MINNESOTA'S WILDLIFE ACTION PLAN 2025-2035

CONSERVING HABITATS AND BIODIVERSITY

PUBLIC ENGAGEMENT

DEPARTMENT OF NATURAL RESOURCES

NONGAME WILDLIFE PROGRAM

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Cover Photos: Educators engaged in hands-on learning about insects in Monarch Joint Venture's North American Monarch Institute; Family enjoying birdwatching at the Urban Bird Festival, Grayson Smith, USFWS

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Chapter 4: Public Engagement

Introduction

The conservation of Minnesota's Species in Greatest Conservation Need (SGCN) requires actions by all Minnesotans. If actively engaged, the people of Minnesota can make important contributions to wildlife conservation wherever they live, from rural to urban settings. Effective engagement of our state's residents begins with an understanding of their demographics and values towards wildlife. As of 2016, 81% of Minnesota residents lived in urban areas (Minnesota Department of Transportation [MnDOT], 2022a), with over half of the state's population residing in the seven-county metro area (MnDOT, 2022b). Recent trends show that growth will steadily continue in urban areas with the highest growth rates in suburban edges (Metropolitan Council, 2024). For these residents living in more highly developed areas, connecting to rare and declining wildlife species and their habitats might pose a particularly difficult challenge. Additionally, the America's Wildlife Values Study (Dietsch et al., 2018), which sought to explore the values, attitudes, and beliefs of residents across the U.S. in relation to wildlife, found that the following breakdown of wildlife value orientations for Minnesota respondents: 37% traditionalist (believe wildlife should be used and managed for human benefit), 27% mutualist (believe people should live in harmony with wildlife), 24% pluralist (their wildlife values vary depending on the context), and 12% distanced (wildlife issues are less salient to them). While participating in the conservation of rare and declining wildlife may be most intuitive for just under a third of Minnesota's residents (the mutualists), we have the potential to engage any Minnesotan in SGCN conservation. However, our strategies will need to be varied and tailored to our residents' differing values and interests.

Photo: Family enjoying birdwatching at Twin Cities Bird Festival, Grayson Smith, USFWS

With a deep passion and appreciation for the outdoors, the people of Minnesota are primed to engage in conservation action, setting this plan up for success. This passion was evident in November 2024, when in remarkable agreement, over 77 percent of the state's voters approved a renewal of the Environment and Natural Resources Trust Fund. This vote assured that a portion of Minnesota state lottery monies would fund environmental projects for another 25 years.

To develop the recommendations in this chapter, the Minnesota Department of Natural Resource's Nongame Wildlife Program (NWP) utilized a participatory process. NWP staff reviewed the input of 161 conservation professionals from 28 organizations that attended a series of seven statewide SWAP workshops in 2023. To obtain further input on content specifically relevant to the SWAP's public engagement strategies, the NWP also consulted with 90 conservation educators, outreach program leaders, and communication professionals from 29 organizations across the state in two additional workshops and two working group meetings. In total, this chapter is based upon input from over 250 individuals, representing multiple DNR divisions and over 50 other agencies, organizations, and academic institutions.

Our recommendations for public engagement take a multi-faceted approach, from sparking inspiration to motivating and empowering conservation action. We seek to first connect Minnesotans to our state's SGCN and habitats by using varied educational approaches that build knowledge, relevancy and positive attitudes around these species. These approaches include information sharing, environmental education, and wildlife viewing recreation. From there, with that essential groundwork in place, we lead Minnesotans to take the following conservation actions: recreating outdoors responsibly, creating and caring for habitat, volunteering to collect wildlife data, and donating to wildlife conservation. Environmental education practices utilizing this continuum from inspiring connections to motivating and empowering action have been found to develop pro-environmental behaviors, build community capacity, support conservation action projects and contribute to long-term conservation goals (Ardoin et al., 2020).

To further increase the efficacy of these strategies for all communities in Minnesota and to address potential historical, cultural and societal barriers, our public engagement recommendations follow insights gained from a study the DNR's NWP contracted from Virginia Tech, which sought to learn how to expand Minnesota's audience for public conservation efforts (Jennings et al., 2024a). Accordingly, some themes throughout our recommended actions are meeting people where they are, working collaboratively with partners and local groups, and developing programs relevant to communities.

Our public engagement recommendations for 2025-2035 are organized into seven overarching strategies, each supported by a suite of actions, flowing from inspirational tactics to action-oriented ones. These strategies include information sharing, environmental education, wildlife viewing, responsible recreation, habitat stewardship, participatory science, and funding support.

Public Engagement Goal

Inspire, motivate, and empower Minnesotans to engage in conservation actions that support Species in Greatest Conservation Need (SGCN) and their habitats

Recommended Strategies for Public Engagement

1. Develop and distribute informational resources and media on SGCN, their habitats, and threats.
2. Support environmental education on SGCN and their habitats on a statewide level.
3. Provide and promote wildlife viewing opportunities and programs that inspire curiosity, caring, and connection with Minnesota's SGCN.
4. Foster responsible recreation practices that reduce recreational effects on SGCN and their habitats while allowing for safe and satisfying access to the outdoors.
5. Engage and empower communities to improve wildlife habitats where they live, work, and recreate.
6. Offer participatory science programming for Minnesotans to take part in conservation volunteerism that addresses SGCN data needs.
7. Cultivate financial support for the conservation of SGCN through the development and promotion of public funding opportunities and public-private partnerships.

Building on the two Prior Plans

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

One of the original Plan's three strategic goals was to: **Enhance people's appreciation and enjoyment of Species in Greatest Conservation Need (SGCN).** The actions associated with this goal were included within each of the profiles for Minnesota's 25 Ecological Subsections:

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.

2015-2025 Minnesota's Wildlife Action Plan

In the 10-year revision of the 2005-2015 State Wildlife Action Plan, public engagement remained one of the three primary goals, to: Enhance opportunities to enjoy Species in Greatest Conservation Need and other wildlife and to participate in conservation. The goal was revised from the 2005 Plan to emphasize creating opportunities for Minnesotans to actively participate in SGCN conservation efforts. Two objectives to reach these goals were delineated:

1. Increase the number and diversity of people participating in wildlife-related outdoor recreation.
2. Increase the number and diversity of people directly engaged in conservation of SGCN.

Information Sharing

Strategy 1: Develop and distribute informational resources and media on Species in Greatest Conservation Need including their habitats and threats.

A first step of inspiring and motivating people towards conservation action is raising awareness that there is a need for conservation action. The people of Minnesota cannot aid in the conservation of SGCN if they do not know these species exist in our state or are unaware of the issues affecting them. Minnesotans are passionate about conserving our state's natural heritage, so if conservation professionals provide the public more information about SGCN, their threats and their needs, we have an opportunity to foster changes in human attitudes and behaviors to benefit these species in need. To be effective, this information must be provided in easily accessed formats and in a relevant manner.

Research has shown that social media can increase pro-conservation behaviors among the public, increase conservation funding, and inspire policy change (Bergman et al., 2022). In addition, sharing information about wildlife conservation, in tandem with efforts like increasing environmental education, can help shift social norms and have a positive effect on rare wildlife species (Salazar et al., 2018).

The species groups in Minnesota that may benefit most from information campaigns include native fish, pollinating insects, mussels, amphibians, reptiles, mammals, and birds. Within these groups are Minnesota SGCN that are threatened by human behaviors such as illegal take (wanton killing/poaching), accidental take (e.g. road mortality and bird building collisions), illegal possession, pollution, climate change, and the spread of invasive species. These are also groups of wildlife that are interesting and/or relevant to Minnesotans (Sinkular et al., 2022; Duda, 2021), in which it may be easier to capture people's attention and foster behavior changes.

Sharing more information about the SGCN listed above will enable Minnesotans to make more informed decisions about their actions and interactions with nature. For example, informing Minnesotans when turtles are more likely to be crossing roads and how to help them safely cross the road may help reduce road mortality. Sharing the important role of native mussels in our water ecosystems is a gateway to discussing pollution, climate change, invasive species and how Minnesotans can make a difference for our waters.

By providing communication products that increase Minnesotans' knowledge about SGCN, the stressors they face, and what people can do to alleviate these stressors, we can foster a deeper appreciation for SGCN, the desire to help them, and motivate people towards the conservation actions outlined in Strategies 4-7.

Stressors Addressed: Development (e.g. bird building collisions), Roads, Trails and Railroads (e.g. road mortality), Hunting and Collecting Animals (wanton killing, poaching, illegal possession), Invasive Species (Problematic Non-Native Species), Diseases and Pathogens, Water-borne Pollution, Air-borne Pollution, Changes in Temperature related to Climate, and Changes in Precipitation and Hydrology due to Climate.

Recommended Actions for Information Sharing:

1. **Identify specific SGCN as ambassador species (i.e. charismatic champions that represent a suite of other SGCNs or habitats) to help build a broader audience to receive wildlife information by streamlining information and making it appealing. These ambassador SGCN could be used for leveraging popular interests, communicators, communication channels, and events to reach new audiences.**

   Work with wildlife biologists to identify specific SGCN to utilize as ambassador species — charismatic champions representing a suite of other taxa (or habitats) — in which by garnering public familiarity, increasing knowledge, and leveraging support for that specific SGCN, a greater suite of species will benefit. These ambassador species can be used in a variety of ways, such as in communication campaigns around calls to action for certain stewardship practices, in an "Adopt-a-SGCN" program to engage schools and municipalities in selecting a species to represent their community, or as features in outreach products like education posters, coloring books, etc. Ambassador species could also be utilized to connect with unique, less traditional audiences, such as reaching sports fans by partnering with Minnesota sports teams that feature SGCN as their mascot (e.g. the Minnesota Lynx), artists through art contests/exhibitions themed around these species, and social media users with the use of influencers and short videos providing educational content on these species. Holding festivals to celebrate these species, serves as an attractive, fun event that also engages people in learning.

2. **Promote and support an update to the DNR's Rare Species Guide (RSG) as a means for providing an information hub on Minnesota's SGCN and their habitats and range.**

   The RSG is a valuable information resource on state listed animals and plants (see Case Study), offering an area of opportunity to present information on more SGCN. It is also in need of updates given that it launched in 2008. In 2023, a MNIT Business Value Assessment showed the RSG as having high business value and moderate to low technical health with multiple modernization efforts needed. A RSG Modernization and Enhancement IT Project has been proposed to address these needs, and a survey was implemented in 2024 to better understand how people use the RSG and how they would like to see it improved. By increasing the capacity to help with these needed technical, design, and content updates (including developing new RSG profiles for SGCN animal species that don't currently have a profile), we can deliver a modern product that will better inform Minnesotans about the needs and threats of SGCN.

