

ENGAGING PUBLIC, PRIVATE, AND TRIBAL LAND MANAGERS IN ON-THE-GROUND CLIMATE CHANGE ADAPTATION

Stories from the field



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www.forestadaptation.org

Northern Institute of Applied Climate Science

Climate

Carbon

Bioenergy

NIACS is a regional 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



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

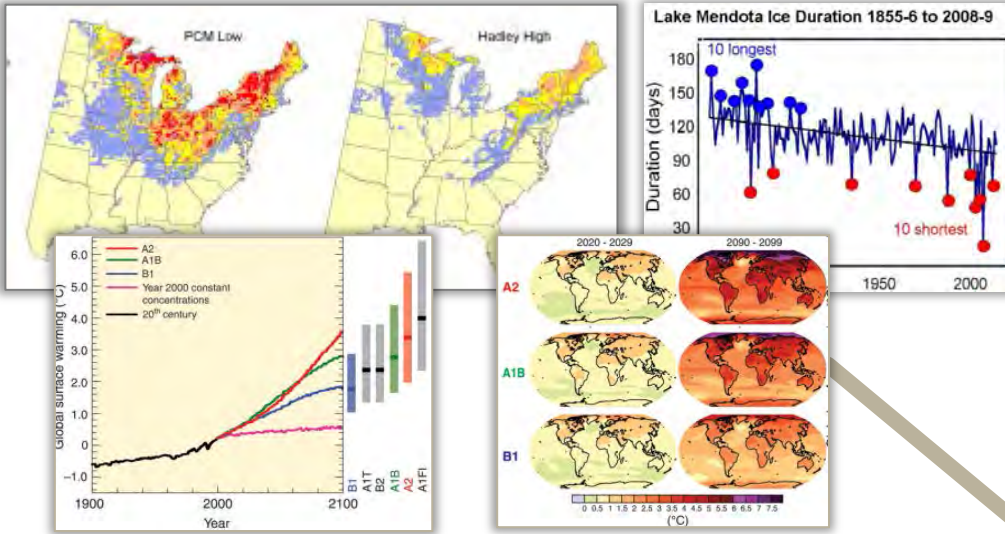


MichiganTech

ncasi



How do we get **from here...**



...to here?





