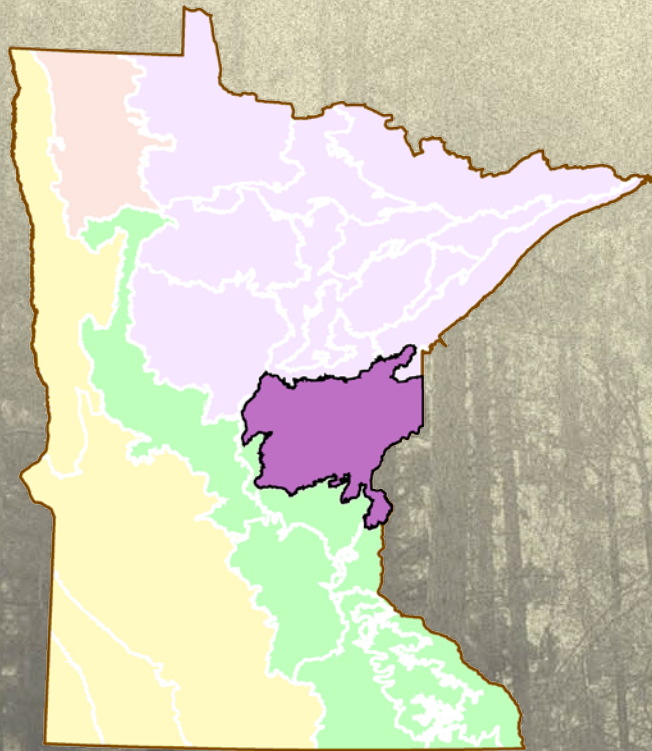


# TOMORROW'S HABITAT

FOR THE  
WILD & RARE

AN ACTION PLAN FOR MINNESOTA WILDLIFE

## MILLE LACS UPLANDS SUBSECTION PROFILE



MINNESOTA'S COMPREHENSIVE WILDLIFE CONSERVATION STRATEGY





# Mille Lacs Uplands

## SUBSECTION OVERVIEW

The Mille Lacs Uplands is a large subsection located in east-central Minnesota and includes the St. Croix Moraines, a small area to the southeast along the St. Croix River. The subsection is named after Lake Mille Lacs, well known for its high-quality walleye fishing. Several major rivers run through the area, including the Kettle, Snake, Rum, Ripple, and St. Croix, the latter forming part of the eastern boundary. The subsection contains extensive wetlands and 100 lakes greater than 160 acres in size. Gently rolling hills are the dominant landform. Glaciation has had a major influence on the landscape, and the resulting moraines provide excellent salamander habitat today. Before settlement by people of European descent, maple-basswood forests were prevalent in the south, and the north was a mix of conifer and hardwood forests.

Because of its proximity to the Twin Cities and its vast network of roads, this subsection is under increasing pressure from human activities, including the expansion of motorized recreation and residential development, some of it affecting lakeshores. Agriculture is concentrated in the western and southern portions, and forestry and recreation are more common in the central and eastern portions. Large areas in eastern Pine County are still heavily forested, although few significant examples of once common white pine stands are present. The once common oak and jack pine barrens are all but gone in this area.

## SPECIES IN GREATEST CONSERVATION NEED

**128 Species in Greatest Conservation Need (SGCN)** are known or predicted to occur within the Mille Lacs Uplands, the third most of all subsections in Minnesota. These SGCN include 57 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, 6 mammal SGCN are known or predicted to occur in the Mille Lacs Uplands, approximately 27% of all mammal SGCN in the state.

### SGCN BY TAXONOMIC GROUP

Taxa	# of SGCN	Percentage of SGCN Set by Taxon	Examples of SGCN
Amphibians	5	83.3	Spotted salamander
Birds	61	62.9	Red-shouldered hawk
Fish	10	21.3	Southern brook lamprey
Insects	19	33.9	St. Croix snaketail dragonfly
Mammals	6	27.3	<i>None documented since 1990</i>
Mollusks	18	46.2	Mucket mussel
Reptiles	7	41.2	Blanding's turtle
Spiders	2	25.0	Jumping spider ( <i>P. fontana</i> )

## SPECIES SPOTLIGHT

### Gilt darter (*Percina evides*)

**Distribution** This fish is found only in the St. Croix River and several of its tributaries, including the Snake, Kettle, and Sunrise rivers. This population is disjunct from populations in the Ozarks and Tennessee uplands.

