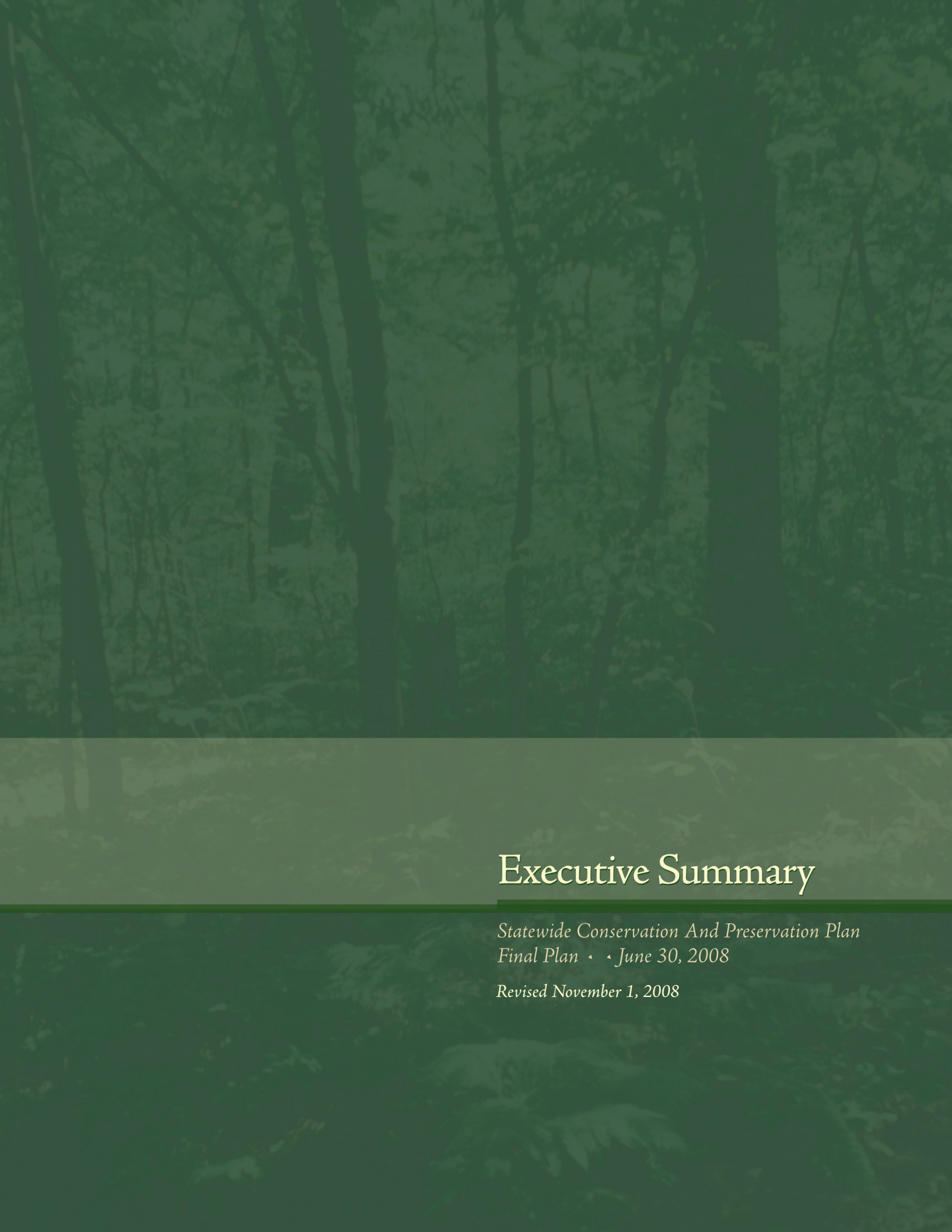

# Executive Summary

*Statewide Conservation And Preservation Plan*
*Final Plan • • June 30, 2008*

*Revised November 1, 2008*

# Executive Summary

The remarkable place known as Minnesota is situated at the convergence of the Great Lakes, the Great Rivers, and the Great Plains. The citizens of Minnesota cherish and take pride in the abundant and varied natural resources of this place. We also value our quality of life and our standard of living, and desire the same for our children. All of these values and desires are intricately connected: continued economic prosperity depends on a healthy and sustainable environment, and vice versa. To foster the conditions we value, we must balance long-term plans for conserving and protecting our priceless natural resources with those for ensuring a healthy public and healthy economy. This document, the Minnesota Statewide Conservation and Preservation Plan (SCPP), lays out a deliberate strategy for doing so in a unified, integrated fashion, that employed an interdisciplinary approach with multiple perspectives and expertise.

The Environmental and Natural Resources Trust Fund funded a unique partnership among the University of Minnesota and the consulting firms of Bonestroo and CR Planning to evaluate the state's natural resources, identify key issues affecting those resources, and make recommendations for improving and protecting them. More than 125 experts, including University scientists and public and private natural resource planners and professionals, participated in the 18-month effort.

The team addressed Minnesota's Constitutionally identified natural resources of air, water, land, wildlife, fish, and outdoor recreation in two distinct phases. In the first phase of the project, the project team assessed the past and present condition of each of these six natural resources. They identified and described (where possible) the drivers of change immediately impacting them, and identified key issues that could be addressed to protect and conserve them in an integrated fashion. This information was published as the Preliminary Plan (http://www.lccmr.leg.mn). In the second phase of the project, the team addressed the key issues in depth, developing recommendations that would positively impact as many natural resources as possible while taking into account demographic change, public health, economic sustainability, and climate change. These recommendations then were synthesized into a framework with five strategic areas. Recommendations were identified as being either policy and action recommendations (those that could be put into effect directly by the legislature) or recommendations that add to our knowledge infrastructure (research needs, data gathering and monitoring needs, or educational activities). This framework and its recommendations were published as the Final Plan (http://www.lccmr.leg.mn). The steps and outcomes for the entire project are shown in Figure 1.