Invasives

Natural Forest
Dynamics

Desired
Conditions

Timber Sale
Revenue

Forest
Health

Past
Management
History

Plan & Project
Requirements

Wildlife
Habitat

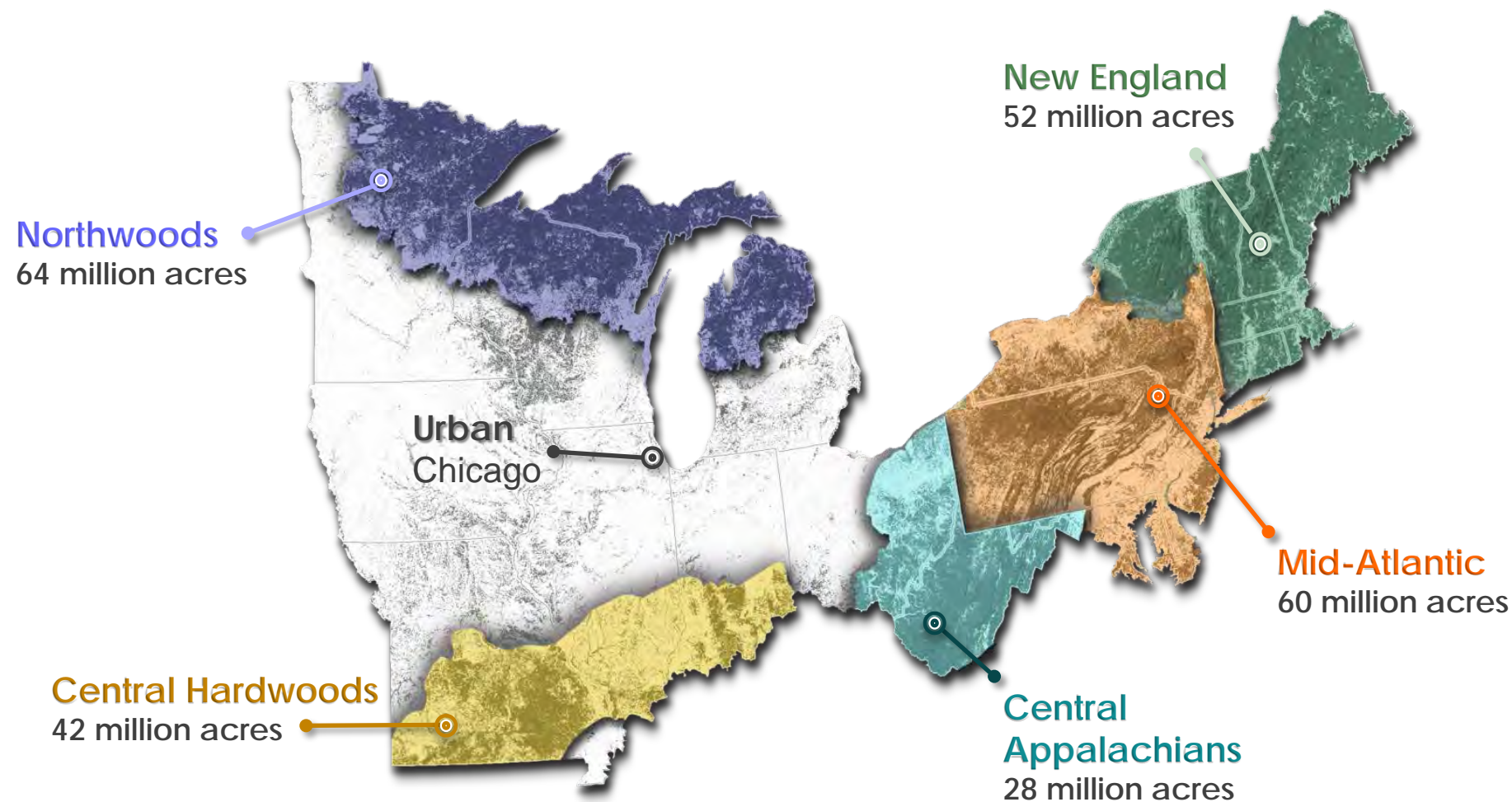
Disturbance:
Past + Future

And more!!

Recreation

**Climate
Change**

CLIMATE CHANGE RESPONSE FRAMEWORK



Midwest USDA Climate Hub

Led by ARS with a **Northern Forests Sub-hub** based in Houghton, MI with NIACS as lead and CCRF integration

Northeast USDA Climate Hub

Led by FS NRS, where CCRFs are integrated into Hub and lead FS outreach and delivery to forest sector

CLIMATE CHANGE RESPONSE FRAMEWORK

Structured, process-oriented, works on multiple scales

Components:

Partnerships

Vulnerability Assessment

Forest Adaptation Resources

Adaptation Demonstrations

Progress:

75+ partner organizations
(and counting)

3 published assessments,
3 more in press

Published in 2012, updated
and online versions in prep

50+ demonstrations
underway

Vulnerability Assessment

Ecoregional Vulnerability Assessments



Audience: Land managers

Scope: Forest ecosystems

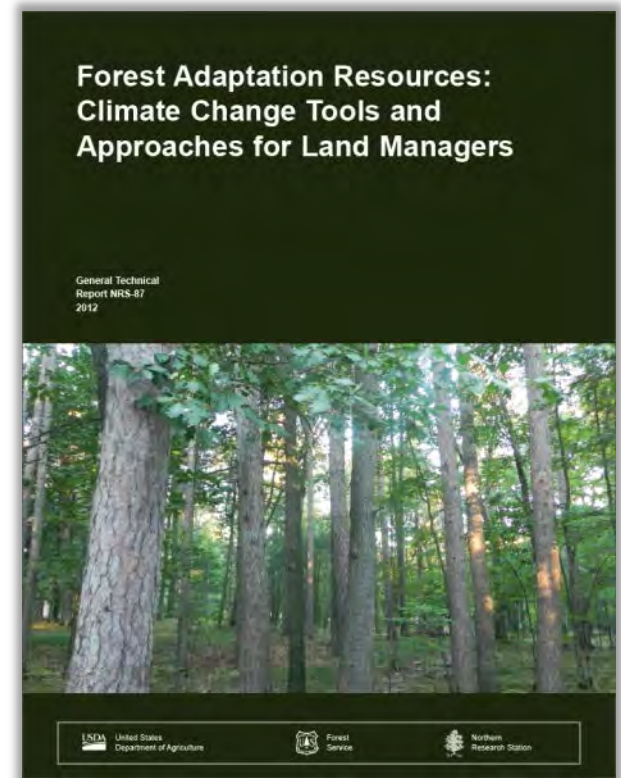
Vulnerability of:

- Tree species
- Forest/natural communities

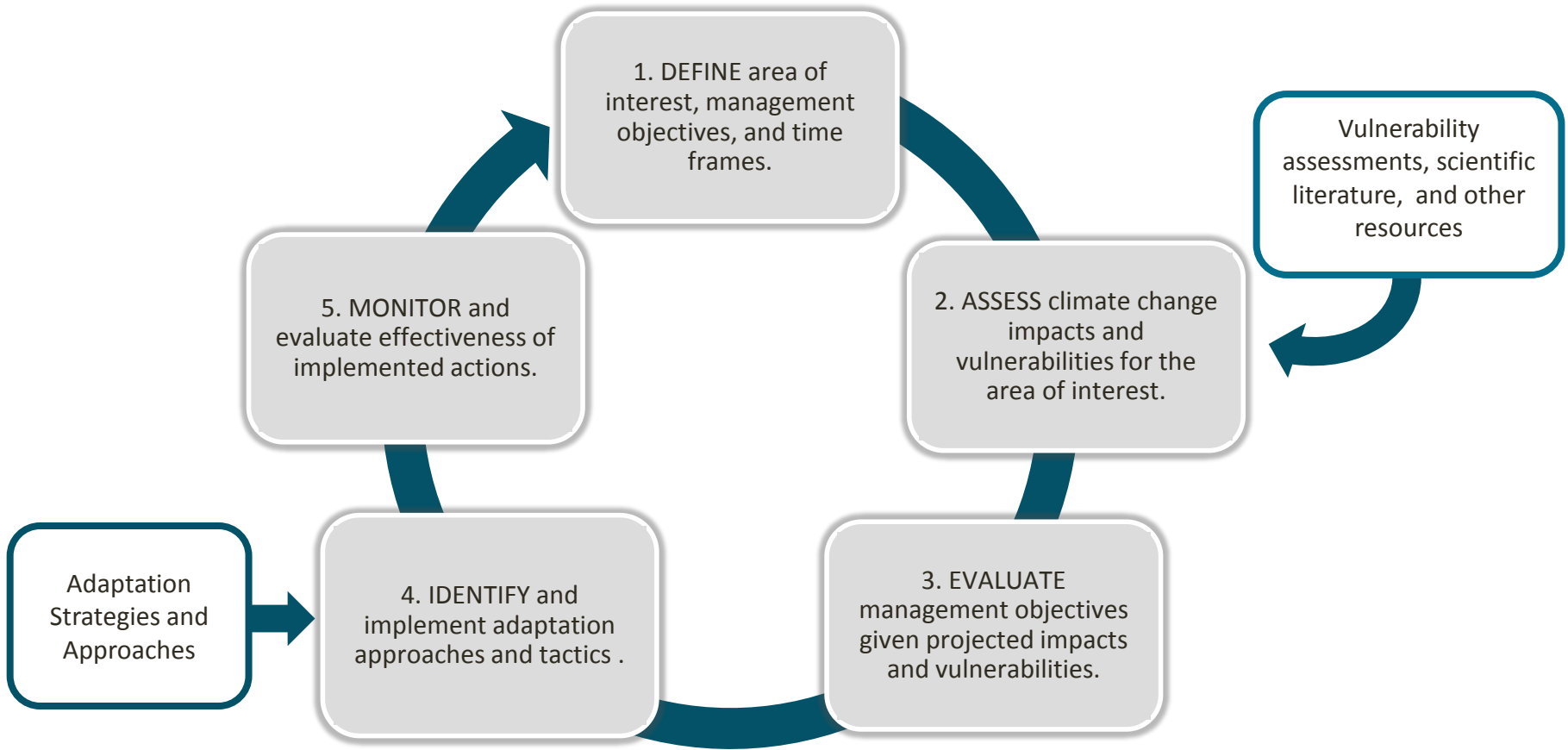
Place based, model-informed, expert-driven, transparent

