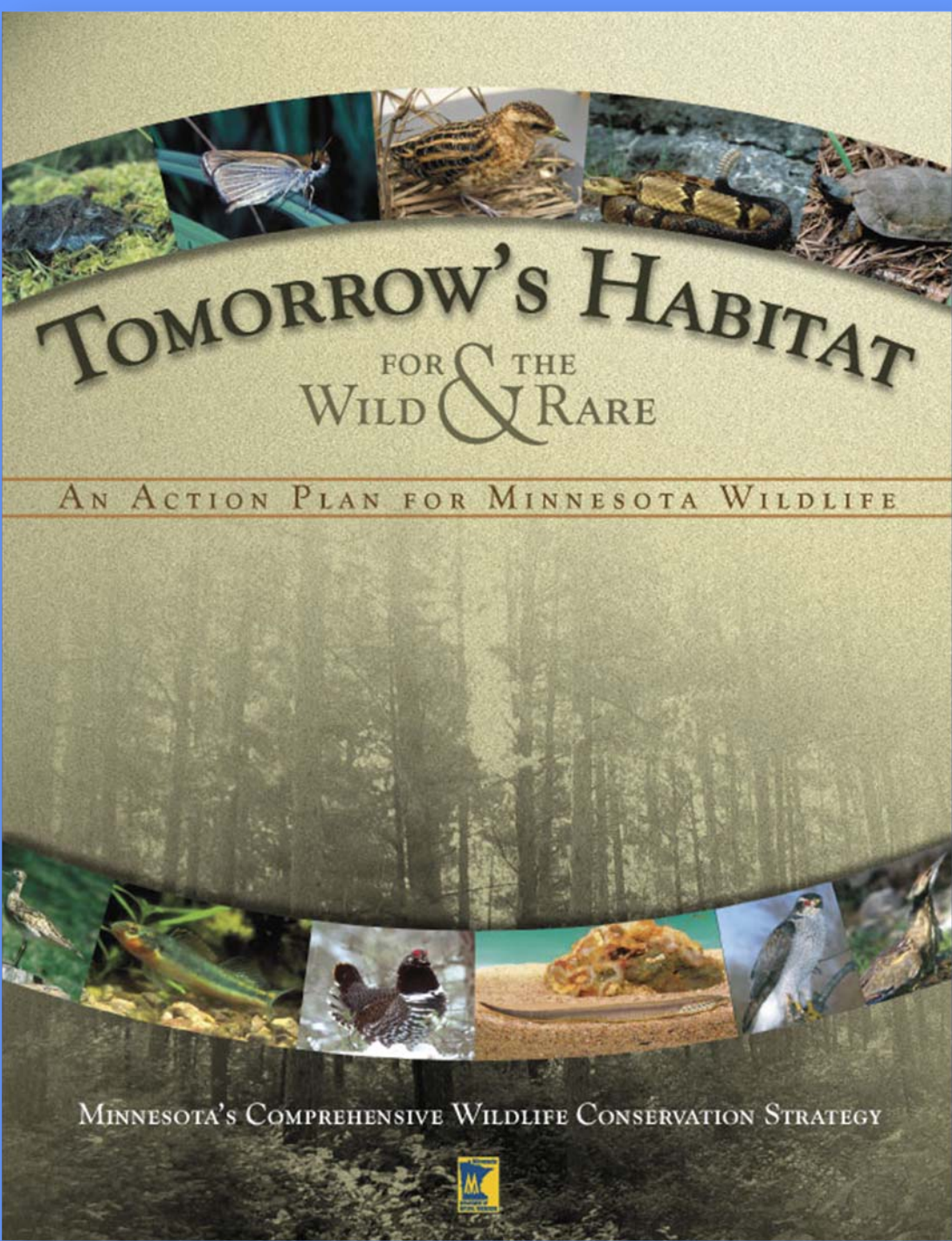




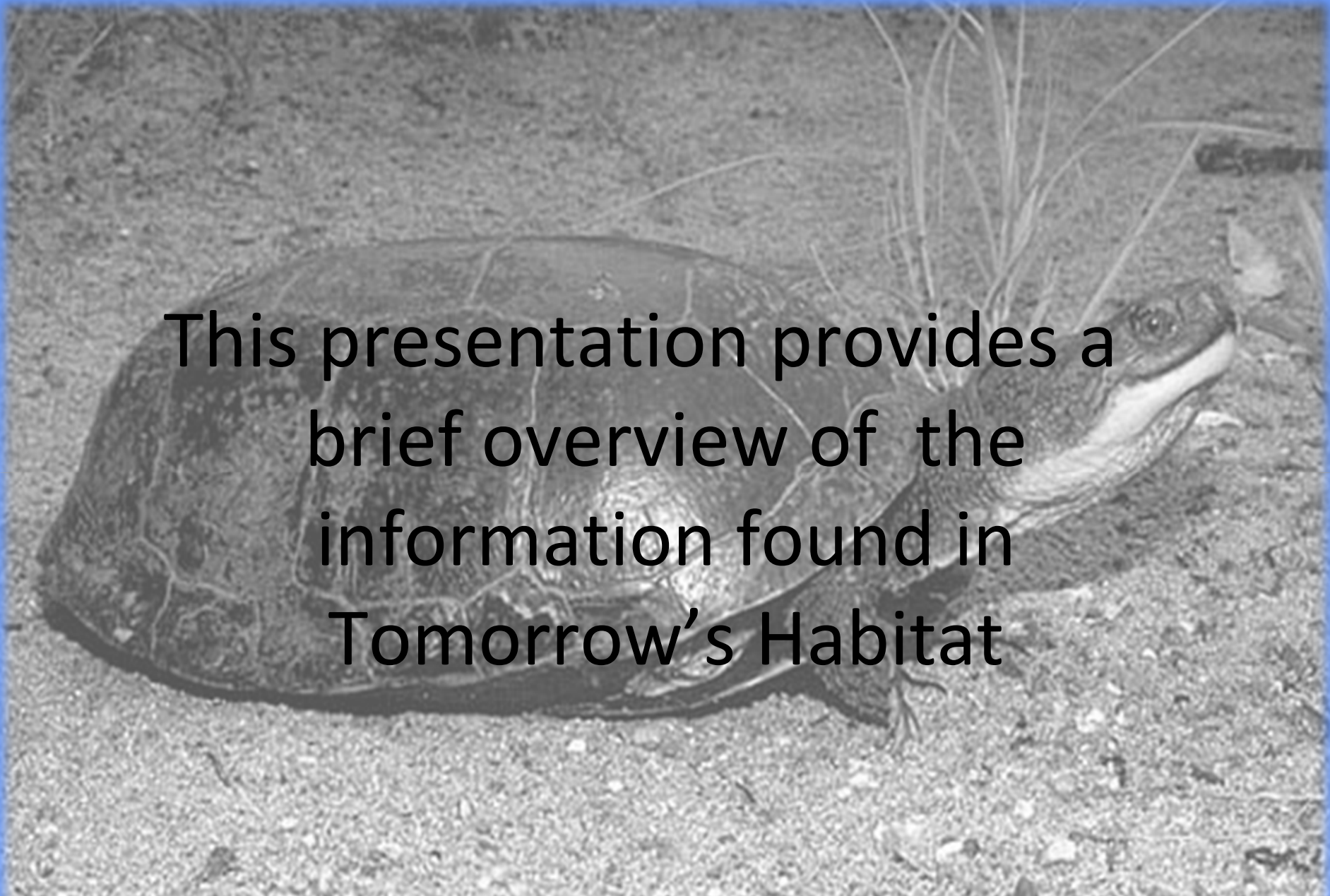
TOMORROW'S HABITAT

FOR THE
WILD & RARE

AN ACTION PLAN FOR MINNESOTA WILDLIFE

MINNESOTA'S COMPREHENSIVE WILDLIFE CONSERVATION STRATEGY





This presentation provides a
brief overview of the
information found in
Tomorrow's Habitat

Unique Opportunities for Rare Wildlife

The development of Tomorrow's Habitat provided an opportunity for many conservation partners to work together to identify Minnesota species, and their habitats, that are in greatest conservation need and the priority conservation actions necessary to sustain these species populations for future generations.

