FSC) and the Sustainable Forestry Initiative (SFI) in 2004. The State Forests were re-certified under FSC and SFI and the balance of department-owned land were added to the certification in 2009. Third-party certification means management of department-owned land meets standards for ecological, social, and economic sustainability. Forest certification improves competitiveness 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. Forests on fish and wildlife properties are managed to meet the forest certification principles.

Fire Suppression

Wisconsin Statutes s. 26.11, states, "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." Wildland 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.

Forest Pest Control

Wisconsin Statute s. 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 will be managed according to the respective management plan, if they exist. Responses to significant infestations from pests (e.g., emerald ash borer) 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.

Authorized Response to Catastrophic Events

Catastrophic events are rare, but allowances must be made to provide management flexibility when such events occur (NR 45.075). These events include severe flooding, ice and wind storms, insect and disease infestations, wildfires or other catastrophic occurrences. The immediate management responses to these events will follow existing department protocols. If the management objectives and prescriptions need to be revised a variance to the master plan must be approved by the Natural Resources Board.

Wildfires, tree diseases and insect infestations shall be controlled to the degree appropriate to protect the values of each management area. However, emergency actions be taken to protect public health and safety, or as directed by the State Forester to prevent a catastrophic incident from spreading to adjacent forest lands.

Management responses to catastrophic events are determined on a case-by-case basis. Salvage of trees damaged by wind, fire, ice, disease, or insects may occur if consistent with the objectives and prescriptions. Salvage may also occur as part of an emergency response plan authorized by the State Forester.

Management of Invasive Species

Invasive species can significantly harm the habitat and recreational potential of a conservation area so property managers should follow the guidance regarding control of invasive species in the department's *Property Managers Handbook*. Proper management will require the inventory, control and monitoring of invasive species on the properties. Invasive species can be managed using the following methods: bio-control, herbicides, grazing, cutting, smothering, hand removal or fire, unless restricted to protect sensitive resources. Farming practices may be used for invasives control and restoration of heavily infested parcels. Best Management Practices (BMPs) for Invasive Species and the guidance in the Property Managers Handbook shall be used to direct management practices on these properties.

Administrative rules and voluntary actions taken by informed users will help slow the spread of aquatic and terrestrial invasive species. Examples include cleaning and disinfecting boats and equipment; not transporting live fish or spawn away from their indigenous waters; not transporting bait species between waterbodies, and hunters/hikers cleaning boots and clothing to reduce the spread of seed.

Chemical Use

Herbicides and pesticides may be used to manage invasive plants and insects or limit plant competition in restoration areas except as restricted in the property specific management prescriptions in this plan. All applications shall follow applicable department procedures and herbicide and pesticides label requirements.

Non-Metallic Mining Policy

The department may use gravel, sand; fill dirt or other fill material from department-owned lands for department use. Under certain circumstances other government bodies or agencies may also have access to these materials. Wisconsin statute s. 23.20 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, the Nonmetallic Mining Reclamation 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. New sites will not be considered if they will impact significant geological or ecological feature or sites within any designated State Natural Area.

Department of Transportation projects are exempt because they have project reclamation requirements.

Real Estate Management

Acquisition Policies

The Natural Resources Board and the department acquire lands from willing sellers only. As required by state and federal laws, the department pays just compensation (e.g., estimated fair market value based on an appraisal) for property. Staff will periodically contact landowners within a project boundary to explain the department's land acquisition program and determine 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 the availability of funds.

Rather than purchasing land in fee title, the department may acquire an easement from a willing land owner. A number of easement options are available to address the circumstances. For example, fishery easements provide access for anglers, protection of riparian habitat and allow habitat development projects. This option is suited to protecting critical or unique habitat when fee acquisition is not feasible due to costs, local concerns, or an owner's desire to retain fee title to the land.

Aides in Lieu of Taxes

State law requires the department to make payments in lieu of property taxes (PILT). An automated process is used for collecting information and calculating PILT payments. The process is determined by statute with little room for interpretation or calculation by the department. There are two separate statutes and several formulas under each statute that dictate the amount of each individual payment:

Wisconsin ss. 70.113 applies to lands acquired by the department prior to January 1, 1992. Payments under this statute are made directly to the taxation district in which the land is located. Schools, VTAE and counties do not receive any payment under this law.

Wisconsin ss. 70.114 governs the payment in lieu of property taxes for all lands purchased by the department after January 1st, 1992. This law has been amended several times so the specific formula used to determine each specific payment varies depending on when and how the property was acquired.

Payments are made to each taxing district in January, similar to the way a private citizen would pay their property taxes and each taxing district then makes payments to all taxing jurisdictions in the taxing district. For detailed information on how PILT is paid, visit dnr.wi.gov and search "PILT".

Project Boundary and Acreage Goal Adjustment Process

The Natural Resources Board (NRB) must approve all Project Boundary and Acreage Goal adjustments. The "project boundary" is the area within which the department is authorized to purchase land or easements from willing sellers. The "acreage goal" is the amount of land the NRB has authorized the department to acquire within the project boundary.

A project boundary may be contracted to exclude developed land or expanded to include desired habitat or recreational lands. Boundary changes of 40 acres or more require approval by the Natural Resources Board. NR 44 provides an amendment process that may be used to make adjustments in the project boundary after the master plan is approved. Where land purchase or easements are being considered, land can be acquired under various authorities in ss. 23.09.

Conveyed Easements and Other Land Use Agreements

There are only 12 acres of conveyed easements on these properties. Conveyed easements or access permits provide access across state property for utilities, public roads, and other public benefit infrastructure or to a landholder surrounded by state property.

Easements, access permits, land use agreements and leases across department land require consultation and joint action by the affected program and the Bureau of Facilities and Lands Real Estate staff. These actions are subject to sections NR 1.48 and NR 1.485 and before any rights are conveyed, the Bureau of Facilities and Lands Real Estate must determine if federal funds were used to acquire the land and, if so, obtain the appropriate approvals.

Conveyed easements may serve a broader public purpose (e.g., a utility corridor), but they can have the following adverse effects on a property: 1.) restricting habitat and recreation management options; 2.) limiting recreational uses and enjoyment; 3.) preventing natural succession of cover types; 4.) introducing exotic and invasive species; 5.) introducing additional herbicides and other contaminants; and 5.) creating liability concerns.

Public Communications and Plan Monitoring

Public comments on recreation and habitat management were received during the Phase 1 Regional and Property Analysis and the Phase 2 draft master planning comment periods. Staff also communicated with elected officials, Friends groups, federal, state and local agencies, sporting groups and interested individuals throughout the process. These comments helped shape the recommendations in the plan.

Once the plan is approved and the habitat and recreation management objectives are being implemented an annual report on progress will be provided. The report will be available to the public on the department internet web site and linked to the respective property descriptions. The report will provide information on how the public can become involved in master plan implementation and when significant property management issues arise.

The annual report will summarize the following:

- Management and development activities completed,
- Significant issues addressed,
- Planned management and development activities for the upcoming year, and
- Potential changes to management actions or approaches.

The annual report may also include information on topics related to property management and uses. Examples include: the status of forest insect or disease problems, storm damage, updates on endangered or threatened species, recreation management issues, and recreational use trends.

In the event the department considers a substantive change to the master plan (i.e., a 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.

The following department staff may be contacted regarding questions about the Sugar River Planning Group properties. At the time of this publication, the property contacts include:

Mike Foy (608) 575-6904 mike.foy@wisconsin.gov Wildlife Biologist, Green and Rock counties

Andy Paulios (608) 534-0092 andy.paulios@wisconsin.gov Wildlife Biologist, Dane County

Kurt Welke (608) 273-5946 kurt.welke@wisconsin.gov Fishery Biologist, Dane, Rock and Green counties

Sharon Fandel (608) 275-3207 sharon.fandel@wisconsin.gov Conservation Biologist, Green and Rock counties

Brigit Brown (608) 266-2183 brigit.brown@wisconsin.gov Parks and Recreation Specialist, state Ice Age Trails

CHAPTER TWO- SECTION TWO

INDIVIDUAL PROPERTY PLANS

Wildlife Area Recommendations

Albany Wildlife Area and Scattered Wildlife land

Albany Wildlife Area (WA) lies along the Little Sugar and Sugar rivers between the Villages of Albany and Monticello in Green County (Map Series B). The wildlife area was established in 1956 as a Federal Aid Fish and Wildlife Restoration Project to protect wetlands and provide public hunting opportunities. Albany WA is the largest state wildlife area located entirely within Green County.

This property has a project boundary of 1,670 acres, an acreage goal of 1,580 acres and the department currently owns 1,427 acres of fee title and 3 acres of easements. Voluntary Public Access leases for hunting have been obtained on 282 acres adjacent to the wildlife area. These leases will expire in 2017.

The department has also acquired parcels through the statewide Extensive Wildlife Habitat (EWH) and Scattered Wildlife (SW) programs. The EWH parcels (580 acres) lie upstream of the Albany WA along the Little Sugar River between the wildlife area and the Village of Monticello. These parcels were purchased between 1970 and 1990 to provide wildlife habitat, public recreation and buffer portions of the Sugar River trail. The fourth parcel is a small SW parcel (20 acres) located northeast of the Albany WA with frontage on both the Sugar River and Allen Creek.

The USDA - NRCS has acquired the development and management rights on 300 acres of lowlands adjacent to the department parcels along the Little Sugar River (Map B-1). These parcels have been restored to wetlands and grasslands, but they are not open for public access.

The Albany WA, the Sugar River Trail, the Scattered Wildlife and Extensive/ Wildlife Habitat parcels, and the NRCS easements present an opportunity to create an integrated set of recreational activities including hunting, fishing, trapping, hiking/biking and a challenging to intermediate river trip along a 10.5 mile corridor of the Little Sugar River and Sugar River. These circumstances present an opportunity to build upon the past conservation and recreation investments between the Villages of Monticello and Albany.

The Sugar River in the wildlife area is currently classified as an Exceptional Resource Water (ERW) (*WDNR web references*). Surface waters designated as an ERW can provide valuable recreational opportunities and support valuable fisheries and wildlife habitat. In contrast, the Little Sugar River is classified as a 303d impaired stream due to excessive phosphorous and sediment loads. The biological data for the Little Sugar River does not indicate impairment.

The primary recreational activities on this property are deer, turkey, pheasant and small game hunting with some waterfowl hunting. These lands are heavily used and overcrowding can be an issue during opening weekends of the hunting seasons. Pheasants are stocked and dove hunting opportunities are enhanced by the food plots on these properties. Seasonal fishing is also popular and trapping furbearers also occurs on the property. Canoeists and kayakers are frequent users of the rivers.

These properties primarily consist of floodplain forests and open wetlands that are subject to seasonal flooding. The Sugar River watershed study indicates the floodplains provide opportunities for maintaining diverse populations of native aquatic plants and animals (*WDNR, 2010c*). A total of 24 species of special concern, threatened or endangered species were noted in the Rapid Ecological Assessment (*WDNR, 2013*). Management challenges include invasive garlic mustard, buckthorn, crown vetch, autumn olive and wild parsnip in the uplands and reed canary grass, hybrid cattails and phragmites in the wetlands.

Key Management Recommendations

- Expand the project boundary by 1,460 acres and the acreage goal by 950 acres. This expansion incorporates the 580 acres of EWH parcels, 120 acres currently outside the existing Albany WA project boundary and 300 acres of NRCS easements..
- Designate an 80 acre Albany Sand Prairie and Oak Savanna State Natural Area.
- Expand the Oak Forest cover type.
- Develop a river trail to complement the Sugar River State Trail (i.e., hiking/biking).

Habitat, Infrastructure and Recreation Management

The habitat, infrastructure and recreation resources will be managed in accordance with the General Management Objectives and Prescriptions or as supplemented below. The objective is to meet Habitat Quality Class 1 in the approved natural area, grasslands and forests, and Class 2 in other cover types.

Cover Type	Current fee title		Planned 50 year Objective	
	Acres	% Cover	Acres	% Cover
Agriculture	90	5	75	4
Grassland	215	11	165	8
Prairie	125	6	125	6
Oak Savanna	45	2	45	2
Oak	100	5	170	9
Upland Hardwood	145	7	145	7
Upland Conifers	6	<1	0	0
Lowland Shrub	505	24	505	24
Marsh/Emergent Wetland	30	2	30	2
Non-forested Wetlands	75	4	75	4
Bottomland Hardwoods	611	30	611	30
Water	75	4	75	4
Developed	3	<1	3	<1
Total	2,007	100	2,007	100

Cover Type	Current fee title		Planned 50 year Objective	
	Acres	% Cover	Acres	% Cover
Central Hardwood	4	20	4	20
Bottomland Hardwoods	16	79	16	79
Water	<1	<1	<1	<1
Total	20	100	20	100

Wetlands, Grasslands and Forest Communities - HMA (1,877 acres)

Habitat Objectives

- Increase Oak by planting and by passive expansion into Grasslands and Agricultural fields.
- Maintain current acreage and Class 2 habitat quality of the Bottomland Hardwoods, Lowland Shrub, Non-Forested Wetlands and Emergent Wetlands.
- Provide food plots for doves.
- Passively manage these parcels except as required under the NRCS easement.

Habitat Prescriptions

- Reduce the ash component of the canopy and under plant with desired forest species to maintain and promote closed canopy forest within the floodplain.
- Promote closed canopy oak forest on the 150 acre timber sale south of the Little Sugar River.
- Provide 10-30 acres/year of food plots for doves and other wildlife.
- Monitor and control invasive species as practicable, particularly EAB and reed canary grass.

Sugar and Little Sugar Rivers Fishery – HMA (70 acres)

Fishery Objectives

- Passively manage the in-stream habitats.
- Maintain, and enhance as practicable, the connectivity of the river with the oxbows, sloughs and floodplain wetlands. Enhance groundwater connectivity with oxbows as practicable to provide habitat for aquatic species of concern.

Fishery Prescription

- Follow the General Warmwater Fishery prescriptions for managing the aquatic habitats.

Sand Prairie and Oak Savanna State Natural Area - NCMA (80 acres)

Natural Area Objectives

- Designate the Sand Prairie and Oak Savanna State Natural Area
- Manage the site as a preserve for sand prairie and all stages of oak savanna/barrens, including Oak Barrens, Oak Opening and Oak Woodland.
- Increase the diversity and abundance of native prairie and savanna vegetation and associated animal species with an emphasis on rare species.

Natural Area Prescriptions

- Natural processes and active management including prescribed fire, tree/shrub control and prescribed understory manipulation to mimic natural disturbance patterns will be used to determine the structure of and transition between the prairies and the oak communities.
- Expand the prairie openings to promote native prairie vegetation and species requiring open conditions. Occasional fire-tolerant oaks and native shrubs may be retained at low densities.
- Other allowable activities include control of invasive plants and animals, augmentation of native prairie species and site access to suppress wildfires.
- Consider impacts to reptiles regarding timing of prescribed burns.

Habitat Management Infrastructure

Infrastructure Objective

- Retain the existing service roads, gates, dikes and water control structures.

Infrastructure Prescription

- Maintain 3.8 miles of primitive/lightly developed service roads; one dike (300 feet in length) and two water control structures.

Public Use Management

Public Use Objectives

- Maintain the existing public access infrastructure.
- Provide opportunities for deer, turkey, pheasant, mourning dove and small game hunting as well as opportunities for warmwater sport fishing, canoeing/kayaking, nature enjoyment, bird/waterfowl observation and other established recreational uses.
- Collaborate with partners to manage the Little Sugar River water trail to provide a “challenge water trail” experience between Silver Road and Tin Can Road and a “recreational water trail” experience between Tin Can Road and the Village of Albany or Conservation Road landing.
- Include the Extensive Wildlife Habitats (580 acres) within the Albany WA project boundary.

Public Use Prescriptions

- Maintain the 500 feet of gravel access road, 10 parking lots, and one improved boat and two unimproved carry in canoe/kayak access sites.
- Stock pheasants for sport hunting.
- Stock with warmwater game fish, typically northern pike and walleye, as resources allow.
- Prepare a short report that assesses the feasibility and desirability of an accessible blind off Conservation Road. Provide the report with recommendations by December 2017. Take action to implement the approved infrastructure elements.
- Adjust the project boundary and acquisition goal by 580 acres to add the EWH parcels.

Approved Little Sugar River Water Trail

- **Section 1: (challenge level)** Silver Road to Tin Can Road is a paddle of about 5.9 miles with an intermediate access point off Schneeberger Road (1.9 miles downstream of Silver Road). This challenge section is suitable for individuals with intermediate to expert paddling skills. The narrow, serpentine course of the river and the very numerous tree falls adds to the challenge and wild character of the river. This section is best suited to solo canoes and kayaks. The tree falls potentially obstruct navigation, but also provide crossing points over the river for hunters and other land based recreational pursuits.
- **Section 2: (recreational level)** Tin Can Road to either a takeout in the Village of Albany (2.8 miles) or to the department landing upstream along the Sugar River at Conservation Road (3 miles). This trail section is suitable for individuals with basic to expert paddlers.
- **Water Trail Management**
 - Access to the stream will be provided from small (2-3 cars) native surface/gravel parking lots at the Silver Road bridge and a Tin Can Road bridge site. Access off Schneeberger Road is from a parking lot north of the river and a pull off near the bridge.
 - Department managed landings will have signs with a map showing river access points, distance in river miles to the put in/take out points, and amenities provided. The launch areas will be primitive, native surface carry in access points that are mowed to the water's edge. Sanitation facilities and property information may be added if warranted and resources are available to maintain the amenities.
 - Down trees across the river may block navigation making a pull-over or carry-around necessary. At the discretion of the property manager, small openings may be cut to allow paddle craft to pass through. Cuts of the tree falls for navigation will be limited in terms of width and the number of trees cut to maintain the challenge experience of Section 1. The downed trees also provide river crossings for users on foot.

Avon Bottoms Wildlife Area

Avon Bottoms Wildlife Area (WA) is located along the lower reaches of the Sugar River in Rock and Green counties. This wildlife area was established in 1960 as a Federal Aid in Fish and Wildlife Restoration project to provide a duck and pheasant production area and provide a public hunting area. The wildlife area has a project boundary of 3,775 acres, an acreage goal of 3,007 acres and the department currently owns 3,402 acre in fee title and four acres of easements. Maps of the wildlife area are found in Map Series C.

The USDA Natural Resources Conservation Service (NRCS) has restored or protected about 3,330 acres of wetlands and grasslands in the Sugar River floodplain downstream of STH 11. Slightly over 3,100 acres of these easements are immediately adjacent to the Avon Bottoms WA (see Map C-1).

This wildlife area is close to major population centers in Wisconsin and Illinois, and is popular with a wide variety of recreational users because of the wild character of the river, sloughs and forests.

Hunting for waterfowl, deer, doves and stocked pheasant are popular activities. Dove fields are planted annually to enhance hunting opportunities. This property is an Important Bird Area and is a stop along a popular birding route. Canoeing and kayaking along the wild stretches of the Sugar River are also popular.

