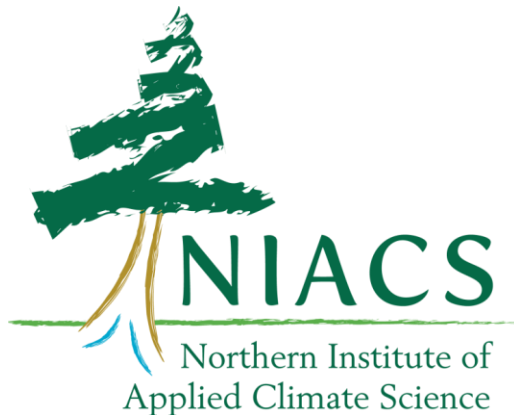


Adaptation strategies and approaches for forest management

A product of the Climate Change Response Framework



*ESA 2013 Annual Meeting
Minneapolis, MN*

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Leslie Brandt, Stephen Handler*

www.forestadaptation.org

Climate Change Response Framework

Key Deliverables and Products:

- Partnerships
- Forest Ecosystem Vulnerability Assessment
- **Forest Adaptation Resources**
- Demonstration Projects

Forest Adaptation Resources:

Climate Change Tools and Approaches for Land Managers

Strategies and Approaches

A “menu” of adaptation actions for regional forests



Adaptation Workbook

Five steps for incorporating climate change into existing management

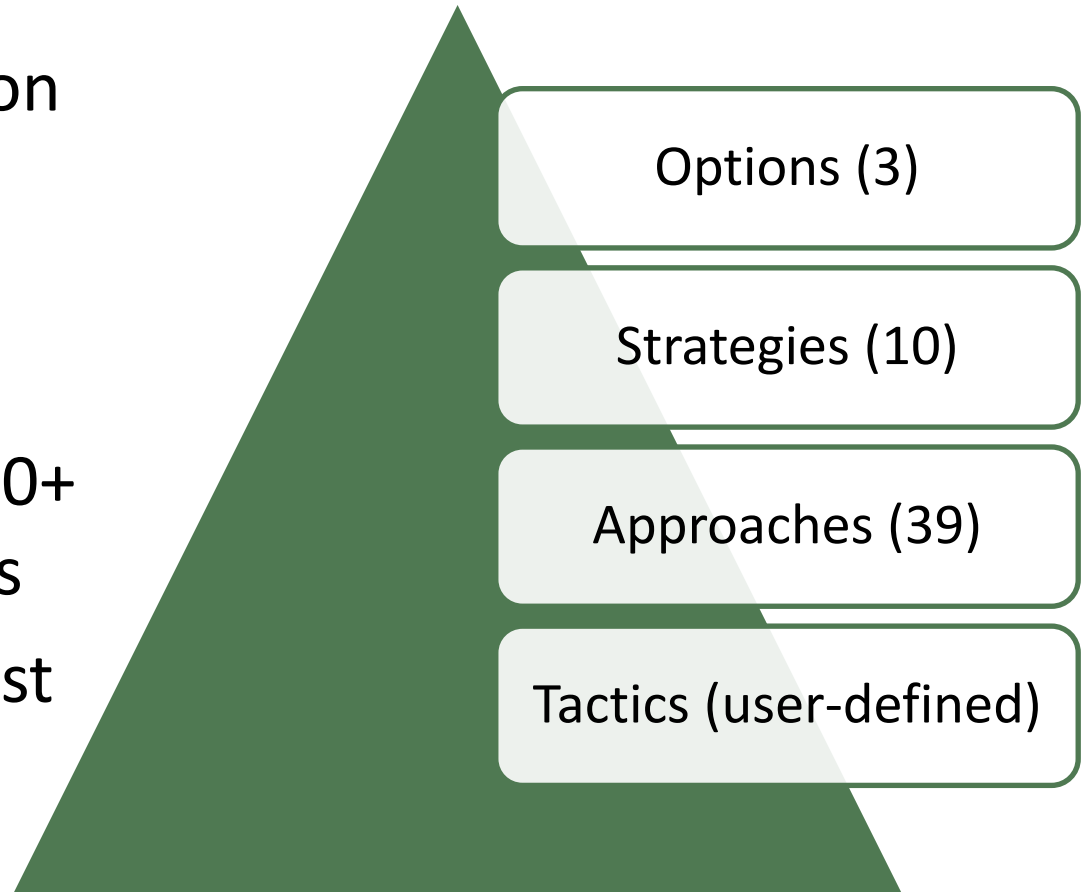


Illustrations

Real-world examples of how these can be used together to develop tactics for adaptation

