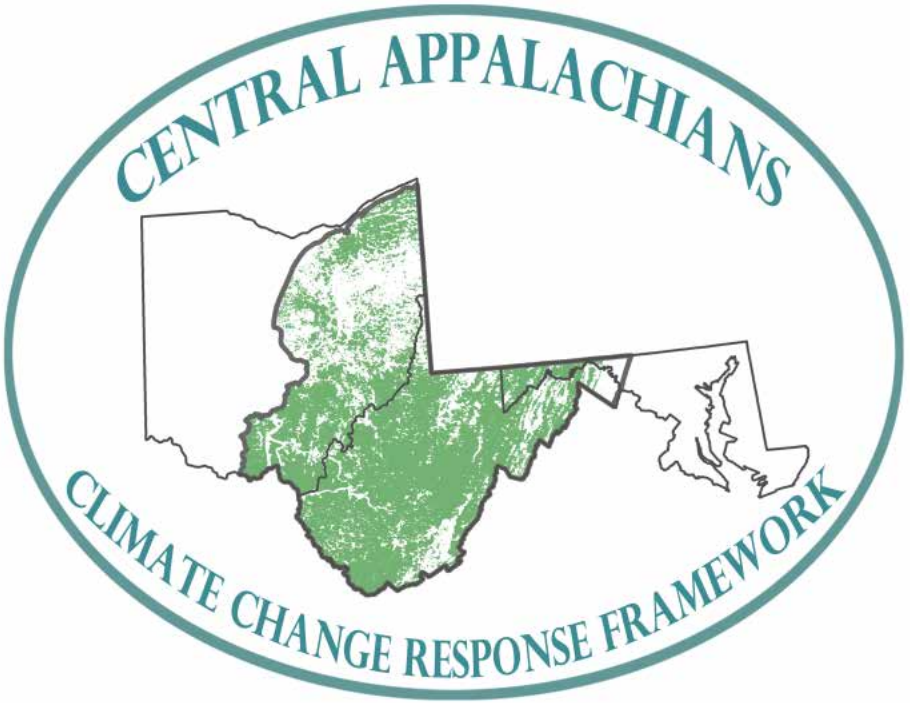
Central Appalachians

Forest Ecosystem Vulnerability Assessment



Webinar

November 28, 2012

Patricia Butler
on behalf of the Framework partnerships

Partners

- Appalachian Landscape Conservation Cooperative
- Appalachian Mountains Joint Venture
- Departments of Natural Resources (Ohio, Maryland, West Virginia)
- Maryland Alliance for Greenway Improvement and Conservation
- Monongahela National Forest
- Natural Resource Conservation Service RC&D (West Virginia)
- Northern Institute of Applied Climate Science
- The Nature Conservancy (Ohio, West Virginia, LANDFIRE)
- Wayne National Forest
- U.S. Forest Service, Northern Research Station
- U.S. Forest Service, Eastern Region
- U.S. Forest Service, Northeastern Area State & Private Forestry

Agenda

1. The basics (purpose, scope, audience, timeline)
2. High-level outline for seven chapters
3. Detailed outline for chapter 1
4. Form two working groups:
    1. Chapter one compilation
    2. Forest/ecological classification systems

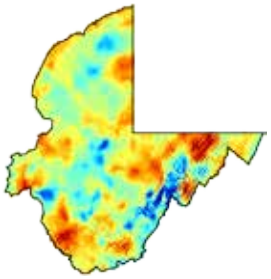
Climate Change Response Framework

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

Key Deliverables and Products:

- Partnerships
- Forest Ecosystem Vulnerability Assessment
- Climate Change Adaptation Resources
- Demonstration Projects

