

Appendix I: Habitat, Fish, and Wildlife

As a result of the Issue Identification Panels, there were **six goals** that emerged in the area of habitat, fish, and wildlife. These six goals were voted on by respondents who participated in the subject matter expert survey.

Table 1. Percent of subject matter experts who prioritized each goal in the area of Habitat, Fish, and Wildlife

	Count	Percent selected
Goal 1. Minnesota has healthy and diverse wildlife populations that sustain and enhance the state's environment, economy, and quality of life.	61	38%
Goal 2. All public and private conservation lands in Minnesota provide long-term, multiple benefits for fish, wildlife, and people.	27	17%
Goal 3. Minnesota lakes, rivers, streams, and wetlands support aquatic biodiversity, including species vulnerable to human impact.	24	15%
Goal 4. Minnesota prevents, detects, and reverses the establishment of aquatic and terrestrial invasive species, and is able to effectively mitigate their negative impacts.	20	12%
Goal 5. The hydrologic function of Minnesota's watersheds supports healthy and diverse biological communities.	19	12%
Other	8	5%
Goal 6. There are diverse and sustainable fisheries and aquatic game populations that are accessible to all Minnesotans for safe consumption.	2	1%
Grand Total	161	100%

Based on feedback received from the subject matter expert survey, Goal 1 was revised to read as: *Minnesota has healthy and diverse wildlife **and plant** populations that sustain and enhance the state's environment, economy, and quality of life.*

Subject matter experts who participated in the Prioritization Panel were asked to review strategies recommended by survey respondents relating to Goal 1. All of the strategies submitted by survey respondents are included in the next section below. Panel participants were invited to revise strategy ideas or come up with their own, and as a group they prioritized five strategies that would be necessary to achieve the goal. Those five strategies, in no particular order, are:

- Monitor the biologic and environmental health of systems through high quality research, to support management of lands and waters.
- Research key issues and develop strategies to combat them (ex. bird/insect crash).
- Species-specific and habitat-level research and management to effectively maintain, protect, and restore habitats and populations.
- Research to inform managing plant, fish, and wildlife communities to adapt to climate change.
- Conservation of additional lands and support for management of currently protected lands.

The following provides the full list of strategies for the area of **Habitat, Fish, and Wildlife** that were recommended by subject matter experts who responded to the survey. They are organized by goal.

Please Note: These strategy recommendations are provided verbatim, as they were submitted through the survey. Therefore, they may contain errors or typos. They have also not been vetted for alignment with the ENRTF mission or charge, and may therefore not be allowable strategies for the ENRTF to pursue or include in its strategic plan.

Goal 1 – which 38% of survey respondents prioritized: Minnesota has healthy and diverse wildlife populations that sustain and enhance the state’s environment, economy, and quality of life.

- Put all proposals in the arena on equal footing, i.e. don't block grant to MAISRC
- Private and industrial lands included in planning process - not just public lands
- Develop a realistic assessment of habitats and their ability to sustain healthy and diverse populations while recognizing that not all aquatic habitats will remain/return to pristine conditions. Using limited resources in a more focused way will ensure better outcomes - even if limited in geographic scope.
- Again, I'm not sure where to start, except to say that maintaining these living resources have multiple benefits as listed in the goal; and developing strategies that can support multiple benefits will require careful and reasonable management.
- Research that supports management related questions
- continue to develop opportunities for the public to enjoy all of the state's natural resources
- Demonstrations
- demonstrating the multiple benefits of wildlife habitat for people (filtering water, recharging groundwater, C storage) to make wildlife issues relevant to everyone, not just those with binoculars or guns.
- The goals over emphasized animals and should also emphasize habitat. Think bigger than producing more fish and deer. Could word as: Minnesota has healthy and diverse wildlife AND PLANT populations that sustain and enhance the state’s environment, economy, and quality of life.
- Research and monitoring
- At some point we may have to give up the fight against invasive species and look at adapting. Many of our native landscapes will not be able to adapt to climate change and invasive species are extremely adaptable. Supporting research that looks at managing plant and wildlife communities to adapt to climate change while accepting invasive species as part of the "community" would be beneficial and could allow us to invest dollars in other areas where we can have a bigger impact..
- Provide funding for habitat restoration projects that can be owned by private entities. Most people dont like selling their ground but still want to make a difference.
- Expand beyond hunters and fishers in your concept of critical stakeholders.
- Best management use of public lands/waters
- ENTRF is a tremendous funding source for applied fish/wildlife research. Since OHF funds cannot be used for these activities; thus, the strategy would be to prioritize these activities ahead of acquisition (OHF eligible)
- Robust investment by LCCMR in on-the-ground conservation outcomes.
- Research and commitment to a HOLISTIC approach for managing MN's lands to maintain the unique biodiversity.
- Continued and improved collaboration between public and private lands conservation programs/goals.
- Quantifying the economic and social benefits of healthy and diverse wildlife populations, and then passing that information on to decision makers
- Changing people's (individuals, consumers, leaders, industry, farmers, etc.) behaviors to positively impact the environment