Adaptation Strategies & Approaches

- Reviewed adaptation literature
- Hierarchical framework
- Refined based on 30+ reviewer comments
- Specific to Northeast and Midwest forests



Options (Millar et al. 2007)

1. Resistance
2. Resilience
3. Response

Adaptation Option #1: Resistance

Improve the defenses of the forest against effects of change.

- Short-term
- High-value

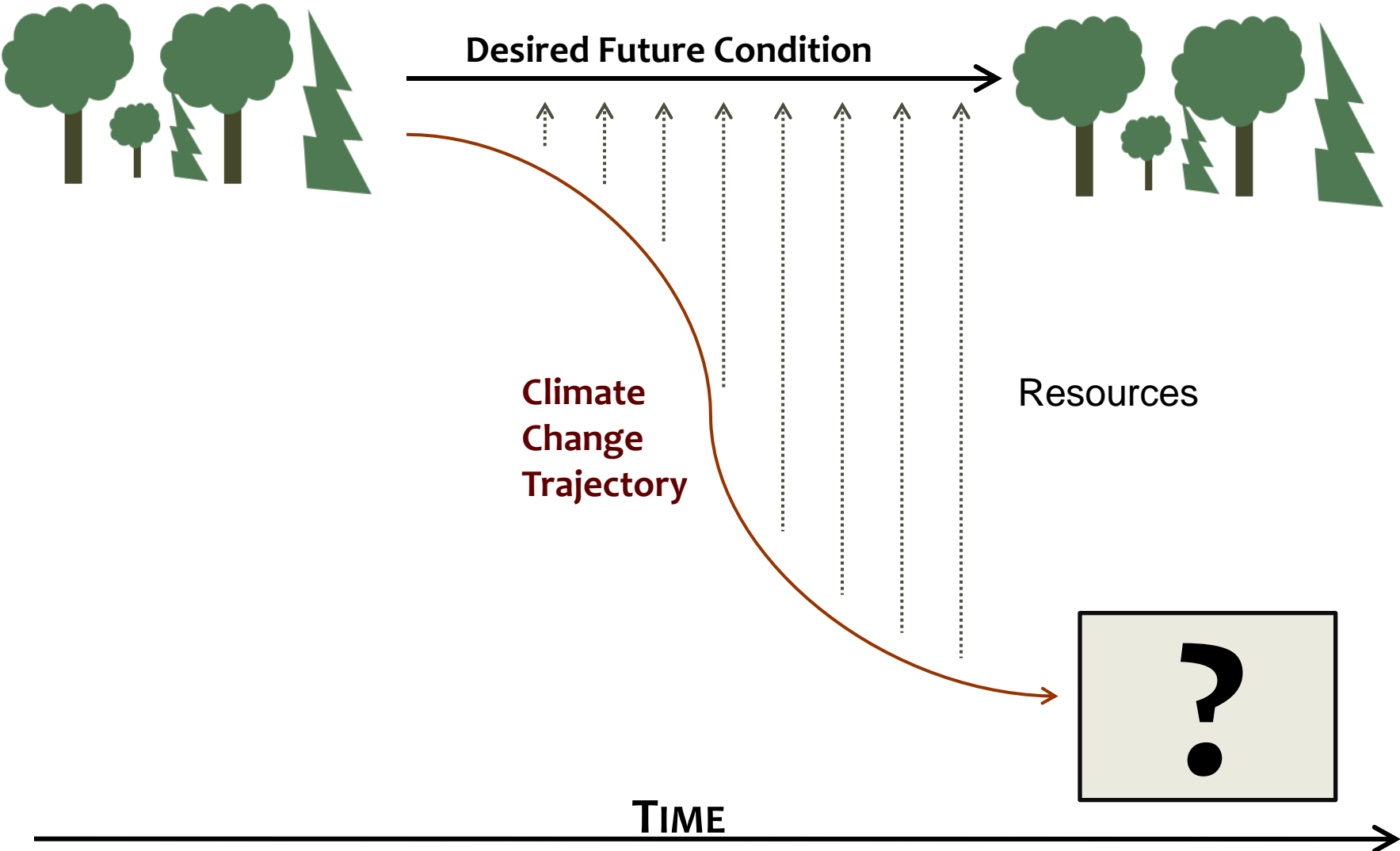


Photo: USFS



Millar et al. 2007

Adaptation Option #1: Resistance



Adaptation Option #2: Resilience

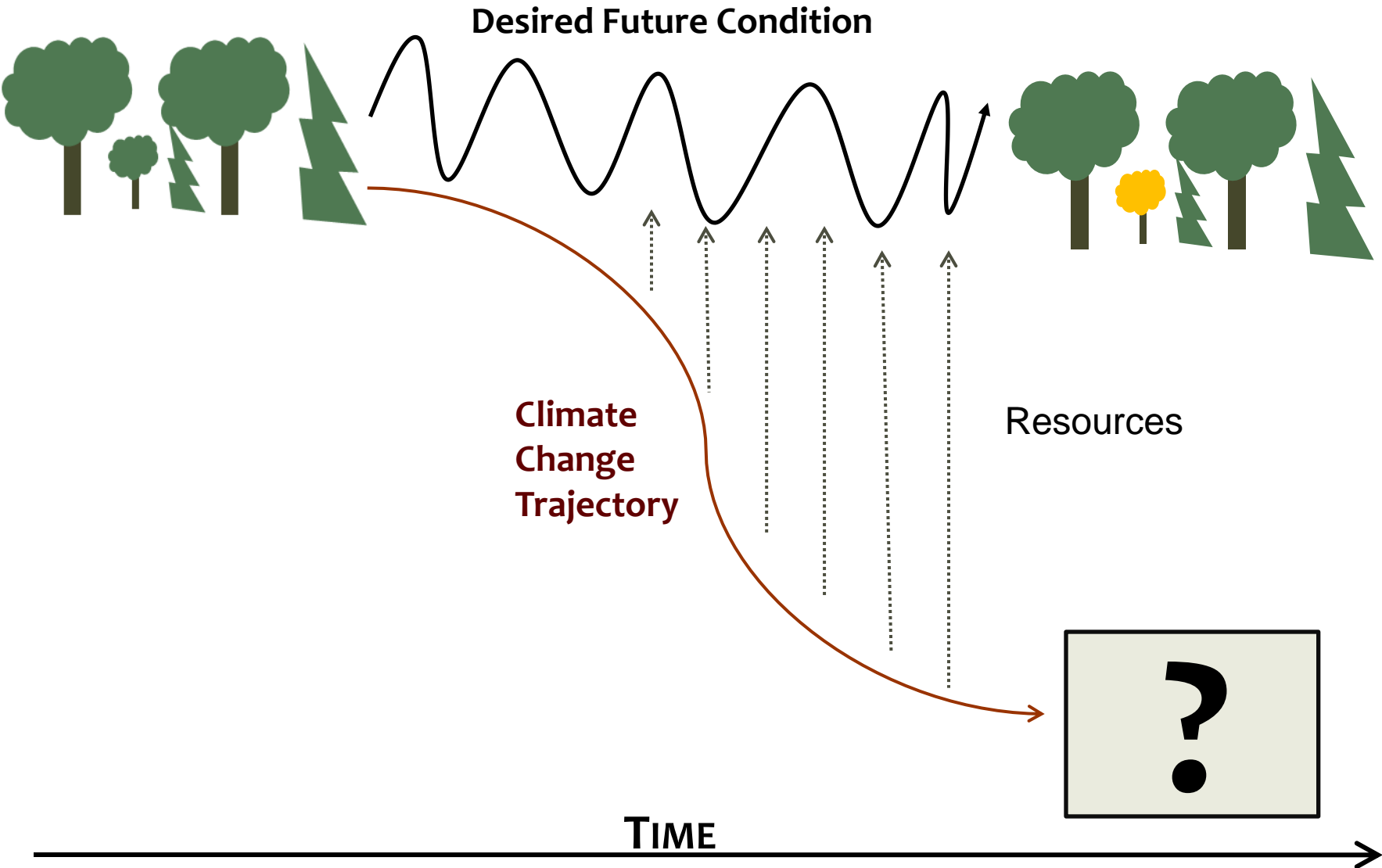
Accommodate gradual change, usually returning to a prior condition after disturbance



