

**Environment and Natural Resources Trust Fund
2010 Request for Proposals (RFP)**

LCCMR ID: 144-E2

Project Title:

Climate Variability Impact Assessment for Habitats/Species

LCCMR 2010 Funding Priority:

E. Natural Resource Conservation Planning and Implementation

Total Project Budget: \$ \$765,000

Proposed Project Time Period for the Funding Requested: 3 years, 2010 - 2013

Other Non-State Funds: \$ N/A

Summary:

This project will assess habitats and wildlife species with respect to climate variability sensitivity by apply global climate models to assess potential changes in Minnesota plant communities and aquatic resources.

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Sponsoring Organization: DNR

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Web Address:

Location:

Region: Statewide

County Name: Statewide

City / Township: Statewide

_____ Knowledge Base	_____ Broad App.	_____ Innovation
_____ Leverage	_____ Outcomes	
_____ Partnerships	_____ Urgency	_____ TOTAL

PROJECT TITLE: Climate Variability Impact Assessment for Habitats and Species

I. PROJECT STATEMENT

During the next 100 years average summer and winter temperatures in Minnesota are predicted to increase while precipitation is projected to decline during the summer but increase overall (Kling et al 2003, IPCC 2007). Increasing temperatures and declining soil moisture during summer will have dramatic effects on plant communities (Carstensen et al. 2008). The *LCCMR Statewide Conservation and Preservation Plan* (2008) indicates that climate variability will alter most landscapes and watersheds in Minnesota and that conservation and preservation of the state's living resources must now include adaptation to a certain amount of climate change. Galatowitsch et al (2008) further report in the *LCCMR Statewide Conservation and Preservation Plan* that adaptation planning for biodiversity has received little attention despite the high likelihood of ecosystem changes.

The goal of this project is to develop a tool that can be used with current and future climate and vegetation models to assess the effects of climate variability on plant communities and wildlife species in Minnesota. Results of these analyses will be used to:

- update habitat and species management plans (e.g., State Wildlife Action Plan, game species plans),
- identify habitat and population monitoring and research needs,
- evaluate current habitat and population management approaches,
- develop effective approaches for strengthening resilience and supporting ecosystem transitions.

The objectives of the project are:

1. assess habitats and wildlife species with respect to climate variability sensitivity,
2. apply global climate models to assess potential changes in Minnesota plant communities and aquatic resources,
3. develop overall vulnerability assessment by evaluating habitat and species climate change impacts,
4. disseminate information and products on DNR website and through workshops.

Results from the current LCCMR funded proposal "Projecting Environmental Trajectories for Energy-Water-Habitat Planning" (Peter Reich, UM), "Adapting Aquatic Resource Management to Climate Change" (Lucinda Johnson, UM) and other modeling (e.g., Galatowitsch et al. in press *Conservation Biology*) will be important components of this project. Additional vulnerability assessments for impacts on key systems and critical ecological services will occur with the development of regional climate models.

II. DESCRIPTION OF PROJECT RESULTS

Result 1: *Create or update species and plant community databases*

Budget: \$ 187,500

Databases will be created that include assessments of climate variability sensitivities for plant communities and wildlife species (approximately 500 – 600 species). Sensitivity of plant communities and individual species will be determined based on characteristics such as hydrological sensitivities and effects of invasive species for plant communities; physiology, specific habitat requirements, and dispersal ability for species. Experts will be consulted to review results and identify habitats and species most sensitive to climate variability.

Deliverable

1. *Create database for climate sensitivity assessments*
2. *Rank vulnerability for plant communities and species*

Completion Date

*June 2011
December 2011*

Result 2: *Assess potential spatial distribution changes for plant communities and species* **Budget:** \$ 255,000

Utilizing downscaled global circulation to generate regional/state climate, abiotic, and vegetation scenarios, potential impacts will be simulated for resource targets including native plant communities, sensitive species (e.g., temperature sensitive, water sensitive, dispersal limited and endangered/threatened/special concern species), recreational resources (e.g., nongame and harvested species), and invasive species.

