Chapter 2.
Minnesota Species in Greatest Conservation Need

Definition

States were required in the development of their 2005 Wildlife Action Plans to identify species in greatest conservation need and to review and update this list as part of the required 10-year review process. Minnesota defines Species in Greatest Conservation Need (SGCN) as native animals, nongame and game, whose populations are rare, declining, or vulnerable to decline and are below levels desirable to ensure their long-term health and stability. Also included are species for which Minnesota has a stewardship responsibility.

Methodology for Updating the List of SGCN

Nine Species Technical Advisory Teams (STATs) composed of DNR staff and external taxon experts were formed to review and update the 2005 SGCN list for the following taxa: mammals, birds, amphibians and reptiles, fish, mussels, butterflies and moths, dragonflies and damselflies, tiger beetles, and bees. The list of team members can be found in Appendix B.

Species Technical Advisory Teams were not organized for snails, caddisflies, leafhoppers, and jumping spiders due to the lack of known, available experts. Given the lack of current expertise and data for these groups, and after consultation with the Minnesota Endangered Species Coordinator, the only species from these groups designated as SGCN are those included on the 2013 state list of endangered, threatened, and special concern species. Strategies to review these taxonomic groups will be implemented during the next 10 years so that more information is available for the 2025 update of the Wildlife Action Plan.

Criteria for Assessing Species as SGCN

The criteria used to assess species as SGCN were those criteria, with minor revisions, originally developed by a technical team for the 2005 Wildlife Action Plan. The most significant change in criteria was to not automatically include as SGCN species on "watch" lists other than the Minnesota and federal lists of endangered, threatened, and special concern species. The exception is the gray wolf. When the mammal STAT reviewed the SGCN list, the gray wolf was not a listed species and did not meet the criteria. Because the Minnesota population has met the federal recovery goal for Minnesota since the 1970's and the subsequent federal listing has been challenged, we have decided not to list the wolf as a SGCN at this time.

Climate change vulnerability was not considered as an independent criterion for evaluating a species as a SGCN. Species Technical Advisory Teams discussed species or groups of SGCN that could be affected by climate change but concluded that data were insufficient to conduct a species climate change vulnerability assessment. However, when assessing a species, the teams frequently considered how changes in temperature, precipitation, and the frequency and severity of storm events could interact with the criteria listed here to reduce a population's long-term health and stability.

Criteria Used by Experts to Assess SGCN:

1. *Listed Species*

   Species on Minnesota's list of endangered, threatened, and special concern species and species on the federal list of endangered and threatened species found in Minnesota, including proposed and candidate species, are automatically included on Minnesota's list of SGCN.

2. *Rare or Declining Species*[1]

   This criterion is used to evaluate native species that do not meet criterion 1 for inclusion on Minnesota's list of SGCN as rare or declining species. Species considered extirpated,[2] occasional,[3] abundant,[4] or migratory in Minnesota should not be evaluated under criterion 2. Migratory species should be evaluated under criterion 3C.

   A. Species for which a statistically valid decline throughout Minnesota has been documented.

   B. Species for which populations in Minnesota may be rare, have declined, or may decline within the next decade due to factors such as the following:

      1. terrestrial and aquatic habitat concerns

         a. dependence on a rare, vulnerable, or declining habitat[5]

         b. habitat loss

         c. habitat degradation

         d. habitat fragmentation

      2. specific threats

         a. overexploitation, collecting, bounty killing

         b. invasive species

         c. disease

         d. contaminants

         e. deliberate killing

         f. predation beyond normal levels

      3. life-history characteristics

         a. require large home ranges or multiple habitats as part of their life cycle (i.e., herps)

         b. depend on large habitat patch sizes

         c. need special resources, such as host species, or have narrow thermal preferences

         d. depend on an ecological process, such as fire, that no longer operates within the natural range of variation

         e. are limited in their ability to recover on their own due to low dispersal ability or low reproductive rate

         f. have a highly localized or restricted distribution

         g. aggregate their populations during some time of the year

C. Survey efforts indicate a decline, but there is uncertainty as to the cause of the decline.

3. *Stewardship Species*

   This criterion is used to evaluate native species not identified by criterion 1 or 2 for inclusion on Minnesota's list of SGCN as stewardship species.

