Introductions
Climate Change Adaptation Menu Training: Chippewa National Forest and Leech Lake Band of Ojibwe

February 17-18, 2021
Northern Institute of Applied Climate Science  (aka NIACS)

Chartered by USDA Forest Service, universities, non-profit and tribal conservation organizations

Climate
Carbon
Climate and Carbon Services
- Climate impacts modeling
- Vulnerability assessment
- Climate adaptation
- Carbon science & management
- Science translation & professional training

22 Staff Members (Forest Service/Universities)
- 11 climate adaptation specialists
- 6 research scientists
- 2 web specialists
- 3 GIS/lab specialists

www.niacs.org
Why are we here?

- Get a quick recap of **regional** and local climate change trends.
- Learn about several new **adaptation menus**, covering a range of topics.
- Work on example projects to **brainstorm adaptation project ideas**.
What are we doing?

Day 1
- Climate change trends
- Activity: climate impacts
- Adaptation menus
- Activity: menu review

Day 2
- Activity: discussion roundtables
- Activity: developing example projects
- Activity: sharing examples
Climate change recap: The BIG THREE

- Annually: warmer and wetter
- Warmer winters
- More heavy rain

Source: Kenny Blumenfeld, Kenneth.Blumenfeld@state.mn.us
Wetter and Warmer Conditions Observed
Minnesota Average Temperature and Precipitation

Annual Precipitation (in.) vs. Annual Temperature (F)

Data for 1895-1986
Minnesota Average Temperature and Precipitation

Annual Temperature (F)

Annual Precipitation (in.)

- 1987-2020
- 1895-1986
Warmer winters: where the action is

Total temperature change, 1895 – 2019

Annual Average
+ 3.0°F
+ 3.5°F
+ 1.9°F

Winter Lows
+ 5.7°F
+ 7.1°F
+ 4.7°F

Summer Highs
+ 1.1°F
+ 0.6°F
- 0.9°F
Warmer winters: where the action is

30-Year Average Minimum Winter Temperature

Minimum Temperature
High: 11.5°F
Low: -11.0°F

0°F Contour
5°F Increment
1°F Increment

1896 1925
1900 1920 1940 1960 1980 2000 2018

Courtesy B. Gosack, MN DNR WHAF program
Warmer winters: cold extremes are vanishing

Count of Minimum Temps -35F or Lower, by Decade
Grand Rapids Forest Research Station
Warmer winters: lake ice

- Long-term state-avg decline is 1.8 days per decade
- Decline from 1987-2017 is 4.2 days per decade
Heavy rainfall: 1-inch events

Census of 1-inch precip days by year at 39 long-term stations
Heavy rainfall: 4-inch events

Census of 4-inch precip days by year at 39 long-term stations
Heavy rainfall: Max rainfall is getting larger

39-station max rainfall by year
Activity: Climate impacts

Climate Change Impacts on the Chippewa National Forest
**Adaptation** is the adjustment of systems to respond to climate change.

Adaptation actions are designed to **intentionally** address climate change impacts and vulnerabilities in order to meet goals and objectives.
Adaptation Workbook

A workbook process provides “structured flexibility”

1. DEFINE management objectives.
2. ASSESS climate impacts.
3. EVALUATE management objectives.
4. IDENTIFY adaptation approaches.
5. MONITOR and evaluate effectiveness.

www.nrs.fs.fed.us/pubs/52760
**Adaptation Workbook**

*Systematic and designed for transparency.*

<table>
<thead>
<tr>
<th>Management Objectives</th>
<th>Challenges</th>
<th>Opportunities</th>
<th>Feasibility</th>
<th>Other Considerations</th>
</tr>
</thead>
<tbody>
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</table>

<table>
<thead>
<tr>
<th>Adaptation Actions</th>
<th>Approach</th>
<th>Tactics</th>
<th>Time Frame</th>
<th>Benefits</th>
<th>Drawbacks/Barriers</th>
<th>Recommend Tactic?</th>
</tr>
</thead>
<tbody>
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Adaptation Workbook

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Menus
Adaptation Menus of Strategies and Approaches

A “menu” of possible actions that allows you to decide what is most relevant for a particular location and set of conditions.
Adaptation Menus of Strategies and Approaches

- Connecting broad ideas to specific actions

- Consistent “hierarchy” of general and specific ideas

- Document the **intent** of adaptation actions.