Photo: USFS

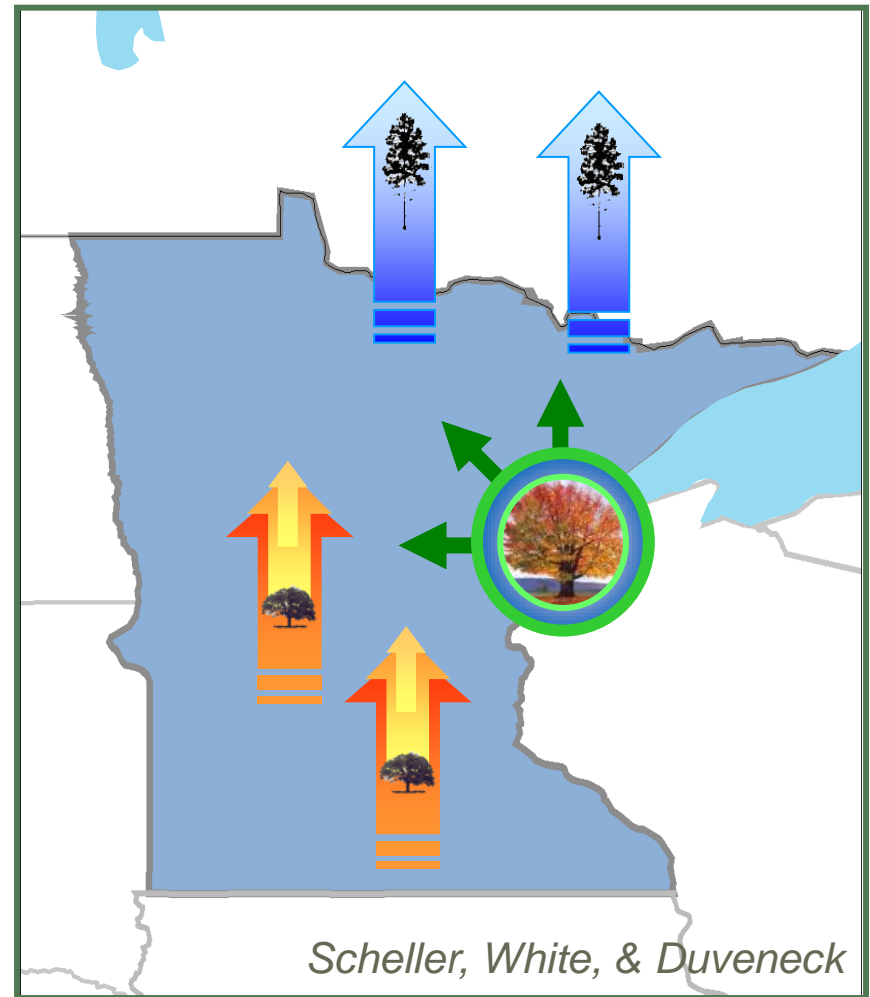
Millar et al. 2007

Adaptation Option #2: Resilience

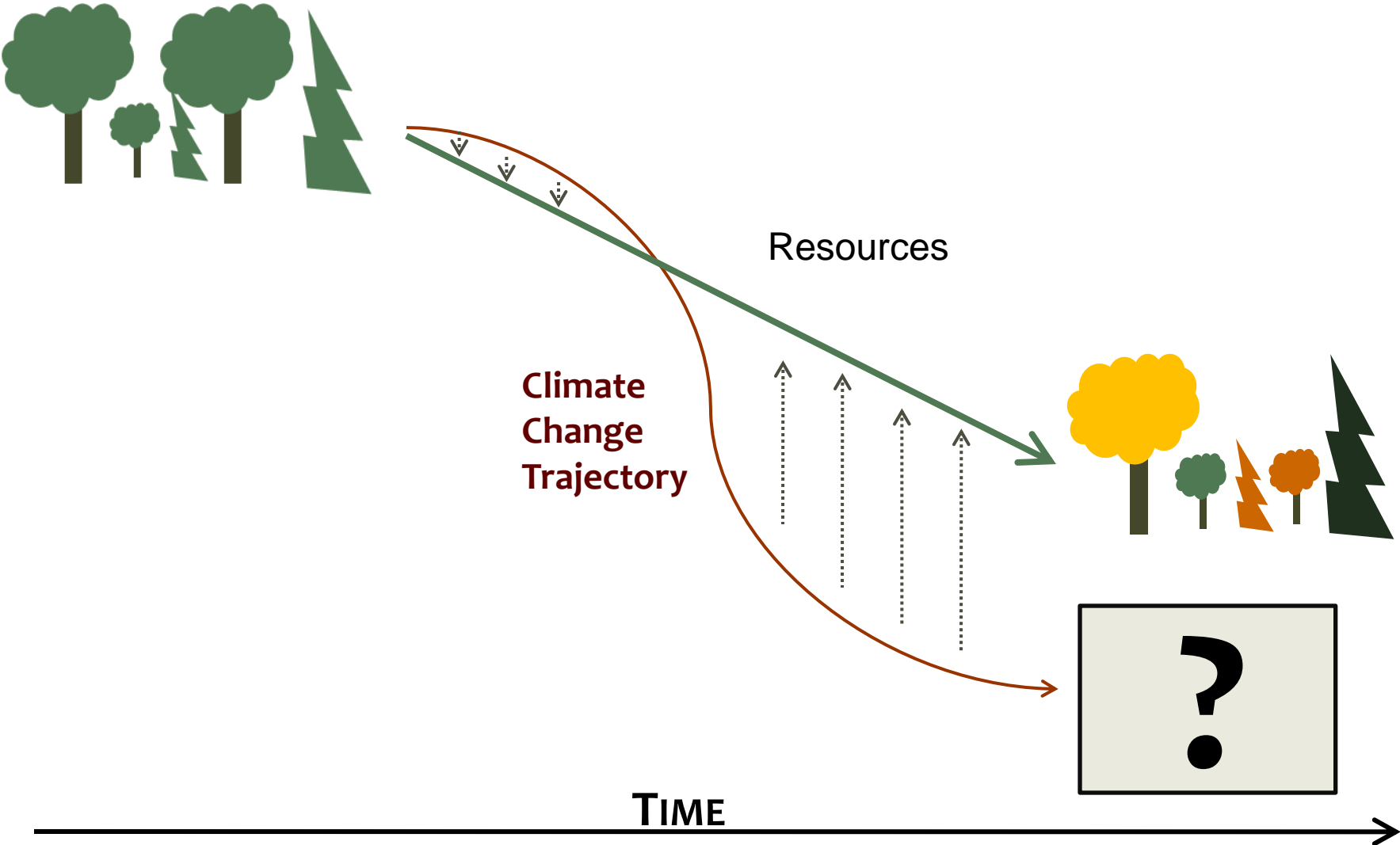


Adaptation Option #3: Response

Intentionally encourage change, help ecosystems respond in a targeted fashion



Adaptation Option #3: Response



Strategies – a few examples

- Broad adaptation responses that consider regional ecology & management
 - Sustain fundamental ecological functions
 - Promote landscape connectivity
 - Facilitate community adjustments through species transitions