   A. Species for which populations in Minnesota represent a significant portion of their North American breeding or wintering population, or

   B. Species whose Minnesota populations are stable, but whose populations outside of Minnesota have declined or are declining in a substantial part of their range.

   C. Species for which migrating populations congregating in Minnesota represent a significant portion of the North American population.

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Definitions

[1] Rare species are those species whose low population densities, few occurrences, or restricted distributions warrant concern about their viability in Minnesota. Species that have always been rare in Minnesota are not considered SGCN. Declining species are those species whose populations have substantially declined within the past decade, and these declines are not part of a recognized population cycle or the result of management activities.

[2] A species is presumed extirpated from Minnesota if there is no expectation of it returning as a resident or being reintroduced in the next decade.

[3] A species occurrence is occasional as a result of wandering behavior of individuals and when no breeding populations are established or likely to become established in the next 10 years. Regular migrating or overwintering species that depend on habitat within Minnesota are not included in this group.

[4] A species is abundant when it is abundant both in Minnesota and throughout its range.

[5] Rare habitats are those with few occurrences or restricted distributions in Minnesota whose rarity may impact the viability of species that depend on them. Declining habitats are those whose acreage or overall quality of habitat has substantially declined within the past decade. Vulnerable habitats are those most likely to be altered or degraded within the foreseeable future.

Assessing the Status of Each Species

Species Technical Advisory Teams met separately by taxon. Each team followed the same process described below and used the same set of criteria listed above for evaluating a species as a SGCN.

- State-listed animal species: The DNR updated Minnesota's list of endangered, threatened, and special concern species in 2013. All state-listed species are automatically SGCN. The following actions were taken to account for changes in the state list in 2013:

  ○ Animals added to the 2013 state list that were not included in the 2005 SGCN list were automatically added to the proposed 2015 SGCN list. Even though these species are automatically SGCN, Species Technical Advisory Teams did evaluate each species to determine the criterion (in addition to criterion 1*)* the species met.

- Animals on the 2005 list of SGCN due to their state-listed status at that time but no longer state-listed as of 2013 were evaluated using the criteria listed above to determine if the species was eligible for the proposed 2015 SGCN list. If the species met at least one of the criteria, they were added to the proposed list.

- Evaluating the remaining species on the 2005 SGCN list:
  - The remaining 2005 SGCN were each evaluated using the criteria listed above.
  - If none of the criteria were applicable to a species, then the species was removed from the revised SGCN list. A "strong" majority (all but one team member agreeing) was needed for a species to remain on the list or be removed.

- Recommending and evaluating new species (species not identified as SGCN in 2005):
  - Species Technical Advisory Team members recommended species not currently on the 2005 SGCN list that they thought met the SGCN criteria. These species were vetted by the team using the best data and expert opinion available.
  - The Species Technical Advisory Team members voted on adding species to the 2015 SGCN list. A "strong" majority (all but one team member agreeing) was needed to add a species.

Incorporating changes to the federal and state species lists, and initial recommendation by Species Technical Advisory Teams resulted in 111 species being recommended for addition to the SGCN list and 59 recommended for removal from the list.

The proposed changes were distributed for comments to key partners within all DNR divisions, 17 conservation partner agencies, 25 nongovernmental organizations, and 11 tribal nations. Eleven comments were received and evaluated against the criteria, resulting in the addition of the monarch butterfly and dusted skipper, and the removal of the deertoe mussel. It was also noted that the American white pelican met the criterion of a stewardship species. Additionally the rufa red knot was listed as threatened by the US Fish and Wildlife Service after the review period, so it was added to the SGCN list. The final tally of changes to the list of SGCN was 60 species removed (Appendix G) and 114 species added (Appendix H).

Minnesota's 2015–25 SGCN List

Minnesota's 2005 Wildlife Action Plan identified 292 species as SGCN. The 2015 list revision resulted in a total of 346 SGCN (Appendix C).

Minnesota's 346 SGCN include species from all major animal taxonomic groups (Table 2.1). Five taxonomic groups have one-third or more of the total species listed as SGCN: mussels (60%), reptiles (50%), tiger beetles (46%), mammals (38%), and amphibians (36%). These values reflect both the fact that these groups are well studied in Minnesota and that they appear to be the most imperiled based on current knowledge.