Climate Change Response Framework

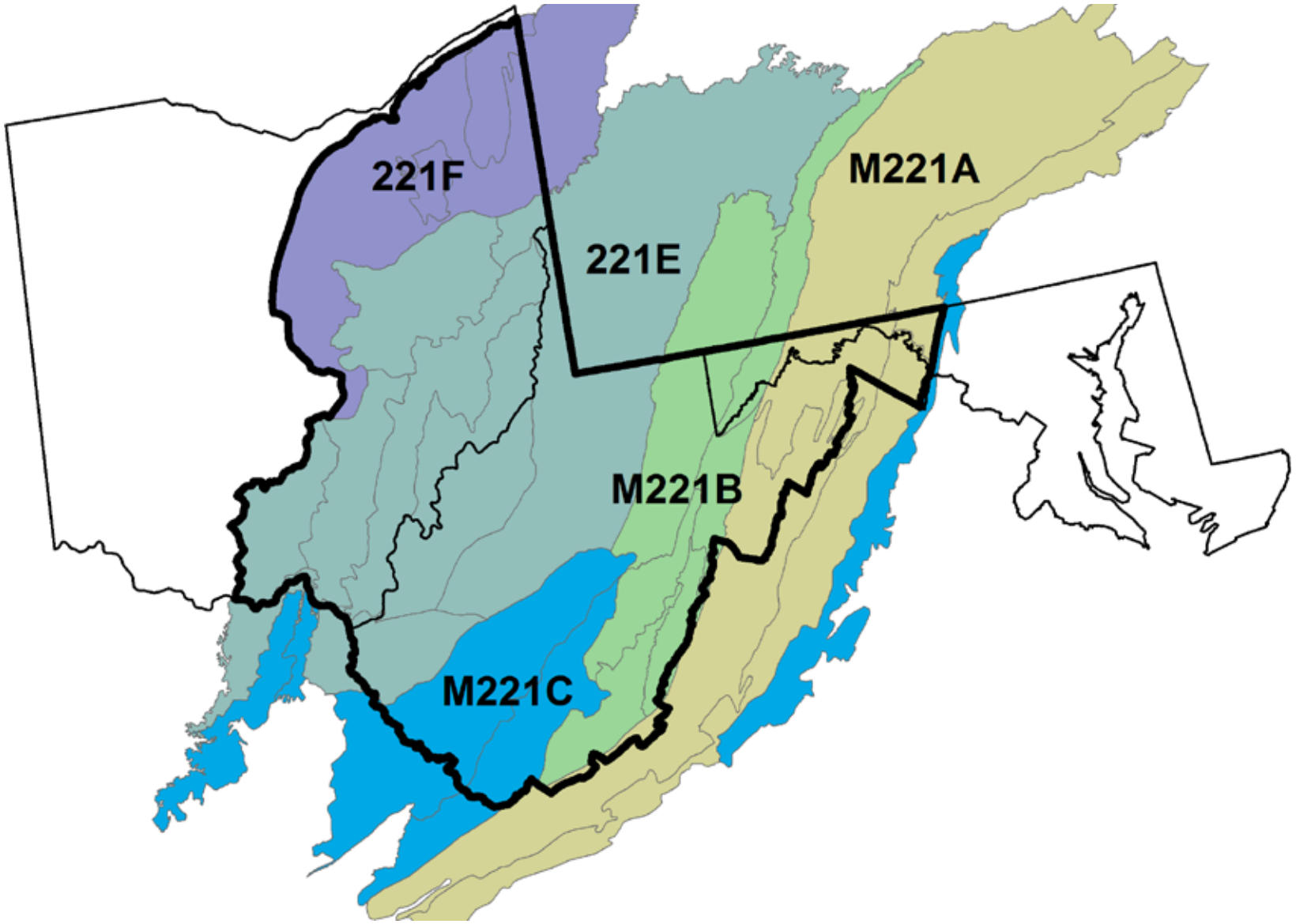
2012: Central Appalachians

2011: Central Hardwoods

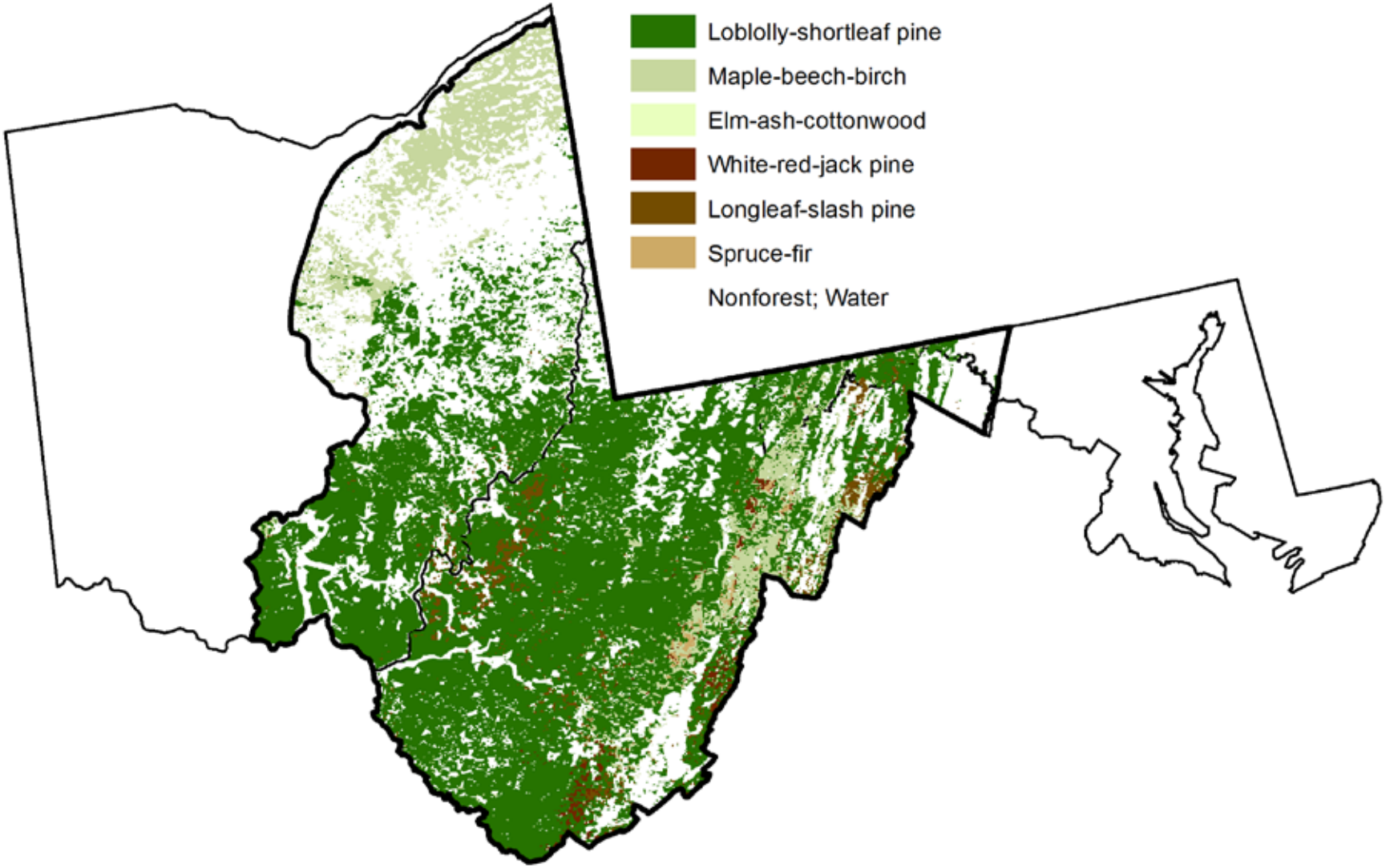
2010: Northwoods expansion

2009: Wisconsin's Chequamegon-Nicolet NF pilot

Assessment Area

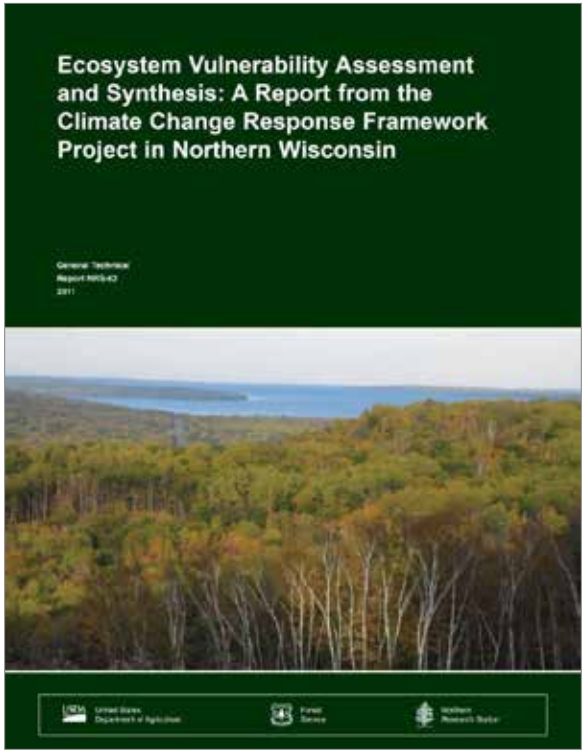


Assessment Area



Ecosystem Vulnerability Assessment

- Evaluate key ecosystem **vulnerabilities to climate change** under a range of future climate uncertainty using existing models and information
- Primary focus on **forest ecosystems**
- Does not assess vulnerability to changes in management, land use, or policy
- **Does not make recommendations**
- Pilot assessment: www.nrs.fs.fed.us/pubs/38255