A management focus for this property is protecting the unique native communities in the river and the floodplain forest. The river is one of the most biologically diverse river systems in Wisconsin and has been identified as a Conservation Opportunity Area to protect native aquatic communities (*WDNR 2006*). The river harbors at least 50 fish species and the wildlife area has many rare species including ten Special Concern species, six state Threatened species, and three state Endangered species. The Sugar River floodplain forest is also listed as a Wetland Gem by the Wisconsin Wetlands Association.

The Sugar River in Green County is currently classified as Exceptional Resource Water (ERW) while the portion in Rock County is classified as a 303d impaired stream (*WDNR web references*). The impairment is related to the total phosphorus load that exceeds the fish and aquatic life use criterion. Fortunately, the available data does not indicate impairment of the aquatic community.

The river channel and the sloughs and oxbows of the Sugar River provide many aquatic and wetland habitats. The wildlife area has an estimated 15 miles of Sugar River frontage, 60-100 acres of oxbow lakes and 120-160 acres of river channel and sloughs. The physical and biological characteristics of these complex ecosystems can change substantially during episodic flooding and drought events, and by long-term changes in water quality (e.g., sediment load filling oxbow lakes).

A notable feature along the Sugar River is the more or less continuous forested corridor from Shirland, Illinois upstream through the Village of Albany in Green County and on into Dane County. These floodplain forests are bordered by productive grasslands and agricultural fields. The habitats in these forests, grasslands and riverine systems meet the life cycle needs of many game and non-game species.

Nearly two-thirds of this property is covered with wetlands and about 45% is forested. Fluctuating water levels and wet soils significantly affect the native communities and recreational uses of the property. Restoration of the floodplain wetlands, prairies, grasslands and forests by the NRCS and/or the department has been and will continue to be a management priority.

Key Property Recommendations

- Expand the size and protect the quality of the Bottomland Hardwood forests along the Sugar River. Active management through tree planting will be used to address the impacts of Emerald Ash borer mortality on the existing closed canopy forest.
- Maintain the wild and challenging character of the river experience on the property.
- Adjust the project boundary by 4,650 acres to include existing department parcels (35 acres), NRCS easements (2,250+ acres) and gift lands (724 acres from Pheasant Forever). Adjust the acreage goal with a net expansion of 4,950 acres to provide adequate authority to include the existing department acreage and allow acquisition through a combination of fee title, easements and/or land swaps with Rock County.
- Create the Avon Bottoms Floodplain Forest State Natural Area (1,978 acres). This natural area will include the existing Avon Bottoms (168 acres) and Swenson Wet Prairie (40 acres) State Natural Areas.

Habitat, Infrastructure and Recreation Management

The habitat, infrastructure and recreation resources will be managed in accordance with the General Management Objectives and Prescriptions or as supplemented below. The objective is to meet Habitat Quality Class 1 in the natural areas, grasslands and forests, and Class 2 in the remaining cover types.

Cover Type	Current fee title		Planned 50 year Objective	
	Acres	% Cover	Acres	% Cover
Agriculture	200	6	150	4
Grassland	410	12	320	9
Prairie	340	10	340	10
Oak	70	2	70	2
Oak Savanna	0	0	30	1
Upland Hardwood	30	1	75	2
Upland Conifer	85	2	10	<1
Lowland Shrub	200	6	200	6
Non-forested Wetlands	380	11	340	10
Bottomland Hardwood	1,440	42	1,625	48
Water	237	7	237	7
Developed	10	<1	5	<1
Total	3,402	100	3,402	100

Wetland, Grassland, Shrub, Forest and Crop Land - HMA (1,342 acres)

Habitat Objectives

- Expand the closed canopy Bottomland Hardwood forests along the floodplain.
- Maintain existing Grasslands except as noted below.
- Increase the acreage of Oak Savanna and enhance the quality of the upland Oak forests.
- Allow natural succession of brush to lowland and upland forest types.

Habitat Prescriptions

- Allow Grasslands on wet soils to succeed to Bottomland Hardwoods.
- Harvest conifer plantations and convert to Grassland or Upland Hardwoods with the retention of some white pine for wildlife and aesthetics.
- Harvest Central Hardwoods and leave Oak to create Savanna communities.
- Passively manage the Bottomland Hardwoods except in areas with a significant ash component. Under plant with desired tree species (e.g., Swamp white, white and bur oaks, silver maple, cottonwood, sycamore, basswood, and Dutch Elm resistant elm).
- Convert acquired cropland over time to Grassland to provide permanent cover for pheasants and habitat for grassland nesting ducks and grassland birds.
- Utilize agricultural practices to provide food plots and aid grassland restoration. Provide 10-20 acres of food plots for doves.
- Enhance native community restoration by restoring hydrology where feasible. Plug and fill ditches, remove dikes, etc.
- Manage NRCS restored wetlands/grasslands as required.
- Promote habitat in the riparian corridor for Endangered, Threatened and Species of Greatest Conservation Need, such as starhead topminnow (*Fundulus dispar*). Allowable actions may involve deepening of oxbow lakes and sloughs to provide groundwater connectivity and re-vegetating with desired aquatic plants. Actions need to be approved through the Wildlife, Natural Heritage and Conservation, and Fishery program processes.

Avon Bottoms Floodplain Forest State Natural Area - NCMA (1,710 acres)

The plan recommends the creation of the Avon Bottoms Floodplain Forest State Natural Area (SNA). The approved boundary for the natural area is 1,978 acres. Land ownership and easements within the boundary includes 1,614 acres under department ownership; 96 acres under department ownership, but NRCS has a permanent management easement; 150 acres are privately owned, but NRCS has a permanent development and management easement; and 118 acres of privately owned land with no easements.

Two existing SNAs within the new SNA will be managed as specific units. These units will be managed as ecological reference areas where natural processes will predominate. The larger SNA will allow more active management activities such as allowing under-planting to maintain a closed canopy forest (i.e., address EAB mortality) and conducting management activities required by the NRCS easements.

Natural Area Objectives

- Manage the Avon Bottoms Floodplain Forest State Natural Area as a reserve for floodplain forests, emergent wetlands and the aquatic communities in the river, oxbows and sloughs.
 - Manage to promote a structurally and functionally diverse, mature and un-fragmented Floodplain Forest along the Sugar River corridor.
 - Protect and/or enhance the ecological values of the natural communities and habitats needed to maintain rare species (e.g., Prothonotary warbler and starhead topminnow).

- The Avon Bottoms Unit will be managed as an ecological reference area for floodplain forests and as an aquatic reserve.
 - Passively manage this unit to allow natural forces to direct the composition and structure of the native communities and the ecological characteristics of the site, except for the management of groundlayer invasive species.
 - Expand this unit to include other floodplain forest stands of similar quality.
- The Swenson Wet Prairie Unit will be an ecological reference area and will be managed as a wet-mesic prairie and oak opening reserve.
- Opportunities for research and education will be provided throughout the natural area.

Natural Area Prescriptions - These prescriptions are applicable to the three natural areas.

- Develop and maintain a soft transition between the closed canopy floodplain forest and the adjacent oak savanna, oak opening, wet mesic prairie and grassland communities.
- Preserve coarse woody debris and standing dead snags to promote old growth characteristics and structural diversity.
- Allow passive expansion of Bottomland Hardwoods along the floodplain.
- Promote habitat in the riparian corridor for rare and endangered aquatic species such as the starhead topminnow (*Fundulus dispar*). Allowable actions may involve deepening of oxbows and sloughs to provide groundwater connectivity and re-vegetating with desired aquatic plants. Actions need to be approved through the Wildlife, Natural Heritage and Conservation and Fishery program processes.
- Actively monitor and manage invasive or naturalized species as well as aggressive native plant and animal species that threaten to dominate and disrupt native communities.

The following prescriptions are applicable to the specific natural areas or respective units:

Avon Bottoms Floodplain Forest SNA (1,502 acres)

- Generally allow natural processes to determine the structure and composition of the floodplain and aquatic communities within this management unit. Specific activities may include reduction of the ash component of the canopy, control of invasives and collaborative management on NRCS easements.
- Active management will be allowed for forest compartments where EAB ash mortality should be mitigated to protect forest ecosystem characteristics. Complete removal of ash as a sanitation measure against EAB impacts will not be pursued (*WDNR 2010c*).
- Under-planting with a diversity of native floodplain species such as swamp white oak, silver maple, sycamore and other longer-lived bottomland hardwood s tree species is allowable to promote and maintain the closed canopy forest.
- Promote tree species with potential for growing large diameter trees.
- Prescribed fire will be allowed to pass through the floodplain forest, though consumption of fuel here will not be facilitated, other than to secure fire breaks.
- Salvage of trees after a disturbance (e.g., storm event) is generally not compatible with the management objectives, but may be considered on a case by case basis.

Avon Bottoms Management Unit (168 acres)

- Passively manage this unit and allow natural processes to direct the composition and structure of the native communities.
- Prescribed fire will be allowed to pass through the floodplain forest, though consumption of fuel here will not be facilitated, other than to secure fire breaks.

- NHC will take the lead and with participation from Wildlife Management and Forestry will survey, recommend and pursue inclusion of additional floodplain forest parcels as warranted in this unit (provide recommendations to supervisors, December, 2016).
- Salvage of trees is not compatible with the ecological reference area objective of this management unit to assess the impacts of natural processes, such as insect mortality (e.g., emerald ash borer), on forest communities.

Swenson Wet Prairie Management Unit (40 acres)

- Continue on-going restoration efforts to promote the oak savanna and wet prairie components. Use intensive fire management and tree/shrub control (e.g., tree harvests to thin the canopy, understory manipulation and shrub control) to mimic natural disturbance patterns. Fire-tolerant woody species such as native oaks, hickories, and shrubs may be retained at low densities consistent with savanna communities.
- Follow the Oak Savanna State Natural Area Management Guide (*WDNR Staffen 2010f*). The dominant savanna tree species (primarily oaks) are to be managed passively.
- Allow the passive expansion of Wet and Wet Mesic Prairie into adjacent forest openings.
- Augmentation of the ground layer is allowable, but only native prairie species that historically would have been found on the site are acceptable. Seeds or plugs shall be from local genetic material.
- Salvage of trees after a major disturbance can occur if the volume of woody material inhibits fire prescriptions.
- Time prescribed burns to minimize impacts to reptiles, especially the Blanding's turtle.

Sugar River In-stream and Riparian Management - HMA (350 acres)

Fishery Objectives

- Promote the warmwater sport fishery (e.g., northern pike, smallmouth bass and catfish) in the Sugar River and its tributaries.
- Promote the connectivity of the Sugar River with the floodplain communities of oxbows, sloughs and seasonally inundated habitats.
- Provide diverse floodplain habitats that promote the Endangered, Threatened and Special Concern fish populations (e.g., grass pickerel and pugnose shiner).

Fishery Prescriptions

- Passively manage the in-stream and riparian zone habitats for the sport fishery.
- Actively manage sloughs, oxbows and channels to provide connections with the groundwater and surfacewaters to meet the life cycle and aquatic habitat needs of the sport and non-game fishery and other aquatic and semi-aquatic species as resources allow. NOTE: Portions of these river channels, sloughs and oxbows are located within state natural areas. Refer to the management objectives and prescriptions in that section.
- Control carp as needed to protect and enhance wetlands, water quality and native fish.

Habitat Infrastructure Management

Infrastructure Objective

- Retain the existing service roads, gates, dike and water control structure.

Infrastructure Prescription

- Maintain the existing 3.5 miles of primitive to lightly developed service roads, four gates, one water control structure and one dike.

Public Use Management

Public Use Objectives

- Maintain the existing parking lots, boat launch sites and access roads for the public.
- Provide opportunities for hunting, fishing and trapping activities and compatible nature enjoyment, canoeing, bird watching and walking activities.
- Provide a challenging skill level water trail along the Sugar River on the property.
- Assess potential site for a target shooting range on or adjacent to the wildlife area.

Public Use Prescriptions

- Maintain the existing 11 parking lots, one improved boat launch, one native surface carry in boat access site (CTH T) and existing public roads.
- Stock pheasant for sport hunting as resources allow.
- Passively manage the warmwater sport fish population.
- A potential target shooting range site may be available at this property or on surrounding lands. A follow-up assessment process will select a site in the region (see Appendix A).

Approved Lower Sugar River Water Trail

- **Section 1 (gateway and recreation levels)** of the water trail begins at the Clarence Bridge (Green County) Park at the STH 11 bridge and Mount Hope Road. The county park has a carry-in landing and sanitary facilities. Section 1 has two take out points - CTH T (5.3 miles) or at West Beloit-Newark Road (7.0 miles) near the community of Avon.

Section 1 is suitable for users with basic skills to well experienced paddlers. The portion of the river between CHT T and Beloit-Newark Road (1.7 miles) is more challenging.

The department will develop a primitive canoe landing at CTH T. The landing will include a small 2-3 car native surface or gravel parking lot and a mowed slope to the waters' edge. A second takeout will be developed just upstream of the West Beloit-Newark Road bridge (target date 2018). The bridge presents a hazard to navigation due to insufficient clearance for water craft passing under the bridge. Parking is provided at the existing 5-7 car gravel parking lot and boat launch on the downstream side of this bridge.

- **Section 2 (challenge level)** begins at the department boat launch off West Beloit-Newark Road. The primary takeout is 4.75 miles downstream at the Sugar River County Park at Nelson Road. This park is maintained by Rock County. Paddlers proceeding downstream from this park will not have a convenient exit point until reaching the Yale Bridge Road boat launch in Winnebago County, Illinois. This river section from Nelson Road to the state line is about 5 miles and just over 8.1 miles to Yale Bridge Road. The most challenging portion of the river lies between Beloit-Newark Road to about a mile upstream of the state line.

Section 2 is recommended only for paddlers with intermediate or higher paddling skills. The river has a narrow, serpentine course and a steady current. The channel is laced with many down and leaning trees. Down trees obstruct navigation, but it also creates the challenge and adds to the experience. Protecting the continuous forest canopy and maintaining the wild character of the water trail is an important habitat and recreation management objective.

Water Trail Management

- The department managed landings will be signed and have a river trail map showing all river access points and the distance in river miles (and approximate paddle time) between access points. The counties will be encouraged to provide the same informational materials at their access points as well.
- The department canoe landing roads and parking lots will have a native or gravel surface. The carry-in access will be grass-covered and mowed to the water's edge. If use levels warrant and resources are available, sanitary facilities (e.g., port-a-potties) and informational or interpretive materials may be provided at the landings.
- Down trees across the river may block navigation making a pull-over or carry-around necessary. At the discretion of the property manager, small openings may be cut to allow paddle craft to pass through. Cuts of the deadfalls for navigation will be limited (e.g., a four foot width) to maintain the challenge experience of Section 2. All cut material will be left in the river channel. Some downed trees over the river provide crossing points for users on foot to cross the river and should be left uncut.
- State Water Trail Designation - The department will partner with local governments and other parties if interest exists in assessing a State Water Trail designation for the Sugar River.

Badfish Creek Wildlife Area

The Badfish Creek Wildlife Area (WA) was established in 1973. This property has a project boundary of 1,273 acres, an acreage goal of 1,262 acres and the department currently owns 1,147 acres in fee title. An additional 287 acres of working farm lands has been leased for public hunting adjacent to the south side of the wildlife area over the past two decades. These leases will expire by 2017. Maps for this wildlife area are found in Map Series D.

A 2.6 mile stretch of Badfish Creek flows northwest to southeast through the wildlife area. This creek bisects the property and the stream channel has been extensively straightened and dredged. Another seven miles of remnant drainage ditches dissect the east and west sides of this property. These activities have lowered the water table and created conditions conducive to reed canary, nettle and thistle infestations. The lowered water table and invasive species have hampered wetland restoration efforts. The creek and the ditches are also difficult to cross except where bridges and culverts have been added.

The primary habitats on the property consist of disturbed open wetlands, grasslands and low quality second-growth deciduous forest. The majority of this property was previously farmed. Past and current management efforts have focused on restoring or enhancing the remnant higher quality wetlands, grasslands and oak communities. Restoration activities included planting native prairie species and/or non-native cool-season grasses that are managed using a combination of prescribed fire, agricultural practices, mechanical brush removal and various invasive species control techniques. The department and partners have enhanced waterfowl habitat by creating wetland scrapes and small impoundments.

The Badfish Creek Wet Prairie and Spring Seeps is a valuable, highly quality native community based on its size and intact hydrology. State natural area status was approved for this unit. Six Special Concern grassland birds and one Special Concern amphibian have been found on this property.

A significant portion of the flow of Badfish Creek is provided by the effluent discharge from the Madison Metropolitan Sewerage District (MMSD) Nine Springs treatment plant. This stream is listed as a 303d impaired stream due to contaminated fish tissue, water quality use restrictions and contaminated sediments related to PCBs and total phosphorus (*WDNR web references*). Fishing for human consumption is not promoted on this property given the fish consumption advisory applicable to this section of stream.

The MMSD discharge has also provided a very steady and dependable flow to the creek. This stream is increasing in popularity with canoeists and kayakers. The plan recommends adding a second carry in launch/take out site on the south side of the property.

Pheasant hunting is supported by the department stocking program and remains the most popular hunting activity on the property. Deer hunting is also popular with secondary opportunities for turkey, dove, small game and waterfowl hunting. It is also a popular location for hiking, birding and canoeing outside the primary hunting seasons.

Key Management Recommendations

- Increase the habitat quality to Class 2 or above on at least 620 acres of grasslands and wetlands.
- Re-locate the Class 2 dog training area to the north end of the property and significantly expand the size to provide both upland and water training opportunities.
- Add a second carry-in launch site off Old Stage Road on the south side of the property.
- Designate the Badfish Creek Wet Prairie and Spring Seeps State Natural Area (100 acres).
- Expand the project boundary by 210 acres and the acreage goal by 150 acres to improve public and management access to the west and southwest portions of the property. The expansion is also intended to buffer the approved state natural area.

Habitat, Infrastructure and Recreation Management

The habitat, infrastructure and recreation resources will be managed in accordance with the General Management Objectives and Prescriptions or as supplemented below. The objective is to meet Habitat Quality Class 1 in the approved natural area and Class 2 in the grasslands and oak communities.

Cover Type	Current Fee title		Planned 50 year Objective	
	Acres	% Cover	Acres	% Cover
Prairie	45	4	50	4
Grassland	170	15	100	10
Oak Woodland	35	3	35	2
Oak Savanna	0	0	35	3
Aspen	45	4	40	4
Upland Hardwoods	15	1	25	1
Conifer Plantations	5	<1	0	0
Lowland Shrub	195	17	185	16
Non-forested Wetlands	365	32	355	32
Marsh/Emergent Vegetation	240	21	290	25
Bottomland Hardwoods	5	<1	5	<1
Water	25	2	25	2
Developed	2	<1	2	<1
Total	1,147	100	1,147	100

Wetland, Shrub, Grassland and Forest Management - HMA (1,047 acres)

Habitat Objectives - The habitat management objective is to meet or exceed habitat quality Class 2 in the following management units.