***Preliminary Plan.*** Initially the team identified drivers of change that negatively impact each natural resource. These included both proximate drivers, those that are closest to and have the most direct impact on the resource (e.g., nutrient loading impacting water quality) and higher-order drivers, which are those that are further removed from the resource and impact the resource through other drivers of change (e.g., shoreline development causing the nutrient loading that impacts water quality). The team mapped these relationships among each other, noting that many drivers of change impact multiple resources and a given resource is impacted by multiple drivers of change. Finally, the team used a matrix prioritization process to objectively identify the key issues that, if addressed, would benefit the greatest number of natural resources to the greatest degree. The seven key areas identified were:

- Land and water habitat fragmentation, degradation, loss, and conversion

- Land use practices
- Transportation
- Energy production and use
- Toxic contaminants
- Impacts on resource consumption
- Invasive species

Each of these key issues is more fully described in the Preliminary Plan.

***Final Plan.*** A subset of these issues was chosen for investigation in the second phase of the project. The key issues for which recommendations are made in this report are:

- Land and water habitat fragmentation, degradation, loss, and conversion
- Land use practices
- Transportation
- Energy production and use, and mercury as a toxic contaminant related to energy production

Figure 2 shows the action or policy recommendations for each of the key issues, arranged according to the degree of integrated benefits across all values associated with natural resources. The knowledge infrastructure and mercury recommendations were not evaluated by this process, and are not included in this figure. This gives an overall snapshot of how much integrated value a given recommendation has. For example, the first recommendation under the key issue of habitat has significant impact across the majority of the resource values, and has little impact on air quality and human health. This figure also identifies which recommendations benefit a given resource value the most. For example, habitat and land use–forestry recommendations have the most impact on biodiversity.