**Abundance** Rare. The species has greatly declined across its range and has become extirpated in some areas due to high sediment runoff and contamination.

**Legal Status** State list-Special Concern.

**Comments** The ideal habitat qualities and high water quality characteristic of the St. Croix River and its tributaries make this watershed a stronghold for the remaining population of gilt darters there.

## Quick facts

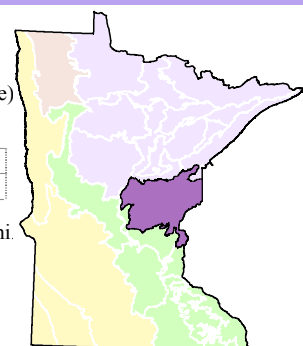
Acres: 3,388,885 (6.3% of state)

### Ownership

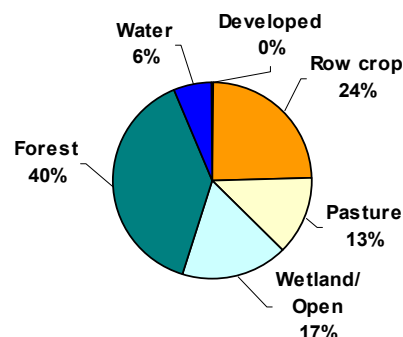
Public	Private	Tribal
17.7%	82.2%	0.1%

Population density (people/sq. mi.)

