USDA United States Department of Agriculture
Northern Forests Climate Hub

The art and science of developing a menu of climate change adaptation actions for managing wildlife and ecosystems




FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

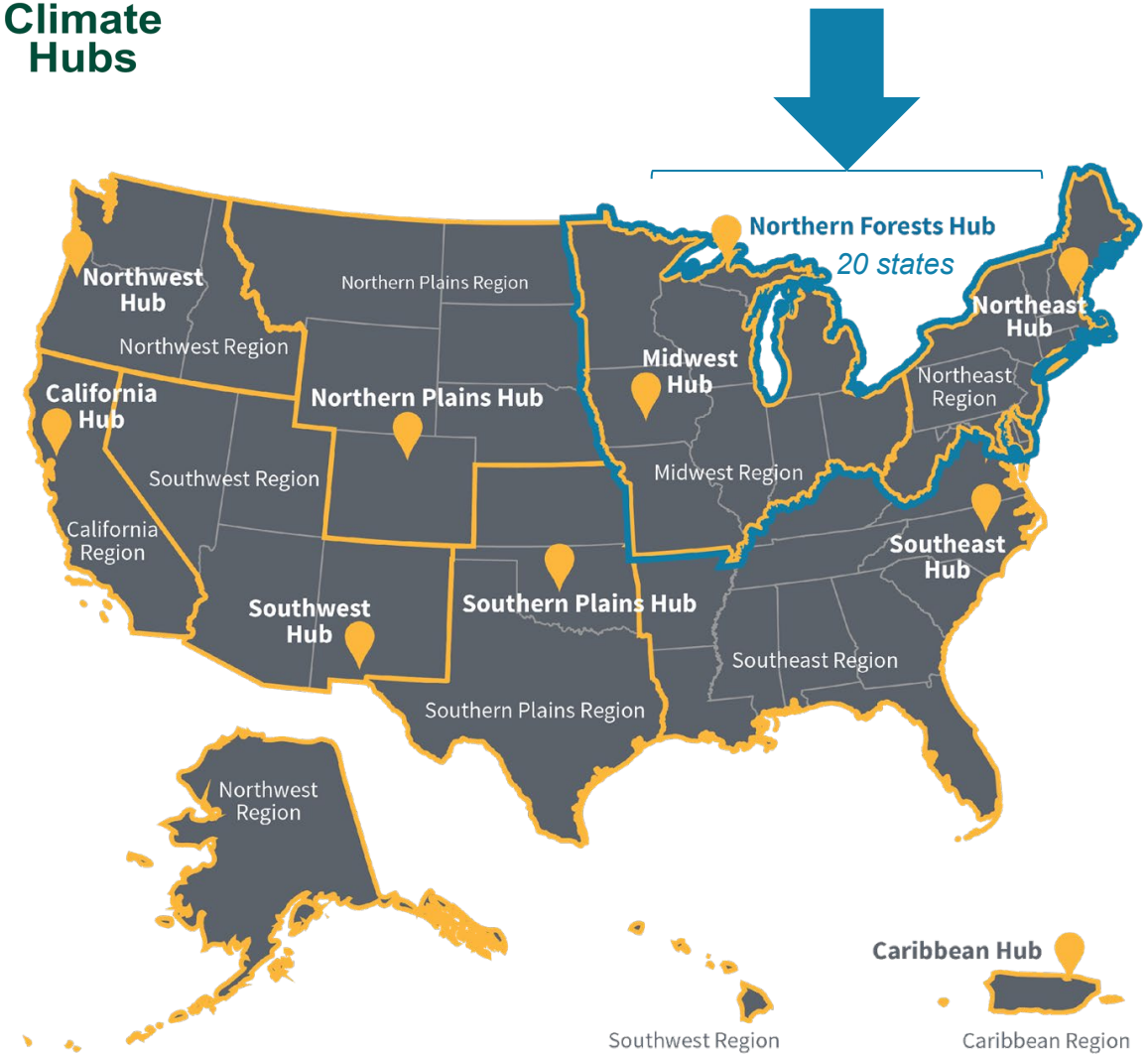
NIACS Northern Institute of Applied Climate Science

WISCONSIN UNIVERSITY OF WISCONSIN-MADISON

DEPARTMENT OF NATURAL RESOURCES DNR MICHIGAN

MIDWEST Climate Adaptation Science Center

USDA Northern Forests Climate Hub



Mission:

To develop and deliver science-based, region-specific information and technologies, to help **natural resource managers** and **woodland owners** integrate climate change information into **planning, decision-making,** and **management activities** in order to sustain the diverse benefits from forests in a changing climate.

The Northern Forests Climate Hub provides additional capacity to two USDA Regional Climate Hubs the **Northeast and Midwest Hubs**— and works within their broader scope and organization.

Website: www.climatehubs.usda.gov/hubs/northern-forests

Northern Institute of Applied Climate Science

Climate

Carbon

The Northern Institute of Applied Climate Science (NIACS) develops synthesis products, fosters communication, pursues science, and provides technical assistance in climate change adaptation and carbon management.

Multi-institutional collaborative chartered by USDA Forest Service, universities, non-profit organizations, and a tribal commission

NIACS
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American Forests™

Great Lakes Indian Fish & Wildlife Commission

NCASI

Michigan Technological University
1885

The UNIVERSITY of VERMONT

UNIVERSITY OF MINNESOTA

MICHIGAN STATE UNIVERSITY

Acknowledging Barriers

Climate change science is not being used

- Mismatches in scale & scope of science
- Science doesn't reflect the needs of managers

Managers feel overwhelmed and isolated

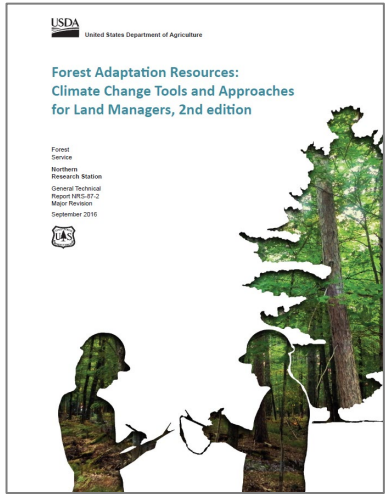
- Managers faced with huge volume of research
- Individual attempts at adaptation are not communicated
- Climate change can be an intimidating topic

There's not a shared understanding of "success"

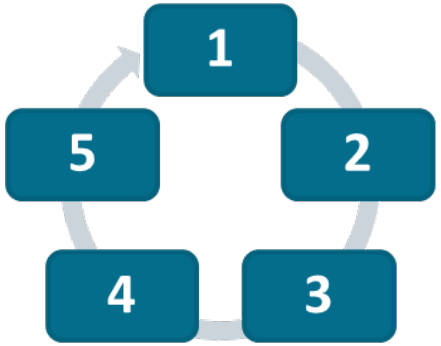
- Best practices haven't been established
- One-size-fits-all prescriptions are non-starters

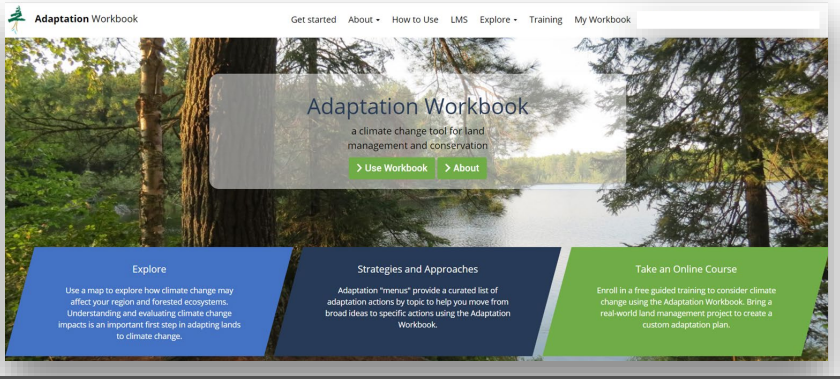
Adaptation Workbook

- Flexible 5-step workbook designed for a variety of landowners with diverse goals
- Works at project level
- Centers around manager's expertise, and judgement
- Creates **clear rationale** for actions by connecting them to **broader adaptation ideas**
- **Does not make recommendations**
- **Includes:**
  - Adaptation workbook
  - Adaptation strategies for different resource areas (menus)



Swanston et al. 2016
(2nd edition)