- Boost creativity!
Adaptation Menus of Strategies and Approaches
Adaptation Menus of Strategies and Approaches

Published:
- Forestry
- Urban Forestry
- Forested Watersheds
- Tribal Perspectives
- Agriculture
- Forest Carbon Management
- Recreation
- Non-Forested Wetlands
- Glacial Lake Fisheries

In Preparation:
- Fire-Adapted Ecosystems
- Wildlife Management
- Ocean Coastal Ecosystems
- Fresh-Water Coastal Ecosystems
- Grasslands

www.AdaptationWorkbook.org/strategies
Spotlight: Tribal Adaptation Menu

▪ Foundation of indigenous values (respect, reciprocity, etc)

▪ Ojibwe and Menominee perspectives, languages, concepts and values

▪ Helps express climate adaptation ideas through an indigenous lens, AND expresses the adaptation benefits of indigenous practices

▪ Communication tool for tribal and non-tribal partners
Activity: Adaptation menu review

- Review adaptation menus that interest you!

Take your own notes and be ready to discuss these questions:

1. *What’s an adaptation approach that you’re already doing?*
2. *Is there a new adaptation approach that you’d like to try soon?*
3. *Did something on the menu surprise you?*
Questions and Next Steps

▪ For tomorrow:
  ▪ Take a peek at other menus
  ▪ Think of an example “project” for tomorrow’s activity!
    • Something that you’re currently working on or that you’d like to work on soon.
    • Have some rough management goals and objectives in mind.
Thank you!

Climate Hubs
www.climatehubs.oce.usda.gov

Climate Change Resource Center
www.fs.usda.gov/ccrc

Climate Change Atlas
www.fs.fed.us/nrs/atlas/

NIACS Resources
www.forestadaptation.org/
Climate Change Adaptation Menu Training: Chippewa National Forest and Leech Lake Band of Ojibwe

February 17-18, 2021
# Activity: Menu discussion roundtables

<table>
<thead>
<tr>
<th>Time</th>
<th>Room 1 (Kristen)</th>
<th>Room 2 (Stephen)</th>
<th>Room 3 (Danielle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:15 – 8:35</td>
<td>Fire-Adapted Ecosystems</td>
<td>Wildlife</td>
<td>Forest Carbon</td>
</tr>
<tr>
<td>8:40 – 9:00</td>
<td>Outdoor Recreation</td>
<td>Forestry</td>
<td>Forested Watersheds</td>
</tr>
<tr>
<td>9:05 – 9:25</td>
<td>Tribal Adaptation Menu</td>
<td>Tribal Adaptation Menu</td>
<td>Tribal Adaptation Menu</td>
</tr>
</tbody>
</table>
Activity: Example adaptation projects

A workbook process provides “structured flexibility”

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5. MONITOR and evaluate effectiveness.

www.nrs.fs.fed.us/pubs/52760
Step 1: DEFINE area of interest, management goals and objectives, and time frames.
**Step 1:** DEFINE location, project, and management goals.

<table>
<thead>
<tr>
<th>Management Goal</th>
<th>Management Objective</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Increase urban tree species diversity</td>
<td>▪ Have no more than 20 percent of a family, 10 percent of a genus and 5 percent of a species</td>
<td>15 years</td>
</tr>
<tr>
<td>▪ Increase canopy cover</td>
<td>▪ Increase % canopy from 20% to 30%</td>
<td>20 years</td>
</tr>
<tr>
<td>▪ Reduce invasive species cover</td>
<td>▪ Reduce area covered by invasive buckthorn from 10% to no more than 5%</td>
<td>10 years</td>
</tr>
</tbody>
</table>
Step 2: Assess site-specific climate change impacts & vulnerabilities
**Step 2:** ASSESS site-specific climate change impacts and vulnerabilities.

