MINNESOTA'S WILDLIFE ACTION PLAN 2025-2035

CONSERVING HABITATS AND BIODIVERSITY

SPECIES

DEPARTMENT OF NATURAL RESOURCES

NONGAME WILDLIFE PROGRAM

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Cover Photos: Blanding's turtle and research intern, by Andrew Herberg; Golden-winged warbler, a stewardship species, Bob Dunlap

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Chapter 2: Species in Greatest Conservation Need

Overview

This chapter gives an overview of Species in Greatest Conservation Need (SGCN), animal and plant species that are vulnerable or at risk of decline or extirpation, or species of stewardship or Tribal significance in Minnesota. We also introduce Species in Need of Information (SNI), species believed to be rare in Minnesota, but for which we do not have enough information to categorize them as SGCN. Also new this year is the inclusion of plants and lichen to the SGCN and SNI list. Although plants are not eligible for funding under State Wildlife Grants, plant Species in Greatest Conservation Need are included here to build the basis for a broader conservation strategy.

SGCN include species that are very imperiled, such as those that are facing extirpation or even extinction. All species listed as endangered, threatened, or special concern by the state or federally are included as SGCN. The federal listing of threatened and endangered species, administered by the U.S. Fish and Wildlife Service under the U.S. Endangered Species Act, provides legal protection to species across their entire national or regional ranges. Minnesota maintains its own list of endangered, threatened, and special concern species under state law, reflecting conservation status specifically within the state's borders (Minnesota's endangered, threatened, and special concern species). Per Minnesota Statute Ch. 84.0895, endangered species are those threatened with extinction throughout all or a significant portion of its range in Minnesota, threatened species are those likely to become endangered within the foreseeable future throughout all or a significant portion of its range within Minnesota, and species of special concern are extremely uncommon in the state or have unique habitat requirements (Status definitions). Legal protections exist for endangered or threatened species, with the goal of preventing the extinction of species. Many of these species also have species-specific plans directing conservation efforts for their recovery. The DNR endangered species program is responsible for administering a permitting program to ensure that activities that may cause take of (harm to) state endangered or threatened species are not detrimental to the species. The DNR cooperates with USFWS on the protection and conservation of federally listed species.

SGCN are animal and plant species that are vulnerable or at risk of decline or extirpation, or species of stewardship or Tribal significance in Minnesota.

In addition to these imperiled species, SGCN include species that are more common. An important function of the State Wildlife Action Plan (SWAP) is to identify early conservation actions for at-risk species that can reduce their need for listing as endangered or threatened species and improve the probability of their recovery to sustainable levels. Designating more abundant species as SGCN highlights their declines or significant threats, ensuring that conservation measures can be implemented early — before populations become so depleted that recovery efforts are more costly and less likely to succeed.

Topics in this chapter include the Goal, three Strategies, and how these relate to conservation actions. We also touch on the evolution of SGCN across the three Plan iterations and the current definition of SGCN. We explain the conservation status assessment (S-rank process) underlying this Plan's list of SGCN and explain our approach to discussing stressors (threats) relating to species and their habitats. We provide a summary table of the 2025 list of SGCN and SNI sorted by taxonomic groups. This is then followed by a set of 8 sub-chapters for amphibians, birds, fishes, mammals, reptiles, aquatic invertebrates, terrestrial invertebrates, and plants (with lichens).

Building on the two Prior Plans

The definition of Species in Greatest Conservation Need has remained consistent across Minnesota's SWAPs, with minor additions and updates in selection processes over time.

2005-2015 Tomorrow's Habitat for the Wild and Rare

Minnesota's original State Wildlife Action Plan, Tomorrow's Habitat for the Wild and Rare, defined Species in Greatest Conservation Need as "animals whose populations are rare, declining, or vulnerable to decline and are below levels desirable to ensure their long-term health and stability." The criteria for SGCN included species whose populations were rare, declining, or vulnerable to decline, species at risk because of dependence on rare, declining, or vulnerable habitats, species subject to other threats that make them vulnerable, species with certain characteristics that make them vulnerable, or species whose Minnesota populations are stable but are declining in a substantial part of their range outside of Minnesota. In addition, federally or state-listed species, species with global conservation status of G1-G3, species of concern by regional lists such as the USFWS Region 3 Species of Concern, were also included. Vagrant and extirpated species not expected to return within 10 years were excluded. The selection process identified 292 SGCN, including 189 vertebrates and 103 invertebrates (DNR, 2005). These were then related to 16 key habitats as well as to 24 ecoregional subsections.

Minnesota's Wildlife Action Plan 2015-2025

In Minnesota's Wildlife Action Plan 2015-2025, technical advisory teams updated the 2005 list, adding 111 species and removing 59, for a new total of 346 SGCN (DNR, 2015). This included 185 vertebrate and 161 invertebrate species. Unique life history traits were identified along with the primary threats, or stressors, to the long-term sustainability of each species (Appendix C of 2015-2025 Plan). In addition, the distribution and abundance of "viable/persistent" SGCN populations were mapped for 156 SGCN with sufficient data and used to develop the Wildlife Action Network.

SWAP Species Goal

Conserve rare, declining, and vulnerable wildlife and plant Species in Greatest Conservation Need (SGCN) through targeted actions.

Species Strategies

1. Survey, monitor and research to document the distribution and trends of SGCN, assess the threats they experience, and evaluate conservation actions that support resilient populations.

2. Collaborate to deliver conservation actions that support resilient populations of SGCN and their habitats in partnerships with agencies, Tribes, non-governmental organizations, private landowners, and others.

3. Develop and share informational material to guide conservation actions for SGCN, such as species accounts, threat assessments, recovery plans, relevant regulations, avoidance measures, and beneficial habitat management practices.

Strategy 1: Survey, monitor and research to document the distribution and trends of SGCN, assess the threats they experience, and evaluate conservation actions that support resilient populations.

The Plan is an informational resource that provides a science-based framework to guide applied conservation strategies and actions. Surveys, monitoring, and research are essential for improving our understanding of the status of animal and plant populations, as well as their vulnerability to a variety of threats. Surveys often focus on questions of rarity and are used to evaluate how extensively a species is distributed within the state. Monitoring builds on this by tracking changes in species' abundance or distribution over time, often requiring long-term efforts across broader areas to determine meaningful trends. Research further contributes by examining the causes of SGCN population decline and by evaluating the effectiveness of conservation practices intended to benefit them. Together, well-designed surveys, monitoring programs, and research projects deepen our knowledge of species-specific habitat requirements and the environmental conditions that support thriving populations. For more information on this strategy, see Chapter 5: Monitoring and Research.

Strategy 2: Collaborate to deliver conservation actions that support resilient populations of SGCN and their habitats in partnerships with agencies, Tribes, non-governmental organizations, private landowners, and others.