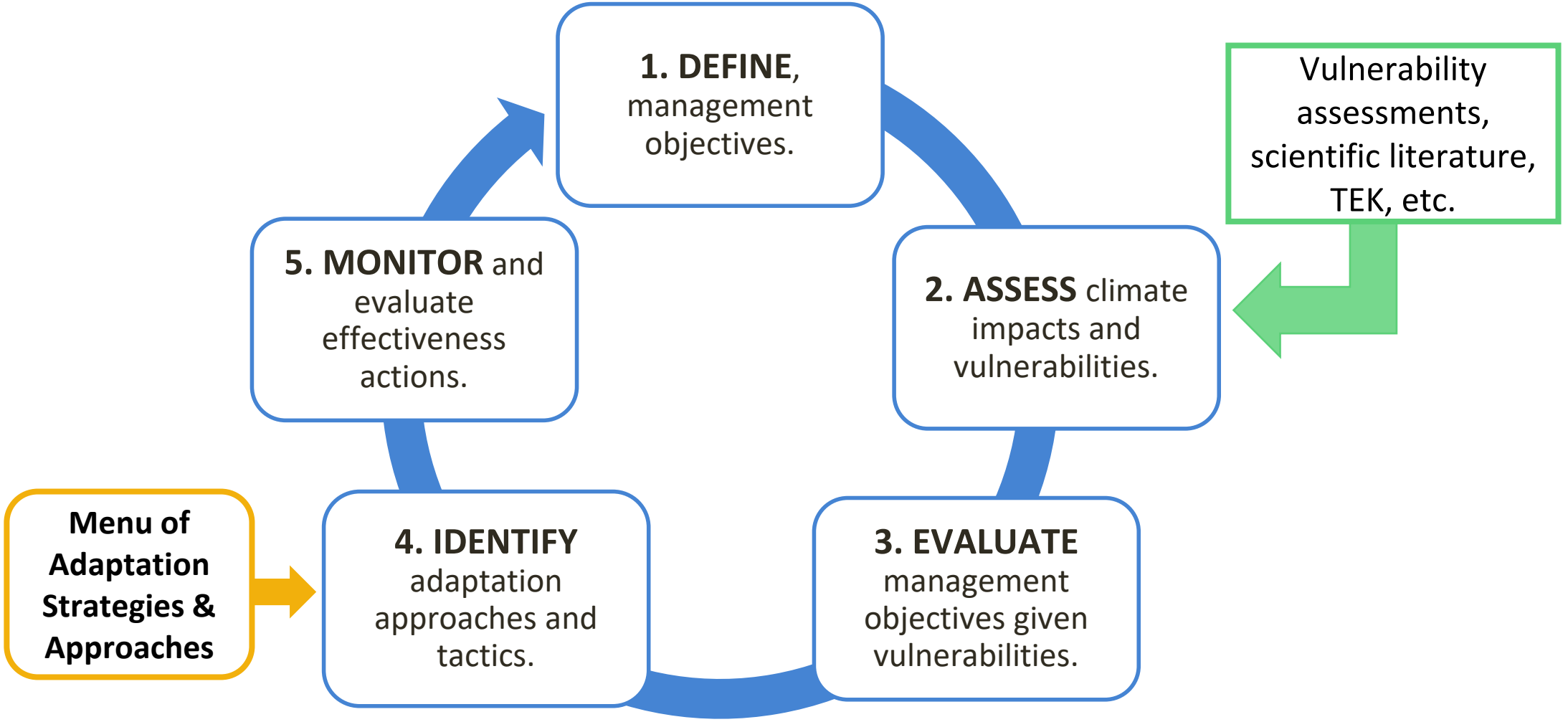




Download at: www.fs.usda.gov/research/treesearch/52760 **or use online at** www.AdaptationWorkbook.org

Adaptation Workbook: Decision-support tool

A workbook process provides "**structured flexibility**"



Adaptation Workbook

Systematic and designed for transparency.

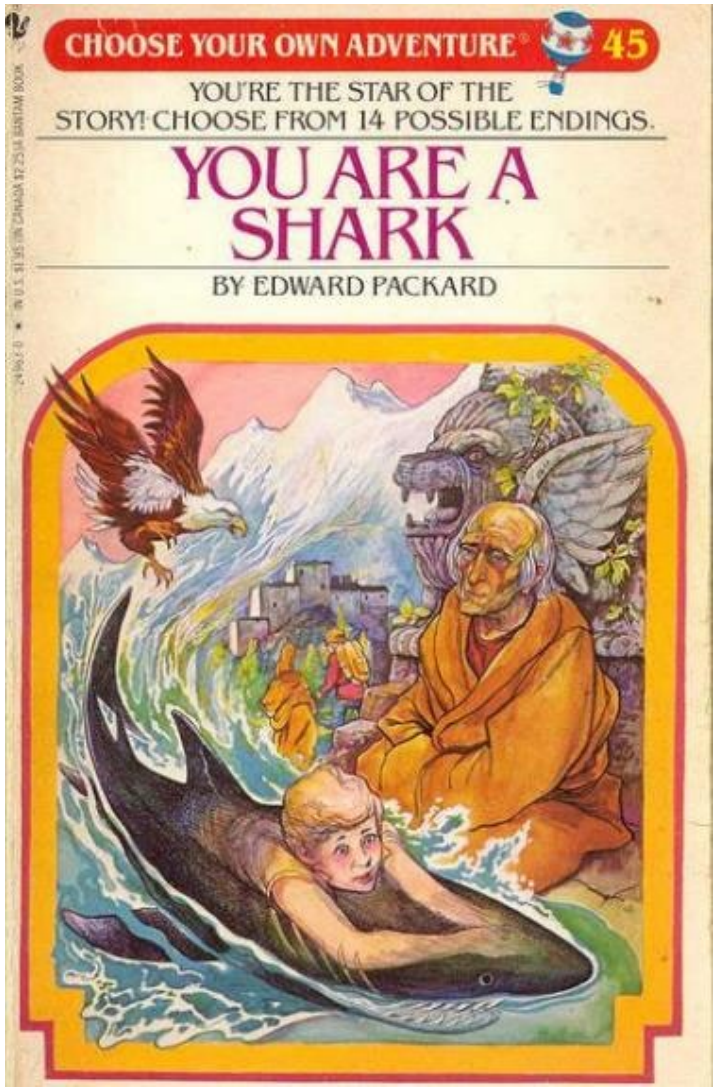
Management Objectives	Challenges	Opportunities	Feasibility	Other Considerations

Adaptation Actions			Benefits	Drawbacks/ Barriers	Recommend Tactic?
Approach	Tactics	Time Frame			

Intentional

- Explicitly consider and address climate change
- Adaptation actions are driven by local consideration of impacts as well as management goals
- Intentionally assessing risk and vulnerabilities **makes our plans more robust!**