- **Unit A (190 acres)** has two objectives:
 - Increase the quality and extent of the grasslands to provide nesting and brood rearing cover for gamebirds as well as bobolink, eastern meadowlark and other SGCNs
 - Restore 50 acres of open, emergent wetlands
- **Unit B (70 acres)** - increase the quality and extent of the Grasslands including removal of scattered trees and the tree line on the west side of the unit.

- **Unit C (110 acres)** - increase the quality and extent of the Grasslands by removing scattered trees and tree lines on the north end of the unit.
- **Unit D (80 acres)** – Promote Savanna and Woodland ecosystems by increasing the Oak and Central Hardwoods components of these forests.
- **Unit E (70 acres)** has two objectives:
 - Enhance the existing 40 acre Oak Woodland.
 - Establish a 30 acre savanna by increasing the Oak and Central Hardwood component.
- Passively manage the remaining 527 acres (Class 2-3 habitat quality).

Habitat Prescriptions

- Actively manage Units A, B and C to achieve Class 2 habitat quality on 140 acres of Grassland.
- Restore and connect Grassland units by removing tree lines to increase pheasant cover and enhance habitat for species of greatest conservation need.
 - Harvest the mature white pine stand (5 acres) in Unit A and convert to Grassland.
 - Restore 50 acres of open emergent wetlands in southeast corner of Unit A.
- Actively manage Units D and E to enhance 50 acres of oak woodland and create 100 acres of Oak/Central Hardwood savanna.
- Manage the remaining habitats as resources allow and promote native species as practicable. These habitats are dominated by reed canary grass and other invasive species and represent a significant management challenge.

Badfish Wet Prairie & Spring Seeps State Natural Area - NCMA (100 acres)

Natural Area Objectives

- Designate the Badfish Creek Wet Prairie and Spring Seeps State Natural Area.
- Manage the site as an open (treeless) wet prairie reserve and a wetland protection area. Natural processes and prescribed fire will determine the structure of the prairie.

Natural Area Prescriptions

- Maintain (and where possible restore) hydrology to protect and promote the Wet Prairie and Spring Seeps communities.
- Control trees and shrubs via brushing or fire to mimic natural disturbance patterns. Occasional native fire-tolerant shrubs may be retained at low densities.
- Other allowable activities include control of invasive plants and animals, and augmentation of native prairie species following approved review procedures and approvals.

Badfish Creek Stream/Riparian Management - HMA (30 acres)

Fishery Objective

- Passively manage the near stream and in-stream habitats.

Fishery Prescriptions

- Follow the General Warmwater Fishery management prescriptions.
- Reduce boxelder cover and promote native forbs, grasses, shrubs and trees to provide wildlife habitat and reduce bank erosion.

Habitat Management Infrastructure

Infrastructure Objective

- Retain the existing service roads, gates, bridge, dikes and water control structures.

Infrastructure Prescriptions

- Maintain the existing 11 miles of primitive to lightly developed burn breaks/stocking lanes, and three gates.
- Maintain one dike and two water control structures.

Public Use Management

Public Use Objectives

- Improve opportunities for hunting, trapping, wildlife observation, paddle craft and walking.
- Inform users of fish consumption advisories.
- Improve access to the southwest portion of the property.

Public Use Prescriptions

- Maintain the existing six parking lots, one bridge, and existing carry in landing.
- Add a bridge to improve access across Badfish Creek.
- Install a carry-in canoe/kayak landing at Old Stage Road (2017).
- Move the Class 2 dog training area to Unit A. Expand the existing parking lot serving this area if warranted. Unit A provides both grassland and water training sites.
- Stock pheasant for sport hunting.
- Install a kiosk in the parking lot on Old Stage road to more effectively communicate with user groups and share information about watershed events, issues (e.g., the fish consumption advisory for Badfish Creek).
- The department has been approved to expand the project boundary and acreage goal and are authorize to acquire access easements from Lake Kegonsa Road and Old Stage Road.

Brooklyn Wildlife Area, Streambank Protection-Story Creek and Scattered Wildlife & Extensive Wildlife Habitat Parcel

The Brooklyn Wildlife Area (WA) and the Streambank Protection-Story Creek are located 1.5 miles east of the Village of Belleville. The department currently owns 2,608 acres in fee title and 338 acres of easements within the 3,070 acre project boundary of the Brooklyn WA. Story Creek includes 258 acres in fee title and 144 acres in easements. Extensive Wildlife Habitat (EWH) and Scattered Wildlife (SW) program funds were used to acquire an additional 138 acres along the Sugar River about one mile south of the wildlife area. Maps for these properties are found in Map Series E.

The Brooklyn WA provides a broad range of hunting opportunities including include stocked and wild pheasant, deer, turkey, rabbit, squirrel, waterfowl, quail, gray partridge and mourning doves. Some trapping of furbearers has also been noted. Story Creek offers quality trout fishing in challenging terrain. The wildlife area is heavily used and crowding can be an issue during the opening weekends of the pheasant and the nine day deer gun hunting seasons. This area is also popular with birders during the spring migration and hikers using 3.8 miles of Ice Age Trail that meanders through the wildlife area.

These properties provide a diverse mix of habitats ranging from a cold/cool water stream bordered by marshes, shrubs and forested wetlands with grasslands and scattered oak and central hardwood woodlands in the uplands. Brooklyn WA also contains an Oak Savanna (50 acres), a Wet Prairie (20 acres) and a Dry Prairie (10 acres). These properties contain a substantial portion of the headwaters of Story Creek. These properties provide a valuable migratory stopover site and habitat for duck production.

Story Creek is a Class 2 trout stream and is the highest quality trout stream in the planning group. Fish survey data indicates the trout population has one of the best size structures in Dane County. This excellent size structure is due in large part to the extensive woody cover that limits fishing pressure and the carryover of trout from year to year helps sustain the abundance and size of trout in the stream.

Thousands of feet of bank protection and bank cover have been installed, brush has been removed and channelized portions of the stream have been re-meandered to improve habitat quality, protect water quality and improve public access. These improvements have been accomplished in cooperation with federal and local partners. However, on-going management challenges include soft organic soils, profuse willow growth, and beaver activity that impede stream flow resulting in warmer water temperatures.

Story Creek is classified as an Exceptional Resource Water (ERW) (*WDNR web references*). This creek provides important recreational opportunities and supports valuable and a relatively unique fisheries (e.g., a cold water brook trout fishery) and wildlife habitat. Public access is provided on about 6.75 miles of stream frontage on Story Creek within the wildlife and fishery areas. The EWH/SW parcels provide about 1.1 miles of frontage on the Sugar River.

Key Management Recommendations

- **Expand the acreage and improve the quality of the grassland and shrub habitats to provide improved cover for pheasant and grassland birds.**
- **Maintain the Class 2 trout classification and improve the channel stability of Story Creek.**
- **Improve the quality of the Oak communities.**
- **Maintain the Ice Age Trail corridor through the wildlife area.**
- **50 acre boundary contraction to remove a subdivision and eliminate boundary overlap.**

Habitat, Infrastructure and Recreation Management

The habitat, infrastructure and recreation resources will be managed in accordance with the General Management Objectives and Prescriptions or as supplemented below. The objective is to meet or exceed Habitat Quality Class 2 in the Primary Sites, oak forests, and grasslands, and Class 2 in the remaining cover types except for those with significant invasive species populations.

Cover Type	Current fee title		Planned 50 year Objective	
	Acres	% Cover	Acres	% Cover
Agriculture	200	7	200	7
Grassland	571	20	581	20
Prairie	200	7	200	7
Aspen	15	<1	15	<1
Oak	280	10	285	10
Oak Savanna	50	2	50	2
Upland Hardwoods	165	5	165	6
Conifer Plantation	20	<1	5	<1
Non-forested Wetland	780	28	780	28
Lowland Shrub	390	13	390	13
Marsh/Emergent Wetlands	110	4	110	4
Bottomland Hardwood	35	1	35	1
Swamp Hardwood	15	<1	15	<1
Water	25	2	25	2
Developed	10	<1	10	<1
Total	2,866	100	2,866	100

Cover Type	Current fee title		Planned 50 year Objective	
	Acres	% Cover	Acres	% Cover
Agriculture	70	51	70	51
Grassland	10	7	10	7
Non-forested Wetlands	38	28	38	28
Bottomland Hardwoods	20	14	20	14
Total	138	100	138	100

Story Creek In-stream and Riparian Management- HMA (20 acres)

Fishery Objectives

- Actively manage the riparian zone (132 feet total width) and in-stream habitat to sustain the coldwater fishery. Fish Management will consult with Wildlife Management and Natural Conservation Heritage on vegetation management within the riparian zone.
- Establish a defined bank and bed between Bellbrook Road and Alpine Road.
- Collaborate with partners and landowners to protect the Story Creek fishery and watershed.
- Manage habitat in Dane County for brook trout and Green County habitat for brown trout.

Fishery Prescriptions

- Install a minimum of 1,000 feet of additional in-stream and riparian zone habitat to promote cold/cool water communities and improve angler access by 2020. Maintain existing in-stream habitat infrastructure.
- Stabilize the organic soil banks and enhance the bed to maintain channel form and function south of Bellbrook Road.
- Work with partners and adjacent land owners to acquire buffer easements and protect the watershed north of the project boundary.

Wetland, Grassland, Forest, Shrub and Crop Lands - HMA (2,850 acres)

Habitat Objectives

- Manage for large blocks of native plant communities to enhance habitat value for game and native non-game species.
- Enhance the quality of the Wetlands and Grasslands for nesting and migrating waterfowl, grassland birds and pheasant cover.
- Enhance the quality and acreage of Oak/Central Hardwood habitats.

Habitat Prescriptions

- Manage the 800 acre Brooklyn Marsh for waterfowl production and water bird migratory stopover habitat (Unit A on Map E-5)..
- Promote desired cool and warm season grassland, wetland and shrubs species to provide cover for pheasants and habitat for grassland nesting ducks and grassland birds.
- Passively manage habitats dominated by invasive species and low value native vegetation.
- Increase the quality and acreage of the 445 acres of oak, hickory and other desired mast and cover tree species on dry and mesic sites.
- Retain conifer plantations in Section 31 as roosting areas, but harvest remaining conifer plantations and convert to grassland or central hardwoods.
- Provide 10-20 acres of food plots for doves and game birds.

Brooklyn Dry Prairie Management - NCMA (10 acres)

Native Community Objective

- Maintain the Dry Prairie. (Minimum Class 2 habitat quality)

Native Community Prescriptions

- Actively manage the Dry Prairie through controlled burns or other approved practices.
- Assess the quality of the 10 acres grassland northeast of the Dry Prairie as a potential addition to this Native Community Management Area.
- Monitor and control invasive species as practicable.

Brooklyn Oak Savanna - NCMA (50 acres)

Native Community Objective

- Maintain the Oak Savanna. (Minimum Class 2 habitat quality)

Native Community Prescriptions

- Actively manage to maintain the oak canopy and understory savanna species.
- Monitor and control invasive species as practicable.

Brooklyn Wet Prairie - NCMA (20 acres)

Native Community Objective

- Maintain and enhance the Wet Prairie community. Meet or exceed Class 2 habitat quality.

Native Community Prescriptions

- Actively manage the Wet Prairie community to remove tree, shrubs and invasive species.

Habitat Infrastructure Management

Infrastructure Objective

- Retain the existing service roads, gates, dikes, culverts and water control structures on these properties.

Infrastructure Prescriptions

- Maintain the current 8.6 miles of native surface to gravel service roads, burn breaks and stocking lanes, and 3 gates.

Public Use Management

Public Use Objectives

- Provide opportunities for the primary recreational activities of deer, turkey, waterfowl and pheasant hunting and trout fishing with secondary opportunities for dove and small game hunting and trapping.
- Provide opportunities for hiking along the Ice Age Trail, nature enjoyment and bird watching.
- Retain the current complement of public access lanes and parking lots.
- Improve recreational opportunities for mobility impaired individuals.

Public Use Prescriptions for Brooklyn WA and Streambank Protection-Story Creek

- Maintain existing 10 gravel and one native surface parking lots, one potable water pump for the Ice Age Trail.
- Brush a minimum of 1,000 feet of stream edge every five years to provide angler access.
- Collaborate with the Ice Age Trail Triad (i.e., US National Park Service, Ice Age Trail Alliance, and the department) on maintaining the 3.4 miles of IAT in the wildlife area and the extension of the trail south and/or east of Mortenson Road.
- Stock pheasant.
- Stock brook trout in Dane County and brown trout in Green County.
- Assess the feasibility of providing an accessible hunting blind for deer and turkey hunting (Wildlife Management lead). Develop a short report by December 2017. Take action to implement the preferred alternative by 2020.

Public Use Goals and Prescriptions for the Scattered Wildlife/Extensive Wildlife Habitat parcel

- Maintain the existing parking lot.

Evansville Wildlife Area & Streambank Protection-Allen Creek

The Evansville Wildlife Area (WA) and the Streambank Protection (SBP)-Allen Creek are located south and southeast of the City of Evansville in Rock County. The wildlife area was established in 1960 to provide public hunting for pheasants and small game. Acquisition of the Streambank Protection Fee program began in 1995 and currently protects lands along several miles of Class 2 and 3 trout waters.

The wildlife area has a project boundary of 905 acres, an acreage goal of 741 acres and the department currently owns 707 acres of fee title and 98 acres of easements. The SBP project boundary is about 2,000 acres and the department currently owns 223 acres of land in fee title. Maps for the wildlife area and the fishery area are found in Map Series F.

Allen Creek is classified as an Exceptional Resource Water (ERW). This stream is one of a very few streams with water quality and temperatures adequate to sustain a brown trout fishery in Rock County. This stream also provides a valuable resource for resident and migratory wildlife.

The dominant cover types on these properties are non-forested wetlands (60%), agriculture (22%) and grasslands/prairies (18%).

This property contains a good quality Southern Sedge Meadow, Wet Prairie, Fen and spring runs complex at the north end of the property.

This property has been stocked with pheasants for many years and is popular with pheasant hunters. Allen Creek has been stocked for decades with brown trout or rainbow trout and is popular with local anglers. This property is also used by small game hunters, trappers, waterfowl hunters and birders.

The department, the US National park Service and the Ice Age Trail Alliance will be looking at routing options to connect the IAT at Brooklyn with the segments near Janesville. The wildlife area and fishery area property may be considered as a potential host for a segment of the through western Rock County.

Key Management Recommendations

- **Assess the feasibility of adding handicapped accessible trout fishing to a Class 2 section of Allen Creek off STH 59.**
- **Contract the Streambank Protection project boundary by 1,870+ acres. The Streambank Protection project boundary upstream of Water Street in the City of Evansville and downstream of the existing fee title fishery parcels should be reduced to a 132 foot wide easement.**
- **Expand the project boundary of the wildlife area by 70 acres to include fee title land outside the existing boundary and allow for the acquisition of permanent public access easement on working farmlands along CTH M.**
- **Continue stocking trout and pheasant.**

Habitat, Infrastructure and Recreation Management

The habitat, infrastructure and recreation resources will be managed in accordance with the General Management Objectives and Prescriptions or as supplemented below. The objective is to meet or exceed Habitat Quality Class 2 in all the cover types on this property.

**Table 2-6: Evansville Wildlife Area and Streambank Protection-Allen Creek
Current and Planned Cover Types (approximate acreage)**

Cover Type	Current		Planned 50 year Objective	
	Acres	% Cover	Acres	% Cover
Agriculture	205	22	165	18
Grassland	90	10	130	14
Prairie	74	8	74	8
Non-Forested Wetlands	500	53	500	53
Lowland Shrub	54	6	54	6
Water	4	<1	4	<1
Developed	3	<1	3	<1
Total	930	100	930	100

Grasslands, Wetlands and Agriculture Management- HMA (855 acres)

Habitat Objective

- Provide large blocks of grasslands, wetland and shrub habitats for pheasant cover and small game and grassland birds.

Habitat Prescriptions

- Convert 40 acres of cropland to grassland. Maintain existing Class 2 quality habitats.
- Provide 10-20 acres of food plots for doves.

Allen Creek In-Stream and Riparian Management - HMA (50 acres)

Fishery Objectives

- Maintain the Class 2 trout stream fishery in Allen Creek below the City of Evansville to STH 59 and the Class 3 trout classification for the portion west of STH 59.
- Contract the Project Boundary.

Fishery Prescriptions

- Manage the riparian zone vegetation and in-stream habitat to support a brown trout fishery.
- Re-meander channelized stream sections and add in-stream habitat on 1,000 feet by 2020 in the Class 2 portions of the stream.
- Contract the current project boundary to a 132 foot width (66 feet on either side of the stream) easement boundary (except for the property currently in department ownership). This contraction will reduce the project boundary by about 1,830 acres.

Evansville Sedge Meadow/Wet Prairie/Fen/Springs - NCMA (25 acres)

Native Community Objectives

- Maintain the Southern Sedge Meadow, Calcareous Fen, Wet Prairie and Spring Runs. (Minimum Class 2 habitat quality)
- Assess the 35 acre sedge meadow/springs north of the approved NCMA for potential inclusion in the NCMA unit.

Native Community Prescription

- Maintain these native communities utilizing general management prescriptions.
- Conduct sedge meadow/springs survey and recommend management status by December 2018. (NHC lead)

Habitat Infrastructure Management

Infrastructure Objective

- Retain the existing roads, culverts and gates.

Infrastructure Prescription

- Maintain the existing 0.9 miles of gravel service road, 1.3 miles of stocking lanes and burn breaks and 2 gates.

Public Use Management

Public Use Objectives

- Provide opportunities for pheasant and small game hunting, trout fishing, trapping and other nature based recreation activities.
- Assess the feasibility of routing an IAT corridor through the wildlife and fishery areas.
- Assess the property as a potential target shooting range site.

Public Use Prescriptions

- Maintain the six gravel parking lots.
- Continue pheasant stocking
- Continue trout stocking.
- Coordinate with the department Parks and Recreation program, National Park Service Ice Age Trail, Ice Age Trail Alliance and local government on assessing trail route options on the former rail right-of-way. Take action as appropriate.
- The target shooting screening process indicated this wildlife area/streambank protection property may have a potential site for a target shooting range. A detailed site assessment and selection process will identify a target shooting range in the planning region. See Appendix A for details on the target shooting screening process.

Hook Lake/Grass Lake Wildlife Area and State Natural Area and Extensive Wildlife Habitat

The Hook Lake Bog State Natural Area (SNA) and the Hook Lake-Grass Lake Wildlife Area (WA) were established in 1991 and 1992. The Hook Lake/Grass Lake WA surrounds the Hook Lake Bog SNA project boundary. A 104 acre of Extensive Wildlife Habitat (EWH) parcel was acquired 1986. These properties are located four miles south of the City of Madison and one mile east of the Village of Oregon. Maps for these properties are found in Map Series G.