The Final Plan is organized in such a way as to take the reader through the project evolution in great detail. Following this Executive Summary and an Introduction section, the overall Strategic Framework is presented and described (also see below) to provide a context for the series of sections that follow, in which each of the key issues is described in detail. The section on land and water Habitat Recommendations contains a unique approach to priority mapping that combines geo-spatial data on a series of stress indicators that culminate in maps showing areas of the state with highest water and land habitat quality superimposed with areas of highest ecological stress. These maps help decision makers and natural resource managers prioritize which parts of the state to protect, conserve, or restore in order to best address our water and habitat natural resources. The Land Use Recommendations section is organized around three main types of land use, including urban/community land use practice, agricultural land use practice, and forest land use practice. Recommendations focus on water management, crop management, low impact development, and adoption of best practices for all types of land use. This is followed by a section on Transportation Recommendations, which stresses how transportation development choices are interwoven with land use choices, and have multiple impacts on water quality, habitat fragmentation, energy use, and air quality. This section also recognizes the current inefficiencies in permitting for transportation projects. The next section on Energy Recommendations focuses specifically on the strategies for renewable energy and conservation practices that will reduce dependence on fossil fuels and promote environmental co-benefits. It also links these recommendations directly to promoting a health economy. This section also addresses how decreases in fossil fuel use might change mercury emissions in the state, and how changes in these emissions translate to changes in concentrations of this toxic chemical in fish as a result.

The Final Plan contains nine appendices. The first contains a list of the recommendations that resulted from the Preliminary Plan; the second contains a list of the project participants and their affiliations; the third is a detailed report on the mercury assessment referenced in the Energy Recommendations section; the fourth is a summary of a study that predicts the future impacts of climate change on biodiversity in

Minnesota; the fifth is a cost benefit analysis of 7 of the major recommendations; the sixth is the result of an expert panel discussion of the value and investment prioritization of the action and policy recommendations; the seventh is a summary of the public engagement and outreach efforts and a summary of the public comments; the eighth is a list of the sources used in preparing the Plan; and the ninth is a short description of each of the recommendations in the Final Plan.

## The Strategic Framework

The collection of recommendations was organized into a comprehensive framework, the Strategic Framework for Integrated Resource Conservation and Preservation, as shown in Figure 3. The five strategic areas of the framework identified at the top of the five boxes, are:

- Integrated Planning
- Critical Land Protection
- Land and Water Restoration and Protection
- Sustainability Practices
- Economic Incentives for Sustainability

Recommendations for each of these strategic areas are listed within a given box. Action or policy recommendations are at the top, with recommendations having the broadest impact across multiple resources listed first, followed by those that are more targeted or specific in their scope. Recommendations for building the knowledge infrastructure for that strategic area are at the bottom of the box. All of these recommendations are described in detail in the Final Plan.

This framework is a comprehensive and integrated environmental strategic plan. The recommendations taken together provide a holistic look, and are not meant to be viewed in isolation or to be acted on in a piecemeal fashion. Each of the strategic areas is summarized below.

## Strategic Areas

### *Integrated Planning*

Natural resource management is interwoven within a larger fabric of economic health, complex regulatory frameworks, human health, and changing demographics and climate. No one agency can address this comprehensively, nor can it be done in individual agency stovepipes. In addition, there are multijurisdictional responsibilities on the geographic scale, from communities to small units of government to soil and watershed districts to statewide agencies.

Planning, whether for transportation, energy, community development, water resources, agriculture, or forestry, should be integrated across all agencies and across the multijurisdictional scale. Doing so can make planning more efficient by removing redundancies. Our strongest, most effective federal environmental laws require cross-agency review or partnership, and this approach should be embraced on the state level for holistic natural resource protection.

Our recommendations address land use practices, transportation policy, and energy production and use policy as related to natural resource protection. For example, we specifically recommend the development of a state land use, development, and investment guide to align investment objectives across social, environmental, and economic sectors. We recommend that the state embrace a conservation-based community planning approach. Enhanced cross-consultation in governance and planning for transportation, land development, and energy projects is essential for protecting and conserving our natural resources.

