

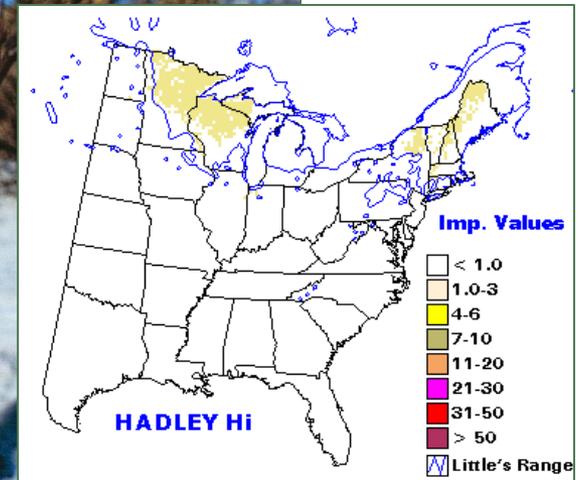
# The Northwoods Climate Change Response Framework in Minnesota



*Minnesota Forest Resources Council  
May 16, 2012*

# Outline

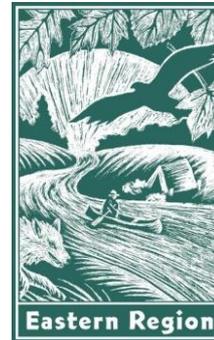
- What is NIACS?
- What is a Climate Change Response Framework?
- What's happening in Minnesota?



# NIACS is a multi-institutional partnership

*Northern Institute of Applied Climate Science*

Forest Service =



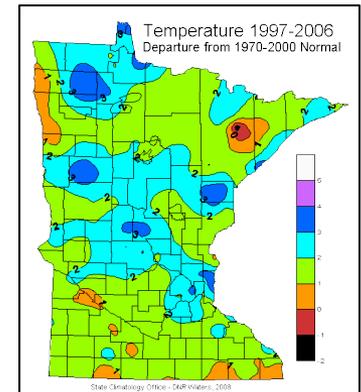
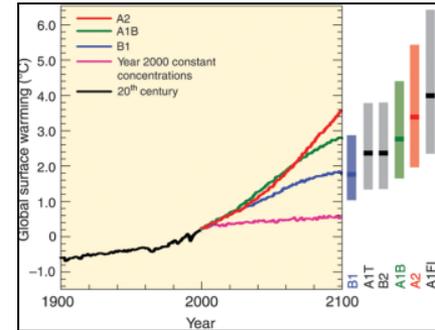
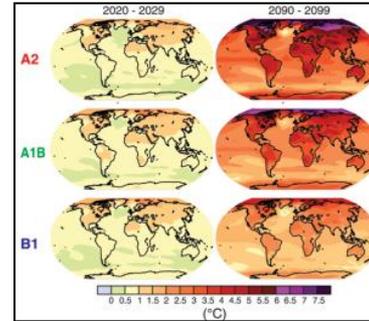
Non-FS partners =



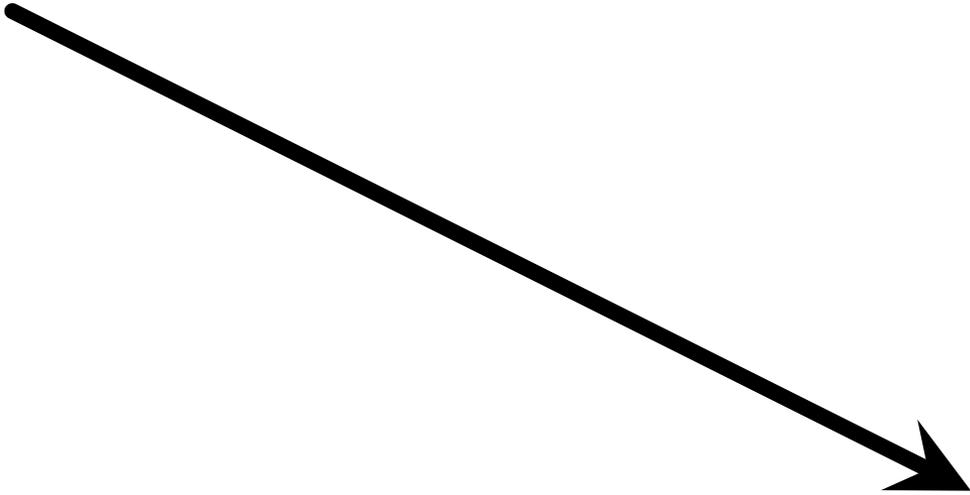
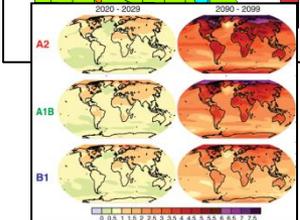
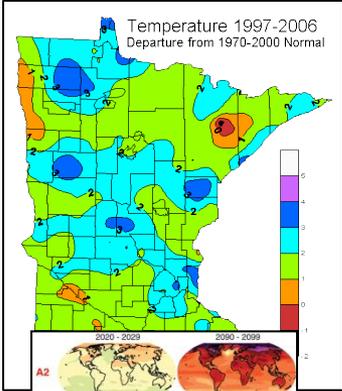
**ncasi**

[www.nrs.fs.fed.us/niacs/](http://www.nrs.fs.fed.us/niacs/)