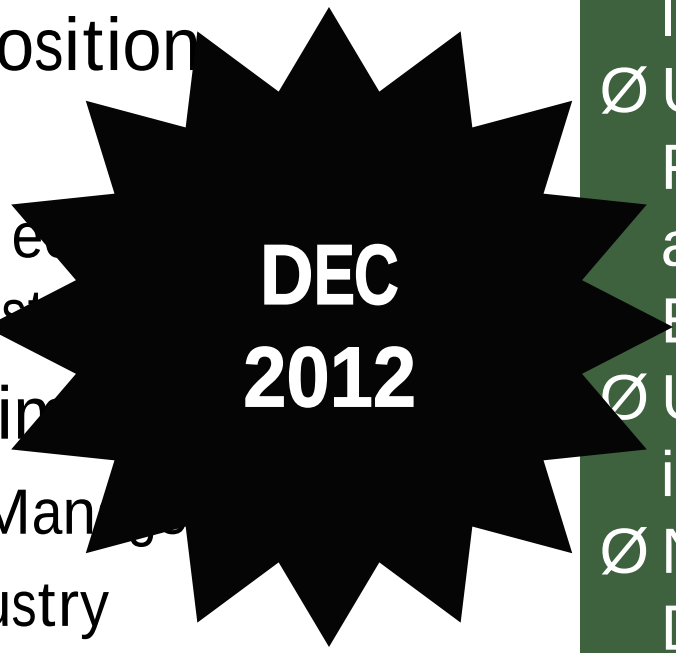


Ecosystem Vulnerability Assessment

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

Chapter 1: The Contemporary Landscape

- Landscape Setting
  - Geology, soils, hydrology
- Ecosystem Composition
  - Land cover
  - Forest types and e
    (current threats/st
- Socioeconomic dim
  - Ownership and Man
  - Harvest and Industry



Resources and Tools:

- Published scientific literature
- U.S. Forest Service Forest Inventory and Analysis (FIA) EVALIDator
- Unpublished forest inventory data
- National LandCover Dataset and other GIS datasets
- Government and industry records

Chapter 2: Climate Change Science and Models

- Climate Change and the Greenhouse Effect
- Climate Models
- Emissions Scenarios
- Downscaling Clima… Models
- Models for Assessing… Forest Change

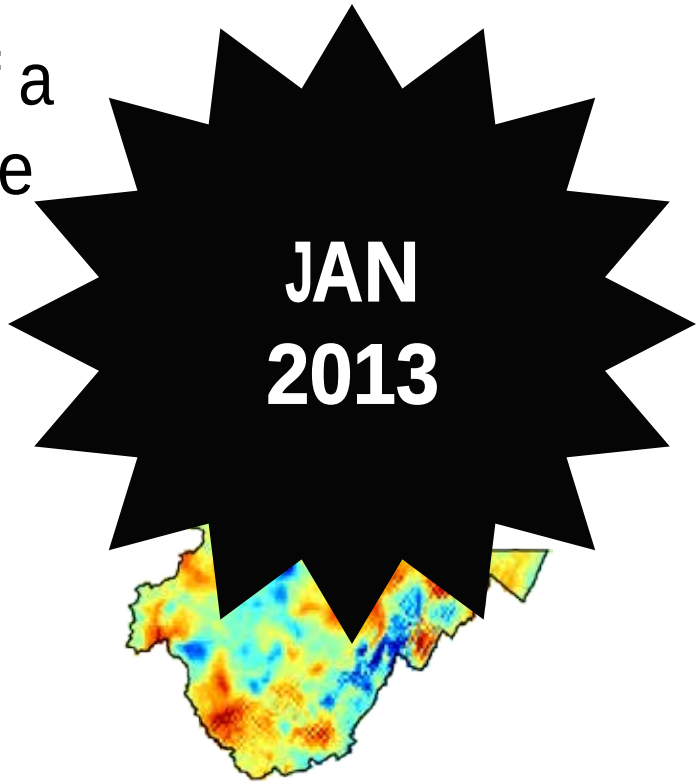
JAN 2013

Resources and Tools:

- Published scientific literature
- Global Circulation Models - …AA's GFDL CM2; …R's PCM
- …Special Report on …sions Scenarios …00)
- Climate Change Tree Atlas (Iverson)
- LANDIS-PRO (Thompson)
- LANDFIRE?
- Others? (eg. Hydrology)

Chapter 3: Observed Climate Change

- Past climate trends and averages
- Observations of a changing climate
- Hydrologic implications

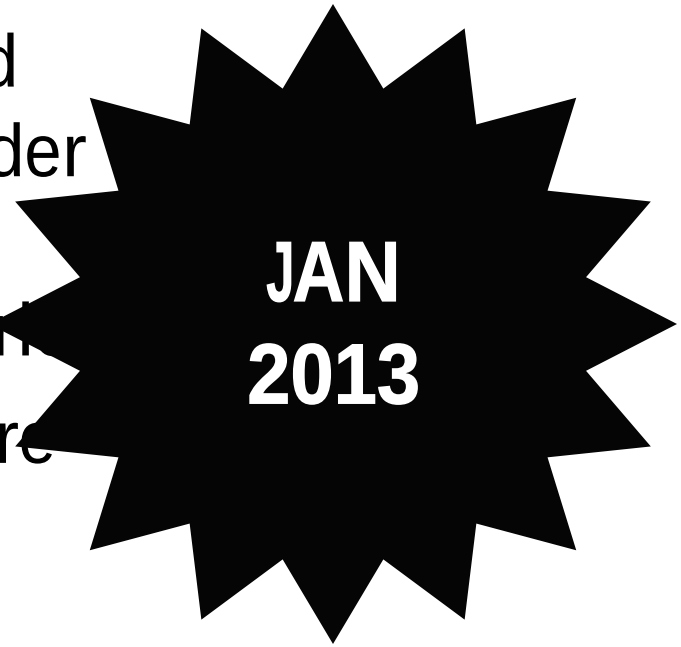


Resources and Tools:

- Climate Wizard climate data
- Published scientific literature
- Weather station data
- Storm reports
- Phenology

Chapter 4: Future Climate Change

- A range of projected changes in temperature and precipitation under high and low emissions scenari
- Other likely future impacts



Resources and Tools:

- Ø Hayhoe (2011) downscaled climate data
- Ø Published scientific literature
- Ø Other modeling (insert here!)