## *Critical Land Protection*

Be it farmland, wetlands, greenways in urban areas, or forestland, a clear and comprehensive strategy must be developed that establishes long-term and short-term protection and acquisition priorities. An array of perspectives should inform this strategy, integrating needs for biodiversity protection, critical agricultural land protection, ecological services, recreational opportunities, and opportunities for climate change adaptation and/or mitigation.

This strategy should build on the excellent work already accomplished by the DNR critical habitat studies, the Metro and Outstate Conservation Corridors initiatives, and the work of many nonprofit land-protection organizations.

Our recommendations in this strategic area focus on the protection by easement or acquisition of critical stream and lake shorelines, priority land habitats, and large blocks of forestland.

## *Land and Water Restoration and Protection*

This strategic area addresses both the restoration of critical land and water habitat and the protection of strategic land and water habitat that has not yet been degraded. It not only addresses the inherent and intrinsic direct benefits of habitat restoration and protection, but also emphasizes the benefits of such strategy for strengthening biodiversity and enhancing resilience to climate change. The recommendations in this area reinforce and strengthen Minnesota cultural values, ethics, appreciation of outdoor recreation, and economic health.

The recommendations include specific actions to restore shallow lakes, wetlands and wetland associated watersheds, and the habitats contained within lakes and rivers, as well as actions to protect critical landscapes.

## *Sustainability Practices*

A healthy environment requires a healthy economy, and a sustainable economy requires a sustainable environment. To reach both goals requires promoting, facilitating, encouraging, and regulating practices that will lead to a sustainable environment and economy. These sustainable practices must cross multiple fronts - sustainable agriculture, sustainable forestry, sustainable water resources, and sustainable economy and standard of living - all in the context of energy production, shifting demographics, and climate change.

Specific recommendations promote the sustainable management of forestlands and action to keep water on the landscape. These include reviewing drainage policy and actions to move water more slowly across and through the landscape to return to more natural conditions to reduce flooding, improving water quality, and improving biological diversity through habitat protection.

## *Economic Incentives for Sustainability*

Moving toward sustainable practice requires specific incentives to move the state and its citizens and stakeholders in a transformative direction. These are broad-scale ideas for achieving a sustainable economy specifically through natural resource policies: Energy policy, agricultural policy, forestry policy, and transportation policy can be used to grow and nurture Minnesota's economic future. For example, the team recommends the development and implementation of incentive programs to develop renewable energy programs and to promote a successful transition of Minnesota's vehicle fleet to electric power.

Minnesotans share a vision for a healthy and sustainable future. This framework of strategic recommendations is a collective roadmap for moving forward to achieve this future. We hope that the citizens, resource managers, and policy-makers of the state embrace this opportunity to deliberately protect and conserve Minnesota's remarkable natural resources before they are futher degraded or lost.

*Figure 1. Process and outcomes of the Statewide Conservation and Preservation Plan*

