United States Department of Agriculture
Northern Forests Climate Hub

Forest Carbon Management Menu: a resource for identifying mitigation and adaptation practices



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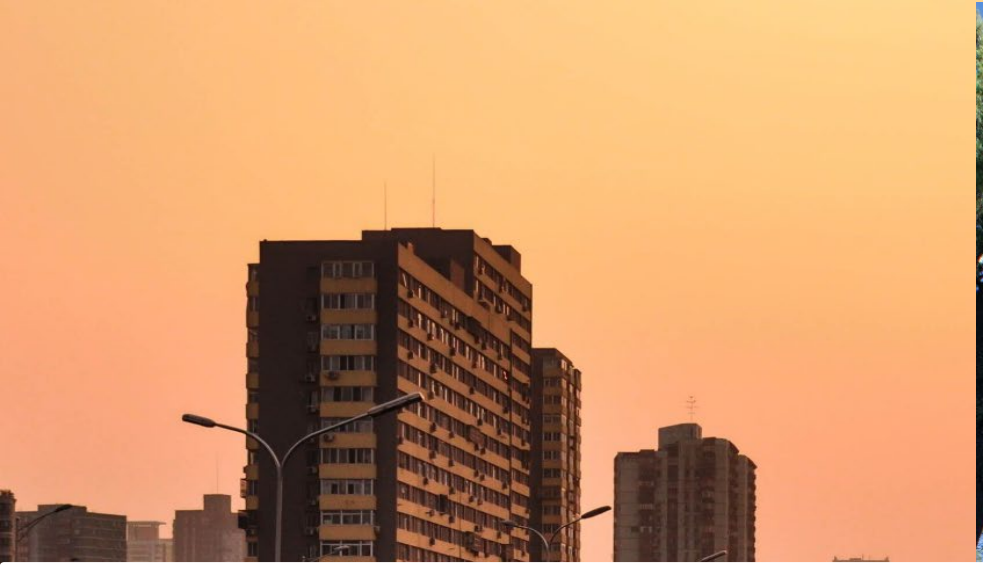
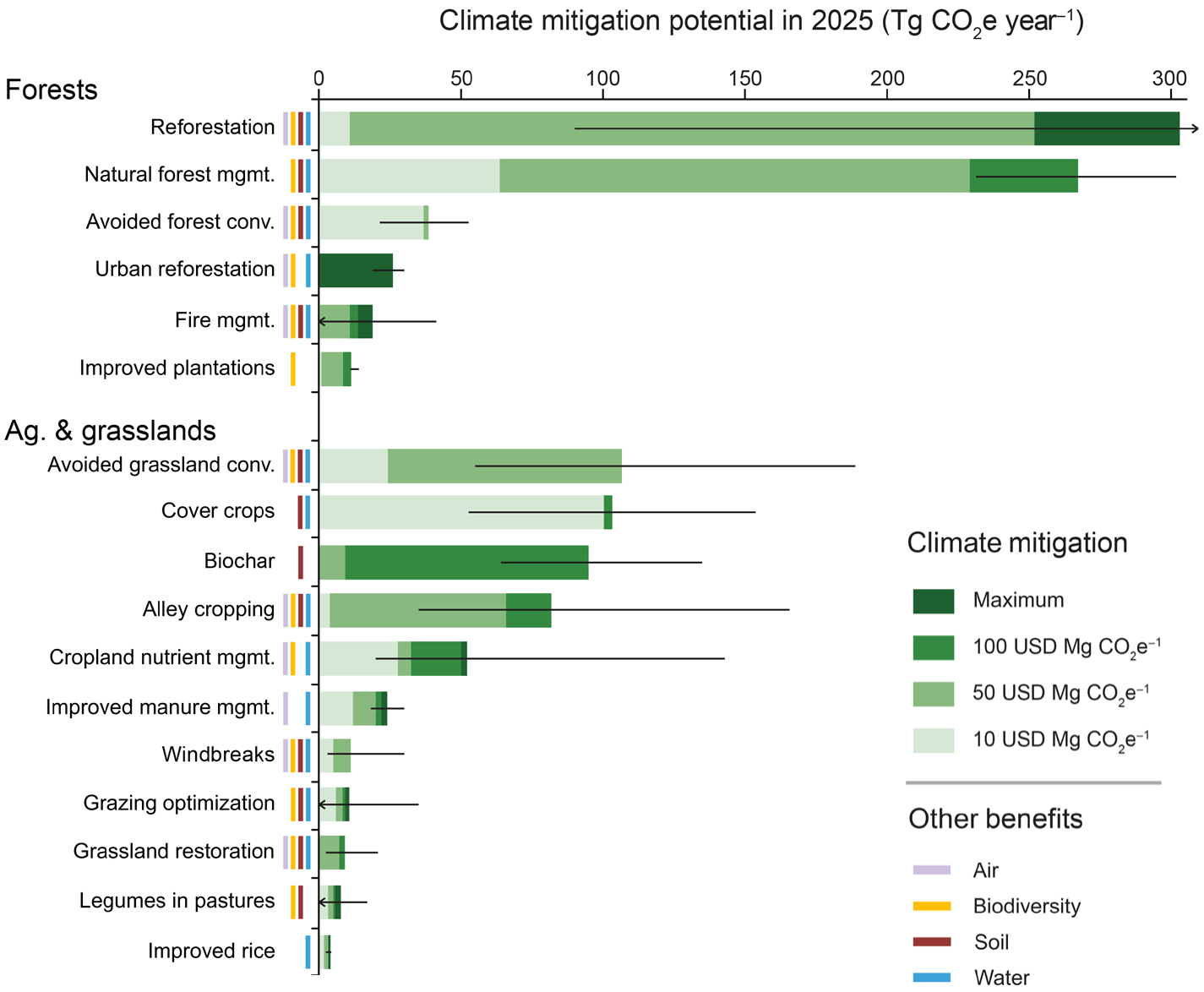


