



Modeling fire management approaches in a changing Southwest climate

William Flatley, Rachel Loehman, Lisa Holsinger, Andrea Thode, Alexander Evans, Donald Falk, Megan Friggens, Windy Bunn, Craig Wilcox



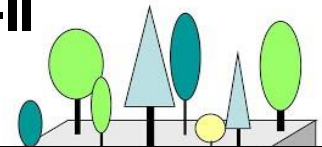
**The uncoupling of
vegetation, climate
and fire regimes can
have drastic
consequences**



***LANDIS-II* and *FireBGCV2*: Forest Landscape Simulation Models**

- Simulate large spatial and long temporal scales

LANDIS-II



forests



Article

Can Land Management Buffer Impacts of Climate Changes and Altered Fire Regimes on Ecosystems of the Southwestern United States?

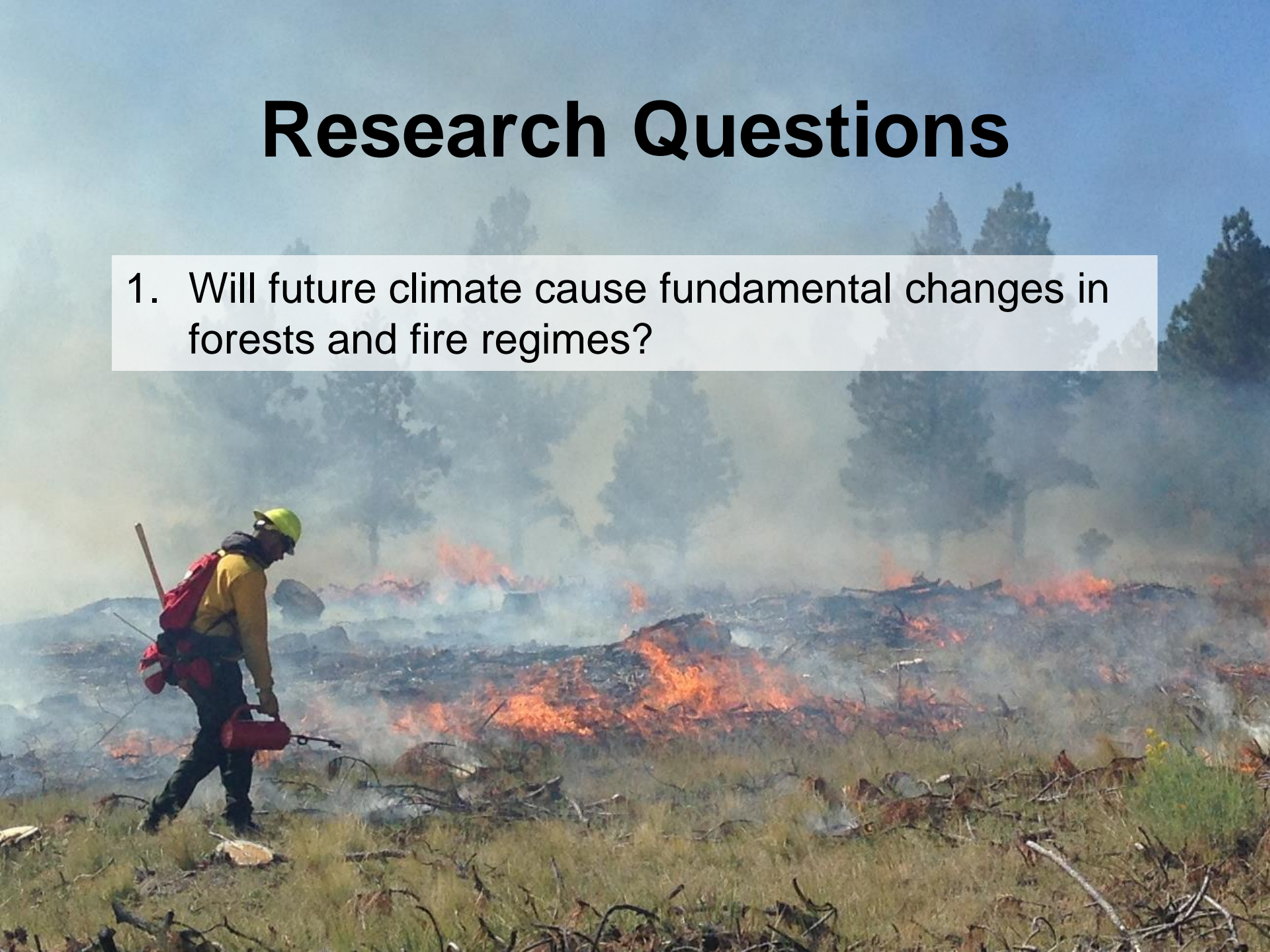
Rachel Loehman ^{1,*}, Will Flatley ², Lisa Holsinger ³ and Andrea Thode ⁴