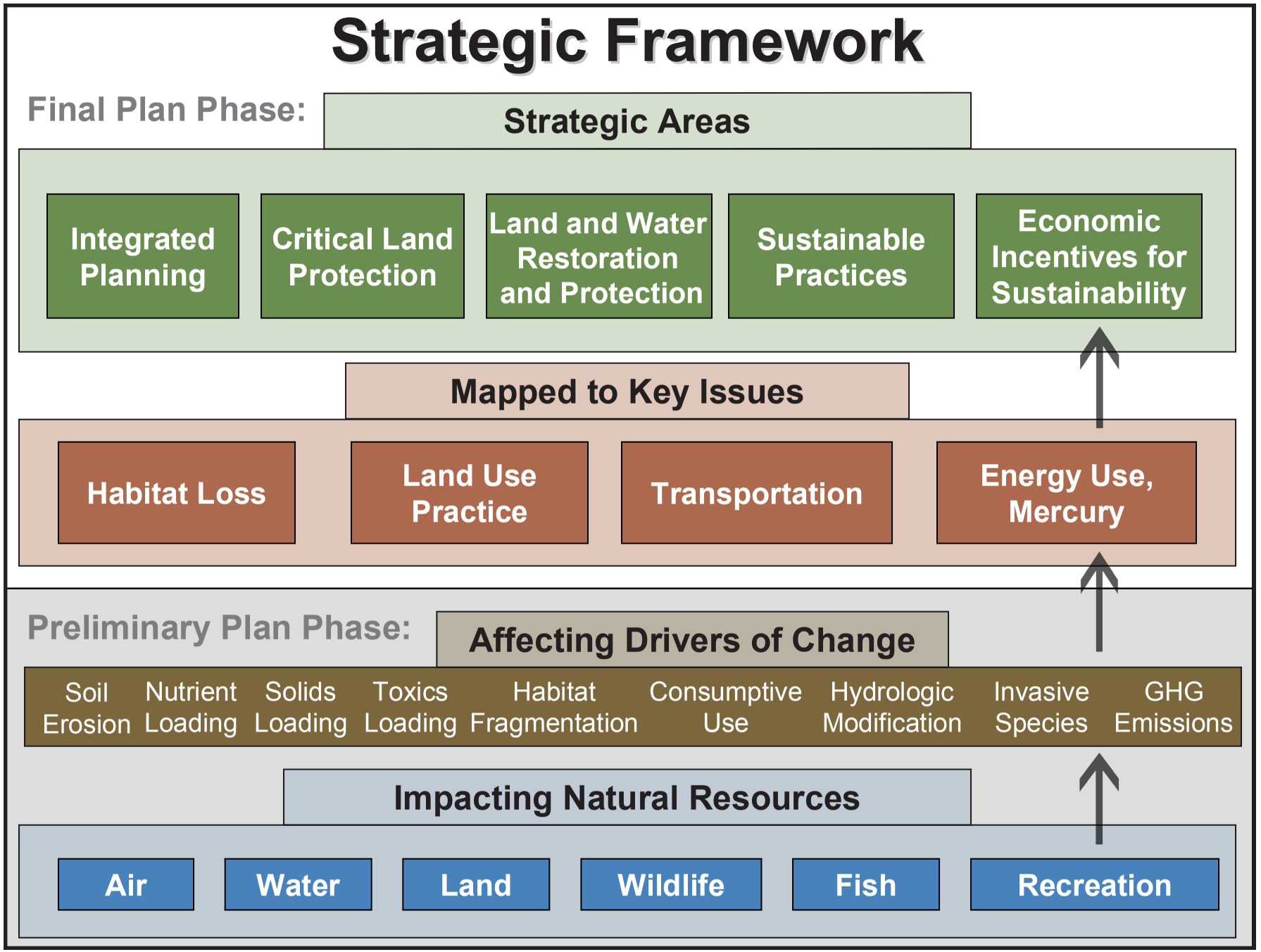

*Figure 2. Natural resource values assessment of policy and action recommendations*