This is not just a rare species plan or nongame wildlife plan, but a comprehensive plan that cuts across all species and habitats in the state. Its success hinges upon the engagement of a wide range of conservation stakeholders and their use of the information presented in Tomorrow's Habitat as a menu for action, to adopt and adapt to their unique interests and capabilities.

In Minnesota, over 100 individuals representing more than 40 organizations collaborated in the development of this strategic plan

An abbreviated list includes:

-  Audubon
-  National Resources Research Institute (NRRI)
-  The Nature Conservancy (TNC)
-  U.S. Fish and Wildlife Service (USFWS)
-  University of Minnesota (UMN)
-  Minnesota Department of Natural Resources (DNR)

Background

-  In 2002 Congress established the State Wildlife Grants (SWG) program to help states address the unmet needs of wildlife.
-  To participate in the SWG program states were required to develop a comprehensive wildlife plan that considered all wildlife species and to provide a state match. Collectively these plans represent an historic effort to address unmet wildlife conservation needs.
-  Minnesota's plan (Tomorrow's Habitat for the Wild and Rare) was completed in September 2005 and approved by the U.S. Fish and Wildlife Service; this plan is also referred to as the State Wildlife Action Plan (SWAP).
-  Approval of the plan allows MN to continue to participate in the SWG program, which has provided about \$1.1 million/yr to implement the plan in MN
-  Minnesota's plan is organized by ecological provinces and subsections. These are subdivisions within an ecological land classification hierarchy developed by MNDNR and the U.S. Forest Service for ecological mapping and landscape classification. The subsections provide valuable ecological information for plan development and implementation
-  The plan identifies 292 species as Species In Greatest Need of Conservation, defined as *“wildlife species whose populations are rare, declining or vulnerable in Minnesota.”*

Species in Greatest Conservation Need

 Each state developed their own definition and list of species in greatest conservation need (SGCN).

 MN definition: Wildlife species whose populations are rare, declining, or vulnerable in Minnesota.

 Nearly 1,200 wildlife species were assessed for Tomorrow's Habitat and 292 (almost 25%) of these met the definition.

 Approximately one-half of the SGCN are state-listed species. One goal of Tomorrow's Habitat is to keep additional species from reaching listed status. Recovery of listed species is much more costly than addressing habitat needs before a species reaches the need for listing.

Key features of the plan

-  Plan goals and strategies
-  Summaries of SGCN by Ecological Province and Subsection
-  Subsection Profiles that include:
 - *Subsection overviews*
 - *Information on SGCN*
 - *Subsection highlights*
 - *SGCN by township*
 - *Species problem analysis*
 - *Key habitats important to SGCN*
 - *Priority conservation actions*
-  Habitat descriptions for the 16 key habitats

Plan Goals and Strategies

I. Stabilize and increase SGCN populations

-  Identify key SGCN habitats and focus management efforts on them
-  Manage federal and state listed species effectively
-  Manage emerging issues affecting specific SGCN populations

II. Improve knowledge about SGCN populations

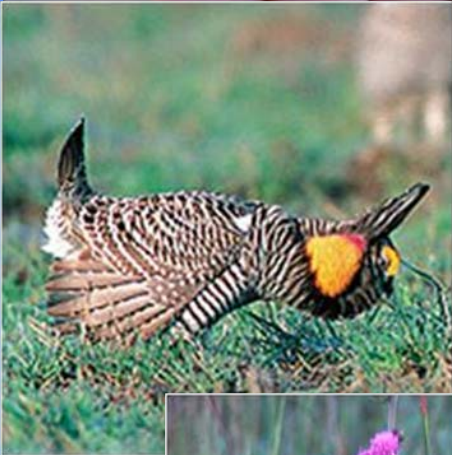
-  Survey SGCN populations and habitats
-  Research populations, habitats and human attitudes/activities
-  Monitor long-term changes in SGCN populations and habitats
-  Create performance measures and maintain information systems

III. Enhance people's appreciation and enjoyment of SGCN

-  Develop outreach and recreational actions

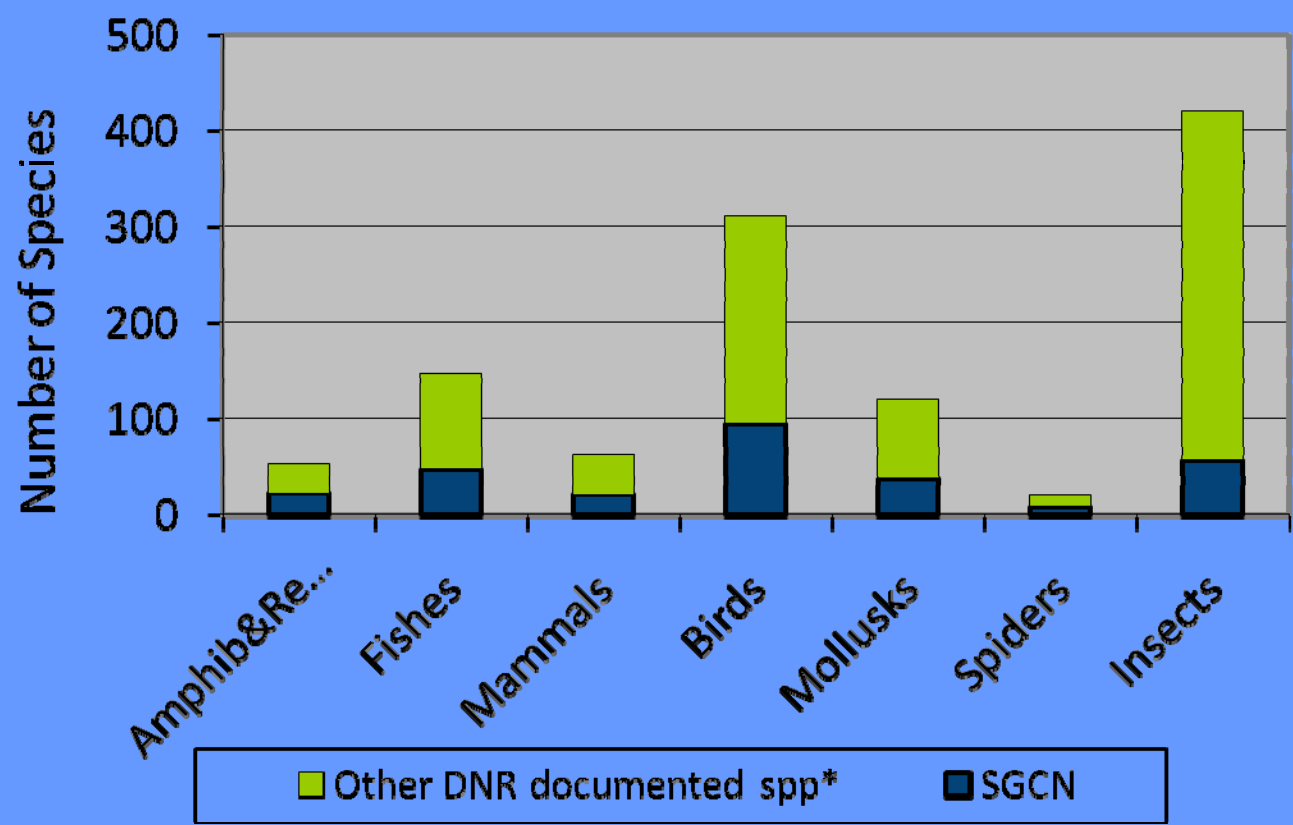


Information About Species in Greatest Conservation Need (SGCN) and their habitats.