Case Study: The Rare Species Guide

The DNR's Rare Species Guide (RSG) is an online guide to Minnesota's rare animal and plant species, including State-listed endangered, threatened, and special concern species. The RSG provides information on the status, distribution, ecology, conservation, and management of our rarest animals and plants. The user can query over 600 species profiles based on name, taxonomic group, status, county, Ecological Classification System (ECS) subsection, watershed, and/or habitat.

The RSG is one way the DNR addresses the mandate in the Minnesota Environmental Protection Act to "establish and maintain information systems sufficient to gauge the environmental health of the state." The RSG is a foundational resource for State-listed and SGCN species topics and for administering State-listed species rule and law. The RSG is used by professionals and the public, receiving over 186,000 visits in 2024.

3. **Provide solutions for DNR staff, conservation organizations, and municipalities to address common wildlife questions and concerns.**

   a. Collaborate with the DNR Information Center to develop FAQs for the public that may be disseminated through communications media and materials by varied agencies and organizations. These FAQs could cover topics like keeping wild species wild, Threatened and Endangered Species poaching, and illegal take/possession penalties.

   b. Enhance internal DNR collaboration between divisions, Listed Species Program, and the Nongame Wildlife Program to increase and support knowledge and enforcement of regulations to help prevent wanton killing, illegal take, or illegal possession of protected species. Species that are protected by state and federal laws, such as Blanding's and wood turtles, migratory birds, native fish, and timber rattlesnakes, would all benefit from this action. Some examples of work to be done in this arena include, providing informational resources and trainings to DNR employees that will support their protection and public communications work for these legally protected SGCN. Trainings and resources could include summarizing protected SGCN-related rules and regulations, species identification, and locations of important populations that could be exploited.

Example Species in Greatest Conservation Need: Black Buffalo

The black buffalo (*Ictiobus niger*) is a State Threatened, long-lived native fish species that inhabits large river systems in Minnesota including the Mississippi and Minnesota and their tributaries. Minnesota is on the Northern edge of the species' continental range and is an important area for conservation. While the black buffalo is protected from any harvest or take due to its status as a state threatened species, it is part of a group native fish including gar, buffaloes, suckers, and redhorse that have historically been classified as "rough fish" and lacked the same protections as game fish, such as legal harvest methods and bag limits. Further, confusion about native fishes' role in the ecosystem and a lack of public identification resources to help people differentiate native fish from common carp often led to unregulated overharvest. Fortunately, recent conservation and legislative efforts have resulted in these native fish being reclassified and receiving the same protections as game fish (Winter, 2024). Specific regulations for these species are relatively new and still being developed. Many people may be unaware of changing regulations and related laws regarding native fish species, and lack of resources for species identification remains an issue. Ongoing communication, education, and outreach will benefit the black buffalo and other native fish by raising awareness, reducing unintentional take, empowering conservation officers to enforce regulations, and filling gaps in scientific knowledge about native fish in Minnesota.

Photo: Black buffalo, Konrad Schmidt

4. **Increase understanding of misunderstood SGCN and foster tolerance for them in human spaces through informational products, trainings, and programs.**

   a. Create outreach products for SGCN that may be perceived as frightening or as a nuisance (e.g. snakes, bats, hawks, wolves, mudpuppies, northern pocket gophers and insects), so that people may learn to appreciate these interesting animals. An example of this work for snakes could include updating the DNR's "Living with Snakes" informational brochure and webpage.

   b. Create outreach products that clarify common and problematic species misidentifications and distribute/promote these to target audiences. For example, a species identification guide helps anglers understand differences among native SGCN fish, common carp, and invasive carp (Have you seen an invasive carp?; also available in Hmong and Spanish on the DNR's Invasive Carp webpage). Similarly, work with herpetologists to develop an updated field guide and/or infographics on Minnesota's snakes, so that people can learn to discern the many nonvenomous snakes in Minnesota from our one venomous snake, the state threatened timber rattlesnake.

   c. Partner with pest control companies to provide professional development on species identification and best practices (e.g. bats).

   d. Connect with Advancing Conservation though Empathy for Wildlife Network (ACE) to use and share their resources.

   e. Wildlife viewing engagement programs would also help to support tolerance and understanding (see Strategy 4) for SGCN.

Example Species in Greatest Conservation Need: Timber rattlesnake

Timber rattlesnakes *(Crotalus horridus)* are generally docile creatures. When threatened, their initial reaction is to hide or flee. They are rarely observed, as they have a localized population in the bluffs of southeastern Minnesota. However, because they are a venomous snake, many Minnesotans fear them and regard them as dangerous. This fear is passed onto many other snake species, as there are several rattlesnake mimics in the state. While they are not venomous themselves, these mimics utilize the rattlesnake's behavior to protect themselves. Unfortunately, this perpetuates the perception that snakes are dangerous and results in wanton killings of our native snakes, which is illegal. By sharing more information about the rarity of timber rattlesnakes in our state, their status as a state threatened species, how to distinguish them from other snake species, and educating Minnesotans about their behaviors and importance to balancing our ecosystem, we can hopefully reduce the killings that they and other snakes face and begin to correct the perception and misinformation that snakes are dangerous. By simply keeping their distance, leaving snakes alone and understanding their fascinating behaviors and important role, Minnesotans can hopefully learn to tolerate and perhaps even enjoy a rare reptile sighting.

Photo: Timber rattlesnake, Amod Zambre

5. **Increase public knowledge on climate change as a threat to Minnesota's wildlife and their habitats.**

   a. Work with wildlife biologists to develop a resource list of iconic and unique Minnesota SGCN that are highly affected by climate change, such as moose, boreal chickadee, migratory birds, shorebirds, wood turtle, brook trout, and monarch. Feature these species in communications products, such as stories, maps and infographics, to garner public understanding of how climate change affects wildlife and natural resources.

   b. Promote and provide trainings for educators on AFWA's Project WILD module Climate and Wildlife, a curriculum guide to support integrating a wildlife lens into climate education, and Climate Generation's curriculum, Healthy Habitats: Climate Change Action for K-2.

   c. As they become available, assist in communications regarding best management practices, climate-adapted management plans, and other resources that may assist habitat managers by creating materials and holding workshops.

   d. Develop a communications plan around climate change and wildlife in Minnesota. Include crafting talking points and key messages that translate scientific information, making it more easily understood. Utilize current resources from University of Minnesota Climate Adaptation Partnership and the Midwest Climate Adaptation Science Center among others). Couple information on climate stress with action-oriented and hopeful messages to keep people motivated (e.g. stories of success in climate adaptation and actionable solutions that individuals can take to make a difference).

   e. Collaborate with biologists to develop a participatory science project that focuses on a specific phenology question and data need (such as through the National Phenology Network) to train and involve the public in documentation of seasonal changes that may be due to climate change; to help foster understanding and support for climate science.

Example Species in Greatest Conservation Need: Moose

An iconic Minnesota species, moose (*Alces alces*) are important to the state's ecology, culture and economy. Moose are well adapted to Minnesota's traditional cold winters and the boreal forest of northern Minnesota, making them more vulnerable to changes in that climate. The moose population has experienced a 60% population decline since 2006 in northeast Minnesota, largely due to changes from the warming climate. Heat stress, increased winter ticks, and introduction of parasites carried by white-tailed deer (brainworms and liver flukes) are key effects from a changing climate (Weiskopf et al., 2019; Midwest Climate Adaptation Science Center). Minnesota has many active organizations working to better understand climate change effects on moose and find ways to adjust management actions to adapt to those changes. Moose offer an excellent opportunity to share local, relevant and compelling information about climate change effects on SGCNs and their habitats.

Photo: Moose in winter

6. **Apply existing social science research and conduct new research as needed to better understand Minnesotans' attitudes about wildlife and wildlife conservation and to help craft effective messaging.**

   Recent social science research, contracted by the Nongame Wildlife Program, has provided valuable insight to help guide Minnesota's public engagement efforts for SGCN (Sinkular et al., 2022; Jennings et al., 2024a; Jennings et al., 2024b) and these resources are recommended for consideration in crafting effective conservation messaging. However, it should be noted that these studies were limited to specific groups of people, such as wildlife viewers, participatory scientists, or current supporters of the Nongame Wildlife Program. To understand the perspectives of broader groups of people within Minnesota's geographic boundaries, the Minnesota results for the America's Wildlife Values study (Dietsch et al., 2018) offers an additional helpful reference. Also valuable are The Nature of Americans (Kellert, 2017) and Conservation Words That Work (Duda, 2021), however both studies' results are provided on a national scale. Consideration should be given as to whether further state-level research is needed to better understand Minnesota's unique demographics and geographic locations (e.g. Metro, suburb, rural) and their attitudes, interests, and understanding of wildlife and wildlife conservation.

Case Study: Minnesota Bat Festival

The Minnesota Bat Festival is an annual festival organized by the U.S. Fish & Wildlife Service, held at the Minnesota Valley National Wildlife Refuge, just outside of Minneapolis. It is a good example of appealing to a broader audience in a densely populated area with a fun, well-timed event about a misunderstood, yet fascinating and ecologically valuable species. The event's goal is to educate adults and youth about bat behavior, bat research techniques, and raise awareness of the many threats bats face. Up to 15 organizations with some specialty in bat conservation and education have participated, providing live demonstrations, presentations, activities and learning opportunities appropriate for all ages. The festival takes place during International Bat Week, which is the last week of October. Also coinciding with Halloween, the event is well-timed to add additional appeal for families and adults alike seeking festive seasonal activities and draws high numbers of attendees. In 2023, 1,500 people attended. First held in 2016, many attendees have shared that the event has become a tradition in their family or that it has helped them appreciate bats more. Through this festival the Refuge has found that Minnesotans are hungry for information about bats.

Photo: Young Bat Festival attendees learning about bat research from DNR biologist Melissa Boman

Environmental Education

Strategy 2: Support environmental education on Species in Greatest Conservation Need and their habitats on a statewide level.

Environmental education builds knowledge of and connection with the natural world. It fosters awareness, skills, and agency, encouraging people to explore environmental issues, solve problems, and care for the environment. As described by the Environmental Protection Agency, "Environmental education does not advocate a particular viewpoint or course of action. Rather, environmental education teaches individuals how to weigh various sides of an issue through critical thinking and it enhances their own problem-solving and decision-making skills."