With the exception of mussels, which are relatively well studied, the estimated number of invertebrate species in Minnesota and the number identified on the list is most certainly underrepresented (Table 2.1). While we have reasonable estimates for the number of species in some of the lesser-studied

invertebrate groups, we know very little about their rarity or population status. For example, we estimate that there are approximately 400 species of bees in Minnesota, but the small percentage that are designated as SGCN is based on a lack of information about this taxon and not an accurate reflection of their true conservation status. The total number of other insect and spider species that have been documented in Minnesota is probably one or more orders of magnitude less than what actually lives here, and we have little understanding of those that are rare, declining, or vulnerable to decline. More survey and research are clearly needed for these taxonomic groups, and we prioritize filling some of these knowledge gaps in our goals and objectives (chapter 4).

In conformance with criterion 1 (above), if species are added to the federal list of endangered and threatened species or the state list of endangered, threatened, or special concern species during the period covered by the plan, those species will automatically be added to the SGCN list. Information obtained about the status of unlisted species will be used to inform the updating of the SGCN list in 2025.

Table 2.1. Summary of the number of SGCN compared to all species in Minnesota by taxonomic group

Taxonomic group	Number of species in Minnesota[1]	Number of state or federally listed species	Number of SGCN	Percentage of species that are SGCN
Vertebrates				
mammals	72	21	27	38%
birds	320	33	92	28%
amphibians	22	5	8	36%
reptiles	30	11	15	50%
fish	143	34	43	30%
Total vertebrates	**587**	**104**	**185**	**32%**
Invertebrates				
mussels	50	28	30	60%
snails[2,4]	100	5	5	5%
bees[2]	400	0	5	1%
butterflies[3]	163	15	22	13%
moths	unknown	4	11	unknown
caddisflies[3,4]	277	24	24	9%
dragonflies & damselflies[3]	149	8	40	27%
jumping spiders[2,4]	74	10	10	14%
leafhoppers[2,4]	300	3	3	1%
tiger beetles[2]	24	9	11	46%
Total invertebrates	**> 1537**	**106**	**161**	**10%**
Totals	**> 2124**	**210**	**346**	**16%**

[1] Appendix I explains how the number of species was calculated for each taxon

[2] Expert estimate of the number of species likely to occur in the state

[3] Number of species documented to date

[4] Taxon not assessed by STAT; only state-listed species were considered SGCN

Occurrence and Distribution of SGCN Populations and Richness Hotspots

As stated in chapter 1, focusing on particular species or habitats will likely not be sufficient to ensure biological diversity and ecosystem resilience in the future given the dynamic shifts that are unfolding as a result of climate change. The Wildlife Action Network is the 2015 Wildlife Action Plan's approach to address this dynamism. As the impacts of climate change become more pronounced, the importance of maintaining the presence of certain species or habitats in a particular area may wane. Of greater importance will be the need to facilitate changes in species and habitat that retain sufficient biological diversity to sustain ecological functions and ensure ecological resiliency. It is likely that future functional and biological diversity will be made up of both existing native species and newly immigrated species, and the intent of the Wildlife Action Network is to allow for that dynamic to unfold as sustainably as possible. That being said, the viable population mapping provides a useful benchmark to track changes over time and evaluate functional and biological diversity.

The Wildlife Action Plan addresses information about the distribution and abundance of wildlife species and location and condition of habitats primarily by mapping "viable/persistent" populations and richness hotspots of SGCN, as well as other habitat or animal community information used to develop the Wildlife Action Network. Since information on population viability is virtually nonexistent for most species in a given location, populations of individual SGCN species were ranked through an expert review of species occurrence and other GIS data based on evidence of abundance, recruitment, and persistence, the presence of suitable habitat, and expert opinion. The ranking guidelines below were used for specific locations, so while the population of a particular SGCN may be declining overall in Minnesota populations in certain locations may be relatively viable or stable.

Populations were mapped using a variety of sources of information to delineate habitat used by the species (see Appendix E for detailed information on the mapping process). In regards to habitat condition, this mapping exercise focused on mapping habitat of high enough quality to support viable populations of one or more SGCN.