Minnesota's Species in Greatest Conservation Need

292 species (out of nearly 1,200 assessed in Minnesota)

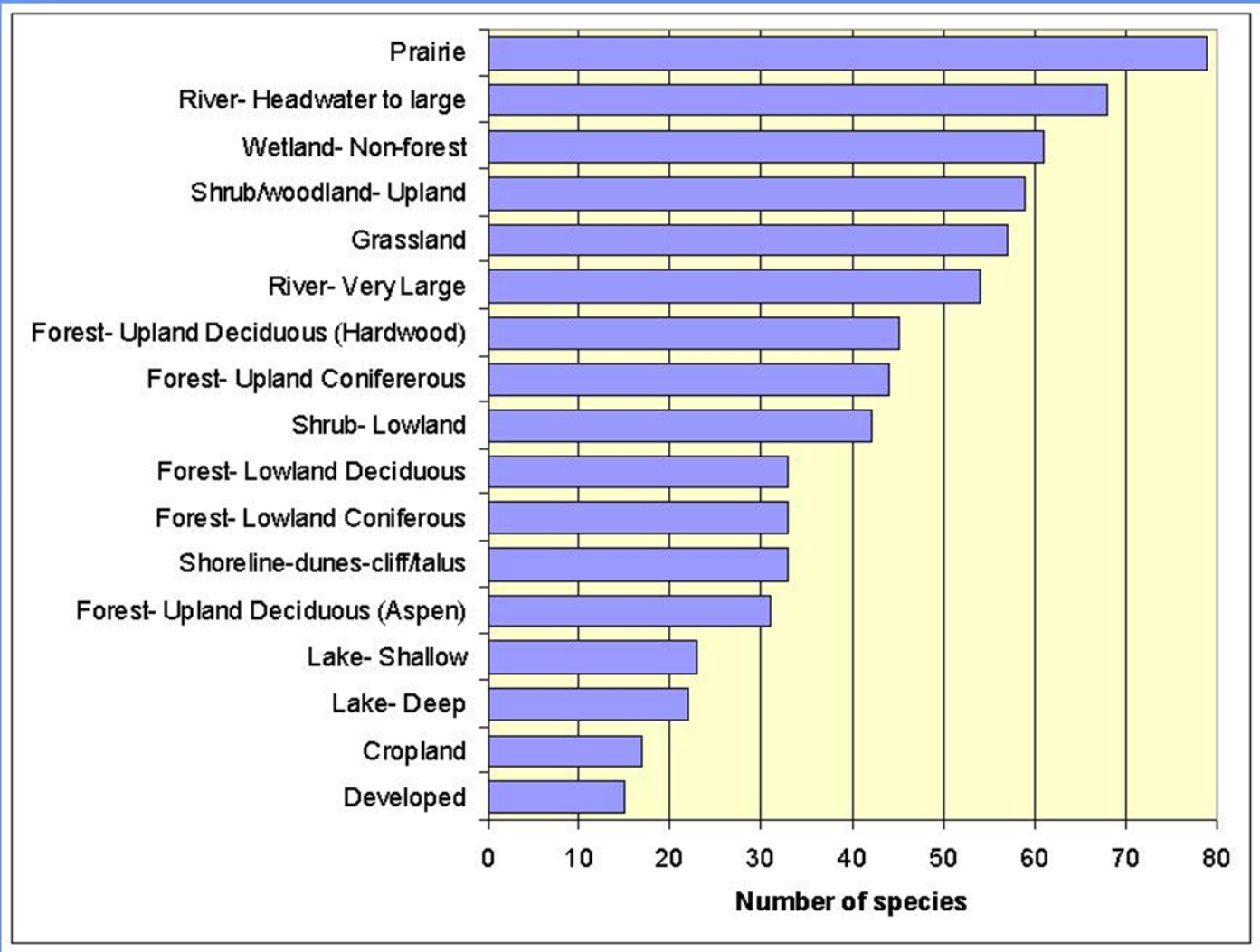


Species Problem Assessment

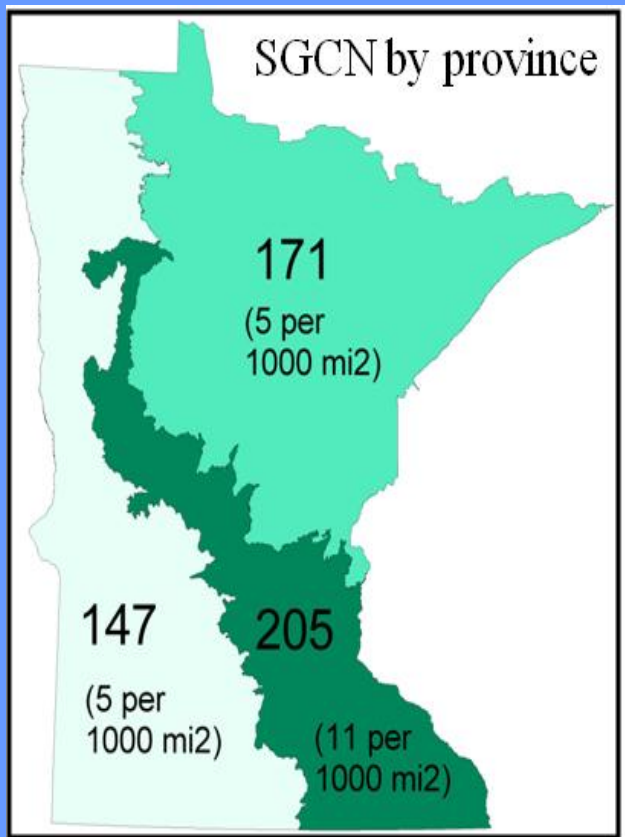
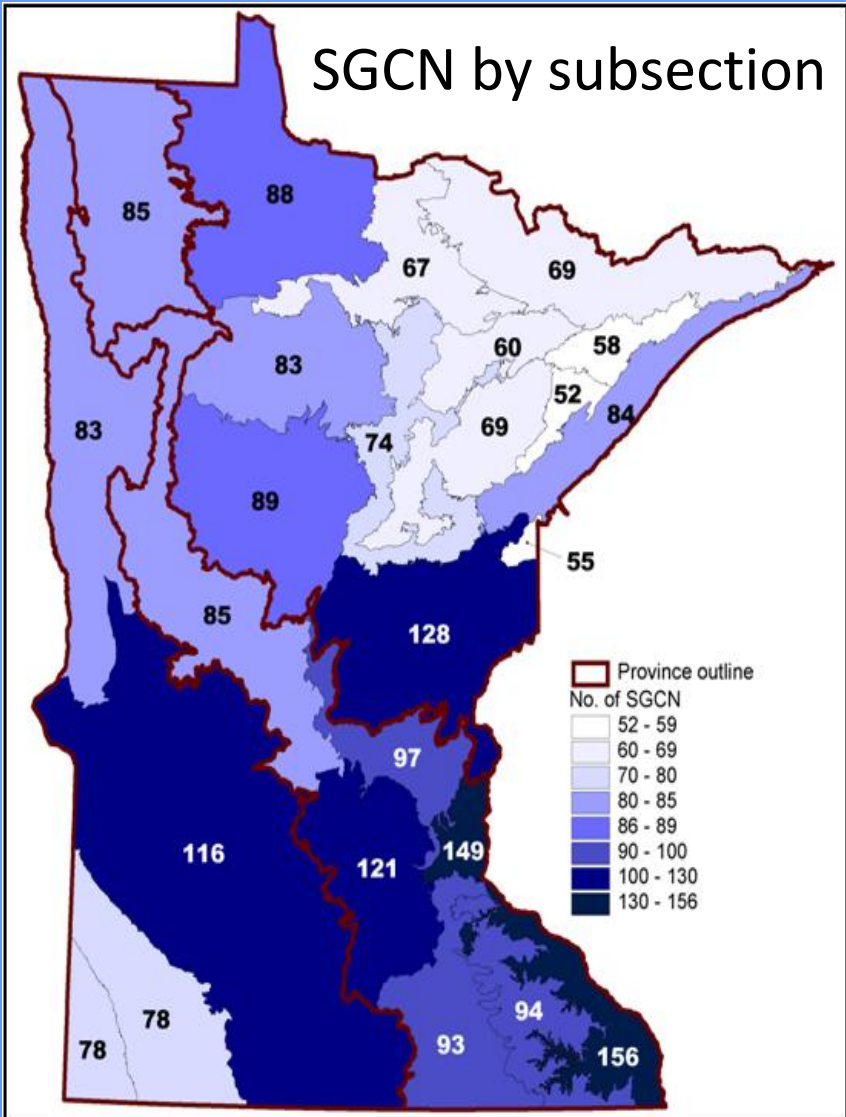
Problem	% of SGCN for which this is a problem
Habitat Loss in MN	76
Habitat Degradation in MN	83
Habitat Loss/Degradation Outside of MN	24
Invasive Species and Competition	24
Pollution	32
Social Tolerance/Persecution/Exploitation	21
Disease	3
Food Source Limitations	3
Other	18

