The Adaptation Workbook Process

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Southwest Adaptation Forum

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Quick Facts

- Research & Science Information Synthesis
- Tool Development, Technology Exchange, and Implementation Assistance
- Stakeholder Education, Outreach, and Engagement

20 states covered in Northern Forests Hub – operated by NIACS

5 states covered in Southwest Hub

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, and non-profit and tribal conservation organizations

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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

Adaptation Planning

Challenges to Implementation

Climate change is too big and too complex.

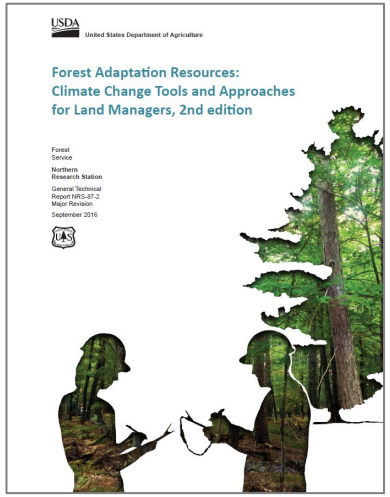
Climate information is not relevant enough.

One-size-fits-all answers are insufficient.

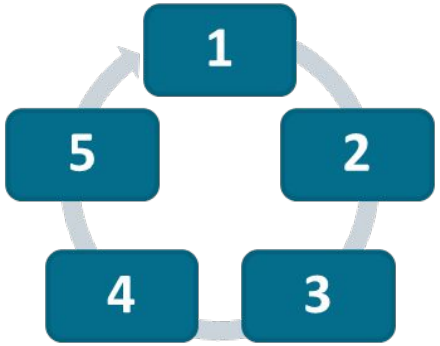
There are not enough real-world examples.

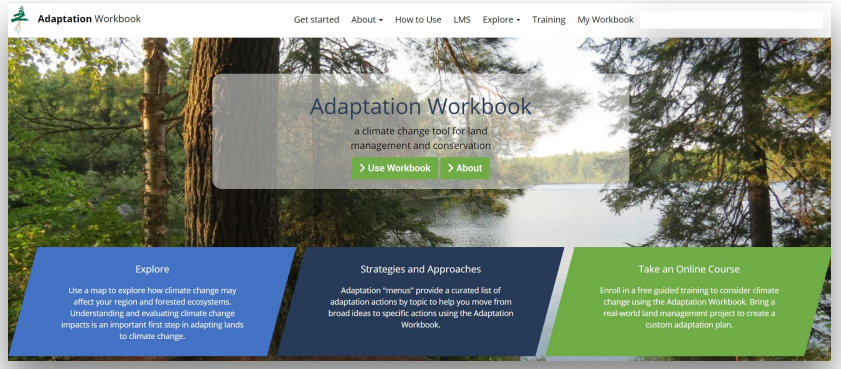
Climate Adaptation Workbook and Adaptation Resources

- 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)