US forests:

- Absorb **15%** of total CO_2 emissions
- Contain **68%** of terrestrial carbon stocks
- Are **90%** of the land sector sequestration capacity

Woodall et al. 2015; Lui et al. 2014, 2011; USEPA 2015

Natural Climate Solutions

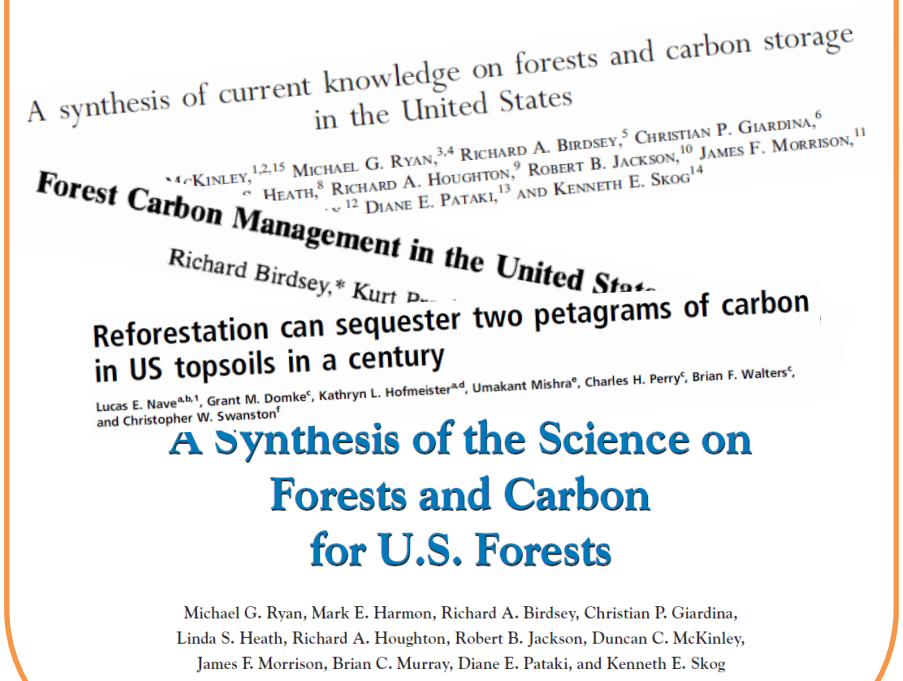


Fargione et al. 2018

A changing climate puts those forests *and the carbon they sequester* at risk

Janowiak et al. 2018: www.nrs.fs.fed.us/pubs/55635

Forest carbon management



A synthesis of current knowledge on forests and carbon storage in the United States

McKinley,[1,2,15] Michael G. Ryan,[3,4] Richard A. Birdsey,[5] Christian P. Giardina,[6]
Heath,[8] Richard A. Houghton,[9] Robert B. Jackson,[10] James F. Morrison,[11]
[12] Diane E. Pataki,[13] and Kenneth E. Skog[14]

Forest Carbon Management in the United Sta

Richard Birdsey,* Kurt P

Reforestation can sequester two petagrams of carbon in US topsoils in a century

Lucas E. Nave[a,b,1], Grant M. Domke[c], Kathryn L. Hofmeister[a,d], Umakant Mishra[e], Charles H. Perry[c], Brian F. Walters[c], and Christopher W. Swanston[f]