Forest Adaptation Resources

- Designed for a variety of land managers
- Does not make recommendations
- Menu of strategies & approaches for climate change adaptation
- Adaptation workbook process for implementation



Adaptation Workbook

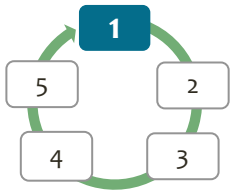


Adaptation Demonstrations

- Provide **real-world examples** of natural resource management activities that:
 - Enhance the ability of forests to cope with changing conditions
 - Achieve land owner management goals
- Foster **cross-ownership** dialogue and learning

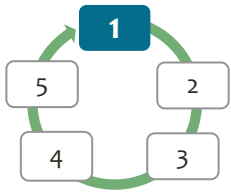
Chequamegon-Nicolet NF: Aspen





Step 1: DEFINE area of interest, management goals and objectives, and time frames.

- **Where are you working?**
- **What are your management goals and plans for this area?**



Step 1: DEFINE area of interest, management goals and objectives, and time frames.

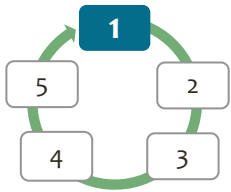
**Area of Interest
& Location**

Forested stand
near Park Falls, WI

**Forest
Type**

Aspen
(mature)





Step 1: DEFINE area of interest, management goals and objectives, and time frames.

Area of Interest & Location

Forested stand near Park Falls, WI

Forest Type

Aspen (mature)

Management Goals & Objectives

Early-successional habitat

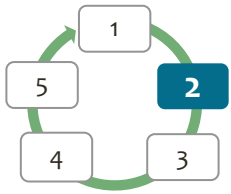
- Desired landscape conditions/age classes
- Maintain forest health & productivity
- Provide sustainable wood

Scenic Integrity

- Road to recreation area

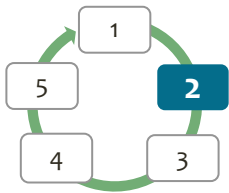
Time Frames

- Harvest (short term)
- Achieve mgmt. goals (long term)



Step 2: ASSESS climate change impacts and vulnerabilities for the area of interest.

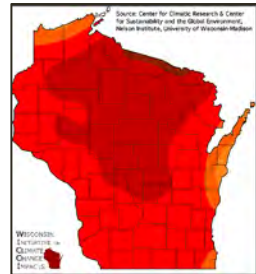
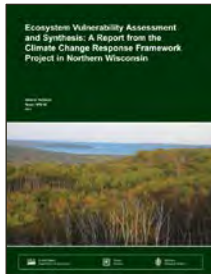
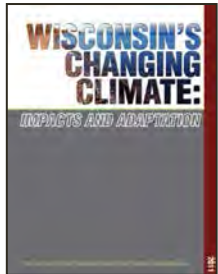
How might the area be uniquely affected by climatic change and subsequent impacts?



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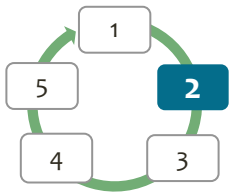
Broad-scale Impacts & Vulnerabilities

- Warmer temps, altered precip, drier summers
- Declines in many common northern species



How might broad impacts be different in the area of interest?

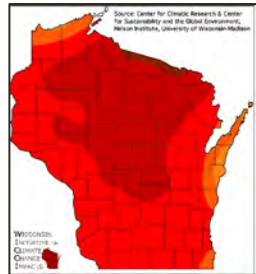
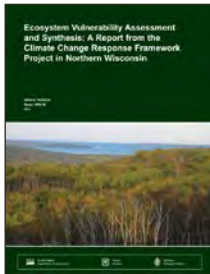
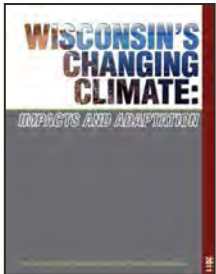




Step 2: ASSESS climate change impacts and vulnerabilities for the area of interest.