The mapping exercise used as much field-verified data as possible and limited reliance on modeled habitat. This was done because of two main challenges with species-habitat modeling: (1) Most of the SGCN do not have sufficient information to model their habitat, and (2) habitat models are only as good as the available land-cover data, which in general is insufficient for accurate models. Models were used for five bird species where team members determined that the modelers had sufficiently addressed both challenges.

Ranking guidelines for SGCN populations

Excellent (strong evidence for viability/persistence):

- The population shows indications (abundance, age class distribution, persistence) of recruitment or immigration, or
- The population represents the only population in the region (ECS section or HUC 4 watershed) or one of three or fewer populations in the state regardless of viability/persistence.
- An additional consideration is that the habitat is known to be of good quality for supporting outstanding viable populations.

Good (evidence for viability/persistence):

- Species has persisted in the area over time.
- Evidence of abundance, recruitment, or persistence either indicates the population is not as viable as a population ranked as outstanding, or
- Data and professional judgment are insufficient to rank the population as excellent.
- An additional consideration can be the quality of the habitat.

Poor (little to no evidence for viability/persistence):

- Species is present but in low numbers.
- Evidence shows lack of persistence, or limited or no reproduction indicates the population is likely not viable.
- An additional consideration is that the habitat quality is known to be poor to the point of limiting population viability.

Viable/persistent SGCN populations were mapped for 156 of the 346 SGCN and included mammals, birds, reptiles, amphibians, fish, and mussels (Table 2.2). Invertebrate species other than mussels were not mapped due to insufficient occurrence information. Of the taxa that were mapped, several species within the taxa could not be mapped because they occurred over a wide range with no distinct population centers, or they used habitats that were not readily mappable (e.g., purple martin, a species that centers its populations near artificial nesting compartments). This occurred most often with birds (51% mapped) and mammals (67% mapped) (Table 2.2). Examples of individual species maps are shown in Figures 2.1 a–f.
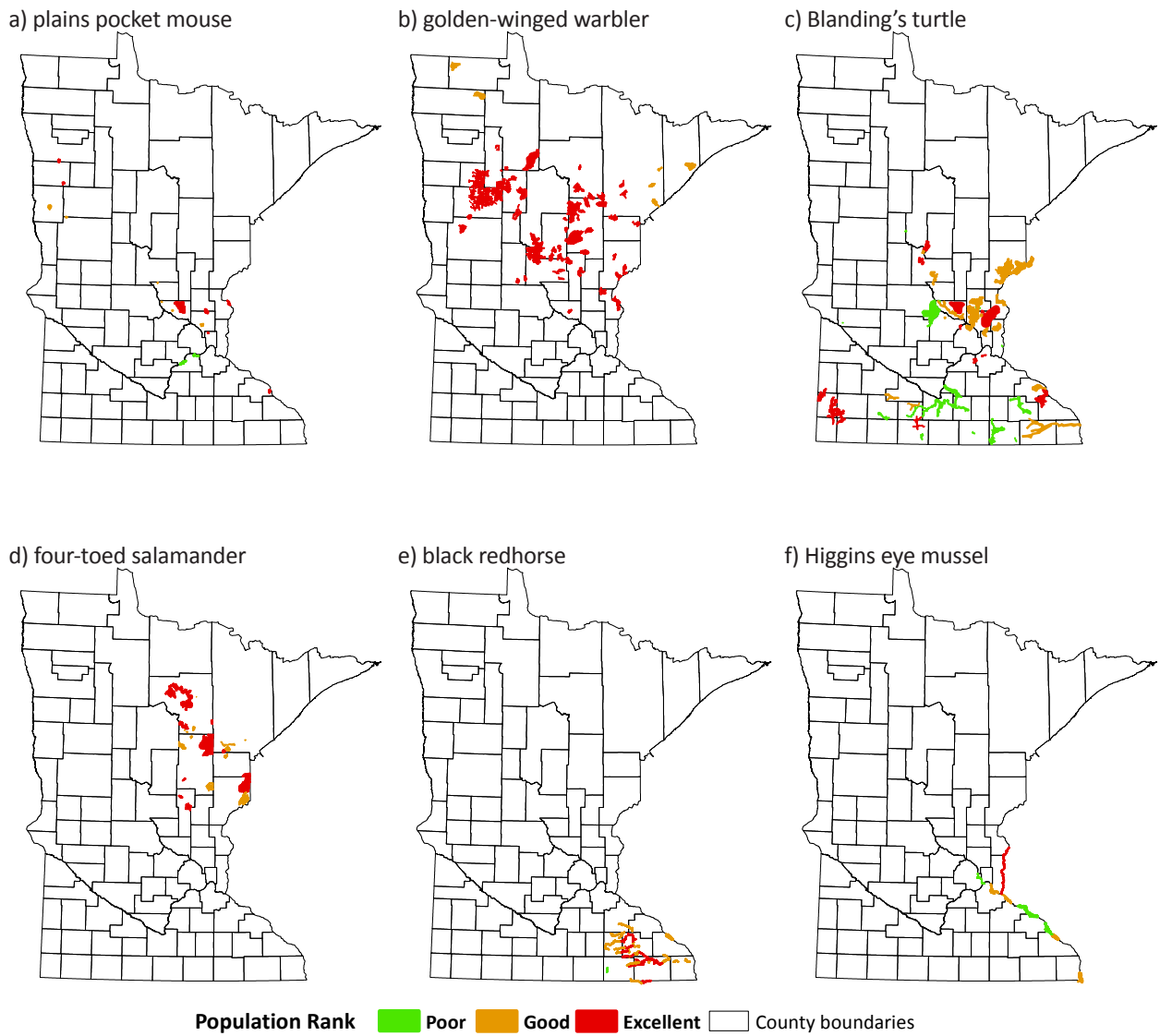
Richness Hotspots