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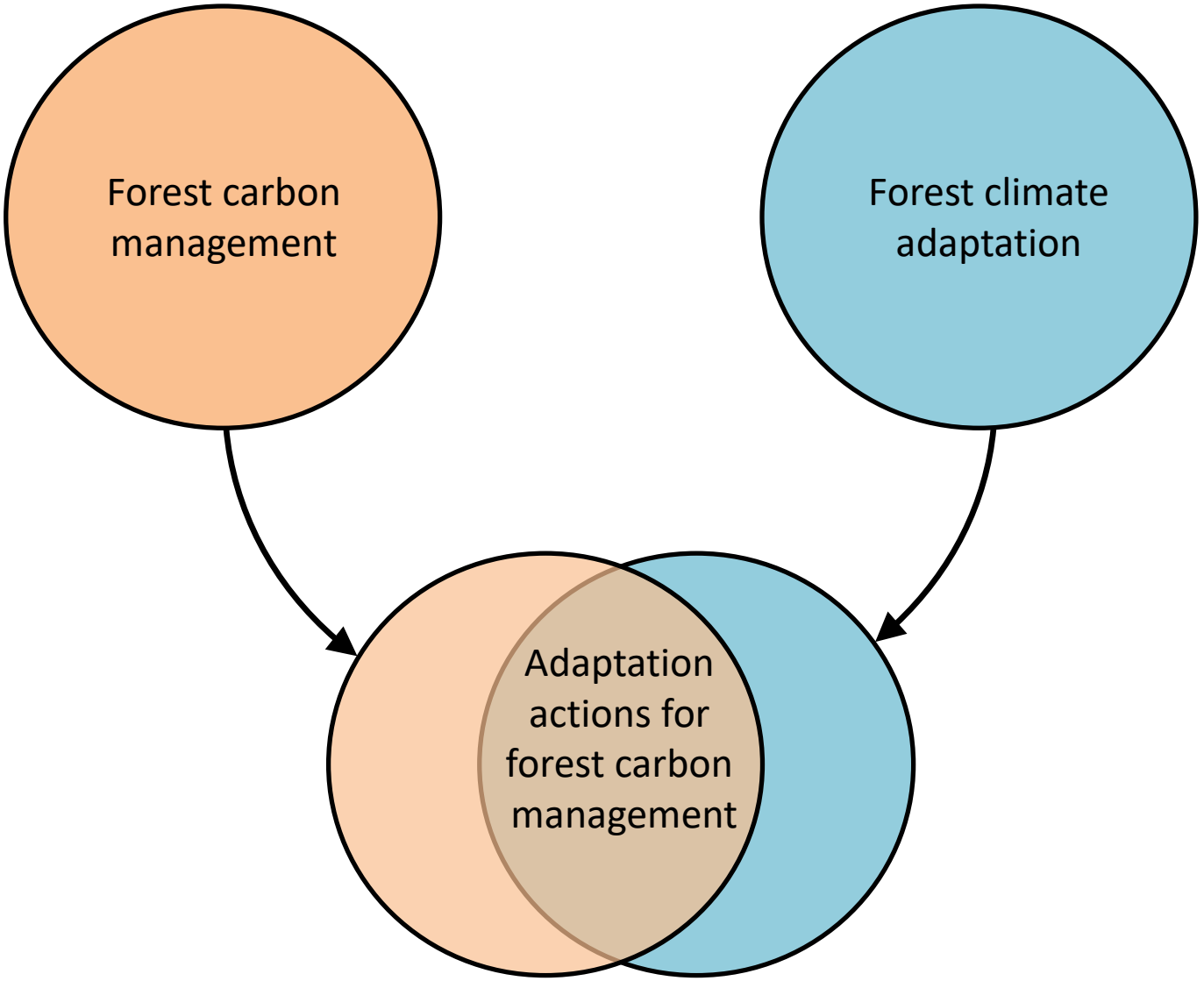
Forest climate adaptation



www.forestadaptation.org/carbon

Practitioner's Menu of Strategies and Approaches for Forest Carbon Management

NIACS
Northern Institute of Applied Climate Science

AMERICAN FORESTS
- SINCE 1875 -

www.forestadaptation.org/carbon

Journal of FORESTRY

Forest management for carbon sequestration and climate adaptation. *Journal of Forestry.* doi: 10.1093/jofore/fvz062

Forest Adaptation Resources

The **Menus** help you create **clear rationale** for your actions by connecting them to **broader adaptation ideas**.