Chapter 5: Future Climate Change Impacts on Forests

- Climate Change Tree Atlas
  - Species distribution model
  - Potential changes in suitable habitat
  - Forest Service, Northern [illegible] Station(Louis Iverson)
- LINKAGES v 2.2
  - Process model
  - Potential changes in [illegible]lishment probabilities
  - School of Natural Re[illegible]y of Missouri (Hong He)
- LANDIS PRO
  - Process model
  - Potential changes in basal area and trees per acre
  - Forest Service, Northern Research Station (Frank Thompson)

Chapter 6: Ecosystem Vulnerabilities

- Potential Impacts on Drivers and Stressors
- Potential Impacts on Ecosystems
- Factors that Redu… Capacity
- Ecosystem Vulnera…
- Confidence Determinatio…

MARCH 2013

Tools and Resources:
- Chapters 1-5
- Expert Panels composed of Modelers, Ecologist, Forest Planner, other specialists

Chapter 7: Implications for Forest Management

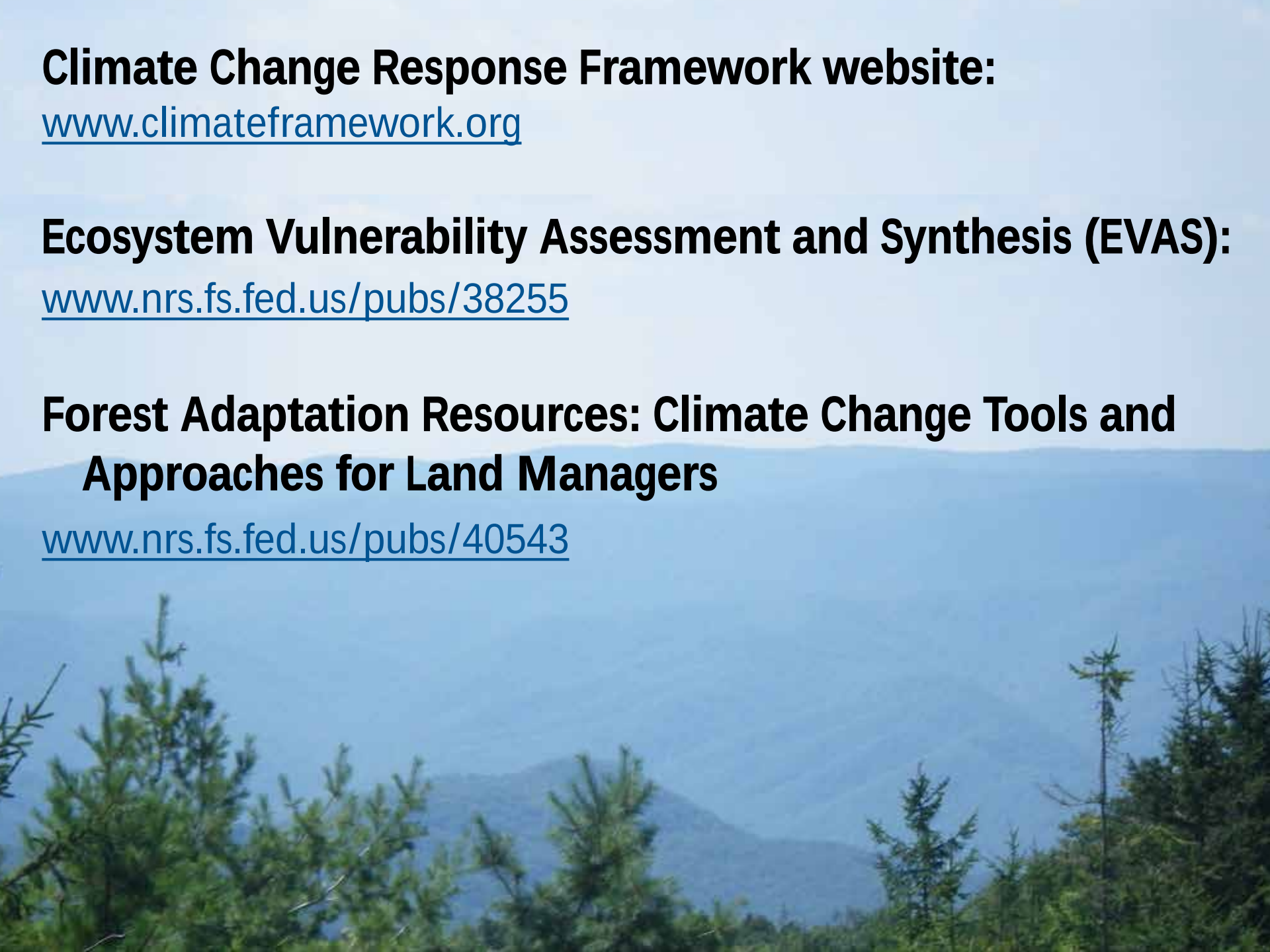
- Wildlife habitat
- Forest roads
- Fire/fuels management
- Carbon stewards
- Mining
- Recreation
- Cultural resource
- Timber
- Woody biomass
- Strategic land acquisition