This wildlife area has a project boundary of 3,025 acres, an acreage goal of 2,430 acres and the department currently owns 745 acres in fee title. The department has also purchased easements on 229 acres within the project boundary. About 108 acres of these easements are open to the public. Hook Lake Bog SNA has a project boundary of 824 acres that includes a 403 acre lake basin consisting of state trust land and 115 acres of upland held in fee title.

The Extensive Wildlife Habitat (EWH) parcel is located about two miles east of Hook Lake/Grass Lake WA at the intersection of Lake Kegonsa Road and Rutland-Dunn Townline Road. The EWH abuts the federal US Fish and Wildlife Service Gadwall Swamp Waterfowl Production Area (~315 acres).

Hook Lake Bog SNA is one of the highest quality wetlands in Dane County. The lake has a maximum depth of four feet and the amount of open water fluctuates with water depth and plant growth over the growing season. The bog is acidic and nutrient poor. The bog covers slightly about 400 acres and contains Bog Relict, Tamarack (Rich) Swamp and Emergent Marsh plant communities. The 115 acres of upland in this SNA primarily consists of Oak and Central Hardwood forests that are heavily impacted by invasive buckthorn, honeysuckle and garlic mustard. Minor amounts of prairie, grassland and shrub habitat are also found in the SNA.

Grass Lake is a seepage lake with a surface area of 30 acres and a maximum depth of nine feet. It is one of the few remaining deep water marshes in Dane County. It is alkaline and nutrient-rich, and supports a diverse emergent marsh community. This site contains one of the few remaining nesting colonies of black terns in Dane County. Grass Lake and Hook Lake winterkill so no sport fishery exists. A Town of Dunn ordinance prohibits the use of motors on both Hook Lake and Grass Lake.

The uplands of the wildlife area consist of extensive prairie plantings containing a mixture of local genotypes, oak/hickory forests and a small red pine plantation. The oaks and hickories provide food for deer, turkeys, small game and a variety of non-game birds and mammals. Portions of the woodlands are heavily impacted by buckthorn, honeysuckle, garlic mustard and other invasive species.

The Hook Lake/Grass Lake WA contains a small in-holding owned and managed by a non-profit foundation. This foundation has a land use agreement for this in-holding. The land use agreement describes the shared responsibility for the maintenance and repair of the road that provides access to the in-holding.

These properties provide hunting opportunities for turkey, deer, waterfowl, doves, pheasants and small game. Pheasant hunting is promoted by the department stocking program. The wetlands usually provide good production of wood ducks and mallards. Dove hunting is provided on the farm agreement fields. Other popular activities include hiking, bird watching and nature observation.

This property provides an important opportunity to provide habitat for ring-necked pheasant and many species of greatest conservation need (e.g., Henslow’s sparrow, Eastern meadowlark, bobolink, and other grassland birds that require large patches of grassland (greater than 80 acres) and scattered patches of oak openings. Prairie restorations have used local genotype seed and an 80 acre Indian grass field north of Rutland-Dunn Road is a valuable seed collection site.

Key Management Recommendations

- Enhance the species diversity and maintain Class 2 quality of the restored Prairies.
- Restore and/or enhance the Oak Savannas and Oak Woodlands.
- Contract project boundary by 38 acres.

Habitat, Infrastructure and Recreation Management

The habitat, infrastructure and recreation resources will be managed in accordance with the General Management Objectives and Prescriptions or as supplemented below. The priority habitat management units are described below and are shown in Map G-5. The objective is to meet or exceed habitat quality Class 2 in the priority management units.

Cover Type	Current fee title		Planned 50 year Objective	
	Acres	% Cover	Acres	% Cover
Agriculture	60	5	40	3
Prairie	442	35	467	35
Grassland	15	1	15	3
Oak	110	9	110	9
Oak Opening	0	0	25	2
Upland Hardwoods	90	7	90	8
Conifer Plantation	25	2	0	0
Upland Shrub	40	3	35	3
Marsh/Emergent Wetland	380	30	380	30
Tamarack Swamp	25	2	25	2
Non-Forested Wetlands	30	2	30	2
Water	40	3	40	3
Developed	7	<1	7	<1
Total	1,264	100	1,264	100

Cover Type	Current fee title		Planned 50 year Objective	
	Acres	% Cover	Acres	% Cover
Upland Shrub	53	51	53	51
Marsh/Emergent Wetlands	51	49	51	49
Total	104	100	104	100

Hook Lake Bog State Natural Area - NCMA (518 acres)

Natural Area Objectives

- Maintain the Bog Relict, Emergent Marsh and Southern Tamarack Swamp (rich) as a wetland reserve (410 acres) and manage as an ecological reference area.
- Restore degraded Oak Woodland and Grasslands (92 acres) in the uplands east of Hook Lake to promote native species. NHC (lead), WM and FR shall develop a report with habitat management recommendations by December 2017 to address the restoration efforts.

Natural Area Prescriptions

- Passively manage the bog relict and marshes except for invasives species control. Allow natural processes to determine the species composition and structure of these cover types.
- Implement the management report recommendations for the oak opening and grasslands. Anticipated management activities include prescribed burns, timber stand improvement practices, herbicide treatments and other general habitat management practices.
- Retain the tamarack communities using approved active and/or passive management.

Grass Lake and Riparian Zone Management - HMA (93 acres)

Grass Lake Objectives

- Maintain the diverse, native aquatic and deep water marsh communities for the benefit of migratory birds, breeding waterfowl and wetland dependent wildlife.
- Seek to maintain a stable population of Black Terns.
- Provide Class 2 quality Grasslands adjacent to the marsh for nesting waterfowl.

Grass Lake Prescriptions

- Utilize dormant season prescribed fire and targeted herbicide application to discourage the increase of hybrid cattail and other persistent invasive species.
- Allow black tern nesting platforms to meet the management objective.
- Protect the black tern nesting colony from disturbance during the nesting season.

Wetlands, Grasslands and Forests Management – HMA (652 acres)

Habitat Objectives

- Increase the acreage, patch size (>80 acres) and quality of grassland habitats to benefit Henslow's sparrow and other grassland species of greatest conservation need.
- Provide nesting and brood cover for turkeys and ring-necked pheasants on public and private lands within the project boundary.
- Enhance the current patches of oak opening and woodland where feasible.
- Maintain high quality (Class I) wetlands at Gadwall Swamp and restore/enhance wetland basins on existing public lands (10 acres).

Habitat Prescriptions

- Restore 20 acres of cropland and low quality forests to diverse, local genotype prairie by 2020.
- Actively manage grassland units using the general management prescriptions to achieve Class 2 habitat quality. Connect adjacent grassland and open, emergent wetland units through strategic tree removal projects. Removal projects that result in patch sizes >80 acres will be prioritized.
- Diversify existing restorations using a combination of prescribed fire and inter-seeding using local genotype prairie/savanna species.

- Work with partners to acquire or restore parcels within the project area that increase the acreage and extent of grassland patches on public and private lands. Patch sizes should be >80 acres.
- Remove 20 acres of conifer plantations and associated woody invasives and convert to oak opening by 2020.
- Utilize a combination of prescribed fire, silvicultural, mechanical control and chemical application to meet or exceed Class 2 habitat quality on 80 acres of oak in the wildlife area
- Passively manage the wetlands at the EWH with control of invasive species as resources allow. Manage the uplands for a mosaic of brush and trees.
- Evaluate the restoration potential of the small Class 3 quality wetland basins located within the EWH and the wildlife area parcels west of Sand Hill Road by 2017 (WM lead).

Habitat Infrastructure Management

Infrastructure Objective

- Retain the existing service roads, culvert and gates.

Infrastructure Prescription

- Maintain the existing 0.7 miles of gravel service roads, 10.9 miles of native surface stocking /burn lanes and four gates. There is a complex of eight buildings used by the department to store equipment and supplies. These buildings are adjacent to the small in-holding on the Hook Lake WA.

Public Use Management

Public Use Objectives

- Continue to provide hunting opportunities for deer, turkey, waterfowl, pheasant, dove and small game.
- Provide opportunities for bird watching and other non-consumptive recreational uses.
- Retain the existing public access infrastructure.

Public Use Prescriptions

- Maintain the existing four gravel parking lots, information boards and carry-in boat access at Grass Lake.
- Stock pheasant for sport hunting as resources allow.
- Work with partners to increase public access to private lands within the property boundary.
- The property group has four parking lots that provide public access. A carry in boat access is available at Grass Lake. The EWH is accessed through the adjacent US–FWS parking lot or parking on the road.

Liberty Creek Wildlife Area

Liberty Creek Wildlife Area (WA) was established in 1959 to provide public hunting access in northeast Green County (Map Series H). This wildlife area. This property has a project boundary of 1,075 acres, an acreage goal of 1,032 acres and the department currently owns 563 acres in fee title.

Wetlands comprise almost 90% of the land cover in this wildlife area. The property is mostly a low quality marsh dominated by reed canary with some high quality sedge meadow wetlands. Small blocks of oaks and scattered bottomland hardwood islands are also found on this property.

Liberty Creek meanders north to south through this property and is currently classified as a Class 3 trout stream. This creek has good water quality and is classified as an Exceptional Resource Water, but based on fishery surveys and the in-stream habitat the NRB approved the staff recommendation to proceed with declassifying Liberty Creek as a trout stream. This creek has not been stocked for several years and the Fish Management program recommends removing the stream from the stocking list given the higher quality trout streams in this planning group and region.

This property is used by pheasant hunters and offers deer, turkey, small game and waterfowl hunting too. Some trapping and bird watching occurs on the property. This property does not offer anglers a quality opportunity to trout fish. Access to this property is limited to one parking area off English Settlement Road and off the shoulder of the Brooklyn-Albany Road. The substantial amount of wetlands makes management of and recreational access to this property difficult.

Key Management Recommendations

- Contract the project boundary by 450 acres and the acreage goal by 450 acres.
- Declassify Liberty Creek as a Class 3 trout stream.

Habitat, Infrastructure and Recreation Management

The habitat, infrastructure and recreation resources will be managed in accordance with the General Management Objectives and Prescriptions or as supplemented below.

Cover Type	Current		Planned 50 year Objective	
	Acres	% Cover	Acres	% Cover
Grassland	5	1	5	1
Prairie	5	1	5	1
Oak	35	6	35	6
Upland Hardwood	5	<1	5	<1
Lowland Shrub	15	2	15	2
Marsh/Emergent Wetlands	180	32	180	32
Non-Forested Wetlands	302	54	302	54
Bottomland Hardwoods	10	2	10	2
Water	5	<1	5	<1
Total	563	100	563	100

Wetland, Grassland and Woodland Management - HMA (445 acres)

Habitat Objectives

- Maintain grasslands, wetlands and the Maintain Oak and Central Hardwood Forests.
- The objective is to meet Habitat Quality Class 2 in all the cover types.

Habitat Prescriptions

- Actively manage to retain and enhance the Oak and other desirable mast and cover species.
- Grassland and wetland management will primarily be passive. However, if resources and circumstances allow prescribed burns will be conducted.

Southern Sedge Meadow/Wet Prairie Management - NCMA (50 acres)

Native Community Objective

- Protect and maintain the Southern Sedge Meadow and Wet Prairies.

Native Community Prescriptions

- Actively manage the Southern Sedge Meadow and Wet Prairie using the general management prescriptions.
- Collaborate with local and non-profit groups to restore/ manage this native community.

Liberty Creek In-Stream and Riparian Management - HMA (35 acres)

Fishery Objective

- Maintain the vegetative cover to protect the riparian and in-stream habitats and water quality.

Fishery Prescription

- Passively manage the in-stream and riparian zone vegetation.

Habitat Management Infrastructure

Habitat Management Objectives and Prescriptions

- There is no habitat infrastructure on this property. No change was approved.

Public Use Management

Public Use Objectives:

- Provide opportunities for pheasant, deer, small game and waterfowl hunting, trapping and other nature based recreation.
- Declassify Liberty Creek as a class 3 trout stream.

Public Use Prescriptions:

- Maintain the gravel access road and gravel parking lot off Old English Settlement Road.
- Stock pheasant for sport hunting.
- The trout stream reclassification process requires the stream biologist to publish a public notice in the local newspaper of record and other media to inform local residents and interested parties of the approved action. The notice will also be published on the department web page for statewide distribution. The department will waive the hearing requirement unless a written request for a hearing is received within 30 days of the posting date. This reclassification process will proceed after the master plan is approved by the Natural Resources Board.

Footville Wildlife Area Feasibility Study

The approved Footville Wildlife Area (WA) has been known for many decades as the Footville and Evansville Public Hunting Grounds (PHG) in western Rock County (Map Series I). This PHG has a long history of providing public hunting opportunities dating back to the late 1940's. The leased lands provide about 40% of the public hunting lands in this planning group. As of May 2016 about 9,000 acres in six townships (Union, Porter, Magnolia, Center, Spring Valley and Plymouth) are available for public hunting.

In addition to the leased lands, the approved wildlife area would include 481 acres of embedded Extensive Wildlife Habitat (EWH), Statewide Wildlife Habitat (SWH) and Statewide Wildlife (SW) fee title parcels, and 156 acres of easement lands.

Pheasant hunting is the primary use of these lands with some deer, turkey, dove and waterfowl hunting.

The funds for leasing the private lands has been provided through various state and federal sources, such as license fees and Pittman-Robertson funds, over the years. Local sporting clubs have provided funding to maintain the leases when state funds were limited. More recently federal USDA Voluntary Public Access funds have been used to secure the leases. A significant concern with the current arrangement is public access could be lost if efforts to secure funding for the leases is not successful or the land is developed.

Approved Action

A 13,000 acre project boundary was approved for the Footville Wildlife Area. Within this 13,000 acre project boundary, a permanent public easement goal of 3,000 acres is was approved to complement the on-going leasing program. The project boundary focuses on lands where leasing has been an accepted department – private partnership for nearly 70 years. The existing state owned wildlife lands and easements within the approved boundary would provide permanent cover, wildlife habitat and year round recreation access.

The primary benefit of the approved action is to provide permanent public access for pheasant and dove hunting. Deer, turkey and small game hunting opportunities would be secondary benefits hunting of acquiring the approved easements. The leased hunting grounds have been heavily stocked for many years (over 2,200 pheasant in recent years). Acquiring permanent public easements on working farmlands would ensure the public has access to hunting land and the stocking program has long-term access to lands for their pheasants.

This project seeks to complement and leverage investments made by two other initiatives:

Rock County PACE program – The Purchase of Agricultural Conservation Easements (PACE) is a Rock County funded program that seeks to conserve working farmlands in priority areas (Rock County web source). There is some overlap between the target areas for the PACE program and the approved WA project boundary. A collaboration between Rock County, the department and willing landowners would allow each party to achieve their desired outcome by more efficiently using existing funding sources to provide a greater return to local land owners and the conservation agencies. Land owners interested in the PACE program should check with the Rock County Land Conservation Department on program guidelines and the availability of funds.

NRCS WRP easements – The NRCS has invested many hundreds of thousands of dollars in acquiring development rights and restoring native vegetation on 1,800 acres of wetlands within the approved project boundary (see Map I-1).

The federal investments have restored valuable wildlife habitat and protected surface and groundwater resources, but they have not provided any additional public recreational access. The approved project would seek to acquire public access easements from willing landowners on these NRCS easements.

Habitat Management – The five EWH/SWH/SW parcels within the approved project boundary will be classified as Habitat Management Areas (**HMA**). The habitat will be managed using the General Management Objectives and Prescriptions. The primary habitat management objective will be to maintain large blocks of grassland, wetland and shrub habitats for pheasants, doves and other resident and migratory birds. The management activities would focus on establishing and/or maintaining the desired warm and cool season grasses needed to provide food, cover and nesting habitats. Agricultural practices will be routinely used to rejuvenate the grasslands and provide food plots. The approved plan recommends several 5-10 acre food plots to enhance dove hunting opportunities be a standard habitat practice. The food plots will rotate from parcel to parcel based on grassland renovation activities.

Table 2-9: Approved Footville Wildlife Area – EWH and SW parcels					
Current and Planned Cover Types (approximate acreage)					
Cover Type	Current			Planned 50 year Objective	
	Acres	% Cover		Acres	% Cover
Agriculture	35	7		35	7
Grassland	105	22		105	21
Prairie	240	50		240	50
Upland Shrub	5	1		5	1
Upland Hardwoods	10	2		10	2
Non-Forested Wetlands	50	10		50	10
Bottomland Hardwoods	31	7		31	7
Water	4	<1		4	<1
Developed	1	<1		1	<1
Total	481	100		481	100

Habitat Management Infrastructure – The EWH/SWH/SW properties have about 1.2 miles of stocking lanes and mowed burn breaks. The plan recommends continued use of firebreaks for prescribed burning purposes. No additional infrastructure was approved for these parcels.

Public Use Management – The primary recreational objective is to provide pheasant and dove hunting with secondary opportunities for deer, turkey and small game hunting, and other nature based activities such as bird watching. Other approved uses on the fee title lands include connector trails as part of regional snowmobile trail systems. Management prescriptions include continued pheasant stocking on the leased parcels, the fee title acreage and any public access easements acquired.

The existing six gravel/native surface parking lots on the fee title lands would be maintained.

The Spring Valley Road parcel appears to have site conditions suitable for hosting a target shooting range. See Appendix A for details on the target shooting range screening and site selection processes. Rock County owns land adjacent to department parcels near Hanover. Authority to pursue land swaps to improve habitat management and public access as warranted was approved.

Extensive Wildlife Habitat - Rock County

Four parcels totaling 397 acres (all fee title) were acquired under the statewide acquisition authority of the Extensive Wildlife Habitat (EWH) program. They provide dispersed hunting opportunities for deer, turkey and small game on properties noted for their grasslands and open wetland cover types. They also provide permanent cover for wildlife in an area dominated by agricultural activities. Maps for these parcels are located in Map Series J.

These properties have about 2.1 miles of stream frontage along Willow Creek and Raccoon Creek, but due to their small size, limited flow and warmwater conditions they do not support a sport fishery.

Two small, land locked properties (20 acres and 10 acres respectively) are surrounded by private land. There is no department or public access to these parcels. The 10 acre parcel is currently for sale and this plan recommends the 20 acre parcel be sold as well.

Key Management Recommendations

- Continue current habitat and recreation management activities.
- Recommend two isolated, land locked parcels with no management or public access rights (30 acres) be sold.

Habitat, Infrastructure and Recreation Management

The habitat, infrastructure and recreation resources will be managed in accordance with the General Management Objectives and Prescriptions or as supplemented below. The objective is to meet Habitat Quality Class 2 in all of the approved cover types, unless noted otherwise.

