PSW/PNW Integrated Research Initiative to Inform Postfire Management and Pre-fire Planning

Revised May 12, 2022

Timeline

- In February/March of 2021, PNW and PSW research stations met jointly to discuss *opportunities for collaboration and synergies between the two stations, focused on post-fire restoration needs*.
  - 1) What are the key challenges to postfire restoration?
  - 2) What does PNW/PSW bring to the table to address those challenges?

- In January - March 2022, PSW/PNW Core Team engaged in discussion with Region 5 and Region 6 to *promote coordination of science-informed post-fire actions through a program of research and science transfer*
  - 1) Address *near term* post-fire mitigation and restoration information needs
  - 2) Inform *longer term* restoration and management strategies in the context of novel climate and interactions among climate related stressors

Re-ocurring Needs

Topic 1. Identification of desired post-fire outcomes and drivers of stakeholder participation

Topic 2: Improved capacity to detect post-fire conditions and identify desired conditions in post-fire landscapes

Topic 3. Improved understanding of future wildfire resilience in post-fire landscapes

Topic 4. Improved capacity to manage post-fire trajectories

Topic 5. Better translation of post-fire science into management through research-management collaboration

Topic 6: Climate-smart reforestation strategies focused on species and genotypes to plant during active reforestation

Topic 7. Restoration of high-value and/or sensitive species and ecosystems

Topic 8. Improved quantification of wildfire risk

"Moving the Needle"

- Support for fire and fuels management
  - *Where* do we need to reduce fuels (did fire reduce or increase fuel loads)
- Support of cultivating future forests
  - *Where* is regeneration occurring/or not occurring
  - *What* should we plant and how
  - *How* can we reduce fuels in young developing stands?
- Co-development/co-investment

Desired Outcomes

- Post-fire management guidance to support post fire restoration and pre-planning for next fire
  - Landscape prioritization
    - Fuel reduction in most needed areas to prevent future negative fire effects
    - Successful investment in limited seed stock and capacity
    - Increased social acceptance of different types of treatments and outcomes

Multi-tiered Approach
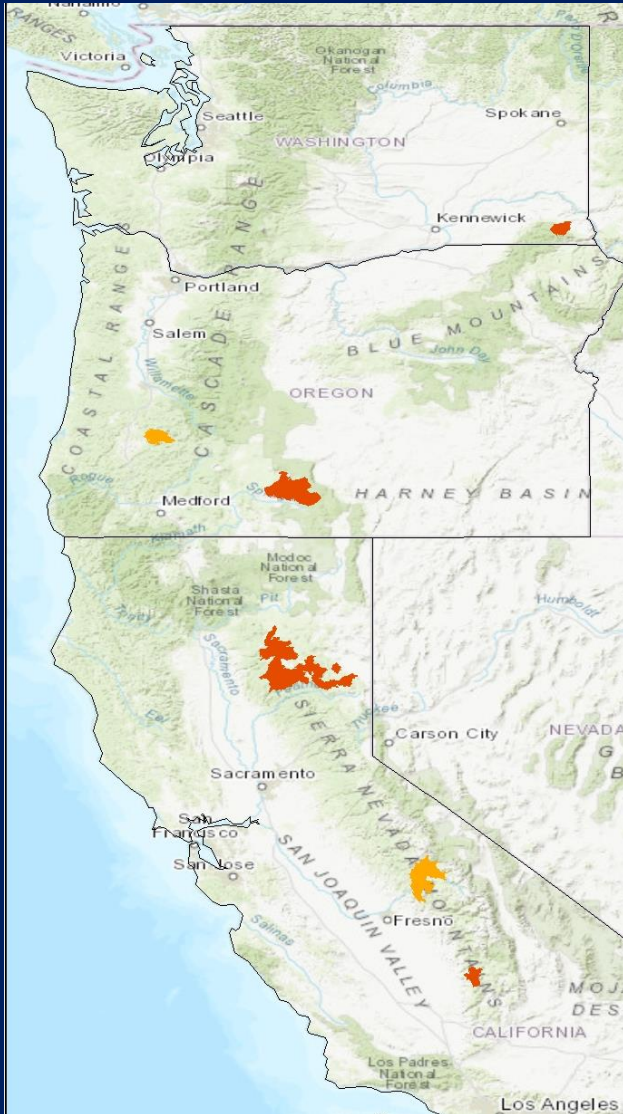
1) Selection of core sites

2) Prioritization of where management actions is most needed

3) Systematic collection of data to increase our understanding of post-fire fuel development, tree regeneration, invasives and use by wildlife following fire and,

4) How different management actions can be used to direct future landscape conditions

Framework for Post-fire Restoration in California's National Forests

Marc Meyer[1], Jonathan Long[2], Hugh Safford[1,3], Becky Estes[1], Kyle Merriam[1], Nicole Molinari[1], Shana Gross[1], Michelle Coppoletta[1], Sarah Sawyer[1], Ramona Butz[1], Amarina Wuenschel[1], Angela White[2], Brandon Collins[2], Malcolm North[2,3], Scott Conway[4], Michele Slaton[4], Clint Isbell[5], Dana Walsh[5], and Emma Underwood[3]

