

# Climate Change Adaptation Planning for Tribes and Tribal Partners



Bay Mills Community College  
Brimley, MI  
June 2019



# Who we are -

## Core Tribal Adaptation Menu team:

- GLIFWC (Melonee Montano, Hannah Panci, Rob Croll, Kim Stone)
- 1854 Treaty Authority (Tansey Moore)
- Lac du Flambeau (Patricia Moran)
- Michigan Tech (Jerry Jondreau)
- College of Menominee Nation (Chris Caldwell, Greg Gauthier)
- Red Cliff Band (Ziigwanikwe (Katy) Bresette)
- Northeast Climate Adaptation Science Center (Sara Smith)
- Inter-Tribal Council of Michigan (Robin Clark)
- NIACS (Stephen Handler, Kristen Schmitt, Chris Swanston)



# Questions you might be asking...

1. How might climate change affect the resources or relatives that I care about?

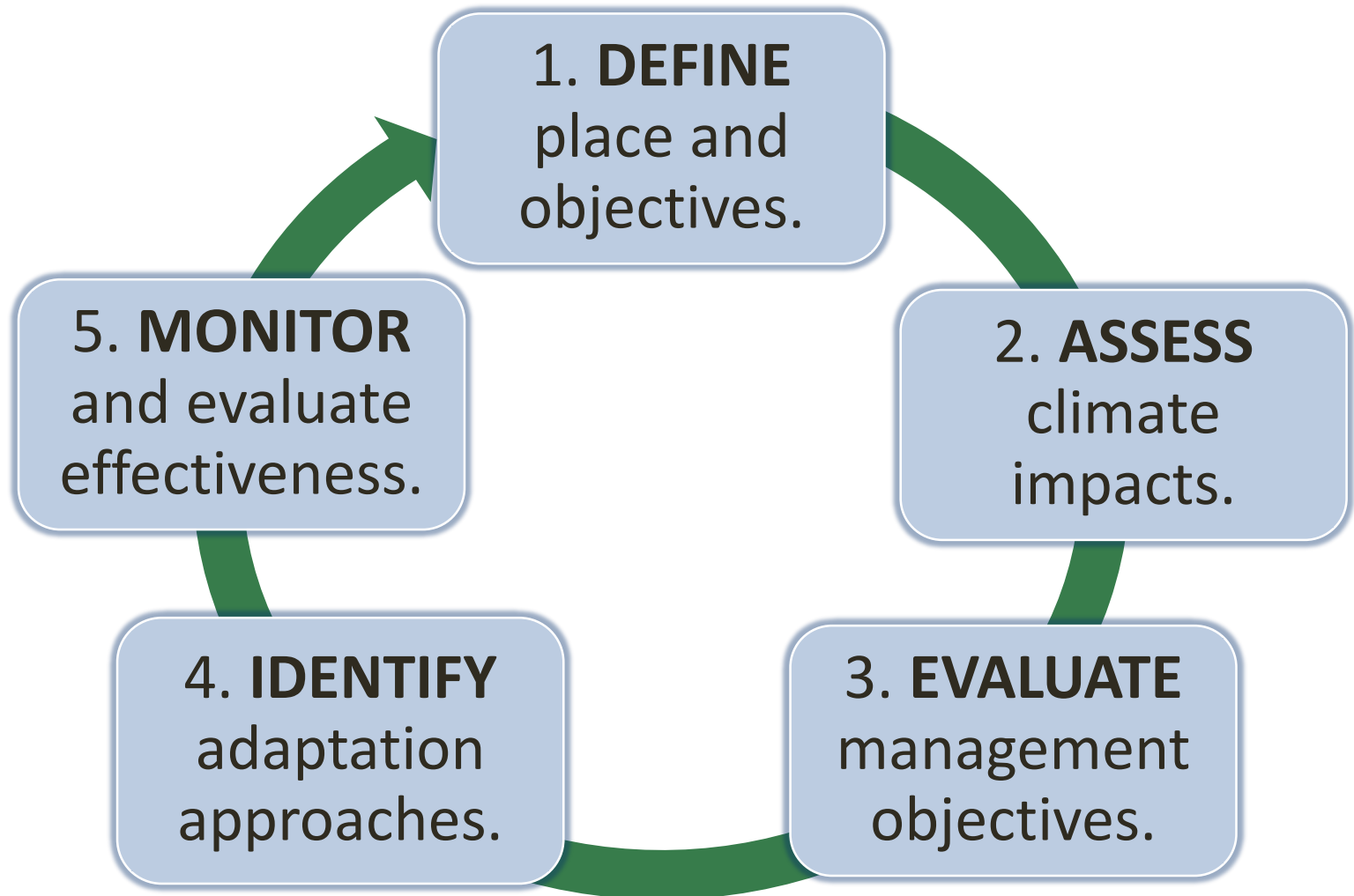
*Focus of the workshop!*

2. What management actions could help prepare for those effects?

# Workshop Goals

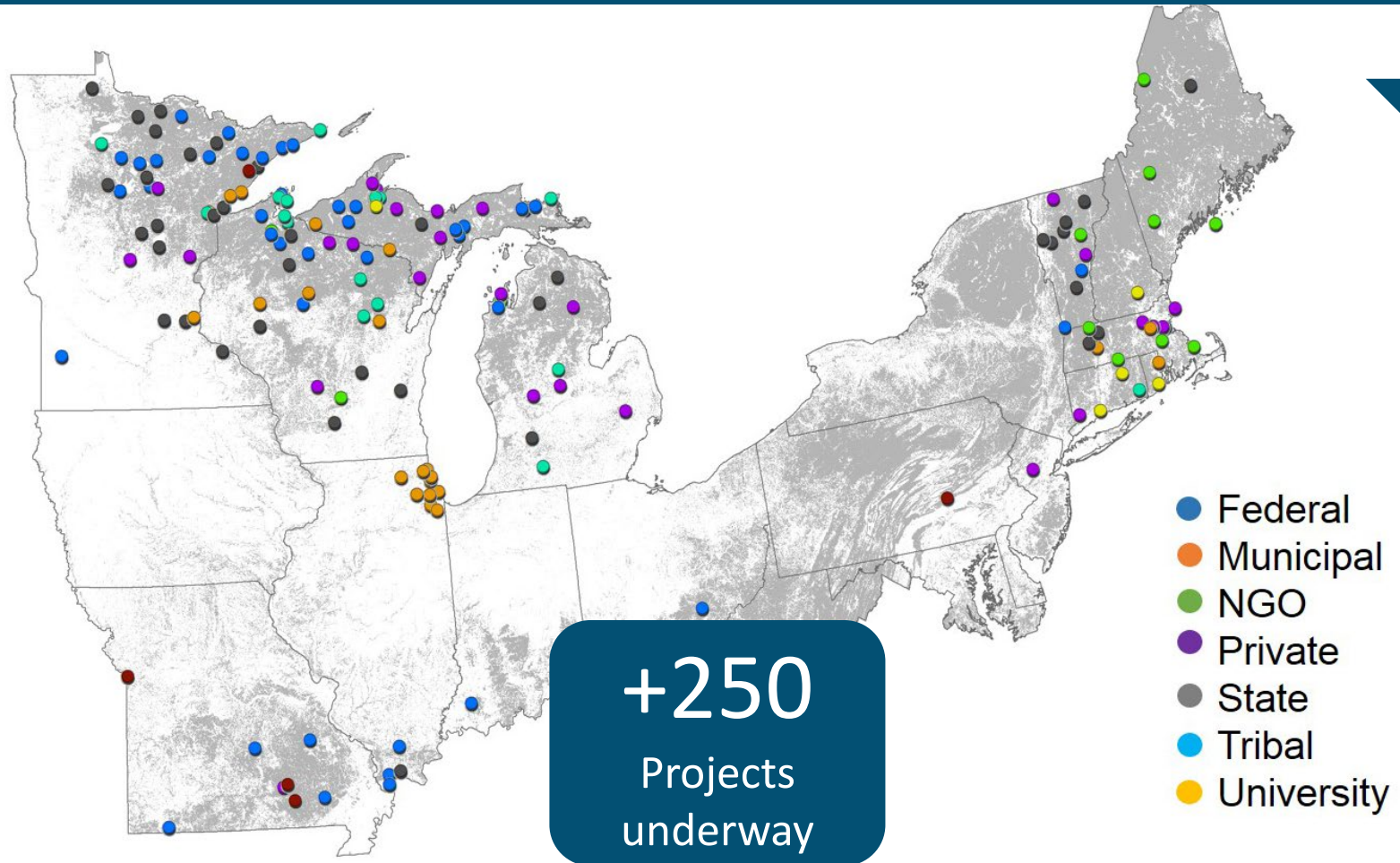
- Be useful
- Think about climate change at a meaningful scale
- Get familiar with the Adaptation Workbook & Tribal Adaptation Menu
- Reflect indigenous perspectives in climate adaptation
- Learn from each other

# Adaptation Workbook Cycle



# The Final Product

## Real-world adaptation projects



# Workshop Logistics

- 9a.m. – 4:30p.m. today and tomorrow, 9-11:30 on Weds
- Lunch served around noon
- Scheduled breaks, but take breaks as needed
- Please step out of room to take calls
- We welcome your feedback!
- Optional group dinner tonight – Pickles!



**Introductions: Who's in the room?**



# Guiding Principles

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# Comparing Values: An Introduction to the Guiding Principles

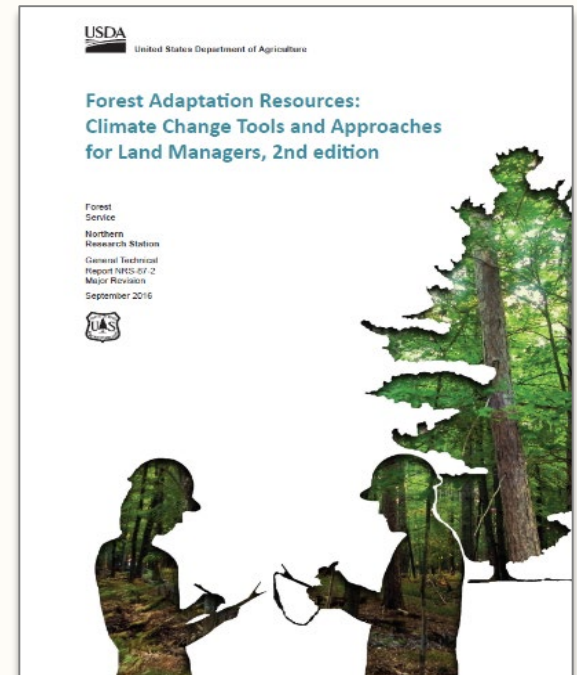
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## **Ojibwe Values**

- Nibwaakkaawin- Wisdom
- Zaagi'idiwin- Love
- Minaadendamowin- Respect
- Zoongide'ewin- Bravery
- Gwayakwaadiziwin- Honesty
- Dabaadedendiziwin- Humility
- Debwewin- Truth

# Forest Adaptation Resources: Climate Change Tools and Approaches for Land Managers

- Practical process to intentionally consider climate
- Does not make recommendations – users customize actions
- Build from a “western” forest management mindset



[www.nrs.fs.fed.us/pubs/40543](http://www.nrs.fs.fed.us/pubs/40543) and  
[www.AdaptationWorkbook.org](http://www.AdaptationWorkbook.org)



# Forest Adaptation Resources: Climate Change Tools and Approaches for Land Managers

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As ecosystems continue to respond to the pressures of a changing climate, individuals and organizations tasked with managing these ecosystems will benefit from reexamining their priorities, objectives, and tactics. Some land managers may ultimately decide not to make any near-term changes in priorities or tactics, even after considering climate pressures on forests. Others may choose to accommodate forest change even as they attempt to ensure continued value from the ecosystem in question. In other words, as forests adapt naturally, organizations need to decide if they intend to play a role in adaptation through land management and how to play that role most effectively. This is easier said than done, of course, as land managers struggle to keep up with “traditional” challenges, not to mention the daunting complexities of climate change.



# Forest Adaptation Resources: Climate Change Tools and Approaches for Land Managers

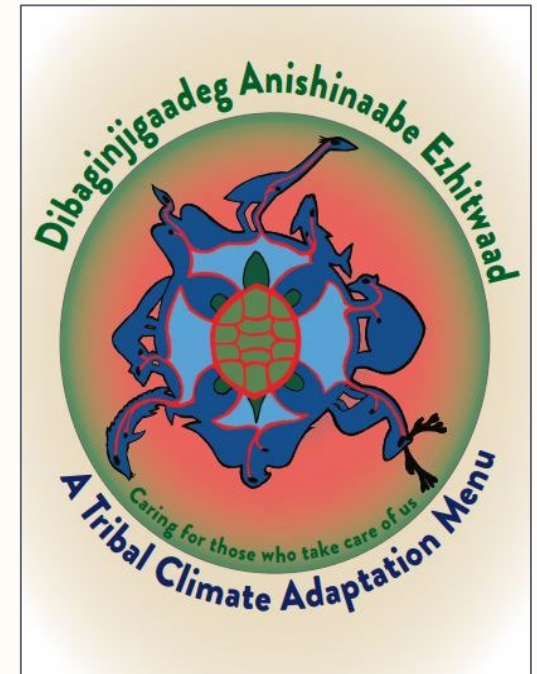
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As ecosystems continue to respond to the pressures of a changing climate, individuals and organizations tasked with **managing** these ecosystems will benefit from reexamining their **priorities, objectives**, and tactics. Some land managers may ultimately decide not to make any **near-term** changes in priorities or tactics, even after considering climate pressures on forests. Others may **choose to accommodate** forest change even as they attempt to ensure continued **value from** the ecosystem in question. In other words, as forests adapt naturally, organizations need to decide if they intend to play a role in adaptation through land management and how to play that role **most effectively**. This is easier said than done, of course, as land managers struggle to keep up with “traditional” challenges, not to mention the daunting complexities of climate change.