Cover Type	Current		Planned 50 year Objective	
	Acres	% Cover	Acres	% Cover
Agriculture	24	7	24	7
Grassland	60	15	60	15
Upland Hardwood	20	5	20	5
Oak	5	1	5	1
Lowland Shrub	200	50	200	50
Non-Forested Wetlands	85	22	85	22
Water	2	<1	2	<1
Developed	1	<1	1	<1
Total	397	100	397	100

Grassland, Wetland and Forest Management - HMA (387 acres)

Habitat Objective

- Maintain or create larger blocks of grassland and forest habitats for deer, turkey, dove and other species.

Habitat Prescriptions

- Actively manage the current cover types using the General Habitat Management prescriptions.
- Protect and enhance the 20 acre Class 2 sedge meadow at the Extensive Wildlife Habitat parcel off South Avon Store Road.
- Provide several 5 acre food plots to enhance dove hunting opportunities.

Willow/Raccoon Creeks Stream/Riparian Management – HMA (10 acres)

Fishery Objective

- Passively manage the in-stream and riparian habitats of Willow Creek and Raccoon Creek.

Fishery Prescription

- Follow the General Habitat Management prescriptions.

Habitat Infrastructure Management

Infrastructure Objective

- Retain the existing service roads and culverts.

Infrastructure Prescription

- Maintain the 0.3 miles of native surface stocking lanes and burn breaks.

Public Use Management

Public Use Objectives

- Provide opportunities for hunting, trapping and nature enjoyment.
- Retain the existing parking lots.
- Assess the property off South Avon Store Road as a potential target shooting range site.

Public Use Prescriptions

- Stock pheasant for sport hunting as resources allow.
- Maintain the existing three gravel/native surface parking lots.
- The South Avon Store Road EWH parcel may have a potential site for a target shooting range. A detailed site assessment and selection process will identify a target shooting range in the planning region. See Appendix A for details on the target shooting screening process.

Fishery Area Recommendations

NOTE: The management recommendations for the Streambank Protection properties at Story Creek and Allen Creek are included in the Brooklyn WA and Evansville WA write-ups respectively.

Streambank Protection-Anthony Branch

Anthony Branch is located two miles southeast of the City of Oregon in southern Dane County. The creek is a tributary of Badfish Creek and may also be referred to as the Rutland Branch. Land acquisition for this property began in 1979. This property has a project boundary of 1,020 acres and the department currently owns 637 acres in fee title. Maps for this property are found in Map Series K.

Anthony Branch is a Class 2 trout stream. Stream management has focused on exclusively stocking brook trout to establish a self-sustaining brook trout population.

The stream is classified as an Exceptional Resource Water (ERW) with good water quality and is not significantly impacted by human activities. They can provide a variety of recreational opportunities and support valuable fisheries habitat. They warrant protection to minimize the effects of pollution.

The property has a diverse mix of open wetlands, small patches of oak forest, and restored prairie. About 70 acres of wetlands consist of a high quality southern sedge meadow and calcareous fen.

This property provides quality habitat for deer, turkey, pheasant and brook trout. It also sustains species such as brown thrasher and red-headed woodpecker as well as Species of Greatest Conservation Need including Henslow's sparrow, American woodcock, American bittern, Eastern meadowlark, and Blanding's Turtle. Habitat management has focused on restoring and maintaining the open wetlands, large patches of restored prairie, prairie remnants, grasslands and oak ecosystems.

This property provides opportunities for trout fishing and deer, turkey and small game hunting. Birding, hiking and winter sports are also enjoyed on this property.

Key Management Recommendations

- **Reclassify Anthony Branch upstream of CTH A to a Class 1 designation and promote a brook trout fishery.**
- **Restore Oak Savanna and Oak Woodlands.**
- **Protect the 70 acre Fen and Sedge Meadow.**
- **Contract the project boundary west of USH 14 by 140 acres since it is protected by an existing conservation easement.**
- **Expand the project boundary on the south and east by 80 acres to protect more of the headwaters and provide additional upland habitat. No expansion of the acreage goal is requested.**

Habitat, Infrastructure and Recreation Management

The habitat, infrastructure and recreation resources will be managed in accordance with the General Management Objectives and Prescriptions or as supplemented below. The management units are described below and are shown in Map K-5. The objective is to meet or exceed habitat quality Class 2 in the priority management units.

Cover Type	Current		Planned 50 year Objective	
	Acres	% Cover	Acres	% Cover
Prairie	165	26	165	26
Grassland	57	9	59	9
Aspen	20	3	20	3
Central Hardwood/Oak	60	11	60	9
Oak Savanna	0	0	13	2
Conifer Plantation	2	<1	0	0
Shrub Wetlands	105	15	105	15
Non-Forested Wetlands	200	30	200	30
Bottomland Hardwood	30	5	30	5
Water	2	<1	2	<1
Developed	1	<1	1	<1
Total	637	100	637	100

Anthony Branch In-stream and Riparian Management - HMA (25 acres)

Fishery Objectives

- Reclassify Anthony Branch upstream of CTH A to a Class 1 trout stream.
- Promote a brook trout fishery.
- Protect springs and restore a natural meandering channel to the stream.
- Establish a riparian management zone (66 feet on each side of the stream) (Unit G).

Fishery Prescriptions

- Plant and/or promote vegetation in the riparian zone to shade the stream and near shore vegetation conducive to brook trout management.
- Re-meander a minimum of 1,000 of stream reach above CTH A and promote in-stream habitat preferred by brook trout.
- Remove infrastructure that forms ponds or warms input waters from springs on the property.
- Remove/disable drainage pipes/culverts that enhance sediment transport to the stream.

Wetland, Grassland, Shrub and Forest Management - HMA (542 acres)

Habitat Objectives

- Achieve Class 2 quality for the Prairie and Oak Savanna (**Unit A – 165 acres**).
- Achieve Class 2 quality of the Oak Savanna and Oak Woodlands (**Unit B – 60 acres**).
- Achieve Class 2 quality and increase the species diversity of Grasslands (**Units D – 38 acres and E – 60 acres**).
- Maintain the Class 1 quality Prairie and expand the size as practicable (**Unit F – 1 acre**) off Oak Ridge Road. Protect the genotype seed source for local restoration efforts.
- Passively manage the remaining habitats (**218 acres** of Class 2-3 habitat quality).

Habitat Prescriptions

- Unit A management prescriptions:
 - Harvest the pine plantation and replant to prairie vegetation. (year 2020 goal)
 - Remove woody invasives and increase the diversity of native grasses/forbs.
 - Restore the Oak Savanna (13 acres).
- Actively manage Unit B to achieve Class 2 quality Oak Woodlands and Oak Savanna. Manage to regenerate oak, hickory and desired woody and native understory species.
- Actively manage Grassland Units D and E to maintain Class 2 habitat quality. Connect adjacent grassland and open emergent wetland communities by removing trees. Use wet/wet-mesic prairie species seed from Unit F as resources are available.
- Actively manage Unit F using standard practices to maintain, and expand the prairie.
- The remaining Lowland Shrub and Bottomland Hardwood habitats will be passively managed as recreational habitat and wildlife cover.

Sedge Meadow and Fen Management – NCMA (70 acres)

Native Community Objective

- Unit C will be managed for Sedge Meadow, Wet Prairie, Calcareous Fen and springs.

Native Community Prescriptions

- Use prescribed burns, chemical application and mowing to control invasive woody species.
- Allow natural processes to guide the composition of the native flora and fauna.
- Monitor and control invasive species as resources allow.

Habitat Infrastructure Management

Infrastructure Objective

- Retain the existing burn breaks, gates, culverts and bridges except as noted below.

Infrastructure Prescriptions

- Maintain the existing 2 gates, one water control structure, one bridge/culvert, one gravel ford and 4.4 miles of burn breaks.
- Remove or block the storm drain pipe in Unit E to reduce sediment moving into the stream.

Public Use Management

Public Use Objectives

- Primary recreational opportunities are trout fishing and deer, turkey and woodcock hunting. Incidental opportunities for waterfowl, dove, small game and pheasant hunting, and trapping and other nature based recreation.
- Maintain existing public use infrastructure except as noted below.
- Assess the property for potential target shooting range sites.

Public Use Prescriptions

- Maintain the existing four gravel/native parking lots and add a five (5) car gravel or native surface parking lot off of Waterman Road.
- Brush a minimum of 1,000 feet of stream edge every five years to provide angler access.
- Stock brook trout only.
- Assess the feasibility of developing an accessible trout fishing site (Fishery lead). Develop recommendations by December 2017 and take action to implement the preferred alternative.

Parks and Recreation Area Recommendations

Ice Age Trail - Montrose State Ice Age Trail Area

The Ice Age Trail - Montrose State Ice Age Trail Area (SIATA) is located about 1.5 miles east of the Village of Belleville and is adjacent to the northwest edge of the Brooklyn WA. The department currently owns 219 acres in fee title within the project boundary – 157 acres acquired by Parks and Recreation and 62 acres by Wildlife Management. Maps for the Montrose SIATA are found in Map Series L.

The trail passes through a variety of cover types and has a rolling course through woods and fields, and provides scenic views of the Sugar River valley. About 3.8 miles of the Ice Age are located on this property. About 2.7 miles of the trail are located on fee title lands and 1.1 mile on easements. This trail segment connects with the Badger State Trail on the north. The trail continues south through the Brooklyn WA and a future IAT planning effort will address a connection toward the City of Janesville

The cover types on this property consist of cropland and restored grasslands on the ridge tops with oak and central hardwood forests on the slopes. Several small prairies are also located on this property. Prescribed burning and other approved techniques are used to limit brush encroachment and improve habitat quality in the grasslands and prairie restorations.

The recreation management emphasis is to provide hiking, silent winter sports and nature enjoyment with some limited deer, turkey and small game hunting. The Ice Age Trail Alliance (IATA) and local volunteers have been essential in constructing and maintaining the trail and assisting with the prairie restorations.

Key Management Recommendations

- **Provide opportunities for hiking, backpacking, scenic vistas and wildlife observation.**
- **Maintain productive relationship with the IATA and local volunteers who conduct the majority of the trail maintenance and restoration of native plant communities in accordance with department policies.**

Habitat, Infrastructure and Recreation Management

The habitat, infrastructure and recreation resources will be managed in accordance with the General Management Objectives and Prescriptions or as supplemented below. The objective is to meet or exceed Habitat Quality Class 2 in the grassland and hardwood cover types.

Table 2-12: Montrose State Ice Age Trail Area Current and Planned Cover Types (approximate acreage)					
Cover Type	Current		Planned 50 year Objective		
	Acres	% Cover	Acres	% Cover	
Agriculture	30	14	20	9	
Prairie	14	6	73	33	
Grassland	50	23	5	2	
Oak	35	16	40	18	
Upland Hardwood	87	40	80	37	
Conifer Plantation	2	<1	0	0	
Developed	1	<1	1	<1	
Total	219	100	219	100	

Grassland, Shrub and Forest Management - RMA (219 acres)

Vegetation Management Objectives

- Promote native communities by converting agricultural lands to native prairie plantings with an objective to maintain scenic views.
- Maintain or restore an oak forest/oak savanna prairie continuum.

Vegetation Management Prescriptions

- Remove conifer plantations and replace with oaks and shagbark hickory. Passively manage the scattered conifers and allow succession to oak and central hardwoods.
- Actively manage the oak and central hardwoods to prolong the biological lifespan of existing oaks. Techniques to use in the restoration of woodland systems include selective tree harvesting, prescribed fire, planting of desired species such as oaks, shagbark hickory, prairie and savanna herbs, and invasive species control.
- Convert agricultural lands on hill tops and ridge lines to prairies.
- Manage vegetation to enhance the vistas and scenic views from hill tops and ridge lines.
- Inventory invasive species and prioritize and apply invasive species control.

Habitat Infrastructure Management

Infrastructure Objective and Prescription

- Maintain the existing burn breaks.

Public Use Management

Public Use Objectives

- Retain the primitive trail, access points, dispersed camping infrastructure and way finding signage.
- The primary purpose of this property is to provide quality hiking, dispersed camping and nature enjoyment opportunities. Hunting is a secondary recreational activity on this property.
- Promote a remote setting featuring native plant communities and scenic views in a primarily natural appearing landscape that emphasizes non-motorized recreation experiences.

Public Use Prescriptions

- Maintain the existing primitive trail, trail route, one gravel parking lot and dispersed camping area.
- A 100 yard no hunting buffer is located on each side of the trail on the Parks and Recreation parcels. These parcels only provide modest deer and turkey hunting opportunities.
- The 100 yard buffer does not apply to the 62 acres of Wildlife Management land. Enter dnr.wi.gov in your search window and go to the department home web page. Then enter files/PDF/pubs/pr/PR_2680.pdf in the search box for additional information and a map of the property.

Project Boundary and Acreage Goal Adjustments

Project boundary and acreage goal adjustments are approved for nine of the twelve properties. These adjustments include both contractions and expansions depending on the management goals for the property and opportunities to work with partners. These adjustments are intended to provide satisfying recreational experiences the anticipated changes in the population of the region, recreational trends, and changes in land use. They are also intended to leverage existing conservation investments, maintain or enhance the quality of the habitats, and promote efficient property management.

The planning group currently has 13,751 acres of fee title land, 403 acres of trust land, and 903 acres of easements. Since 2000, 82 acres/year of fee title land, 48 acres/year of easements and 12 acres/year of gift lands have been acquired annually for these properties. These expansions have aided efforts to provide quality recreational experiences and wildlife habitat on these properties.

The following project boundary and acreage goal adjustments have been approved:

- Contract the project boundaries collectively by 2,645 acres.
- Support the sale of two Extensive Wildlife Habitat parcels - 30 acres total.
- Expand the fish and wildlife boundaries to include department owned land outside of the current project boundaries (794 acres total consisting of 734 acres of wildlife land and 60 acres of fishery parcels).
- Expand the wildlife area project boundaries by 6,390 acres and the acreage goals by 5,600 acres. Within these boundary expansions there are 734 acres of existing department land, about 2,550 acres of NRCS easements, and 724 acres of gift lands (Pheasant Forever lands).
- Create the Footville Wildlife Area to acquire permanent public access easements on 3,000 acres of working farmlands. The approved project boundary of 13,000 acres includes the area within which public hunting leases have been acquired over the last seventy years. Within this new project boundary about 1,800 acres are in NRCS easements. This new project area is proposing an acreage goal of 3,000 acres for the acquisition of permanent public access easements.
- Expand the fishery area project boundaries by 80 acres with no acreage goal expansion.
- Adjust the State Natural Areas as follows:
 - Establish the Avon Bottoms Floodplain Forest State Natural Area (1,978 acres) by merging and expanding two existing state natural areas (Avon Bottoms and Swenson Wet Prairie). A significant percentage of the land in the approved expansion area is department owned.
 - Designate two new state natural areas (180 acres total) on state owned land within the existing project boundaries at Albany WA and Badfish Creek WA.

The reasons for adjusting the project boundaries and acreage goals include:

1. Improve public access and recreational opportunities. Several adjustments are intended to reduce user confusion about property lines and minimize trespass issues. Others are intended to link non-contiguous uplands to improve upland access and recreational opportunities around the water bodies and wetlands that form the core of many of these properties. The adjustments also seek to maintain or improve the quality of the users experience by reducing crowding and improving the aesthetic value of the properties.

2. Provide larger contiguous blocks of wetland, grassland and forest ownership to improve the productivity of the habitat and the efficiency of habitat management activities.
3. Increase the acreage of upland grasslands for grassland nesting waterfowl, pheasants and grassland birds. The approved project boundary adjustments would meet the 1:1 grassland to wetland ratio and increase the bottomland habitat needed for tree nesting ducks as well.
4. Improve efforts to protect the quality of plant and animal communities. Management of invasive species is more consistent and effective if project boundaries follow roads or natural features.
5. Buffer current properties and recreational uses from non-compatible land uses. Hunting regulations state that gun hunting is not allowed within a 100 yard radius of homes unless the resident provides permission. Expanded boundaries were approved to provide greater certainty that existing department lands can be fully used for all of the intended purposes.
6. Protect our existing investment in wildlife and fishery lands. The intent is to sustain critical inputs of surface and groundwater while reducing the risk of habitat degradation related to erosion, sedimentation, nutrient enrichment and introduction of invasive species.
7. Coordinate acquisition and property management activities with partners. Optimize the use of limited management and acquisition funds to maximize habitat and public recreation benefits. Emphasizing public access and/or habitat management rights acquired through easements rather than fee title was determined to be a desirable option at Footville and Allen Creek.
8. Follow NR 1.40 acquisition guidelines to provide recreational land in the heavily populated areas of the state and in places readily accessible to such areas. Acquisition criteria include:
 - (a) Consolidation and completion of existing projects.
 - (b) New acquisition projects that meet the following criteria:
 - Water-based resources and land important to protect and improve the quality of surface and ground water; and land for recreation and management along streams and rivers.
 - Lands to accommodate natural resource-based recreation and state recreational trails.
 - Land within 40 miles of Wisconsin's largest cities, this includes Madison and Janesville.
 - Land to protect rare and threatened natural resources; to protect genetic and biological diversity; and to protect, manage or restore critical fish and wildlife habitat.

Land Acquisition Guidelines

The following criteria are used to assess the conservation and recreation merits of a property:

1. Can the land provide quality hunting, trapping and/or fishing experiences? Does it also offer opportunities for compatible nature-based outdoor activities?
2. Is the land adjacent to current state lands or other protected lands? Will it buffer the property from existing or future incompatible land uses?
3. Is the land greater than 40 acres? Does it have no or low-value improvements?
4. Does it have high quality wildlife habitats, critical habitat for Species of Greatest Conservation Need and/or rare natural communities within the Ecological Landscape?
5. Does the land affect the hydrology of important conservation lands (e.g., trout streams)?
6. Would it enable a wetland or riparian restoration project to proceed?

Project boundary adjustments followed roads or natural features (e.g., rivers). Using roads creates better access opportunities, minimizes trespassing and is easier to portray on maps. Project boundaries are often larger than the acreage goals (i.e., the amount of land authorized to be acquired by the Natural Resources Board) to provide flexibility when negotiating the purchase, easement, sale or trade of land. Using roads as boundaries will bring some developed parcels (e.g., homes, farmsteads) into project boundaries. However, the criteria used to rank properties for acquisition provide lower scores for parcels with substantial improvements. When buildings are purchased as part of a larger land holding, the buildings are typically split from the larger parcel and sold consistent with local zoning ordinances. Portions of properties not needed for conservation purposes may be sold/leased back for agricultural or other compatible uses though the state may retain development and public access rights.

Project Boundary and Acreage Goal Adjustments

Wildlife Management

This plan recommends the following adjustments in the existing wildlife project boundaries (Table 2-13).

