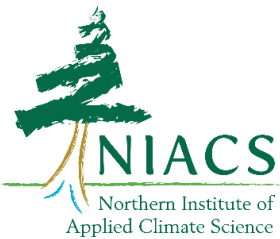
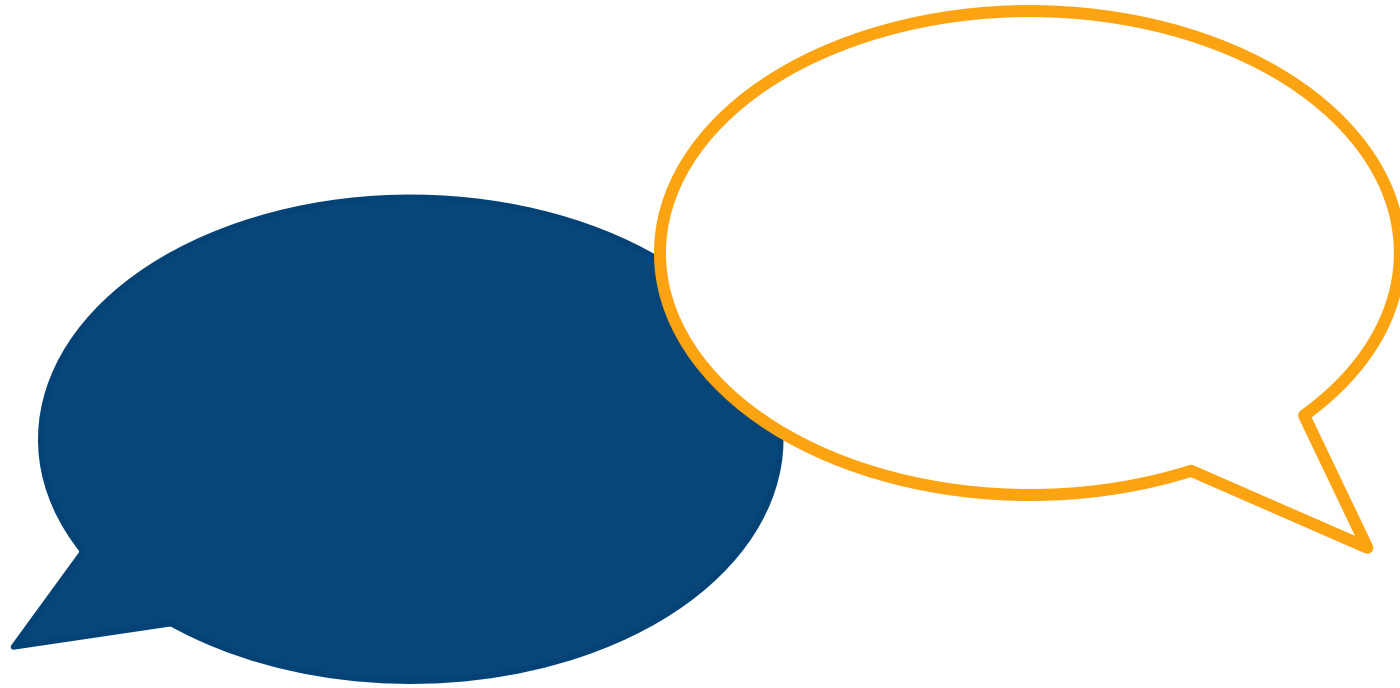


Climate Change Adaptation Menu Training: Chippewa National Forest and Leech Lake Band of Ojibwe

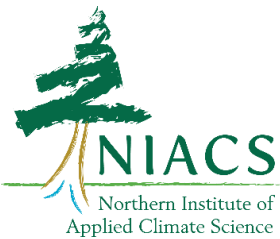


February 17-18, 2021

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)



Climate
Carbon

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



Michigan
Technological
University



The
UNIVERSITY
of VERMONT



UNIVERSITY OF MINNESOTA



AMERICAN FORESTS



NCASI

Northern Institute of Applied Climate Science (aka NIACS)