Collaboration is essential to the successful conservation of SGCN animals and plants. The number of at-risk species and the scale of their conservation needs are too great for any single entity to address alone. As documented in the stressor sections, human activities — both past and present — have profoundly shaped and degraded many of Minnesota's ecosystems. This reality underscores the importance of working together to protect, restore, enhance, and maintain the habitats that remain, while optimizing their conditions to support vulnerable species.

While the DNR serves as the lead facilitator for efforts guided by this Wildlife Action Plan, implementation of actions depends on the work of numerous entities across the state each year. The DNR Nongame Wildlife Program plays a key role in facilitating partnerships with a broad array of collaborators to ensure conservation is approached collectively. Coordinated action among municipalities, soil and watershed conservation districts, private landowners, Tribes, other state agencies, national agencies,

Photo: Mussel research team, DNR Center for Aquatic Mollusk Programs

educational institutions, and non-profit organizations will be the most effective. In fact, the majority of our conservation work is accomplished through these partnerships.

Conservation Opportunity Areas (COAs) are places where on-the-ground conservation actions are concentrated to benefit SGCN and their habitats. COAs build on the Conservation Action Network, which depicts areas of high biodiversity and high habitat quality, linking them with buffers and corridors. They are delineated to encourage partnerships and to focus collaborative efforts on habitat conservation projects that provide the greatest benefit to SGCN. For more information, see the Conservation Opportunity Areas section in Chapter 6: Implementation.

While actions that are specifically related to developing partnerships will be listed under Strategy 2, collaboration as an approach can apply to all actions in the Plan, as all conservation actions would benefit from broader implementation by partners.

Photo: Producers and agency partners at Redwood River Farms on field tour in the Prairie Coteau Conservation Opportunity Area, TJ Boettcher

Strategy 3. Develop and share informational material to guide conservation actions for SGCN, such as species accounts, threat assessments, recovery plans, relevant regulations, avoidance measures, and beneficial habitat management practices.

This Plan is designed to put science into action. It identifies threats, outlines conservation actions, and provides case studies of successful conservation programs and links to existing resources. However, there is still a great demand for information to guide conservation practitioners across the state. In some cases, research or investigations are needed to develop management guidelines, avoidance measures, or habitat best management practices (see Chapter 5: Monitoring and Research). In other cases, valuable findings from the research community or applied conservation practice need to be translated into practical tools and resources that can readily be applied. Expanding efforts to investigate, synthesize, and publish recovery and management guidance for additional SGCN represents a significant opportunity.

There are also opportunities to expand information for a greater number of SGCN. Species accounts, such as the DNR's Rare Species Guide, currently provide information only for state and federally listed species. Recovery or action plans, such as the Wood Turtle Conservation Plan for Minnesota, serve as excellent resources, but plans of this kind currently exist for only a small number of species in Minnesota.

This strategy also emphasizes effective communication to ensure that more people are aware of available informational resources. Workshops, field trips, webpages, webinars, and one-pagers can be valuable tools for sharing new research, threat assessments, or best management practices as they emerge. This approach parallels Strategy 5 in Chapter 3: Habitats and Strategy 1 detailed in Chapter 4: Public Engagement.

Conservation Actions

Strategies are implemented by conservation actions, which are described in the SGCN sub-chapters. Conservation actions are also described in the habitat sub-chapters, so referring to these sections in tandem is recommended; for example, looking at the lakes and river chapters when reading about fish will provide more comprehensive information. Conservation actions are related to stressors through a set of icons, as depicted in the stressor section below.

Species in Greatest Conservation Need - Definition

The definition of Species in Greatest Conservation Need (SGCN) for this 2025-2035 Plan is consistent with the prior versions of Minnesota's Wildlife Action Plan, with the addition of Tribally nominated species of cultural significance. **SGCN are animal and plant species that are vulnerable or at risk of decline or extirpation, or species of stewardship or Tribal significance in Minnesota.**

This set of species provides focus to the entirety of the State Wildlife Action Plan. SGCN are native species whose populations are rare, declining, or vulnerable to decline and are below levels desirable to ensure their long-term health and stability in our state. Also included are species for which Minnesota has stewardship responsibility - those for which populations in Minnesota represent a significant portion of their North American population, or species for which Minnesota populations are stable while populations outside of Minnesota have declined or are declining in a substantial part of their range.

Tribally nominated species of cultural significance were included as criteria for identifying SGCN in this Plan, recognizing the deep and enduring connections that many Ojibwe and Dakota people have with the plants and animals with whom we share the land. Including tribal significance as a factor for designating SGCN status enabled the 11 federally recognized Tribes within Minnesota's borders (Tribes) to nominate species they consider vulnerable even if those species would not otherwise be selected via the other SGCN selection factors. In 2025, this resulted in the addition of the snowshoe hare (*Lepus americanus*) and wild rice (*Zizania palustris*). Snowshoe hare – Waabooz in Ojibwe - is a culturally important prey species valued for its meat and fur, particularly in winter. There are concerns over its reduced population size and range extent, as well as its future status with less extensive snow cover in shorter, milder winters under our warming climate. A special challenge for the Waabooz is the change in its fur color and the potential for phenological mismatch, when the timing of its color change does not match up with the presence of snow. The Waabooz was in the 99th percentile for climate vulnerability in the Aanji-bimaadiziimagak o'ow aki Climate Change Vulnerability Assessment (Great Lakes Indian Fish and Wildlife Commission (GLIFWC) Climate Change Team, 2023). Wild rice, manoomin (in Ojibwe) or psin (in Dakota), is an important food that is traditionally harvested and vulnerable to many disturbances in the waters in which it is found. It should be noted that many other tribally important species such as moose, elk, and wolf were already included in the SGCN list, and that Tribes independently maintain resources regarding species of importance.

SGCN include:

- **Federally-listed species** protected under the Endangered Species Act (including Endangered, Threatened, candidate, or recently de-listed species)
- **State-listed species** on Minnesota's state list of endangered, threatened, or special concern
- **Species that are rare, declining or vulnerable to threats**, as determined through the species conservation assessment (S-rank) process, including species with s-rank of critically imperiled (S1) and imperiled (S2) and some vulnerable

(S3) species if there were sufficient additional factors for concern (see below for more information)

- **Stewardship Species** - Species for which populations in Minnesota represent a significant portion of their North American population or whose Minnesota populations are stable, while populations outside of Minnesota have declined or are declining in a substantial part of their range

- **Tribally Significant Species** - Species of cultural significance to Tribes in Minnesota which are believed to be vulnerable to decline

Photo: Golden-winged warbler, a stewardship species, Bob Dunlap

Species in Need of Information - Definition

New for the 2025 Plan, we have added another category known as Species in Need of Information (SNI). **SNI are species believed to be rare in Minnesota, but for which we do not have enough information to categorize them as SGCN**. Species were designated as SNI if they are thought to be a potential future SGCN, and there is a desire to conduct surveys or monitoring for them within the next ten years. A designation of SNI enables State Wildlife Grant funds to be allocated toward survey or monitoring for those species.