# Forest Management Considerations



# Climate Change Response Framework



# Climate Change Response Framework

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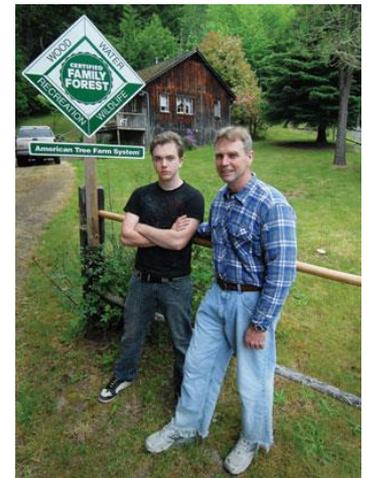
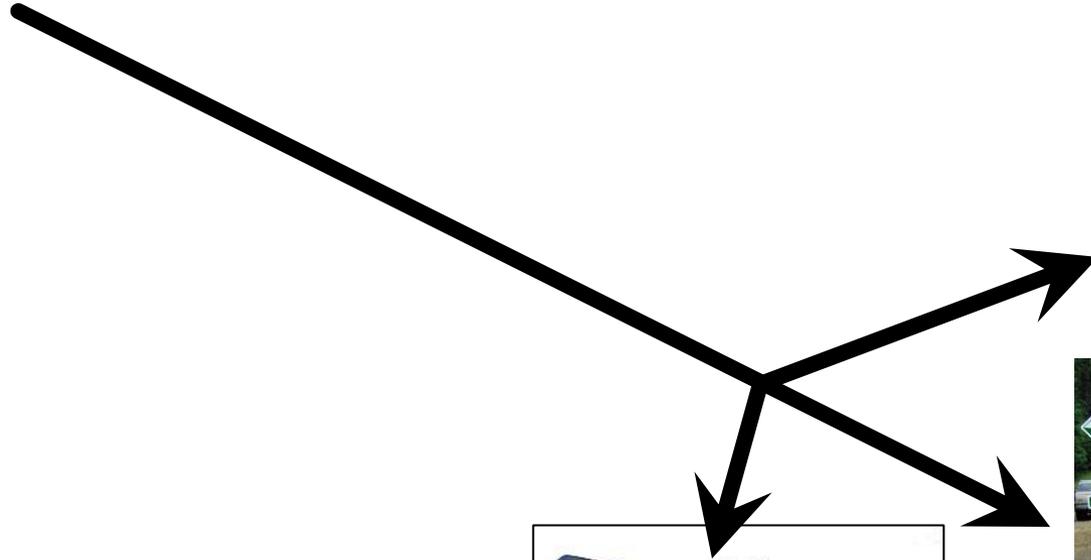
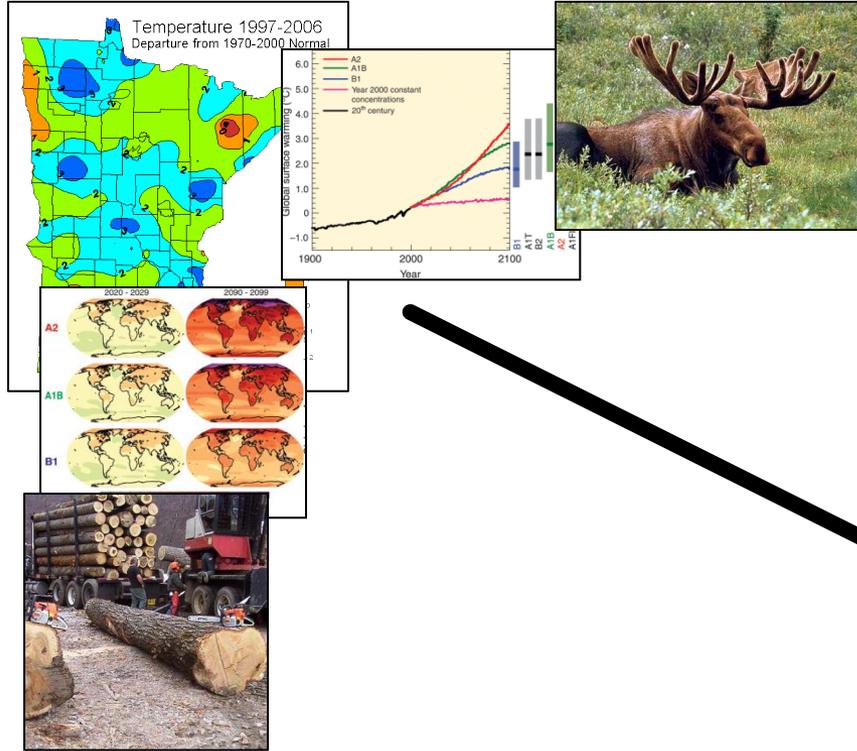
## *Summary:*

A collaborative approach among scientists, managers, and landowners to incorporate climate change considerations into forest management.

## *Outcomes:*

An integrated set of tools, partnerships, and actions to support “**climate smart**” conservation and management.