Table 2-13 Approved Wildlife Project Boundary and Acreage Goal Adjustments (acres)				
Wildlife Areas	DNR parcels outside current boundaries	Expansions	Contractions	Acreage Goal
Albany	690	1,460	0	950
Avon Bottoms	35	4,650	0	4,950
Badfish Creek	0	210	0	150
Brooklyn*	0	0	25	0
Evansville*	8	70	0	0
Hook Lake/Grass Lake	0	0	35	0
Liberty Creek	0	0	450	(-450)
Total	734	6,390	510	5,600

* Brooklyn and Evansville wildlife areas would have minor project boundary adjustments (four acres and seven acres respectively) to incorporate lands outside the existing boundaries.

Approved Footville Wildlife Area

A new project area was established in western Rock County in an area where landowners have participated in public hunting leasing programs for nearly 70 years (Table 2-14).

Table 2-14 Approved Footville Wildlife Area Project Boundary and Acreage Goal (acres)		
Access Proposal	Approved Project Boundary	Acreage Goal
Fee Title*		481
Permanent Public Access Easements	13,000	3,000
Leases		6,000

* The fee title acres were acquired through various statewide wildlife acquisition programs.

Fishery Management

The plan recommends the following adjustments to the fishery area project boundaries (Table 2-15). The major action is a significant reduction of the Allen Creek project boundary.

Table 2-15 Approved Streambank Protection Project Boundary Adjustments (acres)				
Streambank Protection	DNR Parcels Outside Existing Boundaries	Expansions	Contractions	Acreage Goal
Anthony Branch	0	80	140	0
Allen Creek	60	0	1,870	0
Story Creek	0	0	25	0
Total	60	80	2,035	0

Natural Heritage Conservation

The draft plan recommends the creation of one large state natural area at Avon Bottoms along the Sugar River floodplain with the two existing state natural areas managed as specific units within the new natural area. In addition, two new state natural areas were approved – Albany WA (80 acres) and Badfish Creek WA (100 acres).

All of these new or expanded natural areas will be overlays within existing wildlife project boundaries, primarily on state owned land. These expansions will establish additional ecological reference areas within the state natural areas system.

Parks and Recreation

The boundary of the Ice Age Trail corridor (Montrose SIATA) was not revised, but the department owned and eased parcels should be brought into the corridor boundary when the department, the Ice Age Trail Alliance and the US National Park Service (the TRIAD) realign the trail corridor.

Land Cover in the Project Boundary Adjustment Areas

Fee Title – About 5,790 acres of private land were approved for fee title acquisition within the project boundaries. About 57% of this total consists of land under permanent NRCS easements (2,600 acres) and potential gift lands owned by Pheasants Forever (700 acres). Importantly, the NRCS easements and the Pheasant Forever lands have already been restored to grassland and wetlands. This plan recommends that the acquisition of the Pheasant Forever and the NRCS easement parcels should be a priority for this planning group.

Easements - This plan recommends permanent public access easements be acquired in two areas. The highest priority is to acquire 3,000 acres of permanent public access easements for the approved Footville Public Hunting Grounds in Rock County as shown in Map I - 1. These lands have been part of the leased public hunting grounds for nearly 70 years.

Property	Forest/ Brush	Grasslands	Wetlands	Cropland	Developed	Total
Albany WA	30	130	410	265	15	850
Avon Bottoms WA	420	520	2,390	1,245	75	4,650
Badfish Creek WA	10	20	20	160	0	210
SBP- Anthony Branch	0	5	0	70	5	80
Grand Total	460	675	2,820	1,740	95	5,790
Wildlife Areas Total	460	670	2,820	1,670	90	5,710
Fishery Areas Total	0	5	0	70	5	80

* **NOTE:** A variety of department and other sources were used to estimate the cover types and land uses on the private lands in Table 2-16. They include aerial photography, Forestry WisFIRS (forest inventory data base), Water Division Wetland maps, county based internet web mapping and planning documents, and field surveys. These data sources may use different criteria for classifying cover types and land uses. Consequently, different estimates may be developed depending on the source(s) used and the time frame considered.

CHAPTER THREE

FINDINGS AND CONCLUSIONS

Individuals interested in learning more about these properties and the underlying ecological and socio-economic context are strongly encouraged to read the supporting material in the *Rapid Ecological Assessment for the Sugar River Planning Group Fish and Wildlife Properties* (WDNR NH-846, December 2013) and the *Regional & Property Analysis for the Sugar River Planning Group Wildlife, Fish and Natural Areas* (WDNR Pub #059). These documents can be viewed on the web at dnr.wi.gov key words “master planning”.

The following Findings and Conclusions is derived from the *Regional and Property Analysis*, but has been updated to include information and analysis developed after the RPA was published.

The Sugar River Planning Group offers the public access to over 14,000 acres on seven wildlife areas, fifteen scattered wildlife parcels, three fishery areas, one natural area, and one state Ice Age Trail area. About 10,000 acres of leased lands provide public hunting opportunities on working farm lands and some restored habitats.

These properties are located in south central Dane County, eastern Green County and western Rock County. The region is connected by an extensive road network and the properties are within an hour drive of up to 2,000,000 people in the metropolitan areas of Madison, Milwaukee, Chicago and the Rock River valley cities. Importantly, the populations in Dane, Green and Rock counties are anticipated to increase by 20-50% between 2000 and 2035 with the fastest growth (nearly 50%) in Dane County.

These properties provide a substantial fraction of the publicly available hunting, fishing and outdoor recreation land in a part of the state that is significantly below the state average for public hunting and fishing lands.

Increased human demands on these properties and challenges posed by invasive species and other gradual changes in natural systems could affect the resources vital to the quality of the habitats on these properties. Population growth is expected to lead to increased use and a greater diversity of users. Fragmentation of the landscapes surrounding these properties is also anticipated. These changes could affect groundwater flow to trout streams, surface runoff quality and quantity to rivers and wetlands, and the integrity of the native plant and animal communities. In turn, these changes are expected to impact the character and quality of the user experiences on these properties.

Some of these challenges can be met with improved management techniques and appropriate acquisition of habitat lands by state, federal and local governments. Other valuable partners in meeting the challenges of land conservation and management noted above are dedicated sporting groups, non-profit organizations and private landowners.

Priority Needs and Opportunities

The planning group has opportunities to preserve and restore open and forested wetlands, grasslands, upland forests and savanna habitats. There are also significant opportunities to protect and restore meandering floodplains and associated wetland communities. Restoring this landscape mosaic along the riparian corridors, will benefit numerous game and non-game species.

The highest priority recreation, habitat and conservation opportunities include:

- Protecting and enhancing the recreational, habitat and ecological opportunities along the Sugar River corridor. The primary opportunity area is the Avon Bottoms WA, the adjacent NRCS easements and the floodplain corridor up to the City of Brodhead. Other important areas along this corridor include the public lands and conservation easements along the Sugar River and Little Sugar River at the Albany WA and Brooklyn WA.
- Exploring options for providing long-term hunting opportunities on the leased lands and scattered fee title parcels at the Footville Wildlife Area.
- Protecting the coldwater fisheries and the warmwater aquatic communities in the planning group.
- Protecting the open wetlands, grasslands and natural communities identified in the Primary Sites at Avon Bottoms WA, Albany WA, SBP-Anthony Branch, Brooklyn WA, Badfish Creek WA, Evansville WA and Hook Lake/Grass Lake WA and SNA.

Recreational Needs, Opportunities and Capacity

Partnership Opportunities and Challenges

The department has made a significant investment in providing public access in this region. About 13,165 acres are in fee title ownership and 7,340 acres of permanent public access easements have been acquired as of 2013. Almost 10,000 acres of hunting access has been obtained as short-term leases through the Voluntary Public Access program. A concern with the leased parcels is the potential loss of access due to a loss or cut in funding or non-participation by landowners. These fee title, easement and leased lands account for over 75% of the public access lands in the three counties and over 97% of the public access lands in Green and Rock counties.

The following agencies, units of government and private entities collaborate with and complement department efforts to provide public access, protect working farms, and enhance fish and wildlife habitat.

- US Fish and Wildlife Service waterfowl production areas
- US Natural Resource and Conservation Service (NRCS) floodplain and wetland easements.
- County open space lands and Rock County PACE lands.
- Town of Dunn (Dane County) open space and working farms initiatives.
- Natural Heritage Land Trust purchases open space and development rights on working lands.
- Sporting groups (e.g., Pheasants Forever, local sporting clubs), The Prairie Enthusiasts, Audubon and other volunteers have assisted with land purchases and habitat management activities.

While all of these efforts help protect habitat and open spaces, they may not provide public access for hunting, fishing, trapping and other nature based activities. For example, NRCS has protected thousands of acres through wetland, floodplain and/or agricultural conservation easements near Avon Bottoms WA, Albany WA, Hook Lake/Grass Lake WA and the Footville Wildlife Area. However, none of these easements provide public access. A concern about the NRCS easements is the potential for fragmentation and reduced habitat management options if the restored grasslands and wetlands are sold off as recreational parcels. This could jeopardize their potential for future public access and could reduce their value as wildlife habitat as well.

A significant challenge is the future of the leased parcels at the Footville Wildlife Area. These leases are purchased through the Voluntary Public Access program with federal funding. These hunting grounds provide nearly 43% of the public access hunting lands in the planning region and over 75% of the public access lands in western Rock County. If additional funds are not obtained to maintain the leases, these lands will not be available for public access after the leases expire in 2017.

Green and Rock counties have among the lowest percentages of state public ownership in the state. Green County has less than 1.5% state hunting and fishing lands, Rock County has slightly more at 1.8%, and Dane County has the most at 3.1%. All three of these counties fall within the bottom third of counties in terms of the availability of state recreational acreage on a per capita basis.

Hunting

These properties currently provide quality deer, turkey, pheasant, small game, woodcock, dove and waterfowl hunting experiences to many users. Avon Bottoms, Albany, Brooklyn, Badfish Creek and the leased lands at Evansville and Footville are the largest properties and the most heavily used. The smaller properties including Hook Lake/Grass Lake, Anthony Branch, Liberty Creek and the scattered wildlife parcels provide quality hunting experiences, but there is a greater focus on a smaller number of species such as waterfowl, pheasants or small game.

The larger properties have the greatest potential to meet and possibly expand the number of and quality of hunter experiences. These properties typically have larger blocks of habitats that sustain more diverse wildlife populations. They are also more efficient and less costly to manage. Larger properties often have more access points and are less likely to become overcrowded though this remains an issue on opening day of deer and pheasant hunting seasons due to the popularity of these properties.

Providing satisfying hunter experiences in the future will require abundant, sustainable populations of game species on high to moderate quality habitats with good public access. These experiences and habitats can be provided on state owned properties, easements and leased lands, and by partnering with private land owners and other parties (e.g., federal/ local government, land trusts and sporting groups).

Conflicts between hunters and non-hunters currently are minimal as most non-hunters are aware of the hunting seasons and most hunters abide by hunting restrictions near trails, closed areas and adjacent homes. However, the potential for conflict may change as regional demand for nature based outdoor activities is likely to increase given the anticipated increase in the human population. Increasing the number of users and uses creates the potential for competing demands on these properties.

Dog Training

Badfish Creek WA has a designated Class 2 dog training area. Additional habitat management is being considered to improve the quality of this training ground. Other properties can be used if applications are approved by the wildlife manager. An additional dog training site is being considered for Green County.

Shooting Ranges

No designated shooting ranges are currently located on the planning group properties. The closest public target shooting ranges are located at Yellowstone Wildlife Area (Lafayette County) and McMiller Sports Center (Waukesha County). These shooting ranges are over a one hour drive from the major communities and many of the residents within the planning region.

Public access to shooting ranges is provided at some private ranges and hunt clubs in the planning area, but this access is limited and typically a fee is charged. Dane County also offers limited target shooting at the county facility in Waunakee.

Under NR 45.09(5) the public may target shoot on state properties in Rock and Green counties. However, in Dane County shooting on state lands is restricted to the respective hunting seasons, when dog training with a permit, or at a developed shooting range (assuming one is provided).

Public access to shooting ranges is part of the department's efforts to promote responsible gun ownership and safe hunting experiences. Target shooting is also becoming more popular as a sport. Shooting ranges, whether on public lands or leased private facilities, provide a valuable service, but noise, safety and environmental concerns can be issues if the activity is not well managed or the facility is located close to sensitive receptors or non-compatible land uses (e.g., homes, schools or refuges).

Due to the lack of or limited availability of target shooting ranges and the department Shooting Range Guidance, the development of a public shooting range is warranted for the planning area.

Trapping

Trapping is occurring on a number of these properties and the price for furs has provided an impetus for maintaining these activities. Beaver removal is especially desired along trout streams such as Story Creek in the Brooklyn WA. On-going efforts to improve habitat quality in and along the streams, and restore wetlands should provide an abundant and sustainable supply of furbearers.

Fishing

These properties offer numerous warmwater and trout fishing opportunities. Game fish found in the warmwater streams include northern pike, bass and walleye while the trout streams contain brown and brook trout with the occasional stocked rainbow trout. Continued efforts to improve water quality, in-stream habitat and angler access in and along these warmwater and coldwater streams could improve game fish abundance and user experiences.

The warmwater sport fisheries in the Sugar River (Avon Bottoms WA) and Little Sugar River (Albany WA) are not regularly stocked and rely on natural reproduction to sustain their populations. Fishing these streams is challenging due to their meandering nature, the number of tree falls and fluctuating water levels. However, a quality fishing experience exists for those willing to develop the skills and provide the time to explore these streams.

Badfish Creek is not stocked and supports a modest warmwater sport fishery and occasionally a brown trout may be taken. The channelized stream reaches and the depth of the ditches within the wildlife area offer more challenging and less aesthetically pleasing fishing experiences.

Access to the warmwater streams is from the bridges and bank fishing though some canoe/kayak angling occurs too. Fishing access is passively managed at the current time.

Four trout streams (Story Creek Anthony Branch, Allen Creek and Liberty Creek) are located within the planning group. These streams provide opportunities to catch native brook trout, naturalized brown trout and the occasional rainbow trout. Natural reproduction of trout is occurring in Story Creek and Anthony Branch and less so in Allen Creek. Trout are stocked to maintain a sport fishery on these streams because fishing pressure is heavy and/or the in-stream habitat prevents or limits natural reproduction.

Story Creek and Anthony Branch are Class 2 trout streams with the potential to support sustainable brook trout. However, this will require changes in stocking strategies and in-stream and shoreline vegetation management practices to favor brook trout over brown trout. The Class 2 portion of Allen Creek will be managed for brown trout. These streams will be the priority areas for future management. Actions to provide and improve trout fishing include the meandering of straightened stream segments, management of near shore vegetation to provide better habitat and angler access, and beaver control.

The Class 3 trout stream sections of Allen Creek and Liberty Creek have limited potential to provide quality habitat and support trout fisheries into the future.

Boating and Water-based Activities

These properties are valued locally as destination for boating experiences. The oxbows, sloughs, meandering river corridors and tree falls along the Sugar and Little Sugar Rivers provide an opportunity for solitude. There are no official water trails at the current time, but volunteers have been cutting and removing deadfalls along certain segments of these rivers to improve navigation. Access to these rivers is provided at department and town boat landings and road crossings.

Developing informal river trails should be explored as options for promoting an awareness of these floodplain corridors and improving accessibility to these rivers. However, any water trail development needs to respect the solitude and sense of wildness currently enjoyed by users and protect the ecological integrity of these systems.

Birding, Photography and Wildlife Viewing

Birding and wildlife viewing are increasingly popular activities on these properties. The existing roadways, the Ice Age Trail and the many informal paths provide excellent opportunities for bird and wildlife viewing. Avon Bottoms is recognized as a Wisconsin Important Bird Area. Avon Bottoms and Brooklyn wildlife areas plus the Sugar River Trail through the Albany WA are included in the Southern Savanna Region of the Great Wisconsin Birding and Nature Trail (*WDNR 2008*) as offering quality bird observation sites. Additional roadside pull outs, viewing blinds and educational signage should be explored in the planning process.

Hiking, Cross Country Skiing and Snowshoeing

Hiking, walking for pleasure and sightseeing are popular activities as noted by the SCORP analysis and user numbers for the Montrose SIATA and the Sugar River Trail.

The IAT is the premier hiking venue in the region and is the only designated hiking trail in the planning group. The trail section through the Montrose SIATA features scenic bluff top views while the portion through the Brooklyn WA features rolling topography and diverse natural communities. The existing IAT planning corridor does not pass through any of the other planning group properties. Opportunities to connect and enhance trail infrastructure beyond these two properties are being explored by the department, the National Park Service, the Ice Age Trail Alliance and other interested parties. Expansion of the trail through any of the properties will consider ecologically sensitive sites, compatibility with other major users, the potential to spread invasive species, soil suitability and long-term maintenance issues.

Cross country skiing and snowshoeing occur on most of these properties and these uses are expected to increase as the population of the region expands (*DNR 2006c*).

Many of the properties have limited potential to host longer loop trails (e.g., greater than 3 miles) that are desirable as destination trails because of their small size, the non-contiguous nature of the upland parcels, and the amount of wet soils.

Motorized Sports

There are over 800 miles of snowmobile trails in Dane, Green and Rock counties, and several trails cross through these properties. The trails and associated infrastructure (e.g., bridges and signage) are part of regional trail systems and are maintained by local snowmobile clubs.

ATV use is prohibited on all properties except for individuals with permits for personal mobility devices. A number of these properties are not suitable for ATV use due to the combination of wet or erodible soils and sensitive ecological communities. ATV and other off-road vehicle uses are generally not compatible with the primary purpose of these wildlife and fishery areas. ATV use is allowed on the Cheese Country trail in Green County.

Horseback Riding and Mountain Biking

Horseback riding and mountain biking are not authorized uses on these properties. There is little to no evidence that horseback riding or mountain biking is an issue on these properties. Regional recreation studies (*WDNR 2006c*) show a need for additional trails, but the potential for trails on the properties is limited because of the predominance of wet soils and limited contiguous uplands. Use of these properties for horse and bike interests is limited by the requirement (NR 1.51) that non-primary uses not significantly detract from the primary purposes of the property which is hunting, fishing, trapping and other nature based outdoor recreation.

Equestrian trails and mountain biking trails are provided at other regional public and private facilities. For example, Yellowstone State Park and Wildlife Area provide 30 miles of horse trails and four miles of off road biking trails. Rock and Dane counties offer several county parks with equestrian trails.

Camping

Dispersed camping is allowed in the designated camping area on the Montrose State Ice Age Trail Area. Otherwise, camping is not allowed on the wildlife, fishery and state natural areas. Camping has not been identified as a need on these properties given the availability of camping on other state, county and private facilities in the region.

Geocaching

According to geocaching web maps there are approximately 40 caches on the planning group properties. Popular geocaching properties include Albany WA, Liberty Creek WA and Brooklyn WA. There are 15-20 caches on the Sugar River Trail as it passes through the Albany WA.