Species List Development

Updating the SGCN list for the 2025-2035 SWAP included a few steps. First, we implemented a standardized, repeatable, comprehensive conservation status assessment for all regularly occurring species in our state for which we had sufficient data (see Conservation Status Assessment section below). Second, we established criteria for the SGCN list based on the S-ranks as well as additional factors, including plants and lichens in the SGCN list process for the first time. Third, we defined a list of Species in Need of Information (SNI).

Conservation Status Assessments

As a foundation to updating the SGCN list for this Plan, we conducted conservation status assessments for over 7,000 species of animals and plants found in Minnesota. We followed the NatureServe Conservation Status Assessment process, a rigorous and repeatable method adopted widely by states and provinces throughout North America (Faber-Langendoen et al., 2012; Master et al., 2012). For species for which there was sufficient information, we generated numeric conservation status ranks from 1 (critically imperiled) to 5 (secure); additional species that were identified as non-native or vagrant, or for which there was insufficient information, were given non-numeric ranks (see Conservation Status Rank box for rank definitions). Assessments are done globally (G-ranks), nationally (N-ranks), and sub-nationally (S-ranks). We calculated S-ranks for the species in Minnesota.

Prior to calculating S-ranks, we requested and incorporated species observation data from partners, including academic institutions, other governmental entities, non-profit organizations, Tribes, and community science driven databases. These datasets were compiled for use in assessing the conservation status factors. Using the NatureServe S-rank Calculator, we calculated preliminary S-ranks based on rarity, trends, and threats. These preliminary ranks were reviewed by taxonomic experts to assess

any data deficiencies, discrepancies, or gaps, and add additional information particularly regarding threats based on expert knowledge. S-ranks were then revised and reviewed once again after those updates were completed. Once the S-rank was established, species were then assessed for SGCN and SNI designation. Information compiled for status assessments and SGCN identification will also be used in the state's endangered and threatened species list revision process.

Conservation Status Ranks

Conservation Status Ranks indicate the risk of extinction for species (NatureServe Conservation Status Assessment). S-ranks consider species status within Minnesota. Each species received one of these ranks:

SX – Presumed Extirpated – Species or ecosystem is believed to be extirpated from the jurisdiction (i.e., nation or state/province). Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.

SH – Possibly Extirpated – Known from only historical records but still some hope of rediscovery. There is evidence that the species or ecosystem may no longer be present in the jurisdiction, but not enough to state this with certainty. Examples of such evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is no longer present in the jurisdiction.

S1 – Critically Imperiled – At very high risk of extirpation in the jurisdiction due to very restricted range, very few population occurrences, very steep declines, severe threats, or other factors.

S2 – Imperiled – At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

S3 – Vulnerable – At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

S4 – Apparently Secure – At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

S5 – Secure – At very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little or no concern from declines or threats.

SU – Unrankable – for species that we have compiled data and considered, but there is inadequate information available to rank.

SNA – Not Applicable – for species that are not an appropriate target of conservation efforts, such as non-native species or vagrants.

SNR – Species Not Ranked – for species we know have occurred in Minnesota but we have not considered in this effort due to lack of information, e.g., all of our species of ants.

S_M – Migratory species that regularly occur in Minnesota, but do not breed here are ranked, but will be given a modifier (e.g., S2M).

The conservation status assessment process incorporated eight status factors in three categories, highlighting three main ways in which species may become vulnerable:

- **Rarity** assesses the distribution of the species in the state, tabulating the number of known occurrences. It is based on range extent, area of occupancy (the subset of that range containing occurrences), population size (when known), and number of occurrences. Range extent and area of occupancy represent the idea that when occurrences occur over a large spatial extent they are less vulnerable to threats such as development, fire, or climate. Occurrences are areas where species have been detected and are not necessarily analogous to populations; whereas the definition of an occurrence is consistent across taxa, what comprises a population varies greatly. For most vertebrates and plants, a population generally refers to a group of occurrences within a certain distance from each other in which multiple occurrences have been documented across multiple years; for birds, this definition also includes occurrences over consecutive years given the comprehensive data available from multiple sources. For most invertebrates, for which survey effort has been inconsistent or altogether lacking, populations are more difficult to define and as such we did not assess this metric for most invertebrate species. Finally, although infrequent, the number of occurrences with good viability was incorporated when known.

- **Trends** in population size, abundance, occurrences, or area of occupancy are considered, both long-term and short-term. Long-term refers to the period since European colonization, roughly 200 years. Short-term trends are considered 10 years or three generations, whichever is longer, up to a maximum of 100 years. When state level trends are available, these are used. If state-level trends are not available, regional trends are applied, and continental trends are used only when more localized data are unavailable. There is always uncertainty in assuming that continental or regional trends accurately reflect trends within Minnesota. Population trends are central to assessing species status, but they are known only for few species. When trends in population or abundance are unavailable, changes in area of occupancy are sometimes considered as a surrogate.

- **Threats** were assessed for direct and indirect effects on species. We considered 10 threats from the IUCN threats classification system (level-one threats), such as development or climate change, which we describe in detail in the Stressors section below (of IUCN's 11 level-one threats, we omitted "geological events"). Each threat was assessed by taxonomic expert panels for scope and severity. Scope describes the extent to which a threat overlaps with the species' occurrences, such as the proportion of the population affected by a particular threat. For this, we provided reviewers with information on the proportion of the species' range intersecting mapped threat layers when available. Severity refers to the degree to which a threat harms the species, such as the proportion of the exposed population that may suffer mortality due to that factor.

Photo: Blanding's turtle and research intern, by Andrew Herberg

SGCN and SNI Selection

We developed a flowchart (in supplemental material at end of chapter) to determine whether species meet criteria for inclusion on our SGCN list, summarized as:

- SGCN include species ranked in Minnesota as Critically Imperiled (S1) or Imperiled (S2) in our conservation status assessments, species ranked globally as G1, G2, or G3 (Vulnerable), those federally listed as Endangered or Threatened under the Endangered Species Act (or recently de-listed or candidate species on the five-year work plan for listing), and those state listed in Minnesota as Threatened, Endangered, or Special Concern in 2013 and thought to remain on the future state list.
- In addition, other species (particularly those that ranked as Vulnerable, S3) were considered for inclusion on the SGCN list, particularly if they met some of these additional factors:
  - On the 2015 SGCN list or meet the 2015 criteria including for stewardship species
  - On the 2022 Midwest Regional SGCN (RSGCN) list, which are species classified as SGCN by at least one Midwest Association of Fish and Wildlife Agencies (MAFWA) state and meet regional stewardship criteria (% distribution in MAFWA states, core population in MAFWA states, etc.) and conservation concern criteria (federal listing, state listing, imperiled state and global NatureServe conservation status ranks, etc.)
  - On the Superior or Chippewa National Forest Regional Forester Sensitive Species (RFSS) list.
  - Tribally significant species (based on expert knowledge and recommendations by Tribes in Minnesota)

It can be noted that species ranked as vulnerable (S3) were sometimes included as SGCN and sometimes not, and this was a discretionary point in the selection process. The type of data available varied considerably across taxonomic groups, such that different considerations were made for species in different groups. For instance, trend data were available for many bird species, but few others. Some birds, despite having declining trends, were not included as SGCN due to high abundances that likely buffer them from major population declines over the next ten years. However, abundance and trend data are not available for many other species, and in those cases other factors might have been applied to the process of SGCN selection. For instance, habitat specialization was used as a criteria for including species of bees as SGCN and threats weighed heavily in the assessments for reptiles and amphibians.