# Climate Change Response Framework

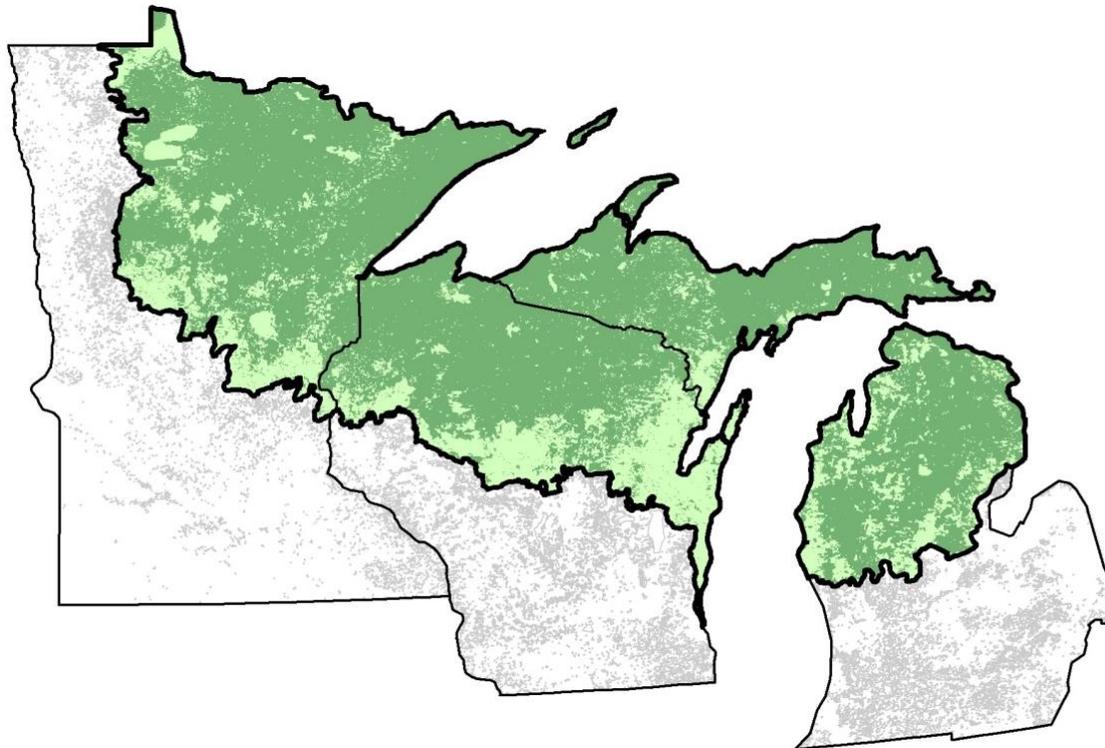






# Northwoods Regional Coordinating Group

- Northwoods expansion launched in 2010
- Consistent approach tailored to local needs
- Regional Partners (*incl. State Foresters*)



# Climate Change Response Framework

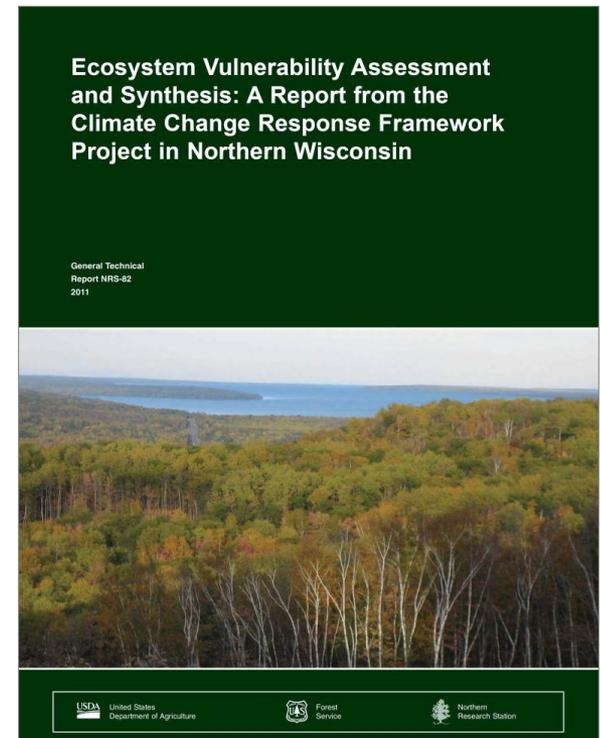
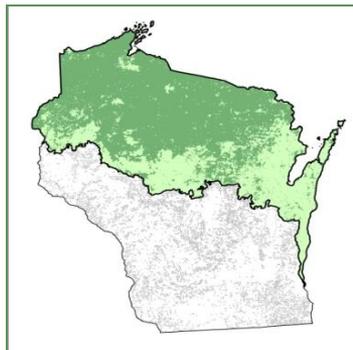
## Key Components:

- Vulnerability Assessment
- Science and Management Partnerships
- Adaptation Resources
- Demonstration Projects



# Ecosystem Vulnerability Assessment and Synthesis

- Evaluate **key ecosystem vulnerabilities** under a range of future climate uncertainty using existing models and information.
- Primary focus on **forest ecosystems**.
- Version 1 for northern WI:  
[www.nrs.fs.fed.us/pubs/38255](http://www.nrs.fs.fed.us/pubs/38255)



# Shared Landscapes Initiative

Foster dialogue about climate change impacts on ecosystems, management responses, and cooperative activities across a variety of organizations



# Forest Adaptation Resources (FAR):

- Menu of **approaches and strategies** for climate change adaptation
- Designed for a variety of land managers
- Tailored to local forest types
- Workbook process for practical application
- Does not make recommendations or decisions for managers
- Published version for northern WI

[www.nrs.fs.fed.us/pubs/40543](http://www.nrs.fs.fed.us/pubs/40543)

## Forest Adaptation Resources: Climate Change Tools and Approaches for Land Managers

General Technical  
Report NRS-87  
2012



# Forest Adaptation Resources (FAR):

Menu of strategies and approaches:

← Applicable across large areas

→ Location & situation specific

## Options

Broad adaptation concepts:  
Resistance  
Resilience  
Response

## Strategies

Regionally-specific ecological and managerial conditions

## Approaches

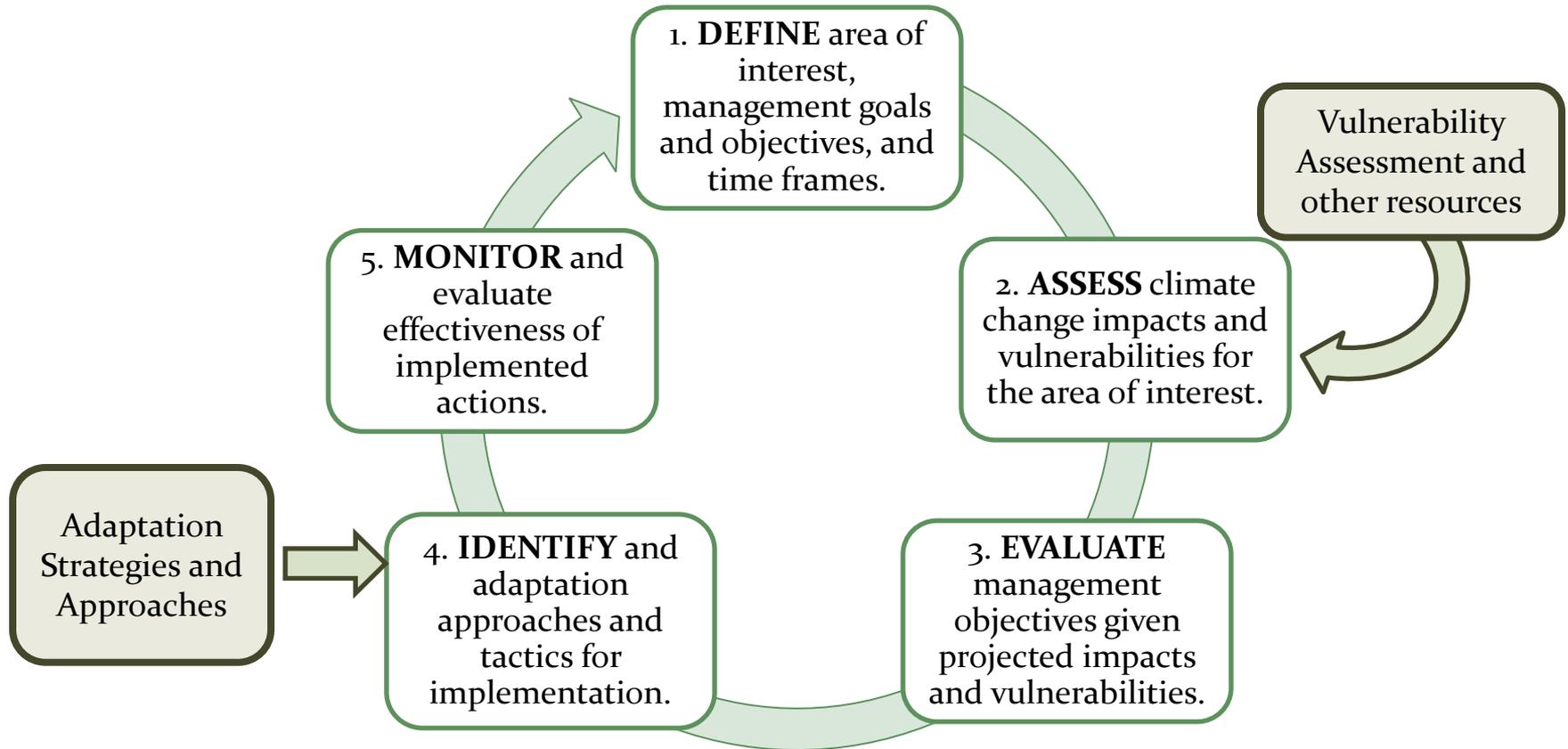
Actions that can be applied to a single ecosystem or forest type

## Tactics

Prescriptions for individual site conditions and management objectives

# Forest Adaptation Resources (FAR):

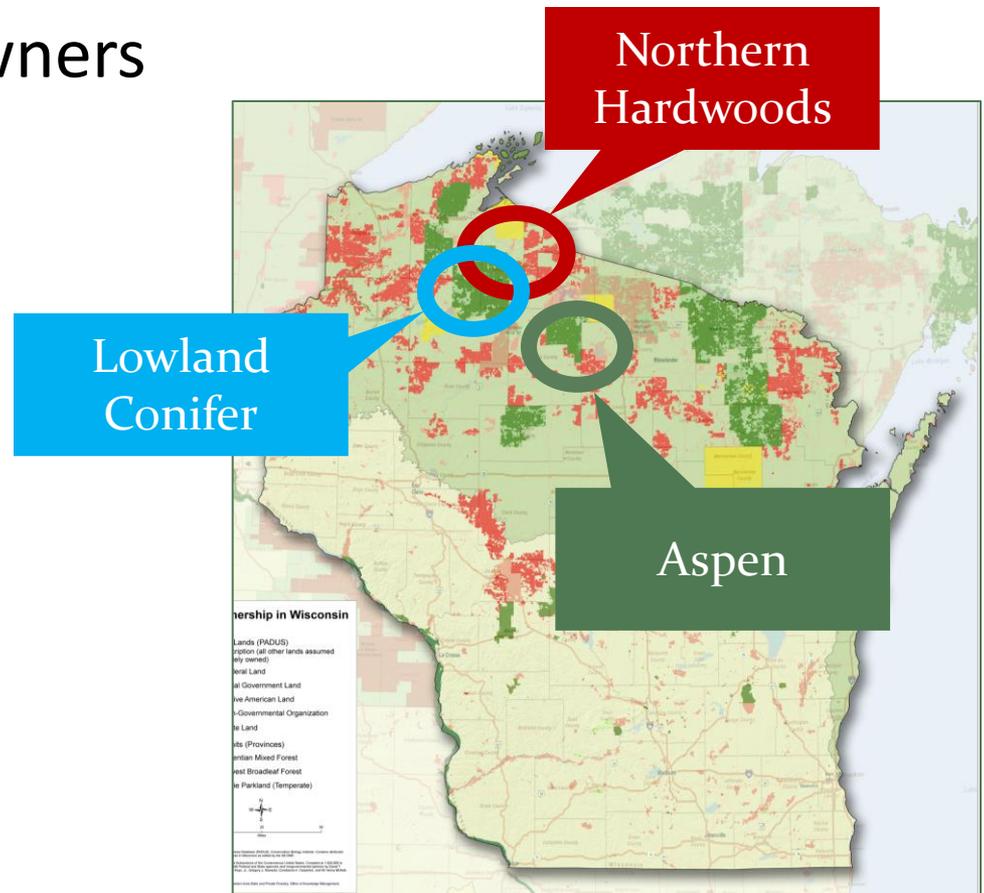
- Workbook process incorporates climate change into management
- Flexibility to fit into existing decision-making processes



# Demonstration Projects

Wide variety of:

- forest types
- organizations and landowners
- management goals
- adaptation strategies