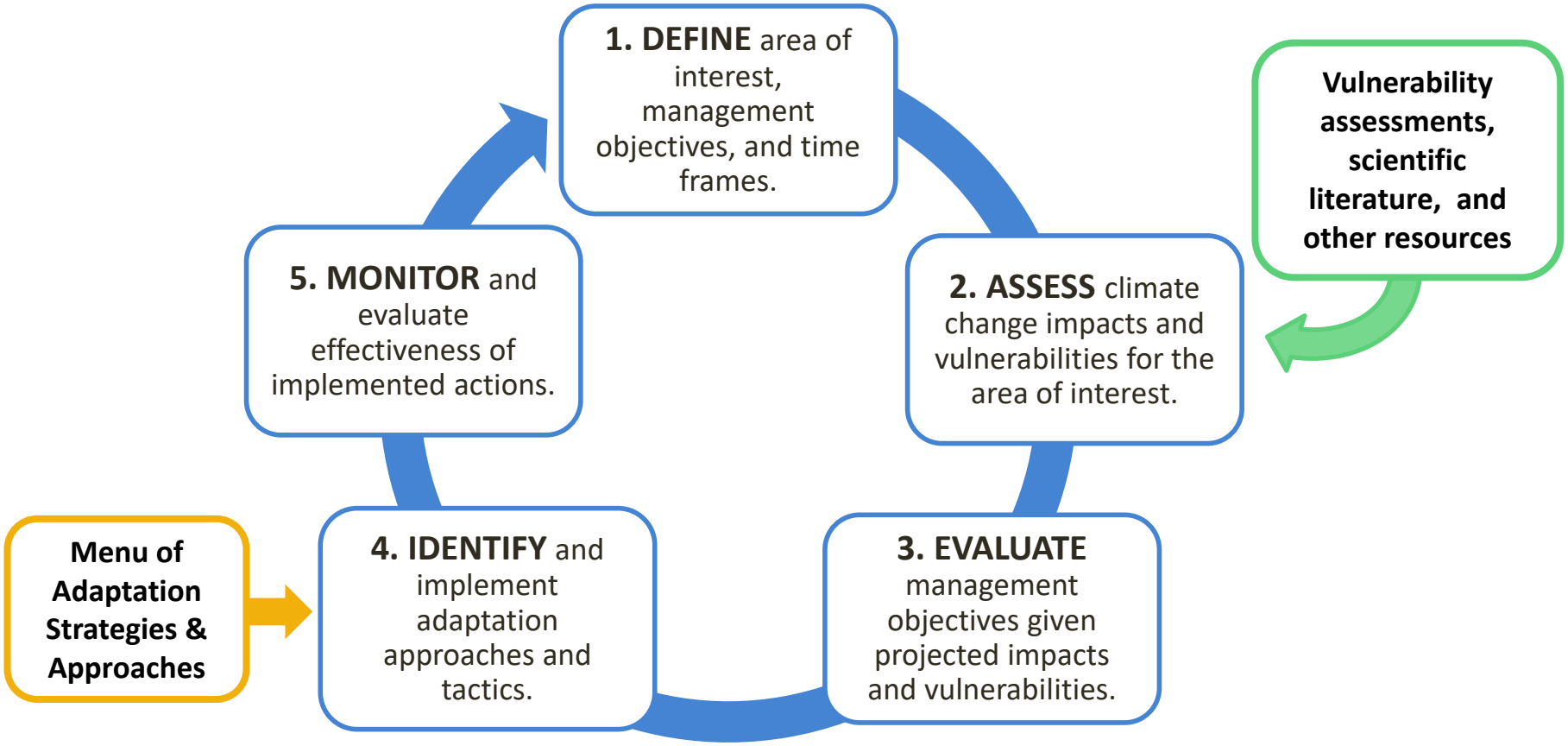
Swanston et al. 2016 (2nd edition) www.nrs.fs.fed.us/pubs/52760

Menu components

- **Strategy:** A strategy is a broad adaptation response that is applicable across a variety of resources and sites
- **Approach:** Adaptation response specific to a resource issue or geography
- **Tactic:** Prescriptive action (devised by manager)