# Dibaginjigaadeg Anishinaabe Ezhitwaad: A Tribal Climate Adaptation Menu

No singular native, tribal or indigenous approach for caring of the land

- Suggestions to assist in addressing needs of a particular indigenous community
- Used by non-tribal people or organizations interested in indigenous approaches to adaptation





# Dibaginjigaadeg Anishinaabe Ezhitwaad: A Tribal Climate Adaptation Menu

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- Relationships are the interwoven bonds that form the framework of place within which we exist. Western societies value, and therefore emphasize, the importance of human interactions. These exchanges are often categorized into bonds of family, friendship, business, casual, intimate, and intellectual, to name but a few. All of these ties create a roadmap that we utilize to guide our everyday actions. Indigenous cultures around the globe and throughout time have also applied these relational values to recognizing and developing connections with their natural environment. We consider beings in the natural environment to be elders and teachers who can teach us valuable lessons. This has ensured an equitable, long-term, sustainable, and generational existence for many of these human and nonhuman communities. These relationships have developed in a multiplicity of cultures that have passed down a knowledge of place through thousands of years of experience to subsequent generations. They provide the framework of relationships and the roadmap to a truly sustainable way of life, with respect and understanding for all aspects of creation.



# Dibaginjigaadeg Anishinaabe Ezhitwaad: A Tribal Climate Adaptation Menu

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# Three R's: Respect, Reciprocity, and Relationships

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- Decisions for use of our relatives were originally communal decisions made with recognition and acknowledgement throughout
- Today management and decision-making for land and the natural environment is made less as a communal decision and more as an individual or institutionalized





## Guiding Principles for Interacting with Tribes

### How to Develop Culturally Appropriate Climate Adaptation Actions



*Offering asemaalnāēqnemaw (tobacco). (Photo by Charlie Rasmussen, GLIFWC.)*

This document is intended to empower tribal governments, federal and state agencies, non-governmental organizations (NGOs), individual landowners and others to incorporate Anishinaabeg perspectives, specifically from the Great Lakes region, into a climate adaptation framework. We recognize the shortcomings of this document in our attempt to incorporate indigenous concepts, language, and cultural practices; a single document written in English can't fully capture what we intend to express. We hope that the perspectives given here offer users an additional lens with which to view the environment and facilitate a more culturally appropriate approach to working with tribal nations.

While the intent of this document is to give specific examples from one group of people, we encourage other tribes to edit these according to the needs of their individual community by adding language, words, and concepts unique to that community. We should stress that the editing process be undertaken first, before initiating any project, as the intent behind this document is to ground climate change adaptation planning in knowledge that is unique to the perspective of each indigenous community.

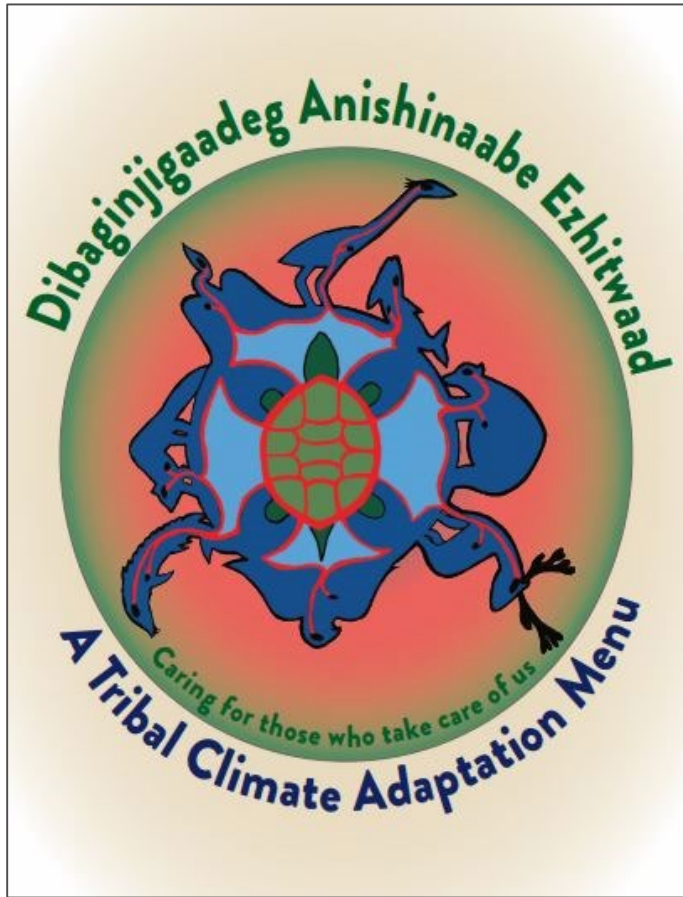


**Questions ?**



**BREAK!**

# Tribal Adaptation Menu



No singular native, tribal or indigenous approach for caring of the land

- Suggestions to assist in addressing needs of a particular indigenous community
- Used by non-tribal people or organizations interested in indigenous approaches to adaptation

A photograph of a forest landscape. In the lower-left foreground, a person wearing a yellow safety vest and a hard hat is partially visible, standing amidst dense green undergrowth. The background is filled with tall, thin trees, some of which are dead and skeletal, contrasting with the living green foliage. The sky is a clear, bright blue with a few wispy clouds. A semi-transparent white box is overlaid on the right side of the image, containing the title text.

# A quick tour of the TAM



**LUNCH BREAK!**



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

**Step 1:** DEFINE location, project, and time frames.

**Key Question:**

- Where are you working?
- What are your goals and objectives for this place or this ecosystem?

# Introductions

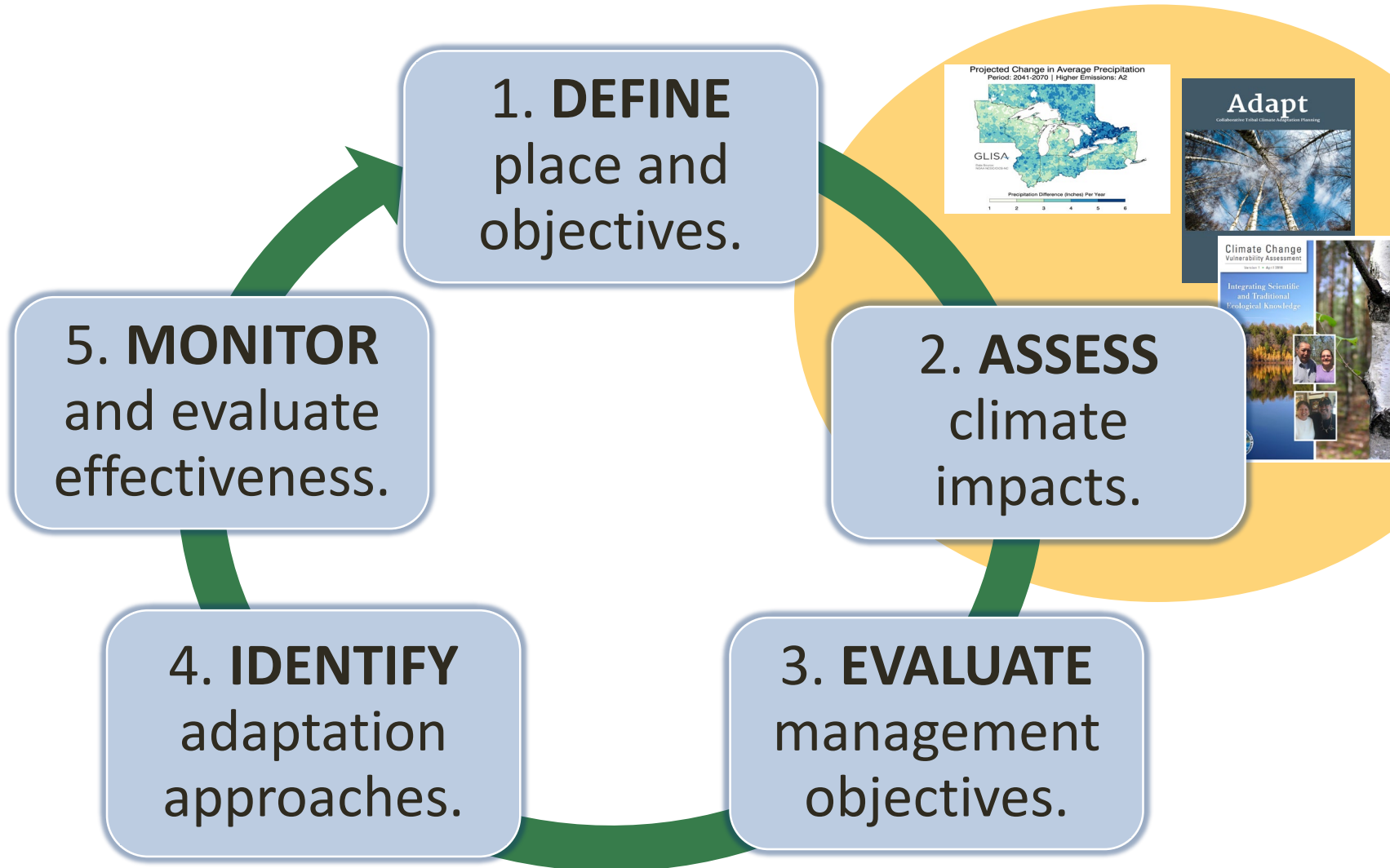
- Walk us through your project (location, ecosystem types, key goals/objectives)
  - A few *brief* comments, please!

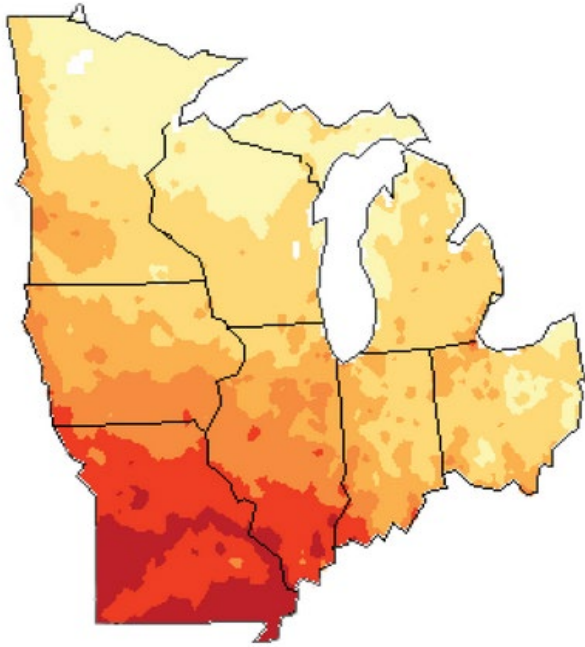




**Step 2**: Assess site-specific climate change impacts & vulnerabilities

# Adaptation Workbook Cycle

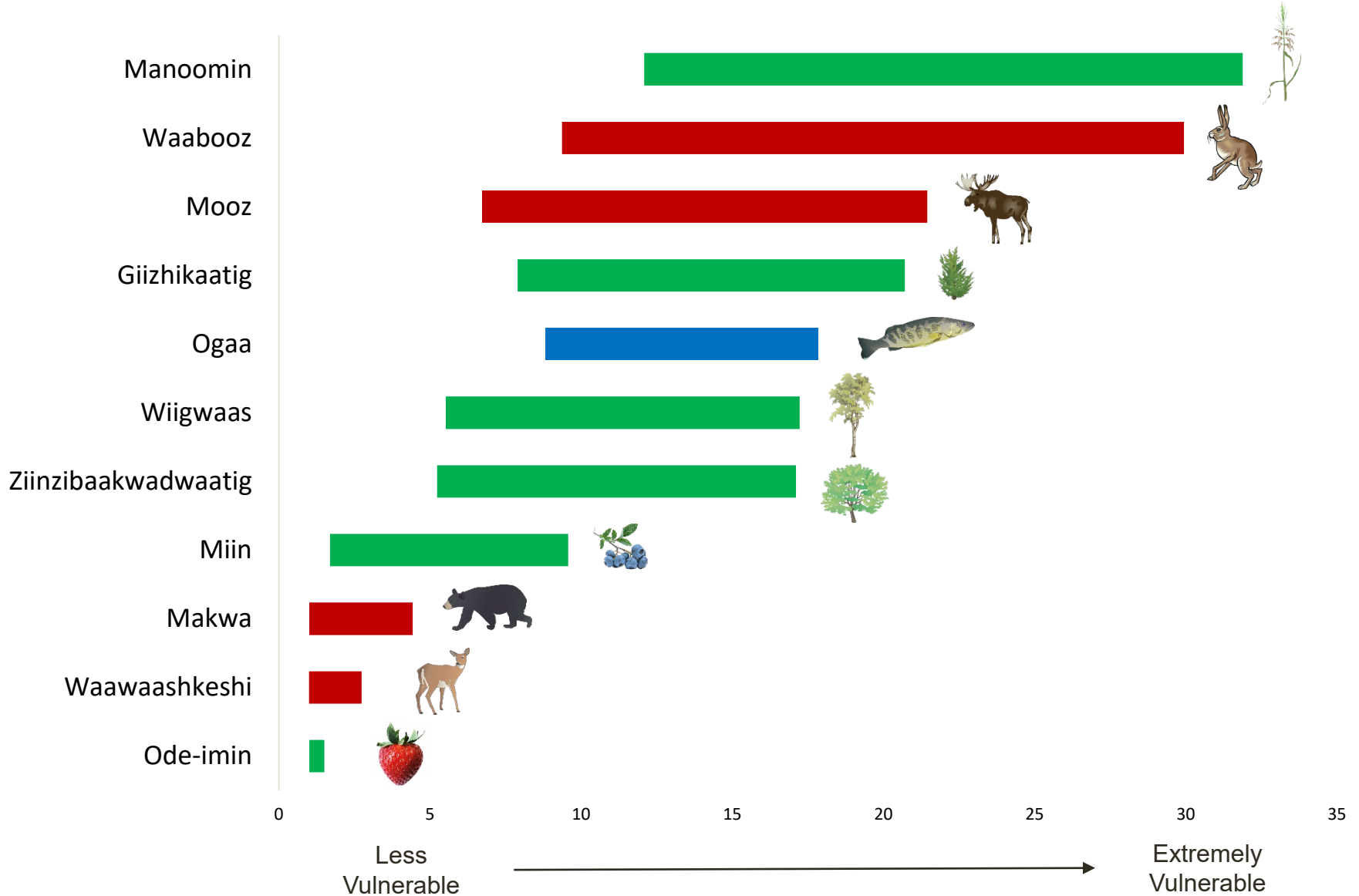




## Eight Key Impacts ...

- Longer growing season
- Less cold / more heat
- Less snow
- More rain in winter/spring
- More extreme rainfall
- More drought stress
- Shifting species
- Cumulative stressors