Tools and Resources:
- Survey of forest managers
- Literature review

Climate Change Response Framework website:
www.climateframework.org

Ecosystem Vulnerability Assessment and Synthesis (EVAS):
www.nrs.fs.fed.us/pubs/38255

Forest Adaptation Resources: Climate Change Tools and Approaches for Land Managers
www.nrs.fs.fed.us/pubs/40543



Northern Institute of Applied Climate Science

NIACS is a multi-institutional partnership

Forest Service

- Northern Research Station
- Eastern Region
- Northeastern Area S&PF

Non-FS partners

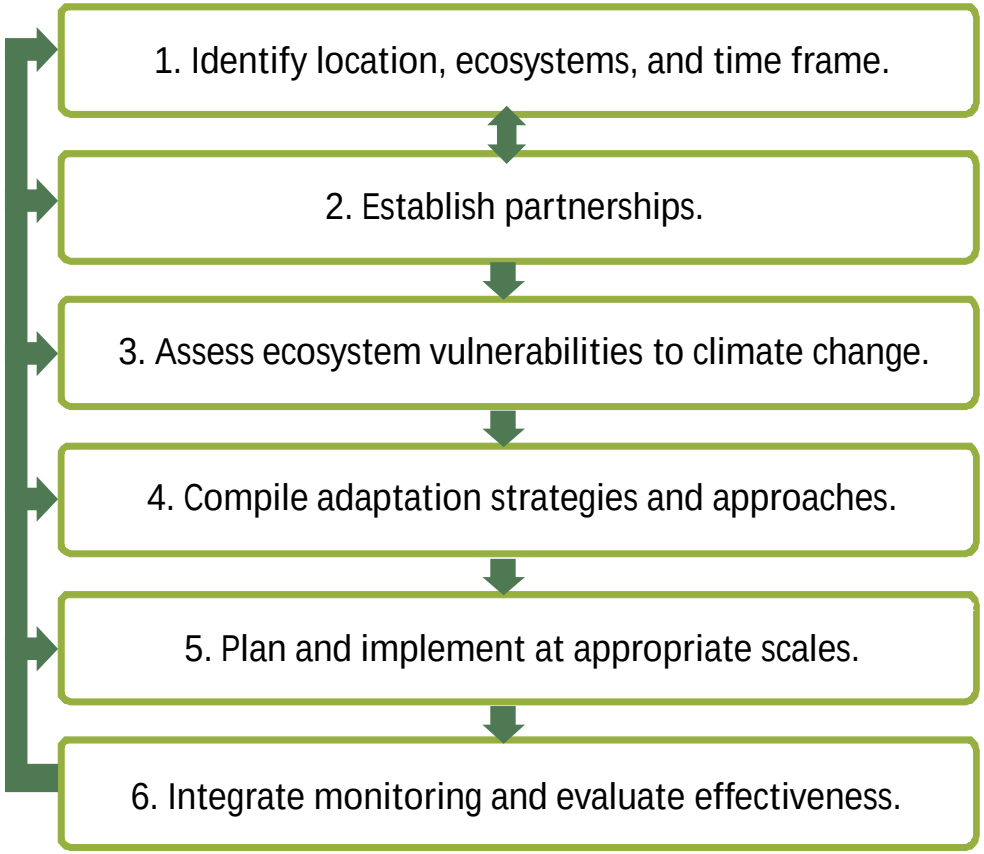
- Michigan Technological University
- National Council for Air & Stream Improvement
- Trust for Public Land

Eleven staff members in different groups/organizations

http://www.nrs.fs.fed.us/niacs/

Mitigation and Adaptation

Climate Change Response Framework



A process for **engagement**, **assessment**, and **management** in pursuit of climate change adaptation.