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

Practical
information

Adaptation
resources

Technical
assistance



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

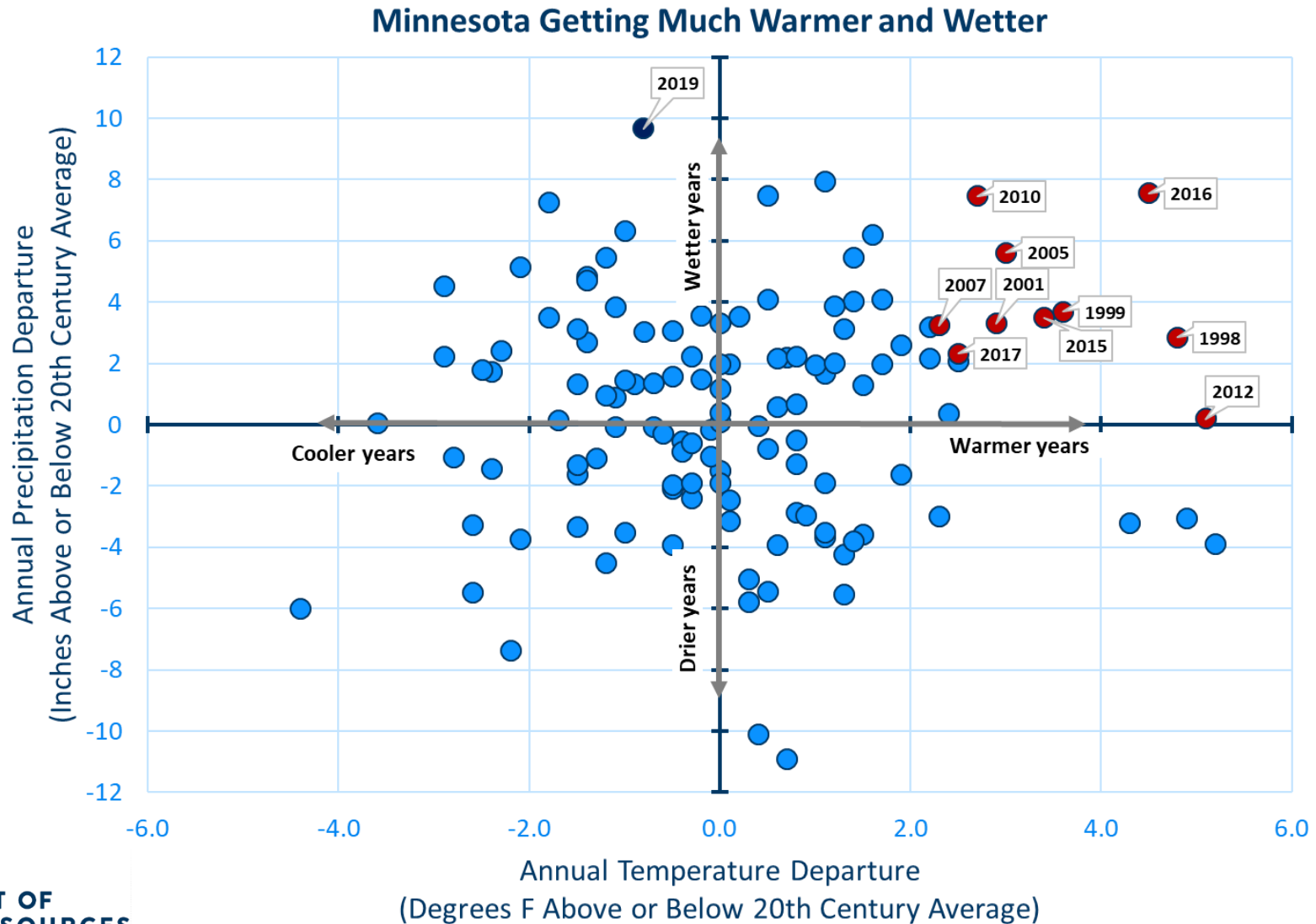
Climate change recap: The BIG THREE

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

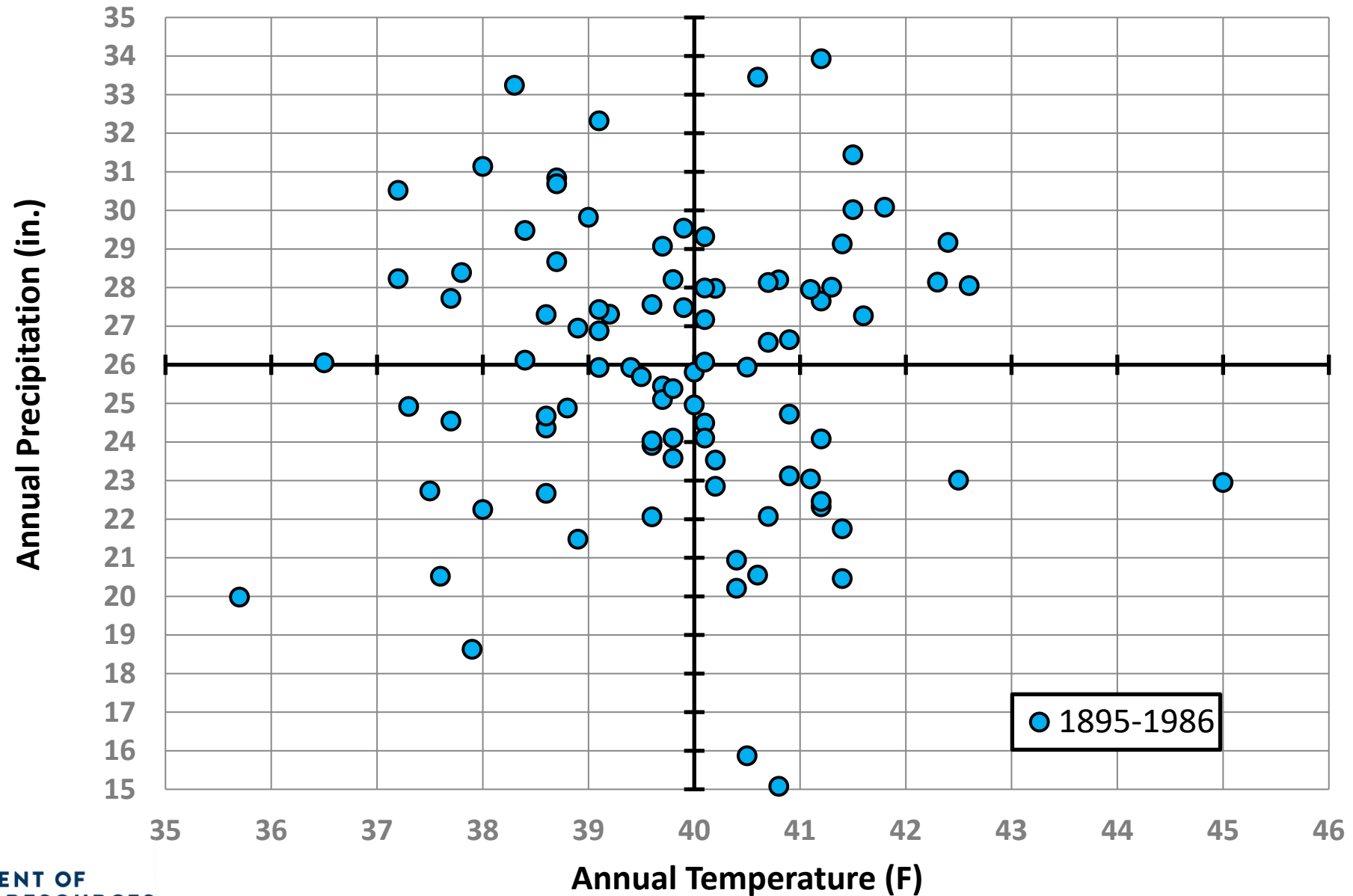


www.facebook.com/ChippewaNF

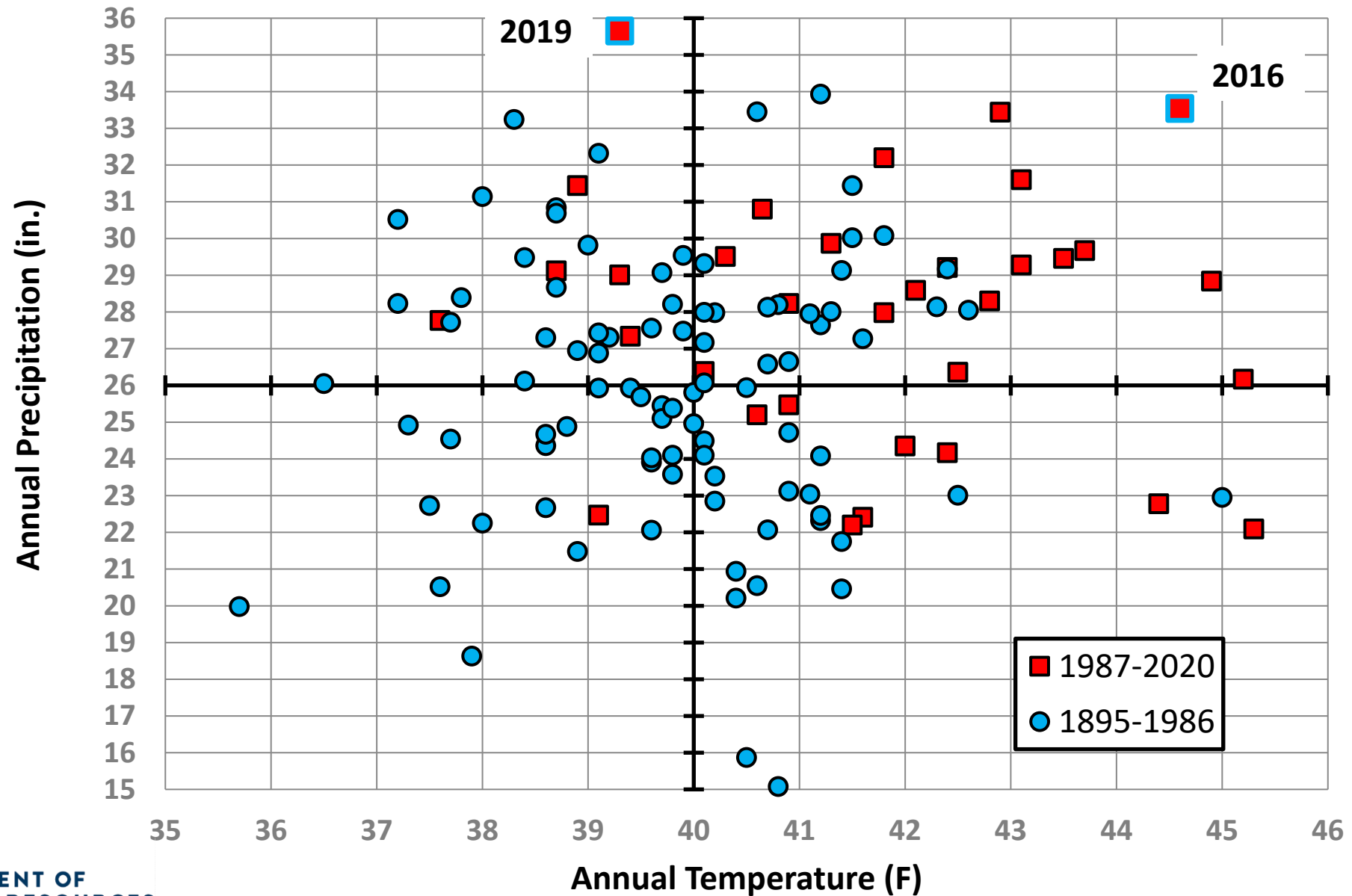
Wetter and Warmer Conditions Observed



Minnesota Average Temperature and Precipitation

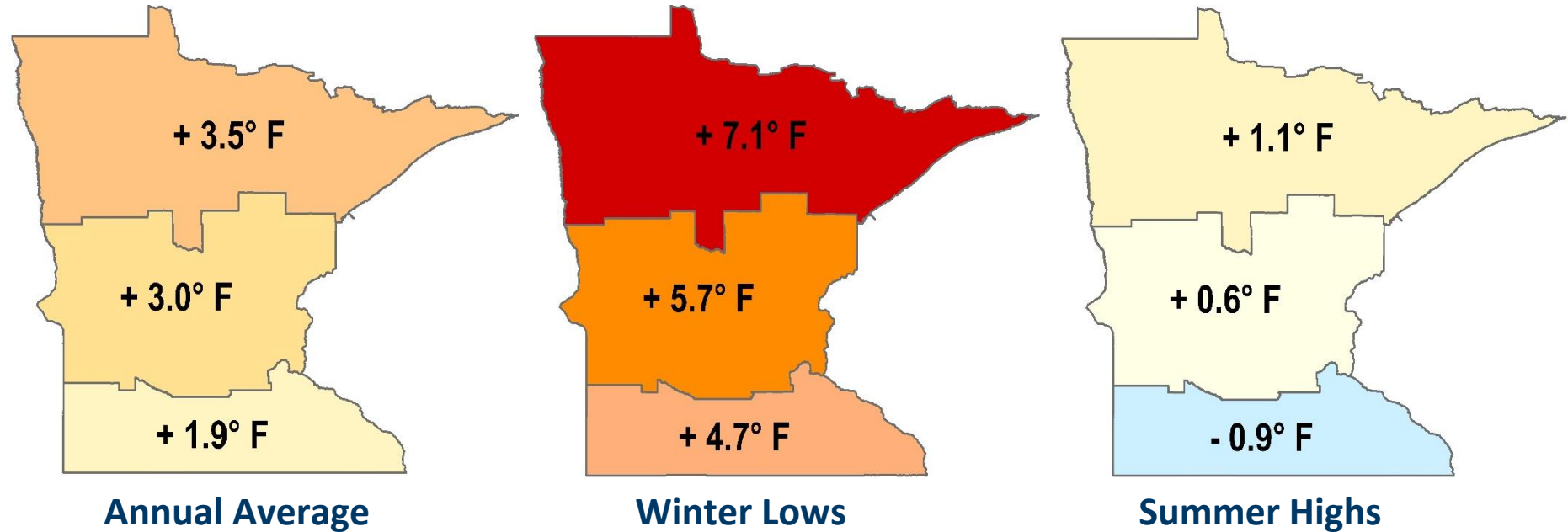


Minnesota Average Temperature and Precipitation