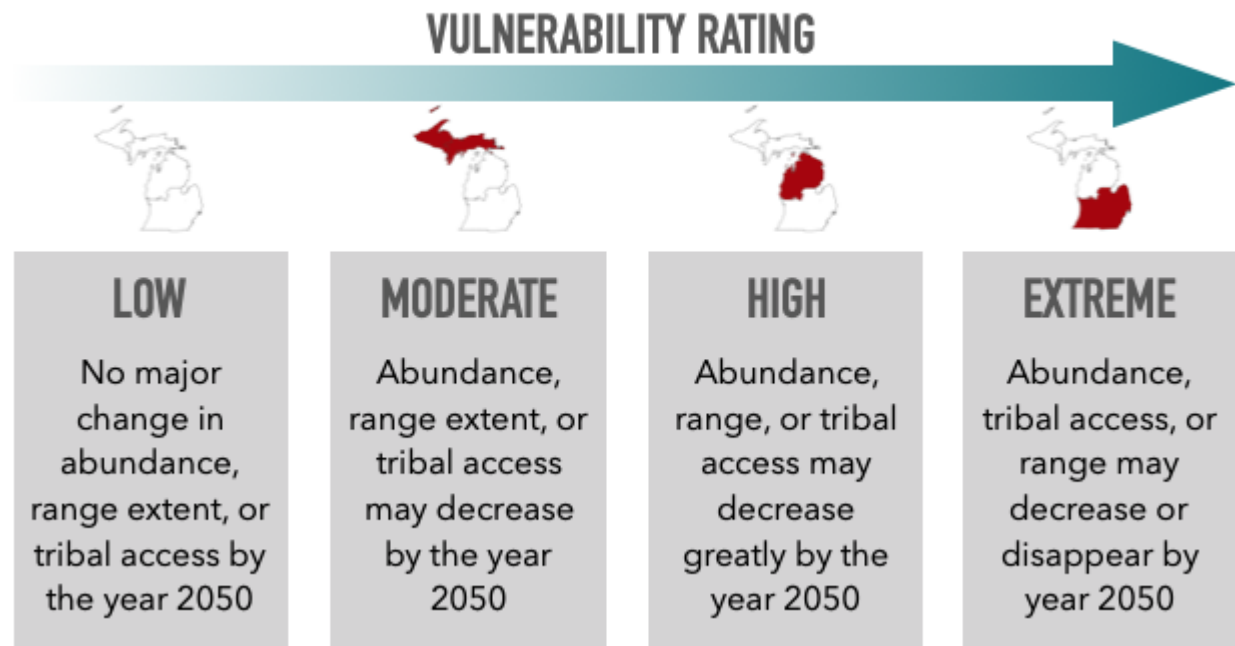
# Beings from GLIFWC Vulnerability Assessment



# Inter-Tribal Forest Understory Adaptation



How might Mashkiigobag respond to climate-driven change in Michigan?



Climate-driven changes	Possible impacts on Mashkiigobag	What to watch for
<b>Increasing temperatures</b> The average temperature increased by 2 F° over the past century and may increase 4-6 F° by 2050.	Mashkiigobag are at their southern limit in Michigan and grows in cooler areas of the forest, which may become too warm for Mashkiigobag to grow.	Have you noticed changes in how or where Mashkiigobag grows? Are they limited to the coolest areas of the forest?
<b>Drier soils</b> Increased air temperatures may lead to warmer and drier soils, especially in mid- to late-summer.	Mashkiigobag may be out-competed by other plants as soils warm, dry out, and become more nutrient-rich.	Have there been changes in how wet or dry the places are where Mashkiigobag grows?



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

**Key Questions:**

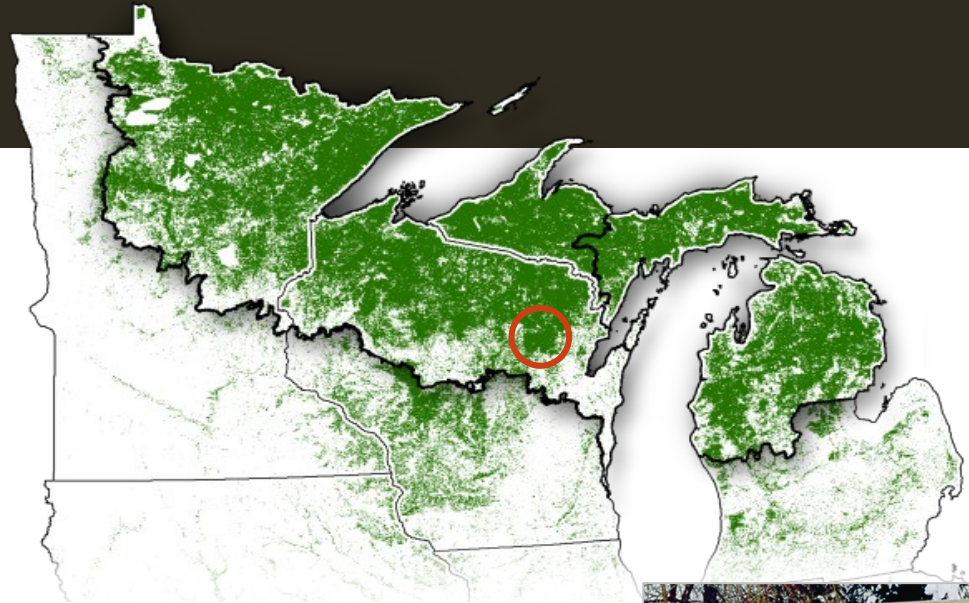
- How might general climate trends be affected or modified by local conditions?
- How might tribal communities and lands be affected?



# Adaptation Demonstration: Menominee Forest

## The Menominee Forest

- 220,000 acres of forest
- Managed by Menominee Tribal Enterprises for Menominee Indian Tribe
- Long history of sustainable management
- Current management issue: **Oak wilt disease**

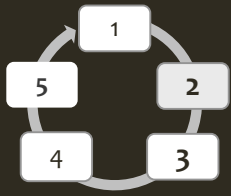


More information: [www.forestadaptation.org/mte](http://www.forestadaptation.org/mte)

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



<b>Project Area:</b>	The Menominee Forest		
<b>Location:</b>	350 sites affected by oak wilt (project focuses on 10 initial pockets)		
<b>Forest Type</b>	<b>Management Goals</b>	<b>Management Objectives</b>	<b>Time Frames</b>
Hardwoods, north-eastern Wisconsin	<ul style="list-style-type: none"><li>▪ Maintain diversity of species and habitats for cultural and environmental values</li><li>▪ Maximize sustainable production of forest products.</li><li>▪ Treat 10 affected oak-wilt pockets.</li></ul>	<ul style="list-style-type: none"><li>▪ Harvest affected and adjacent oaks in oak-wilt pockets.</li><li>▪ Pull stumps to sever root connection.</li><li>▪ Allow regeneration of trees, shrubs, and understory plants.</li></ul>	<ul style="list-style-type: none"><li>▪ Next 10 years (initial actions)</li></ul>

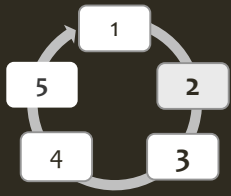


**Step 2: ASSESS** climate change impacts and vulnerabilities for the area of interest.

## Climate Change & the Menominee Forest

### Broad-scale Impacts & Vulnerabilities

- Increasing pests and diseases
- More drought stress
- Declines in many northern species
- Increases in temperate species



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

### **Climate Change & the Menominee Forest**

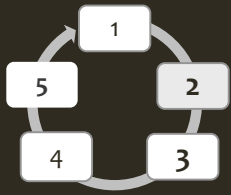
#### **Broad-scale Impacts & Vulnerabilities**

- Increasing pests and diseases
- More drought stress
- Declines in many northern species
- Increases in temperate species

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



- Current disease problems
- Oak-wilt areas have high risk of invasion



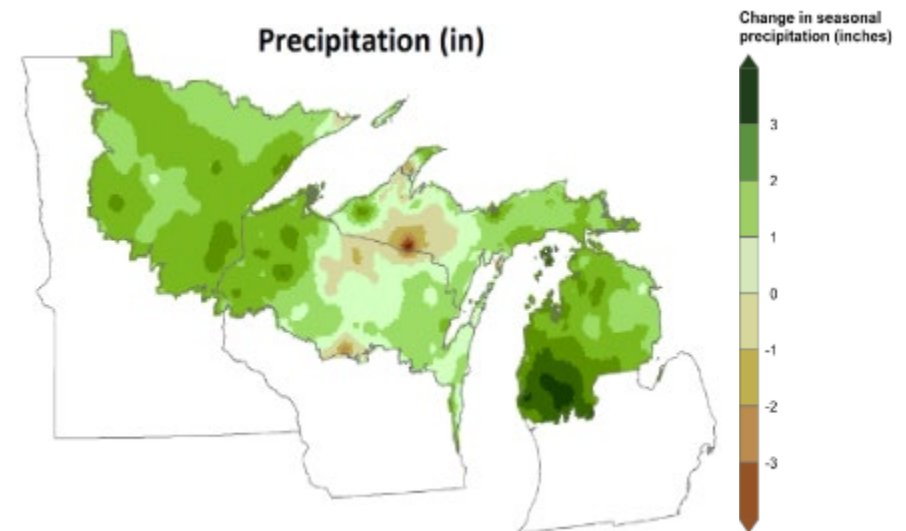
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### Climate Change & the Menominee Forest

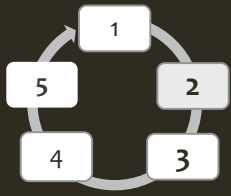
#### Broad-scale Impacts & Vulnerabilities

- Increasing pests and diseases
- More drought stress
- Declines in many northern species
- Increases in temperate species

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



- Potential for dry conditions/moisture stress



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

### Climate Change & the Menominee Forest

#### Broad-scale Impacts & Vulnerabilities

- Increasing pests and diseases
- More drought stress
- Declines in many northern species
- Increases in temperate species

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



- Many northern species
- Relatively High diversity
- At 'transition zone'

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

General Climate Change Impacts and Vulnerabilities	Climate Change Impacts and Vulnerabilities for the Project Area	Points (20 Total)
<i>General climate change impacts across <u>The Midwest and Northeast:</u></i>	<i>How might broad-scale impacts and vulnerabilities be affected by conditions in the <u>project area</u>?</i>	
Warmer temperatures (annual and seasonal)		
More days with extreme heat		
Fewer days with extreme cold		
Increased annual precipitation		
Altered seasonal changes in precipitation		
More frequent heavy precipitation events		
Less snow/shorter winter season		
Altered storm frequency		

- You have 20 points (as a group) to distribute as you see fit.