<table>
<thead>
<tr>
<th>Mgmt. Unit or Topic</th>
<th>Climate Change Impacts and Vulnerabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Regional</strong></td>
</tr>
<tr>
<td></td>
<td><em>From vulnerability assessments</em></td>
</tr>
<tr>
<td>Upland forest</td>
<td>More extreme precipitation events</td>
</tr>
<tr>
<td></td>
<td>Increased potential for summer drought</td>
</tr>
</tbody>
</table>
**Step 2:** ASSESS site-specific climate change impacts and vulnerabilities.

Vulnerability Determination

![Vulnerability Determination Diagram](image)
Step 3: EVALUATE management objectives given projected impacts and vulnerabilities.
**Step 3:** EVALUATE management objectives given projected impacts and vulnerabilities.

**Feasibility** – Can you meet your management objectives using current (business-as-usual) management actions?

**High:** We can do it!
- Opportunities > Challenges

**Low:** We’ll need more resources or effort.
- Challenges > Opportunities
Step 4: Identify adaptation approaches and tactics for implementation
**Step 4:** IDENTIFY adaptation approaches and tactics for implementation.

**Approach** – Select from the menu. Pick any that seem to make sense and help address the challenges.

**Tactic** – Describe a specific action you can take.

These details should ideally answer what, where, and how you will implement the actions.
Adaptation

• Try to sort your adaptation ideas into three different categories:

  - Stuff you’re already doing
    – climate change just makes it that much more important
  - Small “tweaks” that improve effectiveness
  - New & different actions, even some that seem wild & crazy
**Step 5**: Monitor and evaluate effectiveness of adaptation actions
Step 5: MONITOR and evaluate effectiveness of implemented actions.

Example – Jerktail Mountain Woodland

<table>
<thead>
<tr>
<th>Adaptation Monitoring Variable</th>
<th>Criteria for Evaluation</th>
<th>Monitoring Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel loads</td>
<td>reduce fuel loads; reduce leaf litter depth by 50% by first year after second burn</td>
<td>Use the National Park Service Fire Monitoring Handbook (FMH) plot design: 2 plots. Baseline monitoring and return first and second growing season after burn.</td>
</tr>
<tr>
<td>Tree basal area, growth, and composition</td>
<td>Increase in shortleaf pine, white oak, and chinkapin oak, and achievement of woodland structure.</td>
<td>Permanent inventory plots to be established</td>
</tr>
<tr>
<td>Shortleaf pine regeneration</td>
<td>Presence of shortleaf pine seedlings and saplings</td>
<td>Qualitative observation</td>
</tr>
</tbody>
</table>
Activity: Sharing examples

www.menti.com

Code: 95 46 67 6

Tell us more about your project sites:
Questions

▪ How do you envision using these adaptation menus going forward?
▪ What help can NIACS provide?
▪ Other questions or suggestions?
Climate Change Response Framework

Climate change adaptation is complex
We provide education and training to help demystify the issue.

Who we are
Our team of climate adaptation and education specialists is dedicated to collaborating with stakeholders from across the land management community.

Understanding risk
Climate change introduces uncertainty about future conditions and increases challenges for natural resource managers interested in sustaining ecosystems over the long term.

Adaptation in action
Responding to climate change requires an approach that tailors actions to the unique needs of a particular project.

www.forestadaptation.org
Climate Change Resource Center

- Written and organized for land managers
- Original content, links to tools and info
- Credible, science based, relevant

https://www.fs.usda.gov/ccrc/
Thank you!

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www.climatehubs.oce.usda.gov

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Climate Change Atlas
www.fs.fed.us/nrs/atlas/

NIACS Resources
www.forestandadaptation.org/
Forest Service: only federal agency with Climate Scorecard

Our Climate Journey

2011-2016
Climate Change Scorecard
Developed performance metrics & created capacity

2011
Climate Roadmap
Charted a path forward

2015-2019
OIG Review
Improved accountability & outcomes

2020
Sustainability Action Plan & Scorecard
Integrates into agency programs, policies, & decisions.

2019
Sustainability Scorecard Pilot
Created climate actions & outcomes toward sustainability

Our Sustainable Future
Scorecard 2.0: Journey’s Progress Stages
Sustainability Scorecard 2.0: Core Elements

- Vulnerability
- Sustainable Operations
- Adaptation
- Watershed Stewardship
- Monitoring
- Carbon Stewardship