SGCN by Habitat

statewide summary

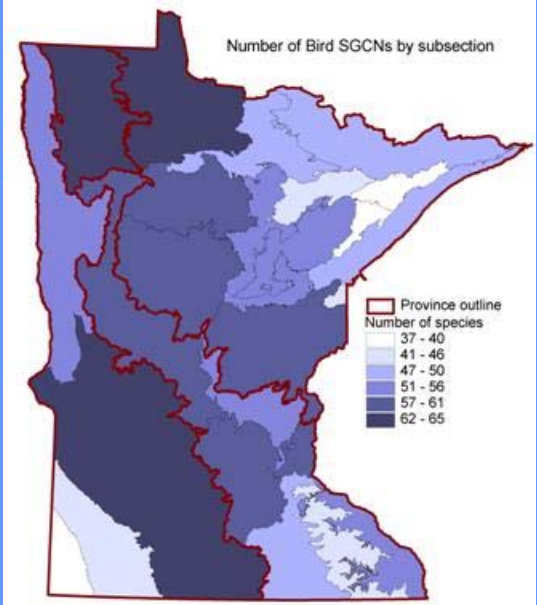


Summaries of Species in Greatest Conservation Need (SGCN) by Ecological Subsection and Province *

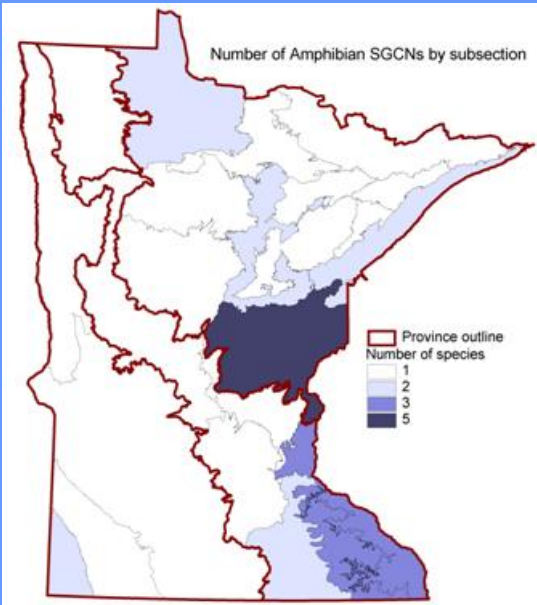


* Known or predicted occurrences

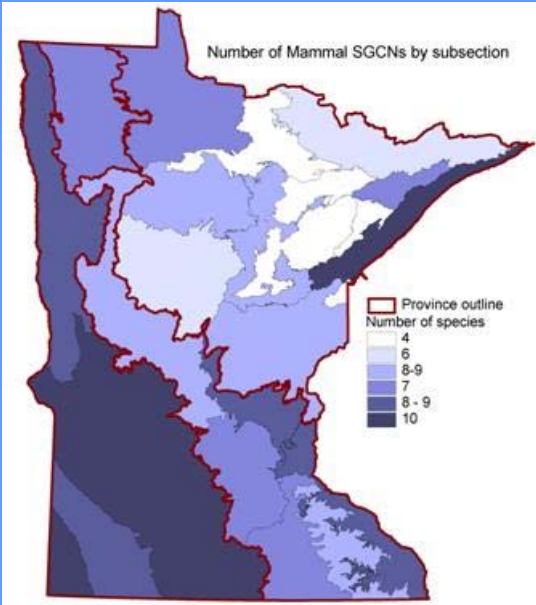
Birds



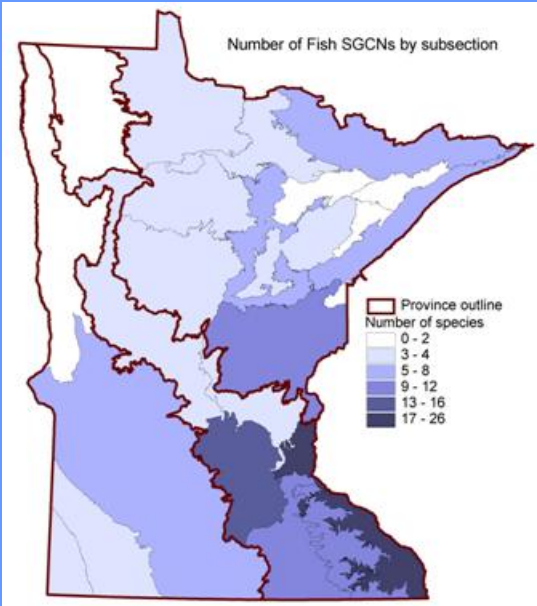
Amphibians



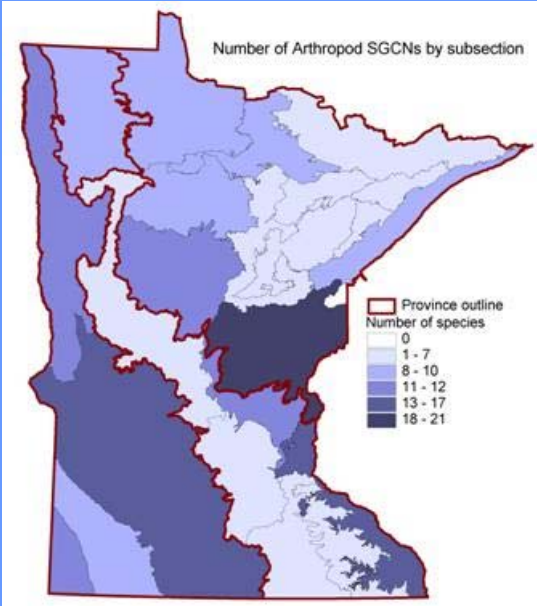
Mammals



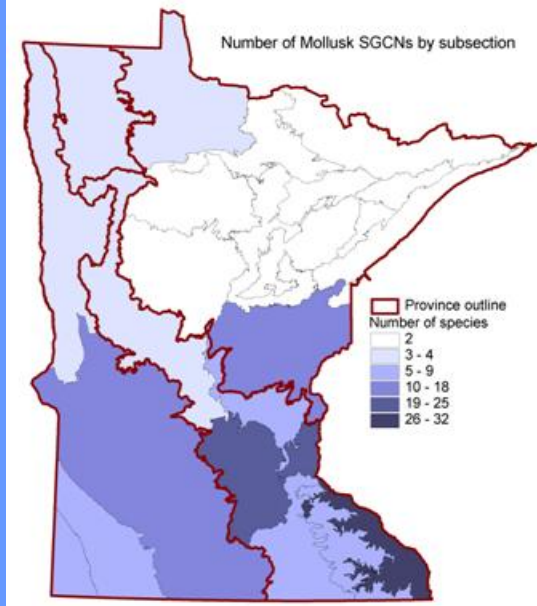
Fish



Arthropods



Mollusks



Subsection Profiles

-  *Subsection overviews*
-  *Information on SGCN*
-  *Subsection highlights*
-  *SGCN by township*
-  *Species problem analysis*
-  *Key habitats important to SGCN*
-  *Priority conservation actions*

SUBSECTION OVERVIEW

The Mississippi River forms the western boundary of the Anoka Sand Plain Subsection. A broad, flat, sandy lake plain dominates the majority of this area and forms the eastern and northern boundaries. Historically, the predominant vegetation was oak savanna and upland prairies surrounded by varied wetland complexes.