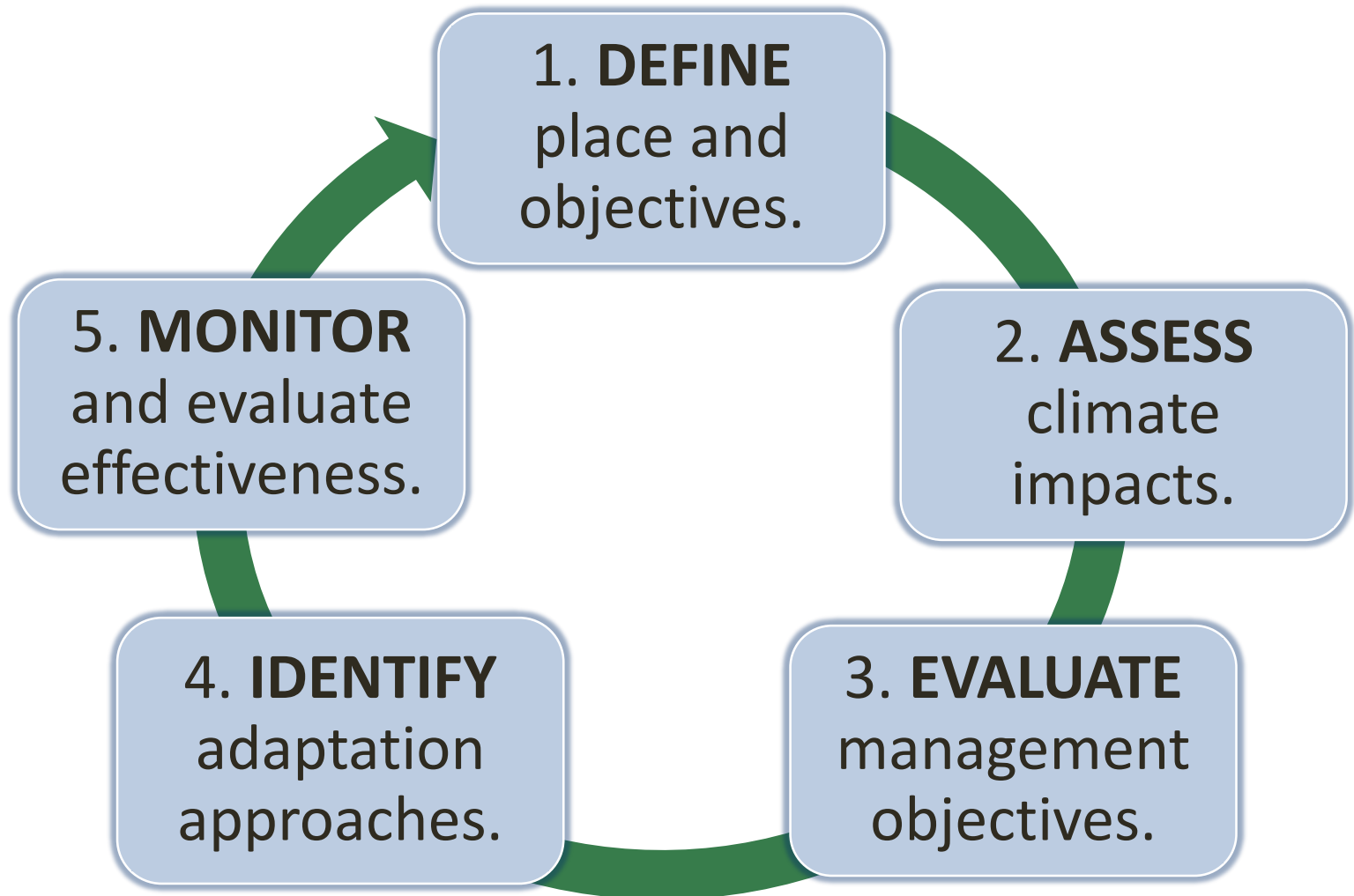
© Patty Bauchman / [www.comedywildlifephotography.com](http://www.comedywildlifephotography.com)

**BREAK!**



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

# Adaptation Workbook Cycle



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

**Key Questions:**

- How will climate change challenge or assist the ability to meet my objectives?
- Do my goals and objectives need to change?

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

**Ecosystem Type or Topic – From Step 1**

**Objectives – From Step 1**

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

**Challenges to Meeting Management Objective with Climate Change** – Things that will make it harder to achieve the management objective due to climate change.

\*\*Focus on challenges related to your management (not global markets, policies, etc.)

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

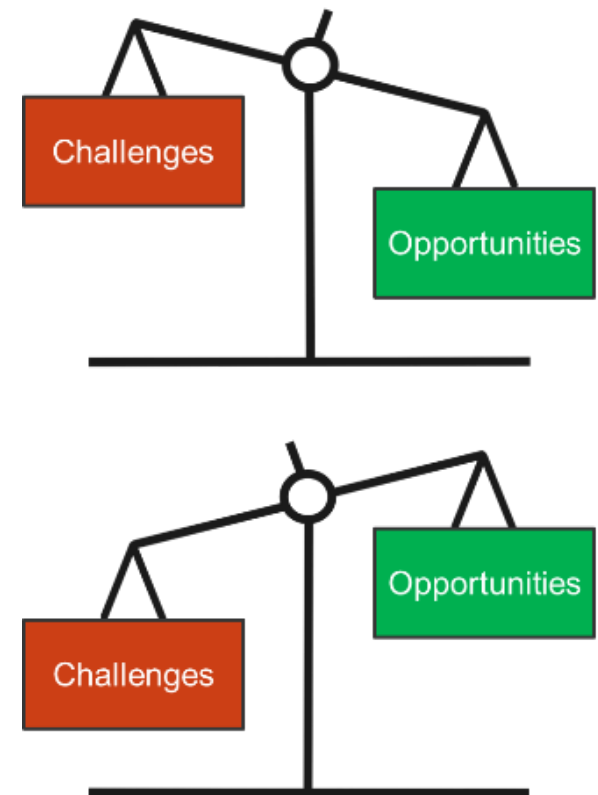
**Opportunities to Meeting Management Objective with Climate Change** – Things that will make it easier to achieve the management objective due to climate change.

\*\*Focus on challenges related to your business-as-usual management (not global markets, policies, etc.)

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

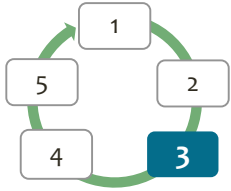
**Feasibility** – Can you meet your management objectives using current (business-as-usual) management actions?

- **High:** We can do it!  
Opportunities > Challenges
- **Low:** We'll need more resources or effort.  
Challenges > Opportunities



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

**Other Considerations** – Social, financial, or other factors that also affect your ability to meet objectives.



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



**Mgmt. Obj.**

- Harvest affected oaks in pockets.
- Allow regen. of trees and plants.

**Challenges**

- Oak wilt treatment results in heavily disturbed sites.
- Potential for more, invasives, drought.
- Allowing natural regen. (business as usual) may not be sufficient.

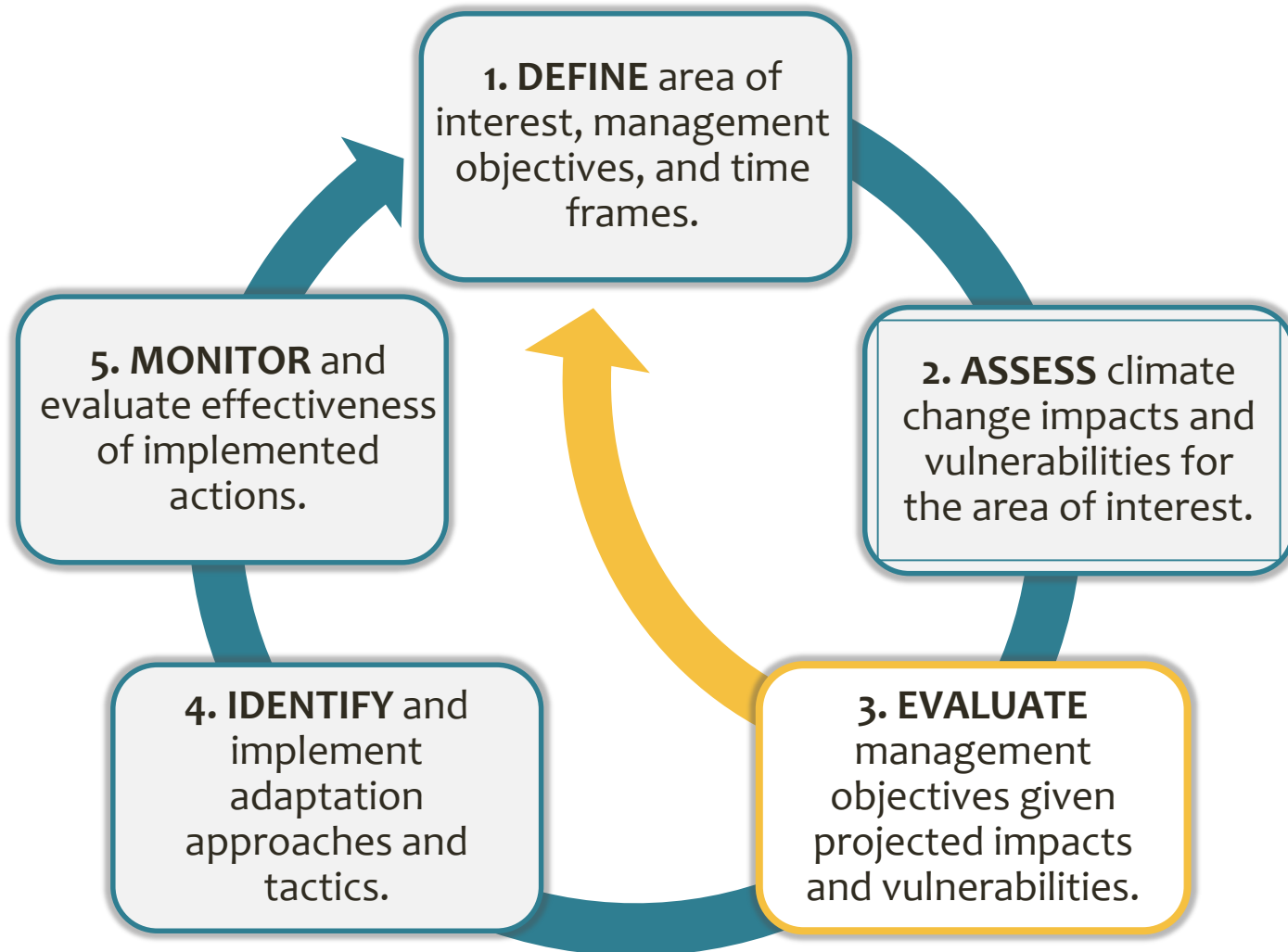
**Opportunities**

- Disturbed sites allow planting of species that could be tolerant of future stressors.
- ‘Transition zone’ - potential increasers on or near the site.