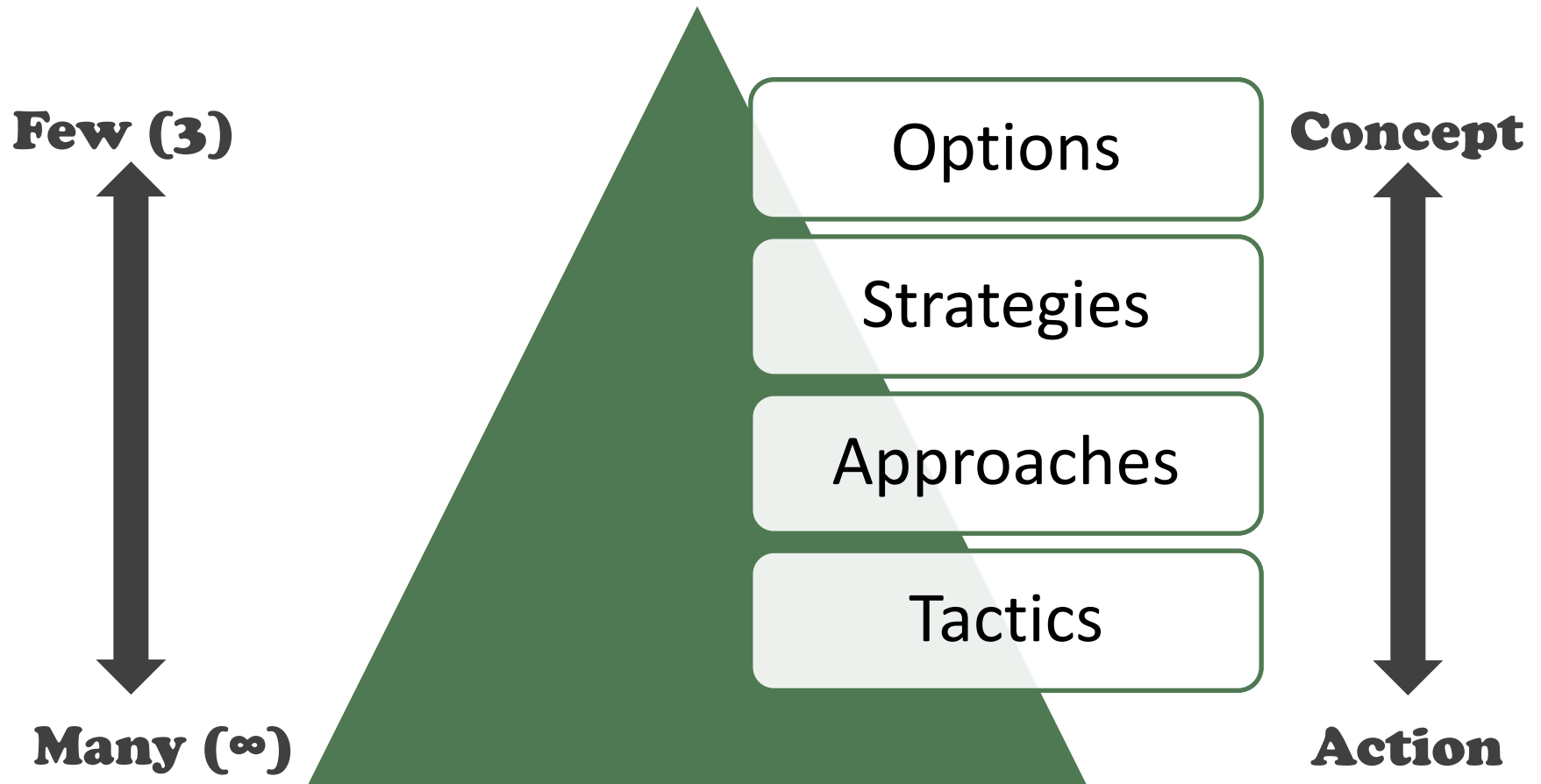
Approaches – a few examples

- More detailed adaptation actions that can be applied to a single forest type or ecosystem
 - Strategy: Facilitate community adjustments through species transitions
 - Approaches:
 - Favor or restore native species that are expected to be better adapted to future conditions
 - Manage for species and genotypes with wide moisture and temperature tolerances
 - Guide species composition at early stages of stand development