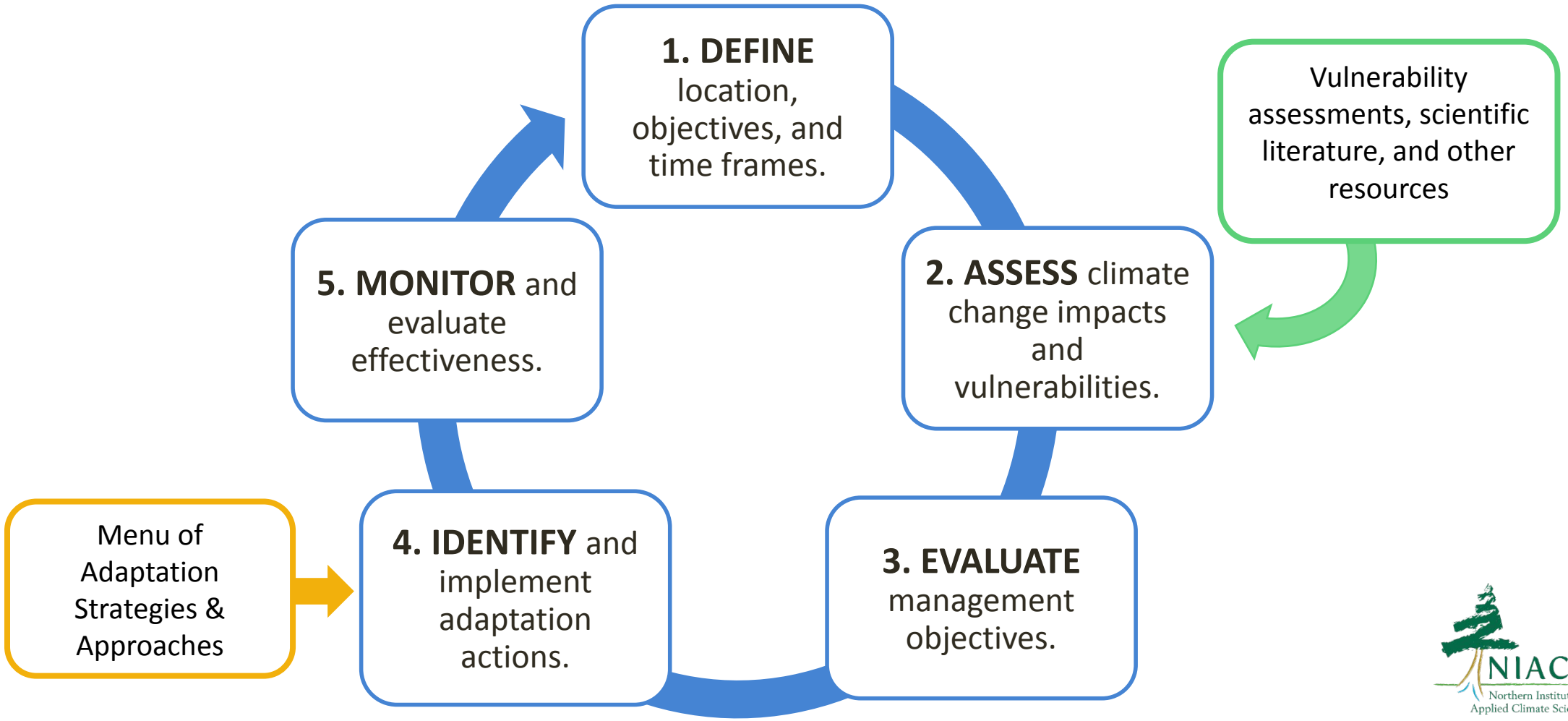
Swanston et al. 2016
(2nd edition)





Download at: www.nrs.fs.fed.us/pubs/40543 **or use online at** www.AdaptationWorkbook.org

Adaptation Workbook



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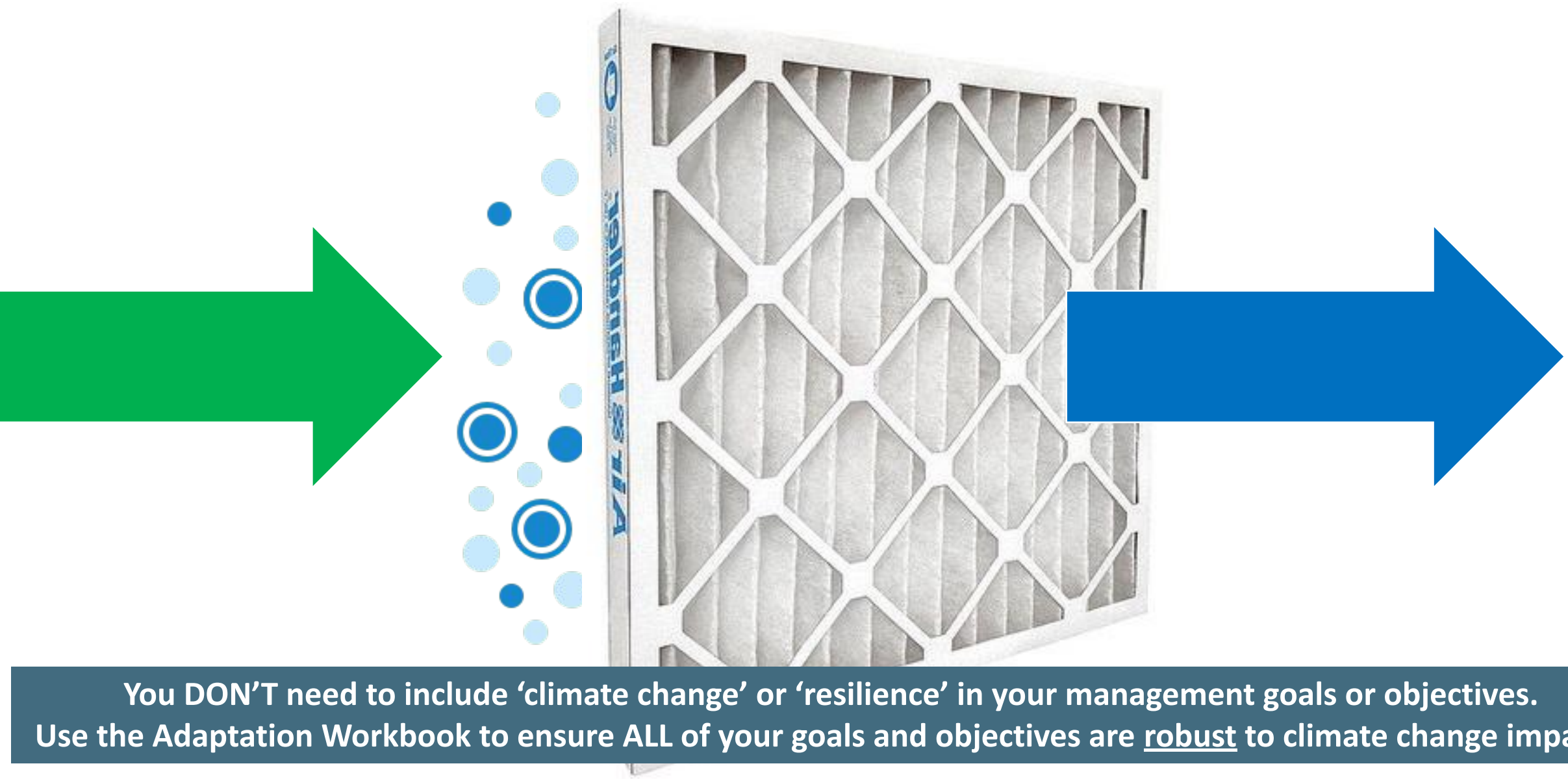
Adaptation Workbook = Climate Change Filter