**Feasibility of Meeting Obj. (Current Mgmt)**

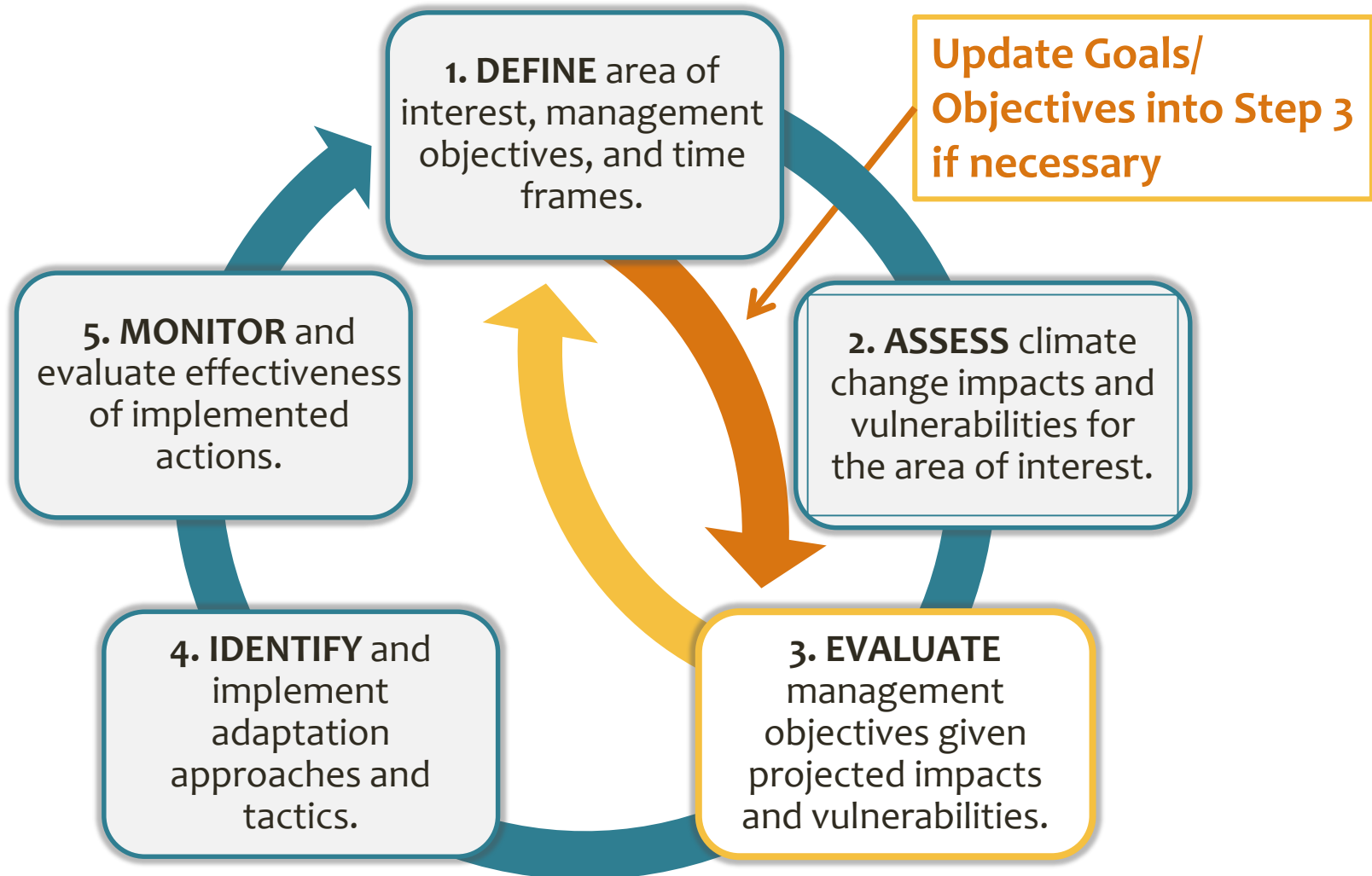
- Moderate

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

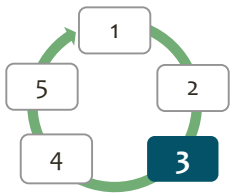


*...or, RE-EVALUATE*

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



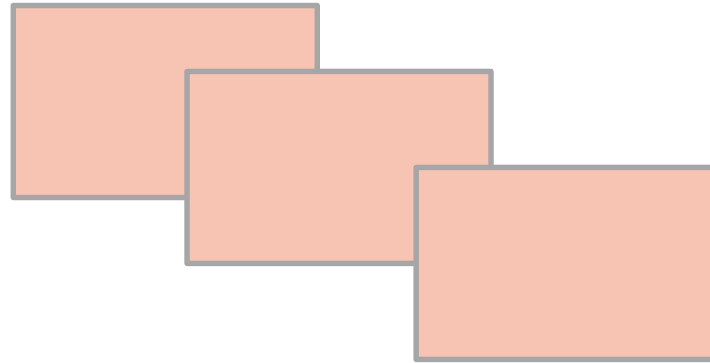
*... or, RE-EVALUATE*



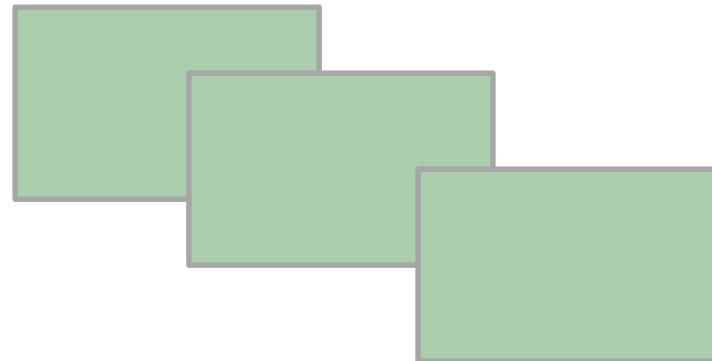
**Step 3:** EVALUATE management objectives given projected impacts and vulnerabilities.

## Challenges & Opportunities Discussion

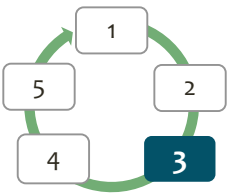
- Select 3 challenges (pink)



- Select 3 opportunities (green)

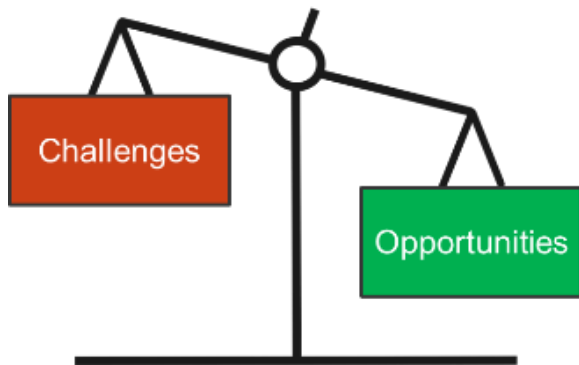
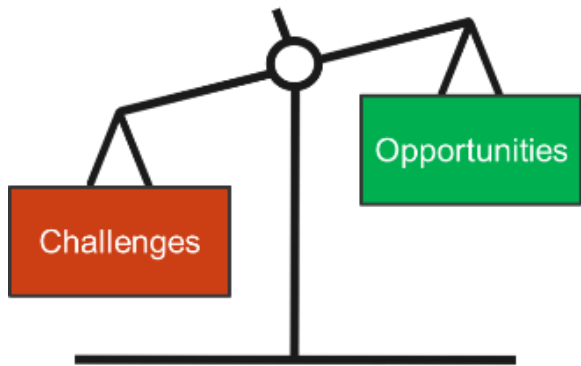


- One idea per sticky note

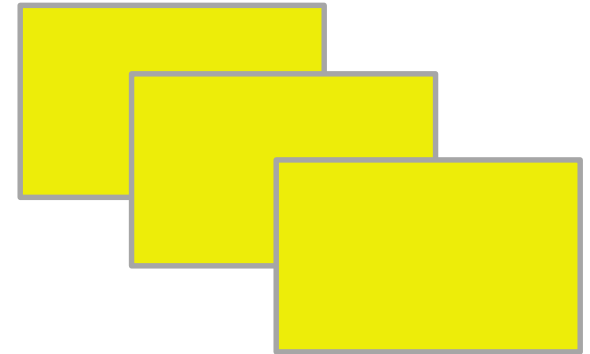


**Step 3:** EVALUATE management objectives given projected impacts and vulnerabilities.

## Feasibility Discussion



- Select 3 objectives
- One per sticky note



**Low:** Current management can't overcome challenges, or few opportunities exist.

**High:** Current management can overcome challenges, or opportunities outweigh challenges

Thoughts/takeaways from the day?

# Climate Change Adaptation Planning for Tribes and Tribal Partners



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# Recap of Day 1

# Adaptation Concepts

What can we do, how do we respond?

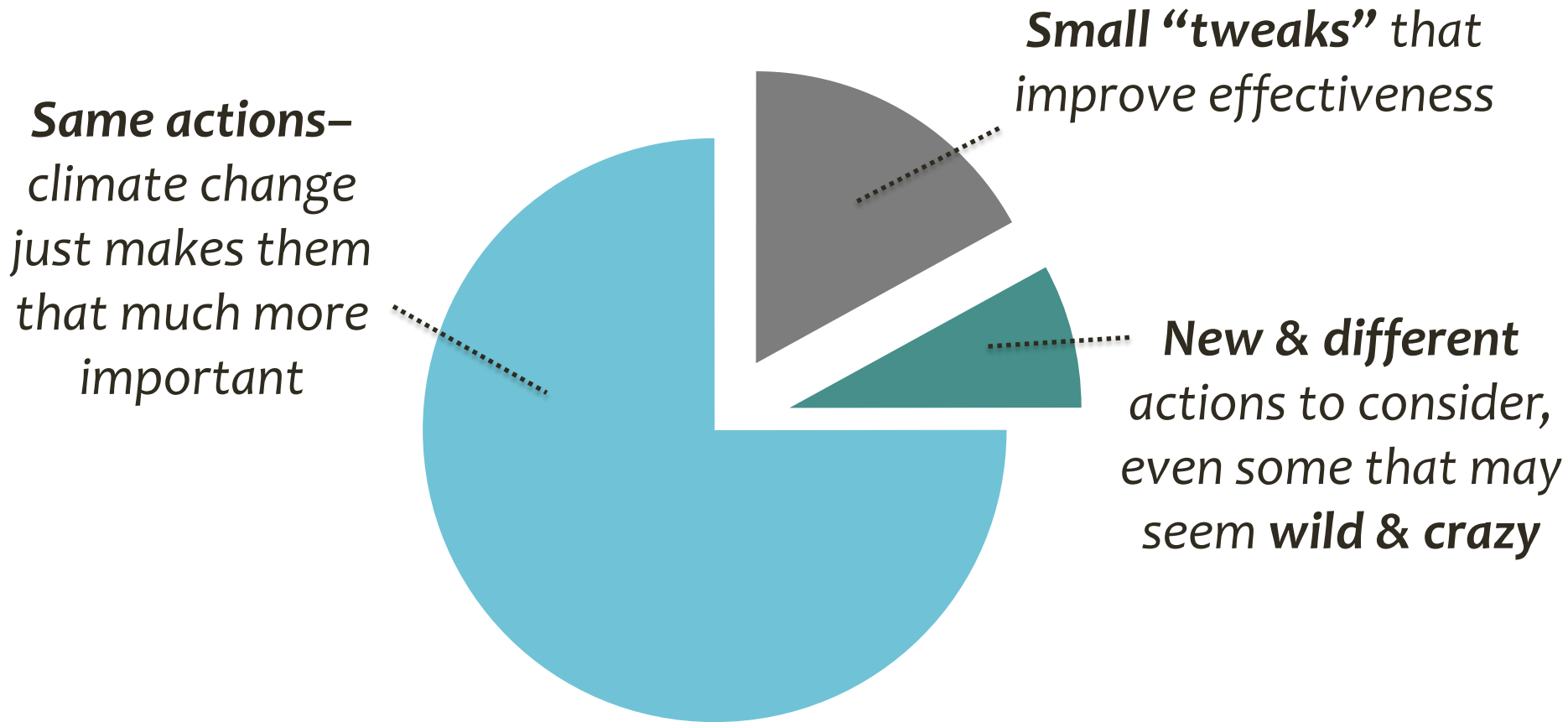
**Adaptation** is helping ecosystems and communities prepare for climate change.



Actions may build upon conservation, restoration sustainable harvest, and other techniques.

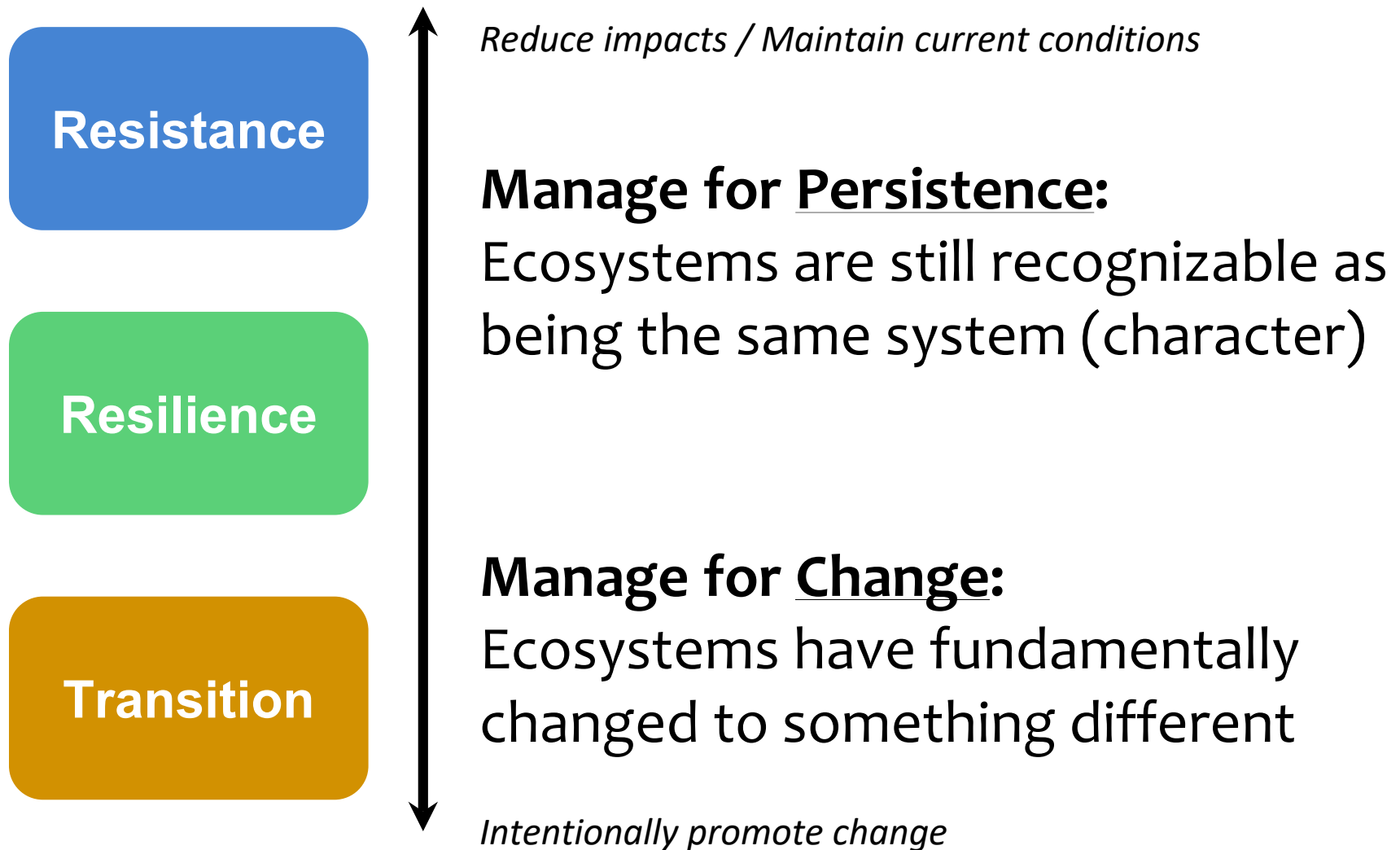
BUT it is necessary to explore potential modification to address climate change

*Adaptation actions may not look that different from current actions, especially in the near term.*



*\*individual results will vary*

# Adaptation Concepts



# Refugia

Valleys that harbor cold air pools and inversions can decouple local climatic conditions from regional circulation patterns.