Deliverable

1. Describe potential temperature and precipitation scenarios for Minnesota
2. Description of potential plant community/habitat range changes, native and invasive species range changes

Completion Date

June 2011
December 2012

Result 3: Develop integrated vulnerability assessment**Budget:** \$ 187,500

Assess relative risk of climate induced changes to plant communities/habitats and wildlife species including an analysis of uncertainties associated with each result.

Deliverable

1. Summarize and describe climate variability sensitivities for habitats and species including methodology, assumptions, and uncertainties
2. Summarize and describe potential impacts for habitats and species including methodologies, assumptions, uncertainties; identify habitats/ species at greatest risk

Completion Date

June 2012
December 2012

Result 4: Disseminate vulnerability assessment findings and information.**Budget:** \$ 135,000

Vulnerability assessment information, products, and tools will be made available on DNR website and through workshops for natural lands and population managers, land use planners, policy makers, and stakeholders. Workshops will be targeted for managers and planners updating and using the State Wildlife Action Plan and other species and habitat management plans.

Deliverable

1. Summary of information needs for resource managers and land use planners regarding climate variability adaptation strategies
2. Customize products and tools for DNR website and workshops for resource managers and planners, policy makers, and stakeholders

Completion Date

December 2010
June 2013

III. PROJECT STRATEGY**A. Project Team/Partners**

An interdisciplinary team carrying out this project will include: (1) DNR Division of Ecological Resources project manager, (2) contractors with experts in ecological sensitivity assessments and state of the art climate and ecological modeling responsible for creating climate sensitivity databases and climate and vegetation models (e.g., Sue Galatowitsch , Lucinda Johnson, Peter Reich; University of Minnesota). (3) DNR managers with expertise in ecological systems, fish and wildlife management, and geographic information systems to review methodologies and results; and (4) a content delivery specialist responsible for optimizing distribution of content and products for land use planners, habitat and species managers, and interested stakeholders. DNR primary proposal contacts: (1) Ann Pierce, Ph.D.; Ecological Resources, Conservation Management/Rare Resource Unit; Ann.Pierce@dnr.state.mn.us ; 651-259-5119; (2) Kathy DonCarlos; Fish and Wildlife, Policy/Planning Unit; Kathy.doncarlos@dnr.state.mn.us ; 651-259-5201

B. Timeline Requirements

The timeline for this project is estimated to be 3 years. In order to complete the project in a timely fashion, work for all 4 objectives will be scheduled in an overlapping manner.

C. Long-Term Strategy

DNR managers need to conduct additional vulnerability assessments for climate variability impacts on key systems such as watersheds, wetlands, lakes, rivers, streams, subsurface aquifers and critical ecological services such as watershed functions, pollination and pest control, soil generation and fertility, and natural resource based recreation. This vulnerability assessment proposal focuses on biodiversity and habitats as a high priority target area with results that will directly benefit those managing and conserving Minnesota's natural habitats and populations. Regional climate models will support vulnerability assessments for these other ecological systems and functions.

Project Budget - Climate Variability Impact Assessment for Habitats and Species

Attach budget, in MS-EXCEL format, to your "2010 LCCMR Proposal Submit Form".

IV. TOTAL PROJECT REQUEST BUDGET (3 years)

BUDGET ITEM <i>(See list of Eligible & Non-Eligible Costs, p. 13)</i>	AMOUNT
Personnel:	\$ -
1 fte Project Coordinator: 3 years; 80% salary:20% benefits	\$ 300,000
	\$ -
Contracts:	\$ -
Result 1: University of MN work plan under existing master contract	\$ 110,000
Result 2: University of MN work plan under existing master contract	\$ 170,000
Result 3: University of MN work plan under existing master contract	\$ 110,000
Result 4: University of MN work plan under existing master contract	\$ 40,000
Equipment/Tools/Supplies:	\$ -
Computer	\$ 3,000
Telephone/internet access	\$ 1,000
Acquisition (Fee Title or Permanent Easements): <i>In this column, indicate the proposed # of acres and who will hold title (e.g. DNR, Non-profit).</i>	NA
Travel:	\$ -
In-state travel: technical expert meetings	\$ 3,000
Out-of-state travel: regional interstate coordination	\$ 3,000
Additional Budget Items:	\$ -
Website and workshop technical services and printing	\$ 25,000
TOTAL PROJECT BUDGET REQUEST TO LCCMR	\$ 765,000