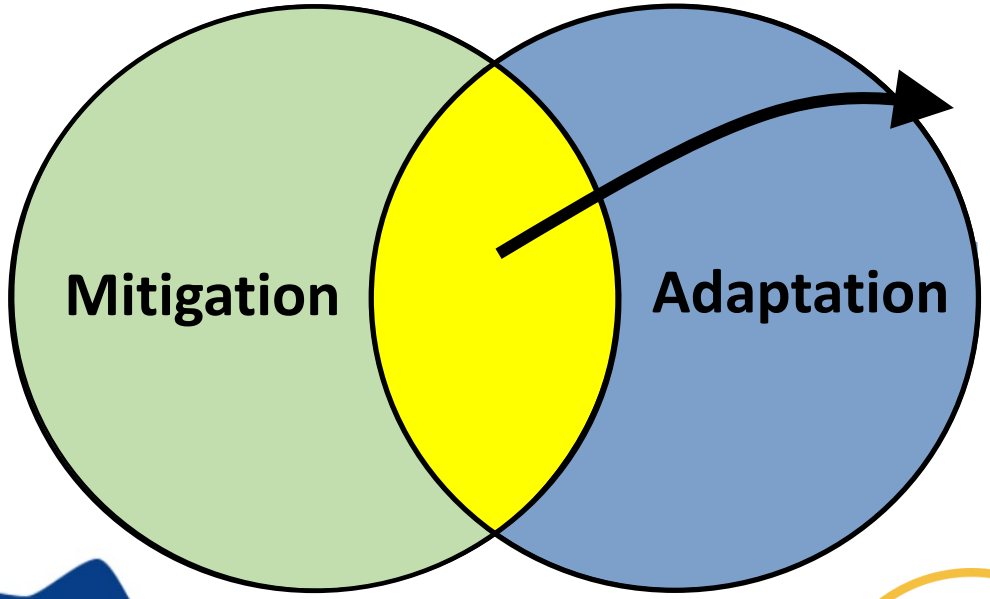
Swanston et al. 2016 (2nd edition) www.nrs.fs.fed.us/pubs/52760

Adaptation Workbook



Swanston et al. 2016; www.adaptationworkbook.org

1. Integrating climate mitigation & adaptation is needed for ***resilient carbon sequestration***



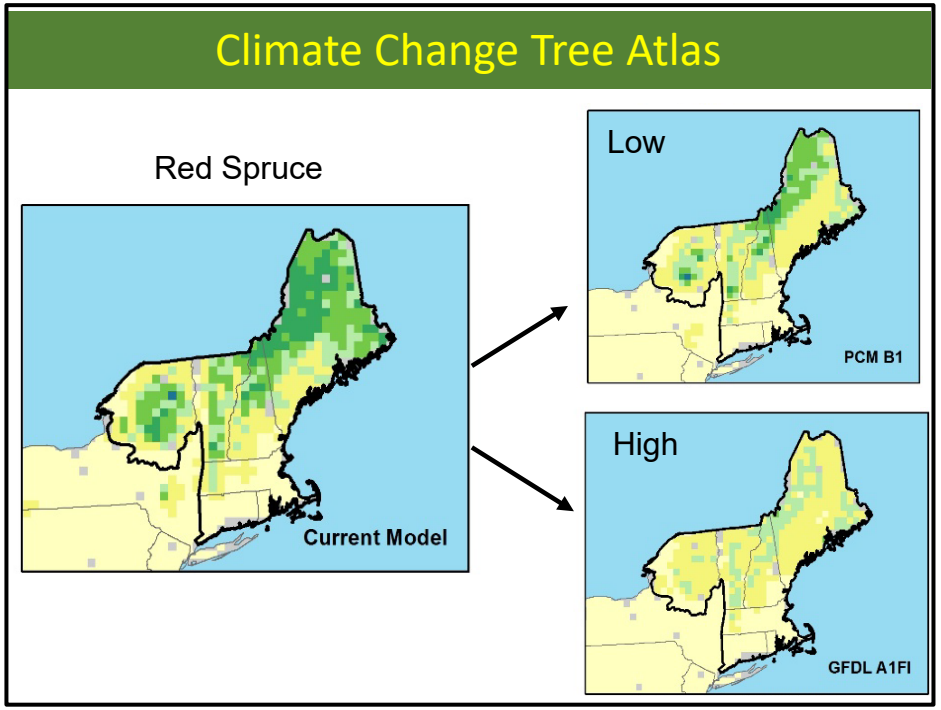
Synergies in mitigation & adaptation

1. Integrating climate mitigation & adaptation is needed for ***resilient carbon sequestration***

Thinning reduces risk of catastrophic carbon loss from wildfire in fire-prone systems

Adler Fire, Yellowstone NP (NPS)