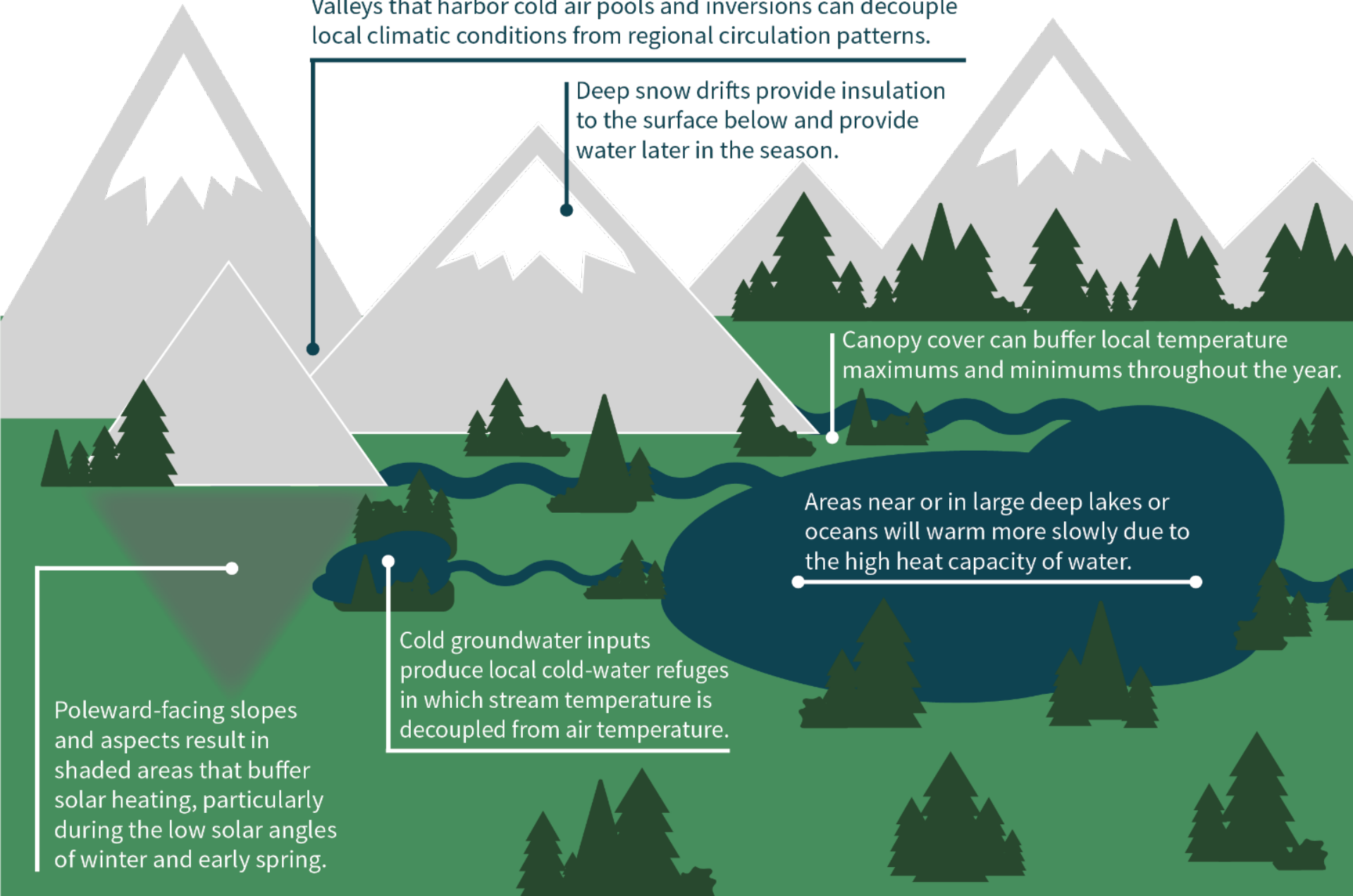
Deep snow drifts provide insulation to the surface below and provide water later in the season.

Canopy cover can buffer local temperature maximums and minimums throughout the year.

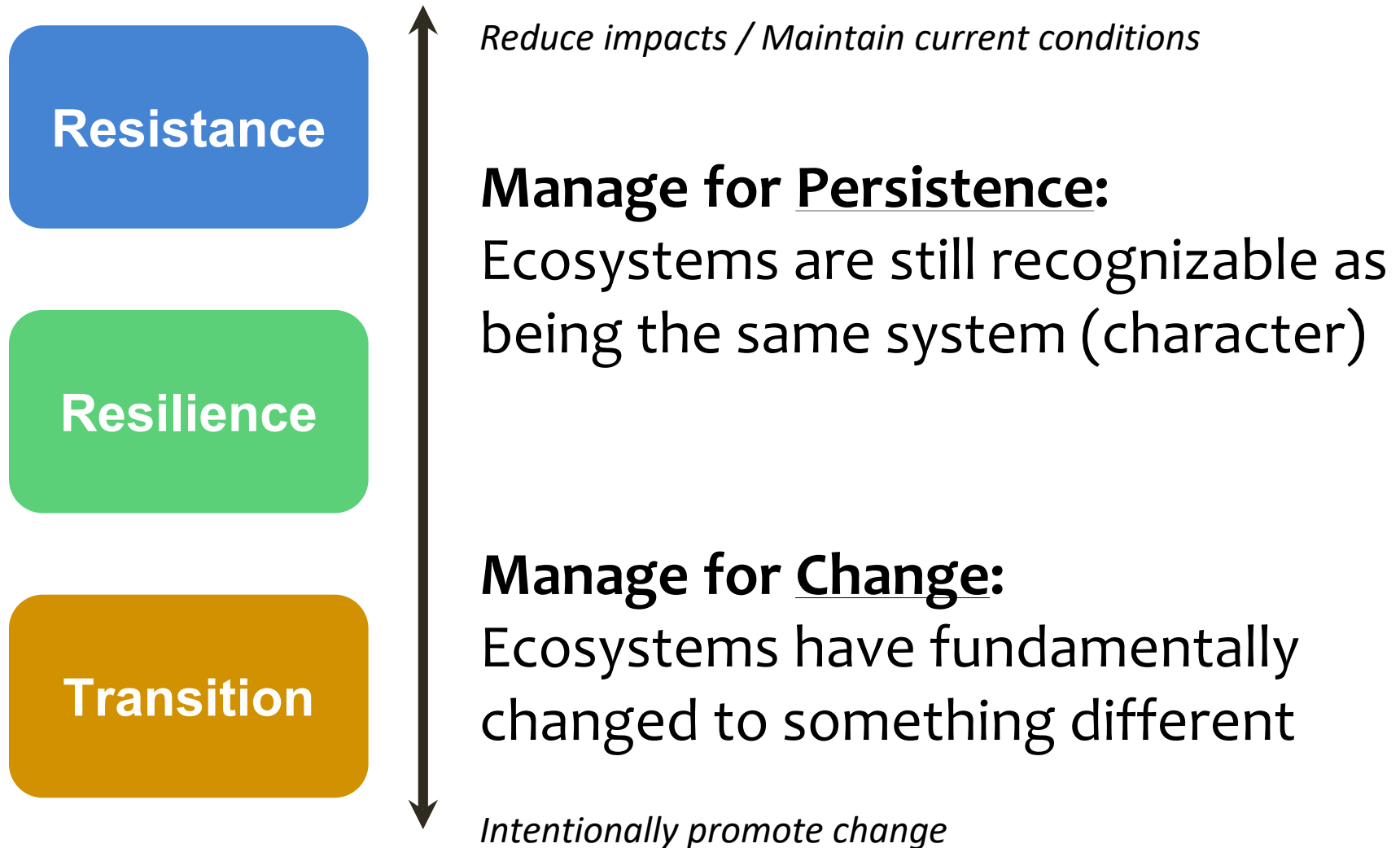
Areas near or in large deep lakes or oceans will warm more slowly due to the high heat capacity of water.

Cold groundwater inputs produce local cold-water refuges in which stream temperature is decoupled from air temperature.

Poleward-facing slopes and aspects result in shaded areas that buffer solar heating, particularly during the low solar angles of winter and early spring.



# Adaptation Concepts



# When you might emphasize...

## **Persistence (Same/Similar)**

- High cultural or social or value associated with current condition. (Or legal requirement to maintain current condition!)
- Inherent ability to buffer changes.
- Highly vulnerable, but your place represents best chance of success.

## **Change (Future-adapted)**

- High likelihood that current conditions will fail, making change more necessary.
- Changes are already occurring, and can be enhanced.
- Good opportunity to try something new.

# There isn't a single answer

## Every community is different



Management  
goal



Timber



Wildlife



Food

Each decision is unique and will vary based upon:

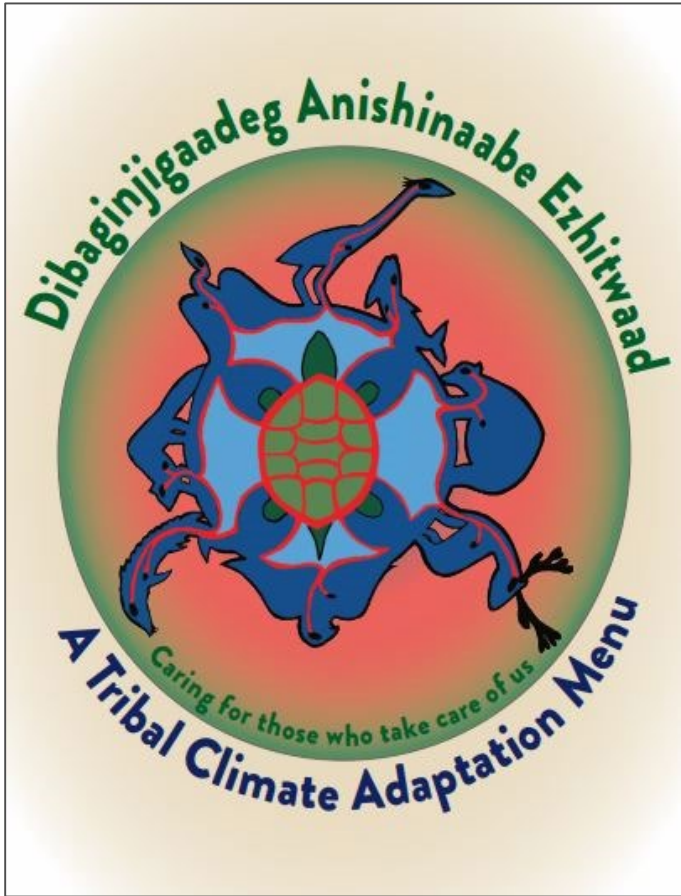
**Place:** Location & Site Conditions

**Purpose:** Goals & Objectives

**People:** Values, Culture, & Mission

**Practices:** Equipment, Procedures, & Methods

# Tribal Adaptation Menu



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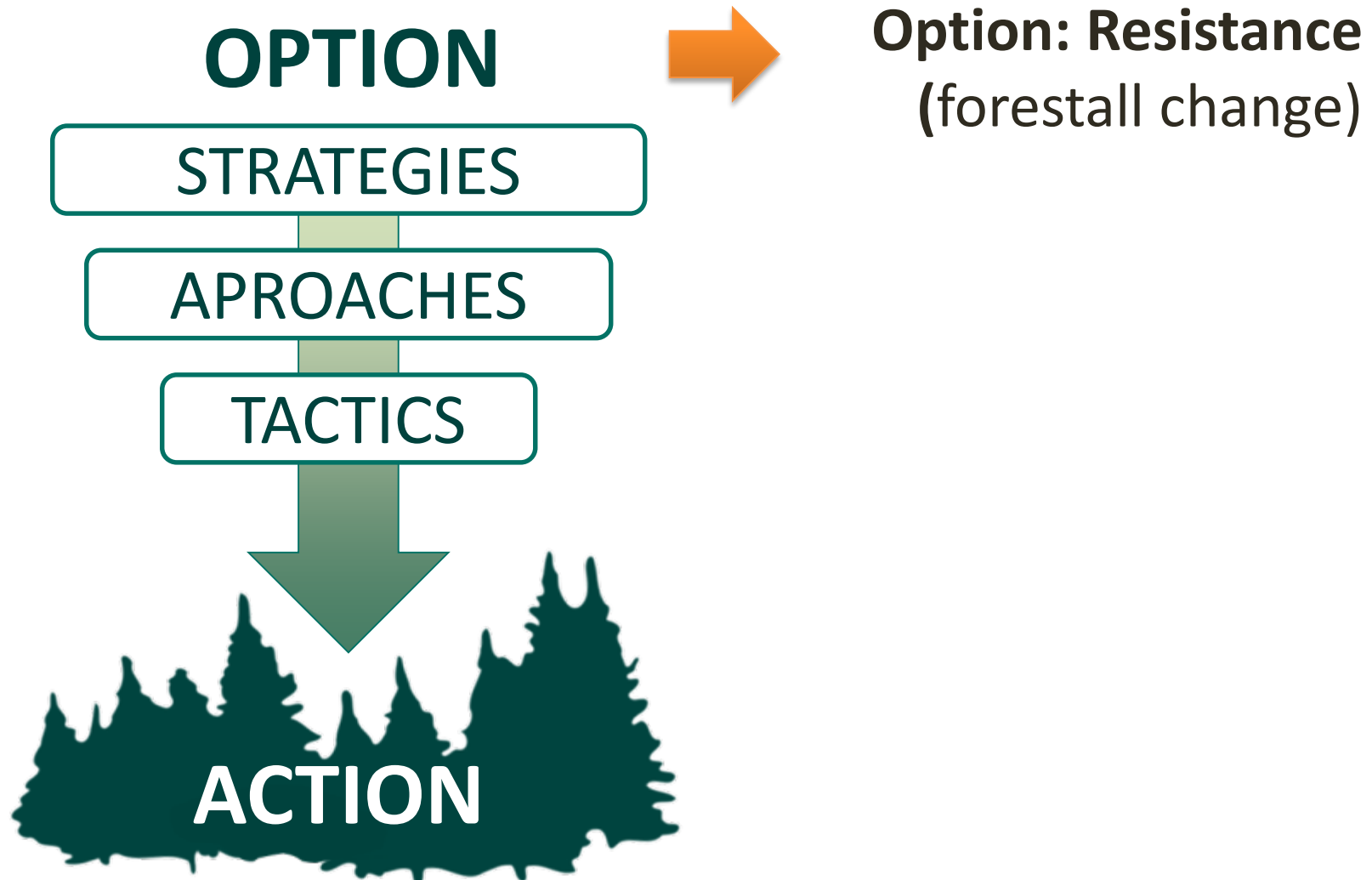
# Adaptation Menu Benefits