You DON'T need to include 'climate change' or 'resilience' in your management goals or objectives.
Use the Adaptation Workbook to ensure ALL of your goals and objectives are robust to climate change impacts.

Adaptation Menus of Strategies and Approaches

OPTION

STRATEGIES

APPROACHES

TACTICS

A "menu" of **possible 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		Sauces	
Rigatoni Semolina, All-Purpose Flour, Olive Oil	14	Marinara San Marzano tomatoes, Garlic, White Wine, Basil, Chili	
Cavatelli All-Purpose Flour, Durum Flour, Eggs, Ricotta	15	Arrabiata All-Purpose Flour, Durum Flour, Eggs, Ricotta	+1
Tagliatelle All-Purpose Flour, Durum Flour, Eggs	15	Broken Meatball House Tomato Sauce with the Addition of Broken Meatballs	+4
Gluten-Free Rigatoni Gluten-Free All-Purpose Flour, Olive Oil, Eggs	16	Sunday Sauce House Tomato Sauce with Short Rib, Sausage, Veal	+4
Spaghetti Semolina, Durum Flour, Olive Oil	15	Roasted Garlic Pecorino Semolina, Durum Flour, Olive Oil	+2
Four Cheese Herb Ravioli	18	Carbonara	+3

h Cocktails

mato Juice, Horseradish	10/45
ne de Peche, Sparkling Wine	12/55
mon	12/55
Carrot Juice	12/55
Crème de Peche	10/45
resh Lime, Grenadine	12/55
's Mimosa Juice, Sparkling Wine	12/55

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

Adaptation Strategies (Menus)

Published:

- Agriculture
- California Forests
- Fire-Adapted Ecosystems
- Forests (*original menu*)
- Forest Carbon Management
- Forested Watersheds
- Great Lakes Coastal Ecosystems
- Inland Glacial Lake Fisheries
- Non-Forested Wetlands
- Recreation
- Tribal Perspectives
- Urban Forests
- Wildlife Management

In Preparation:

- Grasslands

October 13 Workshop:

- Southwest Tribal Climate Adaptation Menu effort led by the New Mexico Tribal Resilience Action

New Mexico Tribal Resilience Action Network

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.