- Provide funding for studying poorly understood components of Minnesota's biological diversity
- We are all about the water here in MN we have to protect it, and the habitat, but we have to use common sense.
- Increased planning of key habitat corridors and refuges areas for species ranging from pollinators to birds and mammals.
- A concentrated effort to demonstrate success in two or three areas of the state on a large scale would go a long way to convince the majority of landowners to adopt more sustainable practices and approaches. By large scale I'm talking about 10,000 - 40,000 acre efforts not the typical small project by project piecemeal efforts we are currently seeing.
- Maintain viable populations of all of Minnesota's native species
- Fund management of public and private natural areas at higher levels
- Support land protection actions that focus on building corridors and networks of habitat, to help with climate change adaptation.
- Cooperation! I chose this option as I think it encompasses most of the others. We want overall healthy ecosystems that can resiliently adapt to future conditions (that include allowing native species to outcompete invasives, are pinned on hydrology in that both the terrestrial and aquatic communities are considered together, and that vulnerable species are supported).
- Enhance native habitats that support wildlife populations.
- We lack information on many important wildlife populations. Research is key to developing programs to sustain their health and diversity.
- In order to maintain healthy and diverse wildlife populations, we need to actually understand what we do have. There is poor knowledge of most of these elements. We must support surveys and ecological research to establish better baseline information about the status and interactions of Minnesota's species.
- Providing quality habitat is the best way to ensure a healthy and diverse wildlife population, continuing to protect and expand conservation lands is critical to this
- invest in monitoring the health of fish and wildlife populations to be able to detect concerns before they are critical
- Research
- Work with the Division of Forestry to manage the forest age class distribution
- protection of diverse habitats, both terrestrial and aquatic
- Development of hunting opportunities as well as wildlife viewing/non-consumptive tourism (i.e., Map of viewing areas, festivals, etc)
- a combination of research and outreach that focuses on managing many species and educating the public about them.
- This is a cruel choice; I want them all for Minnesota. I chose # 2 in hopes that it encompasses a number of the others (particularly 1,3, 5, 6). To meet this goal we need to look at the bigger picture - what is causing the big drop in bird populations across the US? What is causing the huge crash in insect abundances? How can MN combat these in our state?
- Land protection, restoration, and management
- By prioritizing areas for rehabilitation, a discussion can be started on why some habitats are less prioritized which will create much controversy but may also help the public understand that we cannot fix every wrong - especially not without local buy-in.
- Continued research and trend measurement to clearly indicate changes (good and bad) to help guide decision making.
- Protection/purchase of land in headwater ecosystems
- More youth programs.