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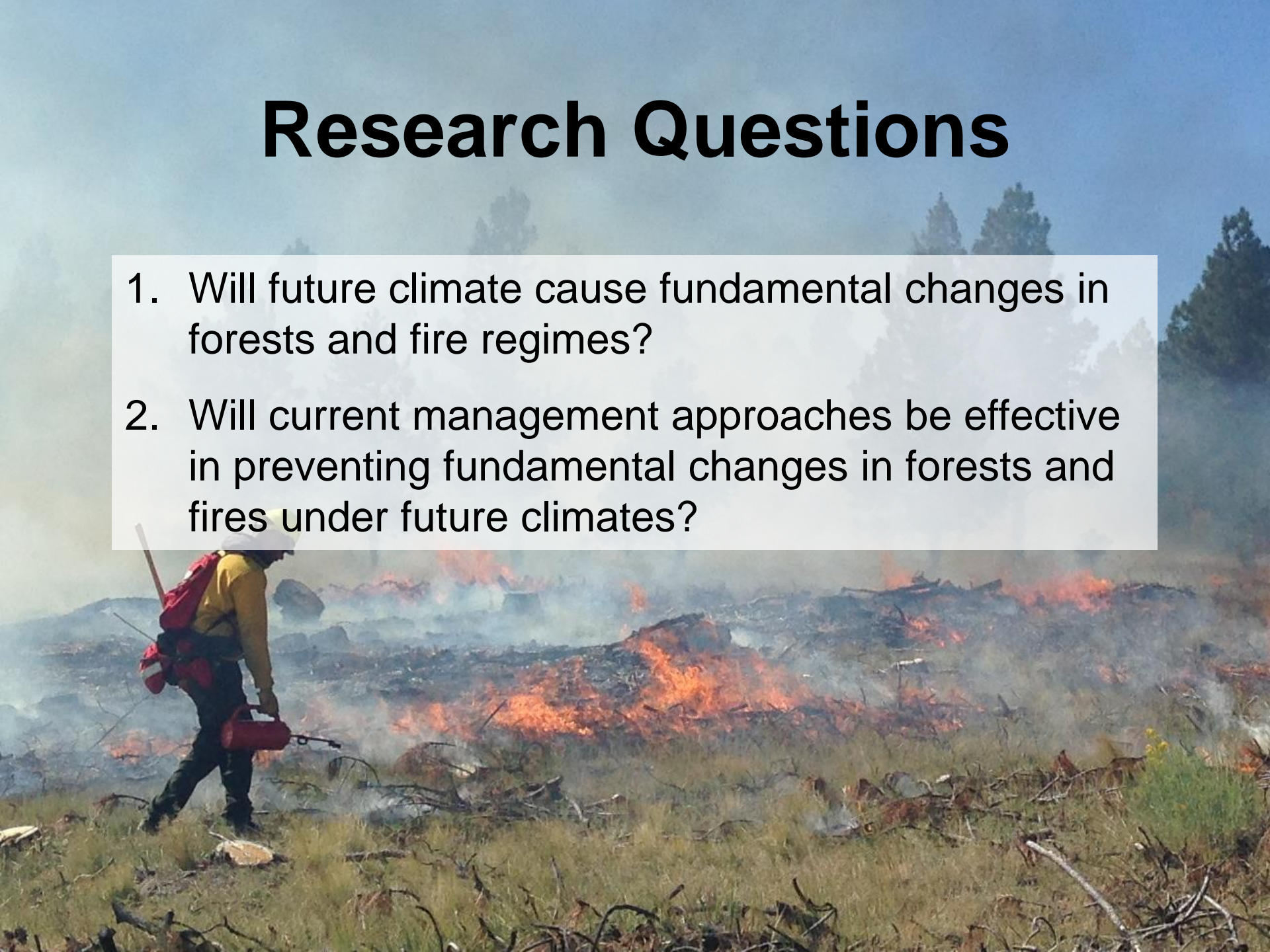
Research Questions