While environmental education techniques are referenced throughout this chapter to help adult audiences gain the knowledge, attitudes, and behaviors to support SGCNs and their habitats, Strategy 2 focuses on applying environmental education within the school age (K-12) realm. Studies show that environmental education for students has numerous benefits, including strengthening motivation to engage in environmentally friendly behavior, and equipping young people with "action knowledge" to have meaningful environmental impact (Van de Wetering et al., 2022).

To help implement this strategy, Minnesota has a large, established and engaged K-12 environmental education community made up of professionals and volunteers working together to increase Minnesotans' knowledge, attitudes and behaviors that support SGCNs and their habitat. Supporting environmental education as described in the recommended actions below will provide environmental educators the resources they need to teach about SGCN and habitats. Collaborating with and supporting K-12 educators is an effective way to integrate wildlife learning for youth in the short term, while building the foundation for conservationists and wildlife stewards in future generations.

Photo: Youth participants in Empowering Pathways into Conservation (EPIC) program, Benjamin Gieseke

Although Minnesota has a strong tradition of connecting with the outdoors and supporting conservation work, our society is still shifting to spend more time indoors (Kellert, 2017). As we do so, people are increasingly disconnected from and less knowledgeable about nature. Environmental literacy or knowledge is shown to directly foster individuals' concern, attitudes, and level of personal responsibility towards environmental protection (Teksoz et al., 2012). K-12 environmental education is essential to building environmental literacy which is key to protecting the environment and ensuring a sustainable future for generations to come (Yildirim et al., 2025).

We recommend focusing environmental education efforts on SGCN in the following species groups: mammals, birds, native fish, reptiles, pollinating insects, amphibians, and mussels. These species groups were selected to highlight based on the Minnesota Results of the National Wildlife Viewer Survey (Sinkular et al., 2022), in which our state's wildlife viewers selected these species groups (except for mussels) as those they were interested in observing. Pollinating insects make a good match for youth because supportive actions, such as native plantings and insect observation, are accessible to young people and provide an opportunity to make a meaningful impact on a threatened population. Knowing that the public places a high value on water quality (Duda, 2021), freshwater mussels are recommended for environmental education because they provide a strong opportunity to connect a community value to a less visible, yet highly valuable taxa.

Example Species in Greatest Conservation Need: Monarch Butterfly

Equipping young people with "action knowledge" they can employ to support environmental issues they care about is one of the most profound effects of environmental education. There are many species that stand to benefit from supportive activity driven by young people. The Monarch butterfly (*Danaus plexippus*) is a profound example of this possibility and has been identified as an excellent 'ambassador species.' Charismatic, colorful, and fragile, this species captures the attention and enthusiasm of young people while also facing significant threats and a declining population. Monarchs present an ideal opportunity for young people to view a declining species and take part in its conservation. Planting milkweed and other nectar-producing plants also can help them to understand the various components of habitat. Connecting with multi-national conservation efforts with concerned residents of Canada and Mexico (e.g. through Monarch Joint Venture) further enhance the conservation learning for this inspiring migratory butterfly and allows young people to understand more about wildlife conservation.

Photo: Monarch on blazing star, Jessica Petersen

Recommended Actions for Environmental Education

1. **Offer free or low-cost professional development trainings to educators (both formal and non-formal) on environmental education and on SGCN and their habitats.**

   a. Reinvigorate and support statewide coordination of reputable curriculum training programs like Project WILD and Project Learning Tree, utilizing their efficient train-the-trainer approach to expand capacity for implementation. In Minnesota, we could train facilitators to train educators, naturalists, Master Naturalists, and nature tourism professionals, who already engage with the public daily on how to implement the wildlife and habitat lessons from these valuable guides.

   b. Utilize Education Minnesota's MEA annual conference as a means for wildlife professionals to connect with educators and provide professional development sessions, and to create networking opportunities for teachers who use a given wildlife curriculum to encourage mutual support.

   c. Promote existing professional development opportunities; e.g. Monarch Joint Venture's North American Monarch Institute, Monarch NECTAR Hub and Wolf Ridge Environmental Learning Center's Teacher Training Institute.

2. **Promote existing SGCN/ habitat curricula that meet state standards in a variety of subject areas.**

   The following curricula already designed to meet state standards are recommended: 1) Association of Fish and Wildlife Agencies' suite of Project WILD curricula, which includes, Project WILD, Aquatic WILD, Growing Up WILD, Flying WILD, plus more specific modules; 2) Monarch Joint Venture's Monarchs and More; and 3) the DNR's Life on the Edge in Minnesota (a supplement to Project Learning Tree's Life on the Edge activity). It's also recommended that organizations that have existing SGCN/habitat lessons correlate these with established K-12 courses (AP Environmental Science, AP Biology, etc.) to help encourage their implementation by educators.

Case Study: Monarch Joint Venture Education Program

Monarch Joint Venture's Education Program provides an excellent example of how an organization can integrate multiple recommended actions to support this environmental education strategy. Monarch Joint Venture offers professional development for educators (North American Monarch Institute), funding and technical support for educational gardens, curriculum (Monarchs and More Curriculum for grades K-8) aligned with the Next Generation Science Standards, educational resources for kids (Growing with Monarchs Activity Book), K-12 classroom presentations, and online courses for all ages (Monarch NECTAR Hub). The North American Monarch Institute alone has reached 126 Minnesota educators who in turn have reached 126,000 Minnesota students since 2010. These combined actions and outreach with multiple partners show how environmental education programs like Monarch Joint Venture can build support for a SGCN and its habitat.

Photo: Educators engaged in hands-on learning about insects in Monarch Joint Venture's North American Monarch Institute

3. **Establish or identify an existing resource hub where educational resources on SGCN could be compiled into one convenient location — sorted by grade, state standards, topic, etc.**

   a. Investigate whether the Minnesota Association of Environmental Education's EE Portal (MAEE) could serve as this hub, with SGCN resources submitted to it.

   b. Connect organizations and schools with wildlife experts by compiling a list of organizations/ programs that can be a resource and incorporate this into the Minnesota Association for Environmental Education's EE Portal.

4. **Provide funding and technical support to advance outdoor learning spaces at schools that would attract and support SGCN (e.g. native plant gardens for pollinators and birds) and enhance outdoor learning.**

   a. Develop a small grants program to provide funds to schools and local organizations conducting habitat restoration projects (e.g. Great River Greening and Metro Blooms) for development of outdoor learning spaces that provide habitat benefits.

   b. Develop a habitat education train-the-trainer program that could promote and train professional educators and established volunteer organizations (Master Gardeners, Master Naturalists, etc.) to provide technical assistance to schools (See Strategy 1, Action 2b) interested in developing or enhancing outdoor learning spaces of habitat value.

   c. Collaborate with the DNR's School Forest Program and other outdoor classroom programs to enhance habitat for SGCN through their stewardship plans and integrate other educational supports such as interpretive signs on SGCN at school forests.

5. **Provide, support the expansion of, and/ or promote grants and programs that fund field trips and transportation to natural areas for environmental education programming.**

   Some examples of existing opportunities that fund field trips and transportation for environmental education experiences include the DNR's No Child Left Inside grants and Bird by Bird and EPIC (Empowering Pathways Into Conservation) programs, as well as Hennepin County's Bus Funding for Environmental Education Field Trips.

Case Study: University of Minnesota Bee Lab Pollinator Toolkit

The University of Minnesota Bee Lab Pollinator Education Toolkit is an example of one way in which environmental education can directly support SGCN. The toolkit comes with a variety of interactive games and activities that help recipients grow in appreciation of pollinators as well as learn strategies to support these important species. More than 200 kits have been distributed to Minnesota educators and community leaders, indicating the significant interest in both pollinator education and support. Increased public awareness of pollinator needs can lead to increases in native planting in homeowners' yards, as well as broad popular support for efforts to preserve these species.

Photo: Educational toolkit created by pollinator experts at the University of Minnesota Bee Lab and Monarch Joint Venture

Wildlife Viewing

Strategy 3: Provide and promote wildlife viewing opportunities and programs that inspire curiosity, caring, and connection with Minnesota's Species in Greatest Conservation Need.

Wildlife viewing is one of the fastest growing types of wildlife-related recreation in the U.S. and is highly popular in Minnesota, making wildlife viewers an essential audience to lead towards SGCN conservation actions. The 2022 National Survey of Hunting, Fishing, and Wildlife-Associated Recreation (National Survey of Wildlife Recreation) defines wildlife viewing as "closely observing, feeding, and photographing wildlife, visiting parks and natural areas around the home because of wildlife, and maintaining plantings and natural areas around the home for the benefit of wildlife." (U.S. Department of the Interior, U.S. Fish and Wildlife Service, 2022) In Minnesota, 3.6 million people (ages 16 and older) watch wildlife, according to the National Survey of Wildlife Recreation. For context, this number far exceeds the combined number of people (ages 16 and older) who fish and hunt in Minnesota, 1.7 million and 504,000 respectively. This same survey estimated that wildlife viewers spent $5.0 billion in our state in 2022 on wildlife watching activities and equipment (e.g. travel, purchases of camera gear and binoculars, and related expenses).

By engaging Minnesotans in wildlife viewing, an activity that fosters connections between wildlife and people's lives, we can support the conservation of SGCN, as has been demonstrated in multiple research studies (Grooms et al., 2023; Cooper et al., 2015; Hvenegaard, 2002; McKinley et al., 2017). One of the many ways that wildlife viewing engagement could support conservation is through financial support. According to a 2025 survey from Charities Aid Foundation, the leading motivation for Americans to support a cause was feeling a personal connection to it and the leading factor for their decision to donate to a charity was because it was tied to a cause they've personally experienced or care deeply about (Vogels, 2025a; Vogels, 2025b). Additionally, by supporting wildlife viewing-based tourism in Minnesota, wildlife viewers will provide income to the conservation efforts of the sites they visit, which in turn has a beneficial ripple effect to those local economies through their tourism expenditures. By communicating these economic benefits, we can garner further support for SGCN conservation from a wider variety of audiences (i.e. state and community leaders), by demonstrating how SGCN and their habitats benefit local economies.

Wildlife viewing programs that focus on birds and mammals stand to be particularly effective. These are by far the most popular species groups to view by Minnesotans. Each group was selected by 78% of respondents in the 2022 Minnesota Results of the National Wildlife Viewer Survey as the specific types of wildlife they were interested in viewing (Sinkular et al., 2022). However, it's important to note that 87% of respondents indicated they were interested in viewing more than one type of wildlife, showing potential that this strategy could support the other species groups of interest reported, which included native fish, reptiles, insects, and amphibians (listed in order of percent of people interested from highest to lowest).

