



High Resolution Climate Projections to Aid Planning Efforts

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UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

Iconic Species



Fertile Farmland



Swimmable and Fishable Lakes and Rivers



Productive Forests



Human Health



Stormwater/Sewer Infrastructure



Energy Infrastructure



Roads and Bridges



Sustainable Cities and a Robust Economy



Why is this project necessary?

State agencies, local governments, citizens, and the private sector need detailed climate model projections to make informed adaptation decisions that benefit Minnesota's natural environment and socio-economic activities

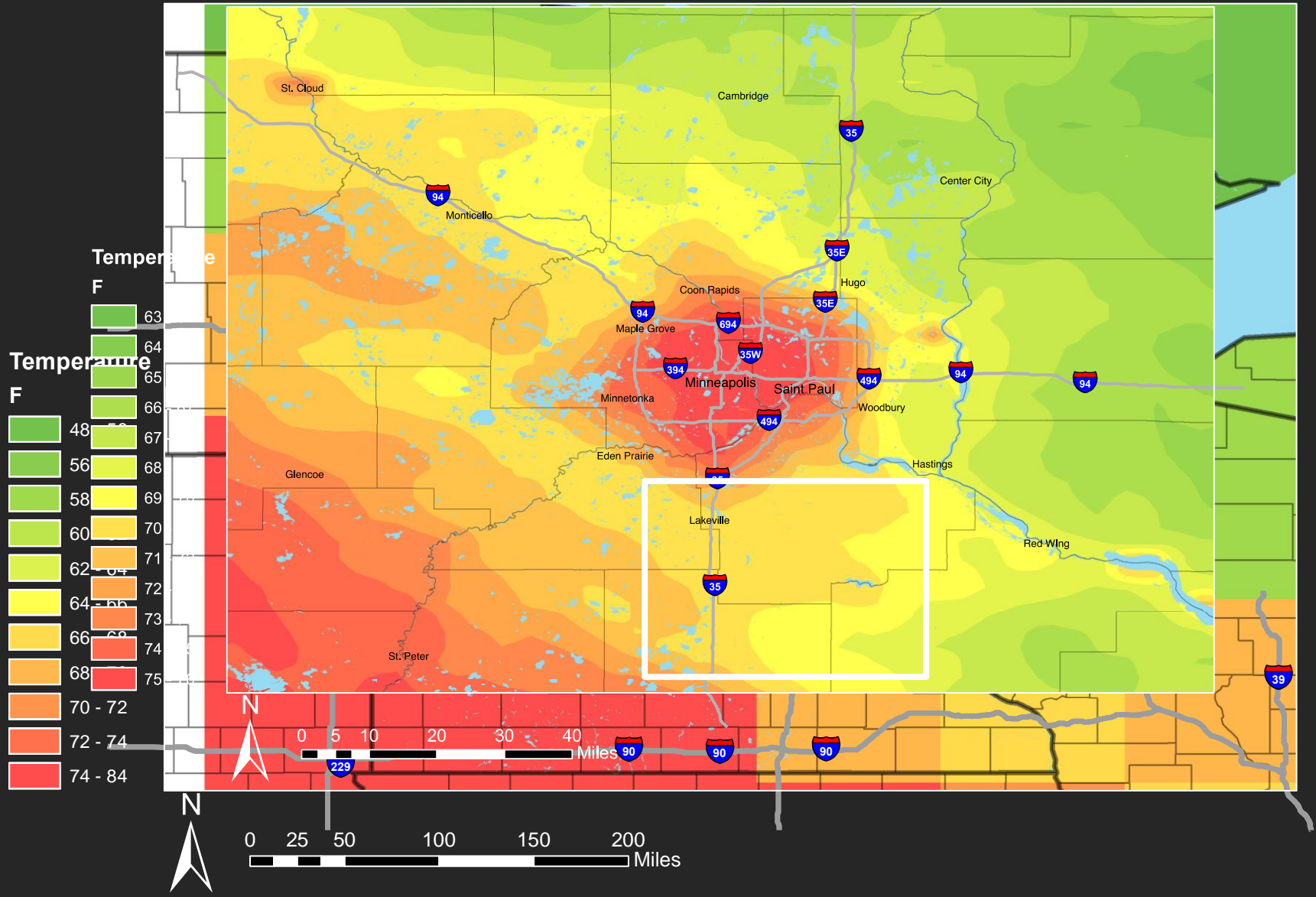


Minnesota Pollution
Control Agency

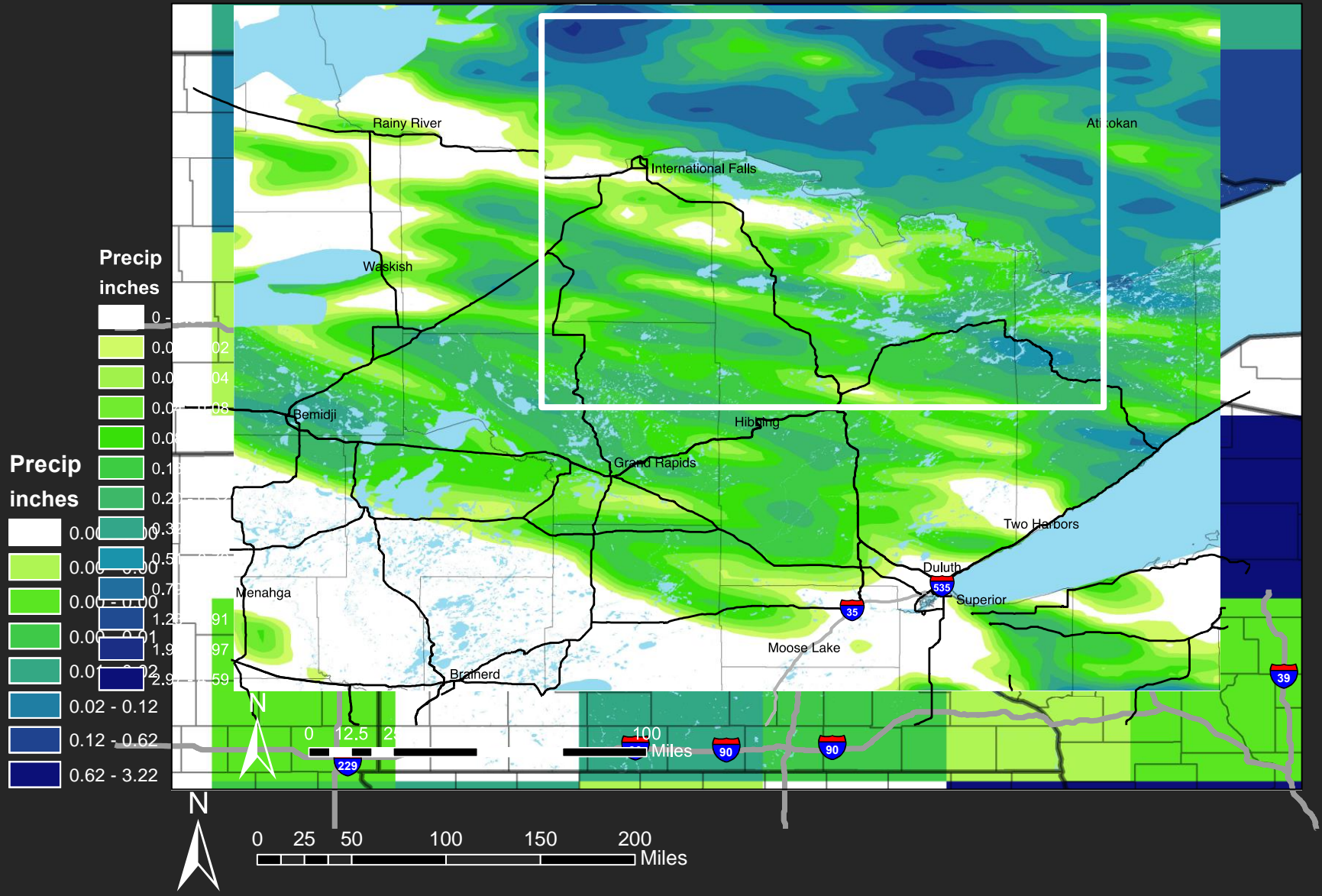


Detailed City Street Models

"Detailed"



Climate Model → Dynamically Downscaled “Detailed”



Activities

1. Produce dynamically downscaled climate model projections for the state of Minnesota

- 3 mile x 3 mile grid cell resolution
- 1970 – 2099
- Multiple global climate models