1. Will future climate cause fundamental changes in forests and fire regimes?



Research Questions

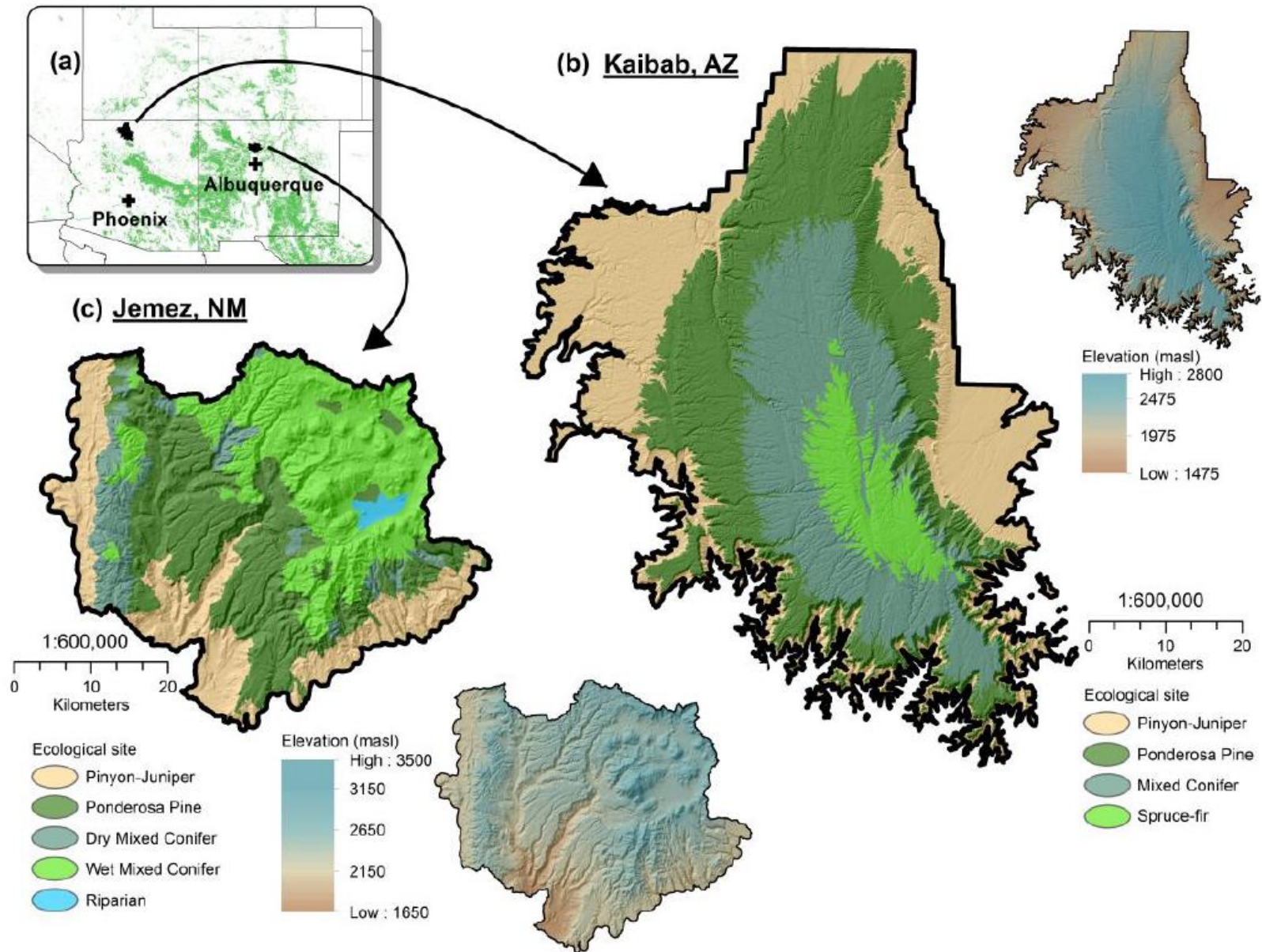
1. Will future climate cause fundamental changes in forests and fire regimes?
2. Will current management approaches be effective in preventing fundamental changes in forests and fires under future climates?



Research Questions

1. Will future climate cause fundamental changes in forests and fire regimes?
2. Will current management approaches be effective in preventing fundamental changes in forests and fires under future climates?
3. Can fundamental ecological characteristics of southwestern forests be preserved through an intensification of current strategies?

