

Looking Belowground to Find Answers to Climate Change

Managing Pinyon-Juniper Woodlands for Resilience

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Project in collaboration with the U.S. Geological Survey (U.S.G.S.),
Ute Mountain Ute Tribe, and National Park Service

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Pinyon-Juniper Forests

- Cover 100 million acres of land across the West
- Provide habitat for a number of declining or rare species such as Gray vireos, pinyon jays and Chapin Mesa milkvetch
- Are an important cultural and economic resource for humans, including many indigenous groups
 - Pine nuts as food
 - Fuel wood
 - Aesthetics and recreation



Bernadette Kuhn



U.S. Department of Agriculture Forest Service





Mycorrhizae



Read 1991



The Problem:

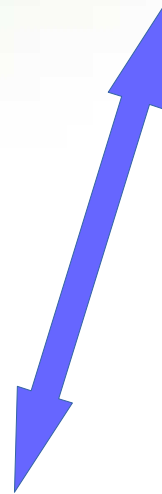
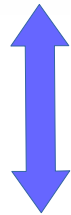
Increased Droughts



More frequent
fires



Mature tree mortality
+
Few new seedlings



Invasive species take over



Goszkaar/ Wikipedia commons



US Forest Service, Southwest Region



Denver Library



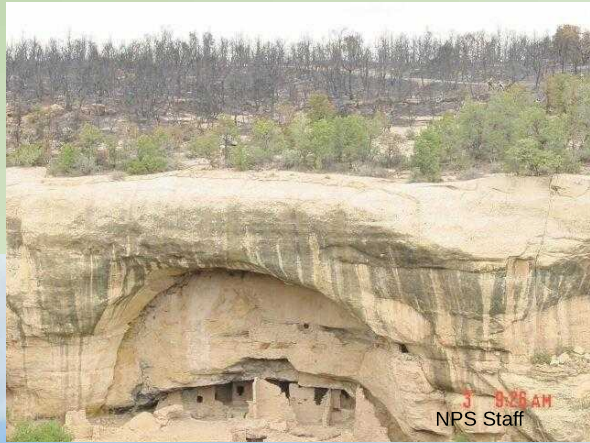
Denver Library

Field Site: Mesa Verde National Park and Ute Mountain Ute Land

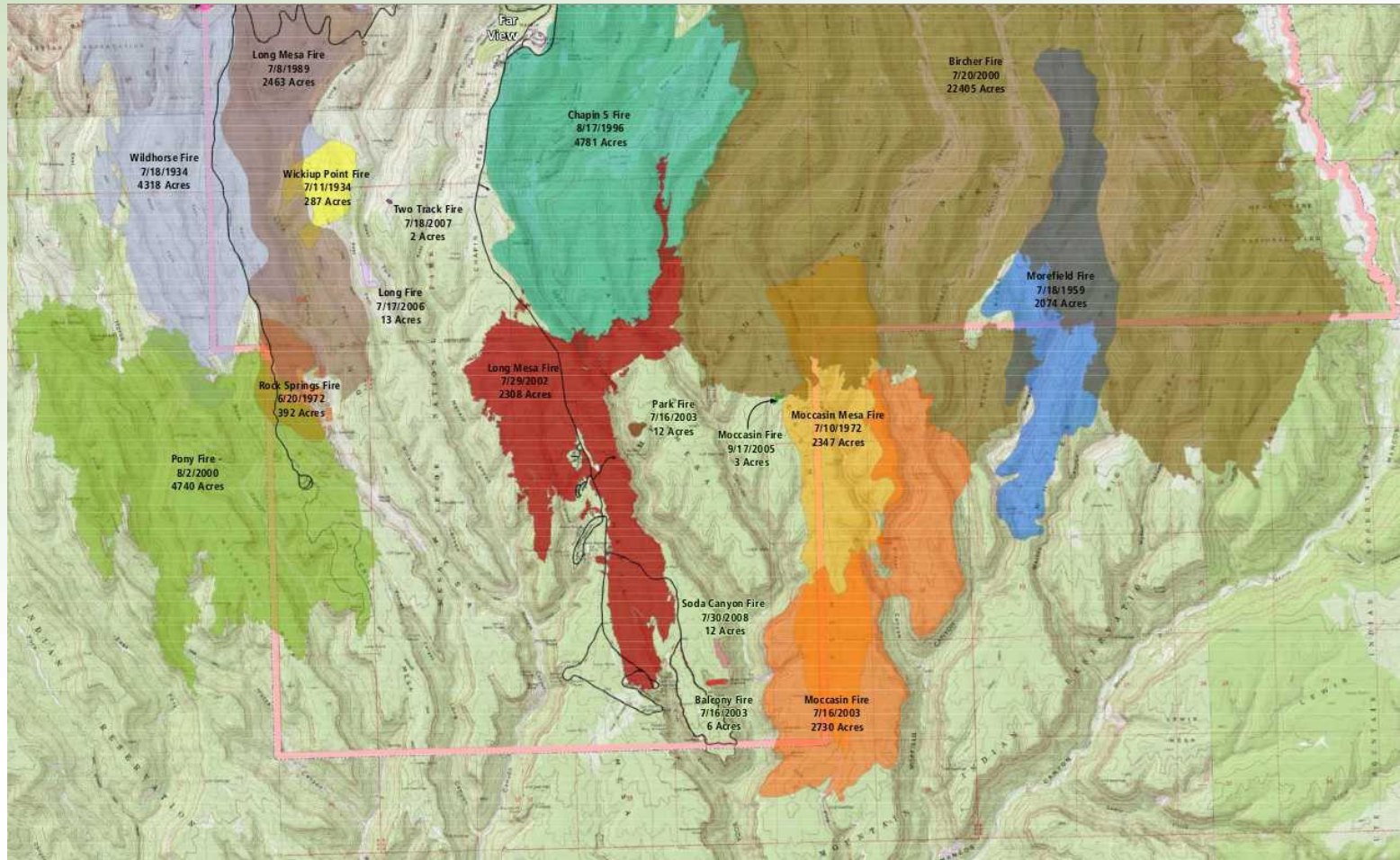


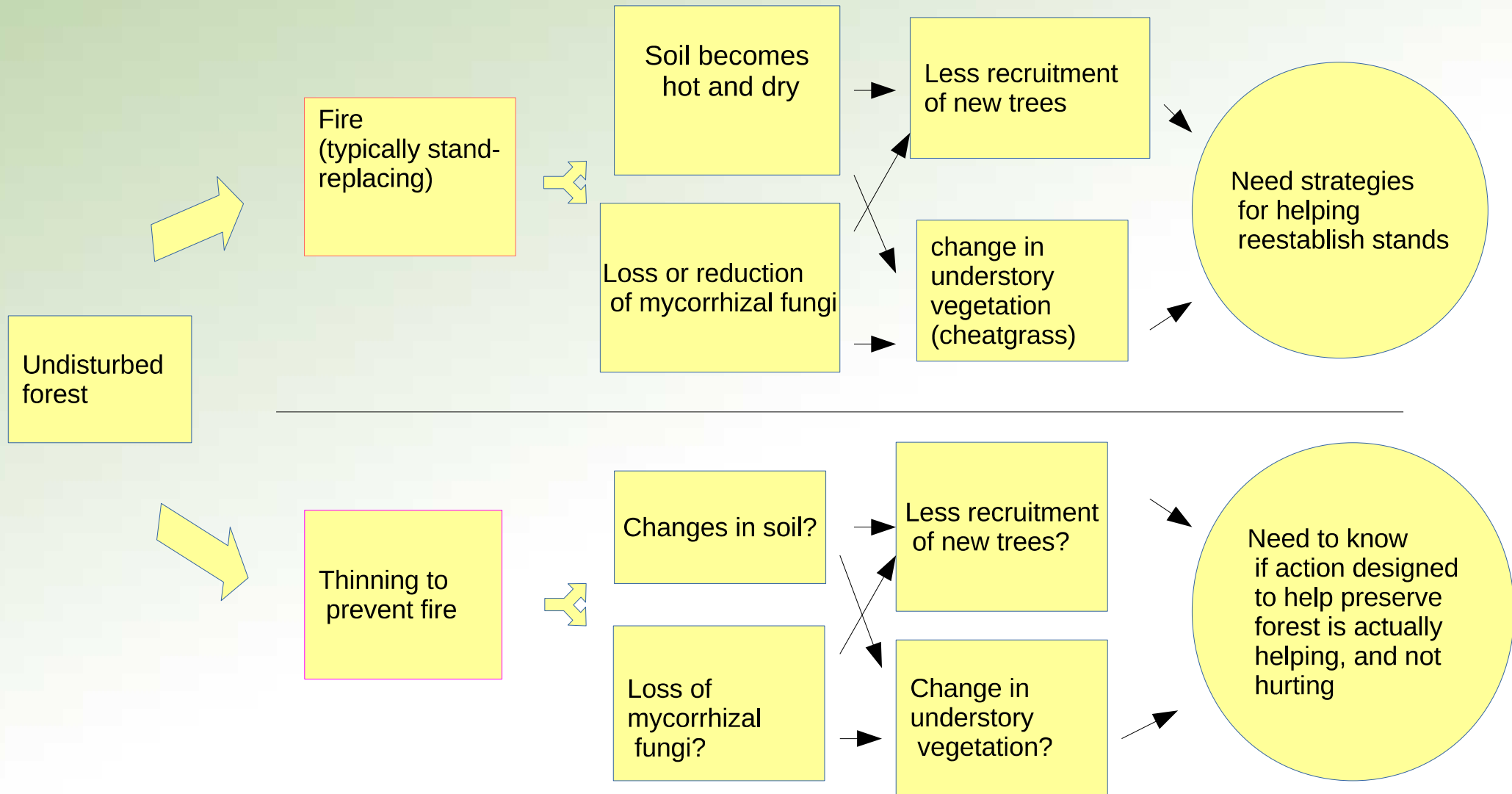
NASA Earth Observatory image by Jesse Allen, using Landsat data from the [U.S. Geological Survey](#).