# Climate Change Response Framework In Minnesota:

## Current Status & Timeline



# Climate Change Response Framework

## Key Components:

- **Vulnerability Assessment**
- Science and Management Partnerships
- Adaptation Resources
- Demonstration Projects

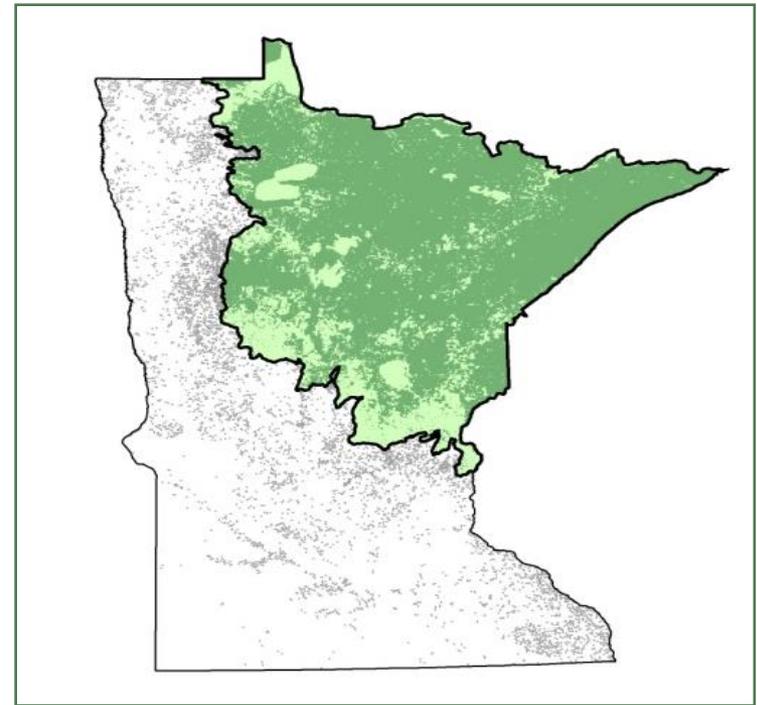


# Ecosystem Vulnerability Assessment and Synthesis

New version in progress for MN:

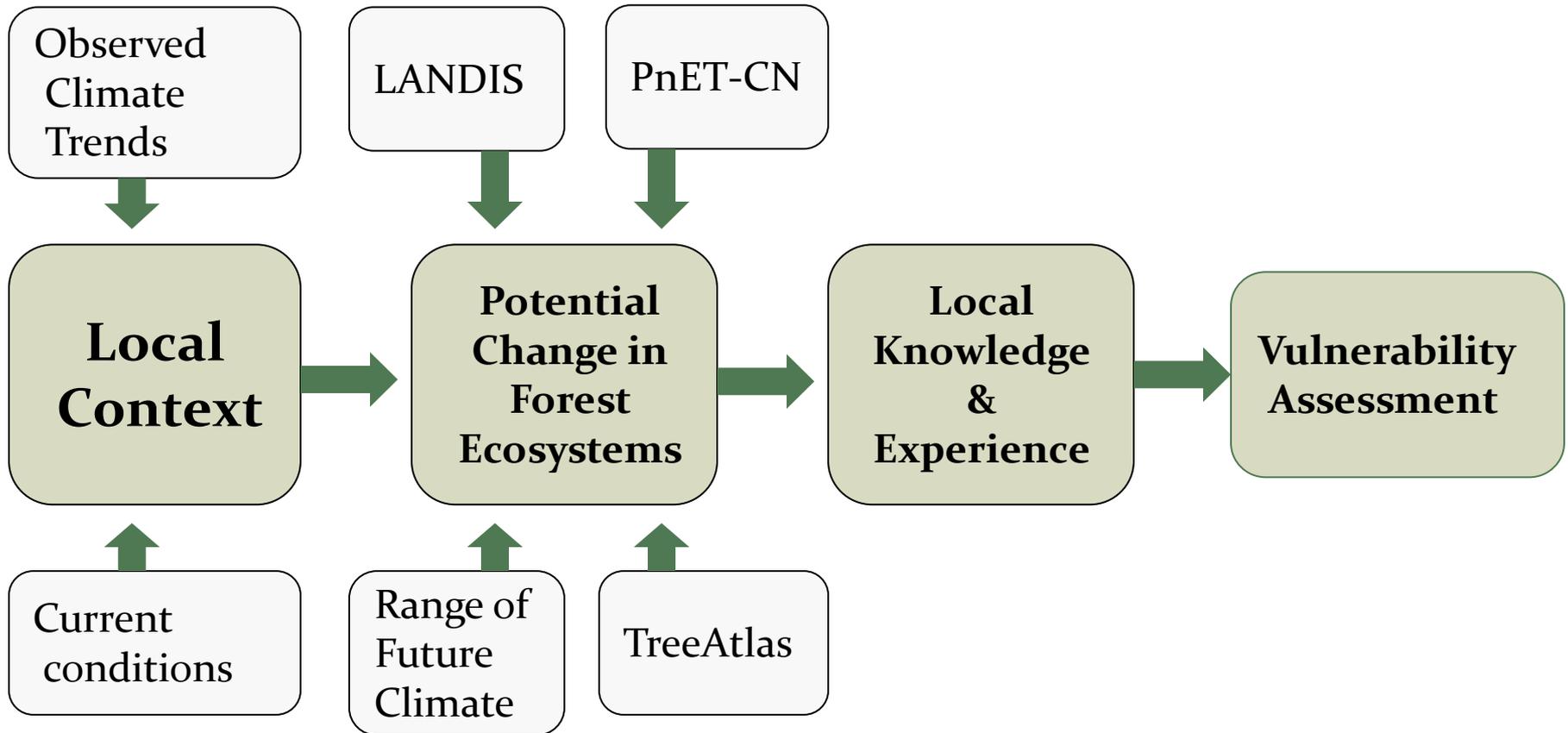
## Contents

- 1) The Contemporary Landscape
- 2) Climate Change Primer
- 3) Observed Climate Change
- 4) Future Climate Change
- 5) Impacts on Forests
- 6) Forest Ecosystem Vulnerability
- 7) Implications for Forest Management