Study Landscapes: Jemez, NM and Kaibab, AZ



Modeling design

Landscapes:

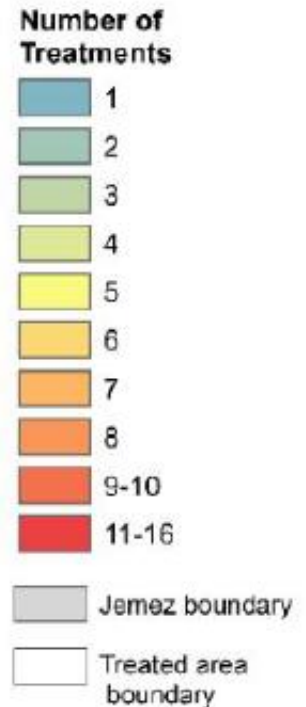
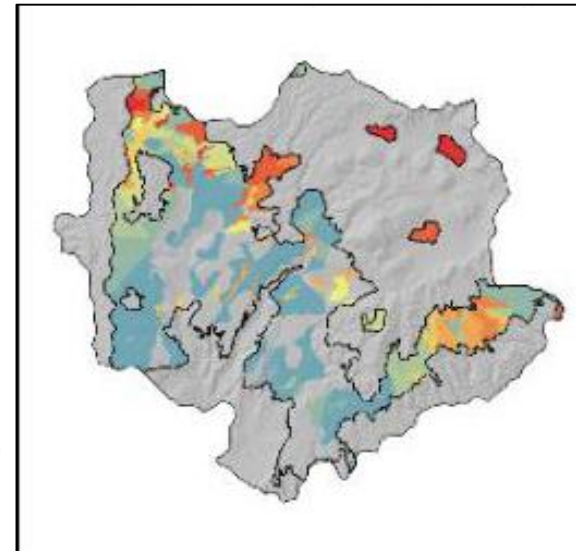
1. Kaibab Plateau, AZ – LANDIS-II model
2. Jemez Mountains, NM – FireBGCv2 model

Climates:

1. Contemporary - Instrumental weather (1960 - 1990)
2. Warm, Semi-Dry – CCSM4 GCM, RCP4.5 (1990-2090)
3. Hot, Arid – HADGEM2-ES GCM, RCP8.5 (1990-2090)

Management Scenarios:

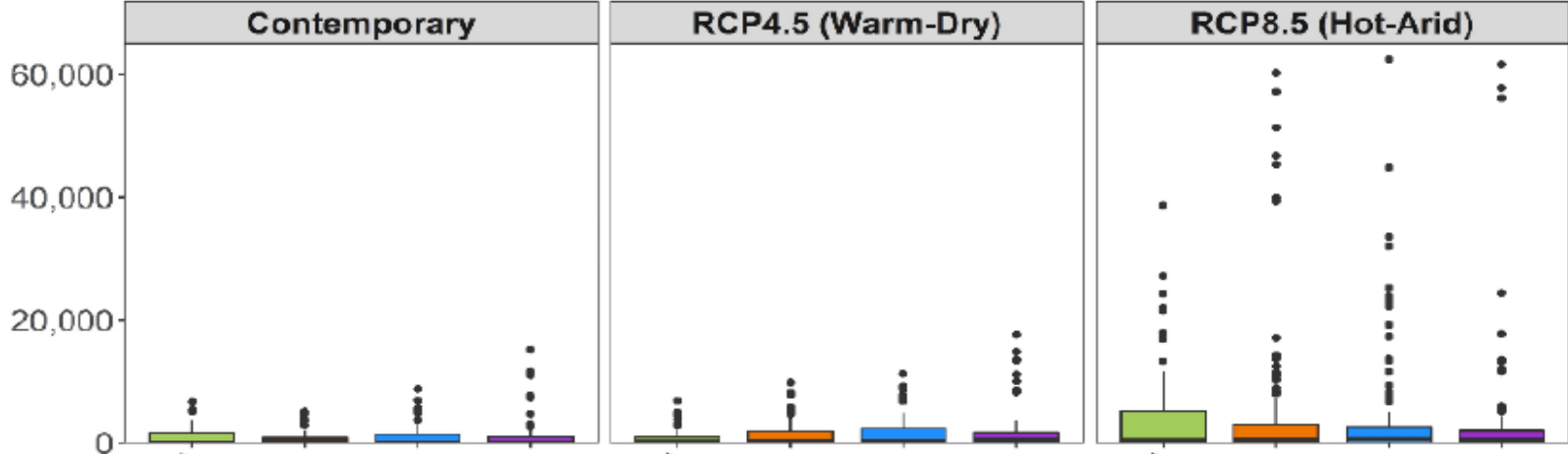
1. Suppression – Fire suppression, no management
2. BAU (1.5%) – Thinning and Rx burns, 67 year rotation for Ponderosa and Dry Mixed Conifer
3. 3xBAU (4.5%) – Thinning and Rx burns, 22 year rotation
4. 6xBAU (9%) – Thinning and Rx burns, 11 year rotation