Flexible

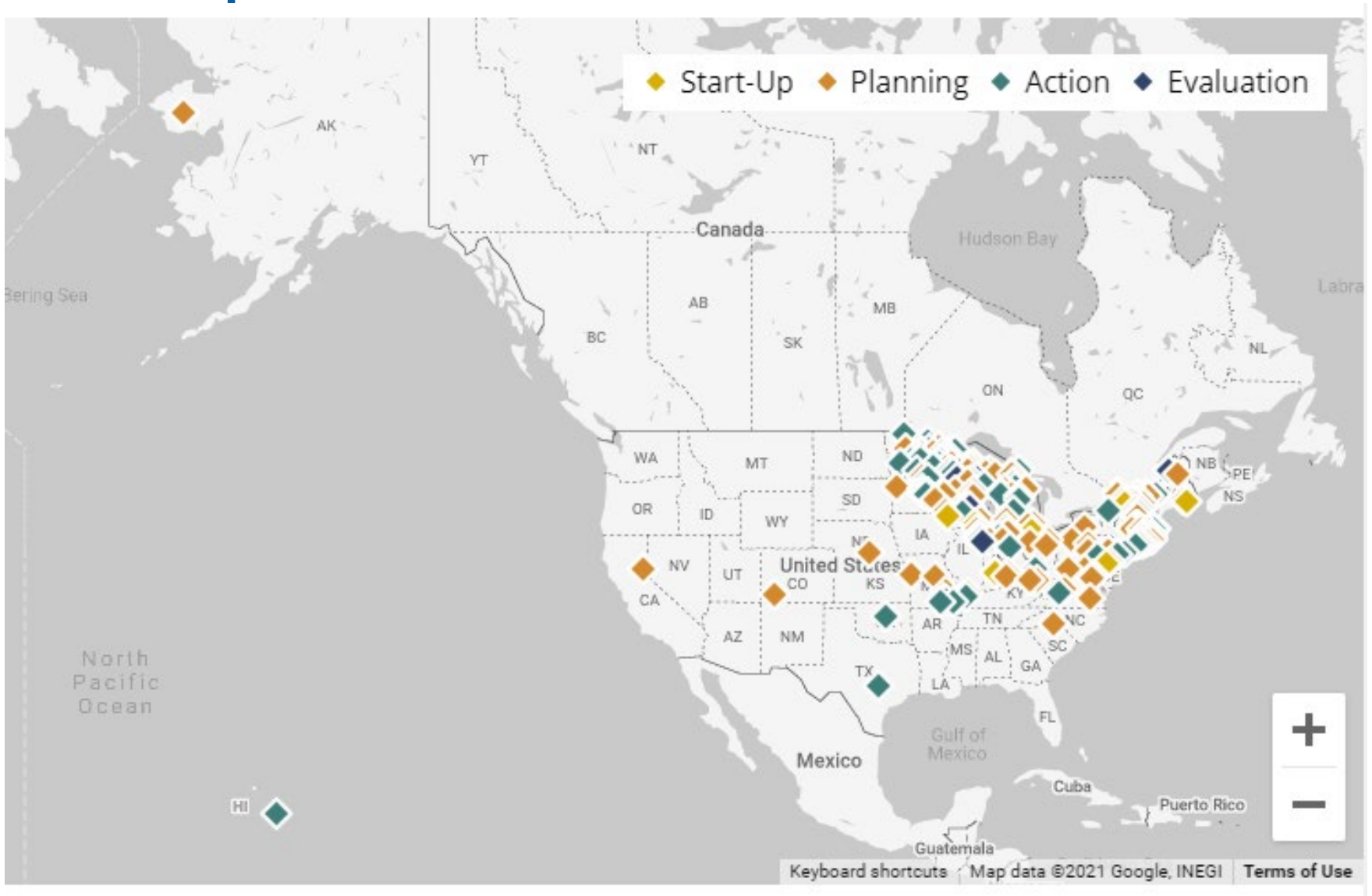

CHOOSE YOUR OWN ADVENTURE®
45
YOU'RE THE STAR OF THE STORY! CHOOSE FROM 14 POSSIBLE ENDINGS.
YOU ARE A SHARK
BY EDWARD PACKARD

Adaptation Demonstrations

Real-world examples of climate-informed forest management.

More than 500 projects have used the **Adaptation Workbook** to consider climate change and identify adaptation actions.

More than 170 are described online



Adaptation case studies: www.forestadaptation.org/demos

Adaptation Menus of Strategies and Approaches

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

Brunch

Classics

Lemon Ricotta Pancakes Whipped Mascarpone Maple, Berries	15	**AJ's Omelet** Fontal Cheese, Spinach, Mushrooms	14
Cornflake Crusted French Toast Berries, Maple Syrup	15	**Eggs Florentine** Spicy Capicola, House-Made Cheddar Biscuit, Spinach	15
Bacon, Egg & Cheese Bacon, Two Eggs, Taleggio Cheese, Ciabatta	14	**Porchetta Hash** Poached Egg, Calabrian Chili Hollandaise	16
Avocado Toast Poached Eggs, Tomatoes, Chili Flakes, Sea Salt	15	**Chia Pudding** Chia Seeds, Toasted Coconut, Banana, Strawberry	14
Chicken Parmigiana Spicy Marinara, Fresh Mozzarella	22	**Farmhouse Breakfast** Two Eggs, House-Made Cheddar Biscuit, Chicken Sausage	14
Squid Ink fettuccine Vongole Little Neck Clams, Garlic, White Wine, Butter, Chili	22	**Chicken Kale Caesar** Chicken, Kale, Croutons	16

Create Your Own Pasta

Shapes

Rigatoni Semolina, All-Purpose Flour, Olive Oil	14
Cavatelli All-Purpose Flour, Durum Flour, Eggs, Ricotta	15
Tagliatelle All-Purpose Flour, Durum Flour, Eggs	15
Gluten-Free Rigatoni Gluten-Free All-Purpose Flour, Olive Oil, Eggs	16
Spaghetti Semolina, Durum Flour, Olive Oil	15
Four Cheese Herb Ravioli Fontal, Ricotta, Parmesan, Pecorino	18

Sauces

Marinara San Marzano tomatoes, Garlic, White Wine, Basil, Chili	
Arrabiata All-Purpose Flour, Durum Flour, Eggs, Ricotta	+1
Broken Meatball House Tomato Sauce with the Addition of Broken Meatballs	+4
Sunday Sauce House Tomato Sauce with Short Rib, Sausage, Veal	+4
Roasted Garlic Pecorino Semolina, Durum Flour, Olive Oil	+2
Carbonara Pancetta, Eggs, Peas, Pecorino	+3

Sides

Pecorino Truffle Fries	8
Potato Hash	6
Bacon	6
Turkey Sausage	6
Field Greens	7
Two Eggs Any Style	6
Beignets	8
Baked Goods	10

Brunch Cocktails

Bloody Mary Vodka, Spiced Fresh DOP Tomato Juice, Horseradish	10/45
Cointreau Spritz Cointreau Spritz, Aperol, Crème de Peche, Sparkling Wine	12/55
Green Side Reyka Vodka, Green Juice, Lemon	12/55
Morning Derby Bourbon, Grapefruit, Ginger, Carrot Juice	12/55
Sangria Red Wine, Fresh Fruit, Pisco, Crème de Peche	10/45
Firing Squad Milagros Tequila, Cointreau, Fresh Lime, Grenadine	12/55
Tall Mimosa Reyka Vodka, Cointreau, Jake's Mimosa Juice, Sparkling Wine	12/55

Why Menus Work

- Consistent “hierarchy” of general and specific ideas
- Connecting broad ideas to specific actions
- Document the **intent** of adaptation actions.
- Boost creativity!

Adaptation Menu Development

- Lit review and synthesis
- Binning, organization
- Testing with managers
- Publication

Adaptation menus available at: www.forestadaptation.org/strategies

Adaptation Menus

Published:

- Forestry
- Urban Forestry
- Forested Watersheds
- Tribal Perspectives
- Agriculture
- Forest Carbon Management
- Outdoor Recreation
- Non-Forested Wetlands
- Inland Glacial Lake Fisheries
- Wildlife Management
- Fire-Adapted Ecosystems
- Great Lakes Coastal Ecosystems

In Preparation:

- Grasslands
- Ocean Coastal Ecosystems

Menu of Adaptation Strategies and Approaches

Developed for forests

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 5: Maintain and enhance species and structural diversity.
5.1. Promote diverse age classes.
5.2. Maintain and restore diversity of native species.
5.3. Retain biological legacies.
5.4. Establish reserves to maintain ecosystem diversity.

Strategy 6: Increase ecosystem redundancy across the landscape.
6.1. Manage habitats over a range of sites and conditions.
6.2. Expand the boundaries of reserves to increase diversity.

Strategy 7: Promote landscape connectivity.
7.1. Reduce landscape fragmentation.
7.2. Maintain and create habitat corridors through 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 better adapted to future conditions.

Strategy 9: Facilitate community adjustments 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 mixes of native species.
9.3. Guide changes in species composition at early 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 wide moisture and temperature tolerances.
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.

Strategy 10: Realign ecosystems after disturbance.
10.1 Promptly revegetate sites after disturbance.
10.2. Allow for areas of natural regeneration to test for future-adapted species.
10.3. Realign significantly disrupted ecosystems to meet expected future conditions.