Bird watchers (or birders) have been identified as a particularly key group of wildlife viewers that stand to make a positive effect on wildlife conservation. As defined in Birding in the United States (USDOI, USFWS, 2024), a birder is someone who has, "taken a trip one mile or more from home for the primary purpose of observing birds or closely observed or tried to identify birds around the home." Participation in bird watching has been found to significantly affect pro-environmental behavior (Larson et al., 2018). One study (Cooper et al., 2015) quantified that wildlife recreationists — both hunters and birdwatchers — were each 4-5 times more likely than non-recreationists to

engage in conservation behaviors, including activities such as donating to support local conservation efforts, enhancing wildlife habitat on public lands, advocating for wildlife recreation, and participating in local environmental groups. Demonstrating this behavior in Minnesota, hundreds of bird watchers of all experience levels collected data in a field survey between 2009-2013 for the Minnesota Breeding Bird Atlas, a collaborative project led by Audubon Minnesota and the University of Minnesota's Natural Resources Research Institute, that documents the distribution of every breeding bird in the state, providing a foundation for the conservation of these species.

Not only do birders demonstrate conservation behavior, but they are also a large group with significant economic might. There are 96 million birders (ages 16 and older) in the United States and birding participation rates are highest amongst those who have higher annual household incomes (USDOI, USFWS, 2024). Birders' expenditures supported $279 billion to the economy, 1.4 million jobs, and $90 billion in job income (at the local, state, and national level). By engaging Minnesotans in the recreation of wildlife viewing, we may enhance people's understanding and appreciation of wildlife and promote their likelihood of supporting conservation of SGCN through habitat stewardship, participatory science, and donations.

To ensure we effectively connect the people of Minnesota to the recreation of wildlife viewing, our recommended actions address the barriers and motivations for the activity, as identified by

Minnesota's state-level results from the National Wildlife Viewer Survey (Sinkular et al., 2022). Our recommended actions follow the survey's recommendations to provide and promote the following: (1) wildlife viewing information, including where to go and how to do it, (2) access to wildlife viewing locations, (3) around-the-home viewing opportunities, (4) social support networks for wildlife viewers, and (5) services and information that support those who are new to the activity. To sustain and increase the number of wildlife viewers in Minnesota, our recommended actions also utilize the recreational model of recruitment, retention, and reactivation (Heberlein et al., 2008; Larson et al., 2014; Quartuch et al., 2017), most often applied to the wildlife recreational activities of hunting and angling, but also applicable to wildlife viewing (Grooms et al., 2020).

Photo: Bird watching at Twin Cities Bird Festival

Recommended Actions for Wildlife Viewing Efforts:

1. **Develop a state Wildlife Viewing Plan for Minnesota, in collaboration with stakeholders and partners, that focuses on SGCN and addresses recommendations from the Minnesota Wildlife Viewer Survey (Sinkular et al., 2022) while tying into and promoting the state's many existing resources and programs. The following actions provide a sample of what the plan could include.**

2. **Develop and promote introductory resources, programs, and social networks to support people who are new to the activity of wildlife viewing that will help them get started.**

    a. To recruit people into the activity of wildlife viewing, provide basic information and instructional experiences. Create resources describing how to get started, (e.g. where to go to see birds and information on binoculars, field guides, and identification apps). And by promoting, providing, and supporting introductory activities and workshops, people can gain hands-on experience in a comfortable setting (e.g. guided instructional bird walks or workshops on how to find and identify birds). To help encourage wildlife viewing of other easy to observe taxa, such as butterflies and dragonflies, refer to the models created for introductory birding resources and programs.

    b. Provide introductory wildlife viewing opportunities for youth that sparks their interest and builds skills and confidence to foster continued participation in the recreation. For example, the DNR's Bird by Bird program, introduces bird watching to classrooms over the course of a school year by providing equipment, activities and lesson plans connected to state standards, a bird watching field trip, and volunteers with bird watching expertise. It also engages the students in conservation actions to support birds, such as learning how to clean bird feeders, prevent bird-window collisions and engaging in participatory science projects such as Project FeederWatch.

    c. Provide loaner equipment (e.g. a library check-out program- backpacks with binoculars and easy-to-use field guides, etc. and tips for getting started), so that people can easily try out the activity without having to make a financial investment.

    d. Create a sense of community and social support to further enhance recruitment of Minnesotans into wildlife viewing. This can be done by promoting and supporting wildlife viewing events (e.g. birding festivals or smaller scale "meet-ups") and connecting people with existing social networks, such as local Bird Alliances (former Audubon chapters) and organizations that support specific community groups like Urban Bird Collective. An important form of social support for wildlife viewers are their families (Sinkular et al., 2022), so providing and supporting programs and resources that engage families to observe wildlife together would be valuable. One example would be collaborating with DNR's Parks and Trails Division to explore development of an 'I Can Bird!' program, utilizing their successful 'I Can!' program structure.

3. **Build interest in wildlife viewing amongst broader audiences by appealing to other, related interests.**

    a. Cross-promote wildlife viewing opportunities with other popular outdoor activities taking place in natural spaces (e.g. camping, trail running, hiking, paddling, disc-golf), creating awareness of SGCN in those areas.

    b. Develop wildlife viewing games that get people outdoors observing wildlife who

are motivated by the challenge of it (e.g. birding bingo/ scavenger hunts, a SGCN observation "bucket list" or promoting/ hosting City Nature Challenges).

c. Collaborate with outdoor affinity community groups to hold introductory wildlife viewing events. Create these as an opportunity for members of the community who may be more experienced and comfortable with the activity to provide leadership and inspiration for other community members to participate.

d. Work with the Minnesota Master Gardener organization to promote planting native plant gardens for attracting butterflies, bumblebees, and birds to gardeners.

4. **Provide and promote access to wildlife viewing opportunities that enable people to observe and learn first-hand about Minnesota's SGCN.**

a. Create and promote online resources and printed materials that clearly identify and illustrate top locations to go wildlife viewing in Minnesota. A large-scale example of such a resource could be creating a statewide wildlife viewing designation system, highlighting Minnesota's top wildlife viewing destinations, including site designation signage and accompanying digital guides/ maps to those sites with descriptions of the locations describing what wildlife you can see there. Smaller scale examples of these resources could include a series of local level guides to birding in the state's popular travel destinations (e.g. birding guides to the Twin Cities, Duluth, North Shore, etc.). Partnering with Explore Minnesota and local tourism and historical societies will help expand the promotion of these resources.

Example Species in Greatest Conservation Need: Cape May Warbler

Migratory birds, such as the Cape May warbler (*Setophaga tigrina*), face several stressors, particularly in developed areas, as they migrate between their wintering and breeding grounds each spring and fall, such as lack of suitable habitat, window collisions, light pollution, and climate change. As reported by the Minnesota Breeding Bird Atlas, cape may warblers have high mortality during migration. Loss et al (2014) found that their risk of mortality from collisions with low-rise buildings is 16.7 times more than the average risk for a bird. Cape may warblers migrate throughout Minnesota in the spring and fall to and from their breeding grounds in Northeast Minnesota and Canada. Fortunately, a high number of Minnesotans are interested in seeing birds (as described above) and birders have a particular interest in seeing warblers. By capitalizing on this existing interest in birds and especially highly attractive birds, such as cape may warbler, and engaging more folks in bird watching (a relatively easy species group to observe), an opportunity is created to increase public interest and knowledge of the birds on Minnesota's SGCN list and the stressors they face. We can leverage the relevance of migratory birds to peoples' lives and shift human behaviors towards bird-friendly conservation actions, such as those recommended in Strategy 5 on habitat stewardship.

Photo: Cape May warbler, Terry Mortier

b. Explore developing a small grant program to provide funding for improvements to or installation of new wildlife viewing infrastructure (e.g. platforms, trails, viewing/ photography blinds and interpretive signage) that highlight and enhance SGCN wildlife viewing opportunities at parks, nature centers, and other high visitation natural areas. Sites participating in the above-described statewide wildlife viewing system (Action 4a) could be prioritized.

c. Develop live-streaming wildlife cameras of lesser known or particularly sensitive SGCN, and couple them with interpretation, to increase public interest and knowledge about species that they may otherwise have no opportunity to observe.

d. Provide and promote guided public program opportunities that enable people to observe SGCN that are challenging for people to observe on their own. For example, the easiest entry into viewing native fish (a species group of high interest to Minnesota's wildlife viewers) is through guided experiences with professional biologists or naturalists with access to specialized equipment and identification knowledge — this could potentially include guided activities such as freshwater snorkeling, angling, microfishing, seining or electrofishing demonstrations.

Case Study: Twin Cities Bird Festival

The Twin Cities Bird Festival, organized by the Urban Bird Conservation Partnership of the Twin Cities (a participant in the Urban Bird Treaty Program), celebrates World Migratory Bird Day (WMBD) and seeks to connect local communities with the birds around them. Hosted in 2025 by Three Rivers Park District at Mississippi Gateway Regional Park with partners providing additional bird watching experiences throughout the Twin Cities, the event provided numerous opportunities for urban residents to observe and learn about birds. The guided bird walks, presentations and exhibits were centered around the WMBD theme of creating bird-friendly cities and communities. The Twin Cities Urban Bird Festival is a great example of a partnership involving multiple conservation groups that is striving to engage folks in bird watching and connect bird watchers to conservation actions. The inaugural 2025 festival was attended by more than 500 people of all ages and birding experience levels, showing that there is demand for wildlife viewing events such as this one and holds great promise for growth. This festival addresses multiple recommended actions: creating a sense of community and social support for bird watchers, including families; opportunities to observe and learn about birds firsthand on guided bird walks; supporting those who are new to birding with guided experiences and access to equipment; and an opportunity to engage urban audiences in local bird watching without having to travel far from home.

Photo: Twin Cities Bird Festival attendees enjoying a live raptor presentation by Three Rivers Park District, Grayson Smith, USFWS

5. **Provide program opportunities and resources that support wildlife viewing around and near people's homes where most wildlife viewers participate.**

   Most of Minnesota's wildlife viewers participate in wildlife viewing around and near their homes (Sinkular et al., 2022). Creating and promoting community habitat stewardship engagement efforts (detailed in Strategy 5) will provide easily accessed opportunities to view wildlife. For instance, encouraging people to install native plant gardens in their home landscaping or at a local school (Strategy 2) creates easily accessed bird and butterfly viewing opportunities. Such activities could be further enriched by promoting participatory science projects (Strategy 6) that involve data collection of wildlife using these native plant gardens, educational curricula on the birds and butterflies (Strategy 2) observable in these spaces, and development of regional pocket identification guides to wildlife that people may observe in native plant gardens that includes SGCNs (see Action 6c).