Since about half of the SGCN species' populations could not be mapped, a SGCN richness hotspot analysis was also performed to identify additional areas in the Wildlife Action Network with high concentrations of SGCN species. To complete this process, observation records of all SGCN species, including invertebrates, were used to sum the number of species in approximately 2.5-square-mile blocks across the state. A set of rules was used to identify areas with high concentrations of SGCN species that had not been mapped as part of the population mapping exercise (see Appendix E for more information on the mapping process). Once these high concentration areas, or "hotspots," were

identified, habitat that represented the species present was delineated for inclusion in the Wildlife Action Network (see Figure 1.2, chapter 1). In addition to identifying these hotspots for the Wildlife Action Network, the statewide map of the number of SGCN species per 2.5-square-mile block is valuable for showing concentrations of SGCN species and was also used as a scoring metric for the Wildlife Action Network (Figures 2.2, 2.3). It should be noted that the map also reflects where species survey information is lacking, such as the vast peatland areas of northern Minnesota.

Table 2.2. Number of SGCN with mapped populations by taxa.

| Taxon | Total number of SGCN | Mapped | | % of SGCN mapped |
		Yes	No	
mammals	27	18	9	67
birds	92	47	45	51
amphibians	8	7	1	88
reptiles	15	14	1	93
fish	43	42	1	98
mussels	30	28	2	93
snails	5	0	5	0
bees	5	0	5	0
butterflies	22	0	22	0
caddisflies	24	0	24	0
dragonflies & damselflies	40	0	40	0
jumping spiders	10	0	10	0
leafhoppers	3	0	3	0
moths	11	0	11	0
tiger beetles	11	0	11	0
Total	346	156	190	45%