## *Address challenges in implementing adaptation:*

1. Connecting broad ideas to specific actions
2. Making actions intentional
3. Communicating your ideas
4. Boosting creativity

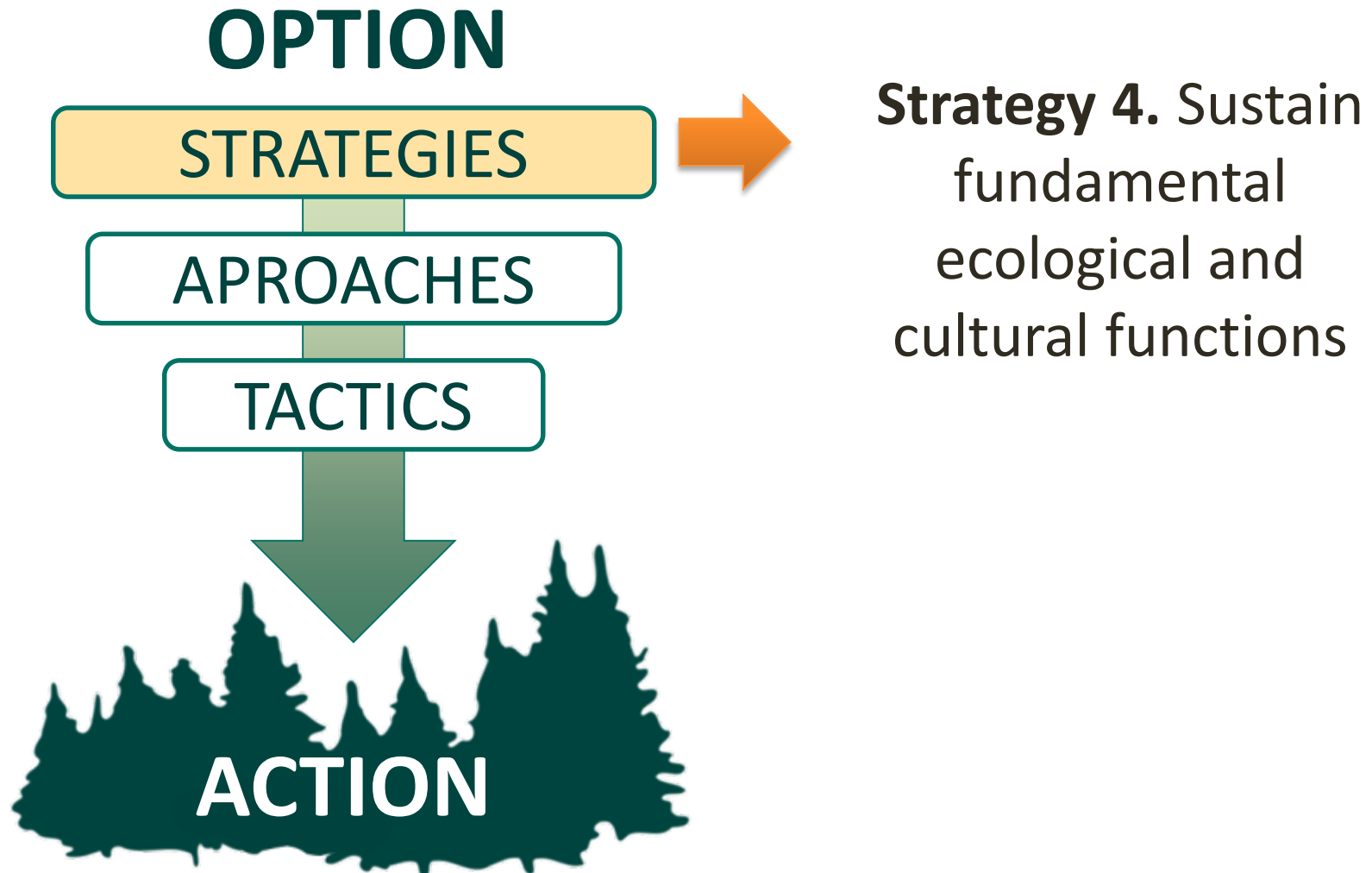
# Adaptation Menus

## 1. *Connecting Broad Ideas to Specific Actions*



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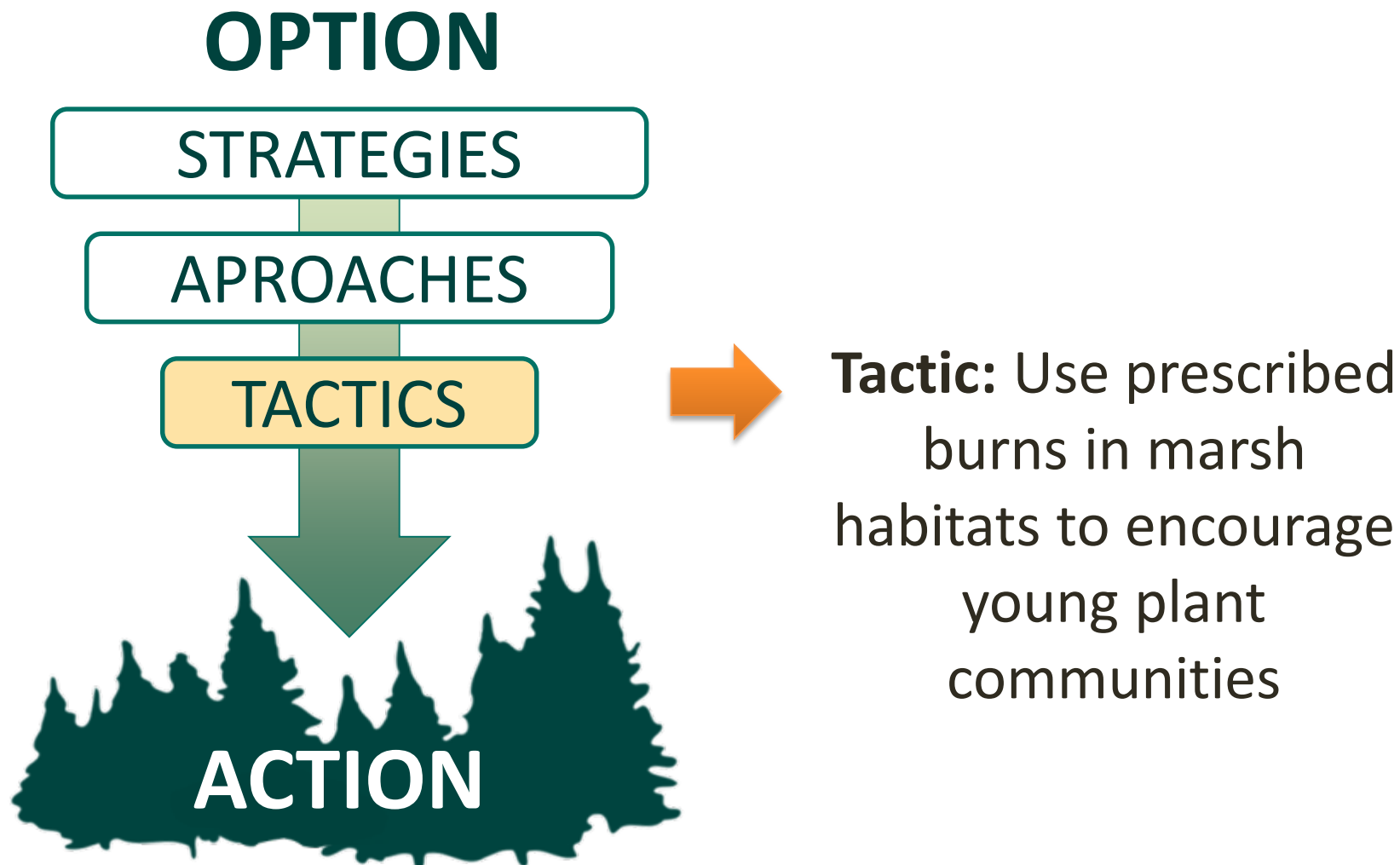


### **Approach 4.5.**

Revitalize and maintain Anishinaabe/cultural use of ishkode (fire) as a stewardship tool.

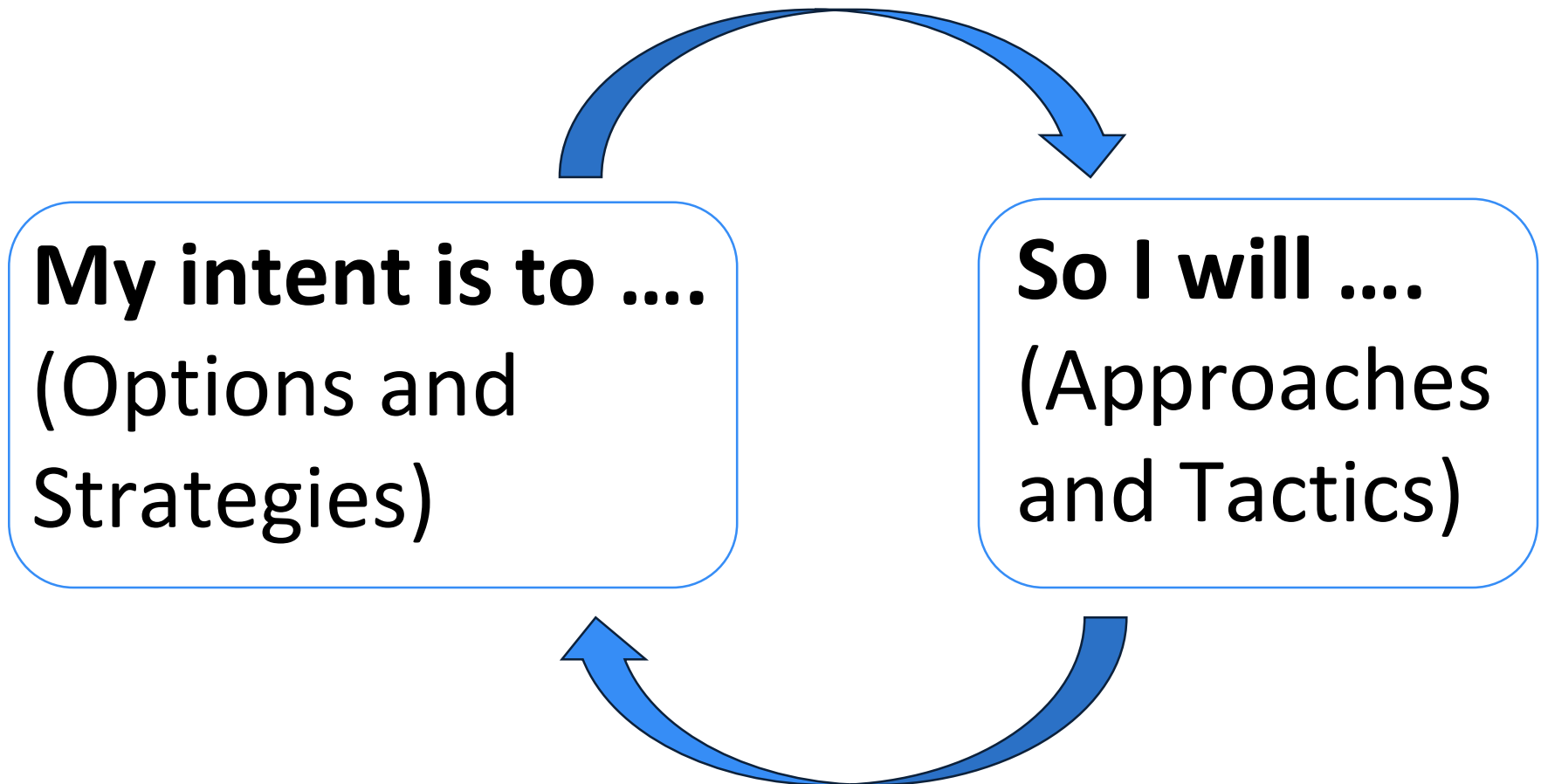
# Adaptation Menus

## 1. Connecting Broad Ideas to Specific Actions



# Adaptation Menus

## *2. Making Actions Intentional*





**Step 4**: Identify adaptation approaches and tactics for implementation

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

### Key Questions:

- What actions can help the project area to adapt to anticipated changes *and* meet your goals?
- Will future managers know what we were trying to do?

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

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

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

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

**Focus on Strategies/Approaches 4 – 14 to start!**

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

**Timeframe** – Specify when you will implement the tactic.

For example:

- Summer 2016
- Winter 2016-7
- Within 3 years of...
- After...