Scales of Assessment

Forest- and Stand-level

Sub-regional

Regional

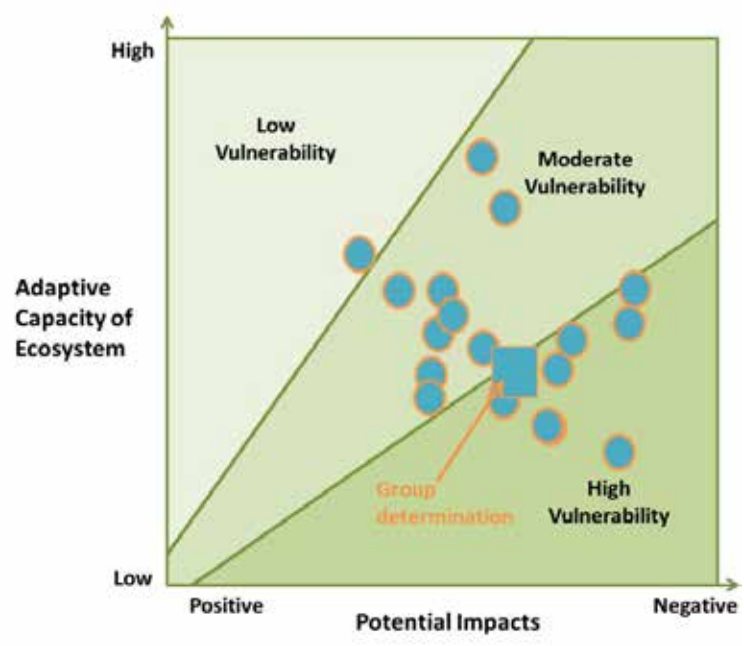
National

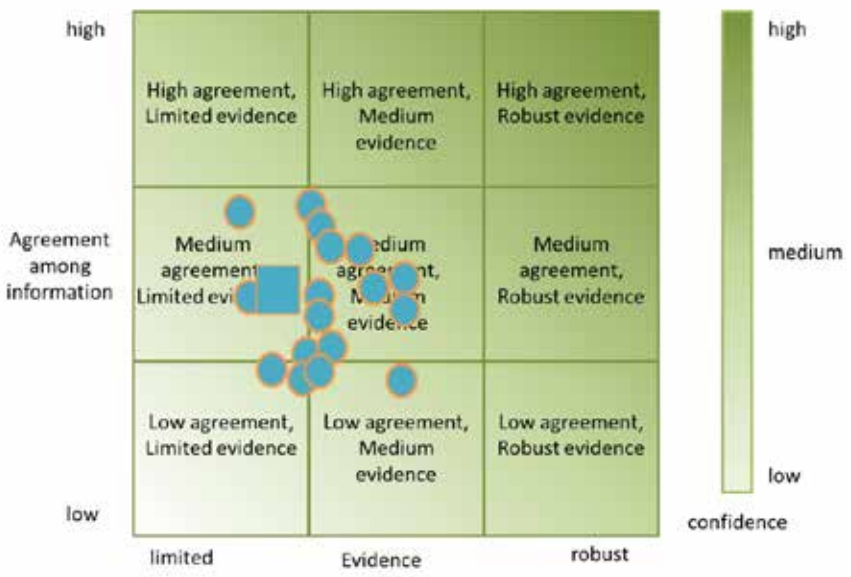
Global/International

Ecosystem Vulnerability Assessment

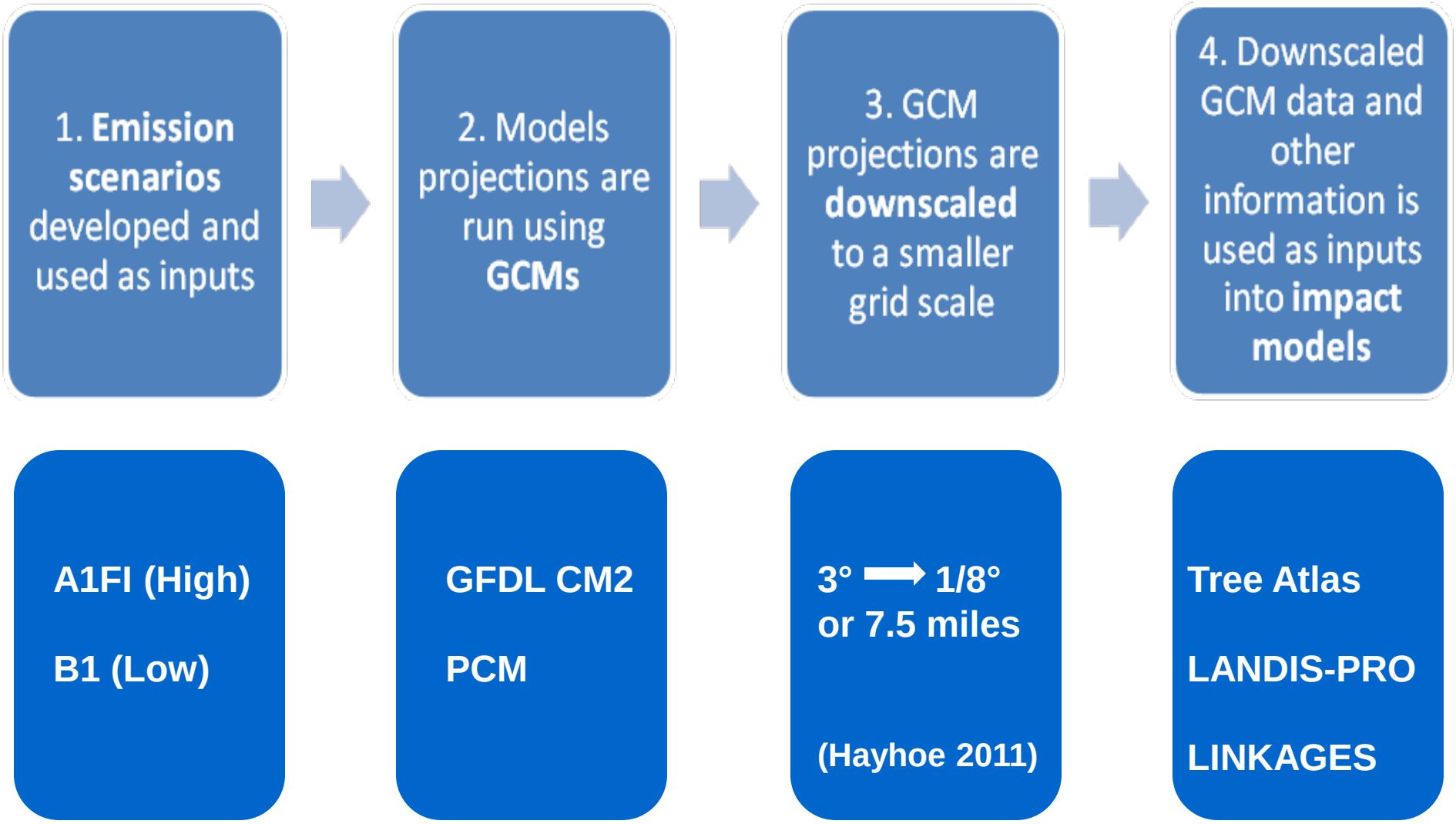
§ Expert panel process for multiple assessments:

1. Central Hardwoods (MO, IL, IN) - 22 panelists
2. Minnesota - 24 panelists
3. Michigan - 27 panelists
4. Wisconsin - planned for winter 2012