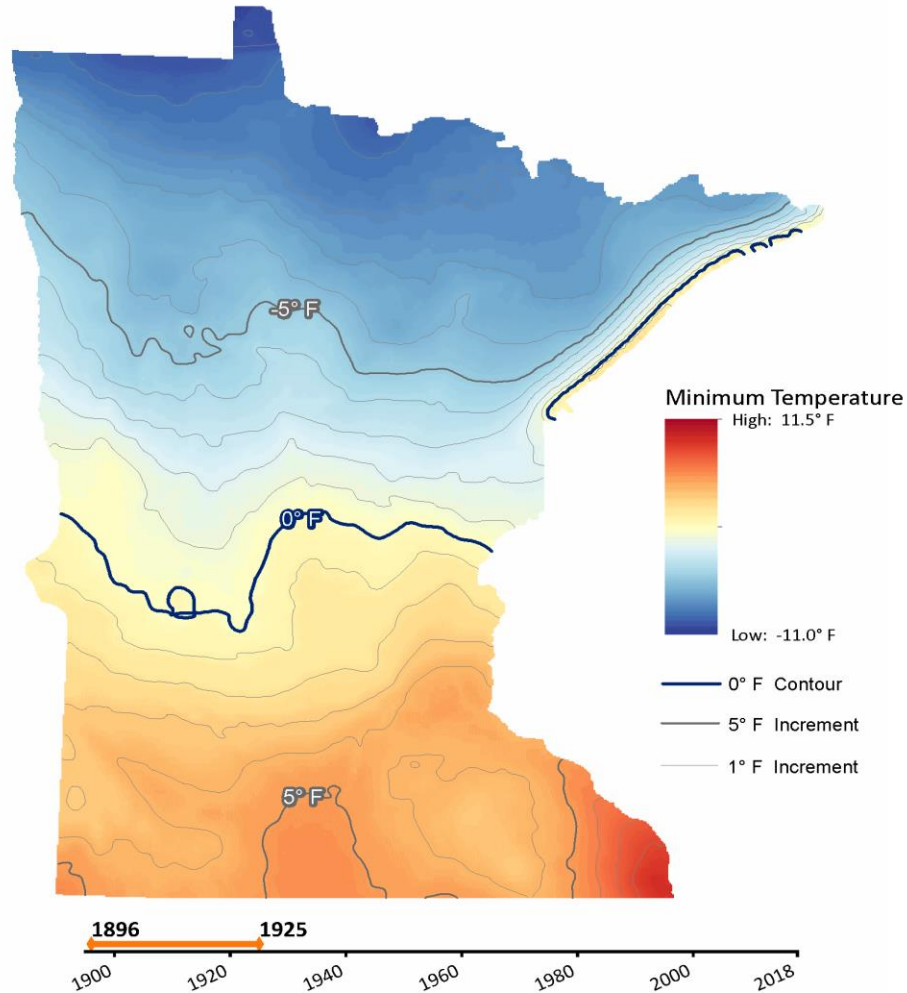
Warmer winters: where the action is

Total temperature change, 1895 – 2019



Warmer winters: where the action is

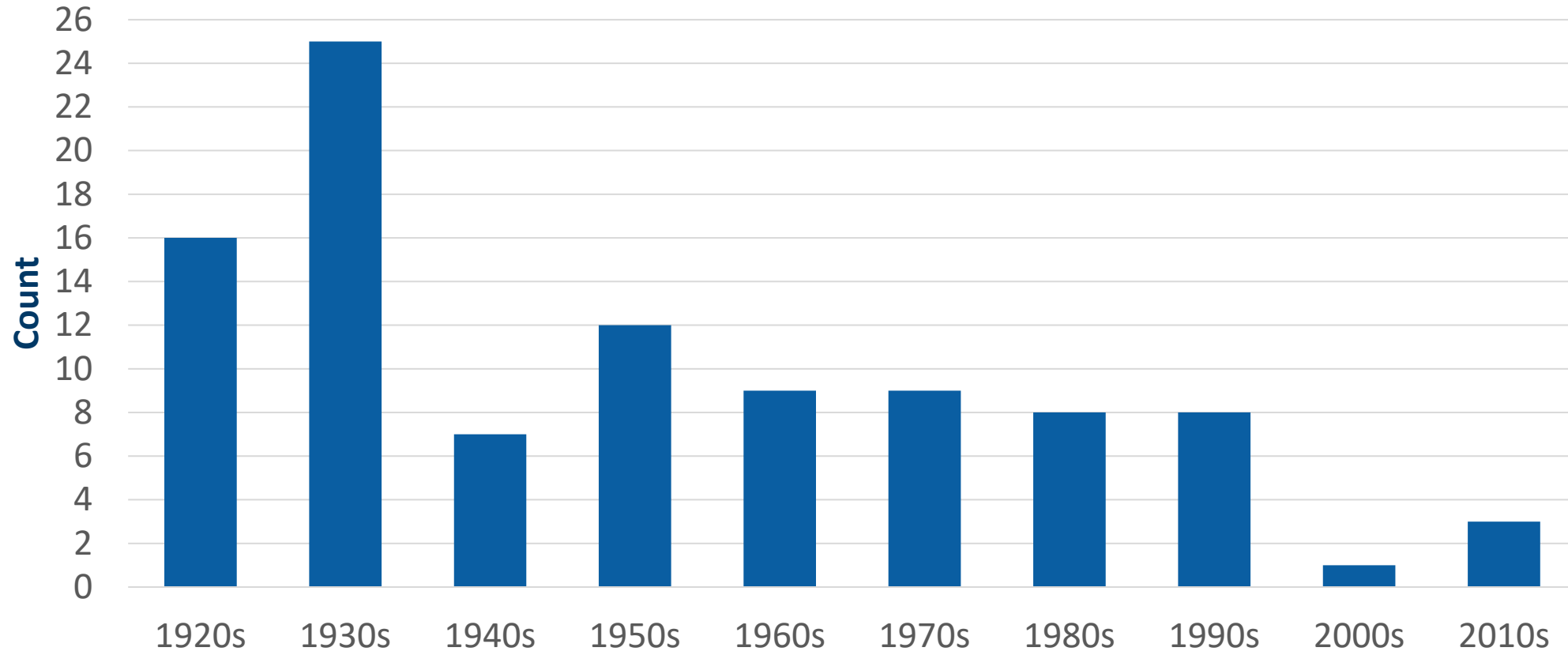
30-Year Average Minimum Winter Temperature



Courtesy B. Gosack,
MN DNR WHAF program

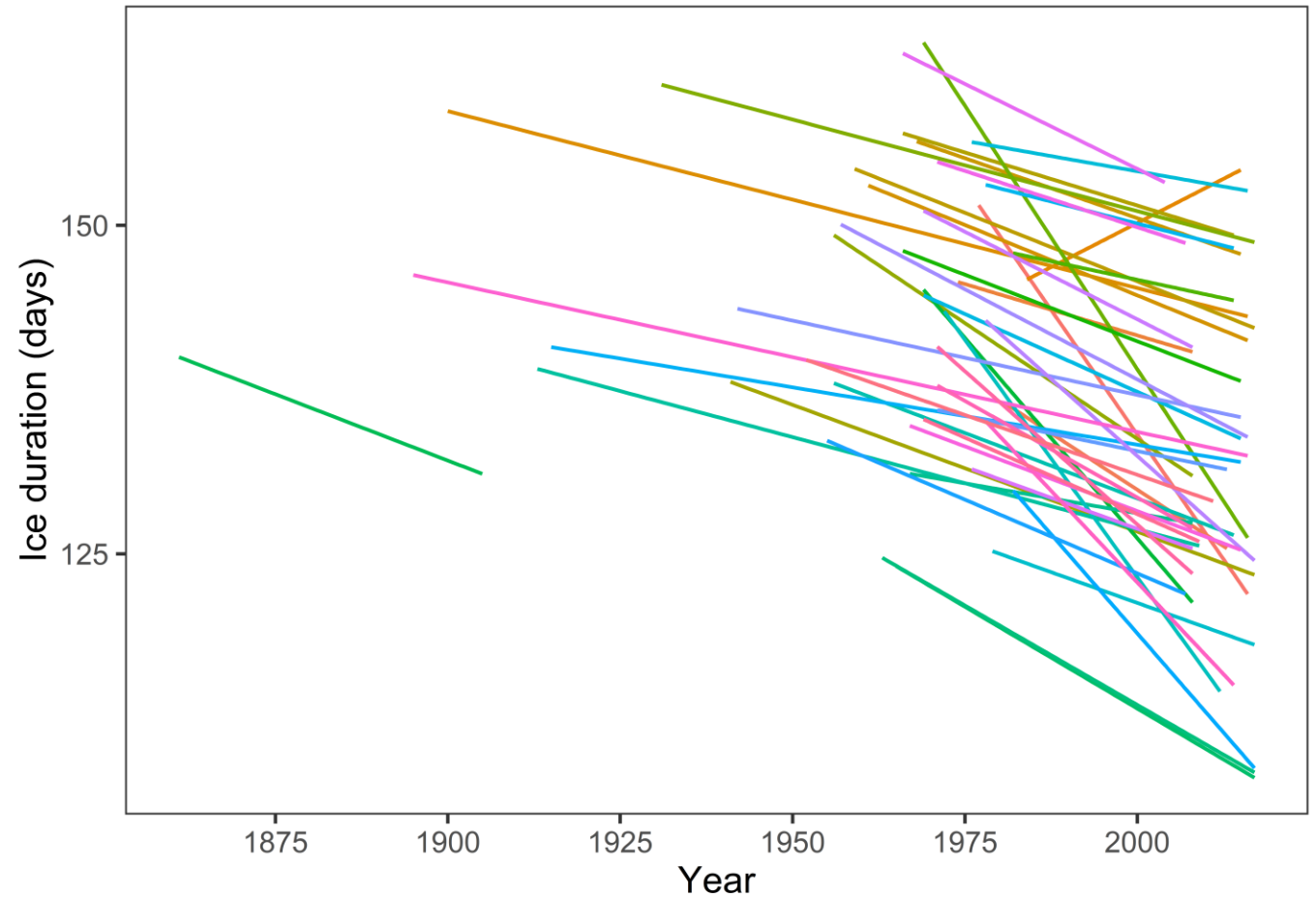
Warmer winters: cold extremes are vanishing

Count of Minimum Temps -35F or Lower, by Decade
Grand Rapids Forest Research Station



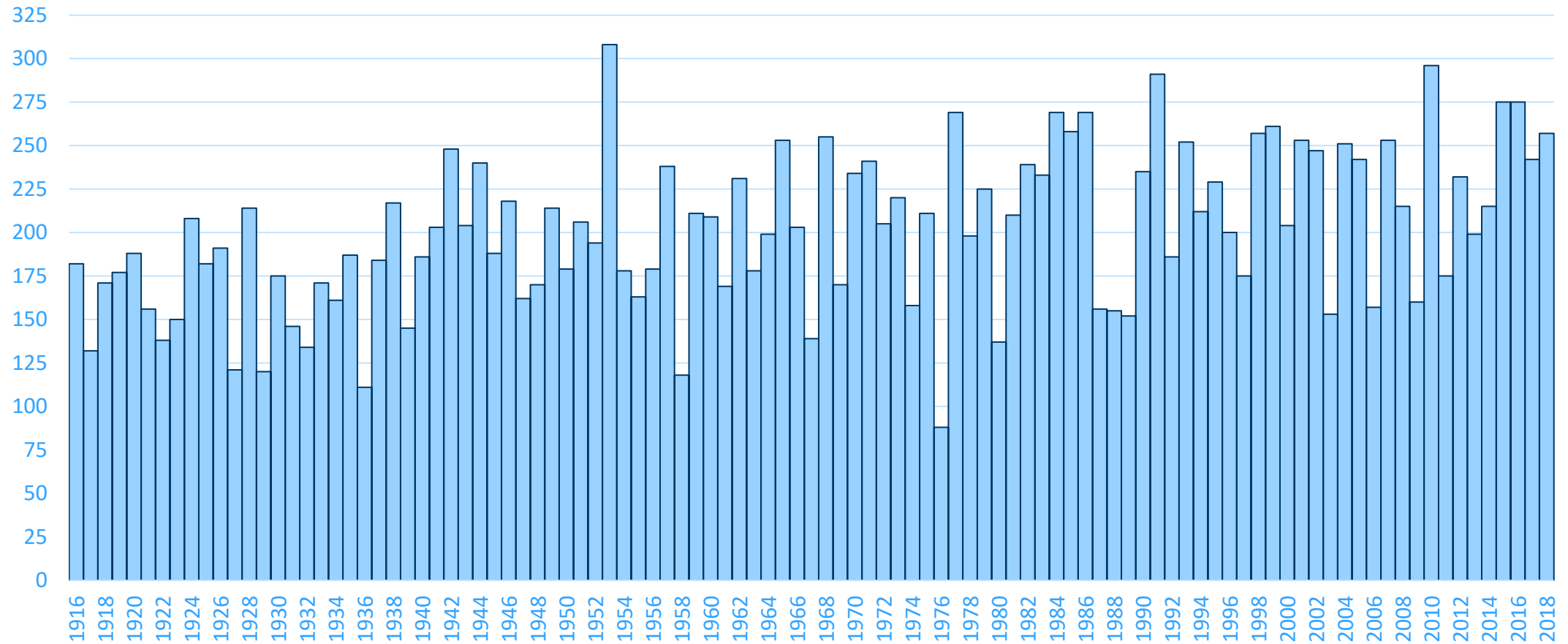
Warmer winters: lake ice

- Long-term state-avg decline is 1.8 days per decade
- Decline from 1987-2017 is **4.2** days per decade



