JFSP Final Report Summary

Project #: 14-1-02-30

Title: Evaluation of past-fire burn mosaics on subsequent wildfire behavior, severity, and fire management strategies

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Objectives:
To address the following questions:

- How do the location, size, and age of past wildfires influence subsequent wildfire behavior and effects? Are past wildfires effective as barriers to subsequent fire spread or for mitigation of burn severity?

- How do past wildfires influence or inform management strategies for subsequent wildfires? How can past wildfires be used in strategic and tactical responses to large, high severity fire events?

Proposed deliverables:
Progress reports
Scientific manuscripts
Manager workshops

Training module
Dataset

Status of data collection and analysis
Complete

Status of deliverables/findings
Complete

Status of metadata/datasets
Complete

Notes/interesting findings

- A review of the literature revealed that past wildfires tend to decrease the severity of subsequent wildfires and often mitigate the amount of area burned. The effectiveness of past fires as a fuel treatment in semi-arid forests of the western U.S. was generally about 20 years.

- Across all study areas, models of burn severity included past fire effects (severity and distance from edge), weather, vegetation, and landform variables. Burn severity was higher on extreme weather days, in dense, closed canopy mixed conifer forests, and on steep slopes.

- Past fires were often barriers to fire spread for up to 5-7 years post fire in East Zone and Tripod study areas and only up to 2-3 years in the Kootenay study area. Burn severity generally increased with time since fire.

- Results confirm the use of past fires in wildland fire planning and provides some context for the likely duration of their effectiveness. Quantifying the longevity of past fires as a barrier to subsequent wildfire spread under various fire weather conditions will help predict their utility in tactical and strategic fire management decisions.

- Results from simulation modeling provide illustrations of how actively removing fires from historically frequent-fire systems has lasting ramifications for landscapes and their relative susceptibility to future fires.

- There has been a nearly 46% reduction in lynx carrying capacity in the study area as a result of the large, high severity fires that have occurred over the past 15 years. The native fire regime for these forest types produced excellent lynx habitat over most centuries in multi-millennial simulations.

Future work:

- There is a need to develop a consistent set of metrics to evaluate the effects of past fires on subsequent fire spread and severity.

- Geographic variation in vegetation type and fire weather can strongly influence fire-on-fire interactions, and the complexity of these interactions warrants further study.

- There is a need to better understand the potential consequences of climate change on fire-on-fire interactions – specifically

- Based on the importance of feedbacks of fire and vegetation to global carbon fluxes and the increased incidence of wildfires on the majority of the world's major biomes, further studies of fire and vegetation dynamics in southeast Asia, African savannas, China and boreal forests in Eurasia are recommended.

- Investigators suggest several specific improvements to the Wildland Fire Decision Support System and the Reburn simulation modeling tool.

Final recommendation
Project is complete