2. Deploy web portal to disseminate model results

- Work with agencies on data needs
- Deploy server and develop publicly accessible web portal

3. Education and Outreach

- Develop web-based educational materials
- Provide “train the trainer” workshops in collaboration with University of Minnesota Extension

In-Kind Support



This project would leverage over \$2 million of in-kind support from the University of Minnesota's Supercomputing Institute

Thank You



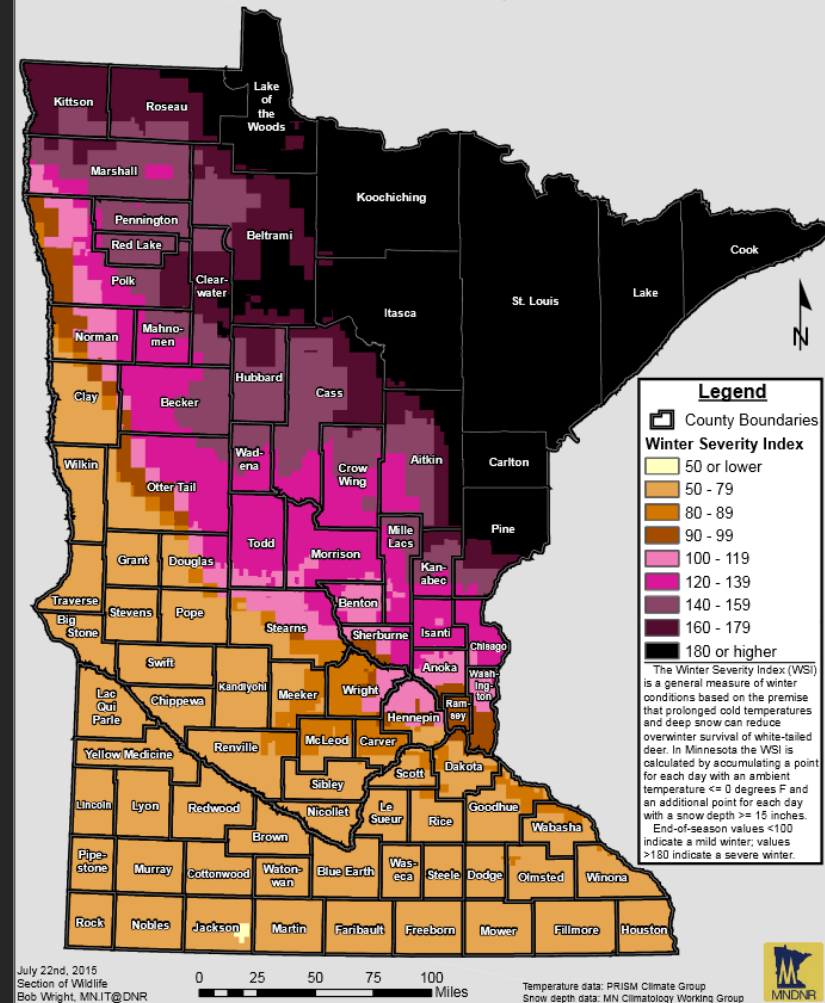
Specific Examples

Winter Severity Index for White-tailed Deer

- Days with deep snow and cold
- High values = high stress, likely mortality
- How will this index change over time?
 - Impacts planning, herd management, and hunting



Winter Severity Index (WSI) for White-tailed Deer
November 1st, 2013 - May 30th, 2014



Forest Resource Management



- Forests are extremely sensitive to climate
- Decisions made today have consequences decades later
- The lack of detailed climate projections challenges long-term forest planning
- Detailed projections will help managers secure and support appropriate tree species