Also of note, species ranked as Possibly Extirpated (SH) or Presumed Extirpated (SX) were sometimes included as SGCN or SNI, another discretionary point in the selection process. These species were included on the SGCN and SNI lists for a variety of reasons, including a high likelihood that breeding populations may be established in Minnesota over the next ten years; conservation actions (such as research and monitoring to confirm extirpation, or captive breeding and reintroductions) may target these species over the next ten years; or species are listed at the state or federal level. For animal species, this resulted in twenty-six SH species selected as SGCN, one SX species selected as SGCN, and two SH species selected as SNI (see Appendix B.) The majority of these are invertebrates. Six SH plant species and six SH lichen species were also designated SGCN, with an additional 68 SH plant and lichen species as SNI.

Draft lists of SGCN and SNI were widely circulated for review: within the DNR, to experts invited to provide S-rank comments, and to participants of the plant or animal SGCN volunteer teams assembled through regional workshops. If the state's list of threatened and endangered species changes during the term of the 2025 SGCN List, we will update the SGCN list and materials to reflect those updates accordingly.

2025 Species List

The 2025-2035 SGCN list contains 1,142 species (see Figure 2.1), along with 860 SNI species (Figure 2.2). Plants comprise 448 of the SGCN, followed by lichens (151 species), butterflies and moths (122), and bees (117). Together, plants and lichens comprise 52% of the SGCN list. Vertebrates, including amphibians, birds, fishes, mammals, and reptiles, total 166 species and represent 15% of the list. Refer also to Table 2.1 for a summary of SGCN and SNI species by taxonomic groups. See Appendix B for the full list of SGCN and SNI animals, plants and lichens. For invertebrates, the class and order, if appropriate, for each group is provided in the Aquatic Invertebrate and Terrestrial Invertebrate sub-chapters.

Among the 71 species previously identified as SGCN but not included in this Plan's list, some were removed due to more favorable assessments, some due to extirpation, and some were changed to SNI to better reflect a need for further information; please reference Appendix C for information on each species.

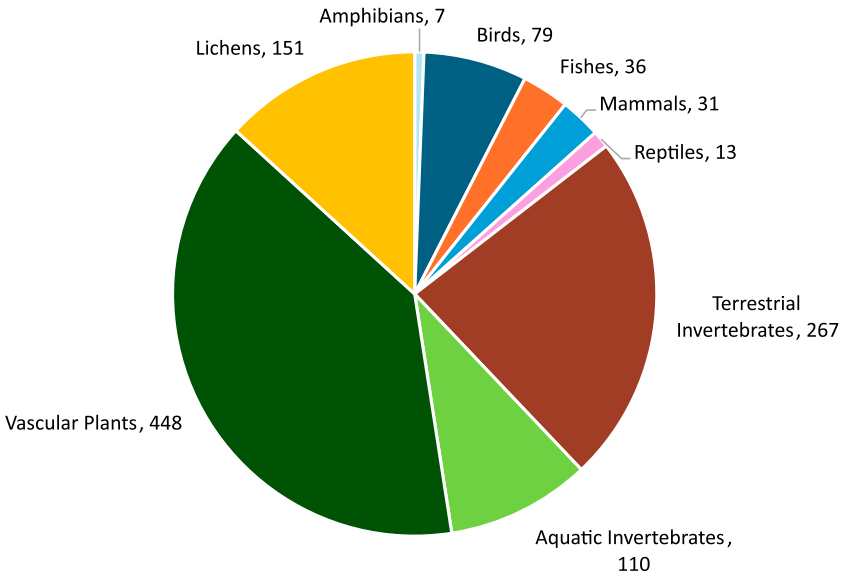

Figure 2.1 Numbers of Species in Greatest Conservation Need by species group. Each species group is described in a subchapter.

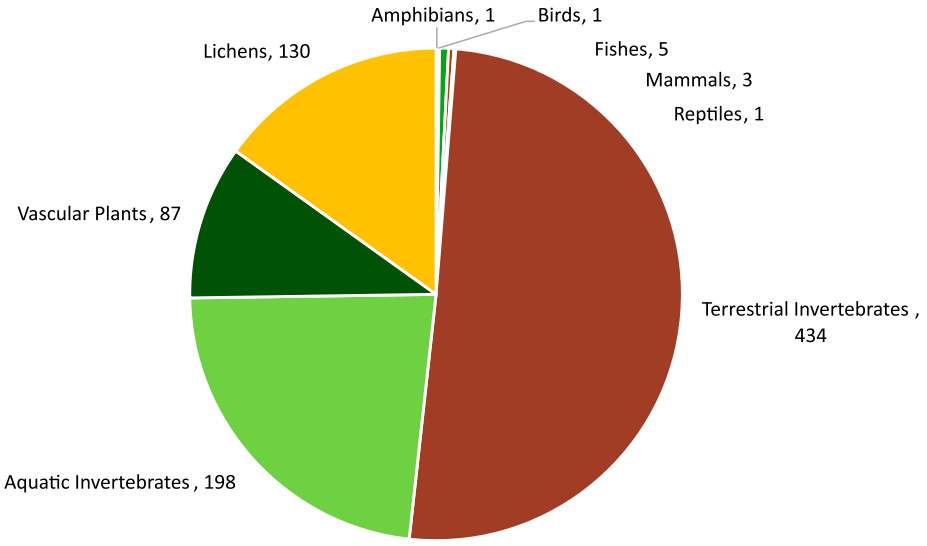

Figure 2.1 Numbers of Species in Greatest Conservation Need by species group. Each species group is described in a subchapter.

Table 2.1. Numbers of Species in Greatest Conservation Need (SGCN) and Species in Need of Information (SNI), the number of species assessed and the number of species that changed status from 2015, grouped first by vertebrate species, terrestrial invertebrates, aquatic invertebrates, plants, and lichen.