Other Recreation Activities

These properties also provide opportunities for gathering wild edibles (e.g., mushroom and berry picking) when in season. Dog walking has become an increasingly popular use for residents close to wildlife areas. Badfish Creek WA is particularly popular for pet walking. Dog should be on leash from April 15 - July 31 to protect nesting wildlife.

Accessibility

The properties are currently served by a variety of parking lots, pull offs along the road, boat landings and, in some cases, by access points provided by other agencies or local units of governments. Most of the properties have adequate access given their size though Hook Lake Bog/Grass Lake and several of the extensive wildlife lands have limited to no access.

Currently there are no handicapped accessible facilities on any of the planning group properties. With the aging of the population and the department goal to improve accessible recreational opportunities some recreation infrastructure improvements for will be considered in the master planning process.

Ecological Significance and Habitat Capabilities

Regional Context

These properties are representative of the Southeast Glacial Plains Ecological Landscape, which is comprised of glacial moraines on the high ground surrounded by expanses of rolling ground moraine and relatively flat glacial outwash plains. Historically, the region was characterized by a mosaic of forests, savannas, prairies and wetlands; many of these ecosystems were adapted to fire. Some of these original ecosystems still remain, albeit in an often degraded condition, and are interspersed among sizeable areas of cropped land, pastures, roads, and human developments.

These lands are populated with diverse game and non-game species. These properties lie in a transition area between an agriculture-dominated landscape with large population centers to the north, south and east and more sparsely populated, agricultural and forested landscapes of the Driftless Area to the west.

Collectively, these properties have the following ecologically significant characteristics:

- Open wetlands, grasslands and oak-dominated forests;
- Cold and warmwater streams that support diverse wetland and aquatic communities, herptiles, aquatic invertebrates, bats, and both game and non-game fish;
- Extensive open (non-forested) wetlands that support diverse wildlife, including amphibians;
- Remnant Oak Savanna and Prairie communities; and
- Habitat for grassland and forest birds

The Sugar River and Yahara River (Badfish Creek) are the principal watersheds in this property group. The region has a diverse mix of surface waters including warmwater rivers and streams, scattered coldwater streams, natural lakes and numerous wetlands.

Opportunities

The priority management opportunities include restoring and expanding grasslands, open wetlands, and lowland forests at a landscape scale. There are also local scale opportunities to protect and restore remnant prairies, oak savannas, and oak forests. Managing for a continuum of oak forest, oak savanna, and native or surrogate grassland is desired to meet the life history needs for numerous rare and declining species. Preserving or developing large blocks of closed canopy oak forest is also desired.

Maintaining a diverse mix of closed canopy forests and young forests is a challenge. The two most pressing forestry challenges include:

- Maintaining older oak stands for habitat diversity while regenerating sun loving oak seedlings.
- Addressing the potentially catastrophic loss of ash in lowland forests due to emerald ash borer.

The fishery areas provide an important opportunity to protect and enhance several high quality coldwater trout streams. The Sugar River extending from the Brooklyn WA through the Avon Bottoms WA is of statewide importance and supports a diverse native flora and fauna, high quality natural communities, and a robust sport fishery.

The state natural areas in the planning group are Hook Lake Bog, Swenson Wet Prairie and Avon Bottoms.

Challenges

Major threats to the ecological integrity of these properties are inter-related and include ecological simplification and alteration of natural communities due to loss of species diversity, proliferation of invasive species, environmental degradation due to pollution (e.g., sedimentation and nutrient enrichment), the long-term challenge of climate change, changes in surface and groundwater systems, and habitat fragmentation. Particular challenges include non-native invasive species infestations, disrupted hydrology due to dams, the ditching and tiling of former wetlands, and severe fragmentation of the natural communities.

A significant issue in the region is the sharp drop in grasslands provided by the federal Conservation Reserve Program (CRP). In Wisconsin, these lands have declined from a high of more than 713,000 acres in 1994 to less than 320,000 acres in 2013. CRP enrollment in the planning group counties has declined almost 50% from an average of 26,000 acres in the mid-1990s to 13,500 acres in 2013.

Wildlife Habitat

These properties provide a variety of high-quality habitat for both game species as well as rare and sensitive species. The primary game species include white-tailed deer, eastern wild turkey, American woodcock, small game and ring-necked pheasants. These properties have significant potential for improved habitat quality and increased capacity to support a wide variety of game and non-game species.

Restoring and protecting the grasslands, wetlands and forests at Avon Bottoms WA, Albany WA, Brooklyn WA, Anthony Branch SBP and Hook Lake-Grass Lake WA will have the greatest benefit for game and non-game wildlife. Protecting the oak communities (e.g., ranging from savanna to woodlands to closed canopy forests) and lowland forests will provide valuable mast, nesting and foraging habitat.

Aquatic Communities

Maintaining the exceptional and outstanding water quality classification of the streams is a priority. Enhancing the quality of the impaired streams is desired as resources and regulations allow. Challenges to protecting water quality and quantity, especially for the trout streams, include minimizing soil, nutrient and herbicide runoff from point and non-point sources. Protecting groundwater quality and flows will also contribute to the long-term biological integrity and productivity of these waterbodies.

The in-stream and shoreline habitats for warmwater streams are passively managed at the current time (due to limited resources and other priority activities). Sugar River, and to a lesser extent, the Little Sugar River offer northern pike, bass, catfish and walleye fishing. The warmwater sport fish populations in the Sugar River are occasionally supplemented with stockings of walleye and northern pike fingerlings.

The two highest quality trout streams are Story Creek and Anthony Branch. Both streams are classified as Class 2 trout waters. They support some natural reproduction, but they are stocked to sustain the popular sport fisheries. These streams are fed by numerous springs and have the potential to support sustainable brook trout fisheries. Working with partners to protect these springs is essential to sustain the coldwater communities into the future.

Brook trout management will mean a change in in-stream management strategies. Brook trout favor small pools and riffles and more overhanging streamside vegetation unlike the larger pools and overhanging banks favored by brown trout. It would also mean a change in stocking practices.

The Class 2 trout streams provide some natural reproduction, but all of the trout streams are stocked to maintain viable sport fisheries. Recent changes to wild source stocked fish have improved the populations and encouraged natural reproduction. The future of the Liberty and Allen Creek trout fisheries is questionable given land use and climate changes anticipated over the coming decades.

Long-term concerns include nutrient loading to both cold and warm water systems, land use changes that degrade surface water runoff and groundwater pumping that may reduce spring inputs to these streams. Protecting wetlands, spawning habitat and minimizing impacts from invasive species, such as Mud snails, carp, zebra mussels and others will be critical for their long-term health.

Warmwater stream habitat and aquatic populations will benefit most from improved water quality, wetland restoration and reduced flashiness to enhance habitat quality rather than direct human intervention in terms of in-stream or shoreline habitat changes.

Badfish Creek carries the distinction of receiving the highly treated effluent of the Madison Metropolitan Sewerage District (MMSD). The stream morphology and flow has been significantly altered by past stream straightening, side ditches, tiling and dredging related to farming activities and the MMSD discharge. Ditching and channelization are not conducive to providing optimal fish habitat in their current condition and potential remedial actions are not anticipated to provide substantial improvement.

Riparian and Aquatic Habitat for Non-Game Species

The lower Sugar River provides important aquatic habitat for fishes and aquatic invertebrates such as mussels, mayflies, dragonflies and damselflies. These species either use habitat at Avon Bottoms WA, or their continued viability is influenced by the high-quality aquatic and wetland habitats at Avon Bottoms.

Acoustical surveys indicate good quality bat habitat is present at Avon Bottoms WA and Albany WA. Maintaining diverse cover types (e.g., forests, marshes, sloughs) close to water will provide needed habitat for six species of bats identified during the summer residency period surveys (*WDNR, REA,2013*).

Open Wetlands

Non-forested wetlands comprise the majority of land cover on these properties. They vary in quality, but are vital for minimizing flooding, filtering nutrients and pollutants, providing moisture banks during low water periods or droughts, and providing natural migration corridors for wildlife. Although Southern Sedge Meadow is the dominant natural community type, Calcareous Fen, Wet Prairie, Wet-mesic Prairie, and Emergent Marsh often intergrade with the sedge meadow. A unique Open Bog and Floating-leaved marsh is located at Hook Lake Bog SNA. These wetlands provide important stopover sites for migratory birds and breeding habitat for grassland and marsh birds, turtles, amphibians, and invertebrates.

Hook Lake SNA-Grass Lake WA is a high-quality due to a lack of invasive species and minimal impacts from draining. By comparison, many of the wetlands have been heavily impacted by non-native invasives, hydrological modification, and grazing. Regardless of their condition, the ownership of the open wetlands should be retained and protected from further disturbance. Restoration should be targeted at the highest quality wetlands in the Primary Sites, or other sites identified as having high restoration potential.

Opportunities also exist to improve all wetlands by limiting the dominance and spread of invasive species (particularly reed canary grass), targeting the early detection of and the rapid response to species such as Japanese hops, and remediating past disturbances and limiting further system disturbances.

Oak Communities

Opportunities exist to restore three types of globally rare oak savanna communities (Oak Opening, Oak Woodland, and Oak Barrens). Restoration and expansion of these communities will enhance the habitat for numerous threatened and endangered species and Species of Greatest Conservation Need (SGCN). Major opportunities are present at Brooklyn WA, Albany WA and Avon Bottoms WA to restore and/or maintain oak savanna communities. Priorities for restoration should be the Primary Sites and other sites identified as having high restoration potential. Secondary restoration opportunities also exist at Badfish Creek WA, Anthony Branch SBP and Hook Lake Bog SNA.

Maintaining oak woodlands is also a concern. Many of the oak communities are mature and regenerating oak raises concerns about the loss of closed canopy forest habitat for forest interior birds. Staff will consider management options during master planning to identify habitat objectives and prescriptions that address forest health and succession issues that impact wildlife habitat goals, endangered resources, recreational uses and forest products.

Bird Habitat

Grassland bird species are exhibiting the most significant declines of any suite of bird species in Wisconsin and across the Midwest. The planning group presents opportunities to provide large grasslands and open wetlands with quality nesting habitat needed to support numerous bird species. Managing from a landscape perspective can better accommodate the complex habitat needs of a greater number and variety of grassland birds, and may include wetland, upland and shrub components.

The best opportunities for grassland bird management are at Avon Bottoms, Brooklyn, Badfish Creek, and Hook Lake-Grass Lake wildlife areas. These species have the potential to increase in density and potentially improve nest productivity if the open grasslands are maintained and connected to open wetlands. A significant opportunity to collaboratively manage and protect a mosaic of large open grasslands and wetlands for game and non-game species exists around the Avon Bottoms WA.

Large, protected blocks of forest are rare in south-central Wisconsin. Avon Bottoms WA provides the best opportunity for forest birds in the entire planning group and has also been recognized as an Important Bird Area and Conservation Opportunity Area (*WDNR 2006c*). Integrated management of the NRCS easements with department parcels could provide over 3,000 acres of grasslands and close to 2,000 acres of floodplain forest. The forest blocks at the Brooklyn WA Oak Savanna and Dry Prairie Primary Site also attract an impressive assemblage of forest birds, including rare or declining species.

Open wetlands provide important habitat for marsh birds and, when in proximity to open water, waterfowl and waterbirds. In particular, the wetlands of Hook Lake-Grass Lake WA support a significant colony of a state-endangered colonial bird. Opportunities to promote stopover habitat for migrating songbirds, waterfowl, waterbirds and raptors also exist on the properties in this planning group.

Reptile and Amphibian Habitat

Reptile and amphibian populations have declined significantly in Wisconsin due in large part to habitat modification and fragmentation. The wetlands on these properties provide basking, foraging and overwintering habitat for numerous rare or uncommon amphibians and reptiles. These properties present significant opportunities for the conservation of the Blanding's turtle, due to an abundance of habitat and the presence of dispersal corridors between areas suitable for habitation. Opportunities also exist at the Avon Bottoms WA (sand prairies) and Albany WA (Albany Sand Prairie and Oak Savanna Primary Site) to provide habitat for a variety of reptiles, particularly rare terrestrial turtles and snakes.

Non-native Invasive Species

Non-native invasive species are a threat to the natural plant and animal communities. If not controlled, they have the potential to significantly harm the general value and fitness of the habitats on all of the properties. Management efforts should identify the areal extent of and limit the spread of the invasive populations, and provide early detection and rapid control of new and/or small infestations. The major invasive plant species on these properties include: common buckthorn, garlic mustard, Eurasian bush honeysuckle, spotted knapweed, Japanese hedge parsley, black locust, and reed canary grass.

Emerald ash borer poses an imminent threat to ash trees and forested areas on these properties. This species has been positively identified at Avon Bottoms WA. Department staff are developing management strategies to address this threat. One example is under planting with one or more native species (e.g., swamp white oak and other suitable species) where ash mortality threatens the ecological integrity of closed canopy forests.

Summary

With continued population growth, expanding infrastructure needs and greater row cropping there has been significant fragmentation of the natural landscapes in this planning area. There are increasingly diverse sets of recreational users on our public lands too. Thoughtful planning and management will be needed to maintain high quality wildlife and fishery habitat while also providing for increased demand for a broader array of recreational experiences from an increasing number of users.

Increased collaboration and efficient management of the SPRG properties as well as those of partner agencies and units of government will be needed to provide quality habitat for game and desirable non-game species as well as satisfying recreational experiences for users.

This planning group contains important opportunities to protect and enhance many ecologically significant communities including diverse cold and warmwater fisheries, open wetlands, upland and lowland forests, savannas, prairies, grasslands and populations of rare species. These habitats provide regionally significant opportunities for outdoor recreation, particularly for deer, turkey, waterfowl, dove and pheasant hunting. Wildlife-viewing will continue to be a popular activity, with rich opportunities for watching waterfowl, shorebirds and grassland birds. These properties also provide valuable environmental services such as floodwater retention, groundwater recharge, and filtration of nutrients and contaminants.

From a regional perspective, these properties can continue to provide high quality natural communities and habitats for both game and non-game species. Importantly, these properties are well-suited to continue providing lightly developed, non-motorized recreation experiences in rustic settings for years to come within this increasingly developed landscape.

Information Sources and References

Acres estimates in this master plan were generated from several web based intranet data systems. All acres for existing department properties were derived from the Bureau of Facilities and Lands Land Records system.

Boundary adjustments and cover type acres were derived from several department data bases including the Lands Division Land Records system, Forestry Division WisFIRS, the surface water and fisheries data, and Natural Heritage Conservation state natural areas. Soils information was taken from the NRCS Web Soil Survey. The respective county comprehensive planning and interactive web mapping tools were consulted to assess natural resources designation, and agricultural soils and preservation recommendations.

This master plan analyzed many attributes including land use patterns and trends, habitat distribution and quality, life history requirements of species of greatest conservation need, recreation needs and trends, factors that influence high quality outdoor experiences, and public input.

Comprehensive Local Plans (Land Use, Parks and Open Space, and Farmland Preservation) for Dane, Green and Rock counties. Web links. Use key word search; *Dane County or Rock County or Green County* with *Planning or Open Space or Farmland Preservation*.

eBird: An online database of bird distribution and abundance [<http://www.ebird.org>]. Cornell Lab of Ornithology, Ithaca, New York. (2012).

Ducks Unlimited. Personal Communication (email) with Brian Glenzinski. (March 2014).

Frumkin, H. and R. Louv. *The powerful link between conserving land and preserving health*. Land Trust Alliance Special Anniversary Report. (2007).

Gies, E. *Conservation: an investment that pays – the economic benefits of parks and open space*. The Trust for Public Lands. (2009).

Greenwire. *National refuges bring positive economic return*. Dane, Green and Rock D.C. E&E Publishing, (November 28, 2007)

Hatch, Brynda K. and Thomas W. Bernthal. *Mapping Wisconsin Wetlands Dominated by Reed Canary Grass, Phalaris arundinacea L.: A landscape level assessment*. Final Report to the U.S. Environmental Protection Agency, Region V Wetland Grant # 96544501-0. (October 2008)

Hardner, J. and B. McKenney. The U.S. National Park system: an economic asset at risk. National Parks Conservation Association. (2006).

Herkert, J.R. An Analysis of Midwestern Breeding Bird Population Trends: 1966-1993. *American Midland Naturalist* 134:41-50. (1995).

Ingraham M.W. and S. G. Foster. *The value of ecosystem services provided by the U.S. National Wildlife Refuge System in the contiguous U.S.* *Ecological Economics*. 67: 608-618. (2008).

Jahn and Hunt. 1964. (referenced in Wisconsin Waterfowl Strategic Plan 2008–2018 p.16)

Kabat. 1972. (referenced in Wisconsin Waterfowl Strategic Plan 2008–2018 p.16)

Minnesota Environmental Partnership. *Why invest in conserving natural areas?* (2010).

Mossman, M.J., Y. Steele, and S. Swenson. *A Strategic Vision for Bird Conservation on the Leopold-Pine Island Important Bird Area*. Unpublished report. Aldo Leopold Foundation, Baraboo, WI. (2009)

Outdoor Foundation. *Outdoor recreation participation report 2011*. (2011).

Outdoor Industry Association. (OIA) *The Outdoor Recreation Economy*. (2013) http://www.outdoorindustry.org/images/ore_reports/WI-wisconsin-outdoorrecreationeconomy-oia.pdf

Sportfishing in America: (SFA). An Economic Force for Conservation. 2013. American Sportfishing Association. http://asafishing.org/uploads/2011_ASASportfishing_in_America_Report_January_2013.pdf

Southwick Associates. *Hunting in America: An Economic Force for Conservation*. Produced for the National Shooting Sports Foundation in partnership with the Association of Fish and Wildlife Agencies. 2012. http://www.nssf.org/PDF/research/HuntingInAmerica_EconomicForceForConservation.pdf

Responsive Management and the National Shooting Sports Foundation. *Issues Related to Hunting Access in the United States: Wisconsin Results*. Funded by U.S. Fish and Wildlife Service grant administered by the Association of Fish and Wildlife Agencies. Multi-State Conservation Grant CT M-8-R. 2009. http://www.responsivemanagement.com/download/reports/Hunting_Access_WI_Report.pdf

Robbins, S.D., D.W. Sample, P.W. Rasmussen, and M.J. Mossman. *The Breeding Bird Survey in Wisconsin: 1966-1991*. Passenger Pigeon 59:81-179. (1996).

Rock County. Key words - *Rock County Wisconsin PACE Program*.

Tourism Federation of Wisconsin. 2011. <http://www.witourismfederation.org/>

US Department of Agriculture, National Agricultural Statistical Service. 2015 http://www.nass.usda.gov/Statistics_by_State/Wisconsin/Publications/Land_Sales/index.asp

US Department of Agriculture, NRCS. *American Woodcock: Habitat Best Management Practices for the Northeast*. Wildlife Insight No. 89. November 2010.