6. **Create fun, engaging opportunities for wildlife viewers to directly support SGCN conservation through their participation in the activity of wildlife viewing itself.**

   a. Collaborate with partners and tourism entities to develop guided interpretive tours of charismatic Minnesota SGCNs, in which participation fees directly support SGCN conservation (e.g. supports habitat work in the area of the tour or goes into Minnesota's Nongame Wildlife Fund). These charismatic species can also work as the draw to provide interpretation on lesser known SGCN that share the same habitat. One possibility could be leveraging Blue Mounds State Park's bison buggy tours to also show and provide education about prairie SGCN observable during the tour.

   b. Hold a birding competition, wildlife photography contest, or wildlife art exhibition that supports SGCN conservation by applying a portion of the registration fees as a donation to a conservation program (e.g. the Nongame Wildlife Fund).

   c. Develop a series of pocket identification guides to Minnesota's wildlife that incorporate conservation actions and ethics. An example might be a guide to butterflies that also encourages planting of the host plants that attract them or a guide to birds that describe simple actions to help them (see Strategy 5).

   d. Recruit wildlife viewers to volunteer for participatory science opportunities (see Strategy 6) to engage them in deeper learning of the taxa they are interested in and taking conservation action for SGCN by collecting needed data.

Case Study: DNR's EagleCam and FalconCam

For over a decade, the DNR Nongame Wildlife Program's EagleCam and FalconCam have streamed video of bald eagle and peregrine falcon pairs nesting in the Twin Cities. These cameras provide intimate looks into the lives of parent birds rearing their young, enabling their viewers to feel a connection to these species. They have created awareness of the fascinating wildlife living in our cities and in the case of the FalconCam, it's engaged people in closely observing the breeding behaviors of a SGCN and state listed Species of Special Concern.

They've also been an opportunity to draw attention to Minnesota's successful recovery efforts for these species, and the mission of the DNR's donation-supported Nongame Wildlife Program (NWP).

Both cameras have been highly successful in their efforts to engage the public in viewing wild birds, frequently attracting news media coverage. Over the last 13 years, the EagleCam has soared in popularity, streaming in over 160 countries across the world. Between 2020-2024, the EagleCam webpage was visited more than 4.1 million times with more than 795,000 users. In 2022 alone, the webpage had more than 2.2 million views with more than 350,000 users. In 2024, the FalconCam webpage had more than 72,000 views with more than 20,000 users. Many people attribute their familiarity with the NWP to the EagleCam, and numerous donors to the Nongame Wildlife Fund indicate that the EagleCam motivated their donation.

Photo: Female peregrine falcon broods an egg and chicks on DNR's FalconCam

Responsible Recreation

Strategy 4: Foster responsible recreation practices that reduce recreational effects on Species in Greatest Conservation Need and their habitats while allowing for safe and satisfying access to the outdoors.

Minnesotans benefit from abundant outdoor recreational opportunities throughout the state and outdoor recreation has been growing in popularity and importance to residents' lives (Minnesota DNR, 2017). Overall, recreational use of public lands can enhance the value of these spaces by raising awareness, increasing the importance placed on outdoor spaces by members of the public, and encouraging sustainable use and stewardship (Larson et al., 2018). Connections with nature and the outdoors also positively affect human health and wellbeing and encourage proactive conservation behaviors (Richardson et al., 2020). While outdoor enthusiasts in general want to preserve and protect the resources they value, inadvertent effects from outdoor recreation activities can be detrimental to SGCN and their habitats through lack of awareness, misunderstanding of proper etiquette and techniques, or social tolerance of destructive behaviors.

Habitat destruction, the spread of invasive species or diseases, and pollution are all stressors that can result from outdoor recreation. These effects are not mutually exclusive and may affect multiple SGCN within the same habitat simultaneously. For example, recreation that covers large distances such as canoe or OHV (off-highway vehicle) and mountain biking trails can spread invasive species, disrupt or destroy nesting habitat for turtles, salamanders, snakes, and tiger beetles, and may cause direct mortality if animals or nests/dens are run over by vehicles or bikes. Recreation on lakes can affect common loons and other waterbirds when nests and shorelines are damaged by boat wakes and pollution is introduced from lead fishing tackle. Multiple bat species can be seriously affected by recreation in caves by the spread of disease or disturbance during hibernation. Peatland habitats, such as bogs and calcareous fens, are particularly fragile ecosystems that are also sensitive to human encroachment.

Recreation can also affect SGCN by affecting their behavior. For example, some SGCN species like Canada lynx (*Lynx canadensis*) and American goshawk (*Astur atricapillus*) are particularly sensitive to human activity, such as snowmobiling for the lynx and general human disturbance for the goshawk. These sensitive species may alter their movement patterns and activity or abandon otherwise suitable nesting territories, respectively (Squires et al., 2019; Morrison et al., 2011).

This strategy offers guidance for land managers, conservation educators, outdoor program and recreation leaders, and natural resource communicators to reduce negative effects from outdoor recreation activities, encourage effective resource management, and foster positive behavioral changes through raising awareness and providing education focused on environmentally responsible recreation. Many of the actions outlined below focus on social marketing campaigns, which are a proven tool for informing and educating the public and affecting sustained behavioral change that contributes to natural resource conservation (McKenzie-Mohr & Tabanico, 2024). Successful messaging highlights the positive effects produced by individual actions and the cumulative effect on the environment or resource. Perceived impact of individual actions is a significant predictor of future behaviors (Lawhon et al., 2013) and people are more likely to act when they believe their actions make a difference. These tactics emphasize the importance of individual decisions, empower individuals to feel capable of making a meaningful difference, and encourage people to promote responsible recreational behaviors as a social norm.

Stressors Addressed: Recreation (e.g. accidental take and overuse of resources), Hunting and Collecting Animals (e.g. improperly discarded gut piles causing potential exposure to lead), Fishing (e.g. use of lead tackle), Invasive Species (Problematic Non-native Species), Diseases and Pathogens, and Water-borne Pollution

Recommended Actions for Responsible Recreation Efforts

1. **Collaborate with park and natural area managers to share best practices that support responsible recreation.**
   a. Host a speaker series or symposium on topics related to creating low impact, satisfying recreational access and its benefits for sensitive wildlife and habitat. Example topics for wildlife viewing recreation include bird photography blinds, wildlife viewing platforms, and wildlife cameras. Example topics addressing all types of recreation could include effective boardwalks and interpretive/ instructional signage or public art installations that increase knowledge of the vulnerable SGCN and habitats on the property and how to reduce one's impact while visiting/ recreating to avoid inadvertent harm.

Example Species in Greatest Conservation Need: Northern Barrens Tiger Beetle

Photo: Northern barrens tiger beetle, Bob Dunlap

Tiger beetles are an intriguing group of species that feed on insects including agricultural pests, but they are increasingly threatened by anthropogenic effects, with eight species listed as SGCN in Minnesota. Tiger Beetles are mostly found in open sandy habitats like beaches, dunes, savannas, riverbanks and trails. They are dependent on these habitats to mate, lay eggs, construct larval burrows and hunt for prey. Unfortunately, a substantial amount of their habitat in Minnesota has been lost to development and much of their remaining habitat is subject to negative effects from recreation. For example, the northern barrens tiger beetle (*Cicindela patruela patruela*) is native to areas in central and southern Minnesota that are also popular areas for outdoor recreation, making it particularly vulnerable. Habitat degradation can stem from recreation that occurs off designated trails or in non-approved areas, whether motorized or non-motorized. Temporary effects like soil compaction or displacement can kill adults, damage burrows, and disrupt egg-laying. Over time, repeated disturbance can render areas uninhabitable. Responsible recreational behaviors such as staying on designated trails and avoiding disturbance of other areas can lessen the negative effects on tiger beetles, but effective communication is key. Most outdoor enthusiasts are prepared to alter their behaviors if they know why the change is needed or beneficial and knowing that specific actions will benefit at-risk animals or plants while maintaining or enhancing the recreational experience can be particularly motivating (Abrams et al., 2023). Increased attention con creating specific, actionable messages is needed to create awareness around these issues and the need for behavior changes.

b. Promote and provide information to park and natural area managers on the installation of boot brush kiosks that encourage visitors to wipe mud off their boots to prevent the spread of invasive plant seeds and earthworm egg cases, which damage habitat. See the "PlayCleanGo: Stop Invasive Species in Your Tracks" program for example boot brush kiosk signage that shares consistent messaging.

2. **Develop highly positive, fun, and memorable key messages—using social science on behavior change and social marketing—that promote and create norms around specific desired behaviors that reduce human impact on SGCN and their habitat.**

   Use these key messages in social media campaigns, programs, materials, and products to promote the desired norm. Some ways to disseminate these messages are to collaborate with the DNR's Division of Parks and Trails and Division of Fish and Wildlife on incorporating these messages into their recreation education programs and materials. For example, the creation of a SGCN mascot (an ambassador species — see strategy 1a) that could help deliver the above messages similar to Smokey Bear would add to their appeal.

3. **Leverage resources from national and state initiatives to communicate established responsible recreation practices and draw the connection to how these practices benefit SGCN by reducing inadvertent human-caused threats (e.g. not transporting potential vectors of pest and disease transmission).**

   Example resources include: Tread Lightly!, Leave No Trace, PlayCleanGo, American Birding Association's Code of Birding Ethics, Partners in Amphibian and Reptile Conservation's Intro to Ethical Outdoor Practices, and Get the Lead Out

4. **Collaborate with organizations already conducting outreach on aquatic and terrestrial invasive species to incorporate information about specific SGCNs that benefit from their recommended actions.**

   The DNR has a variety of programs conducting outreach on invasive species that provide an opportunity for collaboration and inclusion of SGCN information. For example, the DNR partners with the PlayCleanGo campaign to provide an opportunity for incorporating messaging relevant for local OHV clubs, mountain bike groups, and other recreationist groups. The DNR's Invasive Species Program provides behavior change messaging about aquatic invasive species to audiences like boaters, anglers, and shoreline owners. They also provide "Prevent the Spread" messaging about terrestrial invasive to species to a wide variety of outdoor recreationists.

5. **Design and create infrastructure and materials that make it easy for people to learn and adopt responsible recreation behaviors by including specific information with "how to" style instructions.**

   Placing information regarding responsible recreation behaviors on-site at recreational areas or including it in resources that the recreationists use is a way to easily raise awareness and make adoption of the behavior more likely. One example is providing simple stations at recreation access sites such as trailheads, fishing piers, or boat launches for people to take desired actions (e.g. boot cleaning or fishing line disposal) with accompanying interpretive signage explaining the what, why, and how of the desired actions. To further reach specific recreationists, incorporate information on desired practices into materials relevant to that recreation group. For example, for wildlife viewers, incorporate information on ethical wildlife viewing practices within wildlife identification and visitation guides and other wildlife viewing materials/content.