Species Group	No. of SGCN	No. of SNI	No. of Neither	Total Assessed	No. of SGCN removed	No. of SGCN added	No. of SNI added	% SGCN	% SNI
Amphibians	7	1	14	22	1	0	1	32%	5%
Birds	79	1	366	446	21	8	1	18%	0%
Fishes	36	5	124	165	8	2	5	22%	3%
Mammals	31	3	52	86	1	5	3	36%	3%
Reptiles	13	1	17	31	2	0	1	42%	3%
Bees	117	125	273	515	0	112	125	23%	24%
Beetles	12	10	68	90	1	4	10	13%	11%
Butterflies, Moths	122	257	1708	2087	6	95	257	6%	12%
Flies	0	5	62	67	0	0	5	0%	7%
Grasshoppers, Crickets	0	6	5	11	0	0	6	0%	55%
Millipedes	0	1	0	1	0	0	1	0%	100%
Snails	9	23	120	152	0	4	23	6%	15%
Spiders	7	4	517	528	6	3	4	1%	1%
Springtails	0	3	0	3	0	0	3	0%	100%
True Bugs, Cicadas, Leafhoppers	2	8	2	12	2	1	8	17%	67%
Caddisflies	38	63	213	314	3	17	63	12%	20%
Dragonflies, Damselflies	25	8	112	145	20	5	8	17%	6%
Mayflies	8	83	72	163	0	8	83	5%	51%
Mussels	32	1	18	51	0	3	1	63%	2%
Shrimp	0	1	8	9	0	0	1	0%	11%
Stoneflies	5	34	37	76	0	5	34	7%	45%
Plants	448	87	1932	2467	0	447	87	18%	4%
Lichens	151	130	757	1038	0	151	130	15%	13%
TOTAL	1142	860	6477	8479	53	870	842	-	-

Species-Habitat Associations

To associate SGCN with habitat types, species experts classified the SGCN by habitat types they use based on professional knowledge (see Figure 2.3). Habitats were distinguished as primary or secondary for vertebrate species and some invertebrate species. Primary habitats were those that species rely on and use most consistently; loss or degradation of these habitats would have the most significant negative effect on their populations. Secondary habitats were used by the species less frequently. Animals with more general habitat requirements were associated with multiple habitat types, while specialists were associated with one or a few. Some animals were only assigned secondary habitat associations, such as for several mammals that associate with specific features of habitats (e.g. wolf focused on prey) rather than particular habitat types. Plants were only associated with a primary single habitat type. A detailed table associating each animal SGCN with the Plan's 15 habitat types can be found in Appendix D. Appendix E lists the plant SGCN associations with primary habitats.

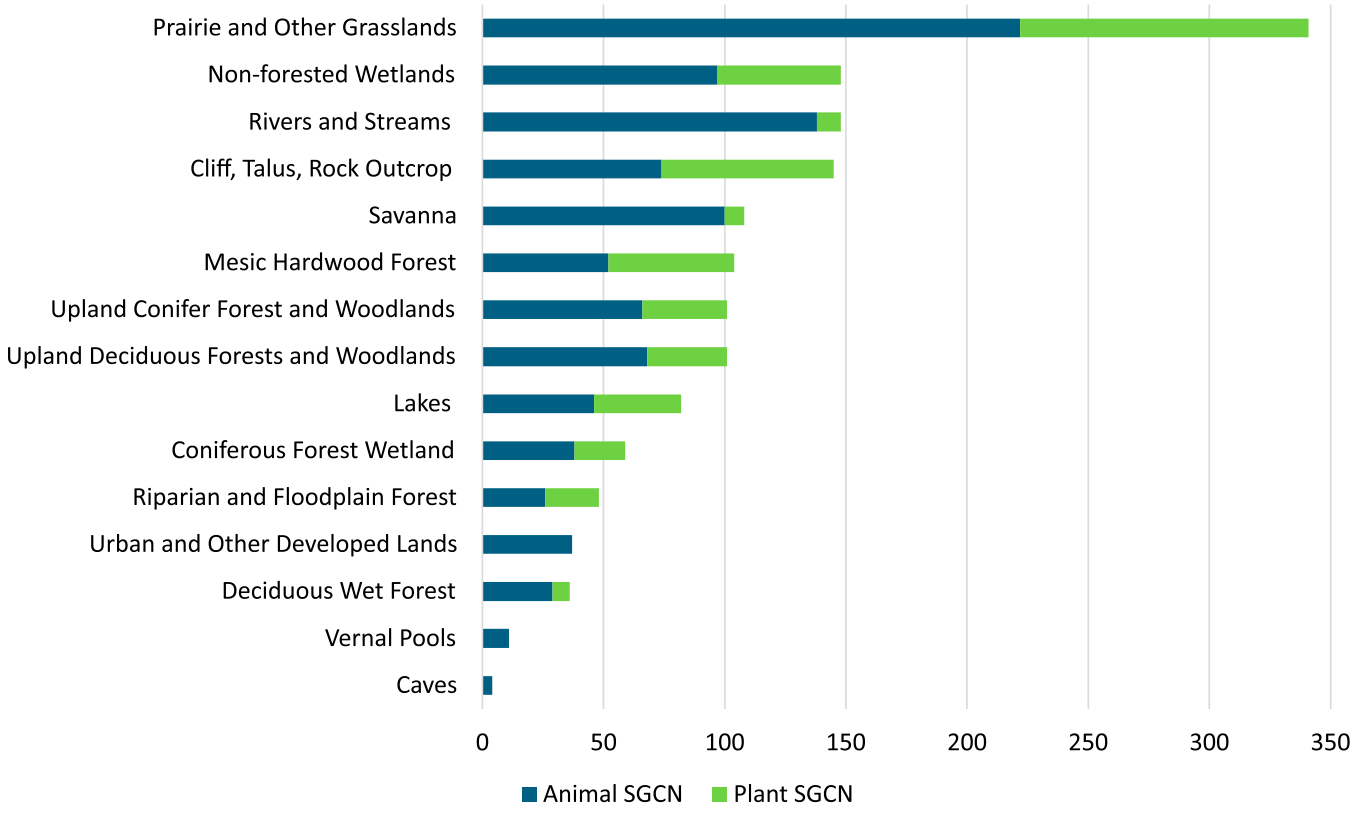

Figure 2.3 Numbers of Species in Greatest Conservation Need (SGCN) Associated with Habitat Types, including both primary and secondary habitat associations for animals. Plants were not associated to Urban and Other Developed Lands, Vernal Pools, or Caves habitat types.

Stressors and Actions

Throughout Minnesota, over time, habitats have been lost and degraded due to pressures that result from human inhabitation, subsistence, livelihoods, and recreation. **Thus, habitat loss or alteration is the primary threat for most, if not all, SGCN**. However, an approach has been taken at the international level to classify threats, or "stressors" as we call them in this Plan, to shine light on more of the proximate activities that continue to degrade our habitats or affect our SGCN directly. See also Chapter 3: Habitats.

We identify stressors as a way to direct conservation attention to where it is needed most. Potential conservation actions are explicitly linked to address the stressors, presented as a set of conservation opportunities. Stressors are factors that pose challenges to vulnerable plant and wildlife species, either directly or indirectly. An example of a direct threat is the stressor of "wind and solar energy" causing collisions for birds and bats with wind turbines. Other stressors may operate indirectly, such as through habitat conditions (e.g., the stressor of "problematic native species" reduces streamside sandy nesting habitat due to expansive cover by reed canary grass). Many stressors operate both directly and indirectly, such as roads, trails, and railroads causing both vehicular strikes for animals (direct) and habitat fragmentation (indirect).