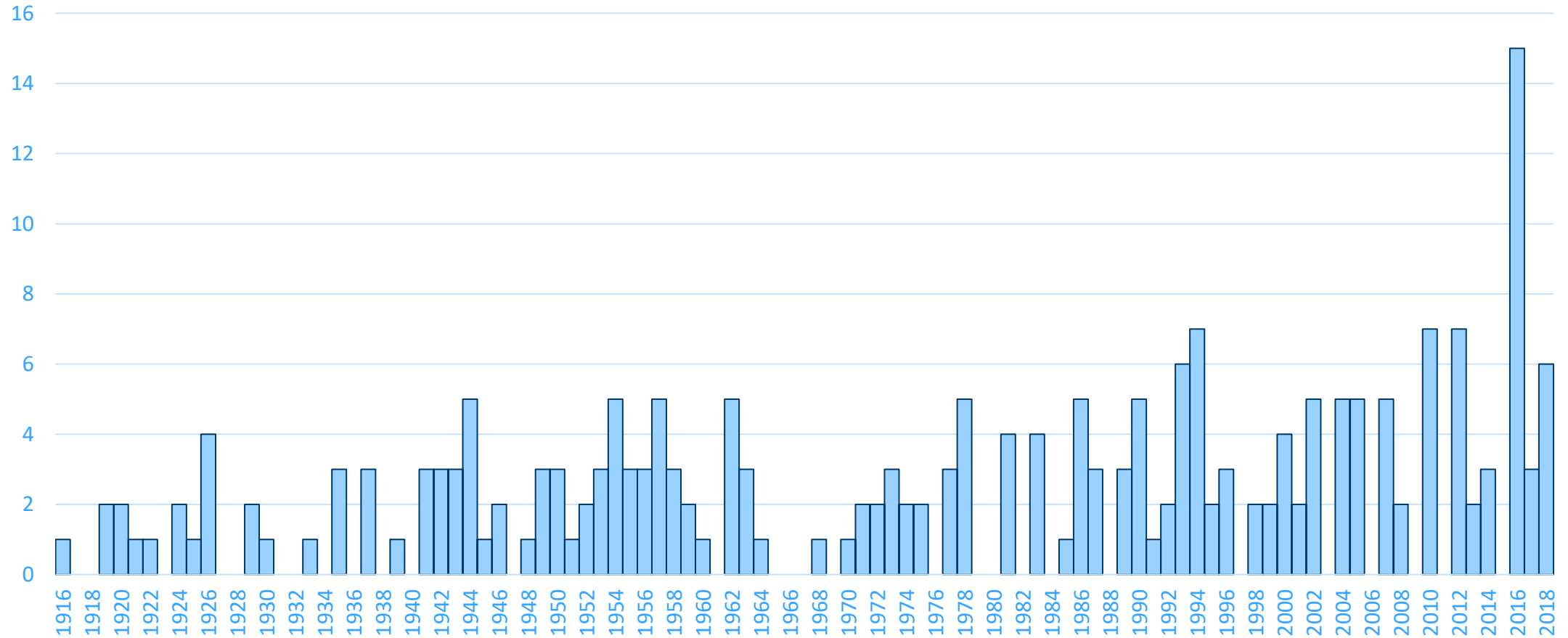
Heavy rainfall: 1-inch events

Census of 1-inch precip days by year at 39 long-term stations



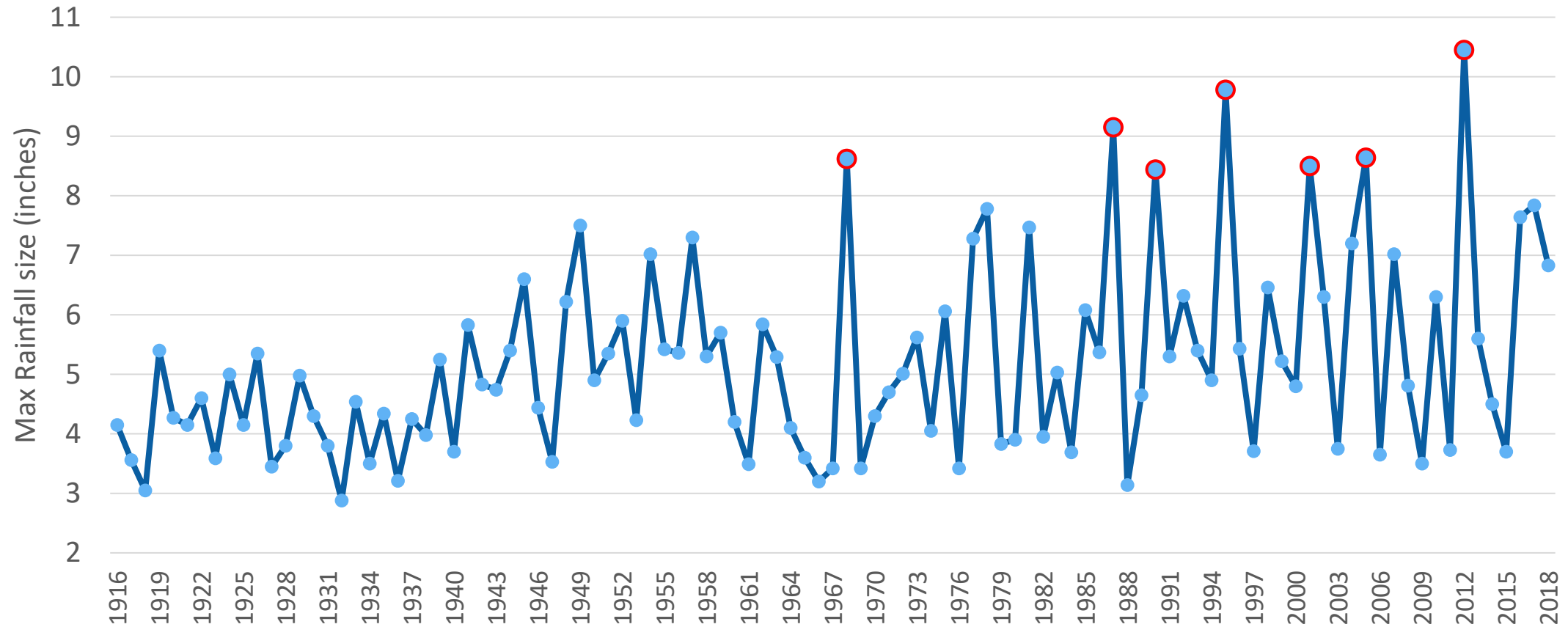
Heavy rainfall: 4-inch events

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

www.menti.com

Code: **48 09 02 9**



Climate Change Impacts on the Chippewa
National Forest

Mentimeter



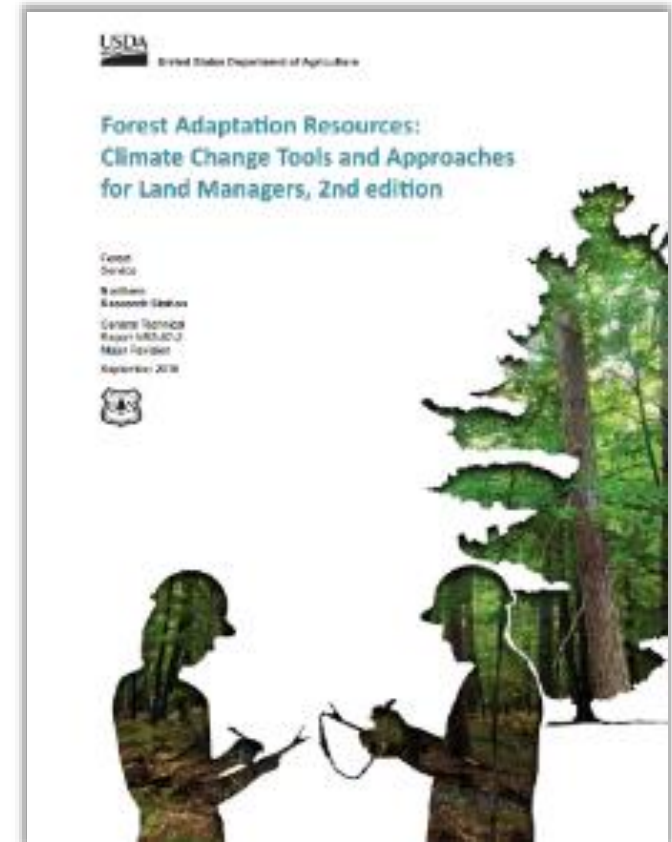
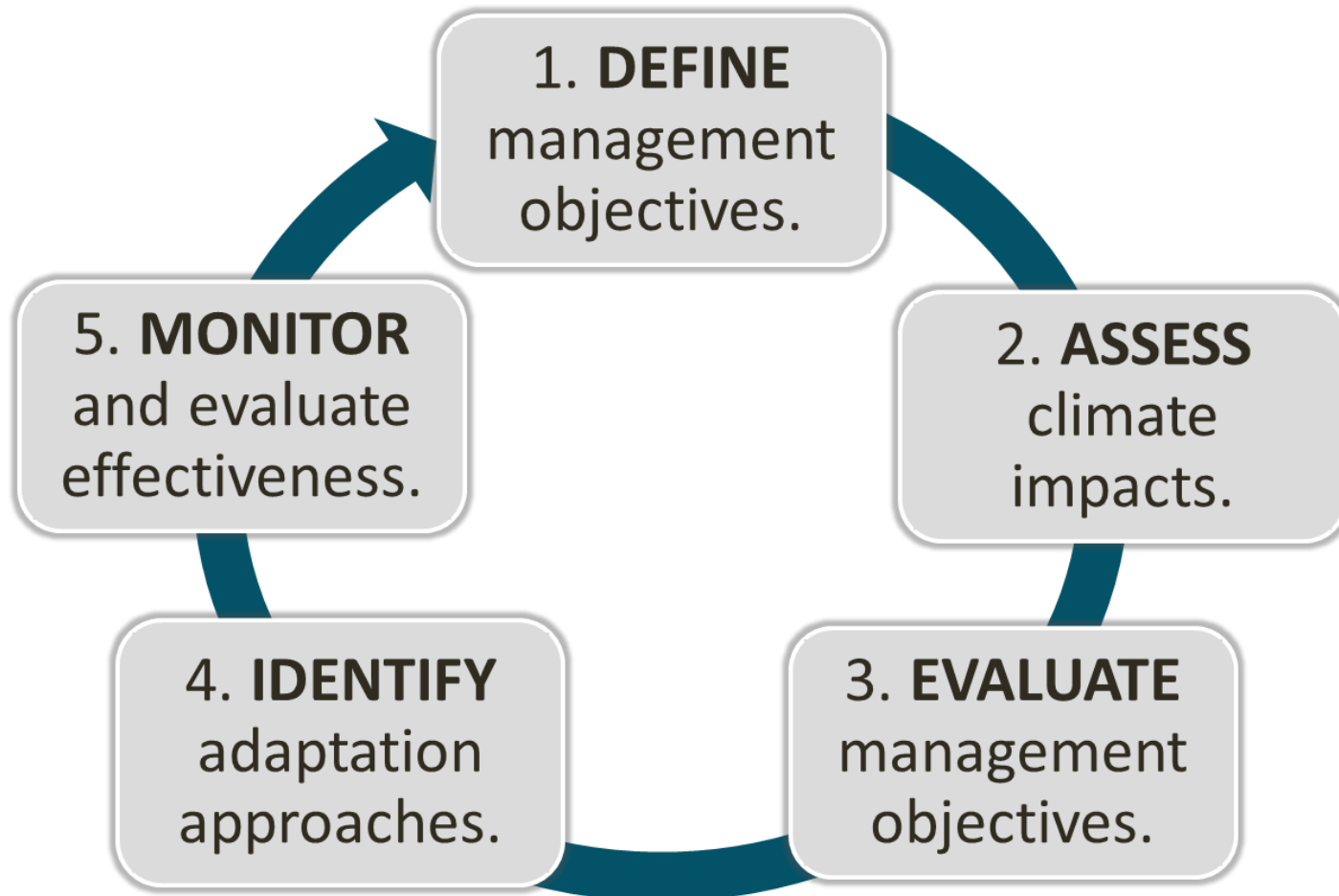
Adaptation is the adjustment of systems to respond to climate change.