Broad-scale Impacts & Vulnerabilities

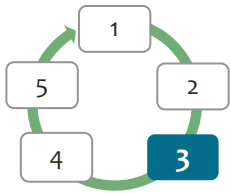
- Warmer temps, altered precip, drier summers
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Impacts & Vuln. for Area of Interest

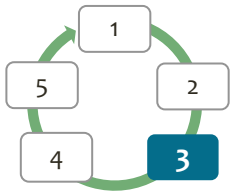
- Site is fairly dry now
- Mesic hardwoods are more susceptible
- Can regenerate aspen now, but maybe not in next rotation

Overall vulnerability: Moderate -High



Step 3: EVALUATE management objectives given projected impacts and vulnerabilities.

- **What management challenges or opportunities might occur?**
- **Can current management meet management goals?**
- **Do goals need to change?**



Step 3: EVALUATE management objectives given projected impacts and vulnerabilities.

Mgmt. Obj.

- Regenerate aspen
- Scenic integrity

Challenges

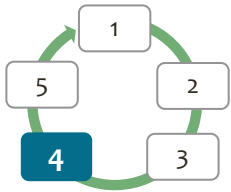
- Long-term maintenance
- Few tree species
- Productivity issues
- Hazel competition
- Reserve strips more vulnerable to windthrow

Opportunities

- Future site may be suitable for pine
- Mixed areas along road look better

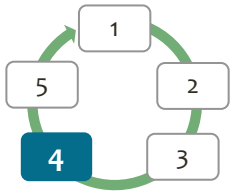
Feasibility of Meeting Obj. (Current Mgmt)

- Short term: High
- Long-term: Low
- High



Step 4: IDENTIFY and adaptation approaches and tactics for implementation.

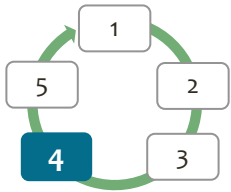
What actions can be taken to enhance the ability of the area to cope with change and meet management goals?



Step 4: IDENTIFY and adaptation approaches and tactics for implementation.

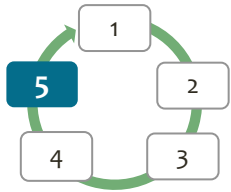
Overall Approach: Enhance future options within existing management trajectory

- Aspen will regenerate now, but is likely to fare poorly over the long term.
- Maintain plans for clearcut, with additional actions to promote diversity and provide future options
- Pro-active on invasives and disturbance planning



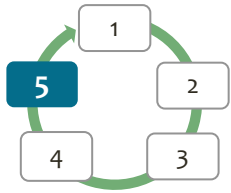
Step 4: IDENTIFY and adaptation approaches and tactics for implementation.

Adaptation Approach	Tactic	Consider:	Recommend Tactics?
<ul style="list-style-type: none"> • Maintain or improve the ability of forests to resist pests and pathogens. 	<ul style="list-style-type: none"> • Clearcut aspen • Thin roadside aspen 	<ul style="list-style-type: none"> • Benefits • Drawbacks • Barriers • Practicability 	Yes
<ul style="list-style-type: none"> • Favor or restore native species that are expected to be better adapted to future conditions. 	<ul style="list-style-type: none"> • Plant white pine and red oak (to become minor component) • Favor future-adapted species on site 		Yes



Step 5: MONITOR and evaluate effectiveness of implemented actions.

- **How do we know if the selected actions were effective?**
- **What can we learn from these actions to inform future management?**



Step 5: MONITOR and evaluate effectiveness of implemented actions.

Monitoring Item	Monitoring Metric	Criteria for Evaluation	Implement
Post clearcut stocking*	Stems/acre	Established criteria	Stocking surveys
Survival of planted trees*	Seedling survival	Established criteria	Survival surveys
Spp. composition for trees >1" diameter*	n/a	n/a	Regular stand exam
Intensified inventory before harvest to establish baseline (?)	n/a	n/a	Before harvest, then revisit

*Standard monitoring item

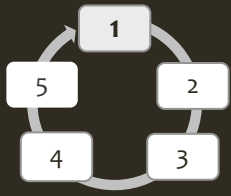
Chequamegon-Nicolet Aspen: Status



- Stands are marked
- Winter harvest (this year?)
- Then: underplant native future-adapted species

Menominee Tribal Enterprises: Oak Wilt



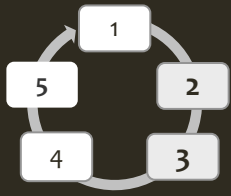


Step 1: DEFINE area of interest, management goals and objectives, and time frames.