6. **Collaborate with organizations, groups, and businesses that can help develop and deliver relevant and tailored messaging to increase awareness amongst the recreationists with which they regularly interact on SGCN that are vulnerable to harm through their recreational activities and how to avoid inadvertent injury/harm to them.**

The following entities are example organizations/ businesses that could potentially help with message development and delivery: Minnesota Outdoor Recreation Industry Partnership; specific recreational groups, such as OHV, paddling, and photography clubs; lake associations; and outdoor outfitters.

Case Study: Clean In, Clean Out Program

The DNR's Clean In, Clean Out program is a comprehensive outreach campaign and resource to help Minnesotans avoid the spread of aquatic invasive species (AIS) throughout the state. The program is especially effective due to its positive messaging that connects people with the resources they care about, explains why AIS are an issue, empowers people to make meaningful conservation choices, and perhaps most importantly, explains exactly what actions to take based on the activity or gear involved. The main website explains that:

"Invasive plants, animals and diseases can harm lakes, rivers, streams, wetlands, water quality, and wildlife habitat. People can unintentionally spread invasive species by moving boats, gear, and equipment from one waterbody to another or releasing non-native species into the environment. No matter how you enjoy the outdoors, always take these actions to prevent the spread of aquatic invasive species (AIS)."

Photo: Boot brush station at Interstate State Park, Laura Van Riper

The website has information about a wide variety of common aquatic activities like boating, fishing, and paddling, as well as resources for people such as water gardeners, aquarium owners, and commercial bait harvesters. There is specific information about how AIS affect different gear and activities, what to do to minimize risk of spreading AIS, instructions to decontaminate gear, relevant laws and regulations, and links to additional resources. The message is simple and clear: We all play an important role in protecting Minnesota waters from aquatic invasive species.

Habitat Stewardship

Strategy 5: Engage and empower communities to improve wildlife habitats where they live, work, and recreate.

Land use change and the associated loss of habitat and habitat degradation is the number one driver of species loss and population decline for terrestrial species worldwide (Jaureguiberry et al., 2022). When lands are converted from natural landscapes to human-dominated ones, wildlife are challenged to find suitable habitat within a matrix of development and heavily modified ecological landscapes. Although many landscape scale changes in habitat cannot be reversed through small-scale actions, anyone with access to a patch of land, whether it be small urban lots or large rural acreages, can help improve habitat in their domain. Collective efforts by individuals and communities have the ability to make a difference for some SGCN, particularly those that use developed areas (see Urban and Other Developed Lands sub-chapter). This includes some migratory birds, pollinating insects, and bats seeking food sources; suitable nesting, egg laying and roosting sites; and migration stopover sites. Even the simple choice to include native plants in one's home landscaping, can provide critical benefits to wildlife (Tallamy, 2009; Tallamy et al., 2021; Tallamy & Shriver, 2021). For example, the use of native landscaping in suburban areas has been found to significantly support the abundance and diversity of birds, butterflies, and moths with one study finding that bird species of regional conservation concern were eight times more abundant and significantly more diverse on native landscaped properties than those landscaped with non-native plants (Burghardt et al., 2009). When individual actions are replicated throughout a community, these small-scale habitat improvements can make a powerful, large-scale change for wildlife in urban, suburban, and agricultural areas.

Our recommended actions for habitat stewardship primarily focus on practices beneficial to migratory birds, pollinating insects, and bats as there are simple conservation actions for these groups that can be easily and practically employed by many people in most communities. Also important, these species groups hold relevancy to Minnesotans; appealing to their wildlife viewing species interests (Sinkular et al., 2002) and in the case of bats, their interests in mosquito control to better enjoy the outdoors (Minnesota DNR, 2025) or encouraging bats to roost outdoors rather than in their homes.

In addition, when engaging members of waterfront communities, we leverage Minnesotans' passion for our state bird by highlighting the benefits to the common loon while encouraging stewardship of their lake shoreline habitats.

When engaging rural communities in habitat stewardship, we highlight practices that can support grassland birds and turtles that use upland, wetland, and stream habitats like wood turtle and Blanding's turtle — all of which would stand to benefit from habitat enhancements in these settings and may hold appeal for the landowners. Our recommended actions take a community approach (to maximize habitat benefits through collective action), create relevancy for communities by highlighting taxa of interest to wildlife viewers, and address potential societal barriers, including overcoming social norms and lack of knowledge and skill.

Stressors Addressed: Development, Crop Production, Timber Harvest, Tree Plantations, Air-borne Pollution, Water-borne Pollution, Light and Noise Pollution, Invasive Species (Problematic Non-native Species), and Fire Management

Example Species in Greatest Conservation Need: Rusty Patched Bumble Bee

The rusty patched bumble bee (*Bombus affinis*) was once widespread and abundant across eastern North America including Minnesota but has disappeared from much of its historic range over the past 30 years, although still abundant in Minnesota. The cause of this decline is not fully understood, but disease, pesticides, and habitat loss have likely played roles. The bee was listed as federally endangered in 2017.

In 2019, the rusty patched bumble bee was named Minnesota's state bee to raise awareness of its conservation status and the importance of protecting pollin31ator habitat. Like many other bumble bees, rusty patched bumble bees forage on a variety of flowering plants for pollen and nectar. Bumble bees nest in cavities above or below ground and often use brush piles, leaf litter, or abandoned burrows for shelter. Rusty-patched bumble bees do not avoid developed areas, so by planting native plants that bloom throughout the growing season, reducing the use of pesticides, and leaving nesting areas alone, Minnesotans can help support our endangered state bee and other pollinator species.

Photo: Rusty patched bumble bee, Jessica Petersen

Recommended Actions for Habitat Stewardship:

1. **Educate local communities, landowners, and land managers on the habitat needs of the SGCN sharing their local area, highlighting migratory birds, pollinating insects, bats, and other species relevant to the community type/geographic area, as applicable.**

2. **Provide coordination that connects communities to programs and resources for technical, financial, and organizational support, so that they can more easily implement habitat stewardship actions for SGCN. Engagement of the 11 federally recognized Tribes with Minnesota's borders is recommended as part of the process to ensure their access to these programs and resources and that this support meets their needs and interests. Specific examples of coordination are provided below.**

   a. Collaborate with conservation organizations and agencies to develop resource information hubs that compile the many existing resources on what individuals can do to improve habitat into one convenient place.

   b. Develop a train-the-trainer program for people to become Master Habitat Stewards—e.g. utilizing Soil and Water Conservation District educators, Master Gardeners and Master Naturalists—to increase capacity for habitat education, technical assistance and site visits.

   c. Promote existing stewardship programs to municipalities that empower them to engage their communities and parks departments in taking actions directly benefiting wildlife. Examples of programs to promote to municipalities include: National Wildlife Federation's Mayor's Monarch Pledge, American Bird Conservancy's Bird City, Minnesota Board of Soil and Water's Pollinator Pathways grant program, and Audubon

International's Audubon Cooperative Sanctuary Program for Golf Courses.

d. Develop a plan for the creation of local-level habitat stewardship collaboratives, involving varied stakeholders (see examples below). These groups could serve as forums for building relationships and trust, holding listening sessions, crafting relevant messaging, increasing knowledge of the SGCN and habitats in their community, and maximizing capacity for on-the-ground implementation of habitat enhancement projects.

   Example stakeholders for Urban/ suburban Communities: NGOs and agencies involved in community habitat enhancement work (e.g. watershed management organizations), Soil and Water Conservation Districts, local parks departments, transportation departments, local influential leaders (mayors and city councils), schools, libraries, and well-being centers.

   Example stakeholders for Rural Communities: Minnesota Farm Bureau, Minnesota Farmers Union, Minnesota State Cattlemen's Association, Pheasants Forever, Ducks Unlimited, Minnesota Deer Hunters Association, Minnesota Chapter of the Wildlife Society, North Shore Forest Collaborative, Forestry for the Birds Initiative, Soil and Water Conservation Districts, Natural Resource Conservation Service's Farm Bill biologists/ private lands biologists, Minnesota Corn and Soybean Growers Associations, The Nature Conservancy, U.S. Fish and Wildlife Service Wetland Management Districts, Minnesota Land Trust, Sustainable Farming Association, and Prairie Reconstruction Initiative.

   Example stakeholders for Waterfront Communities: Homeowners Associations, Watershed Organizations, Tribal governments, and researchers.

3. **Craft communication resources, campaigns, and media with messages that increase public understanding on how the health of habitats, which we share with SGCN, is directly tied to the individual choices Minnesotans make on their own properties and how collectively, our stewardship actions make a difference for both wildlife and humans.**

   a. Promote the benefits of stewardship actions for humans (e.g. well-being, cost savings, wildlife viewing opportunities) and for wildlife, celebrating habitat as a healthy space for both people and SGCN. This action could connect with actions in Strategy 3.

   b. Promote actions that have a clear connection between larger scale benefits to wildlife and humans, resulting from our individual, smaller actions. For instance, collaborate with local watershed organizations to promote connectivity messaging on how what individuals do on their property affects the health of our local lakes and rivers.

Case Study: Minnesota Loon Restoration Project

The DNR's Minnesota Loon Restoration Project provides an example of how to engage waterfront communities. The project supports lake associations as they develop management plans that encourage loon-friendly activities and habitat restoration on the lakes, and it educates the public about loon conservation. The Minnesota DNR has recruited lake associations to participate in the "Loon Friendly Lake Registry." Through presentations at annual lake association meetings and support in the development of lake-specific management plans, the DNR has empowered owners of lake shorelines to restore and conserve shoreline habitat. There are currently 64 lake associations enrolled in the Loon Friendly Lake Registry. In 2024 alone, the Loon Restoration Project reached approximately 2,500 people in over 40 live speaking events/booths to discuss and present on loon conservation in the state.

c. Other messages could include promoting how planting a pocket of milkweed for monarchs builds habitat across the landscape, how turning "lights out" supports migrating birds and reduces light pollution, and how by landscaping with native plants, we increase food and nesting opportunities for birds.