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”



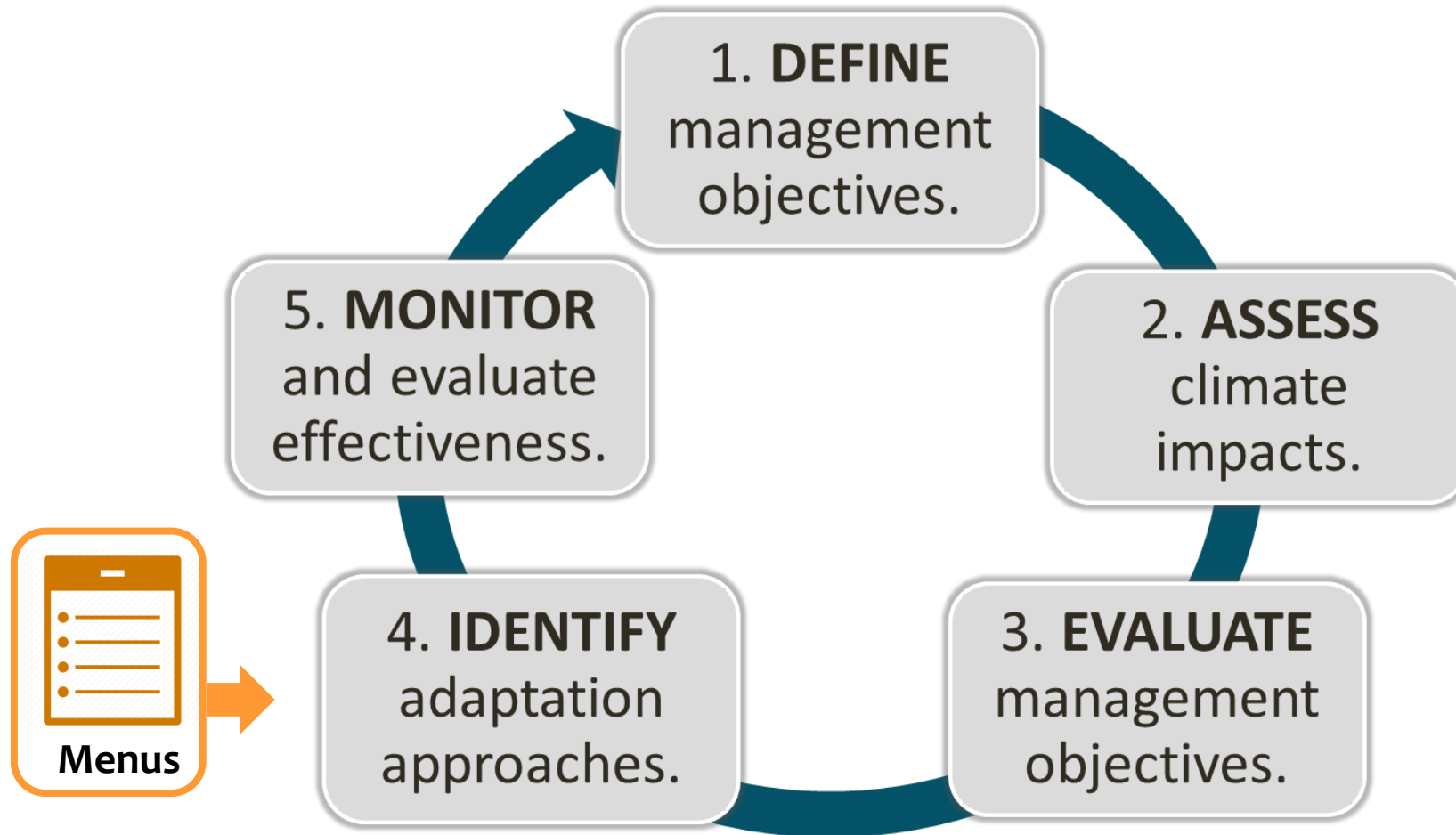
Adaptation Workbook

Systematic and designed for transparency.

Management Objectives	Challenges	Opportunities	Feasibility	Other Considerations	
Adaptation Actions			Benefits	Drawbacks/ Barriers	Recommend Tactic?
Approach	Tactics	Time Frame			

Adaptation Workbook

A workbook process provides “structured flexibility”



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.*



<i>Brunch Classics</i>	
Lemon Ricotta Pancakes Whipped Mascarpone Maple, Berries	15
Cornflake Crusted French Toast Berries, Maple Syrup	15
Bacon, Egg & Cheese Bacon, Two Eggs, Taleggio Cheese, Ciabatta	14
Avocado Toast Avocado, Sea Salt	15
AJ's Omelet Fontal Cheese, Spinach, Mushrooms	14
Eggs Florentine Spicy Capicola, House-Made Cheddar Biscuit, Spinach	15
Porchetta Hash Poached Egg, Calabrian Chili Hollandaise	16
Chia Pudding Chia Seeds, Toasted Coconut, Banana, Strawberry	14
Farmhouse Breakfast Two Eggs, House-Made Cheddar Biscuit, Chicken Sausage	14
Chicken Kale Caesar Chicken, Kale, Croutons	16

<i>Create Your Own Pasta Sauces</i>	
Marinara San Marzano tomatoes, Garlic, White Wine, Basil, Chili	14
Arrabiata All-Purpose Flour, Durum Flour, Eggs, Ricotta	15
Broken Meatball House Tomato Sauce with the Addition of Broken Meatballs	15
Sunday Sauce House Tomato Sauce with Short Rib, Sausage, Veal	16
Garlic Pecorino Durum Flour, Olive Oil	+2
Pea Sauce Eggs, Peas, Pecorino	+3

<i>Brunch Cocktails</i>	
Tomato Juice Fresh DOP Tomato Juice, Horseradish	10/45
Spritz Aperol, Crème de Peche, Sparkling Wine	12/55
Green Juice Lemon, Green Juice	12/55
Derby Papayafruit, Ginger, Carrot Juice	12/55
Tomato Juice Fresh Fruit, Pisco, Crème de Peche	10/45
Tomato Juice Liquorilla, Cointreau, Fresh Lime, Grenadine	12/55
Tomato Juice Reyka Vodka, Cointreau, Jake's Mimosa Juice, Sparkling Wine	12/55