a) plains pocket mouse

b) golden-winged warbler

c) Blanding's turtle

d) four-toed salamander

e) black redhorse

f) Higgins eye mussel

**Population Rank** 🟩 Poor 🟧 Good 🟥 Excellent ☐ County boundaries

Figures 2.1 a–f. A sample of species population maps for (a) plains pocket mouse, (b) golden-winged warbler, (c) Blanding's turtle, (d) four-toed salamander, (e) black redhorse (fish species), and (f) Higgins eye mussel. Colors correspond to the population viability/persistence rank of the species in a given area, and were assigned one of three rank categories of poor (green), good (orange), or excellent (red). See Appendix E for more information.
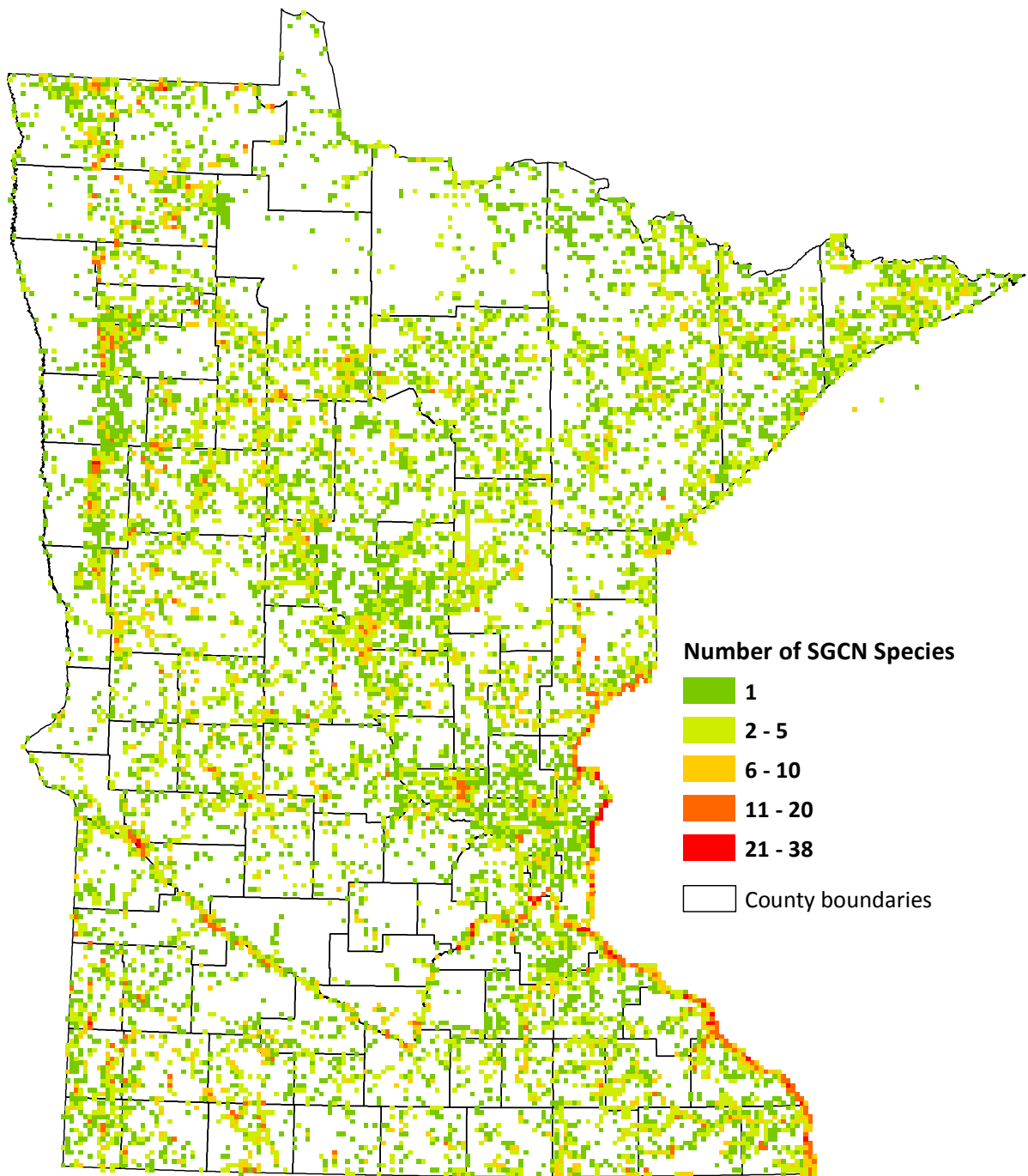