- Conservation of additional lands, funds for adequate management of lands currently protected, funds to prevent and manage invasive species
- Habitat restoration
- Increased awareness of private lands to public land benefits and biological diversity
- Exploration by LCCMR in how they can complement OHF and other legacy funds in this arena - not avoid it altogether.
- Development of an integrated multi-disciplinary and multi-agency team (not just DNR) to draft of plan for managing ALL wildlife (not just game species)
- Research/evaluation of existing management plans (e.g., MN Prairie Plan) to ensure that they are as effective as they can be.
- Raising the importance of the effects of aquatic and terrestrial invasive species.
- Species-specific as well as habitat-level in situ and ex situ management and research to effectively maintain, protect, and restore habitats and populations
- Use common sense!
- Ensure that all of Minnesota's native prairies have some level of protection and that they are managed to maintain native species permanently
- Protect more continuous tracts of land create roadless areas
- Projects conducted by interdisciplinary teams that include both terrestrial and aquatic scientist and practitioners. Specific to the ENRTF, one small change could be not having to group projects into either terrestrial or aquatic upon submission, as focusing on a healthy watershed will include both.
- Support non-consumptive research and management on our rare resources.
- More actions plans and resources are needed to support species of conservation concern.
- Remembering that single species management problems are usually the result of broader ecosystem problems. Targeted efforts (while still justified) should keep in mind, and hopefully also inform solutions to larger issues.
- In order to ensure the way we are managing our lands and waters is the best for wildlife, we need to be vigilant in our monitoring of the biologic and environmental health of these systems through high quality research.
- protect critical habitats, educate about invasive species
- Education
- increased attention to wildlife and aquatic habitat in cities and suburbs
- Investigation of wildlife related economic and business opportunities that could be supported in policies and programs
- Getting people engaged with the natural world may be one of the most important ways to ensure the public supports this goal.
- We need to learn to live WITH the natural world. Having strong and diverse biotic populations means living with them, accepting their presence in our midst, and leaving high quality space for them to thrive. This goal cannot be met if we keep gobbling up habitat and land. We must learn to live on less land so that more land can be preserved in a natural state. But no one wants to hear this or do this. How can we move people's attitudes?
- Incorporate high-diversity native plantings into projects for stormwater mitigation, shoreline stabilization, buffers, reclaimed mine lands, snow fences, etc., as appropriate.

Goal 2 – which 17% of survey respondents prioritized: All public and private conservation lands in Minnesota provide long-term, multiple benefits for fish, wildlife, and people.

- Continue to build on successful programs, explore what other States are doing,
- Continued funding in support of conservation land easements.

- Management of areas for habitat are more likely if there is an economic incentive. For example, forest management can provide income but also ensures there are young growth forests for the wildlife that depend on that habitat type.
- Support bringing together community members in local conservation groups to lead and implement programs in their community - it has to be long-term support for on-going groups - not one and done events or meetings
- Support conservation easements on private land.
- Identify gaps and create action plans
- Research that assesses wildlife and fish populations. Management actions that rely on sound science.
- Restoration and Enhancement of Minnesota's most at risk habitats
- expand allowable uses on some public lands
- Invest in restoration and long-term maintenance of restored habitats
- Economic incentives to alternatives to corn production right up to waters edges
- several of these objectives sound the same
- Develop a long term funding strategy for conservation (see Relevancy Roadmap, Association of Fish and Wildlife Agencies).
- I would like to see more research on how to maximize particular benefits and/or optimize habitat to provide multiple benefits. It would be great to bring in social scientists and biologists to address these issues.
- Talk about conservation and benefit--also really like bringing in environment, economy and quality of life
- More an anti-strategy. Way to much ENRTF funds are being putting into individual responsibility of managing aquatic invasives (i.e. boat access monitoring). Until policies are put into requiring boat and trailer manufacturers to design products that do not move invasives (i.e. left over water in trailers and livewells), we are wasting money focusing on inspections.
- Continuing to 'wall off' ENRTF and Legacy funds from distribution to Agencies by legislators - after they cut Agency programs.
- Research and Best Management Practices for Conservation Working Lands
- Invest in research of best management practices and monitoring of outcomes at protected/restored sites
- Advocate for a better Farm Bill that provides lasting conservation (not temporary CRP-like programs).
- Combine two topics and bring it down to a personal level--everyone loves outdoors, nature, wildlife

Goal 3 – which 15% of survey respondents prioritized: Minnesota lakes, rivers, streams, and wetlands support aquatic biodiversity, including species vulnerable to human impact.