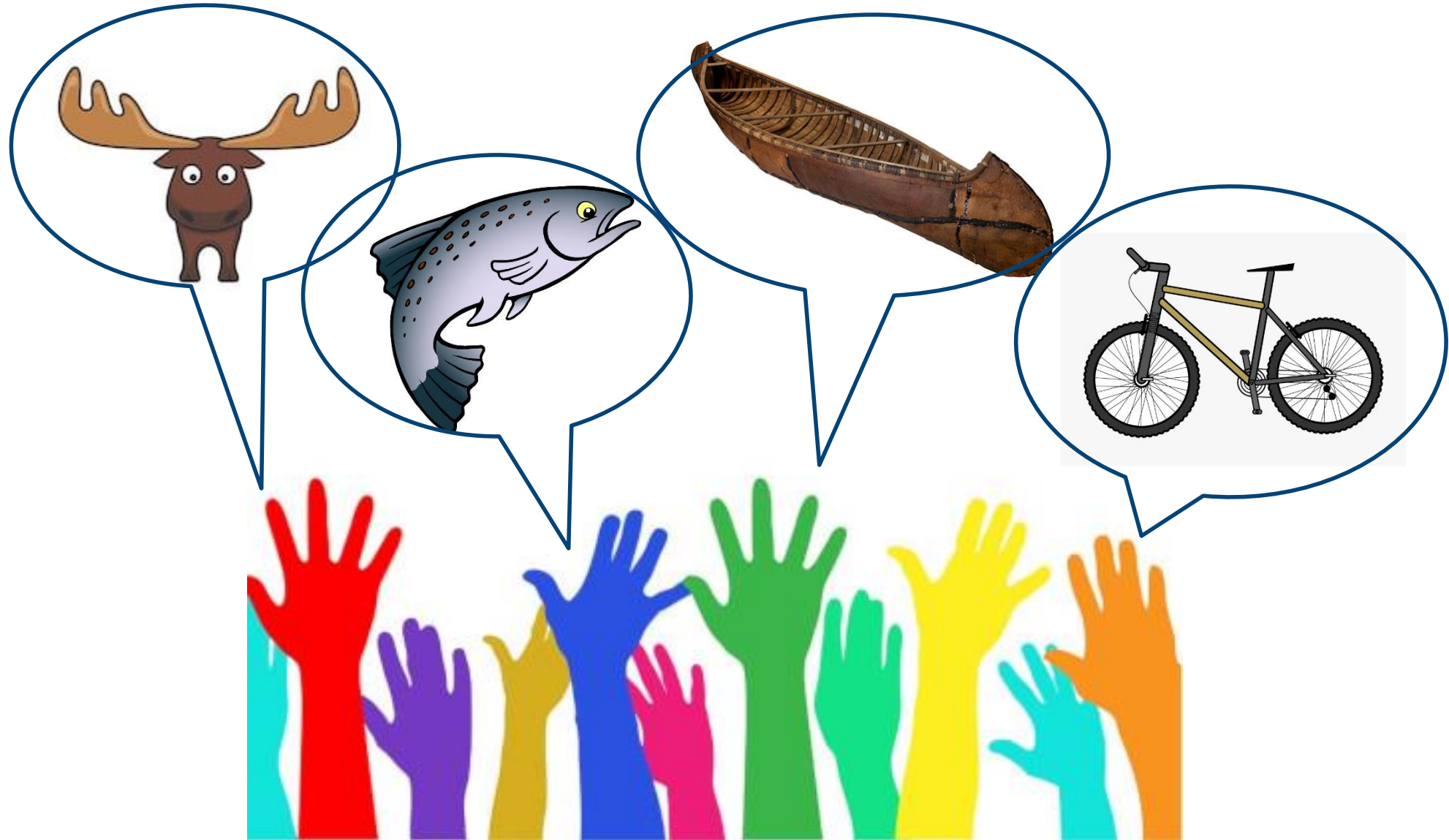


Adaptation Menus of Strategies and Approaches

- 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

Menu of Adaptation Strategies and Approaches

Strategy 1: Sustain fundamental ecological functions.

- 1.1. Reduce impacts to soils and nutrient cycling.
- 1.2. Maintain or restore hydrology.
- 1.3. Maintain or restore riparian areas.
- 1.4. Reduce competition for moisture, nutrients, and light.
- 1.5. Restore or maintain fire in fire-adapted ecosystems.

Strategy 2: Reduce the impact of biological stressors.

- 2.1. Maintain or improve the ability of forests to resist pests and pathogens.
- 2.2. Prevent the introduction and establishment of invasive plant species and remove existing invasive species.
- 2.3. Manage herbivory to promote regeneration of desired species.

Strategy 3: Reduce the risk and long-term impacts of severe disturbances.

- 3.1. Alter forest structure or composition to reduce risk or severity of wildfire.
- 3.2. Establish fuelbreaks to slow the spread of catastrophic fire.
- 3.3. Alter forest structure to reduce severity or extent of wind and ice damage.
- 3.4. Promptly revegetate sites after disturbance.

Strategy 4: Maintain or create refugia.

- 4.1. Prioritize and maintain unique sites.
- 4.2. Prioritize and maintain sensitive or at-risk species or communities.
- 4.3. Establish artificial reserves for at-risk and displaced species.

Strategy 6: Increase ecosystem redundancy across the landscape.

- 6.1. Manage habitats over a range of site conditions.
- 6.2. Expand the boundaries of reserves diversity.

Strategy 7: Promote landscape connectivity.

- 7.1. Reduce landscape fragmentation.
- 7.2. Maintain and create habitat corridors, reforestation or restoration.

Strategy 8: Maintain and enhance genetic diversity.

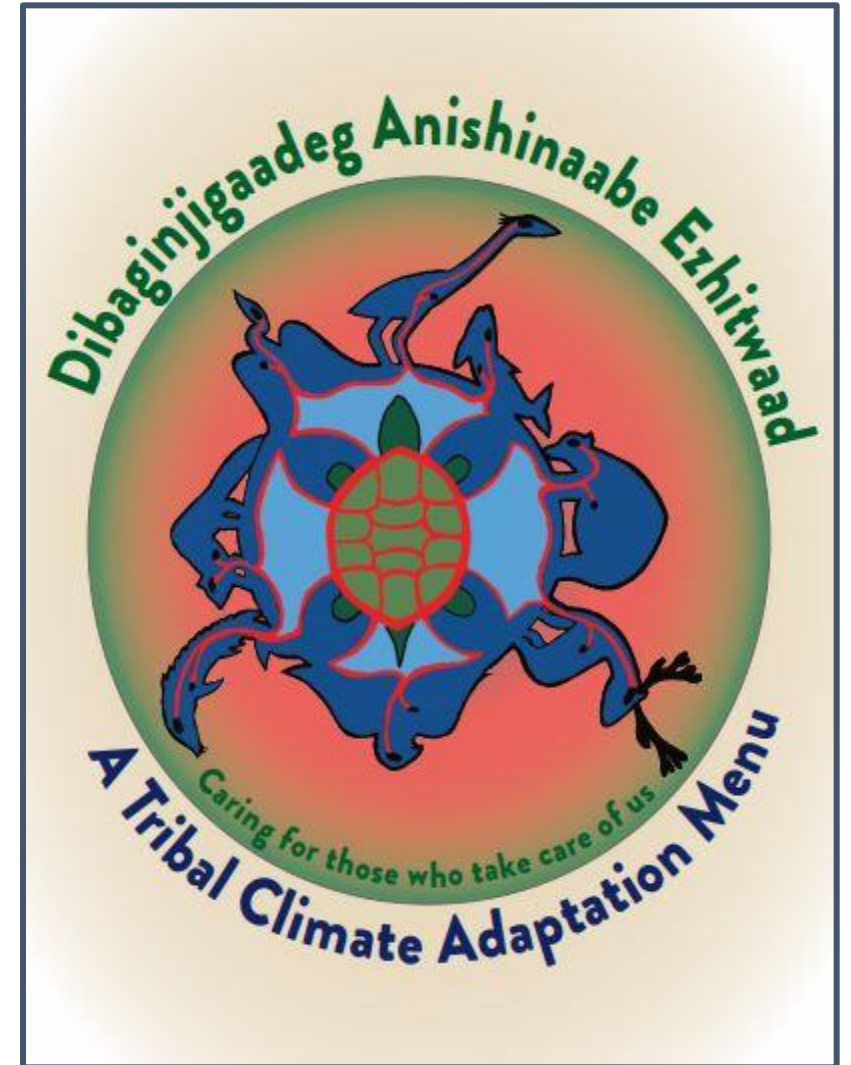
- 8.1. Use seeds, germplasm, and other genetic material from across a greater geographic range.
- 8.2. Favor existing genotypes that are best adapted to future conditions.

Strategy 9: Facilitate community adjustment through species transitions.

- 9.1. Favor or restore native species that are expected to be adapted to future conditions.
- 9.2. Establish or encourage new mixtures of species.
- 9.3. Guide changes in species composition through stages of stand development.
- 9.4. Protect future-adapted seedlings and saplings.
- 9.5. Disfavor species that are distinctly maladapted.
- 9.6. Manage for species and genotypes with moisture and temperature tolerance.
- 9.7. Introduce species that are expected to be adapted to future conditions.
- 9.8. Move at-risk species to locations that are expected to provide habitat.

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!
- Download here: www.forestadaptation.org/learn/chippewa-national-forest-leech-lake-band-ojibwe-adaptation-menu-training

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

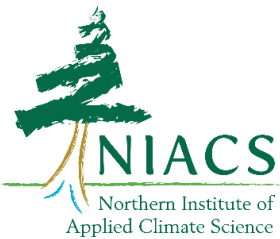
www.fs.fed.us/nrs/atlas/

NIACS Resources

www.forestadaptation.org/



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



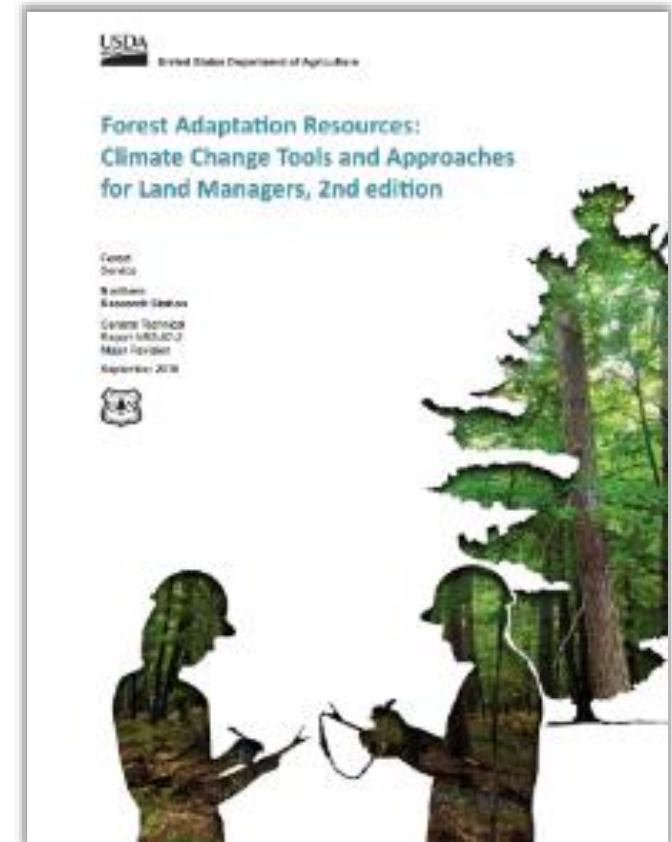
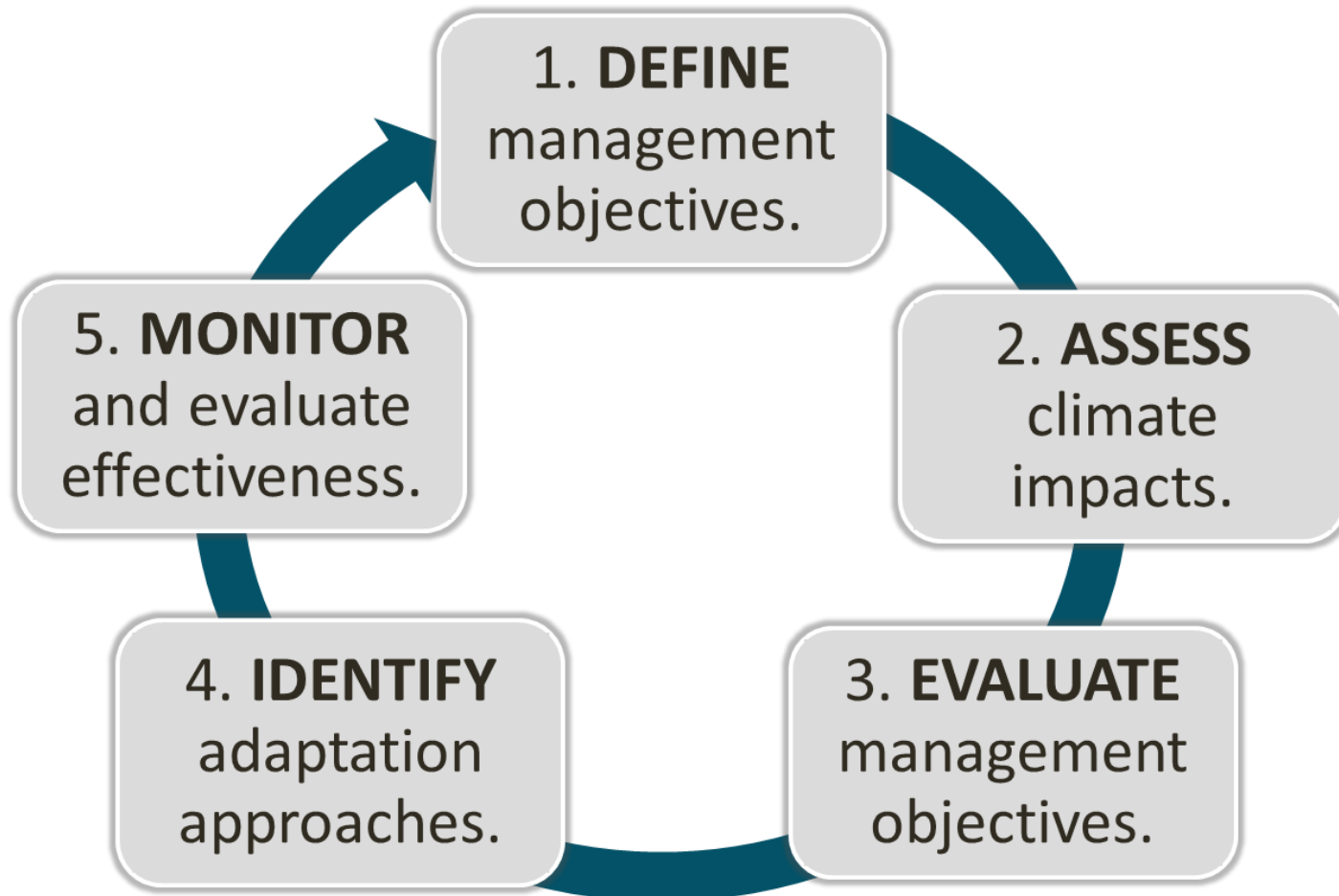
February 17-18, 2021