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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

Identifying Adaptation Actions

Connecting Broad Ideas to Specific Actions

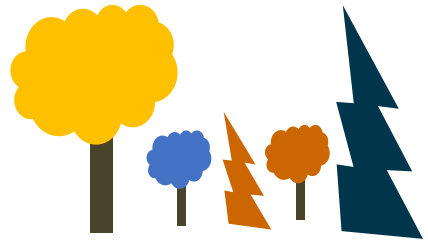
RESISTANCE

- Improve defenses of ecosystem against change and disturbance
- Maintain relatively unchanged conditions

RESILIENCE

- Accommodate some degree of change
- Return to prior reference condition following disturbance

TRANSITION

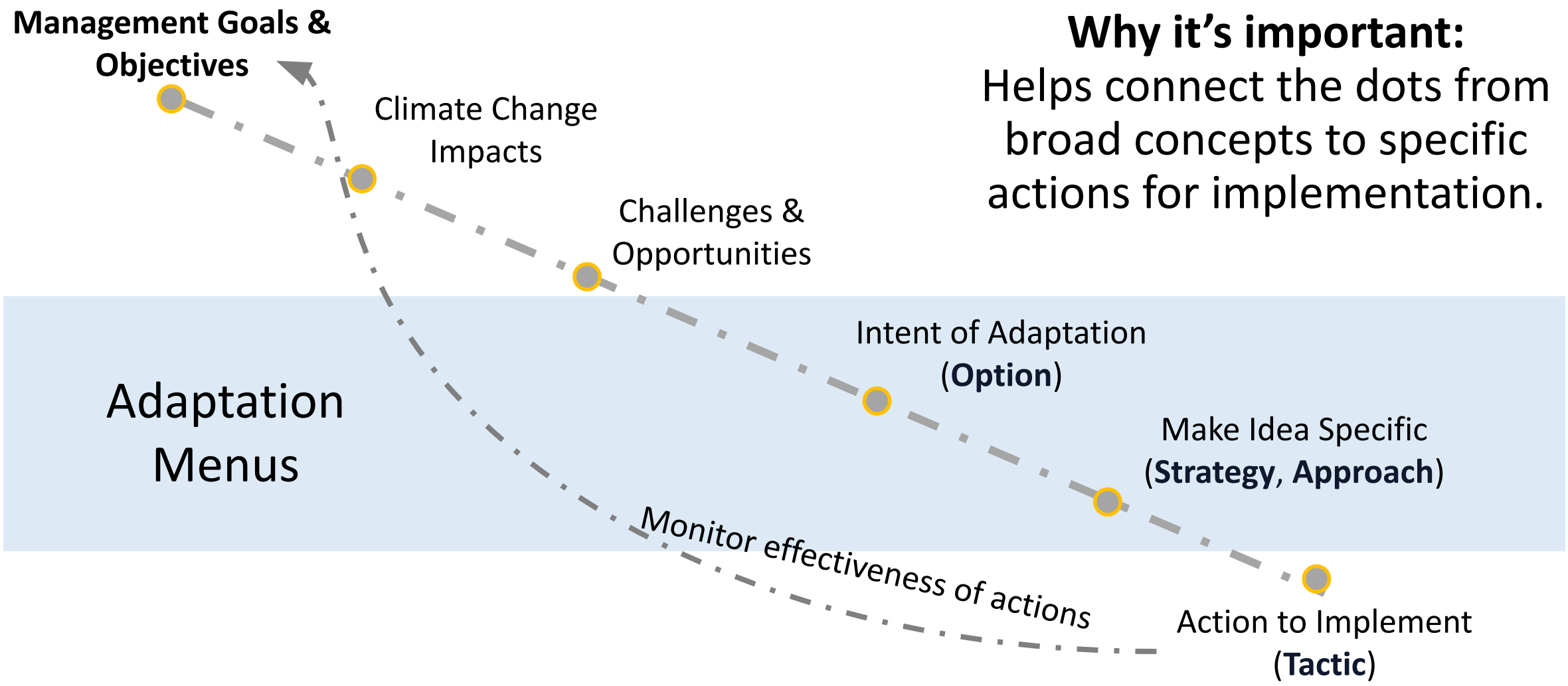


- Intentionally facilitate change
- Enable ecosystem to respond to changing and new conditions

***Reduce impacts/maintain current conditions** — ***Forward-looking/promote change**

Millar et al. 2007, Swanston et al. 2016, Nagel et al. 2017

Workbook + Menu



Why it's important:
Helps connect the dots from broad concepts to specific actions for implementation.