4. **Create and distribute materials and media that promote and enhance application of everyday stewardship actions and best management practices for habitats and SGCN. To be most effective these communications should be provided in easily applied formats and translate scientific, technical information into accessible, plain language and in different languages. A list of specific actions to encourage everyday conservation actions includes:**

   a. Simplify people's ability to include native plants in their landscaping by providing and promoting information on what to plant for SGCN, where to buy the plants, and how to incorporate them into their gardens. Essential resources to develop would be lists of the top beneficial native plants for Minnesota's SGCN, organized by the state's ecoregions. These lists should include soil and sun requirements and information on which species groups are attracted to which plants (e.g. birds, butterflies, or bumble bees). Helpful partners and resources in this effort could be Minnesota's Wild Ones Chapters, Minnesota Native Plant Society and Monarch Joint Venture. To help people locate and obtain native plants, develop a database/list of native plant nurseries and seed sources in Minnesota and promote local native plant sales. And finally, to help people incorporate native plants into their landscaping, promote and connect people to resources with how-to information, such as Minnesota's Board of Water and Soil Resources' Lawns to Legumes program and Ganawenindiwag: Working with plant relatives to heal and protect Gichigami shorelines). Updating and reprinting the DNR's "Landscaping for Wildlife" and "Loonscaping" would provide additional helpful resources.

   b. Provide guidance on how people can stop the introduction and spread of invasive species. Disseminate existing products on (1) how to identify and remove common invasive plants, (2) how to avoid buying invasive plants and plant native alternatives instead, and (3) how to avoid releasing invasive plants and animals into the environment. Create new products as needed.

   c. Promote ways people can reduce threats to wildlife around homes. Guidance should include the following: (1) reducing the use of pesticides and other chemicals in yards, why it matters for wildlife, and information on alternatives that are less impactful to wildlife; 2) methods to prevent bird window collisions, highlighting available programs and resources (e.g. American Bird Conservancy); 3) the importance of snags for cavity-nesting birds, encouraging people to maintain them and/or supplement them with bird boxes; 4) keeping cats indoors for the benefit of birds by utilizing available resources (e.g. from American Bird Conservancy and the Association of Fish and Wildlife Agencies) and by working with veterinarians and Department of Public Health to help amplify these messages; and 5) turning off of exterior lights to reduce light pollution, explaining its effects on migrating birds, moths, and fireflies, and by highlighting programs such as Audubon's Lights Out Campaign and citing reports showing timed/less lights don't affect homeowner safety.

   d. Promote bat boxes, along with siting and design recommendations . Little brown bats (*Myotis lucifugus*) commonly roost in artificial structures including human residences and bat boxes (Minnesota

DNR, 2025). A statewide survey in Minnesota documented little brown bats as the primary species utilizing bat boxes, with colony sizes ranging from 20 to nearly 600 individuals. When little brown bats are excluded and displaced from a building or human structure, their preferred summer roost sites, bat boxes can provide alternative roosting habitat. They also provide a safe location for maternity colonies to raise their pups, which can support the recovery of Minnesota's little brown bat population from white-nose syndrome. (DNR, 2025) Installing bat boxes is a relatively easy way for people to support little brown bats in Minnesota, however studies have shown these structures must be properly constructed, sited, and monitored through time as these long-lived bats will rely on the bat houses to raise pups for many years. Therefore, to truly benefit the species when promoting bat boxes, it is important to provide information on best practices.

e. When working with waterfront communities, include additional information relevant to aquatic habitats: 1) promote the importance of natural shoreline for water quality, loon habitat, and other aquatic wildlife; 2) provide plant lists of native riparian vegetation that benefit loon, other waterbirds and pollinators; and 3) encourage behavior change to reduce the spread of aquatic invasive species.

f. When working with private landowners, provide information on best management practices (BMPs), applicable to larger acreages. Specific recommendations include: 1) develop easily accessed products in plain-language formats to share and promote BMPs for managing SGCN habitats, such as shorelines for loons, prairie for grassland birds and pollinating insects, and forests for birds, bats, wood turtle and other forest-dependent herpetofauna; 2) promote and distribute invasive plant BMP materials for managing large landscapes; 3) provide information on how to recognize and enhance the native plants beneficial to wildlife that are already on their lands, e.g. milkweeds; and 4) promote the importance of prescribed fire, in combination with retained areas of refuges, as a necessary habitat management tool and provide information to support capacity for conducting prescribed fire in Minnesota. University of Minnesota Extension's My Minnesota Woods and Minnesota Woodland Steward program provides resources for this work.

Case Study: Lawns to Legumes Program

The Lawns to Legumes program by Minnesota's Board of Soil and Water Resources (BWSR) exemplifies several of these recommended actions. This stewardship program helps people to install pollinator-friendly native plantings on residential lawns. They offer workshops, coaching, planting guides, and grants to individuals. Additionally, they offer Pollinator Pathways grants, which are pollinator programs run by local governments and nonprofit organizations with support from BWSR, and a public education campaign to raise awareness about creating pollinator habitat. According to their website, in their 2024/2025 fiscal year, the Minnesota Board of Water and Soil Resources (BWSR) offered over $1.1 million in grant funding to promote and establish pollinator plantings though a residential and/or educational-based approach.

Photo: Lawns to Legumes garden sign, Minnesota Board of Soil and Water Resources

Participatory Science

Strategy 6: Offer participatory science programming for Minnesotans to take part in conservation volunteerism that addresses Species in Greatest Conservation Need data needs.

Participatory science (also known as citizen science, community science, or crowd-sourced science) engages the public in scientific projects that produce reliable data and information, often through public data collection, that may be used by scientists, decisionmakers, or the public (McKinley et al., 2017). Involving non-professional participants in wildlife research and data collection increases program capacity and fosters ongoing public involvement in conservation. One of the most significant advantages of participatory science collaborations is the ability to collect data at a scale well beyond the normal reach for many agencies and organizations (Dickinson et al., 2010), including the DNR. Participatory scientists help fill the gap by collecting data across wide geographic areas and over long periods of time. These datasets are invaluable to conservation at local, regional, and international scales (McKinley et al., 2017). A few longstanding examples are the Breeding Bird Survey, eBird, Minnesota Loon Monitoring Program, and Minnesota Statewide Frogwatch. Ongoing public participation fosters appreciation for Minnesota's unique natural resources, encouraging lifelong learning, engagement and conservation action.

Minnesota has a strong history of participatory science and conservation. Universities, state agencies, local governments and parks, nongame wildlife interest groups, and others have all contributed to wildlife conservation for many decades. Participatory science has emerged as way to empower communities to learn and invest in their local environments.

Recommended species groups for participatory science projects in Minnesota include, frogs and toads, loons and other birds, bats, butterflies, bees, and mussels. All these groups represent SGCN with data needs, while also being appropriate for volunteer researchers, thus ensuring that participatory science efforts successfully obtain useable data. These species groups are relatively easy for non-experts to identify with minimal training and simple resources and observing them requires relatively little or easily operated equipment. They are also species that can be readily identified with photographs, recordings or other simple technology. Another important consideration is that all of these recommended species groups are those that Minnesotans are interested in observing (Sinkular et al., 2022) or in the case of mussels, speak to other human conservation interests, like water quality (Duda, 2021.

Participatory science projects are reliant upon volunteers, so they must hold relevancy to people's interests. The 2025-2035 Minnesota State Wildlife Action Plan seeks to sustain and further develop the collective power of participatory science in Minnesota by supporting existing initiatives, collaborating with partners, and the developing new projects and programs. The recommended actions in this section draw upon social science research of Minnesota's participatory scientists (Jennings et al., 2024a). They are designed to contribute to a broad framework of opportunities for Minnesotans statewide to engage in participatory science that benefits SGCN and habitat and is meaningful to the interests of our residents.

Stressors Addressed: Participatory science does not necessarily address a specific stressor; rather, it addresses data gaps/ lack of information.

Recommended Actions for Participatory Science:

1. **Promote existing participatory science initiatives in Minnesota to help recruit volunteers to those projects.**

   While several participatory science projects already exist in Minnesota, people need an easy way to learn about these opportunities and increased promotional efforts would

help (Jennings et al., 2024b). To help boost promotion, it is recommended to create a Minnesota-based resource hub for wildlife participatory science opportunities. This could be modeled after The Wisconsin Aquatic and Terrestrial Resources Inventory. Some examples of projects that would benefit from additional promotion and that could be part of the resource hub include: the Minnesota Bumble Bee Atlas; University of Minnesota Extension participatory science projects; Monarch Joint Venture's Integrated Monarch Monitoring Program; and the DNR's Minnesota Statewide Frogwatch, Blanchard's Cricket Frog Survey, Minnesota's Loon Surveys, and Chimney Swift Roost Monitoring Project.

2. **Collaborate with wildlife biologists and participatory science professionals to identify gaps in existing participatory science programs, identify project priorities, and to understand what specific data would be most useful and appropriate and relevant for volunteers to collect.**

   Although Minnesota has several participatory science projects, there are many areas of opportunity with other species groups, including many bird species, bats, butterflies, and other easily identified insects, and mussels – all represent SGCN with data needs and taxa relevant to Minnesotans. These should be explored further with wildlife biologists to determine specific project needs and design.

   To enhance the success of newly developed projects, partnerships and collaborations with the following organizations are recommended: 1) museums, science centers, nature centers, and zoos to identify projects of mutual interest and maximize resources for implementation; 2) The University of Minnesota Extension's Minnesota Master Naturalist Program for assistance in designing projects that are appealing and volunteer-friendly, volunteer recruitment, and engagement in train-the-trainer opportunities to maximize capacity; 3) existing conservation projects/programs to add a community science component (e.g. Lawns to Legumes to add pollinator monitoring opportunity for their grant recipients); 4) conservation agencies and organizations that have community connections (e.g. USFWS National Wildlife Refuges, Local Parks Departments, and community-based non-profit organizations); and 5) entities that may have monitoring needs (e.g. the DNR's Minnesota Biological Survey, Scientific Natural Areas, and Wildlife Management Areas; Pheasants Forever; Ducks Unlimited; and The Prairie Enthusiasts).

3. **Develop community science opportunities to collect data on SGCN occupying less developed and rural habitats through unique partnerships.**

   SGCN inhabiting less populated areas (e.g. burrowing owls and Richardson's ground squirrels), may pose challenges for volunteer recruitment, so unique partnerships should be explored. Recommendations include: 1) develop a project in partnership with rural postal offices to train mail carriers to identify SGCN of interest and 2) build relationships with educators and collaborate on project ideas, in which students and their families could participate.

4. **Engage broader groups of volunteers by providing training, meeting people where they are, and suiting their needs and interests.**

   Eliminate potential barriers to help people get started in participatory science by: 1) designing projects for variable skill levels including entry level, offering multiple trainings in varying formats, and creating opportunities requiring different levels of commitment; 2) ensuring easy to use species identification resources are available (this also relates to Strategy 1); and 3) promoting entry-level, easily accessed opportunities (e.g. eBird and iNaturalist), coupled with supportive materials or

trainings, to anyone new to participatory science and to educators to encourage youth involvement.