Managing for future-adapted species where tree species are projected to decline

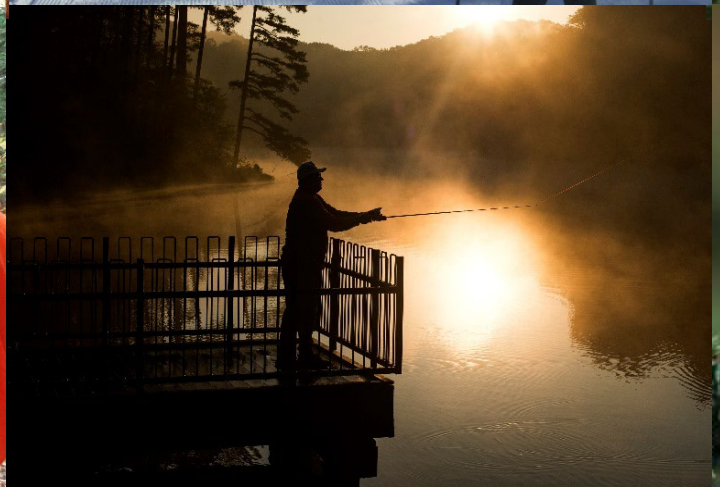


www.nrs.fs.fed.us/atlas/tree/

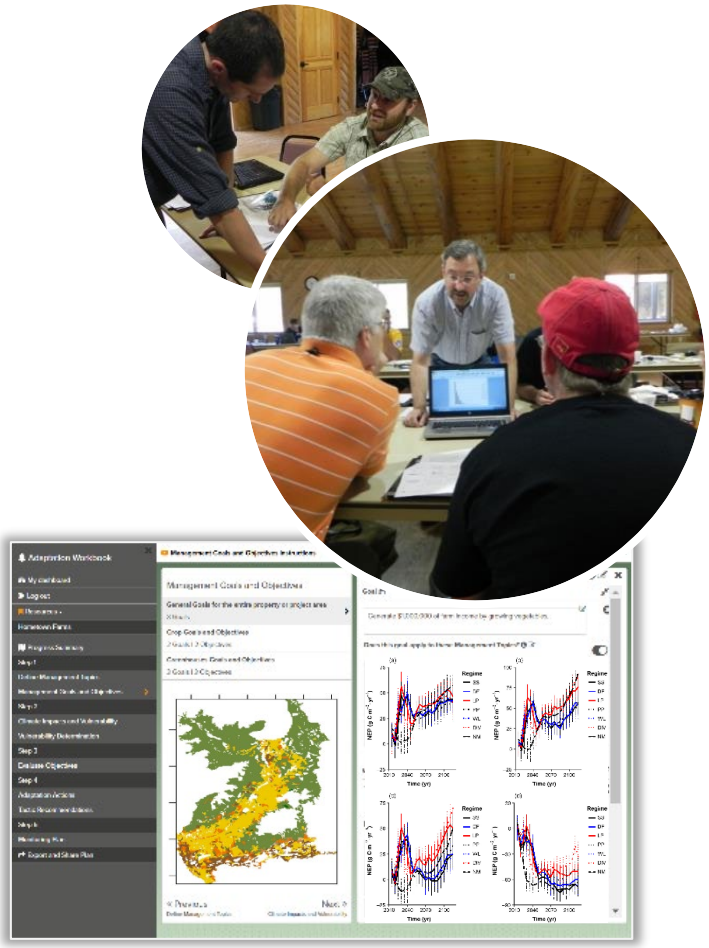
*2. Identifying **"no-regrets" actions** can build support for JMA while highlighting important co-benefits*