# Natural Resource Values Assessment of Recommendations

**LEGEND:** ● = Critical Impact ◑ = Significant Impact ○ = Negligible Impact

| | Number | Recommendation | Air Quality | Water Quality/Quantity | Terrestrial Habitat Quality | Soil/Land Quality | Human Health | Biodiversity | Community Health | Aquatic Economic Health | Recreational/Cultural/ Spiritual/Aesthetic Value | Climate Change Mitigation/Adaptation | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HABITAT | H2 | Protect critical shoreland of streams and lakes | ○ | ● | ● | ● | ○ | ● | ● | ● | ● | ● | |
| | H1 | Protect priority land habitats | ○ | ● | ● | ● | ○ | ● | ● | ◑ | ● | ● | |
| | H4 | Restore and protect shallow lakes | ○ | ● | ● | ◑ | ○ | ● | ● | ● | ● | ◑ | |
| | H5 | Restore land, wetlands and wetland-associated watersheds | ○ | ● | ◑ | ◑ | ◑ | ● | ● | ◑ | ● | ● | |
| | H6 | Protect and restore critical in-water habitat of lakes and streams | ○ | ● | ◑ | ◑ | ◑ | ● | ● | ◑ | ● | ● | |
| | H7 | Keep water on the landscape | ○ | ● | ◑ | ● | ○ | ● | ● | ◑ | ◑ | ● | |
| | H8 | Review and analyze drainage policy (ditch laws) | ○ | ● | ◑ | ● | ○ | ◑ | ● | ◑ | ◑ | ● | |
| | H3 | Improve connectivity and access to recreation | ○ | ○ | ◑ | ○ | ● | ◑ | ○ | ● | ● | ○ | |
| LAND USE | LU1 | Fund and implement a state Land Use Development and Investment Guide | ◑ | ● | ● | ◑ | ◑ | ◑ | ● | ● | ● | ● | |
| | LU2 | Support local and regional conservation-based community planning | ◑ | ● | ● | ◑ | ◑ | ◑ | ● | ● | ● | ● | |
| | LU3 | Ensure protection of water resources in urban areas | ○ | ● | ○ | ◑ | ○ | ◑ | ● | ◑ | ◑ | ◑ | |
| | LU4/E4 | Transition renewable fuel feedstocks to perennial crops | ○ | ● | ◑ | ● | ○ | ◑ | ● | ● | ◑ | ◑ | |
| | LU5 | Reduce streambank erosion through reduction in peak flows | ○ | ● | ◑ | ● | ○ | ◑ | ● | ◑ | ◑ | ◑ | |
| | LU6 | Reduce upland and gully erosion through soil conservation practices | ○ | ● | ◑ | ● | ○ | ◑ | ● | ◑ | ◑ | ◑ | |
| | LU8 | Protect large blocks of forest land | ○ | ◑ | ● | ● | ○ | ● | ◑ | ● | ● | ● | |
| | LU10 | Support and expand sustainable practices on working forested lands | ○ | ◑ | ● | ● | ○ | ● | ◑ | ● | ● | ● | |
| TRANSPORTATION | T1 | Align transportation planning across all agencies; streamline and integrate environmental transportation project review | ● | ◑ | ◑ | ◑ | ● | ◑ | ◑ | ● | ● | ● | |
| | T2 | Reduce per capita vehicle miles of travel | ◑ | ◑ | ◑ | ○ | ◑ | ○ | ○ | ◑ | ◑ | ◑ | |
| | T3 | Develop and implement transportation polices that minimize impacts on natural resources | ○ | ● | ◑ | ○ | ○ | ◑ | ● | ◑ | ◑ | ◑ | |
| ENERGY | E1 | Develop coordinated laws, policies and procedures across state agencies | ◑ | ● | ● | ● | ◑ | ◑ | ● | ● | ◑ | ● | |
| | E13 | Invest in research and policies for "green payment" program | ○ | ● | ● | ● | ○ | ● | ● | ○ | ◑ | ● | |
| | E17 | Promote policies and incentives that encourage C-neutral businesses, homes, communities and other institutions | ● | ◑ | ◑ | ◑ | ◑ | ◑ | ◑ | ● | ◑ | ● | |
| | E2 | Invest in farm and forest preservation to prevent fragmentation due to development | ○ | ◑ | ● | ● | ○ | ◑ | ◑ | ◑ | ◑ | ◑ | |
| | E18 | Implement policies and incentives to lower energy use of housing stock | ◑ | ◑ | ○ | ○ | ● | ○ | ◑ | ● | ◑ | ● | |
| | E16 | Provide incentives to transition a portion of Minnesota's vehicle fleet to electrical power and renewable electricity production | ● | ◑ | ○ | ○ | ● | ○ | ○ | ◑ | ○ | ● | |
| | E21 | Develop standards and incentives for energy capture from municipal sanitary and solid waste, and minimize landfill options | ◑ | ◑ | ○ | ○ | ◑ | ○ | ◑ | ◑ | ◑ | ◑ | |
| | E19 | Promote policies and strategies to implement smart meter and smart grid technologies | ◑ | ○ | ○ | ○ | ◑ | ○ | ○ | ● | ◑ | ● | |
| | E14 | Investigate opportunities to provide tax incentives for individual renewable energy investors | ◑ | ◑ | ○ | ○ | ◑ | ○ | ○ | ◑ | ○ | ● | |
| | E20 | Develop incentives to encourage widespread adoption of passive solar and shallow geothermal heat pumps in new construction | ◑ | ◑ | ○ | ○ | ◑ | ○ | ○ | ◑ | ○ | ● | |
| | E15 | Invest in efforts to develop community-based energy platforms | ○ | ◑ | ○ | ○ | ○ | ○ | ○ | ● | ◑ | ◑ | |