Soil and Water Conservation

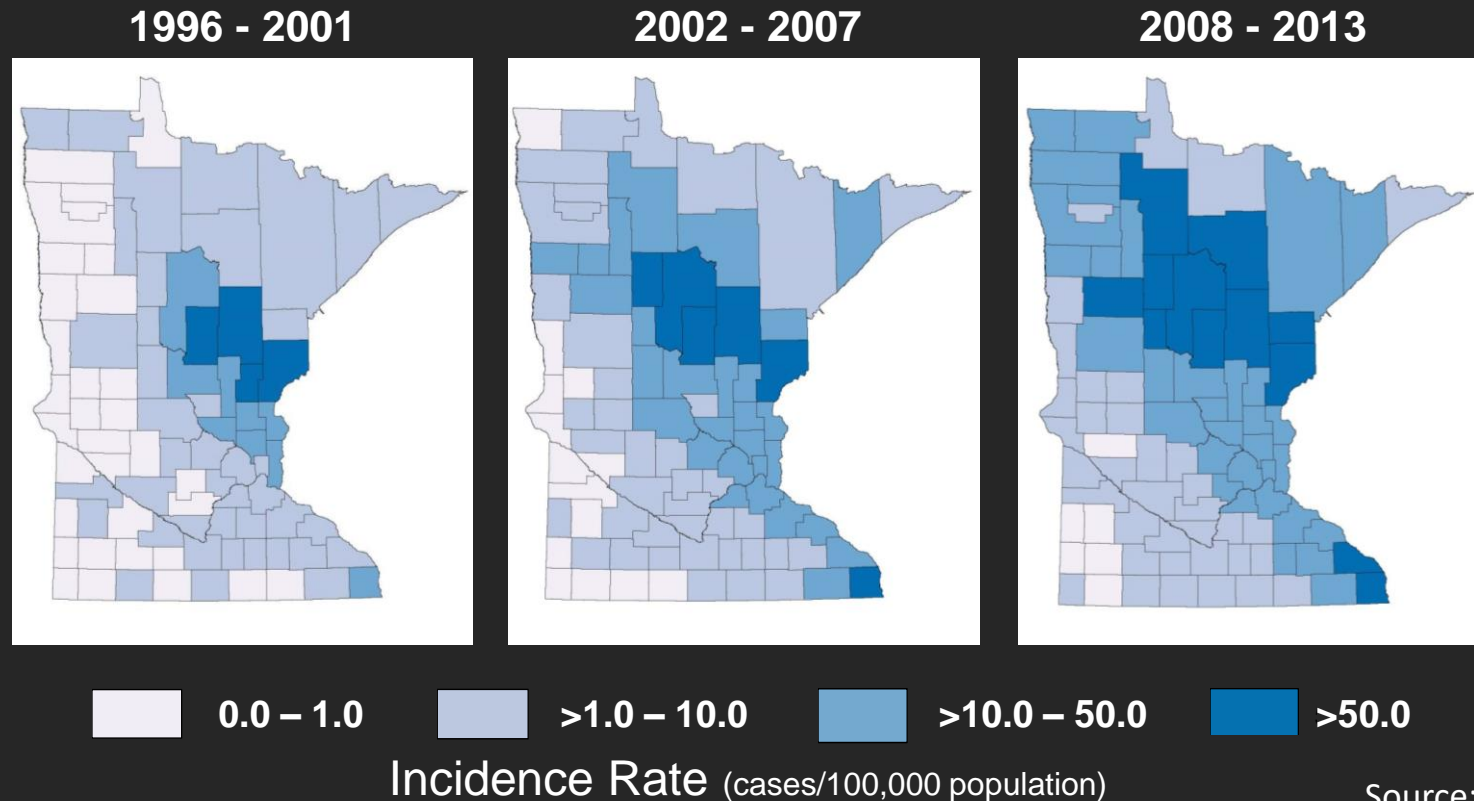
- Climate strongly impacts water runoff and erosion
- Current soil and water conservation practices and installations may not fully protect soil and water in the future
- Improved climate projections can help inform which practices that are needed where on the landscape



Lyme Disease

- Annual Lyme disease case counts in Minnesota have tripled since the 1990s
- Downscaled data can be used to predict at-risk areas and target prevention strategies where most needed

Distribution of MN Lyme Disease Cases by County of Residence, 1996-2013



Source: (MDH, 2015)

Hydraulic Infrastructures

Improved detail in climate model precipitation data would support efforts to:

- Quantify impact of changes in precipitation to hydraulic infrastructure
- Improve MnDOT's Flash Flood Vulnerability and Climate Adaption pilot project results
- Extend the vulnerability methodology to additional MnDOT Districts and assets



Wastewater Infrastructure

- Wastewater treatment infrastructure is susceptible to flooding
- Release of minimally treated or untreated wastewater into lakes, rivers or streams
- Additional detailed data will help with preventing damage



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