Current	Change (2000-2010)
49.3	+9.0



Current Land Use/Land Cover



## HIGHLIGHTS

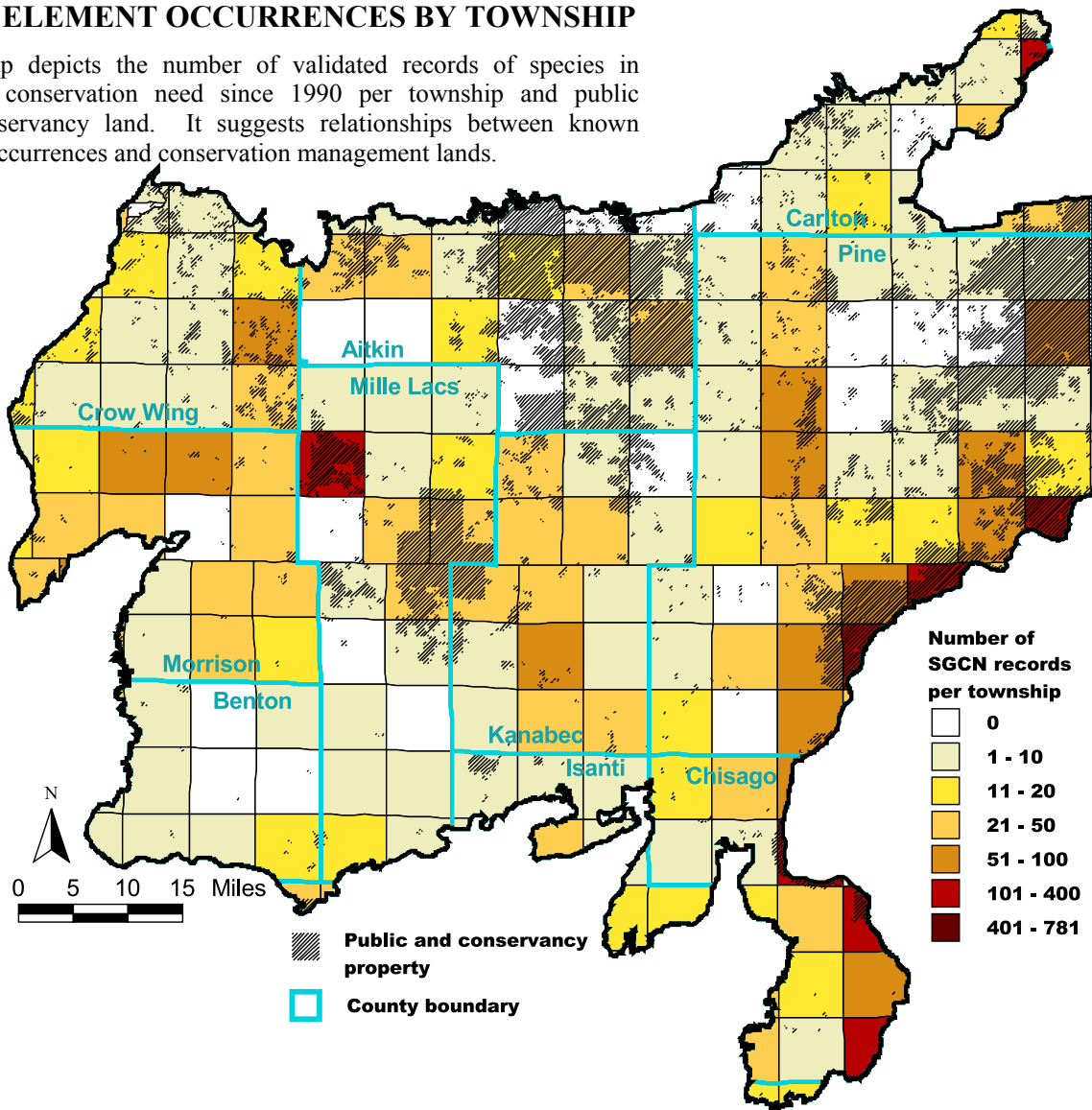
- Extensive forest lands, riparian forests and open waters characterize the subsection. This mix of habitats supports bald eagles, common terns, sandhill cranes, ospreys, wood turtles, trumpeter swans, yellow rails, and sharp-tailed sparrows, as well as rare mussels like the winged mapleleaf, spike, and round pigtoe. Sand terraces and rock outcrops along the St. Croix River provide habitat for bullsnakes.
- This subsection is a major migratory corridor for waterbirds. It is also one of the most important subsections for forest-dwelling salamanders, such as four-toed and spotted salamanders, which use fishless, seasonal wetlands as breeding habitat.
- Areas important for SGCN include Father Hennepin, Mille-Lacs Kathio, St. Croix, and Wild River SPs; St. Croix Scenic Waterway; Sandstone NWR; Mille Lacs WMA; and Nemadji, St. Croix, and Chengwatana SFs.



Photo by Konrad Schmidt

## 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	80
Habitat Degradation in MN	89
Habitat Loss/Degradation Outside of MN	31
Invasive Species and Competition	30
Pollution	38
Social Tolerance/Persecution/Exploitation	17
Disease	2
Food Source Limitations	3
Other	12

# Mille Lacs Uplands

## 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
<a href="#">Forest-Upland Deciduous (Mixed hardwood-pine)</a>			X		
<a href="#">Forest-Upland Coniferous</a>	X		X		
<a href="#">Shrub/Woodland-Upland (Jack pine woodland)</a>			X		
<a href="#">Forest-Lowland Coniferous</a>			X		
<a href="#">Wetland-Nonforest</a>	X	X			
<a href="#">Shoreline-dunes-cliff/talus</a>		X			
<a href="#">Lake-Deep</a>				X	
<a href="#">River-Headwater to Large</a>				X	X
<a href="#">River-Very Large (St. Croix River)</a>				X	X