It should be noted that sometimes factors or activities labeled as "stressors" can also be applied to advance conservation goals. Broad language such as "livestock management" and "fire management" is an attempt to remind readers of this: that these practices may sometimes be stressors but in other cases are applied as conservation tools. It is a matter of "how" and "where" these practices take place that determines if they are advancing ecosystem health and resilience as conservation actions (such as prescribed fire) or if they put stress on the ecological community, habitat, or species (such as a catastrophic wildfire following a long period of fire suppression). Throughout the Plan you will find language clarifying when a stressor may be a challenge and when it can be applied as part of a conservation solution.

We base the stressors listed in this Plan on an internationally employed threats lexicon developed by the International Union for the Conservation of Nature (IUCN) Species Survival Commission and the Conservation Measures Partnership (Salafsky et al., 2024). First developed in 2008 (Salafsky et al., 2008) and updated in 2024, this hierarchical system describes 11 Level 1 (higher level) threats and within those, 41 Level 2 (more specific) threats. We have selected a subset of 24 of these to discuss in relation to the species and habitats in Minnesota. We have shortened and re-named some for ease of understanding (see Table 2.2). We employ a set of icons throughout the Plan to depict stressors visually and to connect them to Actions. Please note that in the production phase of preparing this document for publication, we plan to replace some icons with customized ones, such as for timber harvest, to better convey the nuance and complexity of those stressors. Also note that within each habitat or species sub-chapter, we include only the primary stressors pertinent to that habitat or species group, omitting others to maintain focus.

Table 2.2. Stressor icons and names referenced throughout this SWAP, along with threat level information from the IUCN classification (Salafsky et al., 2024).

ICON	STRESSOR NAME	LEVEL1_2	LEVEL 1 THREAT (IUCN CLASSIFICATION)
	Development	1	Residential, Commercial, & Recreation Areas
	Crop Production	2_1	Agriculture & Aquaculture
	Tree Plantations	2_2	Agriculture & Aquaculture
	Livestock Management	2_3	Agriculture & Aquaculture
	Mining and Quarrying	3_2	Energy Production & Mining
	Wind and Solar Energy Infrastructure	3_3	Energy Production & Mining
	Roads, Trails, and Railroads	4_1	Transportation, Service, & Security Corridors
	Utility Corridors	4_2	Transportation, Service, & Security Corridors
	Shipping Lanes	4_3	Transportation, Service, & Security Corridors
	Hunting and Collecting Animals	5_1	Biological Resource Use & Control
	Gathering Plants and Fungi	5_2	Biological Resource Use & Control
	Timber harvest	5_3	Biological Resource Use & Control
	Fishing	5_4	Biological Resource Use & Control
	Recreation	6_1	Human intrusions & disturbance
	Fire Management	7_1	Natural System Management & Modifications
	Dams and Water Management	7_2	Natural System Management & Modifications
	Invasive Species (Problematic Non-native Species)	8_1	Invasive/Other Problematic Species, Genes & Pathogens

ICON	STRESSOR NAME	LEVEL1_2	LEVEL 1 THREAT (IUCN CLASSIFICATION)
	Problematic Native Species	8_2	Invasive/Other Problematic Species, Genes & Pathogens
	Diseases and Pathogens	8_4	Invasive/Other Problematic Species, Genes & Pathogens
	Water-borne Pollution	9_1	Pollution
	Air-borne Pollution	9_3	Pollution
	Light and Noise Pollution	9_4	Pollution
	Changes in Temperature related to Climate	11_2	Climate Change
	Changes in Precipitation and Hydrology related to Climate	11_3	Climate Change

Species Sub-chapters

Information on Species in Greatest Conservation Need and Stressors is presented in 8 sub-chapters, one for each of the following groups of species:

1. Amphibians
2. Reptiles
3. Birds
4. Fishes
5. Mammals
6. Terrestrial Invertebrates
7. Aquatic Invertebrates
8. Plants and Lichens

Each of these species group sub-chapters includes the following information:

Overview

Each sub-chapter begins with several paragraphs that summarize relevant information about each taxonomic group of species, including unique aspects of the species, the depth of information available, and/or the ecological importance of the species.

SGCN and SNI Summary Information

A brief summary of the number of SGCN and SNI identified is provided and the reader is directed to Appendix B for more extensive detailed information.

Species-Habitat Associations

A summary of the associations of SGCN with the 15 habitat types is provided. Details on the habitat associations for each SGCN is provided for animals in Appendix D and for plants in Appendix E.

Stressors

As noted above, the primary stressors that may affect SGCN in each group are identified and briefly described. Each stressor is depicted by an icon (illustration) to help the reader connect content from stressor to actions.

Priority Species Conservation Strategies

In each sub-chapter we reference the three

Strategies for implementation, using these to group Potential Conservation Actions.

Potential Conservation Actions

Conservation Actions, organized under Strategies, address primary stressors and are tagged by stressor icons to relate them. Frequently a conservation action can address more than one Stressor. In those cases, Conservation Actions are identified by multiple Stressor Icons.

Case Studies

Case studies are provided throughout the plan to showcase examples of successful conservation approaches, highlight key partnerships, and provide additional links to key resources related to the species group in that sub-chapter. Case studies include a brief summary of the project as well as links to read additional information. It should be noted that although some active partnerships are described in the narrative; these are not an exhaustive list but rather given as examples of programs that may interest readers and expand the implementation of conservation actions.

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Supplemental Material - Species Designation Flowchart

To support the Species in Greatest Conservation Need (SGCN) and Species in Need of Information (SNI) designation process, we developed a flowchart to help determine whether species meet criteria for inclusion on our SGCN or SNI lists. The instructions for following the flowchart are below, and the flowchart is illustrated on the next two pages, split into two panels for readability.

The flowchart begins on the far left at the yellow star. It is designed to process one species at a time, answering the questions until one of three boxes is reached: SGCN, SNI, or Neither. Some boxes in the flowchart are colored gray. These indicate questions that are more subjective. Taxa experts can use their knowledge of each species to answer these questions. Additionally, there are three boxes with dashed arrows pointing out from them. These indicate a potential path to follow, and experts choose which path to take using their judgment.

Box A. Native and Regularly Occurring. Verifies that species are native and regularly occurring (not vagrants). Species not meeting these criteria are eliminated from consideration.

Box B. Federal Status. Identifies species federally listed under the Endangered Species Act (ESA) as endangered or threatened, recently de-listed, or on the five-year work plan for listing. These are automatically SGCN.

Box C. Extirpated Species. If a species received an S-rank of SX, indicating it is Presumed Extirpated, then it does not need to be included as an SGCN just because it meets ESA criteria. Continue to Box M.

Box D. State Listed. Includes species from the 2013 Minnesota State list of endangered, threatened, and special concern species. Use in conjunction with Box E.