Management Goals

- Foster diversity
- Favor sawtimber species
- Provide cultural uses
- Restore oak wilt pockets



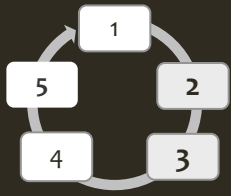
Step 2: ASSESS climate change impacts

Step 3: EVALUATE management objectives



Treatment

- Harvest affected & adjacent oaks
- Pull stumps
- Harvest other species in pocket



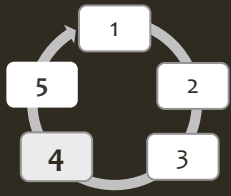
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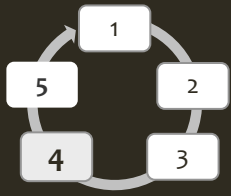
Step 4: IDENTIFY and adaptation approaches and tactics for implementation.

Adaptation Approach

- Reduce biological stressors
- Maintain and enhance diversity
- Promote future-adapted species
- Enhance genetic diversity

Restore sites with future-adapted species





Step 4: IDENTIFY and adaptation approaches and tactics for implementation.

Climate Change Tree Atlas

Projected Habitat Increases

American beech

American elm

American hornbeam

Bitternut hickory

Black cherry

Black locust

Black oak

Black willow

Boxelder

Bur oak

Eastern cottonwood

Silver maple

Slippery elm

White ash

White oak

Projected New Habitat

Black hickory

Black walnut

Blackjack oak

Chinkapin oak

Eastern red cedar

Eastern redbud

Flowering dogwood

Hackberry

Honeylocust

Mockernut hickory

Ohio buckeye

Osage-orange

Post oak

Shingle oak

**Also shrub &
understory
plants**

Menominee Oak Wilt: Status

Last Summer

- Selected sites
- Site prepped
- Oaks planted



This Summer and Next

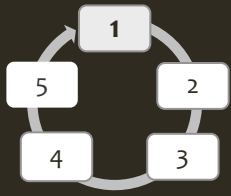
- Additional tree species
- Non-tree species of cultural value

Monitor

- Seedling success
- Forest health and stressors
- Forest composition
- Cost of treatment

Atlas Timberlands





Step 1: DEFINE area of interest, management goals and objectives, and time frames.



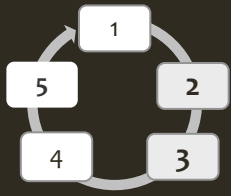
Management Goals

- Sustainable forestry
- Conservation



Current Management with Adaptation Benefits

- Follow BMPs for water quality
- Increase coarse woody material
- Increase tree species diversity
- Increase forest structural diversity
- Ensure adequate seedling regeneration
- Control invasives
- Minimize roads & trails

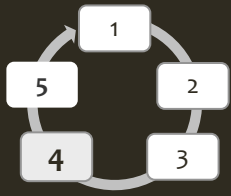


Step 2: ASSESS climate change impacts

Step 3: EVALUATE management objectives



Challenge: Shorter and more variable winter



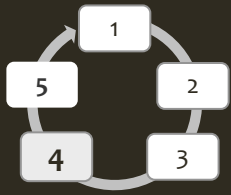
Step 4: IDENTIFY and adaptation approaches and tactics for implementation.



Adaptation Tactic: Summer harvest

Potential Barriers:

- More planning
- Higher cost
- Will it even work??



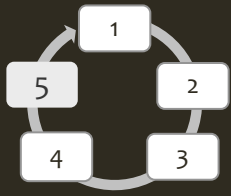
Step 4: IDENTIFY and adaptation approaches and tactics for implementation.