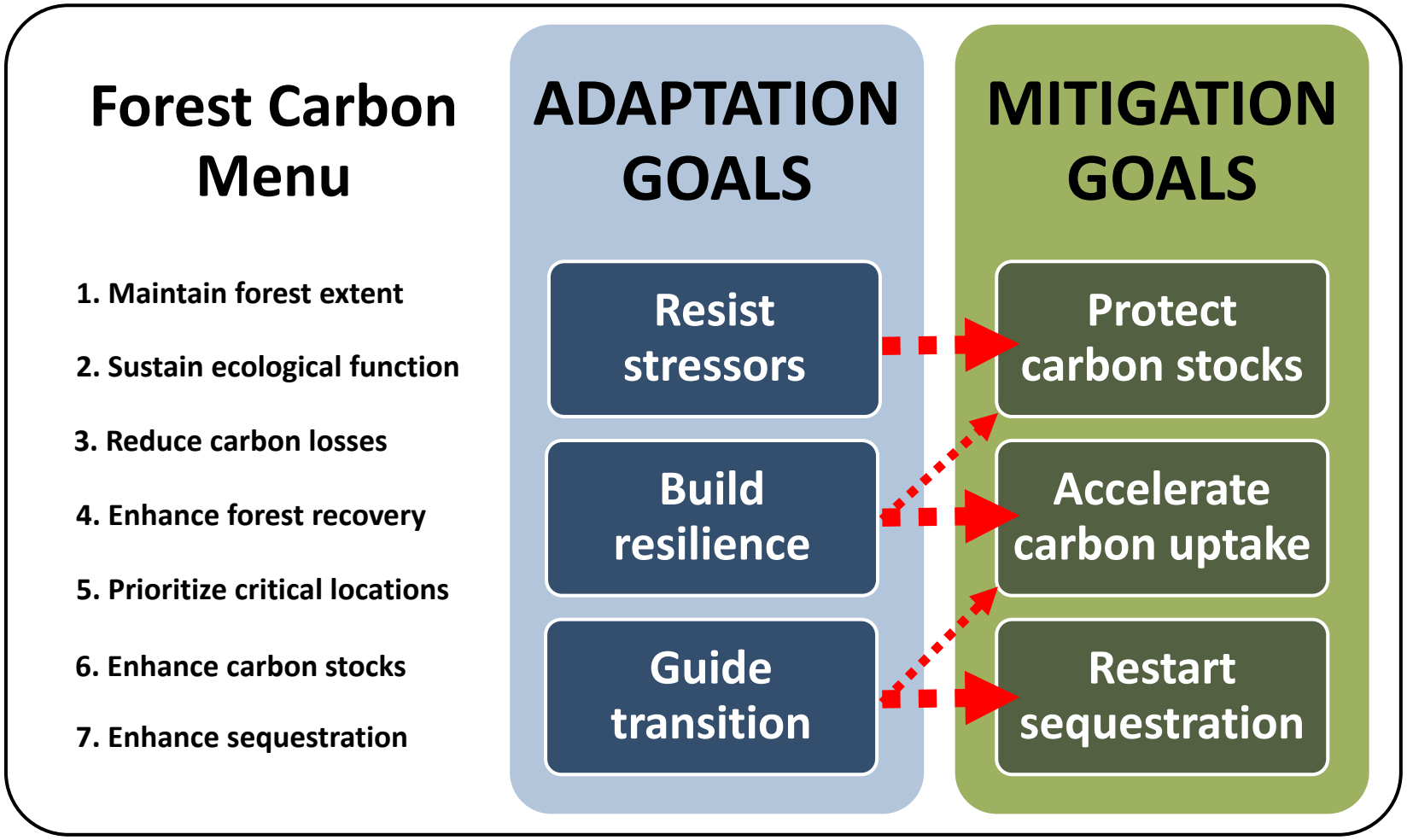



*3. Quantification of carbon benefits is often lacking, so **look to directionality of responses***



Mitigation Practice	C response	Timeframe
Extend rotations	↑	Short
Conservation easements (avoid forest loss)	↑	Short
Underplanting future-adapted species	↑	Mid
Reforestation	↑	Long
Thinning	— / ↑	Mid / Long
Clearcut	↓ / —	Mid / Long

Practitioner's Menu of Strategies and Approaches for Forest Carbon Management



Reduce stressors & maintain carbon stocks

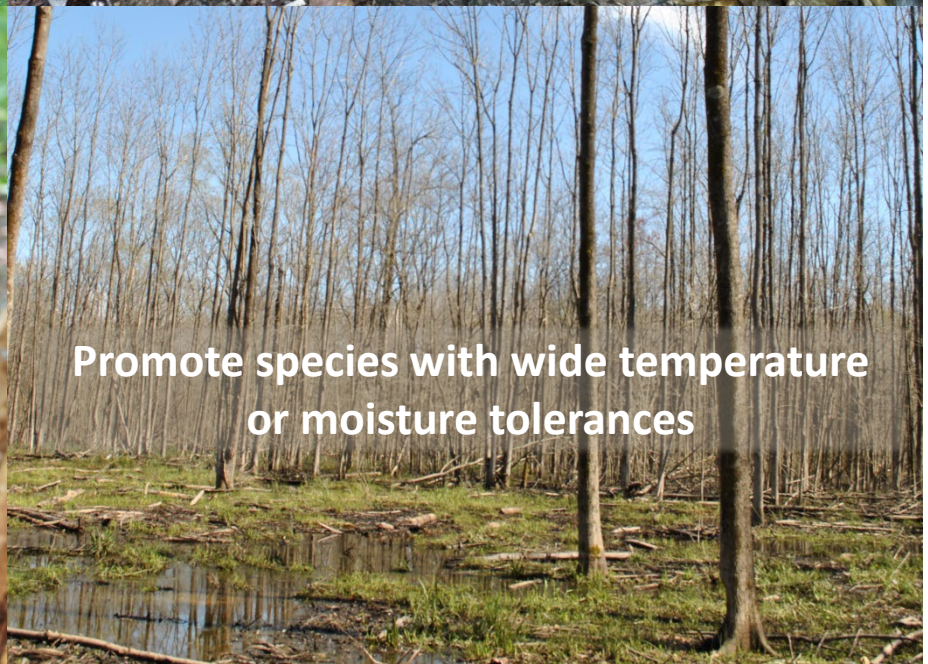
Strategy 2: Sustain fundamental ecological functions