Upper Rio Grande Basin Adaptation Planning & Practices

Fall 2021: Online 7-week adaptation course for professionals working in the upper Rio Grande Basin and partners of the Rio Grande Basin Study: Lobatos Gage to Elephant Butte Dam

The participants represented a wide range of backgrounds

- farming, ranching, pueblos, conservation districts
- developing education/outreach
- small farms, urban, food, agroforestry
- wetlands, and other ecosystems

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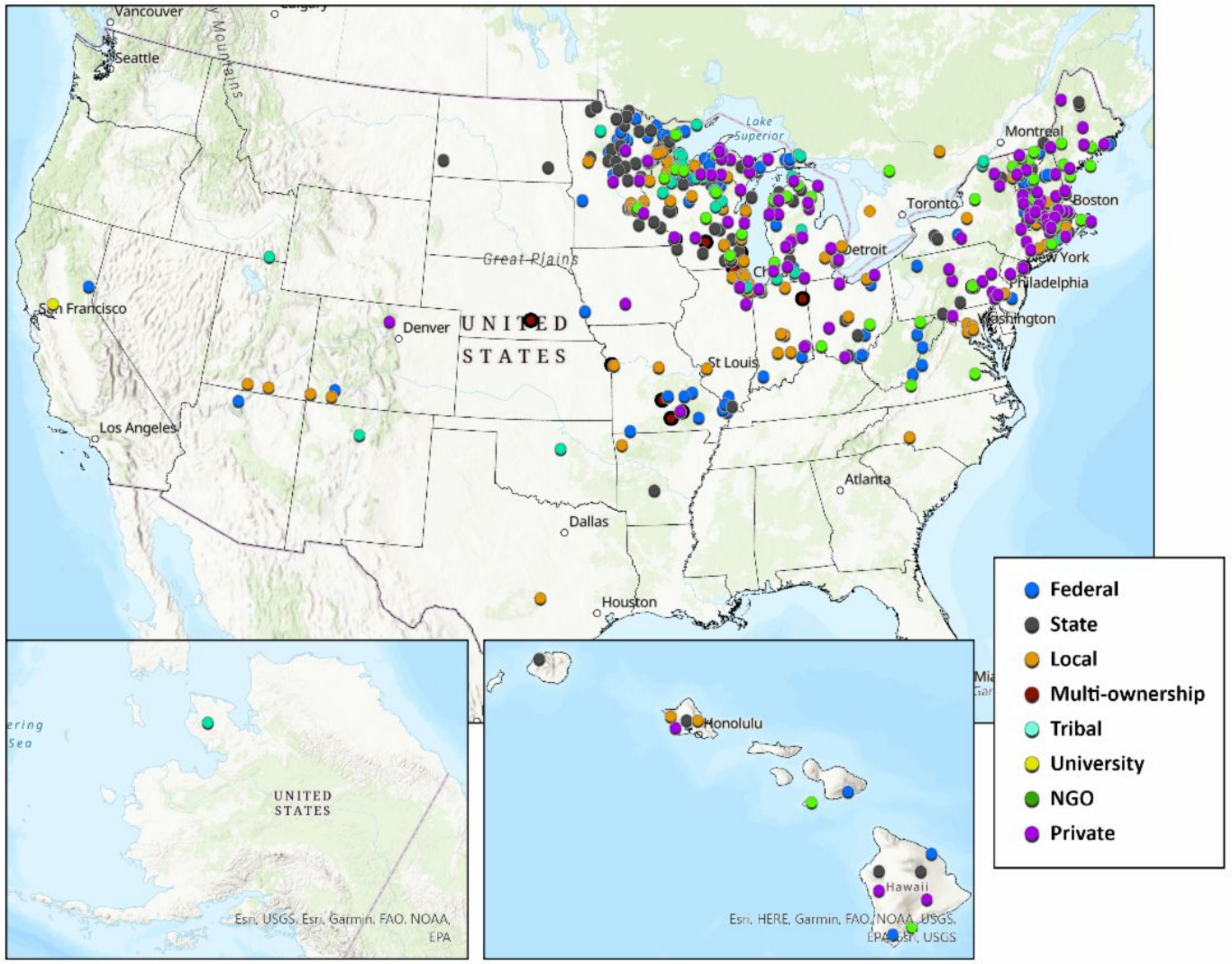
BUREAU OF RECLAMATION

MIDDLE RIO GRANDE CONSERVANCY DISTRICT

Adaptation Demonstrations

Real-world examples of climate-informed resource management.

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



501 Climate change adaptation and mitigation demonstration projects, some featured on forestadaptation.org. Updated Sept. 27, 2021.

www.ForestAdaptation.org/demos

Thank you!

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