*Laurentian Forest Province in MN*

# Ecosystem Vulnerability Assessment and Synthesis



# Climate Change Response Framework

## Key Components:

- Vulnerability Assessment
- **Science and Management Partnerships**
- Adaptation Resources
- Demonstration Projects

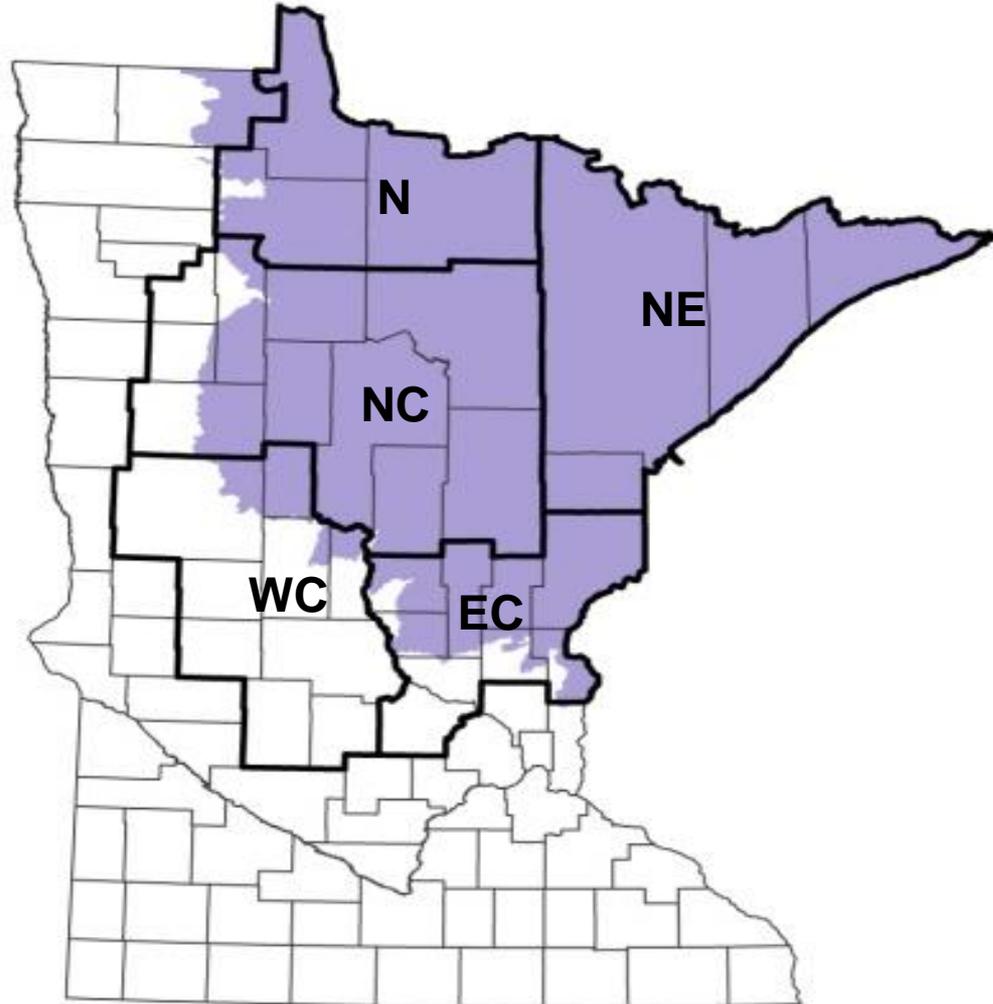


# Science Team



# Management Applications

## “Climate-Smart” Landscape Plans



# Climate Change Response Framework

## Key Components:

- Vulnerability Assessment
- Science and Management Partnerships
- **Adaptation Resources**
- Demonstration Projects

Forest Adaptation Resources:  
Climate Change Tools and  
Approaches for Land Managers