- I selected the broadest possible goal since its all connected. Citizens need to be re-educated regarding the benefits of biodiversity.
- education
- Aquatic systems that support biodiversity and represent aquatic health are designated for protection with enhanced state rules.
- Watershed improvements through more wetland restorations and establishing more grass on the landscape.
- We need more research on how to maintain biodiversity in the ace of climate change and other human impacts, and determine which impacts (hydrology, nutrients, habitat connectivity etc.) are the most crucial to address.
- Monitor biodiversity
- Education and research
- Devote adequate resources to non-game species
- Educate the public on the ecosystem services provided by healthy fish and wildlife habitats

- Securing habitat buffers through conservations easements and habitat preserves with private land owners by taking advantage of generational change in farm ownership, with market changes in large natural resource landowners, and with County governments under 1W1P.
- Research focus on vulnerable species and biodiversity linked with education and outreach.
- research
- State conservation funding is directed at the states healthiest yet most vulnerable freshwater systems.
- Work with the ag. community to establish more grass based agriculture on the landscape.
- Support research on reducing human impact aquatic and terrestrial habitats
- Work with farmers to reduce run-off , phosphorus and nitrate pollution
- Combine water quality solutions with habitat conservation solutions for win-win solutions

Goal 4 – which 12% of survey respondents prioritized: Minnesota prevents, detects, and reverses the establishment of aquatic and terrestrial invasive species, and is able to effectively mitigate their negative impacts.

- Research
- The MIASRC has proven to be bottle neck to innovative solutions in invasive species. The center is primarily concerned with funding their own researchers and proposals from outside this sphere are dismissed without adequate peer review or explanation.
- Invasive species impacts all the other goals listed. Terrestrial is proportionally underfunded compared to aquatics considering the scope of the problem.
- Research and testing to find the right methods to mitigate aquatic and terrestrial invasive species.
- Leverage resources from multiple agencies to make bigger-scale impacts.
- Release of GE biocontrol agents to combat invasive species (I am biased on this one)
- Research into mitigation strategies for invasive species and implementation of research findings
- Foster projects that provide practical solutions to invasive species problems
- Educating users on the dangers of spreading invasive species is key in halting the spread of these species from various water bodies has to be a top priority.
- Research, early detection, management implementation and education all required to mitigate ecological and subsequently human health impacts. Targeted areas vary based on invasive however, people are consistent contributors to the spread of invasives (increasing need for education) and simultaneously significantly impacted (increasing need for direct management implementation).
- Fund long-term invasive species removal efforts.
- Support research relevant to Minnesota
- Education and outreach
- Research the impacts of terrestrial invasive plants such as buckthorn on fish and invertebrates in streams, rivers and lakes.
- Support local initiatives to prevent, respond, and monitoring AIS

Goal 5 – which 12% of survey respondents prioritized: The hydrologic function of Minnesota’s watersheds supports healthy and diverse biological communities.

- Increased coordination of multi-agency activities to address issues more holistically
- apply the principles of strategic habitat conservation, that is , focus on habitat protection and management that benefits an array of species, examples include native prairie and other grasslands, wetlands and shallow lakes

- Continue to fund those projects which work to put on the ground projects in the right places.
- Fund community engagement at subwatershed scale to engage diverse stakeholders in conservation targeting and finding locally-driven solutions for water storage. Provide education so citizens better understand the hydrologic impacts on biological communities and clarify what could be done to improve conditions. .
- Retain more water on the land in seasonal and permanent wetlands
- We have streams overflowing and streams drying up because of altered hydrology. Need to find a balance in order to preserve the function of our riparian ecosystems.
- Measure how biological communities each of the 81 watersheds will be affected by projections in climate change data and identify actions to address.
- Getting serious about preventing the movement of invasives.
- Research into how this is quantified
- Acknowledging the relative contributions of agricultural and urban effects on the water balance
- Fund diverse approaches that will lead to more water storage on the landscape. These can include wetland and drained lake bed restorations, storage along ditch systems and multi-purpose drainage management, and support soil health initiatives that promote farmer peer-to-peer learning to advance cover crop and reduced tillage.