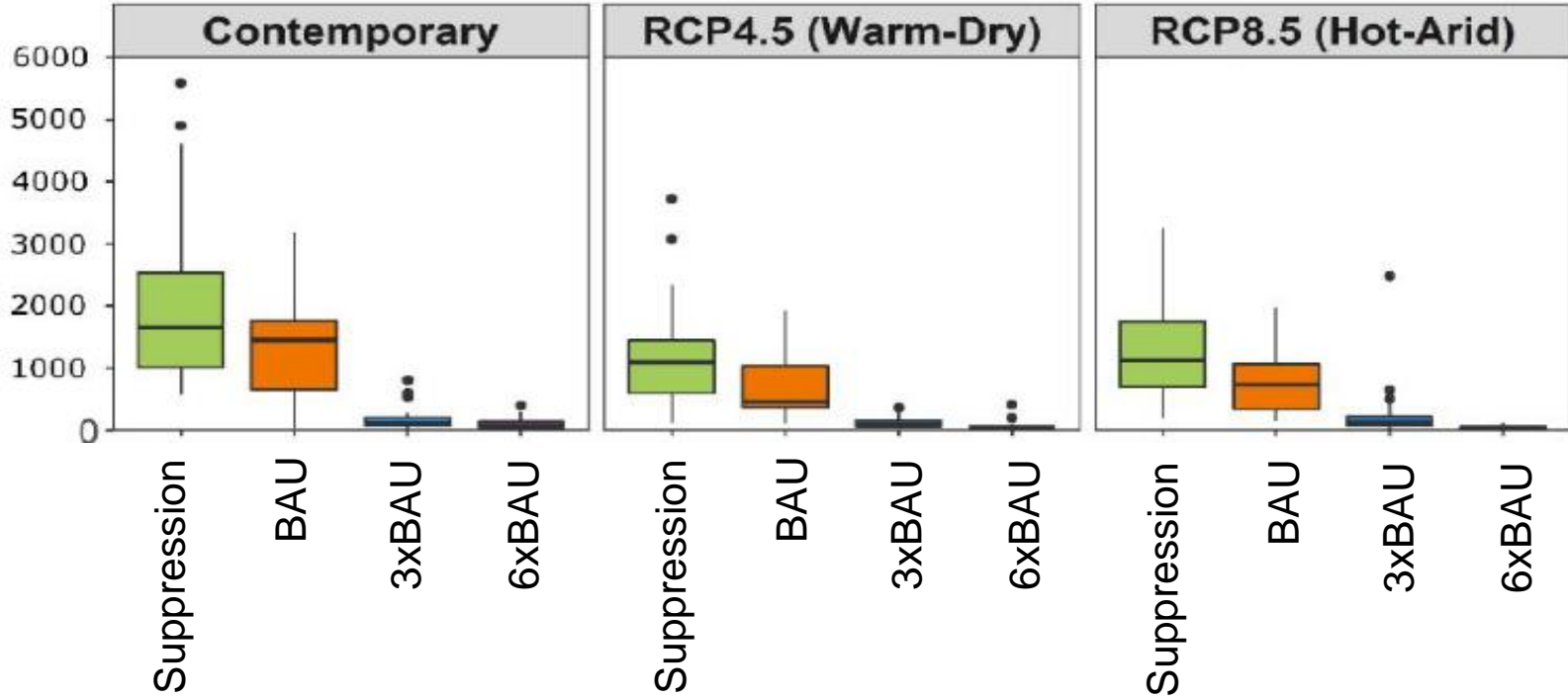
High Severity Wildfire: Ponderosa and Mixed Conifer

High Severity Area Burned Annually (ha/yr)