Create locally and personally relevant opportunities for participatory science by 1) encouraging groups to adopt-a-site (e.g. their local park) for on-going and varied community science projects, with recommendations for projects that would be a good fit for the site; 2) designing projects around community interests and needs and build the conservation effort off of that, so that it benefits the participating community as well as the organizations involved (e.g. working with a community to restore bluff habitats to help keep timber rattlesnakes out of their yards); 3) developing participatory science opportunities for collection of data around people's homes and promoting the existing opportunities (e.g. Project FeederWatch, Monarch Larva Monitoring Project, Bumble Bee Watch), which also supports Strategy 3; and 4) promoting participatory science opportunities that can be done without leaving one's home (e.g. Zooniverse and iNaturalist).

5. **Ensure that data from participatory science projects may be accessed for research conducted by conservation organizations and academic institutions.**

   Conduct outreach to relevant organizations/institutions to promote the use and application of the data. As a best practice, ensure that the need for data accessibility is balanced with the need to protect species that are most vulnerable/subject to illegal collection or disturbance (e.g. location masking for rare herpetofauna and plants).

Example Species in Greatest Conservation Need: Blanchard's Cricket Frog

The Blanchard's cricket frog (*Acris crepitans*) is Minnesota's only endangered amphibian. Historically, they had a patchy distribution in Minnesota, with populations reported in the extreme southwestern and southeastern corners of the state. In the 1960s, their populations declined drastically for unknown reasons, and they were thought to be extirpated from the state.

In the 1990s, a group of participatory scientists found two very small populations of Blanchard's cricket frogs. For the next 20 years, these were the only known locations of Blanchard's cricket frogs in Minnesota.

In the mid-2010s, DNR biologists and partners began discovering new, small populations of Blanchard's cricket frogs throughout their historic range in Minnesota. Hope for the future of the Blanchard's cricket frog hopped back onto the scene and the Nongame Wildlife Program partnered with HerpMapper and the Amphibian and Reptile Survey of Minnesota to create a Blanchard's Cricket Frog Survey, using participatory scientists to gather more information about this rare amphibian.

Photo: Blanchard's cricket frog, Jeff LeClere

Case Study: Two Minnesota Loon Participatory Science Programs

Minnesota's Loon Restoration Project includes several ways one can help with loon conservation. The Minnesota Loon Monitoring Program and Loon Watcher Survey are excellent examples of participatory science projects that provide long-term tracking of a SGCN, while offering a relevant opportunity to Minnesotans (in this case focusing on Common Loon, the state bird).

Since 1994, more than 1000 volunteers have helped the DNR survey loons with the Minnesota Loon Monitoring Program (MLMP). During a 10-day period in summer, volunteers survey 100 lakes in each of 6 different index areas in the state. The MLMP provides important data to help understand population trends in the state.

For more than 40 years, approximately 200 volunteer Loon Watchers per year have recorded their loon observations on any lake of their choosing in the state. These volunteers survey the same lake(s) repeatedly throughout the season and have provided the Minnesota DNR's Nongame Wildlife Program with data on nesting success, number of loons observed, interesting occurrences and problems that may negatively affect the loons. Data from the Loon Watchers program have been critical for identifying lakes that are relatively unproductive for loons, and candidates for conservation actions and habitat acquisition through the Minnesota Common Loon Restoration Project (as highlighted in Lakes sub-chapter).

Photo: Loon monitoring, USGS

Financial Support

Strategy 7: Cultivate financial support for the conservation of SGCN through the development and promotion of public funding opportunities and public-private partnerships.

Minnesotans care about the outdoors and the state's natural heritage and connecting to that care is imperative for supporting conservation and research for Species in Greatest Conservation Need (SGCN). By building a stronger relationship between the DNR's Nongame Wildlife Program and Minnesotans through targeted partnerships and marketing, we can leverage their support to help SGCN.

The DNR's Nongame Wildlife Program (NWP) leads the conservation of SGCN, with funding from USFWS State Wildlife Grants (SWG), donations to the Nongame Wildlife Fund, Reinvest in Minnesota (RIM) funds that are generated from purchases of Minnesota's critical habitat license plates (see Case Study below) and the Environment and Natural Resources Trust Fund (Minnesota lottery funds made available through competitive grants). The NWP does not receive any 'base funding' from the state and is reliant on this unique blend of private, state, and federal funds, none of which are guaranteed. Donations to the Nongame Wildlife Fund provide essential matching dollars required to receive both SWG and RIM funds. Donations are obtained through direct giving as well as through a 'check-off' option on Minnesota tax forms, in which tax payers can donate a portion of their tax refund.

While the amount of funds from donations has been relatively stable, the number of individual donations to the NWP have been on the decline (see Case Study below). A survey of NWP supporters (Jennings et al., 2024b) found that lack of awareness was the largest barrier for engaging with the program. They found that 52% of respondents had little to no familiarity with the NWP and 75% listed being "unaware of opportunities" as the main barrier to volunteering for participatory science programs and donating to the program. However, after receiving an introduction to the program's work, 60% of respondents were interested in volunteering and 70% were interested in donating.

In addition, wildlife viewers indicated that they were most likely to increase their contributions to the DNR if they knew their funds would be used for the conservation of rare or vulnerable wildlife species or if used to support conservation of the types of wildlife they like to view (Sinkular et al., 2022). This tracks with another finding that having a conservation impact is a primary driver of contributions for the NWP's current and potential donors (Jennings et al., 2025). Therefore, another approach the NWP can take to motivate public support will be highlighting their conservation project work and especially their success stories, instilling confidence and trust around how donations to the Nongame Wildlife Fund benefit SGCN, like the recovery of bald eagles or trumpeter swans or the improved status of peregrine falcons (see Trumpeter Swan Case Study in the Bird Sub-chapter in Chapter 2). It's important to highlight species of relevance to Minnesotans. Species groups to especially highlight include mammals and birds, which most wildlife viewers reported an interest in observing (Sinkular et al., 2022). Another species group to consider highlighting would be native mussels, given their connection to water quality, another strong human conservation value (Duda, 2021).

Recommended Actions for Financial Support

1. **Increase public interest in donating to the Nongame Wildlife Fund with strategic marketing and promotions that expand Minnesotans' familiarity with and connection to the Nongame Wildlife Program's mission to conserve SGCN and their habitats.**

   Develop a marketing plan for the Nongame Wildlife Program that helps communicate the program's goals in a manner that

creates a sense of pride and relevancy and clearly shares how to contribute. Include the following elements within the plan: 1) materials and promotional activities that share the NWP mission, build relationships with future donors, and connect the needs of vulnerable wildlife to Minnesotan's pride in the outdoors and the state's natural heritage; 2) methods to nurture relations with current donors through regular acknowledgment and communications about the NWP; and 3) a survey of Nongame Wildlife Program donors every five years to better understand who they are and evaluate and improve outreach and engagement efforts.

2. **Reinvigorate critical habitat license plate promotions.**
   Promote how the Reinvest in Minnesota Critical Habitat License plate fund benefits the Nongame Wildlife Program and SGCN conservation. Develop updated outreach media and materials and new Critical Habitat License plates, led by the DNR. Collaborate on critical habitat license plate promotions between DNR programs/divisions and other organizations. Increase Minnesotans' understanding about how these plates provide matching dollars to donations for the Nongame Wildlife Fund, Minnesota Biological Survey, and Minnesota's Scientific and Natural Areas, all of which support SGCN and their habitats.

3. **Promote the Nongame Wildlife Fund Tax Check Off and highlight how donating to the Nongame Wildlife Fund benefits SGCN conservation.**

   Develop information products and communication campaigns encouraging Minnesotans to donate to the Nongame Wildlife Fund during the tax season. Work with Certified Public Accountants (CPAs) and other tax professionals to promote the Nongame Wildlife Fund to their clients. Promote the Nongame tax checkoff on corporate tax forms to corporations.

Case Study: Critical Habitat License Plate

The Minnesota Critical Habitat license plate was initiated in 1995 to provide an opportunity for citizens to contribute to conservation of Minnesota's natural resources and show their commitment and individuality with a special vehicle license plate. As of 2025, there are 9 specialty plates featuring both game and nongame wildlife and plant species. Minnesotans can obtain a critical habitat plate with a minimum $30 annual contribution added to their tab renewal. This contribution goes into the Reinvest in Minnesota (RIM) Critical Habitat Program, which provides a two-to-one match for each individual donation made to the Nongame Wildlife Program. Half of the matching funds go to the Nongame Wildlife Fund and the other half go to support the Minnesota Biological Survey and Scientific and Natural Areas, all of which benefit Species in Greatest Conservation Need. In 2024, these plate sales provided 2.3 million for the conservation of SGCN and their habitats.

Example Critical Habitat license plate featuring a rusty patched bumble bee and monarch butterfly; artwork by Minnesota artist Timothy Turenne

4. **Develop relationships with philanthropic organizations and individuals who have an interest in wildlife conservation.**

   Strengthen support for the Nongame Wildlife Program by corporate donors and foundations through researching conservation-inclined philanthropic organizations, relationship building, and the promotion of corporate giving. Leverage existing partnerships and connect with local businesses interested in donating portions of their sales to the Nongame Wildlife Program. Promote the Nongame Wildlife Fund to estate attorneys as an option for planned giving.

5. **Explore new funding mechanisms that could create new revenue streams for the Nongame Wildlife Fund.**

   Collaboration between the Nongame Wildlife Program, local businesses and corporations, and/or the DNR's legislative liaisons to develop new funding mechanisms could generate additional revenue for the Nongame Wildlife Fund.

Case Study: Nongame Wildlife Program Boosts Tax Check-off donations

The Nongame Wildlife Fund has been present on Minnesota state tax forms since 1980. Once a strong source of funding for the Nongame Wildlife Program, donations to the tax checkoff have waned over the last decades. In 2025, the program developed new outreach initiatives for promoting the Nongame Wildlife Fund. Across all advertising platforms, messaging was overhauled to reflect Minnesotan wildlife viewers interest in supporting rare or vulnerable wildlife (Sinkular et al., 2022), coupled with images of wildlife belonging to species groups that they are interested in viewing as found in that same study. The updated and enhanced campaign was a success, resulting in an almost 100% increase in new visitors to the Nongame Wildlife Program's donation webpage and over 500 more direct donations amounting to a $30,000 increase in donations compared to the 2024 campaign period.

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