Figure 2.2. Species in Greatest Conservation Need (SGCN) richness by 2.5-square-mile grid block. Scale is from the lowest number of species per grid block (green) to the highest number of species per grid block (red).
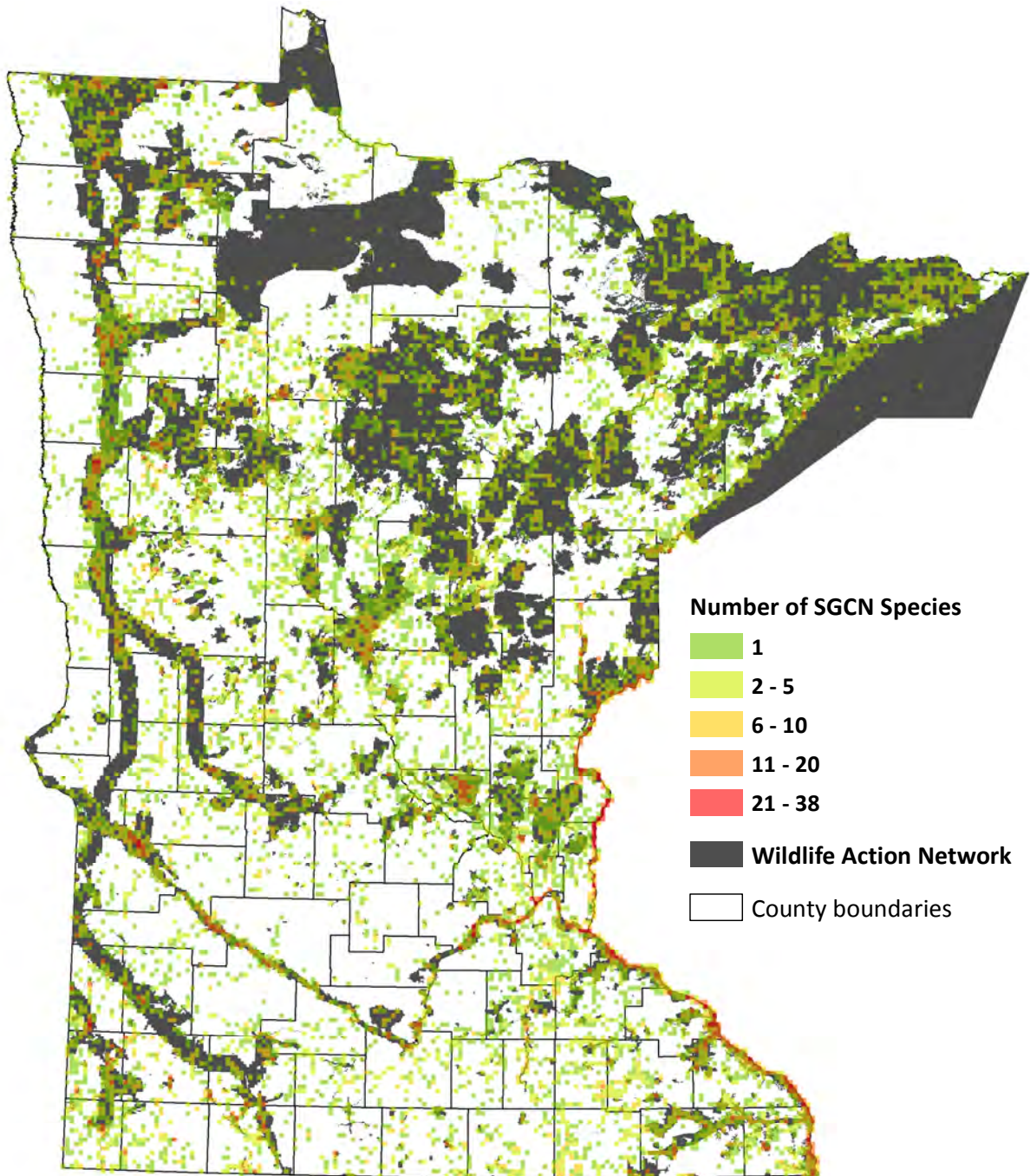
Figure 2.3. Species in Greatest Conservation Need (SGCN) richness by 2.5-square-mile grid block overlaid on the Wildlife Action Network. See Figure 2.2 for an explanation of the SGCN richness map, chapter 1 for an explanation of the Wildlife Action Network, and Appendix E for methods. The area in northeastern Minneosta deliniating a portion of Lake Superior represents Minnesota's managed area of the lake.