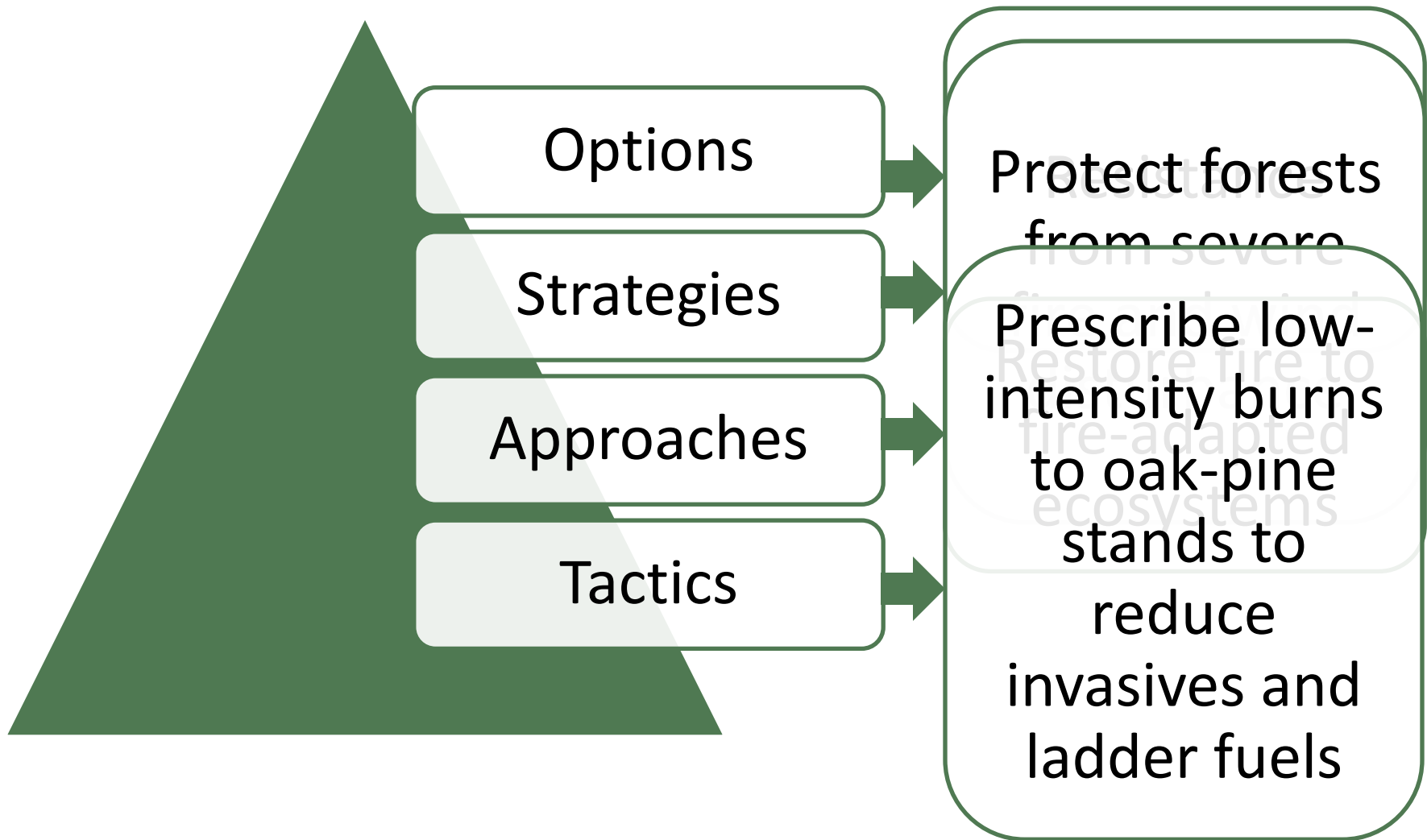
Tactics – a few examples

- Prescriptive actions designed for individual site conditions and management objectives
 - Approach: Favor or restore native species that are expected to be better adapted to future conditions
 - Example tactic:
 - Underplant red pine and white pine in a northern hardwood forest to increase species diversity, while promoting species expected to do better in warmer, drier future

Adaptation



Adaptation



Ease of Implementation



Adaptation Strategies & Approaches

- Best management principles, but applied in the context of climate change
- Hierarchy helps organize and justify adaptation actions
- Menu allows user to pick and choose actions that are relevant to their situation

Adaptation Strategies & Approaches

- Provide greater flexibility
- Prioritize actions to reduce vulnerability
- Implement “no regrets” decisions
- Take immediate action, even if uncertainty is high

For More Information:

Climate Change Response Framework website:

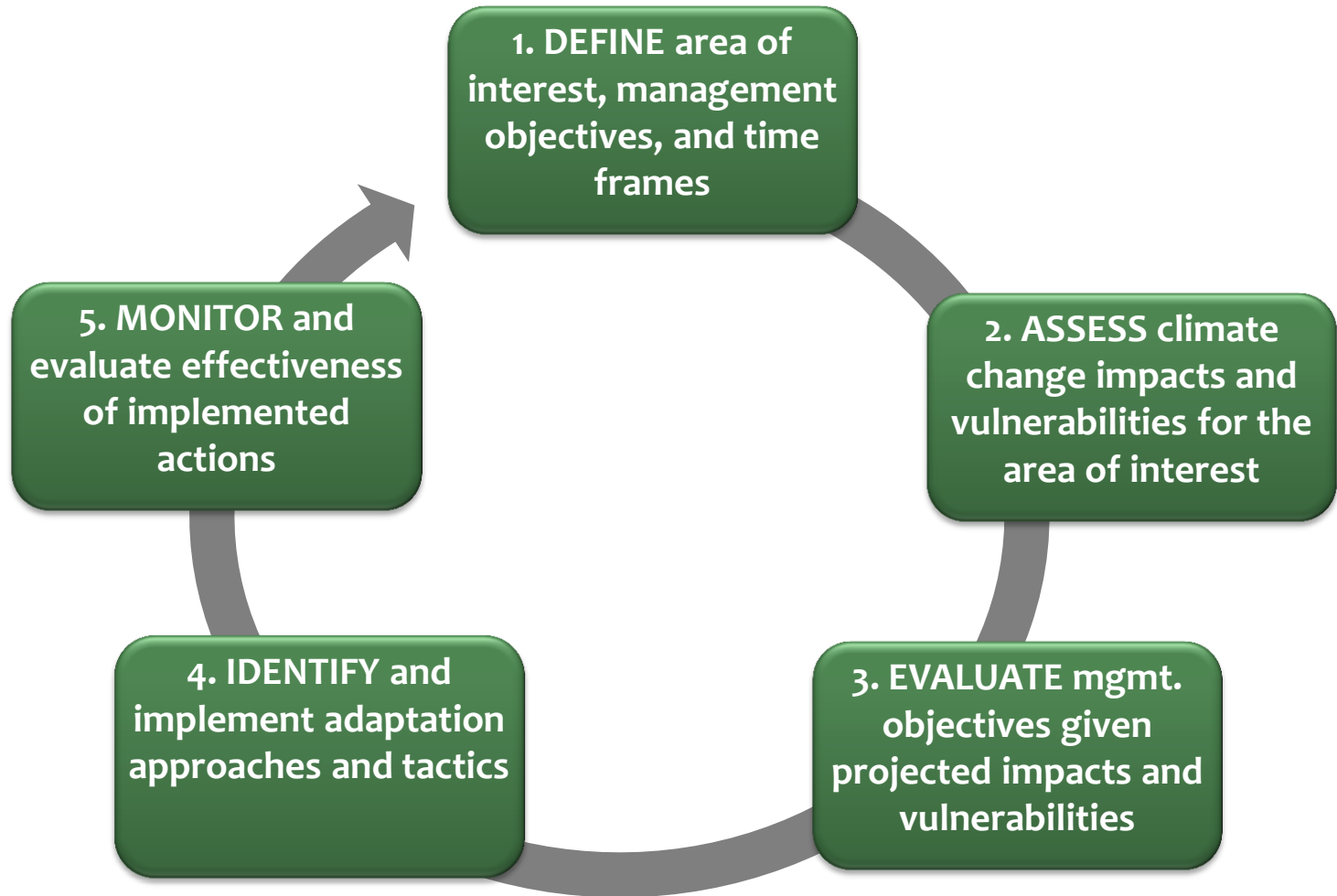
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**Forest Adaptation Resources: Climate Change Tools and
Approaches for Land Managers**

<http://www.nrs.fs.fed.us/pubs/40543>

Forest Adaptation Resources:

Climate Change Tools and Approaches for Land Managers



Expansion