Box E verifies the species is likely to remain on the next Minnesota state list; if so, these are SGCN. If not, continue to box F.

Box F. Imperiled S1 and S2 Species. Identifies species that in our 2025 conservation status assessment (S-rank process) received ranks of S1 (Critically Imperiled) or S2 (Imperiled). These will become SGCN unless they are not thought to merit SGCN status due to factors in gray boxes G, H, and I.

Box G. If a species was classified as an S1 or S2 in Minnesota only because it is at the edge of its range, go to Box K.

Box H. If a species was classified as S1 or S2 because it is under-surveyed (not truly rare), go to Box I.

Box I. Re-evaluate the S-rank. In this case, it is more appropriate that the species have an S-rank of SU. Change S-rank if needed and go to Box O.

Box J. S3, S4, and S5 Species. Most species that received S-ranks of S3, S4, and S5 will not become SGCN, but some species can be qualified based upon additional factors.

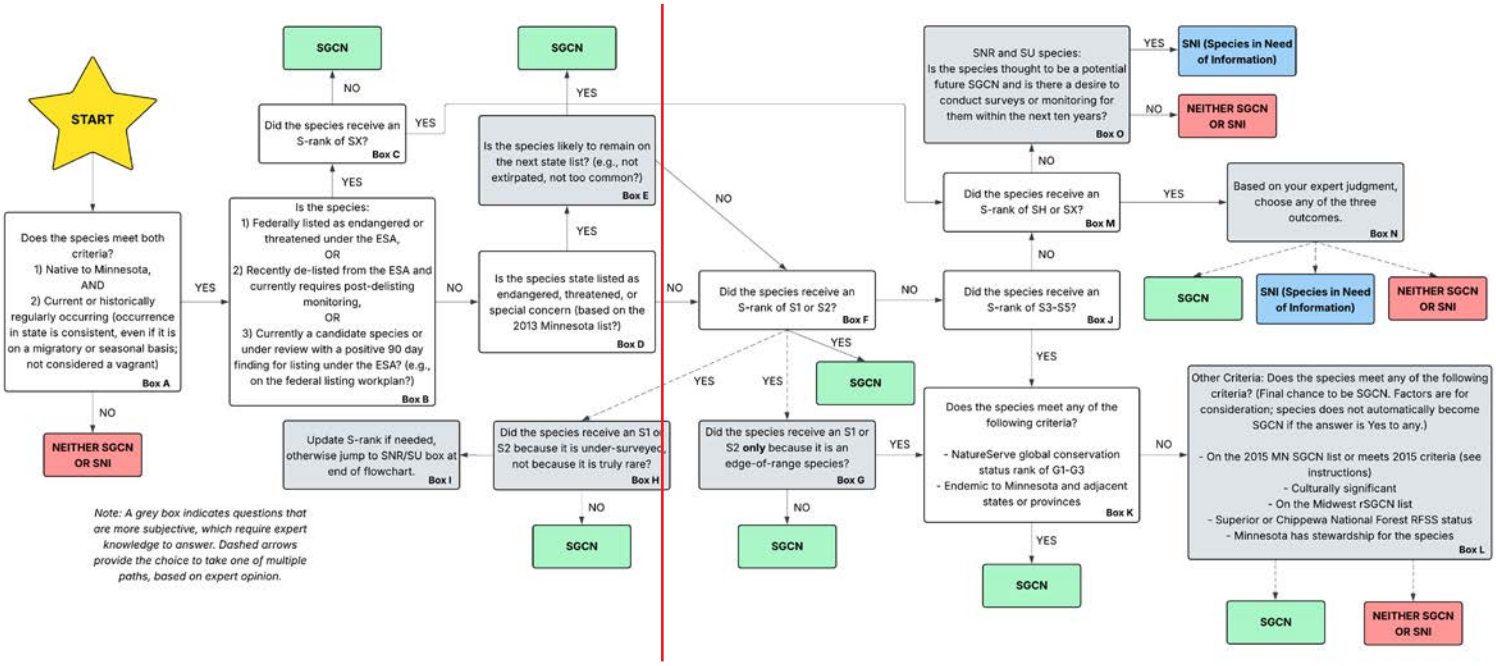
Box K. Global Status and Endemism. If a species has a global conservation rank of G1, G2, or G3, it is a SGCN. If a species is endemic to Minnesota and adjacent states, it will be designated as a SGCN. These criteria apply to species from Boxes G and J.

Box L. Other Criteria. This box represents additional criteria to consider, including being a SGCN in 2015 or meeting the 2015 criteria for SGCN status, thought to have cultural significance, designated within the 2022 Midwest Regional SGCN list, included on the Superior or Chippewa National Forest's Regional Forester Sensitive Species list, or if Minnesota has stewardship of the species. Based on expert judgment, a species can be designated SGCN or Neither from this box. Some experts may feel that meeting just one of the criteria is important enough to call the species a SGCN. Or, they may want a species to meet several criteria to call it a SGCN. There may be cases where a species meets one or more criteria, but experts don't believe they are important enough to necessitate SGCN designation.