NIACS

To be used in the Adaptation Workbook decision-support framework – Swanston et al, 2016. Forest Adaptation Resources: climate change tools and approaches for land managers, 2nd edition http://www.treesearch.fs.fed.us/pubs/52760 ***More information can be found at*** *www.forestadaptation.org/strategies*

Adaptation menus available at: www.forestadaptation.org/strategies


STANLEY
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FAUCET
CONNECTOR

Wildlife Management Adaptation Menu

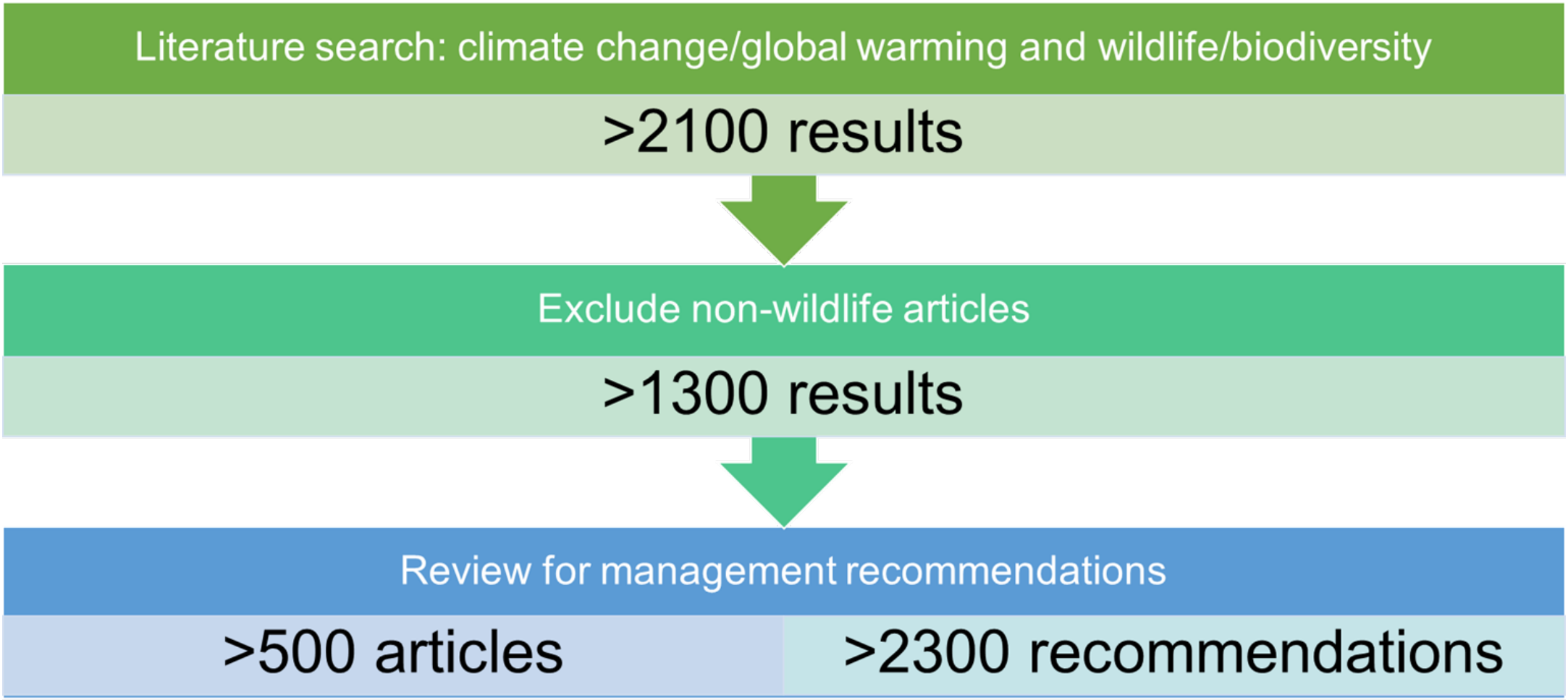
Target Audience:

- Terrestrial wildlife managers
- Focus on **population management** as well as **habitat management** (2 halves of the menu)





Wildlife Management Adaptation Menu



Literature Review Results

Preparing wildlife for climate change: how far have we come? LeDee et al. 2020, JWM, https://doi.org/10.1002/jwmg.21969

Recommendation	Count
Establish and enhance protected areas	596
Maintain or create optimal cover	[illegible]
Promote a 'wildlife-friendly' landscape matrix	276
Facilitate shifts in the geographic range of the species	124
Reduce existing threats	119
Prevent or limit human alteration of habitat	115
Maintain or restore water resources	107
Maintain metapopulation processes	106
Maintain a viable, socially acceptable population size	93
Sustain positive and reduce negative interspecific/biotic interactions	93
Other	72
Maintain or mimic disturbance regimes	66
Enhance genetic diversity	45
Prevent or limit human disturbance	41
Maintain or create adequate food sources	35
Take no action/laissez faire	30
Maintain or enhance reproduction	[illegible]
Prevent or control wildlife disease	26
Plan for and reduce human-wildlife conflict	24
Maintain or enhance survival	14
Total	2306

Pilot Workshops

- Michigan, 2018
- Wisconsin, 2019
- Nebraska, 2019

Wildlife Adaptation Menu: Strategies

Populations

1) Maintain and enhance **genetic diversity**
2) Establish and maintain **connectivity** between populations
3) Facilitate **shifts in the geographic range** of the species in anticipation of future conditions
4) Manage interspecific and biotic **interactions**
5) Maintain a sustainable **population size** by managing reproduction, survival, and dispersal
6) Adjust **harvest regulations** to manipulate populations
7) Plan for and reduce human **disturbance** and human-wildlife **conflict**

Habitat

8) Restore and maintain sources of **food, water, and cover** as components of habitat
9) Adjust management of food, water, and cover to align with expected **future conditions**
10) Establish and enhance **protected areas** or habitat reserves
11) Promote wildlife habitat conservation on lands **outside of protected areas**

Xtra

12) Intentionally chose to **take no action**
13) Engage **human communities** in wildlife conservation

Wildlife Adaptation Menu: Approaches and Tactics

Example Strategy with Approaches and Tactics

3. Facilitate shifts in the geographic range of the species in anticipation of future conditions

3.1. Establish corridors and minimize barriers to movement to new suitable habitats

Tactic: Create highway crossing structures that span barriers to northward movement.

Tactic: Connect mature northern or boreal forest habitats that are oriented north-south across the landscape to facilitate northward migration of northern flying squirrels.

3.2. Prepare suitable habitat in anticipation of future introduction, reintroduction, or natural range shift of a species

Tactic: Provide technical assistance to enable private landowners to create grassland habitat for quail and other grassland birds.

Tactic: Identify and improve anticipated future stopover or wintering habitat for migratory birds.

3.3. Move and release individuals into a population where conditions are now suitable and expected to improve

Tactic: Release wild turkeys from mid-Atlantic states into New England.

Tactic: Move eastern tiger salamanders from populations in south-central Minnesota to populations in north-central Minnesota, where conditions may be more suitable as the prairie-forest border shifts to the northeast.

Wildlife Adaptation Menu: Approaches and Tactics

Example Strategy with Approaches and Tactics

8. Restore and maintain sources of food, water, and cover as components of habitat

8.4. Manage and create suitable microhabitats and microclimates

Tactic: Protect and create vernal pools in mesic forests.

Tactic: Implement forest management actions that promote diverse canopy cover, light environments, and down woody habitat.

8.5. Enhance primary food sources for specialist climate–sensitive species

Tactic: Promote lupine species for Karner blue butterfly habitat

Tactic: Promote milkweed along roadsides, utility corridors, and grasslands for monarch butterfly habitat.