Note: Policy and action recommendations are grouped by topic (Habitat, Land Use, etc.) and then ordered starting with those recommendation having the broadest impact across multiple resource values followed by those having more targeted impact.

# Strategic Framework For Integrated Resource

| INTEGRATED PLANNING (IP) | | CRITICAL LAND PROTECTION (LP) | | LAND AND WATER RESTORATION AND PROTECTION (RP) | |
|---|---|---|---|---|---|
| **Rec. No.** | **Broad Policy and Action Recommendations** | **Rec. No.** | **Broad Policy and Action Recommendations** | **Rec. No.** | **Broad Policy and Action Recommendations** |
| **E1** | Develop coordinated laws, policies and procedures across state agencies | **H2** | Protect critical shorelands of streams and lakes | **H4** | Restore and protect shallow lakes |
| **LU1** | Fund and implement a state Land Use Development and Investment Guide | **H1** | Protect priority land habitats | **H5** | Restore land, wetlands, and wetland-associated watersheds |
| **LU2** | Support local and regional conservation-based community planning | **LU8** | Protect large blocks of forest land | **H6** | Protect and restore critical in-water habitat of lakes and streams |
| **T1** | Align transportation planning across all agencies; streamline and integrate environmental transportation project review | | | | |
| **E23** | Develop mercury reduction strategies for out-of-state sources | | | | |
| **Rec. No.** | **Targeted Policy and Action Recommendations** | **Rec. No.** | **Targeted Policy and Action Recommendations** | **Rec. No.** | **Targeted Policy and Action Recommendations** |
| **LU3** | Ensure protection of water resources in urban areas | **E2** | Invest in farm and forest preservation to prevent fragmentation due to development | **LU5** | Reduce streambank erosion through reduction in peak flows |
| **T3** | Develop and implement transportation polices that minimize impacts on natural resources | **H3** | Improve connectivity and access to recreation | **LU6** | Reduce upland and gully erosion through soil conservation practices |
| | | | | | |
| | | | | | |
| **Rec. No.** | **Knowledge Infrastructure Recommendations** | **Rec. No.** | **Knowledge Infrastructure Recommendations** | **Rec. No.** | **Knowledge Infrastructure Recommendations** |
| **LU2C** | Provide communities with the tools and technical assistance for conservation-based planning | **H9** | Invest in overall research on land and aquatic habitats | **H10** | Invest in research on near-shore aquatic habitat vulnerability |
| **E24** | Continue state enforcement programs to reduce mercury contamination of the environment | **T3A** | Develop research programs in habitat fragmentation | **H11** | Improve understanding of groundwater resources |
| **LU3B** | Simplify modeling for TMDLs | **LU9** | Assess tools for forest land protection | **LU5A** | Invest in research that quantifies the relationship between artificial drainage and stream flows |
| **LU3C** | Monitor TMDL BMP implementation | | | **H12** | Improve understanding of watershed responses to multiple drivers of change |
| **LU2D** | Invest in databases and tools needed to support land use and conservation decisions | | | **E11** | Invest in research and enact policies to protect existing prairies from genetic contamination |
| **LU2A** | Fund demonstration projects for conservation-based community planning | | | **LU10E** | Develop and test new management policies to test ecosystem resilience |
| | | | | **H13** | Encourage conservation education and training programs for all MN citizens |
| | | | | **E12** | Invest in efforts to develop sufficient seed stocks for large scale plantings of perennial crops |
| | | | | **LU3D** | Expand water quality media campaign |