Jemez Mountains

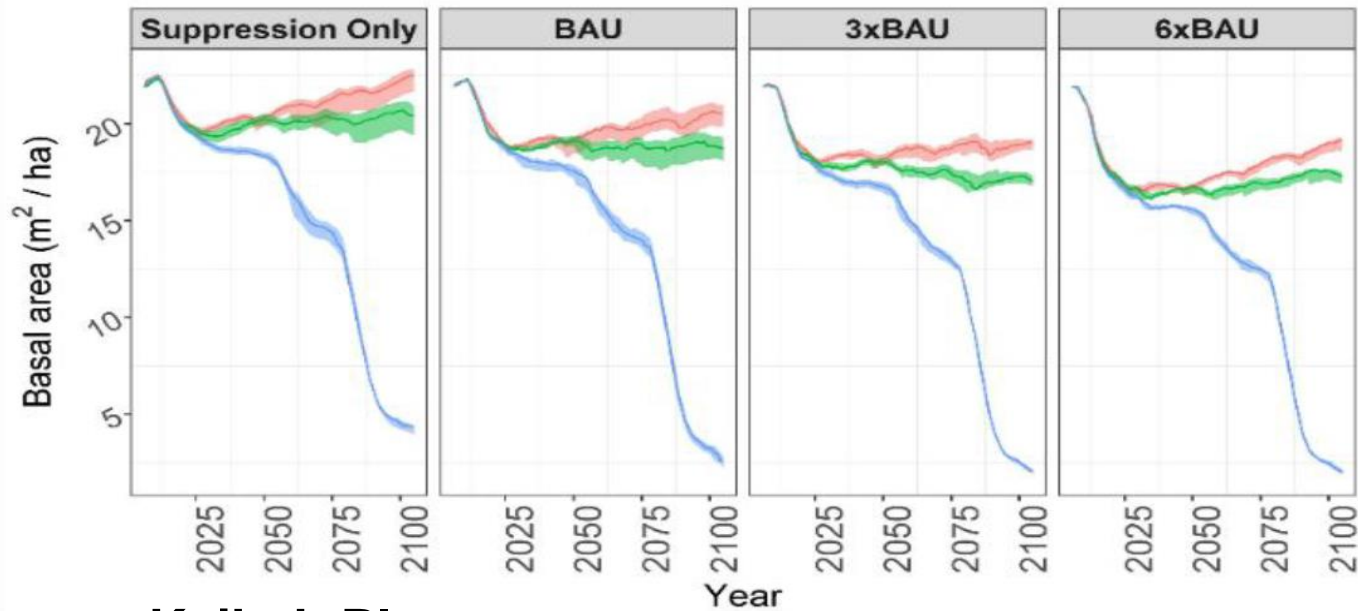


Kaibab Plateau

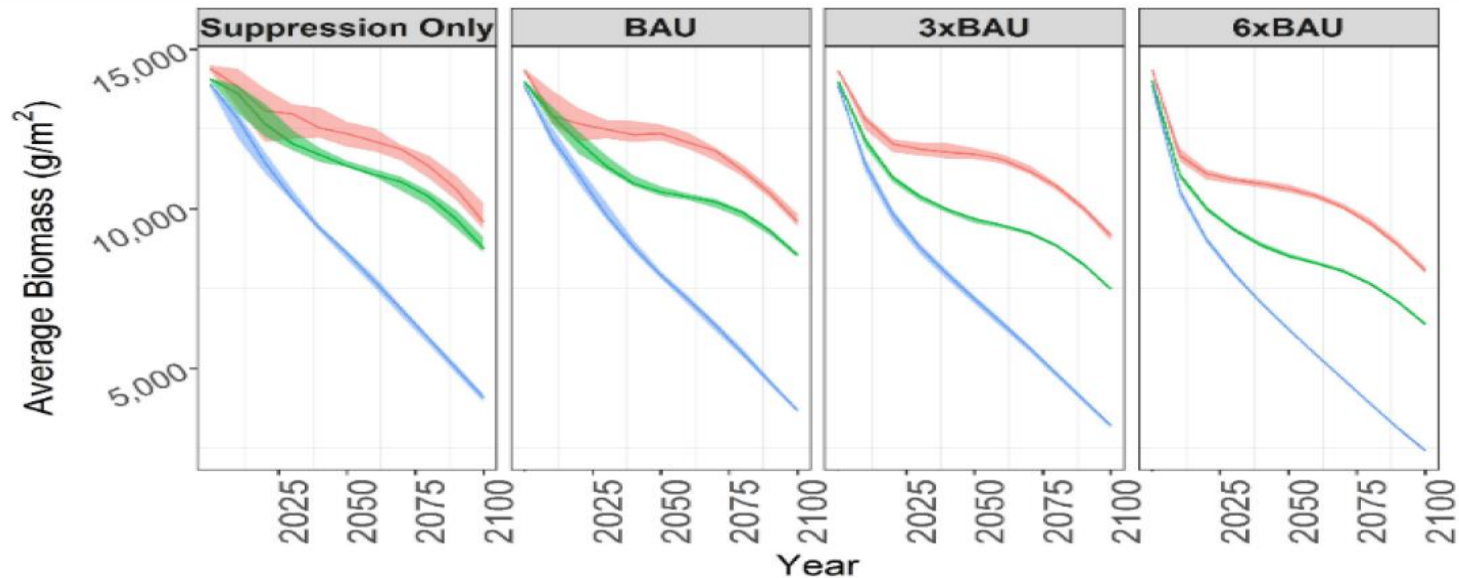


Forest Productivity: Ponderosa and Mixed Conifer

Jemez Mountains

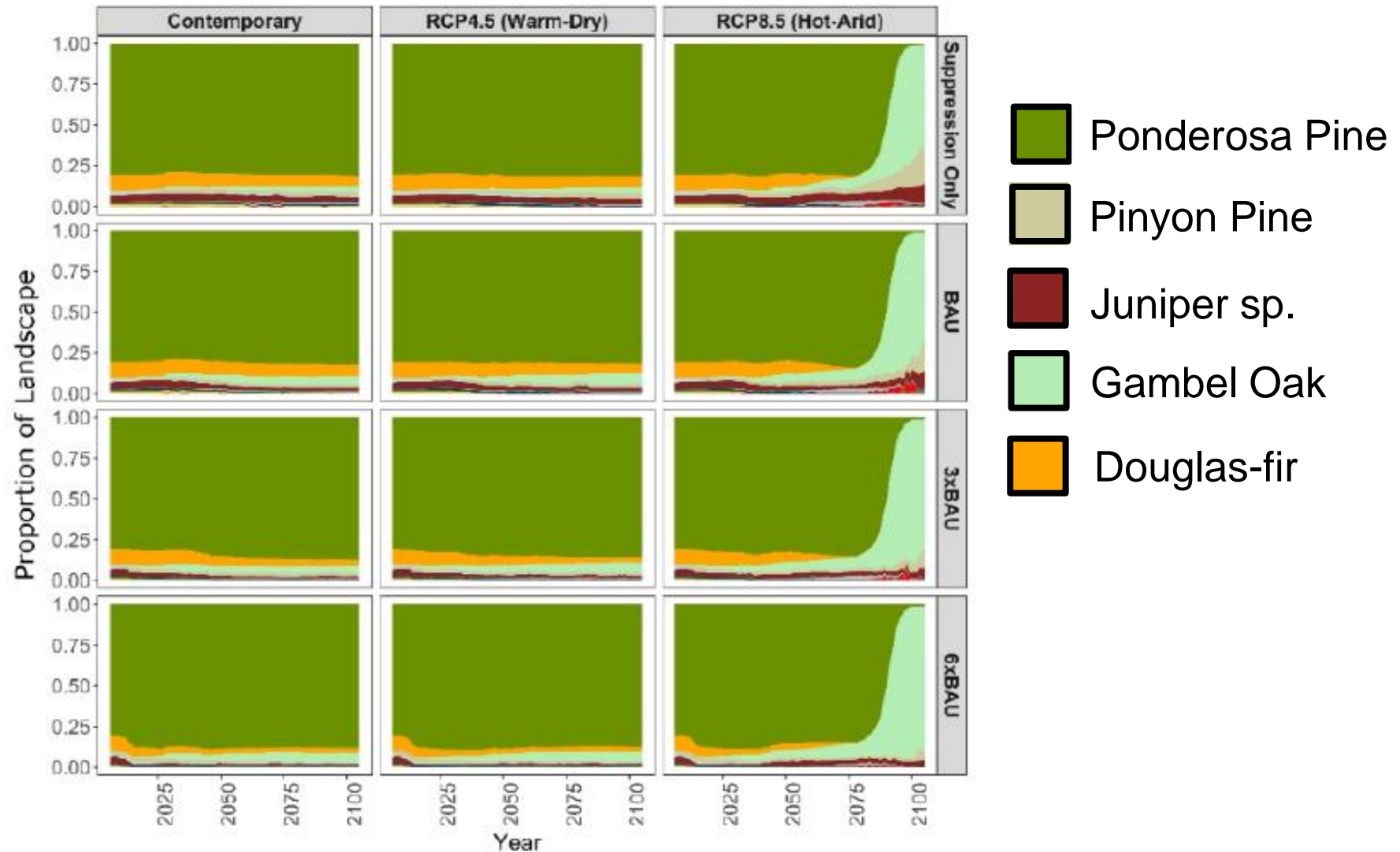


Kaibab Plateau



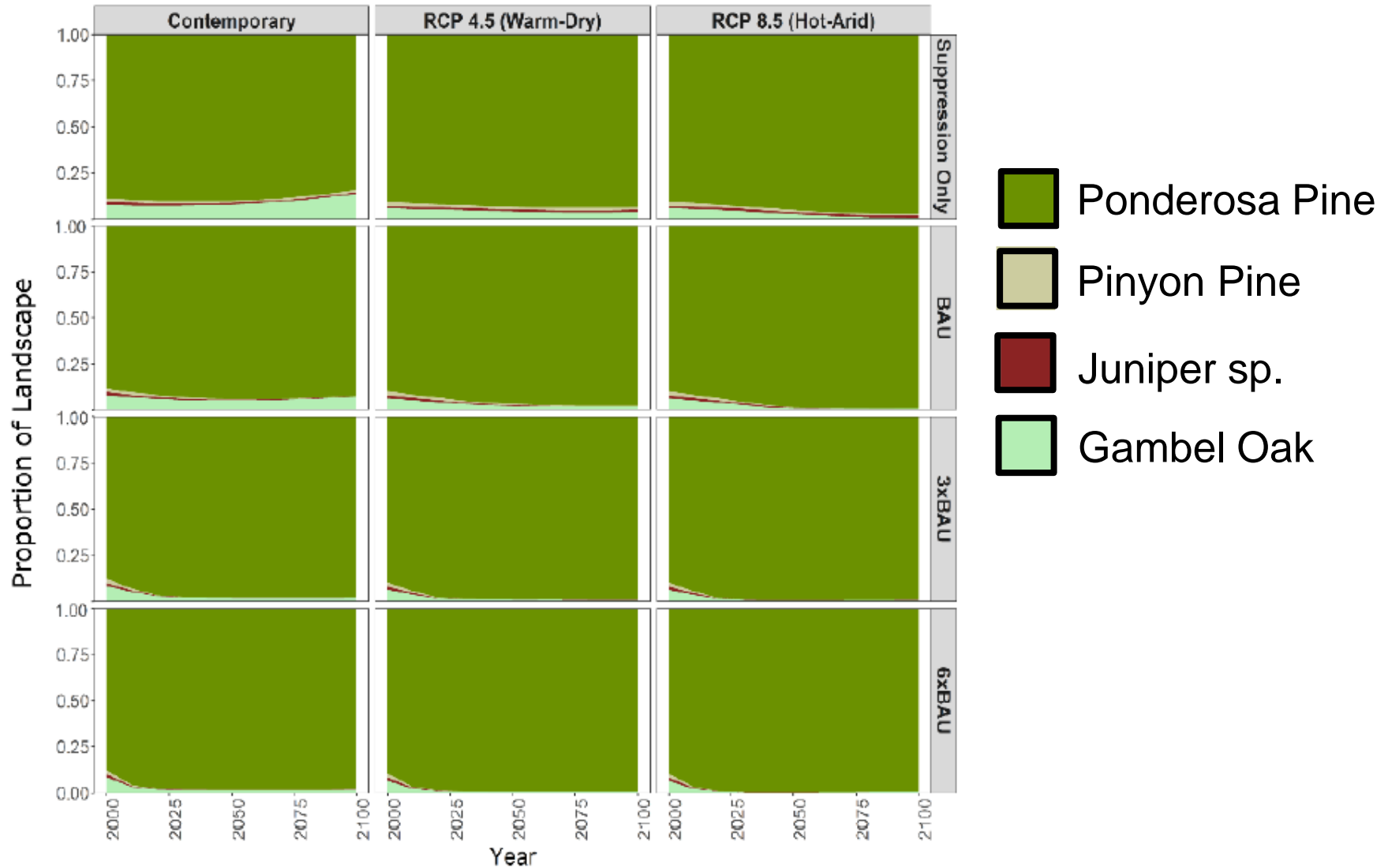
Forest Composition: Ponderosa Pine

Jemez Mountains



Forest Composition: Ponderosa Pine

Kaibab Plateau



Research Questions

1. Will future climate cause fundamental changes in forests and fire regimes?

Fire – Mixed; Forests –Yes

2. Will current management approaches be effective in preventing fundamental changes in forests and fires under future climates?

No

3. Can fundamental ecological characteristics of southwestern forests be preserved through an intensification of current strategies?

No

Many thanks to:



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Station Fire Sciences Lab

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Teske

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