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period:	NA	
Other State \$ Being Applied to Project During Project Period:	NA	
In-kind Services During Project Period:	\$ -	
1200 hours (i.e. DNR and nonprofit staff) technical guidance over 3 years	\$ 18,000	
Remaining \$ from Current Trust Fund Appropriation (if applicable):		
Funding History:	NA	

Pre-Settlement Vegetation

Current Vegetation/Species

Predicted Future Vegetation/Species

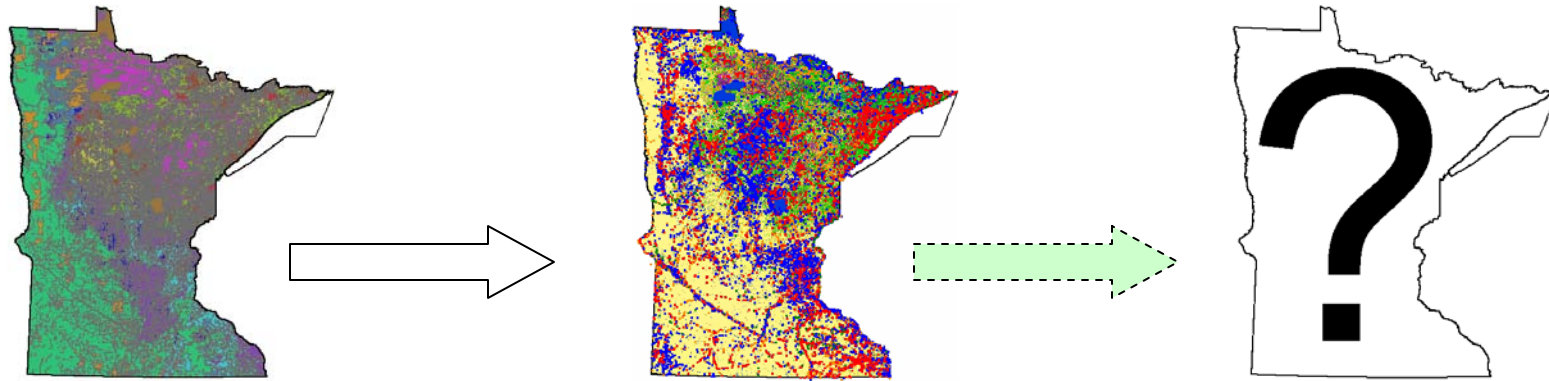


Figure1. This figure illustrates the changes in vegetation cover experienced since the 1890s mainly due to land use changes. Currently Minnesota's native plant communities and species are vulnerable to a myriad of pressures including shifts in temperature and precipitation due to climate change. At present our understanding of these vulnerabilities is limited. This project will provide us with needed information on species and plant community vulnerabilities so we can manage appropriately for these future scenarios.

Project Manager Qualifications:

Ann Pierce currently works at the Supervisor of the Conservation Management and Rare Resources Unit of the Division of Ecological Resources with the Minnesota Department of Natural Resources. As supervisor Ann oversees statewide conservation efforts related to rare species and habitats. Ann previously worked as the Terrestrial Invasive Species Coordinator in the Invasive Species Unit and Southeast Regional Plant Ecologist in the Heritage Unit of the Division of the Division of Ecological Resources with the Minnesota Department of Natural Resources.

Ann received her Ph.D. in Conservation Biology with a focus in Forest Ecology from the University of Minnesota, her Masters of Science in Forest Ecology from the University of Wisconsin, and her Bachelor of Science in Genetics and Cell Biology from the University of Minnesota.

Organization Description:

The Department of Natural Resources mission is to:

- conserve and manage the state's natural resources;
- provide outdoor recreation opportunities; and
- provide for commercial uses of natural resources; in ways that create a sustainable quality of life.