This subsection stretches across the northern Twin Cities metropolitan area, including St. Cloud to the west and North Branch to the east, and has the second fastest-growing population in the state. Urban development and agriculture (primarily sod and vegetable crops), which occurs in about one-third of the subsection, has resulted in the loss of prairie and savanna and drainage of peatlands.

SPECIES IN GREATEST CONSERVATION NEED

97 Species in Greatest Conservation Need (SGCN) are known or predicted to occur within the Anoka Sand Plain. These SGCN include 39 species that are federal or state endangered, threatened, or of special concern. The table, SGCN by Taxonomic Group, displays by taxonomic group the number of SGCN that occur in the subsection, as well as the percentage of the total SGCN set represented by each taxon. For example, 8 mammal SGCN are known or predicted to occur in the Anoka Sand Plain, approximately 36% of all mammal SGCN in the state.

SGCN BY TAXONOMIC GROUP

Taxa	# of SGCN	Percentage of SGCN Set by Taxon	Examples of SGCN
Amphibians	1	16.7	Common Mudpuppy
Birds	56	57.7	Eastern meadowlark
Fish	3	6.4	Greater redhorse
Insects	9	16.1	Uncas skipper
Mammals	8	36.4	American badger
Mollusks	9	23.1	Fawnsfoot
Reptiles	8	47.1	Gopher snake
Spiders	3	37.5	<i>Tutelina formicaria</i>

SPECIES SPOTLIGHT

Blanding's turtle (*Emydoidea blandingii*)

Distribution Found in marshes, ponds, and river bottoms of Central, East-Central, Southeastern, and Southwestern MN, especially where adjacent uplands have sandy soil suitable for nesting.

Abundance Abundant in some localized areas of SE MN, but also regularly encountered in the Anoka Sand Plain and recently found to be more common than previously known along small streams adjacent to prairies and grasslands of SW MN. Reasons for decline include changes due to land use, urban sprawl into former nesting areas, and fragmentation of remaining habitats.

Legal Status State list-Threatened.

Comments Travels up to a mile from wetlands to uplands for nesting, and moves between wetlands throughout the summer, making it vulnerable to road traffic.



Quick facts

Acres: 1,199,711 (2.2% of state)

Ownership

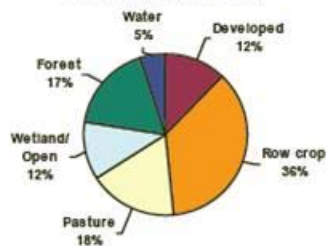
Public	Private	Tribal
9.7%	90.3%	0.0%

Population density (people/sq. mi.)

Current	Change (2000-2010)
627	+103



Current Land Use/Land Cover



HIGHLIGHTS

- This subsection is well-known for sandhill cranes, trumpeter swans, bald eagles, bobolinks, and lark sparrows. Other important species are badgers, Blanding's turtles, and gopher snakes.
- Important habitat features include dry prairie associated with scattered wetlands, rivers, and streams, which provide excellent habitat for Blanding's turtles, both species of hognose snakes, and bullsnakes.
- Some of the best examples of dry oak savanna in the state occur in this subsection.
- Carlos Avery WMA and Sherburne NWR are important stopover sites for migratory birds.

25 Subsection profiles

The subsection profiles are the heart and soul of Tomorrow's Habitat

Six pages of rich, accessible information:

- Overview
- Species found in the subsections
- Key habitats in the subsections
- Conservation actions specific to the subsections

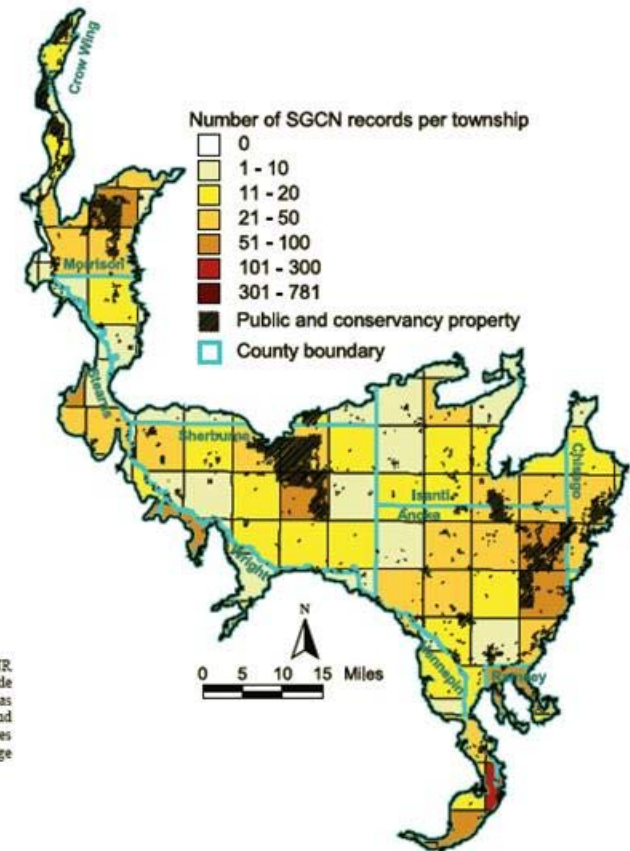
Subsection profile

Page 2

- Map of SGCN and land ownership
- Table of Species Problem Analysis

SGCN ELEMENT OCCURRENCES BY TOWNSHIP

This map depicts the number of validated records of species in greatest conservation need since 1990 per township and public land/conservancy land. It suggests relationships between known SGCN occurrences and conservation management lands.



Sources: MN DNR Natural Heritage database, MN DNR County Biological Survey (MCBS), MN DNR Statewide Mussel Survey, MN DNR Fisheries Fish database. Areas with no MCBS animal surveys may have had mussel and fish surveys, as well as reports of other species occurrences recorded in the MN DNR Natural Heritage database.

SPECIES PROBLEM ANALYSIS

The species problem analysis provides information on the factors influencing the vulnerability or decline of SGCN that are known or predicted to occur in the subsection. The table lists the nine problems, or factors, used in the analysis, and the percentage of SGCN in the subsection for which each factor influences species vulnerability or decline. The results of the species problem analysis indicate that habitat loss and degradation in the subsection are the most significant challenges facing SGCN populations.

NOTE: The inverse of the percentages for each problem does not necessarily represent the percentage of SGCN for which the factor is not a problem, but instead may indicate that there is not sufficient information available to determine the level of influence the factor has on SGCN in the subsection.

Problem	Percentage of SGCN in the Subsection for Which This Is a Problem
Habitat Loss in MN	82
Habitat Degradation in MN	87
Habitat Loss/Degradation Outside of MN	31
Invasive Species and Competition	26
Pollution	36
Social Tolerance/Persecution/Exploitation	24
Disease	3
Food Source Limitations	2
Other	12

KEY HABITATS - For Species in Greatest Conservation Need

The CWCS identified key habitats for SGCN within the subsection using a combination of five analyses, labeled A-E below. The table depicts the five analyses, and under which analyses the key habitats qualified. To qualify as a key habitat for the subsection, the habitat had to meet the criteria used in at least one of the five analyses, as specified in the descriptions to the right of the table. The graphs below depict results from four (A-D) of the five analyses used in determining key habitats. Those habitats that meet the criteria are highlighted in **RED** in the graph for that analysis. Those habitats that do not meet the criteria are shaded in **GOLD**. Analysis E is not represented by a graph; the results of this analysis are presented as a list of key rivers/streams in Appendix I. For a more detailed explanation of the five analyses used, see [Chapter 7, Methods and Analyses](#).