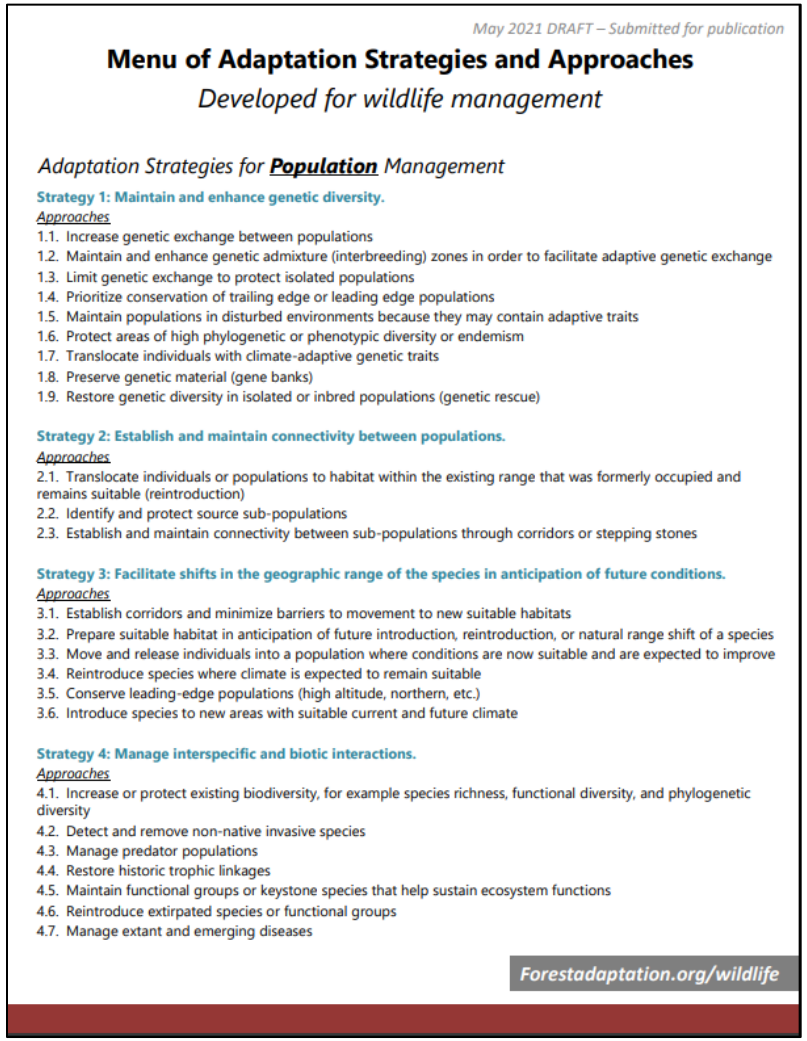
8.7. Create or maintain replicated sources of food, water, and cover in a variety of locations across the landscape

Tactic: Manage for early-successional aspen forests in multiple locations adjacent to winter deer yards.

Tactic: Restore pothole wetlands and riparian oxbows in agricultural landscapes to provide redundant waterfowl habitats.

Wildlife Adaptation Menu

A menu of climate change adaptation actions for terrestrial wildlife management. Handler et al. 2022, WSB, https://doi.org/10.1002/wsb.1331



May 2021 DRAFT – Submitted for publication

Menu of Adaptation Strategies and Approaches

Developed for wildlife management

*Adaptation Strategies for **Population** Management*

Strategy 1: Maintain and enhance genetic diversity.

Approaches

1.1. Increase genetic exchange between populations
1.2. Maintain and enhance genetic admixture (interbreeding) zones in order to facilitate adaptive genetic exchange
1.3. Limit genetic exchange to protect isolated populations
1.4. Prioritize conservation of trailing edge or leading edge populations
1.5. Maintain populations in disturbed environments because they may contain adaptive traits
1.6. Protect areas of high phylogenetic or phenotypic diversity or endemism
1.7. Translocate individuals with climate-adaptive genetic traits
1.8. Preserve genetic material (gene banks)
1.9. Restore genetic diversity in isolated or inbred populations (genetic rescue)

Strategy 2: Establish and maintain connectivity between populations.

Approaches

2.1. Translocate individuals or populations to habitat within the existing range that was formerly occupied and remains suitable (reintroduction)
2.2. Identify and protect source sub-populations
2.3. Establish and maintain connectivity between sub-populations through corridors or stepping stones

Strategy 3: Facilitate shifts in the geographic range of the species in anticipation of future conditions.

Approaches

3.1. Establish corridors and minimize barriers to movement to new suitable habitats
3.2. Prepare suitable habitat in anticipation of future introduction, reintroduction, or natural range shift of a species
3.3. Move and release individuals into a population where conditions are now suitable and are expected to improve
3.4. Reintroduce species where climate is expected to remain suitable
3.5. Conserve leading-edge populations (high altitude, northern, etc.)
3.6. Introduce species to new areas with suitable current and future climate

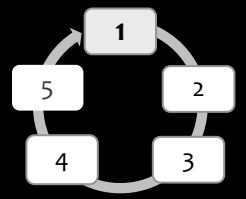
Strategy 4: Manage interspecific and biotic interactions.

Approaches

4.1. Increase or protect existing biodiversity, for example species richness, functional diversity, and phylogenetic diversity
4.2. Detect and remove non-native invasive species
4.3. Manage predator populations
4.4. Restore historic trophic linkages
4.5. Maintain functional groups or keystone species that help sustain ecosystem functions
4.6. Reintroduce extirpated species or functional groups
4.7. Manage extant and emerging diseases

Forestadaptation.org/wildlife

Adaptation menus available at: www.forestadaptation.org/strategies



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

Wildlife habitat and sustainable agriculture in the Central Platte River Valley

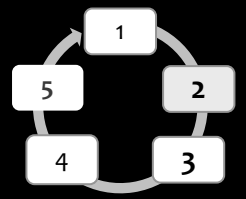
www.ForestAdaptation.org/central_platte_river

Goals:

- Improve habitat for sandhill cranes and other wildlife
- Promote habitat-compatible agricultural practices

Objectives:

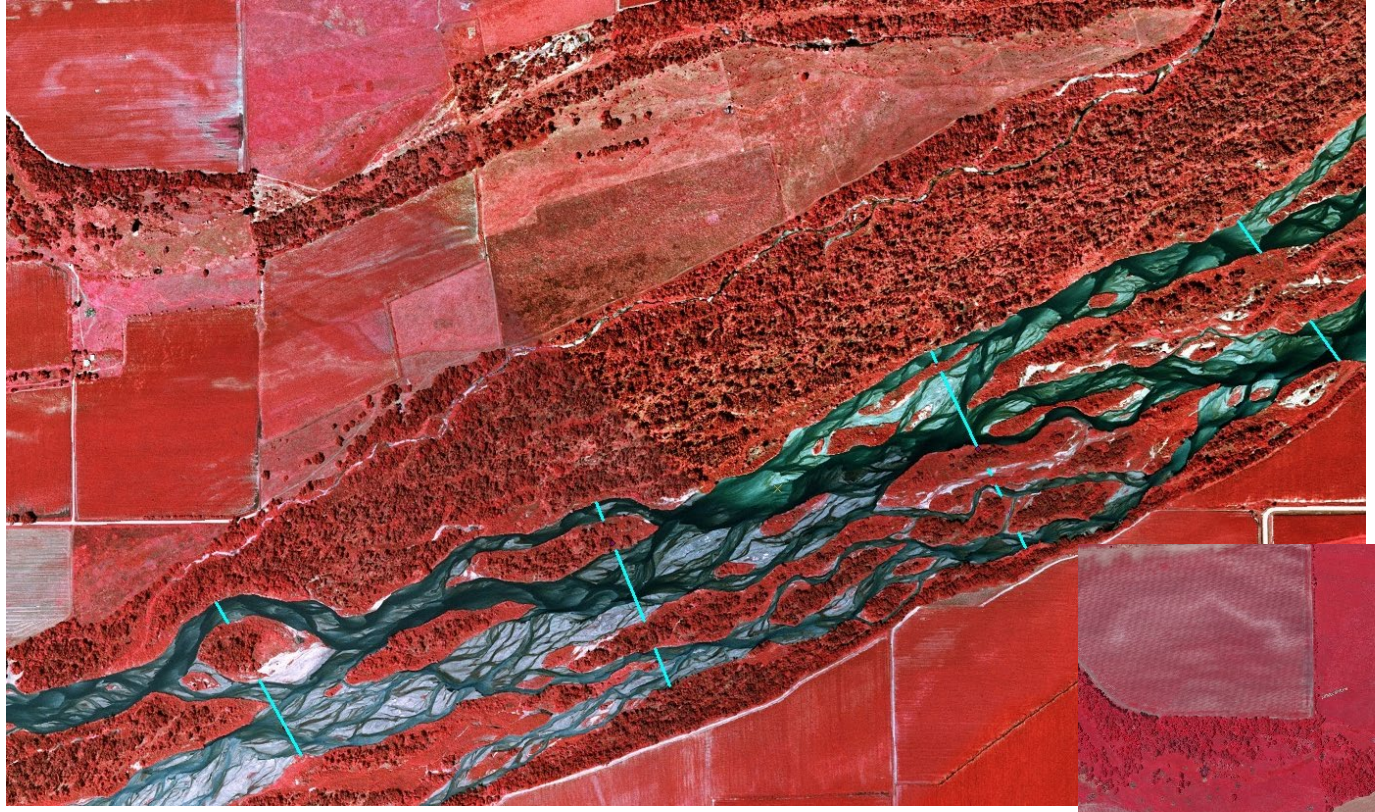
- Increase meadow cover (<30%) and reduce woodland cover (>30%) within 800m of the river
- Increase average river channel width to <200m
- Improve soil fertility in agricultural fields
- Convert 40% of the row crop fields to crane-friendly crops such as wheat, barley, alfalfa, and corn