### 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  $p < 0.01$ .

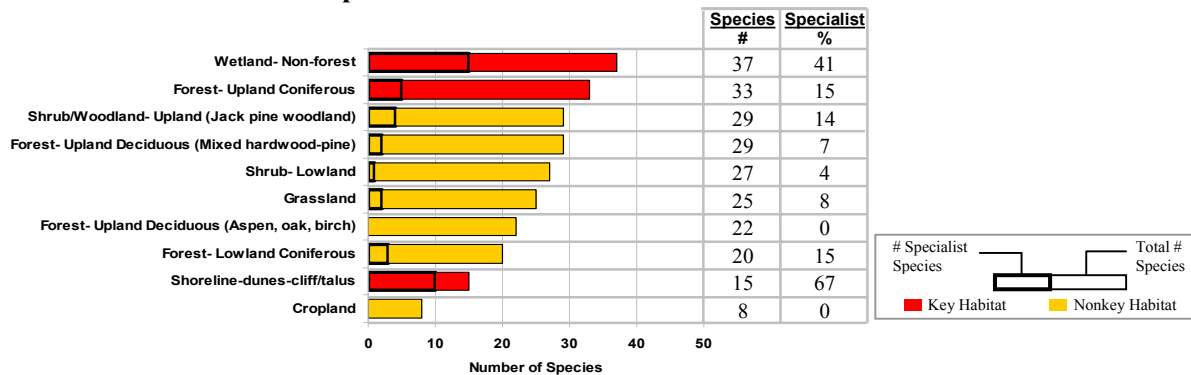
**B: Specialist terrestrial habitat use analysis** - terrestrial habitats that represent more than 5% of 1890s or 1990s landcover and have more than 15 species, 20% of which use 2 or fewer habitats (specialist species).

**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).

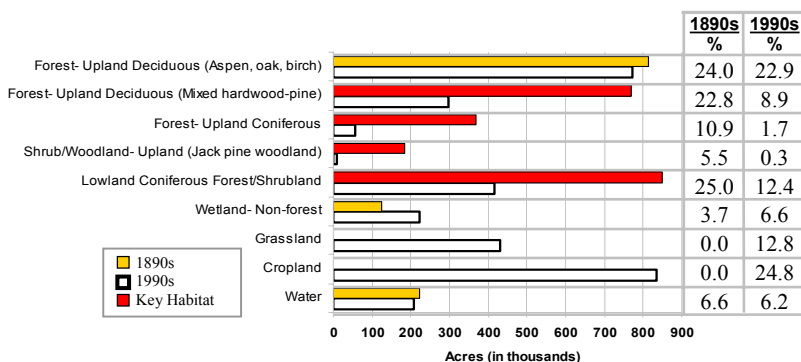
**D: Aquatic habitat use analysis** - lake or stream habitats that have the most SGCN use based on a z-test with  $p < 0.01$  of all subsections.

**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).

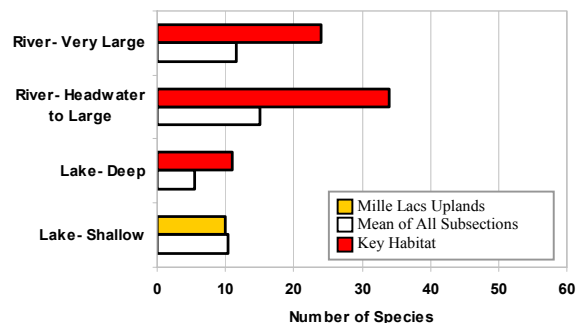
### A/B – Terrestrial Habitat Use/Specialist Terrestrial Habitat Use