KEY HABITATS	ANALYSIS				
	A	B	C	D	E
Oak Savanna	X		X		
Prairie	X	X	X		
Wetland-Nonforest	X	X	*		
Grassland	X				
Shoreline-dunes-cliff talus (Dune habitat)		X			
Lake-Shallow				X	
River-Headwater to Large					X

*Wetlands had not changed by more than 50% at the time of the 1994 Anderson & Craig study, but recent changes in this subsection indicate further wetland loss has occurred.

Description of Analyses

A: Terrestrial habitat use analysis - terrestrial habitats that represent more than 5% of 1890s or 1990s landcover and are modeled to have the most SGCN using them based on a z-test with $p < 0.01$.

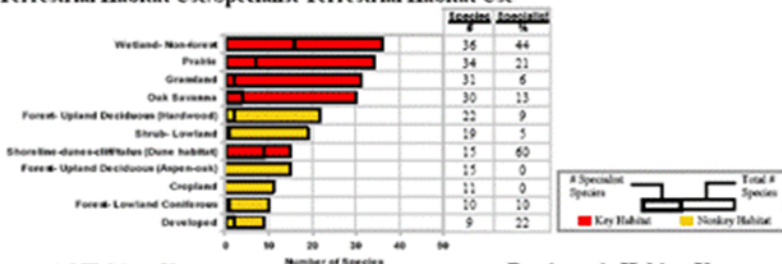
B: Specialist terrestrial habitat use analysis - terrestrial habitats that represent more than 5% of 1890s or 1990s landcover and have more than 15 species, 20% of which use 2 or fewer habitats (specialist species).

C: Terrestrial habitat change analysis - terrestrial habitats that represent more than 5% of the 1890s landcover and have declined by more than 50% in the 1990s landcover. For wetlands this change was based on an analysis done by Anderson & Craig in *Growing Energy Crops on Minnesota's Wetlands: The Land Use Perspective* (1984).

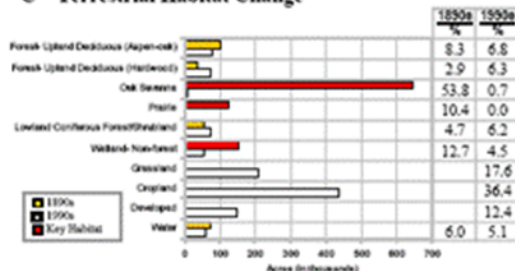
D: Aquatic habitat use analysis - lake or stream habitats that have the most SGCN use based on a z-test with $p < 0.01$ of all subsections.

E: The Nature Conservancy/SGCN occurrence analysis - stream reaches identified in the Areas of Aquatic Biodiversity Significance in the four TNC Ecoregional Assessments and reaches with high SGCN occurrences (see [Appendix I](#) for list of stream reaches).

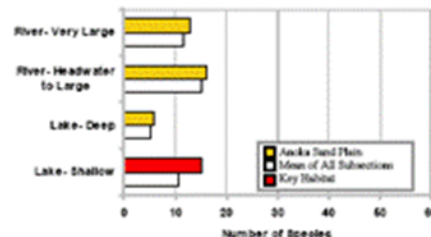
A/B - Terrestrial Habitat Use/Specialist Terrestrial Habitat Use



C - Terrestrial Habitat Change



D - Aquatic Habitat Use



E - The Nature Conservancy/SGCN Occurrence

To reference the key rivers and streams for the subsection, see [Appendix I](#).

Subsection profile

Page 3

List of key habitats

- Key habitats are those most important to the greatest number of SGCN in a subsection.

Summary graphs of key habitat analyses

Analysis for Determining Key Habitats

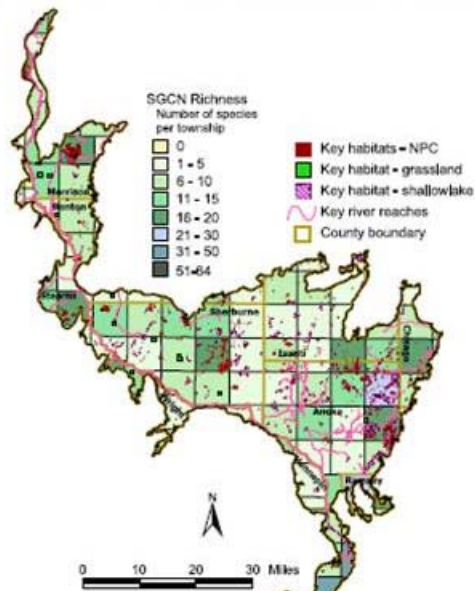
Five analyses (see p. 39):

- A. Terrestrial habitat use - habitats used by the most SGCNs in a subsection
- B. Specialist terrestrial habitat use - habitats in which 20% or more of the species are specialists (use 1 or 2 habitats)
- C. Terrestrial habitat change - habitats that have declined by more than 50%
- D. Aquatic habitat use - subsections with lakes or streams that have the most SGCN use of all subsections
- E. Identification of key river reaches - stream reaches within TNC Areas of Biodiversity Significance and/or have significant fish and mollusk occurrences

Page 4

- Map of Key Habitats
- Summary table of all habitats and associated SGCN

DISTRIBUTION OF KEY HABITATS AND SPECIES RICHNESS BY TOWNSHIP



This map depicts key habitats and the number of species of SGCN per township based on the sources listed below. It suggests there is often a relationship between key habitats and species richness (i.e., the variety of species of SGCN in a township).

Sources:
Grassland Bird Conservation Areas (GBCA), 2002
Major River Casteline Traces in Minnesota, 1994
MCBS Native Plant Communities (NPC), 2003
MN DNR 34K Rivers and Streams, 2005
MN DNR County Biological Survey (MCBS), 2005
MN DNR Fish database, 2005
MN DNR Natural Heritage database, 2005
MN DNR Statewide Mammal Survey, 2005
Shallow Lakes in Minnesota, 2005
The Nature Conservancy Rivers and Streams combined dataset, 2005

For more information on how this map was constructed, please see the [Subsection Profile Overview in Chapter 5](#).