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

Priority Climate Change Impacts

- Warmer winters leading to shifts in crane migration and overwintering patterns
- Reduced ice jams that help maintain the river's open, wide-braided character
- Increased pressures from insect pests and cool-season invasive plants
- Variable mountain snowpack and warmer winters = shifting timing of floods/scouring action
- More low-flow days in the summer leading to vegetation encroachment in the river channel



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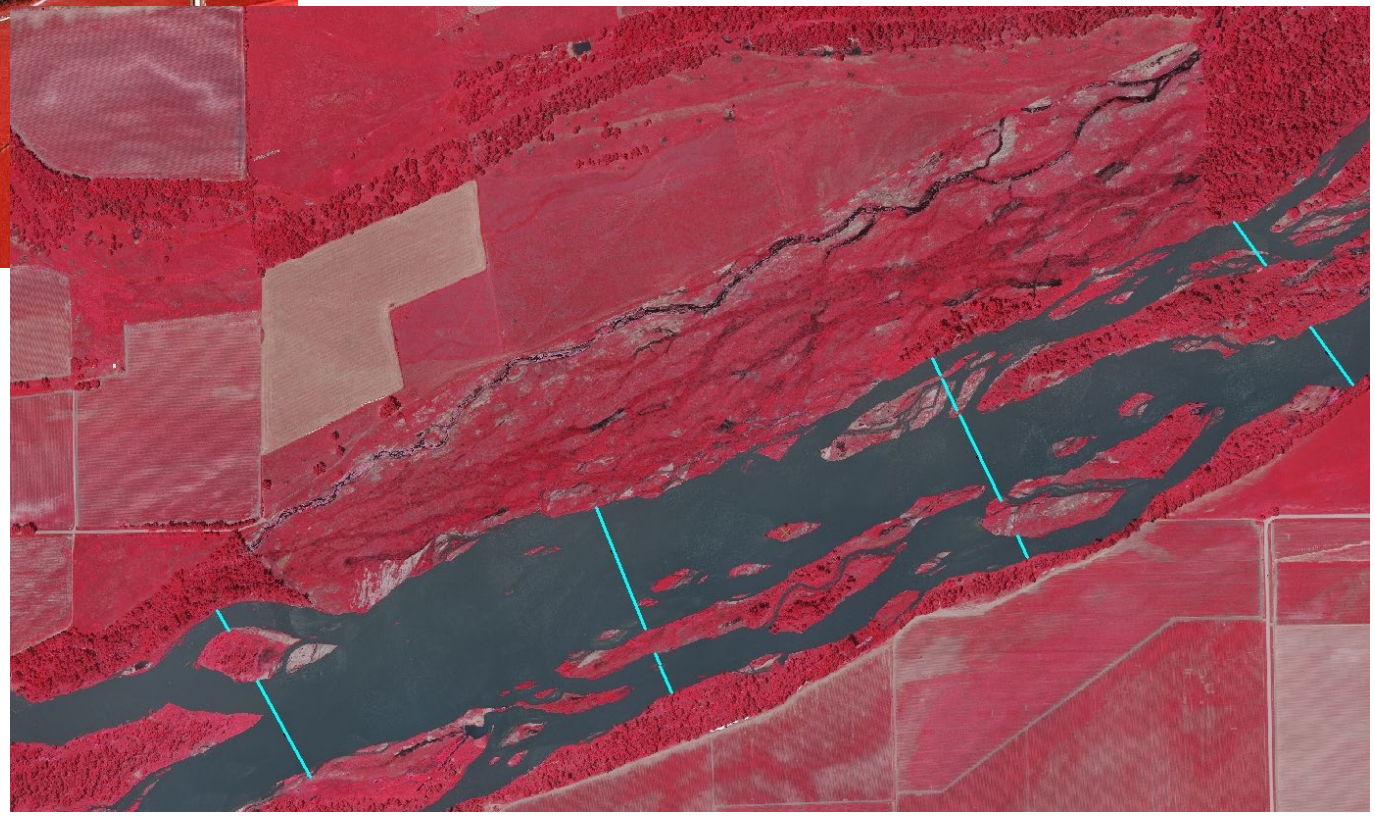
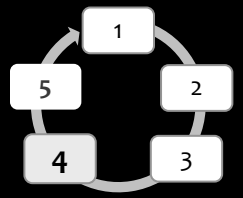
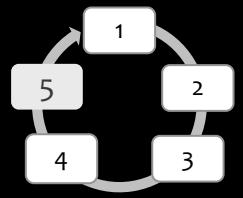


2016



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

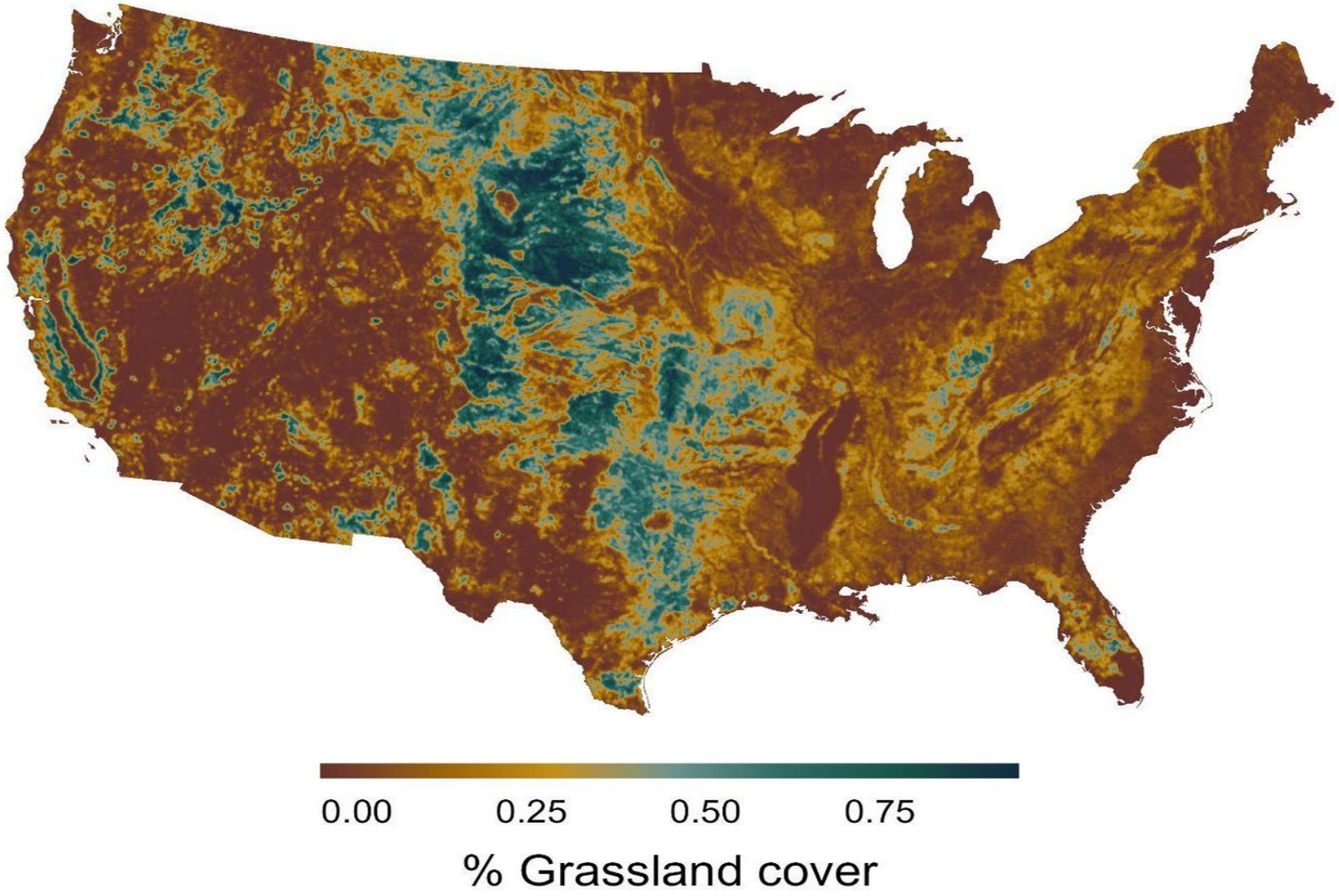
Option	Approach (From Wildlife Menu)	Tactic (Specific adaptation actions)
Resistance	11.5. Manage public or private agricultural land to provide compatible wildlife use	• Encourage no-till agriculture and cover crops in the Central Platte River watershed. • Promote "precision agriculture" techniques to reduce inputs of fuel, fertilizer, and water.
Resilience	8.8. Maintain or mimic natural disturbance regimes to enhance habitat quality	• Create disturbances at suitable seasons to boost floristic quality and biodiversity in meadows, such as grazing in the winter and prescribed fire in the summer as opposed to spring.
Transition	8.1. Manage for plant species diversity and complexity 9.2. Create new sources of food, water, and cover in anticipation of future conditions 11.3. Manage private lands near and between protected lands (buffer zones)	• Replace conventional row crops with native meadow species or alternative crops that may provide a greater variety of food sources over a longer seasonal timeframe.