General Technical  
Report NRS-87  
2012

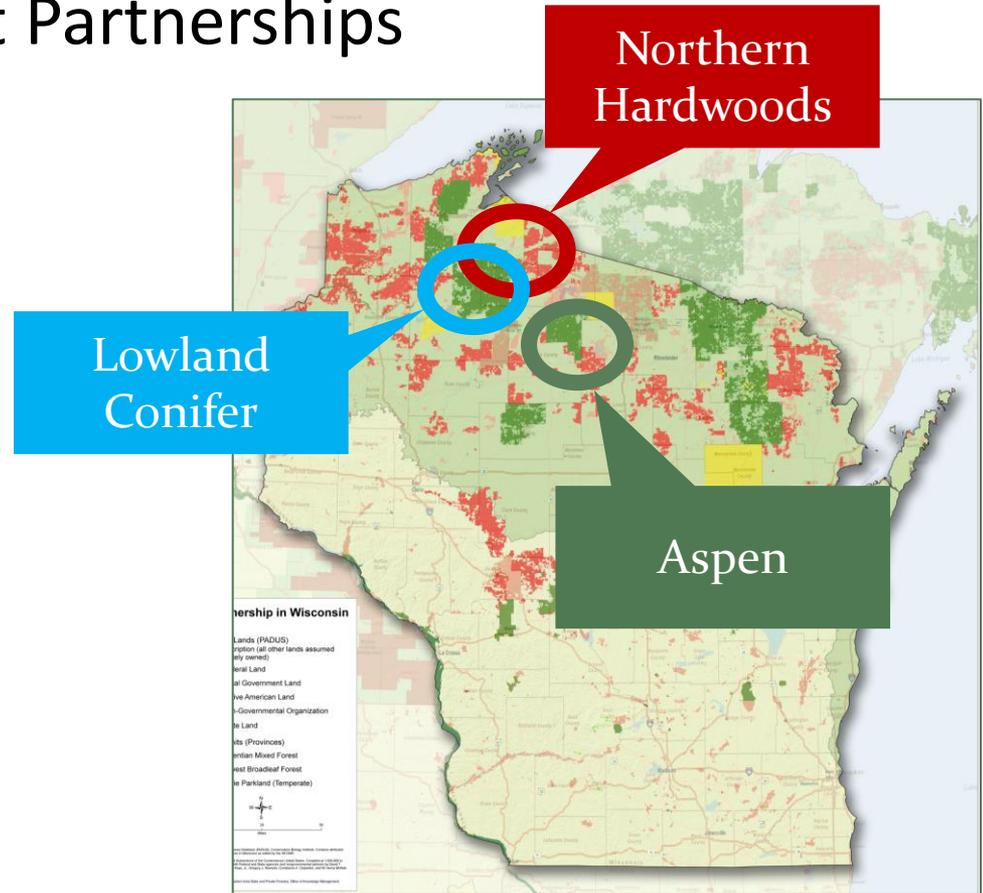


[www.nrs.fs.fed.us/pubs/40543](http://www.nrs.fs.fed.us/pubs/40543)

# Climate Change Response Framework

## Key Components:

- Vulnerability Assessment
- Science and Management Partnerships
- Adaptation Resources
- **Demonstration Projects**



# Thank you

## [www.climateframework.org](http://www.climateframework.org)

**Climate Change Response Framework**

Home | Our Approach | **Projects** | Products | Partners | Contact

- Central Appalachians
- Northwoods**
- Central Hardwoods

**Northwoods News & Events**

Forest Management in the Face of Climate Change  
February 21, 2012

Partnerships  
Vulnerability Assessment  
Forest Adaptation Resources  
Demonstration Projects

**Northwoods**

The Northwoods Climate Change Response Framework covers 64 million acres of northern Minnesota, Wisconsin, and Michigan within Ecological Province 212 (Laurentian Mixed Forest) of the National Hierarchical Framework of Ecological Units. Provinces are broad geographic areas that share similar coarse features, such as climate, glacial history, and vegetation types. The shaded area on the map shows Ecological Province 212, a rich mosaic of water features and forests characterized by past glacial activity and Great Lakes climate. This diverse landscape is also a transition between the northern boreal forests and the southern hardwood forests. The unshaded areas are outside the scope of the Northwoods Framework.

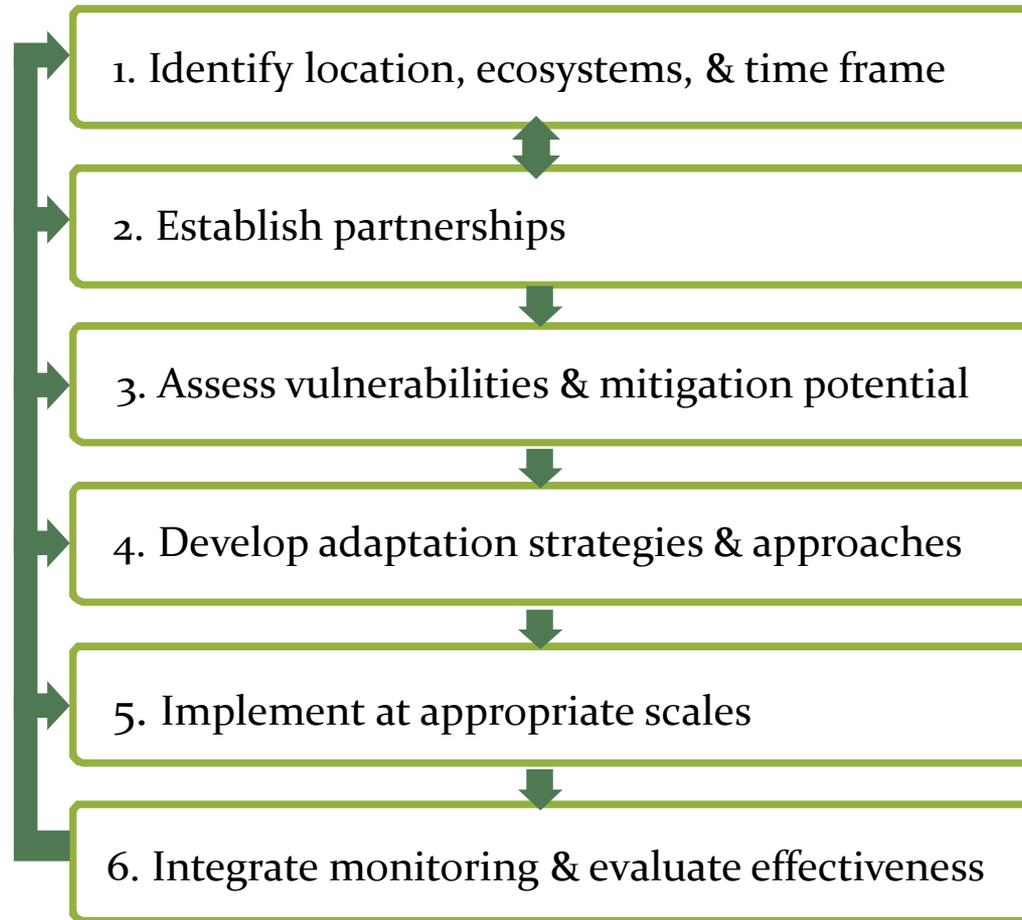
To meet the challenges brought about by climate change, a team of federal and state land management agencies, private forest owners, conservation organizations, and others have come together to accomplish three objectives:

1. Provide a forum for people working across the region to meet regularly and efficiently share

**NIACS**

Terms and Conditions

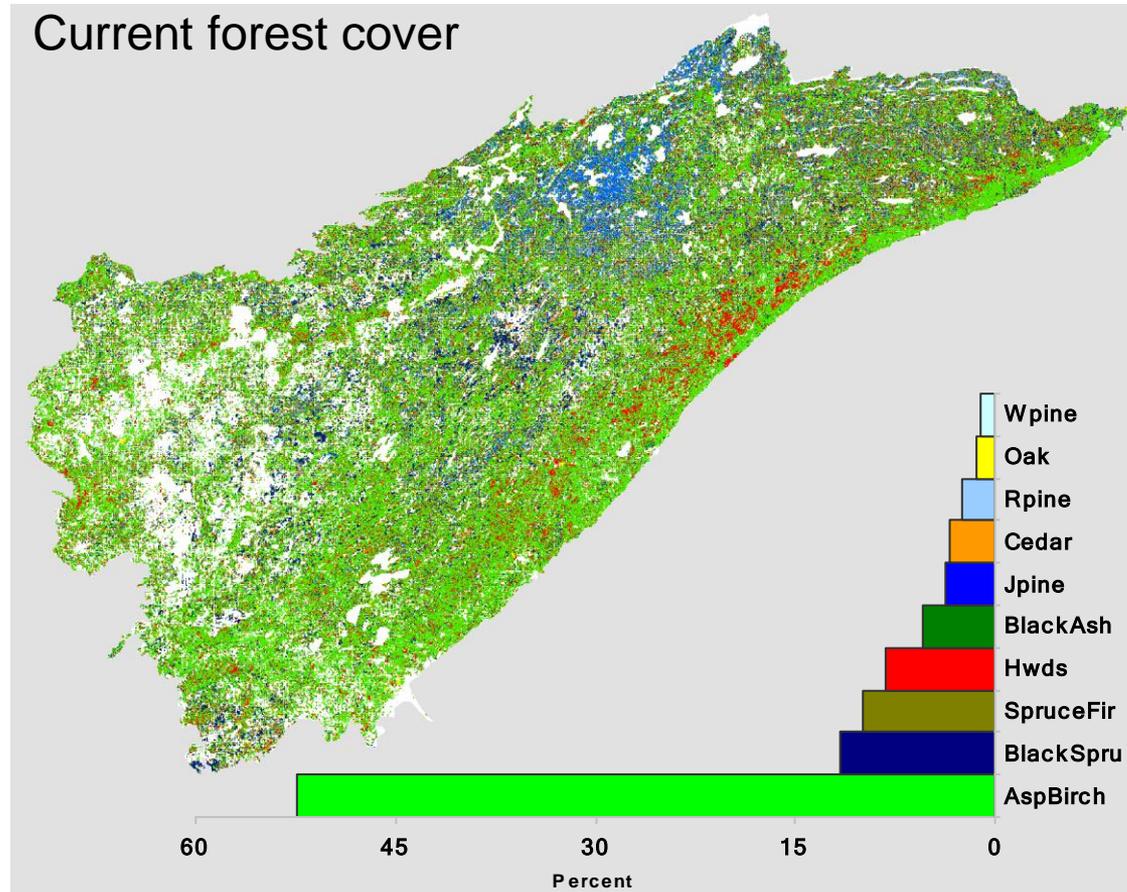
# Climate Change Response Framework



The framework is a process for engagement, assessment, and management in pursuit of climate change adaptation.

# Tools to Examine Forest Change

## LANDIS-II - Forest simulation modeling (*Scheller & White\**)



\*Funded by UMGL LCC (Project 11-08)

# Demonstration Projects – Aspen Example

## Management Goals/Objectives:

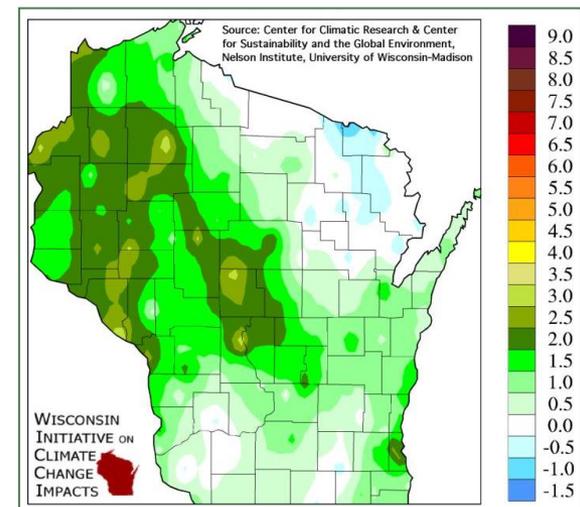
- Regenerate mature aspen to
  - Enhance stand vigor
  - Achieve age class distribution
  - Provide wood
- Provide scenic integrity



# Demonstration Projects – Aspen Example

## Climate Change Considerations:

- Climate shifts
  - Warmer, longer growing seasons,
  - Altered precipitation,
  - Potential for summer drought
- Species projected to decline
  - Aspen, Balsam fir, White spruce
- Species projected to do well
  - Red maple, red oak, basswood



# Demonstration Projects – Aspen Example

## Current management with climate change benefits

<b>Practice</b>	<b>Current Purpose</b>	<b>Adaptation Benefits</b>
Reserve trees and islands	Stand diversity, underrepresented species	Hedge against decline of one species; opportunity to favor future-adapted species
Stand regeneration	Meet management objectives; provide wood	Maintains aspen on site for longer; buys time

# Demonstration Projects – Aspen Example

## Easiest

- Plantings to increase the component of local, native species that are expected to fare better under warmer and drier conditions (red oak, white pine)



## More Difficult

- Use planting stock from populations that are better adapted to anticipated future conditions.
  - Local populations that survived drought
  - Populations outside seed zone



## Most Difficult/Expert Only

- Large-scale conversion of aspen to other forest types.



# Relationship to Other MN Efforts

- MN DNR (Habitat & Species Vulnerability Assessments)
- BE4WARMED
- Social Vulnerability Rapid Assessments
- SPRUCE (Spruce & Peatland Responses Under Climatic and Environmental Change)
- Others?