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

**Benefits** – Describe why the tactic is good.

For example:

- addresses biggest or multiple challenges
- is cheap and easy
- has co-benefits
- is likely to succeed

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

**Drawbacks and Barriers** – Describe why it's not so good.

For example:

- it may have negative side effects,
- Requires high cost or effort
- may not be successful
- has social, financial, or other barriers

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

**Practicability** – Is it both *effective* (will meet desired intent) and *feasible* (capable of being implemented)?

- **High:** Yes to both!
- **Moderate:** Yeah, but it will take some additional effort or planning...
- **Low:** No, the barriers/drawbacks seem too big or the benefits too small.

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

**Recommend Tactic**– Given all this, is this tactic likely to be helpful?

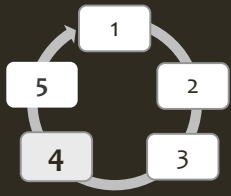
Also consider: trade-offs, urgency, likelihood of success, cost, and effort...

**Yes:** look to integrate into plan, prescription, or other activities

**No:** not useful at this time



# Adaptation Demonstration: Menominee Forest



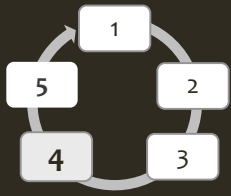
**Step 4:** IDENTIFY and adaptation approaches and tactics for implementation.

## Adaptation Approaches

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

→ **Adaptation Action:**  
Restore sites with  
future-adapted species





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

### Plant selection: Climate Change Tree Atlas

#### Projected Habitat Increases

American beech

**American elm**

American hornbeam

Bitternut hickory

**Black cherry**

Black locust

Black oak

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

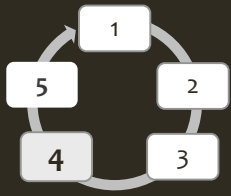
Mockernut hickory

Ohio buckeye

Osage-orange

Post oak

Shingle oak



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

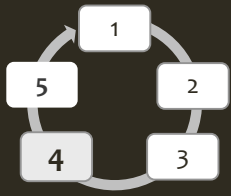
## Plant selection: Traditional Ecological Knowledge

Example plant list for some sites

Tree Species	Notes	Menominee Name	Meaning	Menominee Use
White Oak	60% of site	Askeqtemaehnak	Good for the eyes	medicinal/food
Black Oak	30% of site	Anipahkahkuehtek	Black inside	medicinal/food
Bur Oak	8% of site	Mahkemenah maeqtekomen	Biggest acorn	medicinal/food
Swamp Oak	1% of site	Maskik-askeqtemaeh	Found in swamp	medicinal/food
Post oak	1% of site			

### Additional Tree Species

Black Walnut	Kentucky Bluegrass along side	Paskanaweh	Good tasting nut	medicinal/food
American Elm	Variety with higher resistance	Keckiwahtek	Elder Tree	medicinal
Shingle Oak	Hoping for shrublike effect			
Black Cherry	Earlier successional stage	Awaehsehsaekahtek	Little Bear tree	medicinal
Northern White-cedar	Medicine tree within stand	Kesaehkahtek	Medicine tree	medicinal/ ceremonial



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



**Summer 2014 - 2016**

- Tree planting
- Seeding of understory plants



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

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

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

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

**Focus on Strategies/Approaches 4 – 14 to start!**



***BREAK!***

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

Using your Step 4 worksheet:

Put a star \* next to tactics that you'd like to implement after you get more input or engagement from the community.

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

**Approach** – Select from the menu.

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

Think about strategies 1-3:

- What are you already doing that will help you meet your project goals?
- What information do you need from the community before moving forward on “starred” tactics?
- These details should include the who and when.



**LUNCH BREAK!**

# Poster

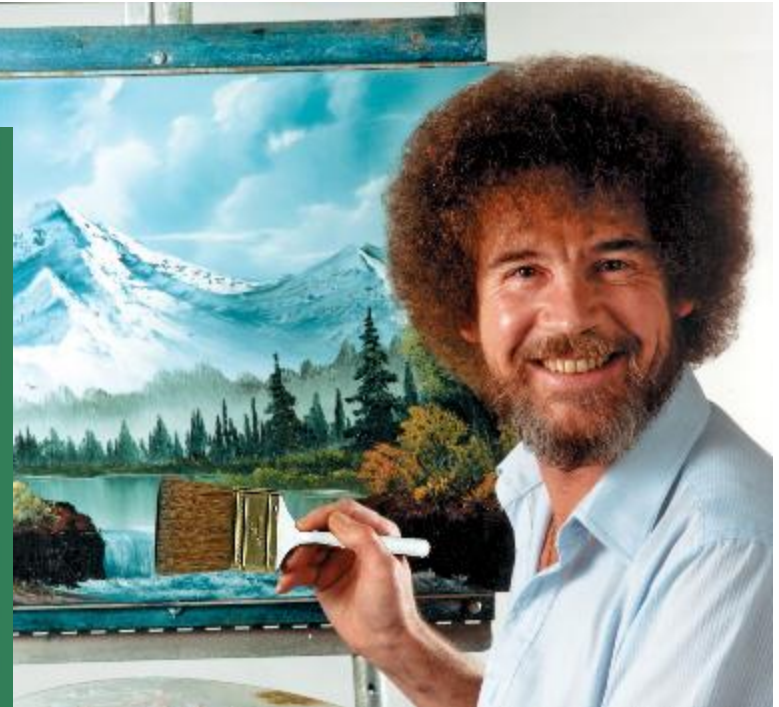
Project Name

Objective (s)

Climate Challenges/  
Opportunities

Cover these up with another  
flip-chart page!

# Poster Time!



Be creative! What's your future vision, and how will adaptation help you get there?

# Report out:

- Share your poster/Action Plan for your project area:

15 min per group for feedback!





***BREAK!***

Moving Forward: How do we start?

Thoughts/takeaways from the day?

# Climate Change Adaptation Planning for Tribes and Tribal Partners



Bay Mills Community College  
Brimley, MI  
June 2019

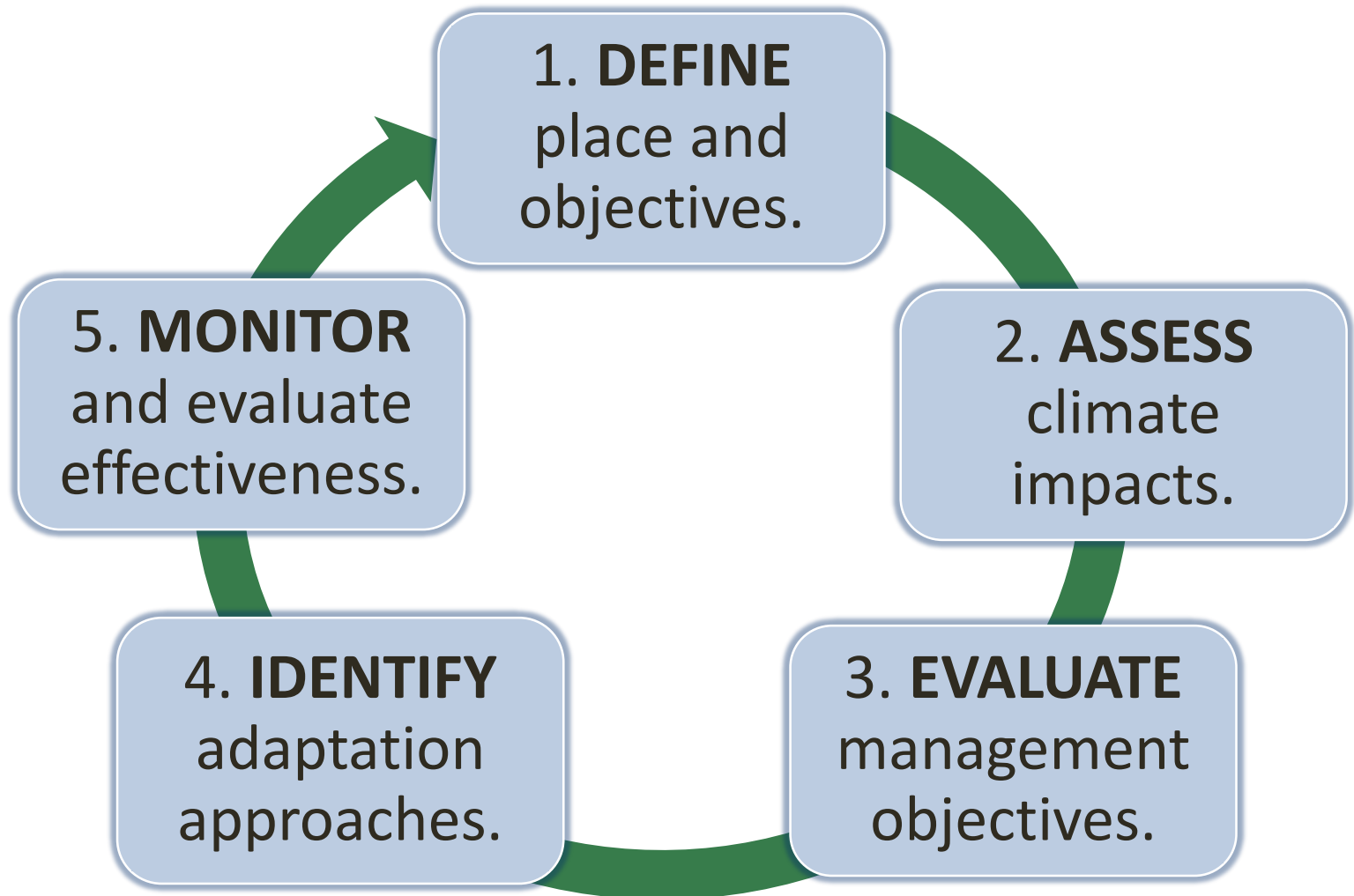


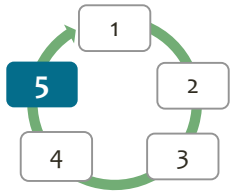
Thoughts/takeaways from the past  
two days?



**Step 5**: MONITOR and evaluate effectiveness of implemented actions.

# Adaptation Workbook Cycle





**Step 5:** MONITOR and evaluate effectiveness of implemented actions.

## **Purpose:** Practice adaptive management

How do we know if the adaptation actions are effective?

What can we learn from the other beings in the system?

What can we learn from our community members or other communities?

## Step 5: MONITOR and evaluate effectiveness of implemented actions.

Different categories of scientific/western knowledge gathering:

- **Scientific research** = Is this outcome statistically significant compared to a control? Could we expect similar results elsewhere?
- **Impact/ response monitoring** = What changes are occurring?
- **Implementation monitoring** = Did we do the action?
- **Effectiveness monitoring** = Did our actions actually have the desired effect?

# Step 5: MONITOR and evaluate effectiveness of implemented actions.

Different ways of gathering TEK:



# Step 5: MONITOR and evaluate effectiveness of implemented actions.

## Monitoring Variable

Evaluation Criteria

Monitoring

Implementation

*Items that can tell you whether you have achieved your management goals & objectives.*

*Use an item that also helps evaluate a particular tactic (e.g. what was the strategy/ approach?)*

*For example:*

- *Diversity of species composition*

## Step 5: MONITOR and evaluate effectiveness of implemented actions.

Monitoring variable

**Evaluation Criteria**

Monitoring

Implementation

*What is success?*

*What you're monitoring or measuring. What are the units on your data?*

*For example:*

- *25% of stems are of future-adapted species*

## Step 5: MONITOR and evaluate effectiveness of implemented actions.

Monitoring variable

Evaluation Criteria

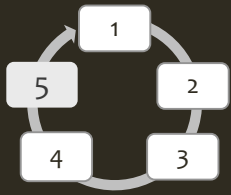
**Monitoring  
Implementation**

*How the monitoring will actually get done.*

*Use existing monitoring when possible!*

*For example:*

- *Regular post-planting stocking surveys.*



## Step 5: MONITOR and evaluate effectiveness of implemented actions.



### Monitor

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

## Thanks to Menominee Tribal Enterprises!

- Tony Waupoichick
- Dave Mausel
- Jeff Grignon
- Marshall Pecore



**Read more!**

Adaptation Demonstration summary:  
[www.forestadaptation.org/mte](http://www.forestadaptation.org/mte)

*Journal of Forestry* article:  
[www.nrs.fs.fed.us/pubs/46417](http://www.nrs.fs.fed.us/pubs/46417)

**Step 5:** MONITOR and evaluate effectiveness of implemented actions.

**Adaptation Monitoring Variable** – What you will measure

**Criteria for Evaluation** – a value or threshold that is meaningful for assessing effectiveness or informing future decisions

**Monitoring Implementation**– How you will gather the information



***YOU MADE IT!***  
***(Congrats!)***

But you're not done yet ...



## Discussion & Next Steps

# Discussion:

## Menu Feedback

- Please add your thoughts to the feedback form!
- What resonated? What would you change?
- How can we help you facilitate this or bring it to audiences that may be more resistant?

# Next Steps:

- Let's keep moving these ideas forward! We'd like to share your examples of culturally relevant adaptation projects:
  - [www.ForestAdaptation.org](http://www.ForestAdaptation.org) as Adaptation Demonstration Projects.
  - Will you share your workbook sheets?
- Tribal Adaptation Cohort Calls!
  - Next call is Friday June 28 @ 10am Eastern.
  - Will send out call details.

# To-do list:

## Participants:

- Complete Tribal Adaptation Menu feedback
- Evaluations (please!)
- Follow up with questions or ideas
- Complete necessary reimbursement information

## US:

- Share contact list & presentations from the workshop
- Schedule a follow-up call
- Check in soon!

**Thanks everyone!**