5. Central Appalachians (OH, WV, MD) – planned for spring 2013

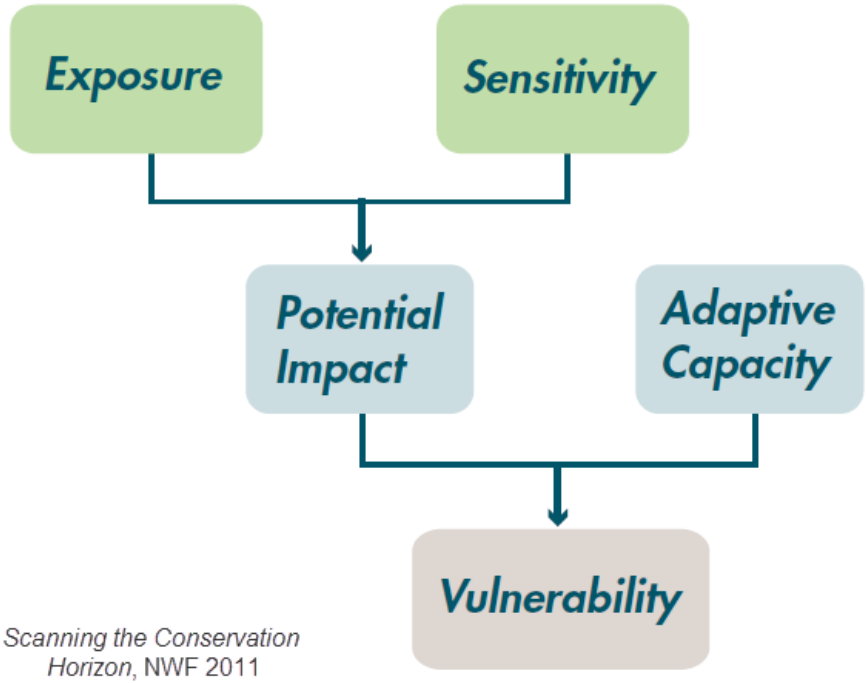




Chapter 2: Climate Change Science and Models



Chapter 6: Ecosystem Vulnerabilities



Scanning the Conservation Horizon, NWF 2011

Exposure: size and rate of climate changes

Sensitivity: the *tolerance* of the system to climate changes

Adaptive Capacity: (resilience) the ability of the system to cope with potential impacts