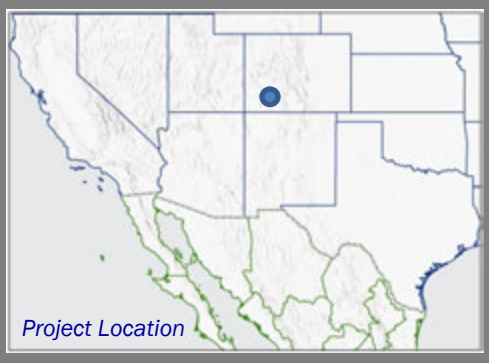
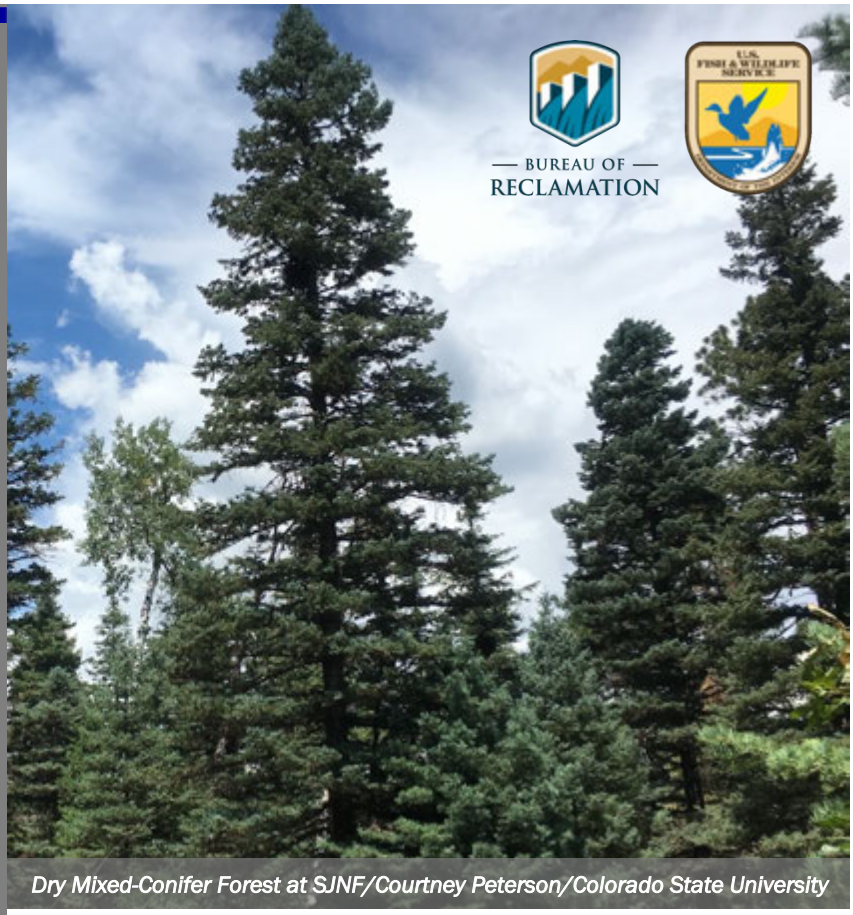
FIRE MANAGEMENT

The Adaptive Silviculture for Climate Change Project in the San Juan National Forest

ASCC
Adaptive Silviculture for Climate Change

Climate change is affecting forests in the US, and forest managers require resources to predict and respond to climate impacts but have few examples of climate adaptation strategies implemented at scale to learn from. The San Juan National Forest (SJNF) contains dry mixed-conifer forests where climate change has exacerbated the impacts of drought, fire, insect and disease pressure. The SJNF houses an Adaptive Silviculture for Climate Change (ASCC) site. The ASCC project is a multi-region network of research sites testing science-based strategies to help forests resist, be resilient to, or transition to meet the impacts of projected future climate conditions. In 2014, scientists, land managers, and non-governmental organization (NGO) personnel participated in a workshop to identify desired future conditions and develop adaptation strategies for the SJNF.