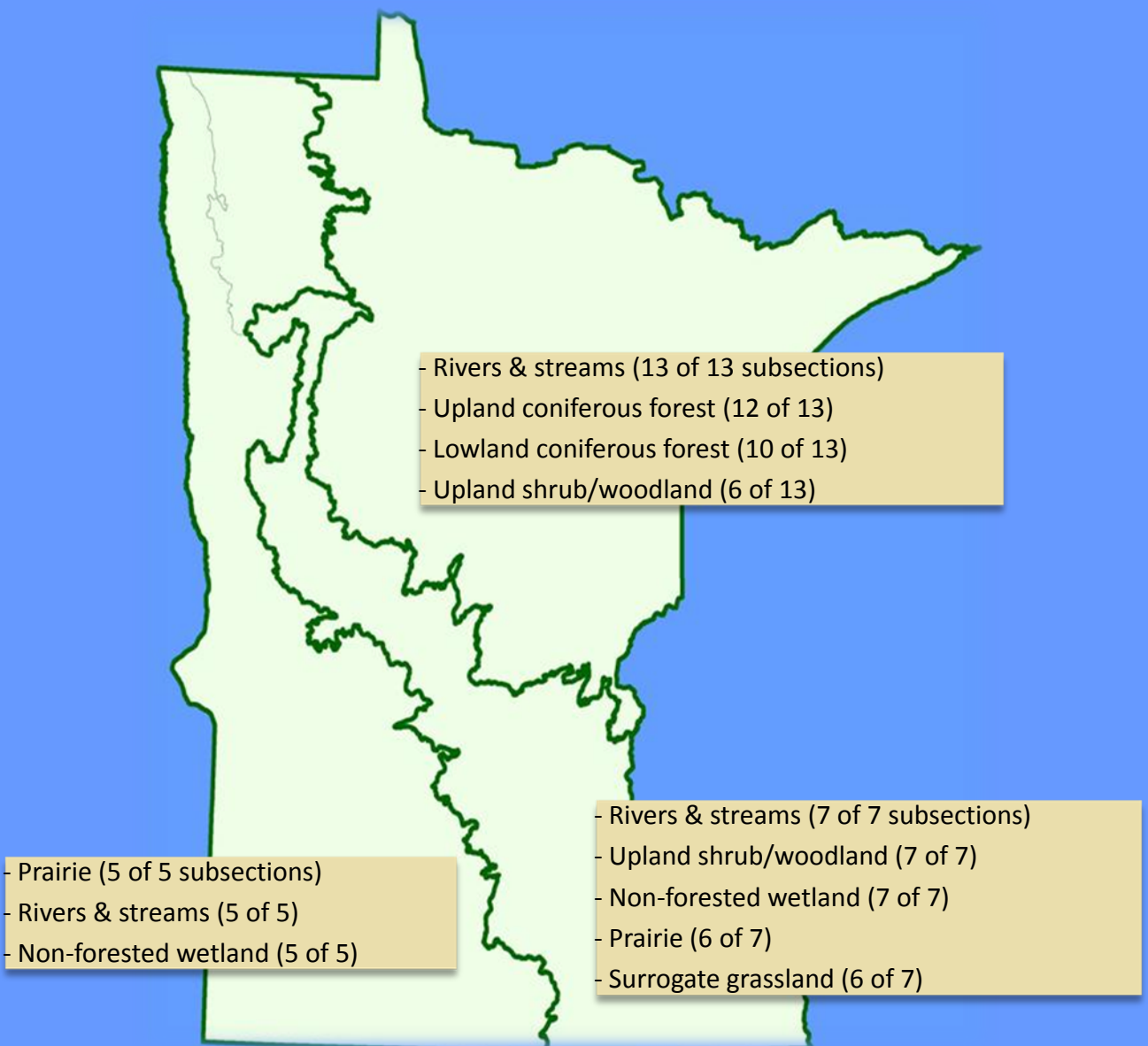
SUBSECTION HABITAT PERCENTAGES AND HABITAT USE BY SGCN TAXA

This table presents information on the percentages for each habitat in the subsection (showing changes in coverage between the mid-to late 1800s and the 1990s), as well as habitat use by SGCN taxonomic group. Habitats are listed in ranked order for percent coverage within the subsection in the 1990s. Key habitats for the subsection (as identified on previous page) are listed in **BOLD**. SGCN habitat use is broken down by taxonomic group, with a total number of species for all taxonomic groups listed at the far right of the table.

HABITAT	Percentage of Subsection (1890s)	Percentage of Subsection (1990s)	SGCN BY TAXONOMIC GROUP								Total Number of Species
			Amphibians	Birds	Fish	Insects	Mammals	Mollusks	Reptiles	Spiders	
Cropland	N/A	36.4		6			4		1		11
Grassland	N/A	17.6		17			8		6		31
Developed	N/A	12.4		5		1	3				9
Forest-Upland Deciduous (Hardwood)	2.9	11.0		14		2	4		2		22
Forest-Lowland Coniferous	4.7	6.2		7		1	1			1	10
Wetland-Nonforest	12.7	4.5		29		1	3		2	1	36
Lake-Shallow	N/A	2.8		12					2		14
Forest-Lowland Deciduous	1.2	2.4		13			2		2		17
Lake-Deep	N/A	2.3	1	2	2				1		6
Forest-Upland Deciduous (Aspen-oak)	8.3	2.1		13			2				15
Forest-Upland Coniferous	0.0	1.6		12		2	4		4		22
Oak Savanna	53.8	0.7		15		5	6		4		30
Prairie	10.4	0.0		15		3	7		6	3	34
Shoreline-dunes-cliff talus (Dune habitat)	N/A	N/A		11			2		2		15
Shrub-Lowland	N/A	N/A		14		1	3		1		19
River-Headwater to Large	N/A	N/A	1	3	2	1		6	3		16
River-Very Large	N/A	N/A	1	1	1			8	2		13

N/A: Insufficient data available to determine percent coverage within subsection. We have no data to indicate the existence of cropland, grassland, or developed land prior to settlement by people of European descent, although these land uses likely did occur at very low levels.
NOTE: 0.0 indicates less than 0.05 percent coverage.

Top Key Habitats by Province



Priority Conservation Actions

Pages 5-6

Examples:

- Incorporate SGCN habitat concerns in forest management planning
- Maintain and enhance riparian areas along priority stream reaches
- Research important aspects of SGCN habitats and populations within the subsection

Anoka Sand Plain

Ten-Year Goals, Management Challenges, Strategies, and Priority Conservation Actions

Goal I: Stabilize and increase SGCN populations

Management Challenge 1 – There has been significant loss and degradation of SGCN habitat
Strategy 1 A – Identify key SGCN habitats and focus management efforts on them

Priority Conservation Actions to Maintain, Enhance, and Protect the Key Habitats

1. Oak savanna habitats, actions include:
 - a. Manage invasive species
 - b. Use prescribed fire and other practices to maintain savanna
 - c. Encourage oak savanna restoration efforts
 - d. Provide technical assistance and protection opportunities to interested individuals and organizations
2. Native prairie habitats, actions include:
 - a. Manage invasive species
 - b. Use prescribed fire and other practices to maintain prairie
 - c. Manage grasslands adjacent to native prairie to enhance SGCN habitat
 - d. Encourage prairie restoration efforts
 - e. Provide technical assistance and protection opportunities to interested individuals and organizations
3. Nonforested wetlands, actions include:
 - a. Enforce the Wetlands Conservation Act
 - b. Manage habitats adjacent to wetlands to enhance SGCN values
 - c. Provide technical assistance and protection opportunities to interested individuals and organizations
4. High-quality grassland habitats, actions include:
 - a. Maintain high-quality grasslands
 - b. Support the maintenance of pasture and grassland habitats valuable to SGCN
 - c. Encourage when appropriate transformation of plowed fields into pasture/grasslands
 - d. Provide technical assistance and protection opportunities to interested individuals and organizations
5. Dune habitats, actions include:
 - a. Support the protection of dune habitats from damaging development
 - b. Enhance dune habitats to support SGCN
 - c. Provide technical assistance and protection opportunities to interested individuals and organizations
6. Shallow lake habitats, actions include:
 - a. Maintain good water quality in shallow lakes
 - b. Enhance near-shore terrestrial and aquatic habitats
 - c. Provide technical assistance and protection opportunities to interested individuals and organizations
7. Stream habitats, actions include:
 - a. Maintain good water quality, hydrology, geomorphology, and connectivity in priority stream reaches
 - b. Maintain and enhance riparian areas along priority stream reaches
 - c. Provide technical assistance and protection opportunities to interested individuals and organizations

Management Challenge 2 – Some SGCN populations require specific management actions