### C – Terrestrial Habitat Change



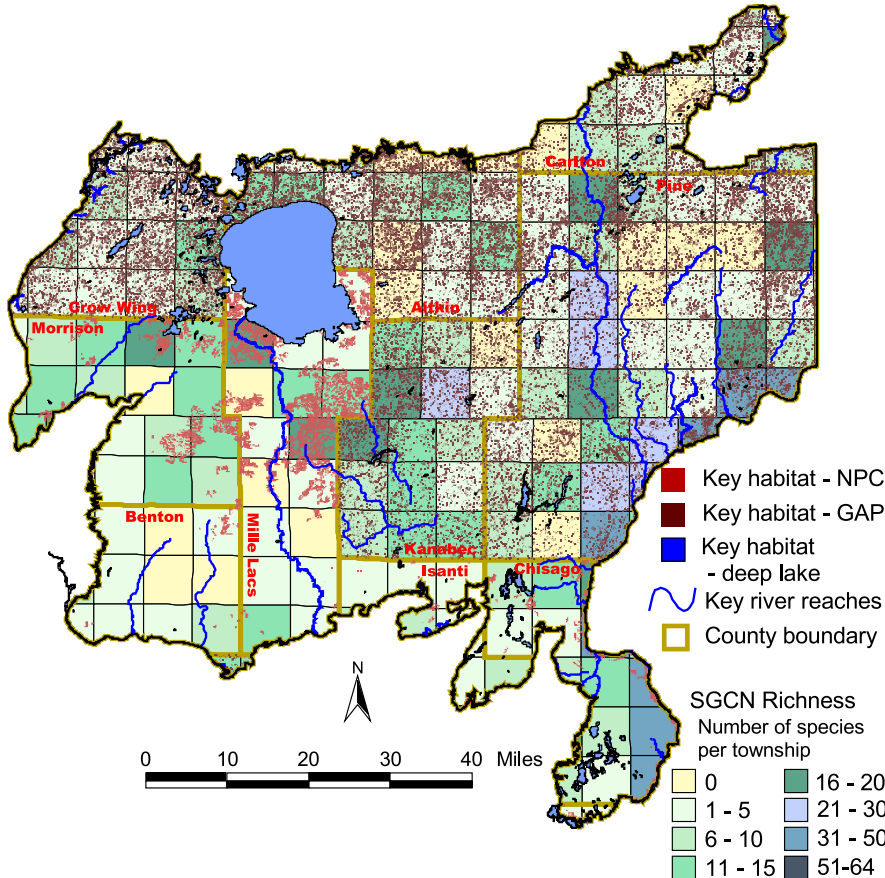
### D – Aquatic Habitat Use



### E – The Nature Conservancy/SGCN Occurrence

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

## 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:*

- Major River Centerline Traces in Minnesota, 1984
- MCBS Native Plant Communities (NPC), 2005
- MN DNR 24K Lakes, 1990
- MN DNR 24K 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 Mussel Survey, 2005
- MN GAP Landcover, 1993
- 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	24.7		5			3				8
Forest-Upland Deciduous (Aspen, oak, birch)	24.0	22.9	3	16			3				22
Grassland	N/A	12.8		15			5		4	1	25
<b>Forest-Lowland Coniferous</b>	25.1	12.4		16		1	2			1	20
<b>Forest-Upland Deciduous (Mixed hardwood-pine)</b>	22.7	8.9	3	16		3	5		2		29
<b>Wetland-Nonforest</b>	3.7	6.6	1	28		1	3		2	2	37
<b>Lake-Deep</b>	N/A	5.2	1	2	4	3			1		11
Forest-Lowland Deciduous	1.3	3.2		14		1	2		1		18
<b>Forest-Upland Coniferous</b>	10.9	1.7	2	19		5	5		2		33
Lake-Shallow	N/A	1.0		7					2		9
Developed	N/A	0.3		4		1	2		1		8
<b>Shrub/Woodland-Upland (Jack pine woodland)</b>	5.5	0.3	1	15		5	5		3		29
Prairie	0.3	0.0		13		1	5		5	2	26
<b>Shoreline-dunes-cliff/talus</b>	N/A	N/A	1	11			2		1		15
Shrub-Lowland	N/A	N/A	1	19		1	5		1		27
<b>River-Headwater to Large</b>	N/A	N/A	1	3	9	11		7	3		34
<b>River-Very Large (St. Croix River)</b>	N/A	N/A	2		2	1		17	2		24

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.



## 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 I A – Identify key SGCN habitats and focus management efforts on them*

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

1. **Upland deciduous mixed hardwood-pine forest habitats**, actions include:
  - a. Incorporate SGCN habitat concerns in forest management planning
  - b. Provide technical assistance and protection opportunities to interested individuals and organizations
2. **Upland coniferous forest habitats**, actions include:
  - a. Incorporate SGCN habitat concerns in forest management planning
  - b. Provide technical assistance and protection opportunities to interested individuals and organizations
3. **Jack pine woodland habitats**, actions include:
  - a. Incorporate SGCN habitat concerns in forest management planning
  - b. Provide technical assistance and protection opportunities to interested individuals and organizations
4. **Lowland coniferous forest habitats**, actions include:
  - a. Incorporate SGCN habitat concerns in forest management planning
  - b. Provide technical assistance and protection opportunities to interested individuals and organizations
5. **Shoreline, dune, cliff/talus habitats**, actions include:
  - a. Support the protection of these habitats from damaging development
  - b. Enhance SGCN habitat along the shoreline
  - c. Enhance SGCN habitat within dune communities
  - d. Provide technical assistance and protection opportunities to interested individuals and organizations
6. **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
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
8. **Deep lakes habitats**, actions include:
  - a. Maintain good water quality in deep lakes
  - b. Enhance near-shore terrestrial and aquatic habitats
  - c. Provide technical assistance and protection opportunities to interested individuals and organizations