Spring/Early Summer 2014

- Timber marking
- Road layout
- Pre-sale road work
- Temporary bridge installation

**Currently being harvested
(weather permitting!)**

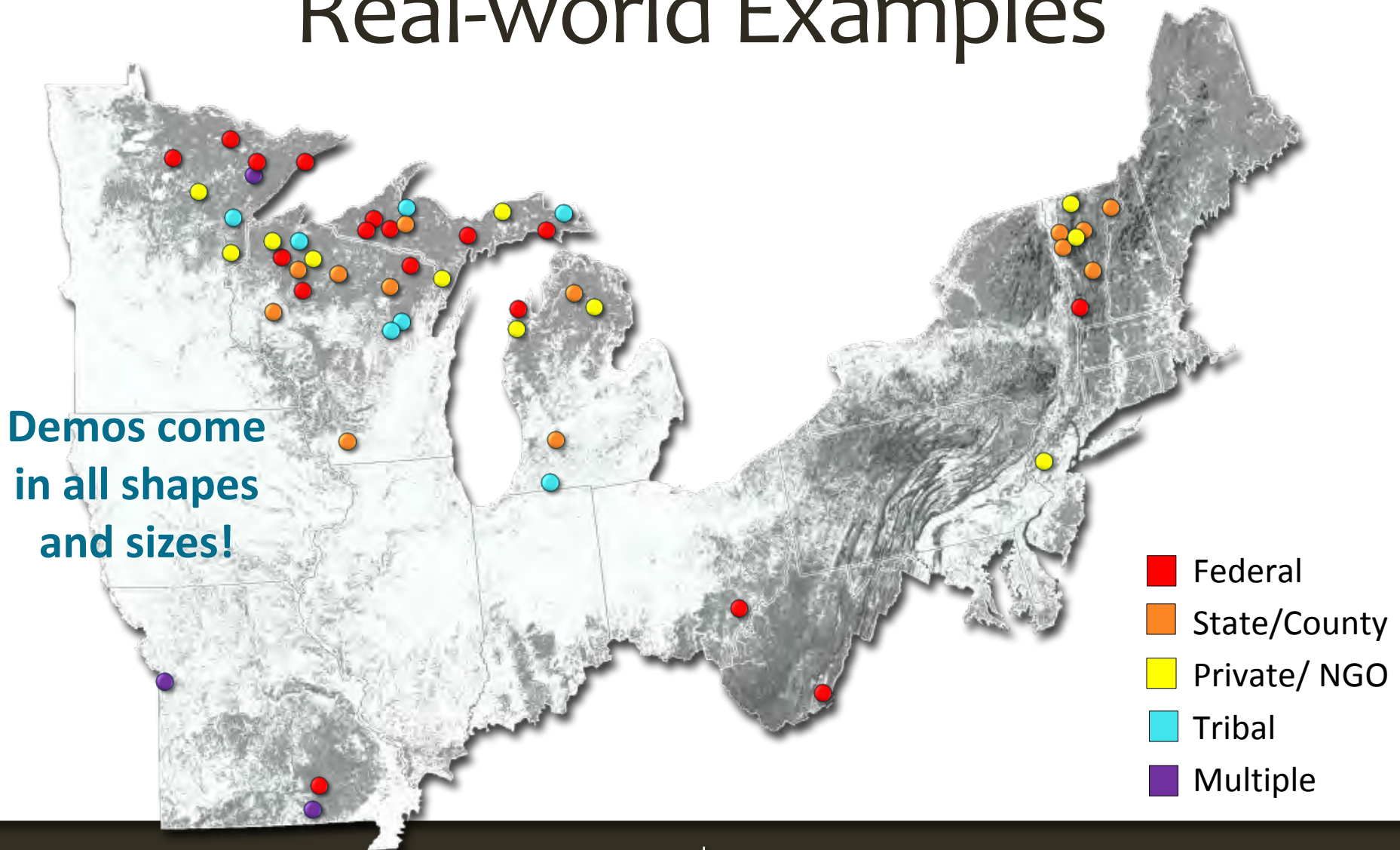


Step 5: MONITOR and evaluate effectiveness of implemented actions.



Rutting from a bad woods road (past management)

Real-world Examples



Final thoughts

When science-management interaction works best:

- Top-down: global/regional information “downscaled”
- Bottom-up: place-based expertise & need informs action

Climate-informed decisions are typically about people and place, not about climate.

- Help people do their jobs better
- Be creative and flexible