Strategy 1 B – Manage federal and state listed species effectively

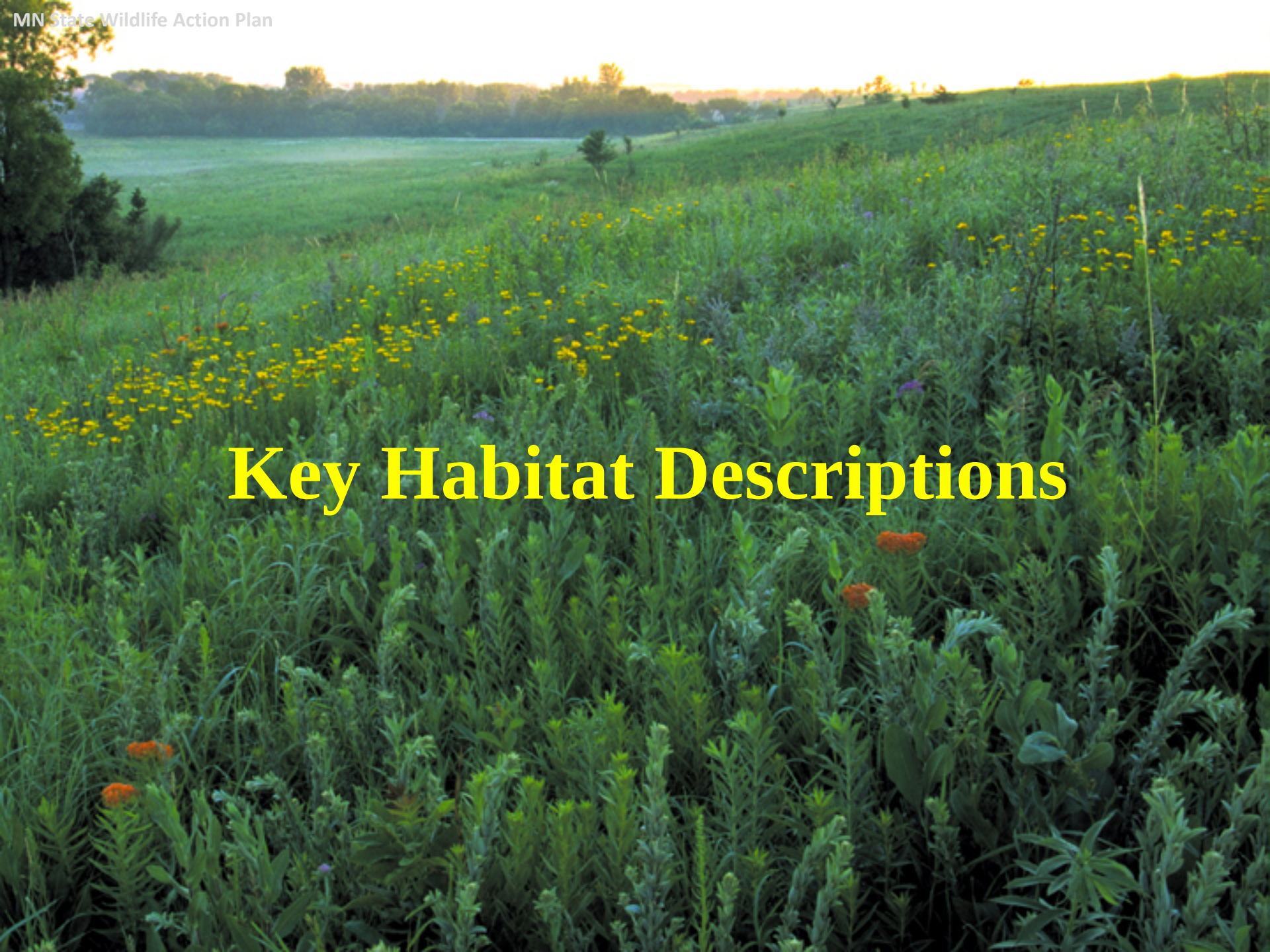
Priority Conservation Actions for Specific SGCN

1. Implement existing federal recovery plans
2. Develop and implement additional recovery plans
3. Provide technical assistance to managers, officials, and interested individuals related to listed species
4. Enforce federal and state endangered species laws, as well as other wildlife laws and regulations

Strategy 1 C – Manage emerging issues affecting specific SGCN populations

Priority Conservation Actions for Specific SGCN

1. Work with partners to effectively address emerging issues affecting SGCN populations
2. Enforce federal and state wildlife laws and regulations



Key Habitat Descriptions

Habitat Chapters

Provide Valuable Information

Features:

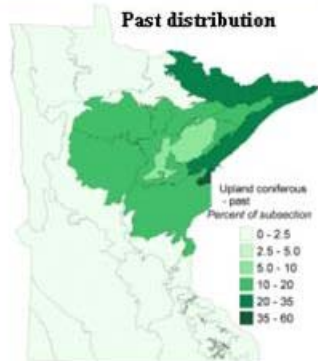
- Crosswalk to the Native Plant Community classification
- Maps of past and current distribution
- General description
- Examples of features important to SGCN
- Management opportunities

Forest-Upland Coniferous

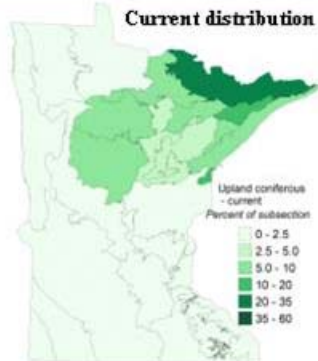
Ecological Systems	Native Plant Community Types (NPC)	NPC Codes
Fire-dependent Forest (FD)	Jack Pine Woodland (Sand)	FDn12a
	Red Pine Woodland (Sand)	FDn12b
	Jack Pine Woodland (Bedrock)	FDn22a
	Red Pine-White Pine Woodland (Northeastern Bedrock)	FDn22b
	Red Pine-White Pine Woodland (Eastcentral Bedrock)	FDn22c
	Red Pine-White Pine Woodland (Canadian Shield)	FDn32a
	Black Spruce-Jack Pine Woodland	FDn32c
	Jack Pine-Black Spruce Woodland (Sand)	FDn32d
	Spruce-Fir Woodland (North Shore)	FDn32e
	Red Pine-White Pine Woodland	FDn33a
	Black Spruce Woodland	FDn33c
	White Pine-Red Pine Forest	FDn43a
	Upland White Cedar Forest	FDn43c
	Jack Pine (Bearberry) Woodland	FDc12a
	Jack Pine (Yarrow) Woodland	FDc23a
	Jack Pine (Bush Honeysuckle) Woodland	FDc24a
	Jack Pine-Oak Woodland	FDc25a
	Red Pine-White Pine Forest	FDc34a
	Jack Pine-Oak Woodland (Sand)	FDs27a
	White Pine-Oak Woodland (Sand)	FDs27b
Mesic Hardwood Forest (MH)	White Pine-White Spruce-Paper Birch Forest	MHn44b
	White Cedar-Yellow Birch Forest	MHn45b



Red Pine-White Pine Forest (FDc34a)



Source: Marschner 1930



Source: MN GAP 1993

Habitats Chapter

Examples of Features Important for Species in Greatest Conservation Need

Wildfire:

Black-backed woodpeckers are largely confined to recently burned coniferous forests.

Spruce grouse rely on the mosaic of new patches of dense young forests of jack pine and spruce created by wildfire.

Heather voles feed on the foliage, berries, and seeds of Ericaceous shrubs, which require fire to thrive.

Old forest:

Winter wrens need large snags, down trees with root wads, stumps, very large trees, and small openings in the canopy.

Bay-breasted warblers and **Cape May warblers** feed on spruce budworms and increase during periodic outbreaks of budworm in older spruce and fir.

Coarse woody debris:

Smokey shrews prefer a cool, damp forest floor with a thick litter layer, mossy covered rocks, and decaying debris.

Management Options to Support Species in Greatest Conservation Need

Explore opportunities to implement forest management practices that:

- Use fire (“let burn” and prescribed fire), including in the 1999 blowdown in the BWCAW.
- Use natural disturbance return intervals to guide rotation periods.
- Mimic landscape disturbance patterns with timber harvest (e.g., more large patches).
- Manage stands to retain biological legacies (at site level).
- Increase the proportion of forest dominated by conifers.



Online link to the State Wildlife Action Plan:

www.mndnr.gov/cwcs