Activity: Menu discussion roundtables

Time	Room 1 (Kristen)	Room 2 (Stephen)	Room 3 (Danielle)
8:15 – 8:35	Fire-Adapted Ecosystems	Wildlife	Forest Carbon
8:40 – 9:00	Outdoor Recreation	Forestry	Forested Watersheds
9:05 – 9:25	Tribal Adaptation Menu	Tribal Adaptation Menu	Tribal Adaptation Menu

Activity: Example adaptation projects

A workbook process provides “structured flexibility”





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

Step 1: DEFINE location, project, and management goals.

Management Goal	Management Objective	Time Frame
<ul style="list-style-type: none">▪ Increase urban tree species diversity	<ul style="list-style-type: none">▪ Have no more than 20 percent of a family, 10 percent of a genus and 5 percent of a species	15 years
<ul style="list-style-type: none">▪ Increase canopy cover	<ul style="list-style-type: none">▪ Increase % canopy from 20% to 30%	20 years
<ul style="list-style-type: none">▪ Reduce invasive species cover	<ul style="list-style-type: none">▪ Reduce area covered by invasive buckthorn from 10% to no more than 5%	10 years



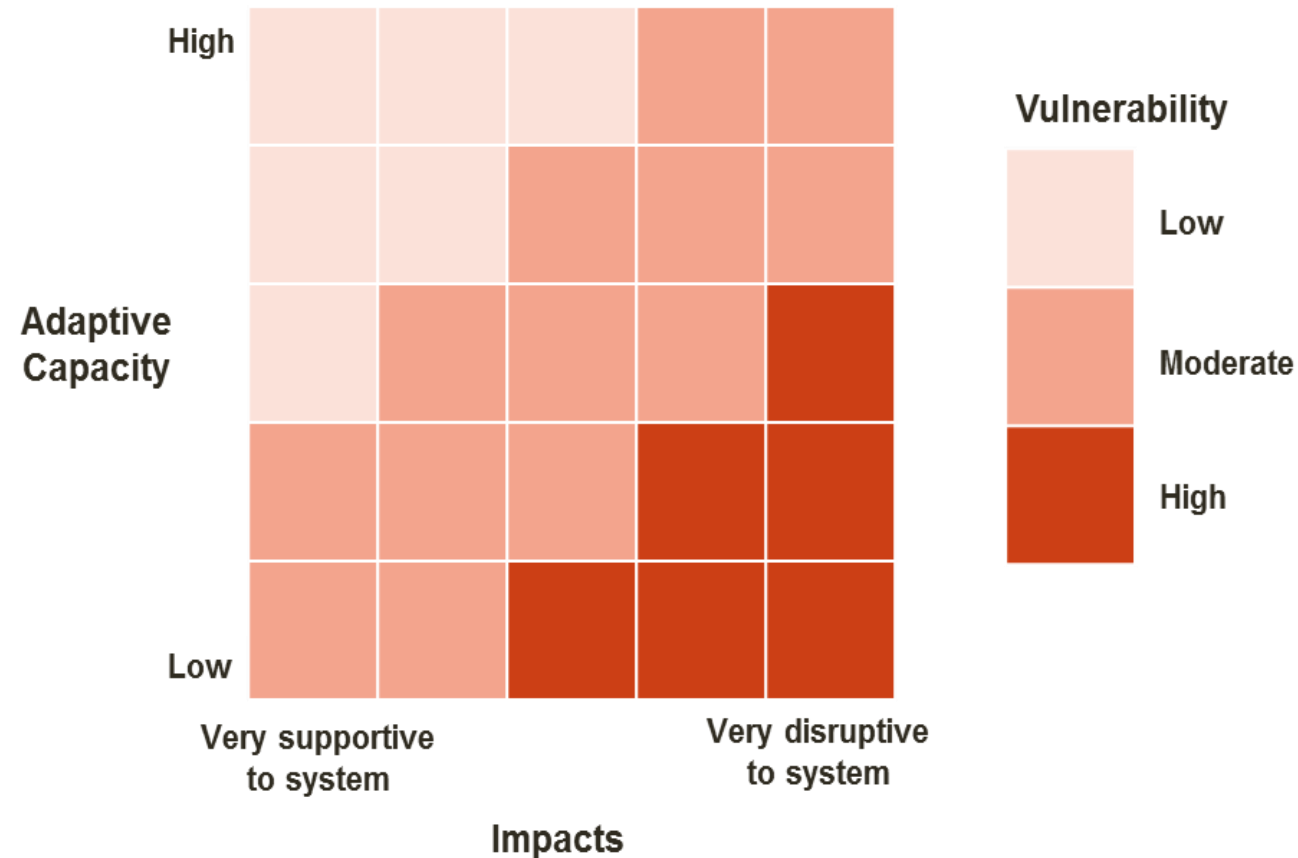
Step 2: Assess site-specific climate change impacts & vulnerabilities

Step 2: ASSESS site-specific climate change impacts and vulnerabilities.

Mgmt. Unit or Topic	Climate Change Impacts and Vulnerabilities	
	Regional	For the Property or Project Area
	<i>From vulnerability assessments</i>	<i>Based on your knowledge of the site or area</i>
Upland forest	More extreme precipitation events	Slope and soil on east side of property is vulnerable to flooding/ponding
	Increased potential for summer drought	Hill tops are especially vulnerable to growing season moisture stress

Step 2: ASSESS site-specific climate change impacts and vulnerabilities.

Vulnerability Determination





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.

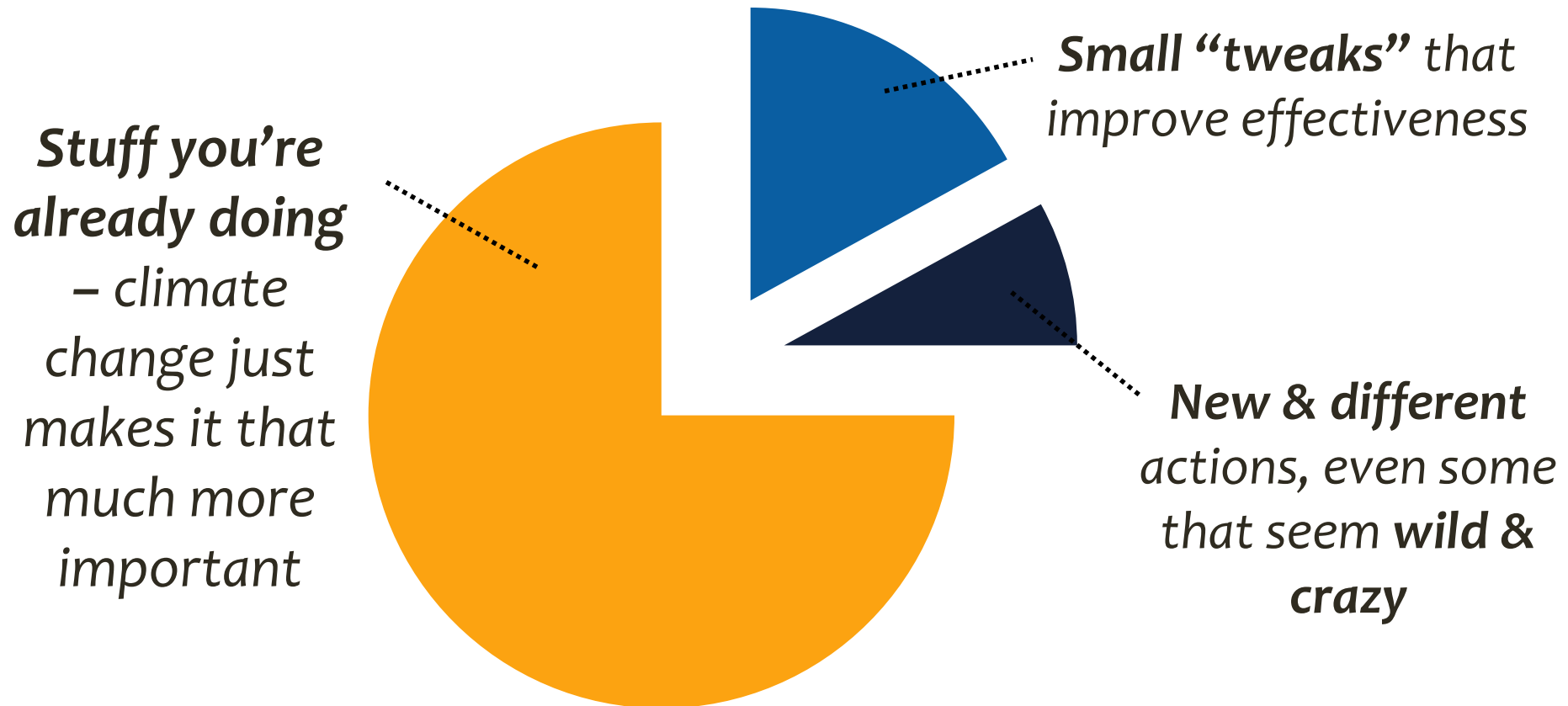
Tactic – Describe a specific action you can take.