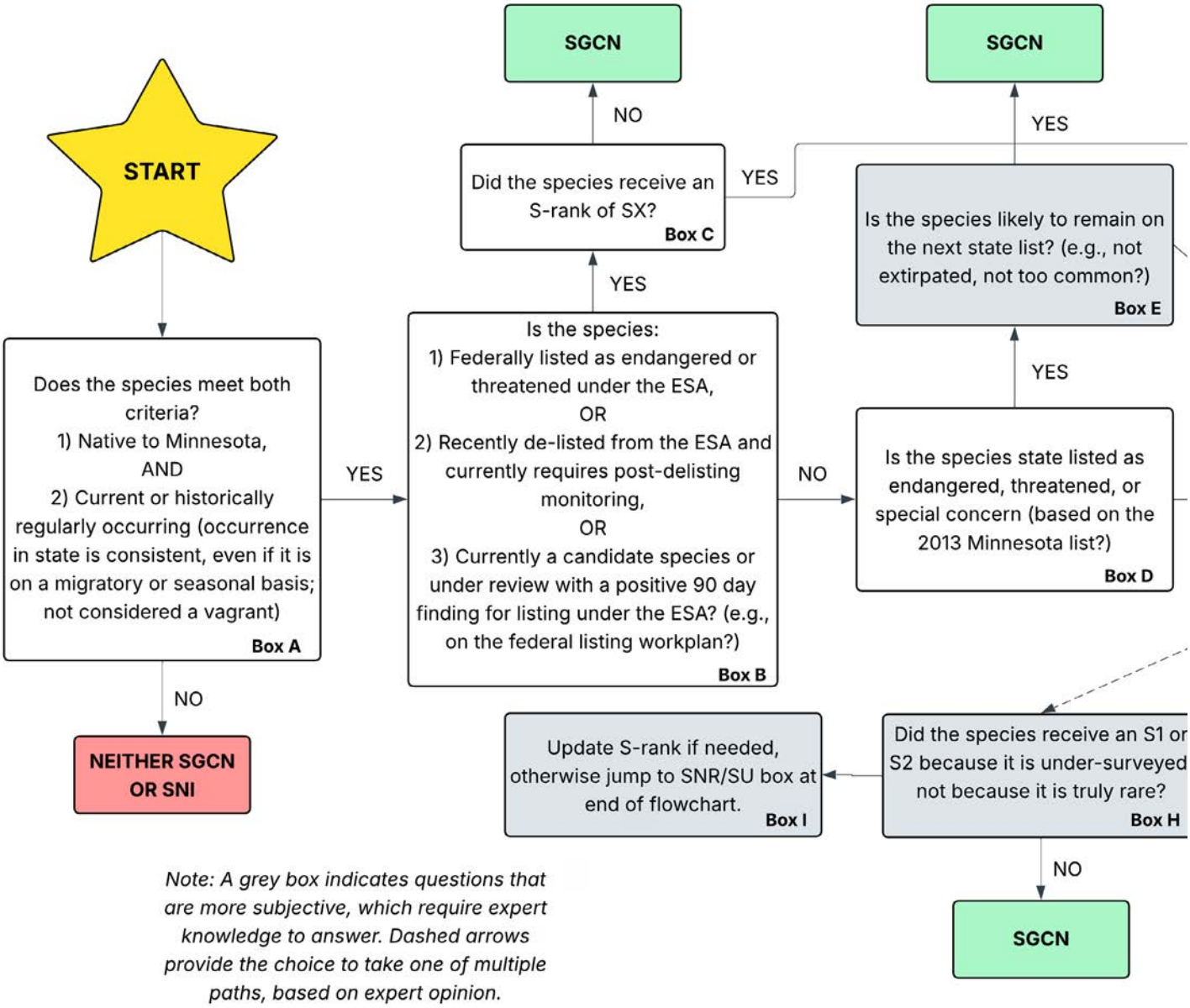
Box M. Extirpated Species. If a species was ranked Possibly Extirpated (SH) or Presumed Extirpated (SX), go to Box N.

Box N. Based on your expert opinion, you can choose to make SH and SX species SGCN, SNI, or Neither. Most SH are likely to become SGCN.

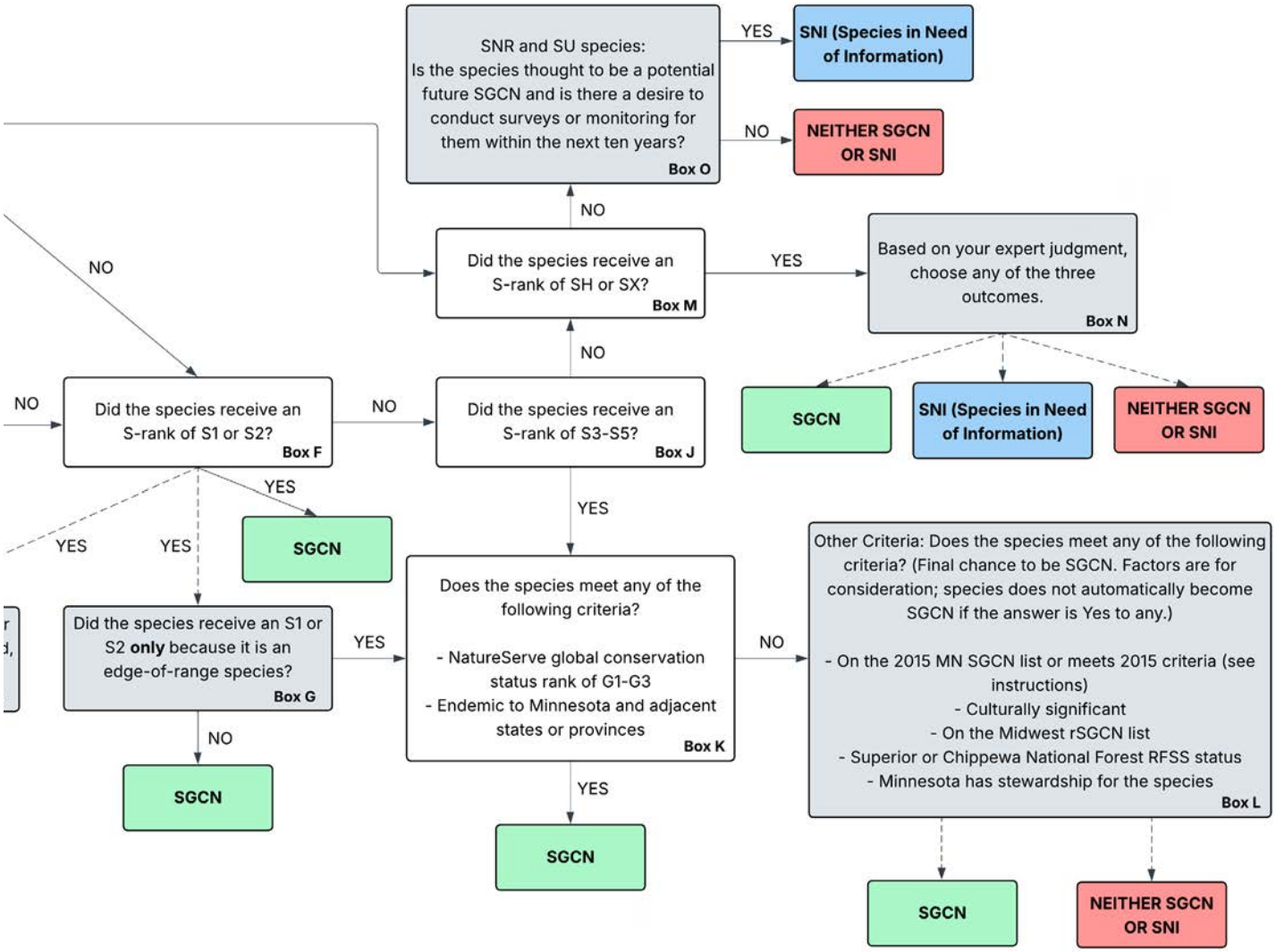
Box O. Species Lacking Information. Unrankable Species (SU) for which we have compiled data and considered, but there is inadequate information available to rank, and Species Not Ranked (SNR) for species we know have occurred in Minnesota but we have not considered in this effort due to lack of information, can be designated as Species in Need of Information (SNI) if they are thought to be a potential future SGCN and there is a desire to conduct surveys or monitoring for them within the next ten years. A designation of SNI enables State Wildlife Grant funds to be allocated toward survey or monitoring efforts for those species.



Chapter 2 Supplement Figure A. Species Designation Flowchart (Full), with red line indicating where the figure is split into the next two figures.



Chapter 2 Supplement Figure B. Species Designation Flowchart (Left Side).



Chapter 2 Supplement Figure B. Species Designation Flowchart (Right Side).