Reduce stressors & Maintain carbon stocks

S3: Reduce carbon losses from natural disturbance

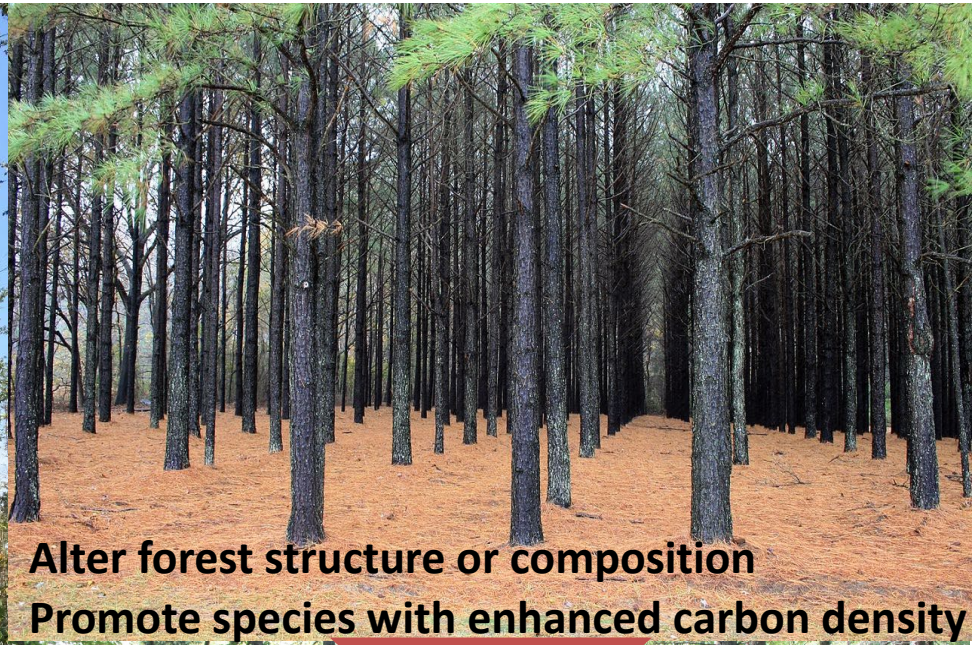
Build resilience

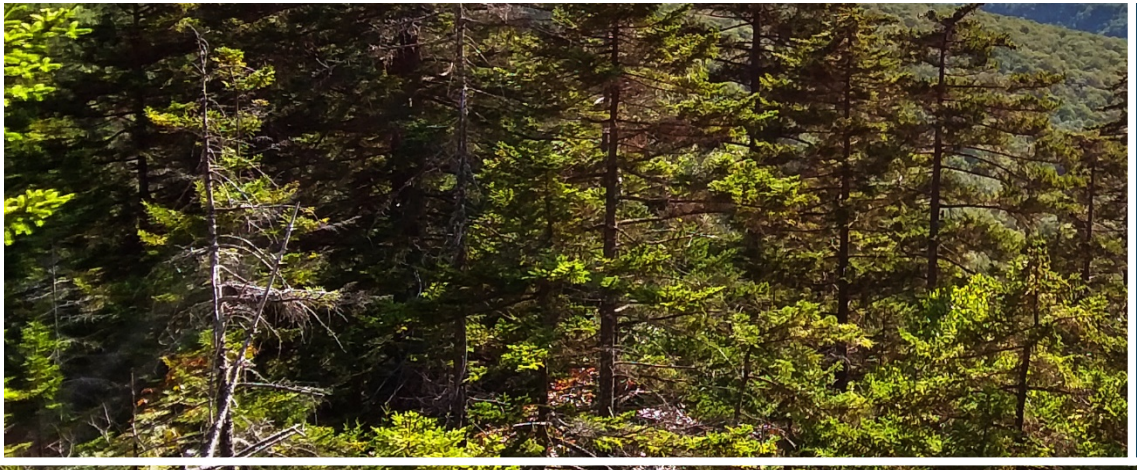
S6: Enhance existing carbon stocks while retaining forest character



Restart or enhance carbon sequestration

S7: Enhance sequestration capacity through forest alterations





Thank you!

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