Chequamegon-Nicolet National Forest
Climate Change Assessments & Response Framework

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Scales for Assessment

- Global/International
- National
- Regional
- Sub-regional
- Forest- and Stand-level
Climate Change Response Framework

Our goal:

Identify strategies and approaches to climate change adaptation and mitigation relevant to ecosystems in CNNF and northern Wisconsin.
Climate Change Response Framework

Project boundaries

Legend
- CNNF
- Forest Type
- White-Red-Jack Pine
- Spruce-Fir
- Oak-Hickory
- Elm-Ash-Cottonwood
- Maple-Beech-Birch
- Aspen-Birch
- Non-forest
- Water
Climate Change Response Framework

**Northern Research Station**
- **Lead:** Chris Swanston,
- **Collaborators:** Rich Birdsey, Louis Iverson, Sarah Hines

**Chequamegon-Nicolet National Forest**
- **Lead:** Jeanne Higgins
- **Collaborators:** Geoff Chandler, Linda Parker, Matt St. Pierre, Suzanne Flory, Connie Chaney

**Eastern Region Regional Office**
- **Lead:** Tom Doane

**Northeastern Area State and Private Forestry**
- **Lead:** Barbara Tormoehlen
- **Collaborators:** Gina Childs, Sarah Hines

**Northern Institute of Applied Carbon Science**
- **Project Coordinator:** Maria Janowiak
- **Collaborators:** Leslie Brandt, Patricia Butler

**University of Wisconsin-Madison**
- **Lead:** David Mladenoff

**Additional Collaborators**
- Wisconsin Department of Natural Resources
- Wisconsin Initiative on Climate Change Impacts (WICCI)
1) **Vulnerability and Mitigation Assessments**

Evaluate key ecosystem vulnerabilities and mitigation opportunities within CNNF under a range of future climate uncertainty using existing models and information.
Climate Change Response Framework

1) **Vulnerability and Mitigation Assessments**

2) **Shared Landscapes Initiative**

Foster *dialogue* about climate change, ecosystem response, ecosystem management, and cooperative activities among CNNF, regional landowners, and the general public.
Climate Change Response Framework

1) **Vulnerability and Mitigation Assessments**

2) **Shared Landscapes Initiative**

3) **Science Needs & Applications Workshop**

Identify the science needs, monitoring infrastructure, and applications necessary for making science-based management decisions at CNNF within the context of climate uncertainty.
Climate Change Response Framework

1) Vulnerability and Mitigation Assessments
2) Shared Landscapes Initiative
3) Science Needs & Applications Workshop
4) Climate Change Response Framework

Provide guidance on rapidly incorporating science and monitoring information into CNNF management activities to mitigate carbon emissions and better adapt ecosystems to changing climate
Northern Wisconsin Forest Carbon

Only 13% of the forested land is in the CNNF.
Northern Wisconsin Forest Carbon

The CNNF is not contiguous
Northern Wisconsin Forest Carbon

Only 14% of the forest carbon is in the CNNF.
The CNNF stores slightly more carbon/hectare.
Northern Wisconsin Forest Carbon

The CNNF sequesters slightly more carbon/hectare.

Mg C/ha/yr

- National Forest
- State and Local Gov't
- Private Ownerships

1990-2000
2000-2009
Parallel & Integrated Assessments

- Understanding responses of forest ecosystems to climate change across an entire landscape will provide greater insight into selection of mitigation strategies

  - Increased disturbance:
    - Localized stress & mortality
    - Windthrow and ice damage
    - Pest & disease
    - Fire

  - Species distribution changes:
    - Decline of existing species
    - Potential for species expansion
    - Successional uncertainties

- Most vulnerable:
  - Tree species
  - Ecosystems & communities
  - Management objectives
Parallel & Integrated Assessments

- Will integrate vulnerability and mitigation assessments into a single assessment, and also into Framework
- Adaptation and mitigation need to be considered together when developing management approaches
Parallel & Integrated Assessments

- Will integrate vulnerability and mitigation assessments into a single assessment, and also into Framework.
- Adaptation and mitigation need to be considered together when developing management approaches.
Thoughts for a National Assessment

- **Place**
  - regional and forest type differences
  - management approaches and constraints
  - industry

- **Scale**
  - tools and questions
  - user communities
  - integration

- **Time**
  - adaptation
  - dynamics, reversals
Thank you.
Thoughts for a National Assessment

- Return to idea of scale – while national in level, should try to incorporate issues at smaller scales
  - Regional differences in forest type, management approaches and constraints, …

- Also return to idea of adaptation- we are beyond thinking only about mitigation. Adaptation will be occurring at the same time as mitigation. Identify where two goals seem at odds. Favor mitigation strategies that are adaptive.
Climate Change Response Framework

- **Ecosystem Vulnerability Assessment and Synthesis** – determine what ecosystem components are most vulnerable to change under a variety of future climate scenarios.

- **Mitigation Assessment** – describe options to increase carbon stocks in forests and wood products, increase the use of wood for bioenergy, and engage in greenhouse gas markets and registries.

- **Shared Landscapes Initiative** – bring together local forest owners and managers and the public to encourage discussion and effective ecosystem management.

- **Science Applications and Needs Workshop** – bring scientists and managers together to discuss climate change science needs, applications, and monitoring at the CNNF to continue science-based land management.

- **Climate Change Response Framework** for the CNNF – incorporate information from the above to provide guidance to:
  - better adapt ecosystems to changing climate
  - mitigate carbon emissions
  - respond to climate change impacts across ownership boundaries
  - rapidly incorporate science and monitoring information into management
Intro (big picture)
- (One) purpose of workshop: explore approaches for assessing the capacity of national forests to mitigate climate change
- Scales of interest – this workshop is looking at national assessment, but scenarios will need to consider on-the-ground realities and constraints to be relevant
- This talk will describe on an assessment that includes broader objectives (adaptation AND mitigation) but focuses on a smaller spatial scale.
- Assessments should scale up/scale down

Climate Change Response Framework Project
- People, purpose, components, landscape
- Vulnerability and Mitigation Assessments
  - Goals, process (briefly)
  - Relationship – adaptation and mitigation. Two assessments help guide realistic mitigation approaches under climate change
Carbon in the northern Wisconsin landscape

- Need to think outside the green(?) line
  - Percent area, percent carbon not federal
  - Noncontiguous- many more neighbors
  - Importance of forest industry??
    - Wood products matter…
    - Interactions between public/private in the marketplace??
  - Mitigation potential (in progress – prelim results)

Summary

- Need to consider how NF role varies by landscape (east vs. west)
- Integrated assessment (adaptation and mitigation) may be more comprehensive—more informed selection of mitigation approaches
Northern Wisconsin Forest Carbon

Maximum Potential Carbon (preliminary estimate)

Current:
- Ecosystem: 1.0 Tg C/yr
- Products: 0.5 Tg C/yr
- Total: 1.5 Tg C/yr

No harvest, 50 years:
- Ecosystem: 4.3 Tg C/yr
- Products: 0.0 Tg C/yr
- Total: 4.3 Tg C/yr

Net Increase of 2.8 Tg C/yr

Next steps: Determine scenarios timeline for more detailed analysis.