Dry Mixed-Conifer Forest at SJNF/Courtney Peterson/Colorado State University

KEY ISSUES ADDRESSED

Pressure from insects, such as bark beetles, and fir engravers, as well as root diseases and dwarf mistletoe, are increasing tree mortality in the SJNF. Additionally, fire suppression has reduced fire frequency which has increased the density of Gambel oak (*Quercus gambelii*) and young coniferous trees, which has caused an increase in the severity of wildfire and competition for limited water resources. Developing climate adaptation strategies requires specialized knowledge and resources. Input from a variety of experts can provide additional contemporary resources, knowledge, and examples to supplement the existing work of forest managers to support forest health. More examples of projects that implement operational-scale climate adaptation are needed to aid forest managers in similar forests in their work.

PROJECT GOALS

- Share tools and approaches to integrate climate change into decision making
- Collaboratively identify desired future conditions, management objectives, and on-the-ground actions that respond to the impacts of climate change
- Provide a robust, operational-scale example of climate adaptation strategies

Area Marked for Transition Treatment at SJNF/Tim Leishman/USFS

OPENING DOORS The scale and statistical rigor of this project will allow other researchers, including The Nature Conservancy and USDA, to pursue related research questions at the site. For example, how treatments will affect snowpack.

PROJECT HIGHLIGHTS

Broad Representation: The diverse expertise and connections of the planning team and workshop participants helped everyone understand climate impacts and develop implementable prescriptions.

Workshop and Prescription Plans: The Northern Institute for Climate Science (NIACS) Adaptation Workbook helped develop three distinct prescriptions for the SJNF:

The first improves **resistance** to drought, insect and disease pressure, and fires by reducing basal area of trees to 60-90 ft^2/ac, removing small and damaged trees and keeping consistent spacing and species composition.

The second increases **resilience** to fire, insects, and disease by creating heterogenous forest spacing with ½- to 2-acre openings, reducing basal area to 60-90 ft^2/ac, retaining fire and drought tolerant ponderosa pine, and cutting young and diseased white fir and Douglas-fir.

The third helps forests **transition** towards large ponderosa pine by cutting 80-90% of white fir, and small Douglas-fir and ponderosa pine, and reducing basal area to ~40 ft^2/ac with openings up to 2 acres.

Forest Modeling for Scenario Planning: The Forest Vegetation Simulator (FVS) models helped evaluate tradeoffs between costs, forest health, and other considerations; determine when follow up actions were needed; and allow sustainable logging in 30 yrs.

Collaborators

- See online for full list of collaborators

LESSONS LEARNED

At the workshop, SJNF staff continued learning about "Ecological Forestry" management practices that consider social, ecological, and economic factors. This allowed planned prescriptions to be more readily implementable and scalable.

The treatments developed in 2014 have not been implemented yet. The use of "long-term stewardship contracts" allowed for a larger scope of work because there was not a robust timber industry at the time of the workshop. These contracts occur over a longer timeline than to smaller "stand-alone contracts."

The lack of soil scientists at the workshop impeded development of climate adaptation strategies because their expertise can help understand soil characteristics that determine treatment success.

Being in the field is valuable when planning land management treatments. High snowpack during the workshop made field visits impossible. It is best to plan workshops when weather conditions allow site visits. Gathering managers, scientists, and climate experts to share conceptual tools and approaches allowed treatments to meet the goals of both the ASCC and the SJNF. Results can be applied to management of other dry mixed-conifer forests.

NEXT STEPS

- Implement prescriptions developed in 2014
- Add fire simulations to current FVS models
- Monitor natural forest regeneration, soil conditions, ladder fuels, and understory plants
- Determine how resistance, resilience, and transition compare across forest types

For more information on this project, contact Timothy Leishman: timothy.leishman@usda.gov

Example of Future Transition Treatment at SJNF/Tim Leishman/USFS

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