*Management Challenge 2 – Some SGCN populations require specific management actions*

*Strategy I 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 I 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

### Goal II: Improve knowledge about SGCN

*Management Challenge 1 – More information about SGCN and SGCN management is needed*

*Strategy II A – Survey SGCN populations and habitats*

#### Priority Conservation Actions for Surveys

1. Survey SGCN populations within the subsection, actions include:
  - a. Continue MCBS rare animal surveys
  - b. Survey SGCN populations related to key habitats
  - c. Survey wildlife taxa underrepresented by MCBS animal surveys

## **Priority Conservation Actions for Surveys (continued)**

2. Survey SGCN habitats within the subsection, actions include:
  - a. Assess the amount and quality of key habitats and map their locations

### *Strategy II B - Research populations, habitats, and human attitudes/activities*

#### **Priority Conservation Actions for Research**

1. Research important aspects of species populations within the subsection, actions include:
  - a. Better understand the life history and habitat requirements of important SGCN
2. Research important aspects of SGCN habitats within the subsection, actions include:
  - a. Identify best management practices for maintaining and enhancing key habitats
  - b. Identify important patterns and distributions of key habitats to better support SGCN populations
  - c. Identify important functional components within key habitats to support specific SGCN
  - d. Explore important, emerging SGCN habitat management issues
3. Research important aspects of people's understanding of SGCN within the subsection, actions include:
  - a. Identify people's attitudes and values regarding SGCN
  - b. Identify places and ways people can enjoy and appreciate SGCN

### *Strategy II C – Monitor long-term changes in SGCN populations and habitats*

#### **Priority Conservation Actions for Monitoring**

1. Monitor long-term trends in SGCN populations, actions include:
  - a. Continue existing population monitoring activities
  - b. Develop additional monitoring activities for specific SGCN populations
2. Monitor long-term trends in SGCN habitats, actions include:
  - a. Develop long-term monitoring activities for important SGCN habitats

### *Strategy II D – Create performance measures and maintain information systems*

#### **Priority Conservation Actions for Performance Measures and Information Systems**

1. Create and use performance measures, actions include:
  - a. Develop partner-specific performance measures within the subsection
  - b. Develop project-specific performance measures for SWG-funded projects
  - c. Actively incorporate monitoring and performance measure information to enhance adaptive management
2. Maintain and update information management systems

## **Goal III: Enhance people's appreciation and enjoyment of SGCN**

### *Management Challenge 1 – Need for greater appreciation of SGCN by people*

#### *Strategy III A – Develop outreach and recreation actions*

#### **Priority Conservation Actions for Outreach and Recreation**

1. Create new information and communicate with people to enhance their appreciation of SGCN
2. Create opportunities for people to appropriately enjoy SGCN-based recreation

# *Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife*

## How to use this subsection profile

### **Intended audience: Natural resource professionals and interested stakeholders**

- \* Identify how the priority conservation actions and key habitats intersect and inform your current and future priorities.
- \* Using your additional insights and local knowledge, “step-down” the priority conservation actions into more detailed actions and practical on-ground tasks.
- \* Use it to understand species in greatest conservation need priorities and tell a story about the subsection (its history, biology, ecology, demography) to other natural resource professionals, managers, decision makers and land owners.
- \* Visit our website, or give us a call, and tell us how you’re using it, how others are using it, and ideas that “step-down” the priority conservation actions.

### **Website:**

[www.dnr.state.mn.us/cwcs](http://www.dnr.state.mn.us/cwcs)

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