*Figure 3. Strategic framework for integrated resource conservation and preservation*

# Conservation And Preservation

| SUSTAINABLE PRACTICES (SP) | | | | ECONOMIC INCENTIVES FOR SUSTAINABILITY (ES) | |
|---|---|---|---|---|---|
| **Rec. No.** | **Broad Policy and Action Recommendations** | | | | |
| LU10 | Support and expand sustainable practices on working forested lands | | | | |
| H7 | Keep water on the landscape | | | | |
| H8 | Review and analyze drainage policy (ditch laws) | | | | |
| T2 | Reduce per capita vehicle miles of travel | | | | |
| | | | | | |
| **Rec. No.** | **Targeted Policy and Action Recommendations** | **Rec. No.** | **Targeted Policy and Action Recommendations** | **Rec. No.** | **Targeted Policy and Action Recommendations** |
| E13 | Invest in research and policies for "green payment" program | E19 | Promote policies and strategies to implement smart meter and smart grid technologies | E16 | Provide incentives to transition a portion of Minnesota's vehicle fleet to electrical power and renewable electricity production |
| E17 | Promote policies and incentives that encourage C-neutral businesses, homes, communities, and other institutions | E20 | Develop incentives to encourage widespread adoption of passive solar and shallow geothermal heat pumps in new construction | E21 | Develop standards and incentives for energy capture from municipal sanitary and solid waste, and minimize landfill options |
| LU4/E4 | Transition renewable fuel feedstocks to perennial crops | E15 | Invest in efforts to develop community-based energy platforms | E14 | Investigate opportunities to provide tax incentives for individual renewable energy investors |
| E18 | Implement policies and incentives to lower energy use of housing stock | | | | |
| **Rec. No.** | **Knowledge Infrastructure Recommendations** | **Rec. No.** | **Knowledge Infrastructure Recommendations** | **Rec. No.** | **Knowledge Infrastructure Recommendations** |
| E3 | Invest in perennial biofuel crop research and demonstration projects on a landscape scale | E22 | Invest in public education focusing on benefits and strategies for energy conservation | | |
| E6 | Invest in research to determine removal rates of corn stover and to establish incentives and BMPs | E25 | Develop public education on actions that individuals and communities can take to reduce mercury contamination of the environment | | |
| E7 | Invest in research to review thermal flow maps | LU7 | Invest in statewide high resolution digital elevation data, watershed delineation, maps of artificial drainage network, and other data to support decision making | | |
| E8 | Invest in applied research to reduce energy and water consumption and emissions in ethanol plants | LU10B | Educate landowners and forest managers on BMPs to protect working forests | | |
| E9 | Invest in research to determine the life cycle impacts of renewable energy production systems | | | | |
| E10 | Invest in research and demonstration projects to develop, and incentives to promote, combination electricity production projects | | | | |
| T3B | Reduce non-point source pollution to surface and ground waters from transportation infrastructure | | | | |
| LU4A | Invest in research on parameters that control successful perennial feedstocks | | | | |
| E5 | Invest in data collection to support energy production assessment | | | | |

Note: Recommendations having the broadest impact across multiple resources are listed first in each column followed by those having more targeted impact, and supported by knowledge infrastructure recommendations.

The following icons are used throughout the plan to quickly identify recommendations by type:


**Integrated Planning Recommendations**


**Critical Land Protection Recommendations**


**Land and Water Restoration and Protection Recommendations**


**Sustainable Practices Recommendations**


**Economic Incentives for Sustainability**