US Fish and Wildlife Service. Stepping Down the Habitat Goals of the American Woodcock Conservation Plan for the Upper Great Lakes Woodcock and Young Forest Initiative - (BCR 12 and 23 in Michigan, Minnesota, and Wisconsin). Tom Cooper (FWS) in cooperation with the Wildlife Management Institute. December 2008. http://www.timberdoodle.org/sites/default/files/UGLWI_Stepdown_Plan_December_2008.pdf

US Fish and Wildlife Service. Upper Mississippi River and Great Lakes Region Joint Venture. Waterfowl Habitat Conservation Strategy. (December 2007). http://www.uppermissgreatlakesjv.org/docs/UMRGLR_JV_WaterfowlHCS.pdf

US Fish and Wildlife Service. National survey of fishing, hunting, and wildlife-associated recreation – Wisconsin. (2006).

US Fish and Wildlife Service. Waterfowl Management Handbook Fish and Wildlife Leaflet 13. Richard S. Sojda US-FWS and Kent L. Solberg Mn DNR. US Department of the Interior. Dane, Green and Rock, D.C. (1993). http://www.nwrc.usgs.gov/wdb/pub/wmh/13_4_13.pdf

US Fish and Wildlife Service. Upper Mississippi River and Great Lakes Region - Joint Venture Wisconsin Plan. (March 1992).

Wildlife Management Institute. Implementing the American Woodcock Conservation Plan July 2010 http://www.timberdoodle.org/sites/default/files/Woodcock_Conservation_Progress_Report-070610.pdf

Wisconsin Department of Natural Resources. *Old-growth and Old Forests Handbook* (WDNR Handbook 2480.5).

Wisconsin Department of Natural Resources. Foy, Michael. DNR Wildlife Management. Email communication June 21, 2015.

Wisconsin Department of Natural Resources. Holzwart, James. DNR Wildlife Management. Email communication July 16, 2012. (2014).

Wisconsin Department of Natural Resources. *Department of Natural Resources 2011-13 BIENNIAL REPORT*. (October 2013).

Wisconsin Department of Natural Resources. *Regional & Property Analysis: Sugar River Planning Group*. Land Management Section, Bureau of Facilities and Land. FL 059. (December, 2013).

Wisconsin Department of Natural Resources. *Rapid Ecological Assessment for the Sugar River Watershed Planning Group*. Natural Heritage Inventory Program, Bureau of Endangered Resources. December 2013. NH-846 (2013)

Wisconsin Department of Natural Resources. Gatti, Ronald. DNR Science Services. Email communication January 26, 2012. (2012).

Wisconsin Department of Natural Resources. *Important Bird Areas of Wisconsin, Critical Sites for the Conservation and Management of Wisconsin Birds*. Steele, Y. (2011).

Wisconsin Department of Natural Resources. *Wisconsin's Statewide Forest Assessment*. 2010a.

Wisconsin Department of Natural Resources. Emerald Ash Borer and Forest Management. 2010b.

Wisconsin Department of Natural Resources. *Wisconsin Watersheds, Sugar River Watershed – 2010 Water Quality Management Plan Update*. Water Division. March 2010. 2010c.

Wisconsin Department of Natural Resources. *Managed Lands Needs Assessment Report*. Version 1.0 June 21, 2010. 2010d.

Wisconsin Department of Natural Resources. State Lands – Passive Management Report. Division of Forestry. August 2010. 2010e.

Wisconsin Department of Natural Resources. *Chapter 100.60 Oak Savanna State Natural Area Management Guide*. *State Natural Areas Handbook*. 2010f.

Wisconsin Department of Natural Resources. A Review of Stocking Strategies in Wisconsin, With an Analysis of Projected Stocking Needs: 2010-2019. Administrative Report No. 71. Bureau of Fisheries Management. September 2010.

Wisconsin Department of Natural Resources. *A look at Wisconsin's forests*. PUB-FR-122-09. 2009a.

Wisconsin Department of Natural Resources. *Natural Heritage Inventory Working List*. Wisconsin Natural Heritage Inventory Program, Bureau of Endangered Resources. 2009b.

Wisconsin Department of Natural Resources. *Birding and Nature Trail – Southern Savanna Region*. Bureau of Endangered Resources. Great Wisconsin Publication ER-662-2008. 2008a

Wisconsin Department of Natural Resources. Wisconsin's Wildlife Action Plan. 2008b.

Wisconsin Department of Natural Resources. *Wisconsin Waterfowl Strategic Plan 2008–2018*, Kent Van Horn and Kim Benton, WM-479-2007. (2007). Approved by the Natural Resources Board Dec. 2007 <http://dnr.wi.gov/topic/WildlifeHabitat/documents/plan2.pdf>

Wisconsin Department of Natural Resources. Fish, Wildlife and Habitat Management Plan July 1, 2007 - June 30, 2013. Final Version – September 11, 2007.

Wisconsin Department of Natural Resources. *Wisconsin Land Legacy Report: An Inventory of Places to Meet Wisconsin's Future Conservation and Recreation Needs*. John Pohlman, Gerald Bartelt, Andrew Hanson III, Paul Scott, and Craig Thompson (Editors). 2006b.

Wisconsin Department of Natural Resources. *Wisconsin's Strategy for Wildlife Species of Greatest Conservation Need, Appendix C - State Natural Areas and other Ecological Reference Sites by Ecological Landscape*. Pub-ER-641. 2005.

Wisconsin Department of Natural Resources. *State Parks and their Gateway Communities: Development and Recreation Planning Issues in Wisconsin (G3773)*. PR-466-2002. 2002.

Wisconsin Department of Natural Resources. Sample, David W., and Michael J. Mossman. *Managing habitat for grassland birds - a guide for Wisconsin*. PUBL-SS-925-97. 1997.

Wisconsin Department of Natural Resources. *Wisconsin's Biodiversity as a Management Issue, Chapter Two, "Biodiversity: Issues and Implications," A report to Department of Natural Resources Managers*. Addis, James, et.al. 1995.

Wisconsin Department of Natural Resources. Go to www.dnr.wi.gov/ to view web based references, data and program information. Enter a specific search term (e.g., *master planning, woodcock, oak, trout*) or enter the following *key words for these programs*:

Wildlife Areas – *wildlife, wildlife areas, pheasant stocking, FFLIGHT (game bird habitat)*

Fishery Areas – *fisheries management, fishery areas, fish stocking*

State Natural Areas - *natural areas, natural communities*

Forestry – *forest management, Emerald Ash Borer and Forest Management*

Parks and Planning – *SCORP, Ice Age Trail*

Water Quality - *exceptional resource waters, impaired waters*

Environmental Analysis – *Environmental Impacts*

Ecological Landscapes – *ecological landscapes*

Shooting Ranges - *public shooting range*

Handicapped accessible recreation - *Open the Outdoors*

Annual payment in lieu of real estate taxes to local units of government – *PILT*

Wisconsin Department of Natural Resources. Bureau of Facilities and Lands property files - previous master plans for Albany WA, Avon Bottoms WA, Badfish Creek WA, Brooklyn WA and Evansville WA.

Wisconsin Geocaching Association. (2014). <http://www.wi-geocaching.com/index.php>

Wisconsin Wetlands Association. *Wetland Gems Avon Bottoms*.

http://www.wisconsinwetlands.org/Gems/SE12_Sugar_River_Floodplain_Forest.pdf

APPENDIX A – SHOOTING RANGE

This appendix describes the screening criteria used in this master planning process to assess the properties as potential shooting range sites. A detailed site selection and facility design process to identify a shooting range site would need to be pursued before an actual site is selected and constructed. This detailed selection and design process, if it occurs, would follow the approval of this master plan. A brief description of this detailed site selection process is included in this appendix.

Property Screening

The department has a long history of promoting safe and accessible shooting opportunities for residents and visitors. This history includes a commitment to providing ranges on public lands and a shooting range grant program to assist with maintenance and development on private ranges in exchange for some public access. The *Strategic Shooting Range Guidance, 2014 – 2019* guidance document (WDNR, 2014) assessed target shooting opportunities around the state and identified a service area around each public shooting range based on a 100,000 resident criterion (Figure A-1). The construction and maintenance of public shooting ranges can be provided by a variety of sources including the federal Pittman-Robertson excise tax revenues.

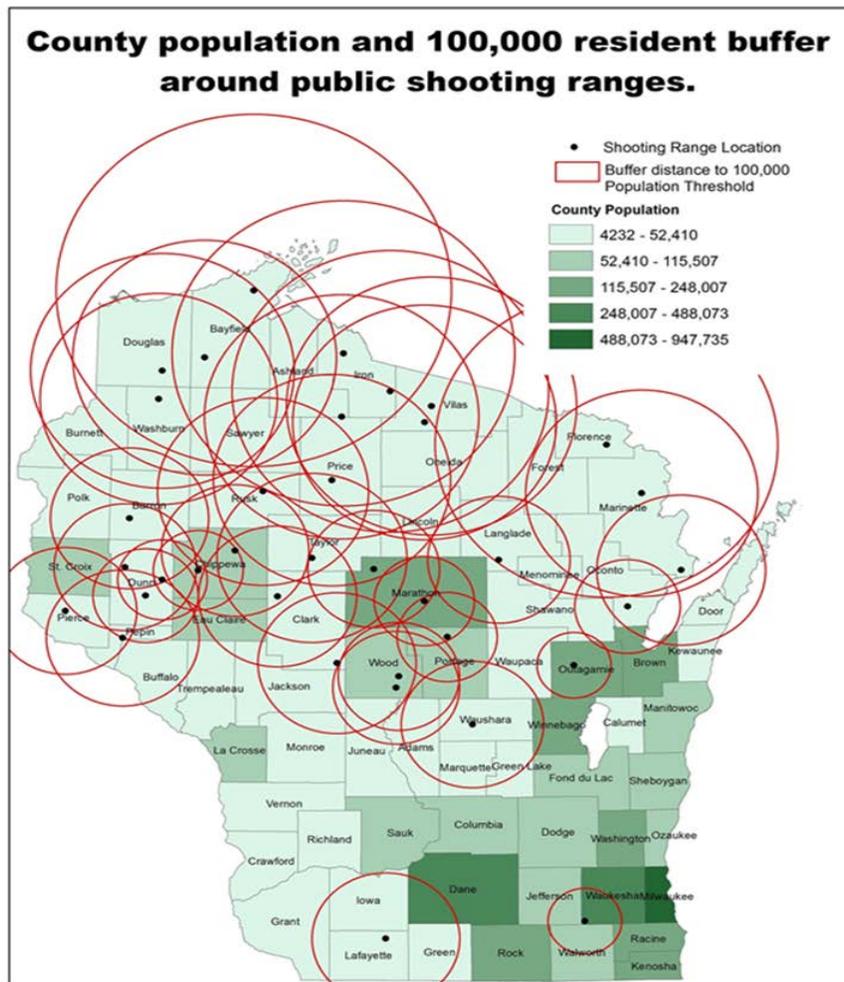
The Guidance document identifies a goal of establishing shooting ranges in areas outside of the service areas of the existing ranges. The majority of Green County and part of Dane County are within the service area of the Yellowstone WA shooting range, the Mud Lake WA shooting range in Columbia County and other facilities (e.g., Dane County Law Enforcement Training Center Range).

The planning group properties not within a service area were evaluated using the following criteria:

- Minimize the number of residences within 1,000-yards.
- Compatibility of a shooting range with surrounding land uses and recreational uses.
- Access off major federal, state and county highways are preferred, especially those that provide convenient access to population centers (i.e., Madison, Janesville and Beloit).
- Favorable physical characteristics such as terrain that minimizes potential noise and safety concerns, minimizes site disturbance and provides on-site soil for berm construction.
- Presence of wetlands, hydric soils, soils with hydric inclusions, and 100 year floodplains.
- Avoid archeological sites and state natural areas.
- Minimize the impacts on large habitat blocks (i.e., locate the shooting range close to a road and on the edge of habitat blocks so as not to disrupt wildlife habitat or sensitive areas (e.g., refuges).
- Is the site supported by other units of government (e.g., town, county or federal) and/or local private or non-profit partners? Sites where local partners are willing to collaborate on range management and operations are preferred.

The screening process indicated the Avon Bottoms WA, Evansville WA/Streambank Protection-Allen Creek, an Extensive Wildlife Habitat parcel off South Avon Store Road and a Statewide Wildlife Habitat parcel off Spring Valley Road were outside of the service areas (Figure A-1) and may have a potentially suitable site within or adjacent to the project boundary.

FIGURE A-1 Areas Identified as Having a Need for a Public Shooting Range (Areas outside of red buffer circle)



Shooting Range Site Selection Process

Selection of a site will involve a process similar to that followed in Columbia County. For example, an ad hoc shooting range committee consisting of town and/or county elected officials, local agencies, interest groups, and department staff will probably be developed to assist with site selection. The selection process will include an assessment of the water bodies, wetlands, soils, topography, endangered and threatened species, and other relevant ecological, biological and social factors.

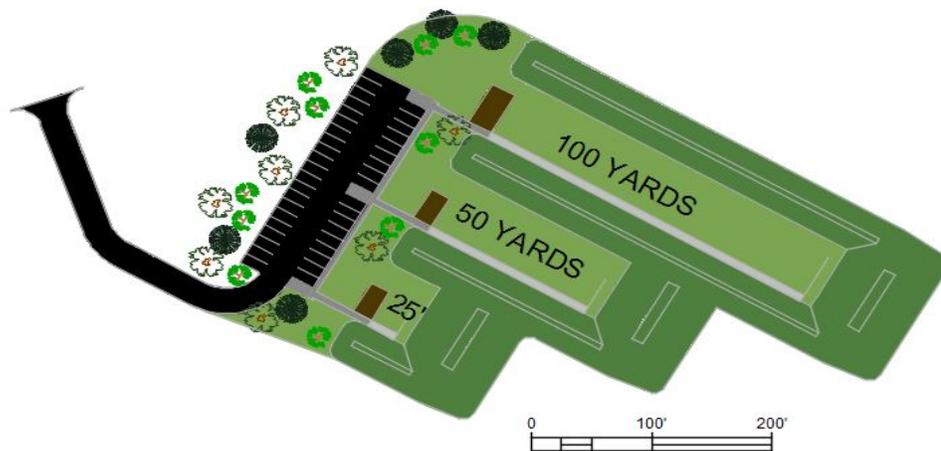
An environmental analysis under NR 150 (Wisconsin Environmental Policy Act) will be developed to describe and assess the following: a.) the proposed facilities and general operation of the shooting range; b.) the impacts of the construction and operation of a shooting range including potential concerns such as public safety, noise and traffic; and c.) the alternatives considered and their impacts. The NR 150 review process will include public meetings and a comment period.

Shooting Range Facilities and Operations – The typical shooting range would have the facilities and operations as described below.

- The range must be open at least 5 days a week with hours of operation generally considered to be 8 AM to sundown.
- The range would have at least a 50-yard rifle shooting lane and a 25 foot handgun lane. One hundred and 200 yard rifle lanes and a shotgun patterning lane are also options. End and side-berms between shooting lanes will be designed to provide user safety, enhance lead recovery and aid sound reduction.
- Each lane should have a minimum of four shooting stations (which may include shooting benches). Optional enhancements at the shooting station include overhead structures to provide shade and protect shooters from rain.
- Provide a 10-20 car parking lot (gravel surface) and toilets facilities. Lighting at the parking lot, an entrance gate, and fencing may also be installed. The facility will be fully ADA accessible.
- Archery and crossbow lanes may be included as well.

Figure E-2 is the proposed footprint of the Columbia County Shooting Range at the Mud Lake Wildlife Area. A facility of similar size and uses can reasonably be assumed to be proposed for a site in this planning area. Typically, 4-5 acres is the minimum size of the shooting range with an additional five acres surrounding the range providing a buffer zone.

Figure A-2 – Generic Shooting Range Configuration and Facilities



Common Shooting Range Concerns - The concerns most often related to shooting ranges are social issues such as public safety, noise and traffic. These concerns can be minimized if the siting criteria and the design and operations guidelines are followed. Mitigation measures may be added as warranted (e.g., sound reduction devices such as shooting baffles).

Public safety concerns at shooting ranges are primarily related to bullets falling outside the shooting range boundary, and individuals or animals wandering into the range. Proper range design, such as the use of high berms on three sides of the shooting lanes and overhead baffles can minimize the first issue. Fencing and signage on the perimeter can minimize the second concern. Strict adherence to safe gun handling procedures is also important.

Noise can be a concern to nearby residents and other users on the property. The noise impacts will vary considerably and will be directly proportional to the level of shooting activity and the types of firearms being discharged (i.e., pistols, shotguns, rifles and large magazine, rapid fire firearms). Siting a range to take advantage of physical factors like the distance to homes, vegetation around the site and topography to contain the noise are also important. Variables such as wind and weather can influence noise levels too. The berms will help reduce noise, and sound damping devices (e.g., shooting tubes) can mitigate noise. Adjusting the hours of operation can also reduce noise in the early morning and evening hours.

Traffic impacts tie directly to the number of users at the shooting range in relation to the background traffic level on roads leading to the range. If the range is located along a state or county highway the increased traffic is anticipated to have a minimal impact. Traffic impacts will be more noticeable if the range is located on a town road with low traffic volumes. Town roads with lower weight limits may be more susceptible to construction related damage. The increased traffic would probably be more noticeable on weekends or prior to the different hunting seasons.

Environmental issues such as dust, soil erosion, site disturbance, site upkeep and lead recovery can be minimized by following the siting criteria and use of best management practices during site construction and operation. Construction impacts are typically short-term impacts lasting weeks to a month or two. Long-term environmental impacts should be negligible if the site is properly maintained and lead is recovered and recycled.

No Action Alternative – Shooting ranges that offer covered shooting stations with shooting benches and target boards, convenient parking and restroom facilities are preferred by many shooters. Construction of such a facility may reduce the unregulated target shooting that is currently occurring on the fish and wildlife lands in Rock and Green counties. The impacts of no action include potentially unsafe conditions for other property users, disturbance of neighbors and lead build-up in soils and sediments that can result in lead ingestion by wildlife.

Alternative Target Shooting Sites - The screening of the properties in this planning group constitutes a subset of the sites that might be considered for hosting a shooting range in Dane, Rock and Green counties. A comparison of the properties in the regional map (Map A) with the area outside the buffer zone map indicates there may be suitable shooting range sites on other department properties and non-department parcels in these counties. The shooting range siting process that will follow this master planning effort has the latitude to evaluate a broad range of sites within the region.

Development of a target shooting range would probably reduce, but not eliminate target shooting on state lands in Rock and Green counties. The public will still be allowed to target shoot on the state owned properties in these counties even if a shooting range is established. Concerns expressed by neighbors, town officials and department staff may be minimized, but will not be eliminated. NR 45.09 (5) would need to be revised to include Rock and Green counties to regulate gun discharges outside of the hunting seasons.