Goal 6 – which 1% of survey respondents prioritized: There are diverse and sustainable fisheries and aquatic game populations that are accessible to all Minnesotans for safe consumption.

- Support projects that aim to restore moose. Support projects in Indian country on subsistence species used by MN ojibwe and dakota people.
- Support ecosystem health research projects.

Other goal ideas offered by subject matter expert survey respondents for the area Habitat, Fish, and Wildlife:

- Minnesota has healthy and diverse wildlife populations and habitats that sustain and enhance the state’s environment. (The human dimensions component is mostly addressed on the other three areas, this area should mostly focus on habitats, fish and wildlife)
- All of the above are extremely important, I can't pick just one.
- Maintaining or improving terrestrial and aquatic biodiversity within the state (and region) through habitat improvement on a qualitative and quantitative basis.
- Minnesota's aquatic and terrestrial habitats are managed to anticipate and respond to a changing climate.
- Minnesota aquatic and terrestrial systems support native biodiversity, including species, habitats, and ecological functions and services that are vulnerable to human impact.
- Ensure that significant areas of biodiversity are protected and sustainably managed throughout the state, in every ecological subsection.
- Instead of focusing on wildlife populations we need to focus on landscape level conservation. Without the natural habitat you lose many non-game species(insects, non-game birds etc) and your wildlife populations will not be as adaptable and flexible as the climate changes unless the natural communities are intact and functioning.
- Minnesota protects and enhances its most vulnerable, significant habitat AND reverses the decline in loss of habitat across the state to benefit healthy ecosystems, wildlife and people.

Other strategy ideas offered by subject matter expert survey respondents for the area Habitat, Fish, and Wildlife:

- Climate adaptation strategy, natural environments will change and a proactive approach to assess mitigation and adaptation opportunities is needed.
- Continue to promote outdoor recreation and provide education so that people care enough about the resources that they want to continue to protect and conserve them.
- Addressing loss of critical habitat, habitat fragmentation and species relationships via research and education.
- Advance research and measurement of ecological functions and services and their economic impact.
- Set goals for Minnesota that will help contribute to the United Nations goal of protecting 50% of the world's biodiversity by 2050, and establish a plan that helps to accomplish this.
- Focus on connecting already conserved lands and increasing the amount of land that is permanently conserved. We only have 1% (or less) of our historical prairies in MN left. Secure habitat is the best safeguard for
- Habitat protection, restoration and enhancement.
- Monitoring and evaluation, to increase the long term return of investment the effort to understand the impact of different conservation efforts has to continue. Uncertainty will increase and we cannot just rely on old practices or untested ideas.
- Develop partnerships, and find collaborative funding mechanisms to achieve goals.
- Maintain and enhance investments in Minnesota natural heritage data and information systems sufficient to provide people with the information necessary to achieve sustainable, systems-based conservation and management solutions.
- Use the data from the Minnesota Biological Survey, as well as from other sources, to set statewide goals for protection similar to those already established in the Minnesota Prairie Plan.
- Lots and lots of education to private landowners and in schools (grade 2 on) on the importance of natural and native functioning ecosystems and all the ecosystem services/benefits they provide. EX Runoff reduction, increased water quality, resiliency with storm and flood events, groundwater recharge, healthier soils, pollinator habitat (pollination for crop species), wildlife habitat, unknown future uses (medicines etc) etc.
- Education