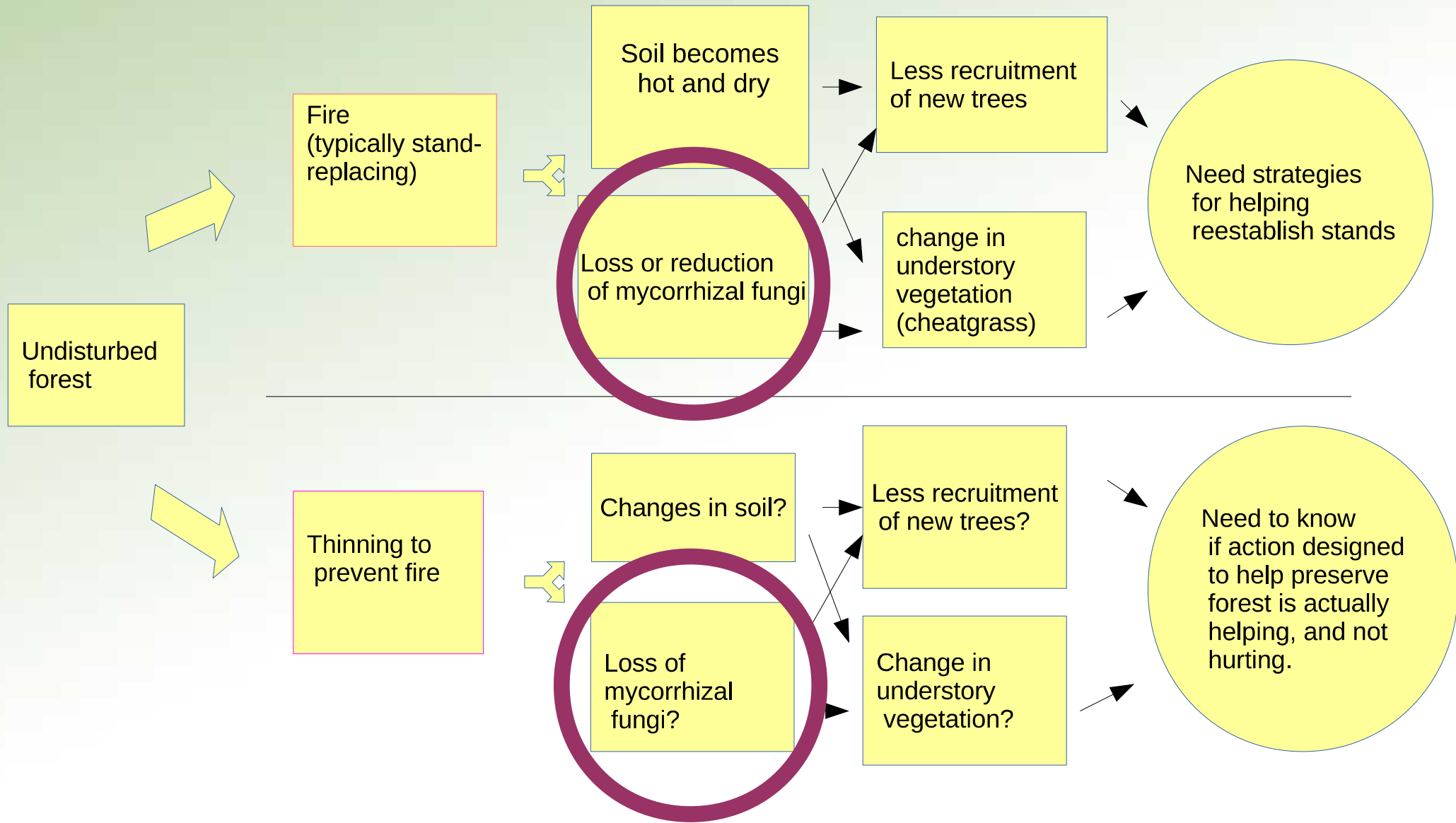
Fire at Mesa Verde



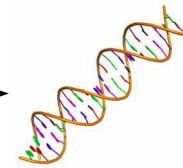
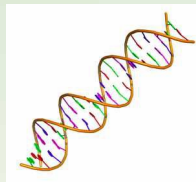
Mesa Verde Fires 1972-2012





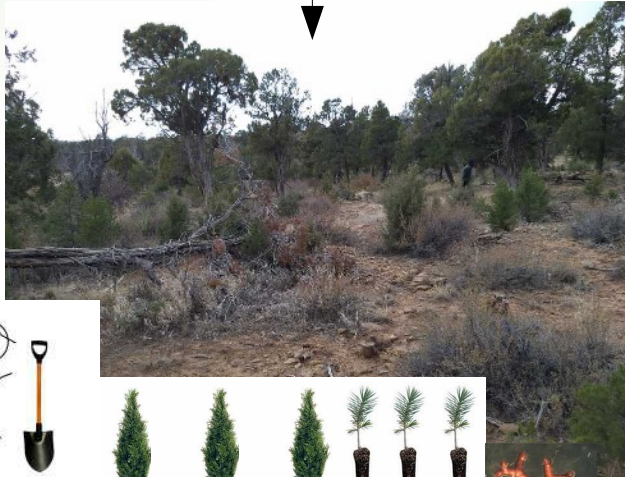


How do Fire and Thinning Affect Pinyon-Juniper Mycorrhizae?



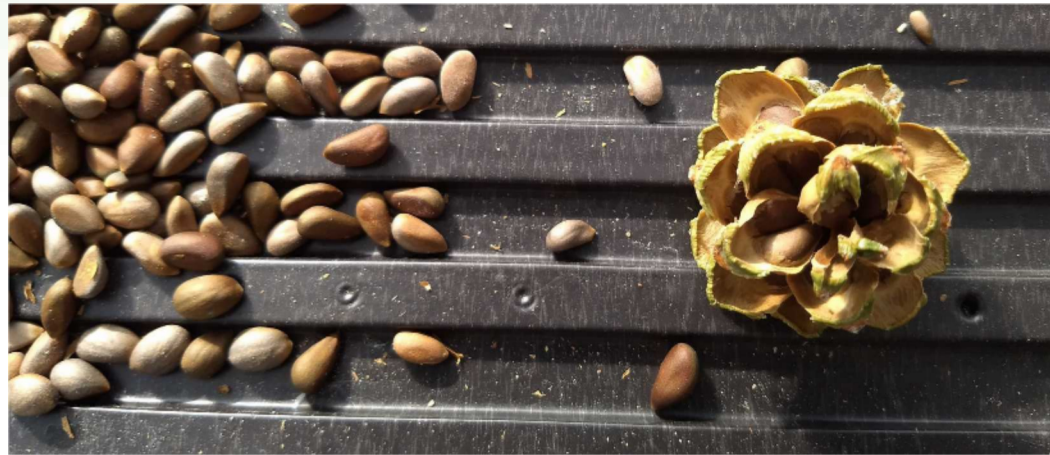


What can we do to help new seedlings survive?



Significance

- Help directly answer the questions land managers are faced with and inform management strategies
- Contribute to efforts to preserve rare and declining species
- Improve our understanding of how to move forward and protect ecosystems in a rapidly changing climate



OK, what about the Southern Tier?



Questions?



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Work Cited

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