Step 5: MONITOR and evaluate effectiveness of implemented actions.

- Crane population trends
- Crane arrival and departure dates
- Acres of meadow vs. woodland in the project area
- Acres of wildlife-friendly agricultural practices being employed
- Fuel and fertilizer consumption trends for farmers engaging in these practices

Why Are Grasslands Important?



~ 25% of conterminous US is grassland and pasture

Most grasslands occur in the Great Plains, but areas of natural and planted grasslands, rangeland and pasture are found in many regions

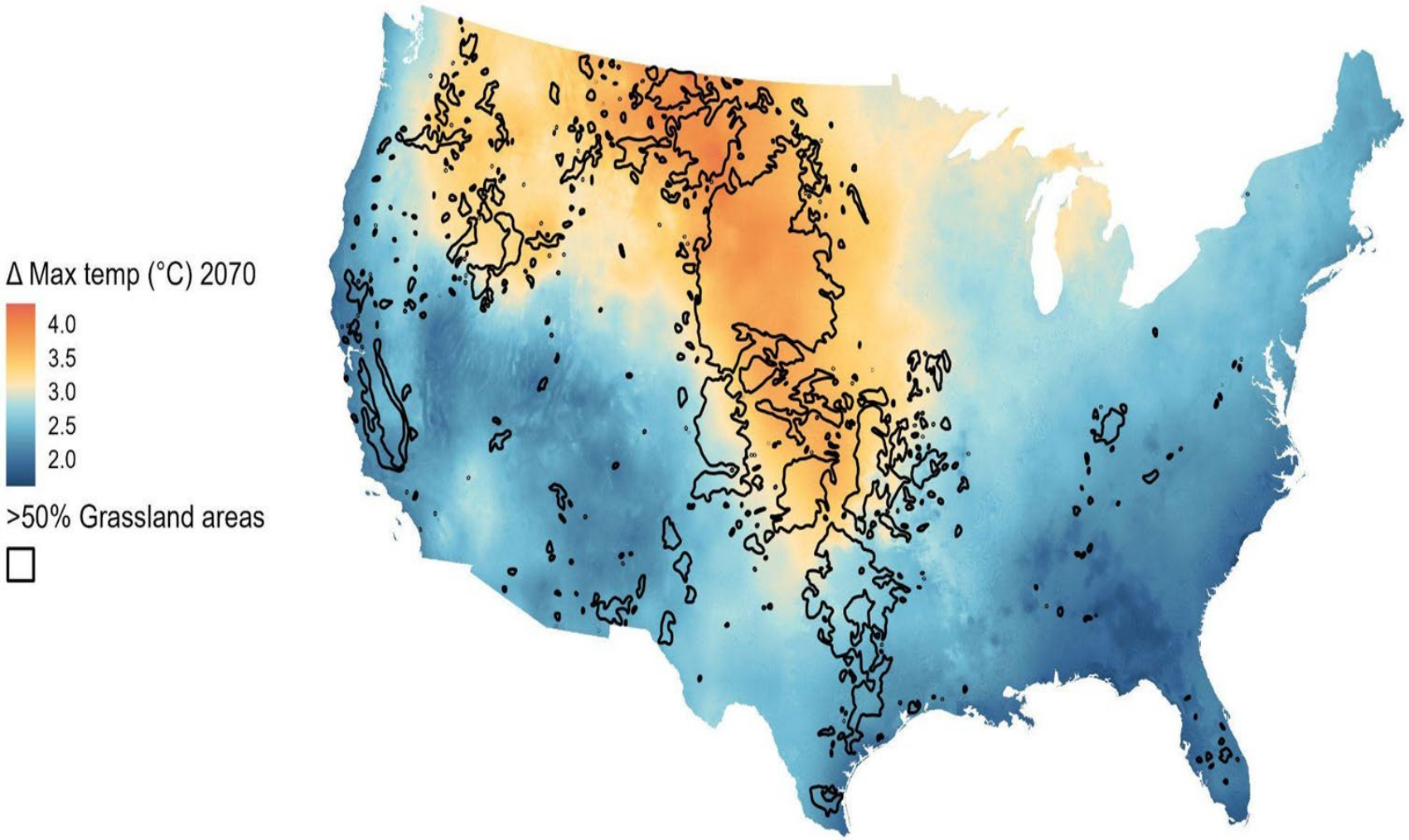
Why Are Grasslands Important?

Grasslands provide important ecosystem services including erosion and surface runoff control, pollination, ranching livelihoods, and carbon sequestration

Critical habitat for many obligate and declining grassland species

Heavily managed systems (prescribed burning, mowing, herbicide)

Grasslands Are Imperiled and Climate Vulnerable



~60 % of grasslands have already been lost

Grasslands occur at low elevation and lack canopy structure

Face highest exposure to increases in temperatures

Grasslands Are Often Neglected

A recent review of climate adaptation recommendations made for wildlife management found that out of 2306 recommendations made from 1995-2017, < 100 were specific to grasslands (LeDee et al. 2021)

New Menu Development

Literature review (~4000 initial returns)

Crafting menu from literature and expert opinion

Workshop testing with managers/professionals

8 Strategies for Grassland Adaptation

1. Sustain ecosystem functioning
2. Reduce stressor impact
3. Enhance genetic diversity
4. Maintain and restore extent
5. Landscape-scale resilience
6. Adjust site-level management
7. Facilitate ecological transition
8. Engage communities

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<u>Maintain structure:</u>
Heterogeneity and disturbance essential to grassland health. Appropriate fire, grazing, and mowing may help sustain resilience and prevent state-shifts

8 Strategies for Grassland Adaptation

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8. Engage communities

<u>Restore embedded wetlands:</u>
Restoring natural wetlands in grasslands can help increase moisture in the system and improve drought resilience

8 Strategies for Grassland Adaptation

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Preserve and utilize plant genetic diversity:

Many grassland species have functional traits that vary across climate gradients in their ranges.

8 Strategies for Grassland Adaptation

1. Sustain ecosystem functioning
2. Reduce stressor impact
3. Enhance genetic diversity
4. Maintain and restore extent
5. Landscape-scale resilience
6. Adjust site-level management
7. Facilitate ecological transition
8. Engage communities

<u>Restore habitats in favorable climates:</u>

Creating habitat in areas where climate may remain suitable longer is a no-regrets conservation strategy that may help species persist

Look out for more from the grassland menu in 2024

Thank you!

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Maintain connectivity:
Mobile species, such as grassland birds, may respond to climate extremes through within range movements. Maintaining landscape connectivity can help facilitate this adaptive response

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<u>Shifts in burn phenology:</u>
Grasslands in many regions are typically burned in Spring, but as temperatures rise, these burns may become risky. Therefore, Winter and Fall burns may be appropriate alternatives.

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<u>Anticipate community shifts:</u>
Introduce native, drought resistance species found in arid grasslands in grasslands where extreme drought is becoming the new normal. This is will help maintain permanent cover.