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:





Step 5: Monitor and evaluate effectiveness of
adaptation actions

Step 5: MONITOR and evaluate effectiveness of implemented actions.

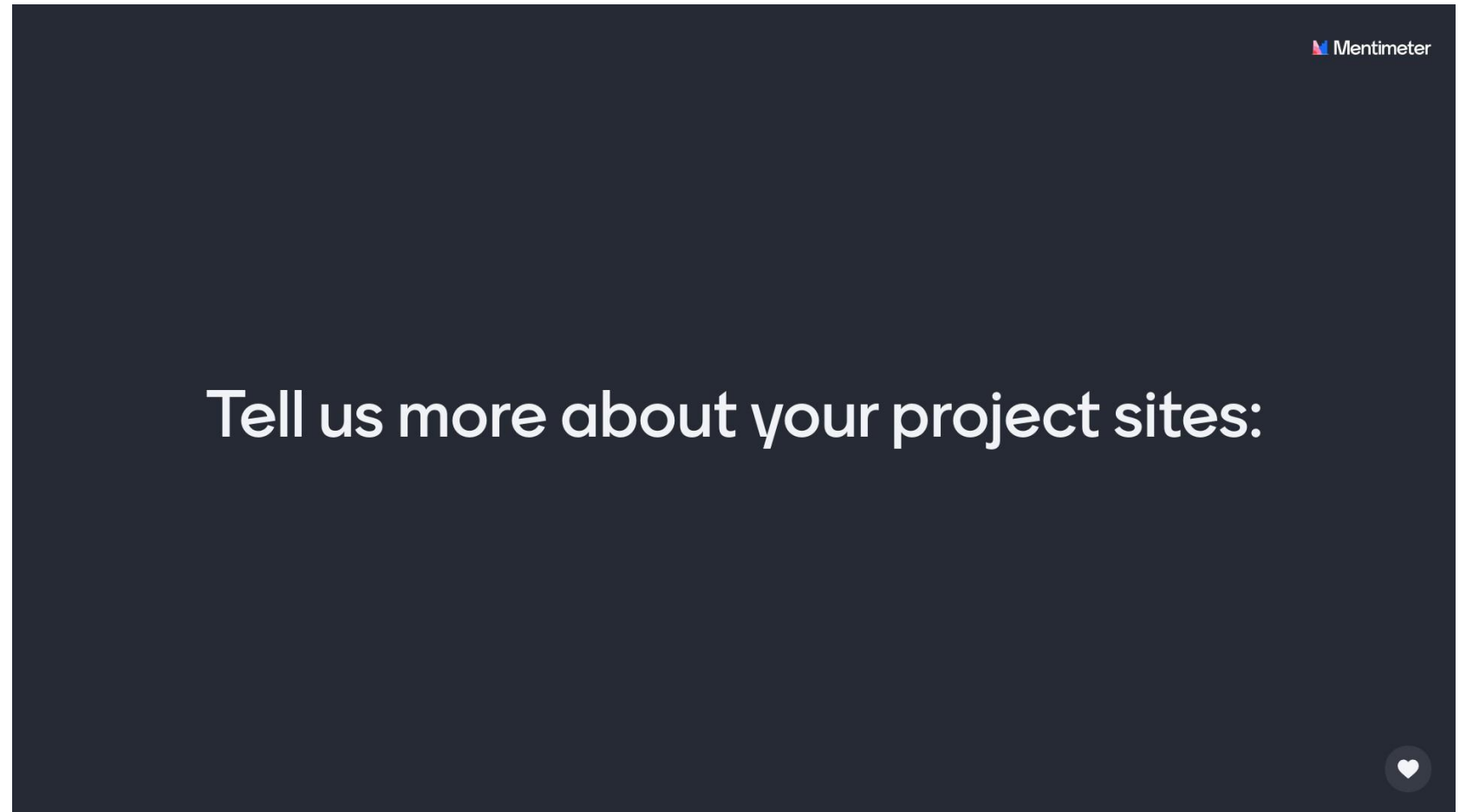
Example – Jerktail Mountain Woodland

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

Activity: Sharing examples

www.menti.com

Code: 95 46 67 6



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
RESPONSE FRAMEWORK

Who we are ▾ Assess ▾ Adapt ▾ Learn ▾ Focus ▾ Contact 🔍

Climate change adaptation is complex

We provide education and training to help demystify the issue.

[> Learn More](#)

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.

Climate Change Resource Center

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

The screenshot shows the homepage of the Climate Change Resource Center. At the top left, it features the USDA and U.S. Forest Service logos with the tagline 'Caring for the land and serving people'. The main header includes the text 'CLIMATE CHANGE RESOURCE CENTER' and a navigation bar with icons for 'EDUCATION', 'TOPICS', 'TOOLS', 'ADAPTATION', and 'LIBRARY'. A large map of the United States is displayed in the center. To the right of the map is a search box with the text 'Interested in finding resources near you?' and a 'Search CCRC' button. Below the search box are two sections: 'POPULAR TOPICS' listing Wildlife, Grasslands, Urban, and NEPA; and 'POPULAR TOOLS' listing CUFR Tree Carbon Calculator, Tree Atlas, and All Tools. At the bottom, there is a section titled 'CLIMATE CHANGE: WHAT YOU NEED TO KNOW' with three sub-sections: 'CLIMATE CHANGE SCIENCE AND MODELING' (with a line graph icon), 'CLIMATE CHANGE EFFECTS ON FORESTS AND GRASSLANDS' (with a forest icon and arrows), and 'RESPONSES TO CLIMATE CHANGE' (with a clipboard icon).

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/

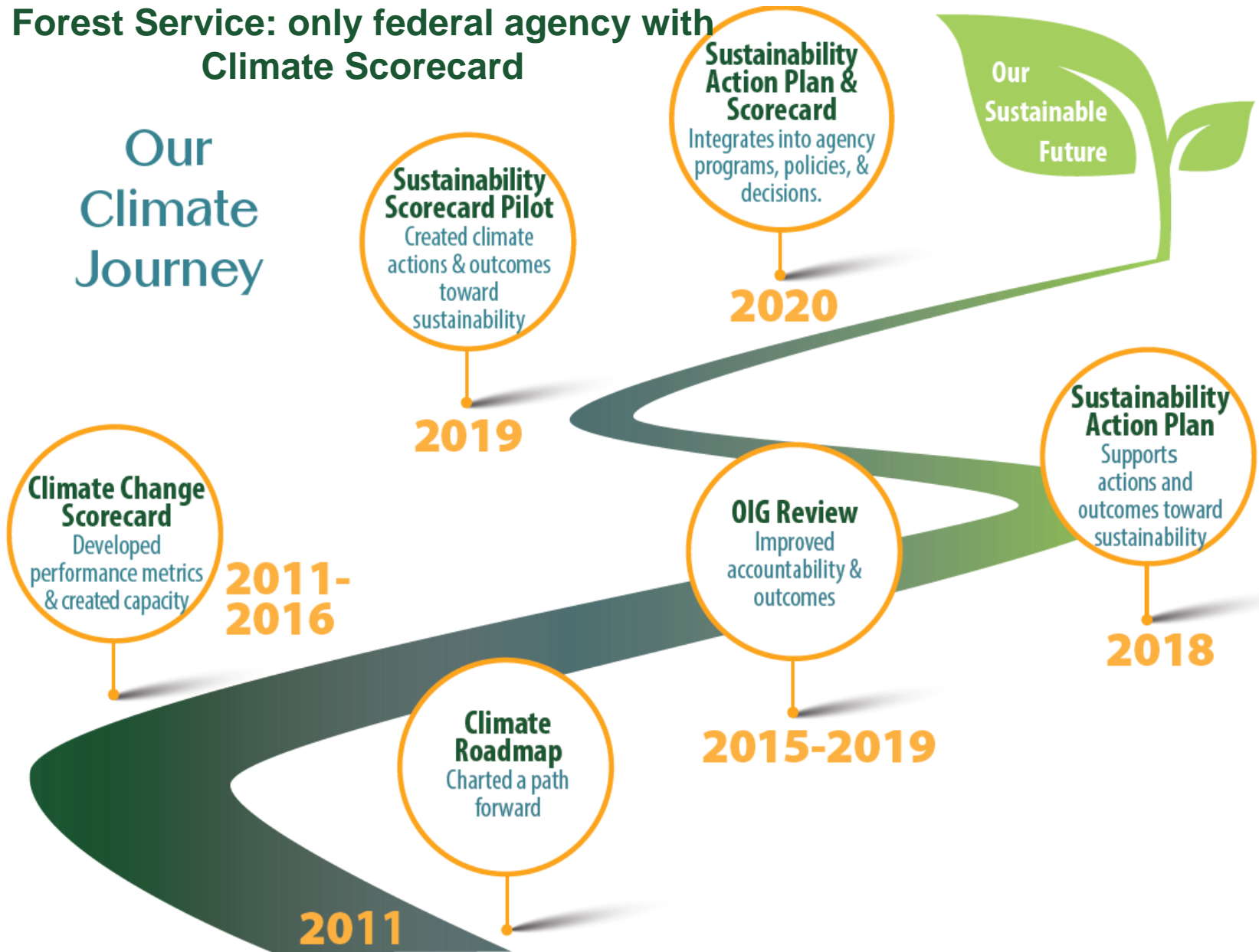
NIACS Resources

www.forestadaptation.org/



Forest Service: only federal agency with Climate Scorecard

Our Climate Journey



Scorecard 2.0: Journey's Progress Stages



Sustainability Scorecard 2.0: Core Elements