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<u>Technical assistance programs:</u>
Continue to invest in Farm Bill programs, such as EQIP, and update these programs with adaptation practices

Piping Plover (Apostle Islands, WI)

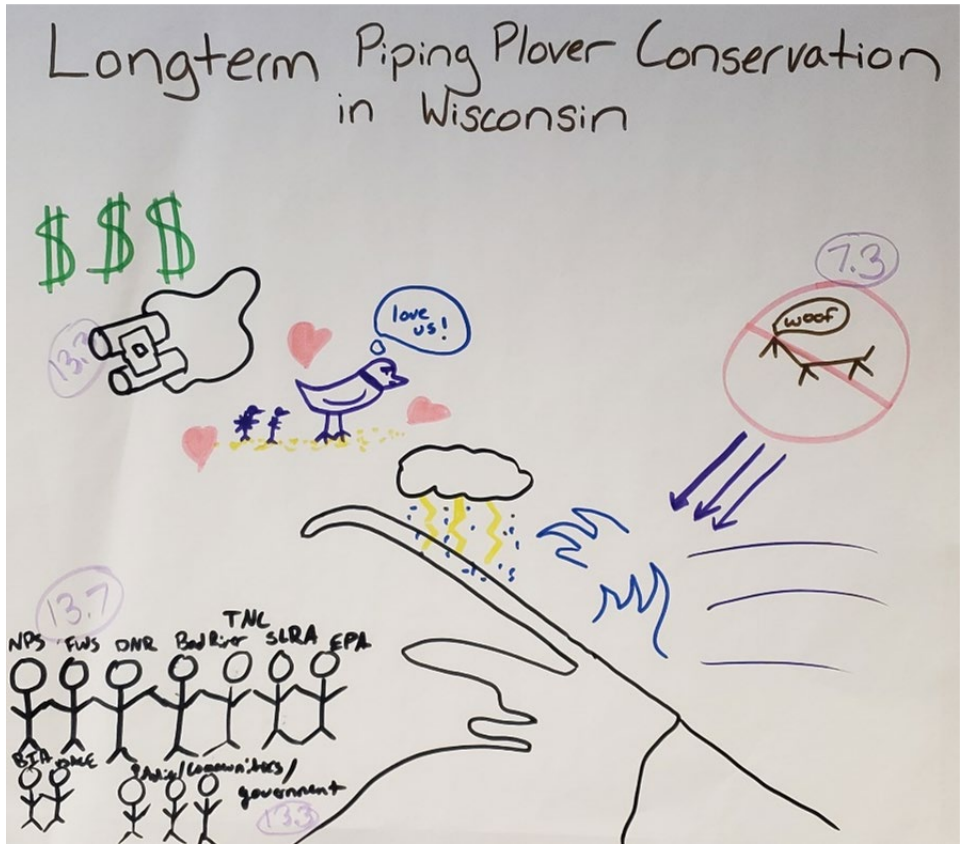
Goals:

- Support 10-20 piping plover nesting pairs on Long Island/ Chequamegon Point
- Maintain piping plover nesting and foraging habitat

Climate challenges:

- More beach disturbance due to stronger storms, larger waves, etc.
- Botulism, West Nile virus, tick diseases
- Changes in food webs and food availability

Piping Plover (Apostle Islands, WI)



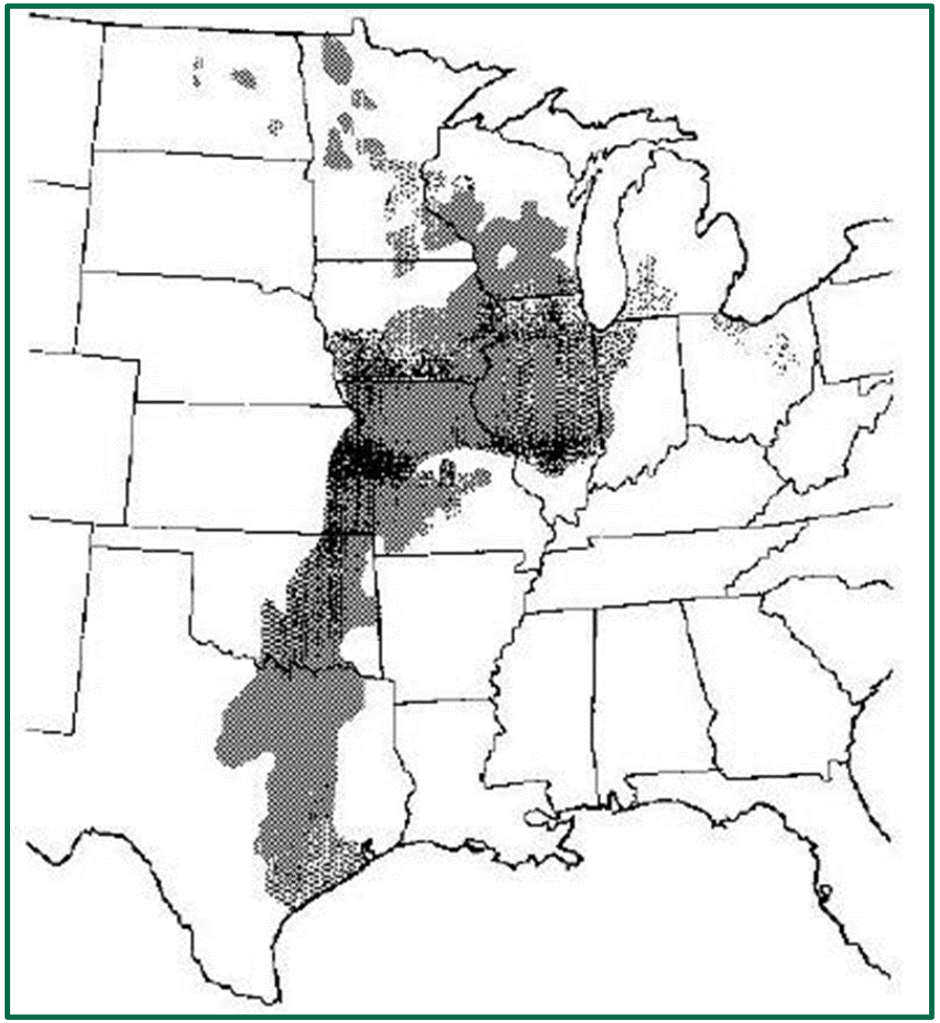
Select Actions:

- Remove eggs from the mouth of Bad River for **captive breeding**
- Identify **possible new habitat** along Bad River corridor
- **Close Long Island to dogs** during the breeding and rearing season
- Continue installing **nest exclosures** and psychological fencing
- Develop beach observation points for the public to provide **safe viewing opportunities**, including a live-action webcam for community engagement

Whitney Kroschel
Agassiz National Wildlife Refuge

- **Project:** Oak Savanna Restoration and Management
- **Location:** Northwest Minnesota
- **Purpose:** Restore and effectively manage 3 units of oak savanna for native vegetation and wildlife
- **Audience:** Refuge management, staff, and stakeholders

- Located at the northern extent of oak savanna habitat
- Goals: Restore tree density, encourage native cover and regen, implement prescribed fire, improve wildlife use



Extent of Midwestern oak savanna in the United States pre-settlement. From the 1993 Proceedings of the Midwest Oak Savanna Conferences, modified from Nuzzo (1986).

Climate Change Impacts, Challenges, Opportunities

Climate Change Effects

- Temperatures are projected to increase ~5-9 °F; more frequent extremes (drought, temps, precip); average annual precipitation will likely increase; longer growing season

Climate Change Challenges

- Encroachment by undesirable woody species may become more aggressive
- Management could be more demanding, requiring more mowing, burning, grazing, etc.

Climate Change Opportunities

- Oak regeneration may be positively affected by longer growing seasons and more precipitation
- Oak productivity may increase, producing more forage for wildlife

Adaptation Actions

Adaptation Strategies and Tactics

- Manage for plant species diversity and complexity
  - 25-50% canopy cover
  - Remove aspen, green ash, hazel
- Maintain or mimic disturbance regimes to enhance habitat quality
  - Prescribed fire
- Promote diverse age classes
- Maintain and restore diversity of native species
  - Encourage viburnums, juneberries, dogwoods, black cherry and choke cherry

Combination of Standard and New Approaches

- New: formerly neglected, low-priority units. Today – high priority with intentions to establish a regular, long term management plan with monitoring criteria
- Business as usual: Will be implementing strategies used in similar oak savanna units, combining fire and mechanical methods to set back unwanted vegetation and encourage native species growth for the benefit of wildlife