[1]USDA Forest Service Region 5 Ecology Program
[2]USDA Forest Service, Pacific Southwest Research Station
[3]Dept. of Environmental Science and Policy (HS, EU) or Dept. of Plant Sciences (MN), University of California Davis
[4]USDA Forest Service Region 5 Remote Sensing Lab (SC, MS)
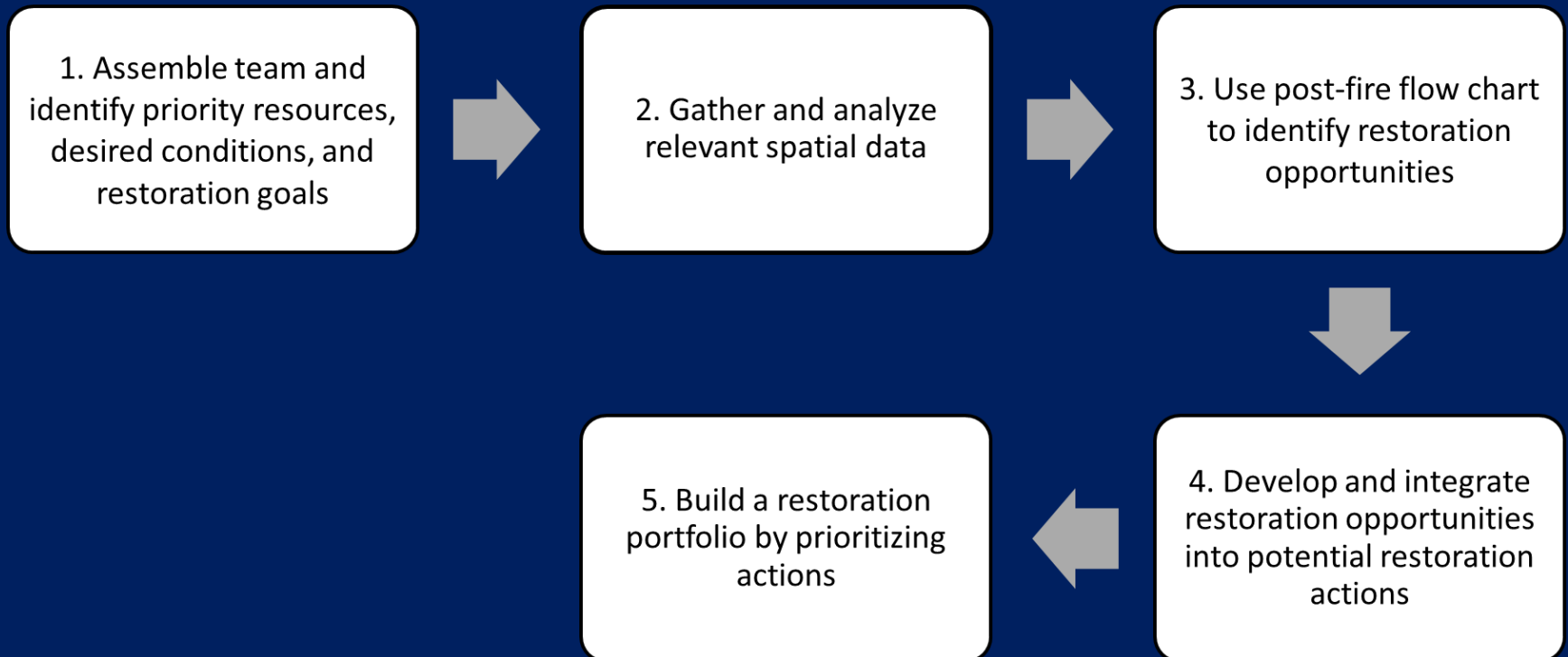[5]USDA Forest Service, Klamath National Forest (CI), or Eldorado National Forest (DW)

Refresher

- PSW-GTR-270 – Postfire restoration framework for national forests in California
  - Landscape-scale framing of ecological restoration
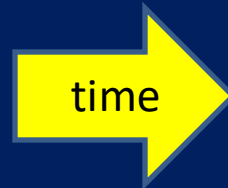 - Currently being applied to several burned areas in CA
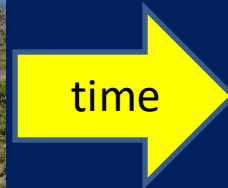
Restoration Framework Steps

1. Assemble team and identify priority resources, desired conditions, and restoration goals

→

2. Gather and analyze relevant spatial data

→

3. Use post-fire flow chart to identify restoration opportunities

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5. Build a restoration portfolio by prioritizing actions

←

4. Develop and integrate restoration opportunities into potential restoration actions

Flowchart Outputs

- Divide landscape into 3 zones:

  1. Beneficial fire effects – Maintain/promote DCs*
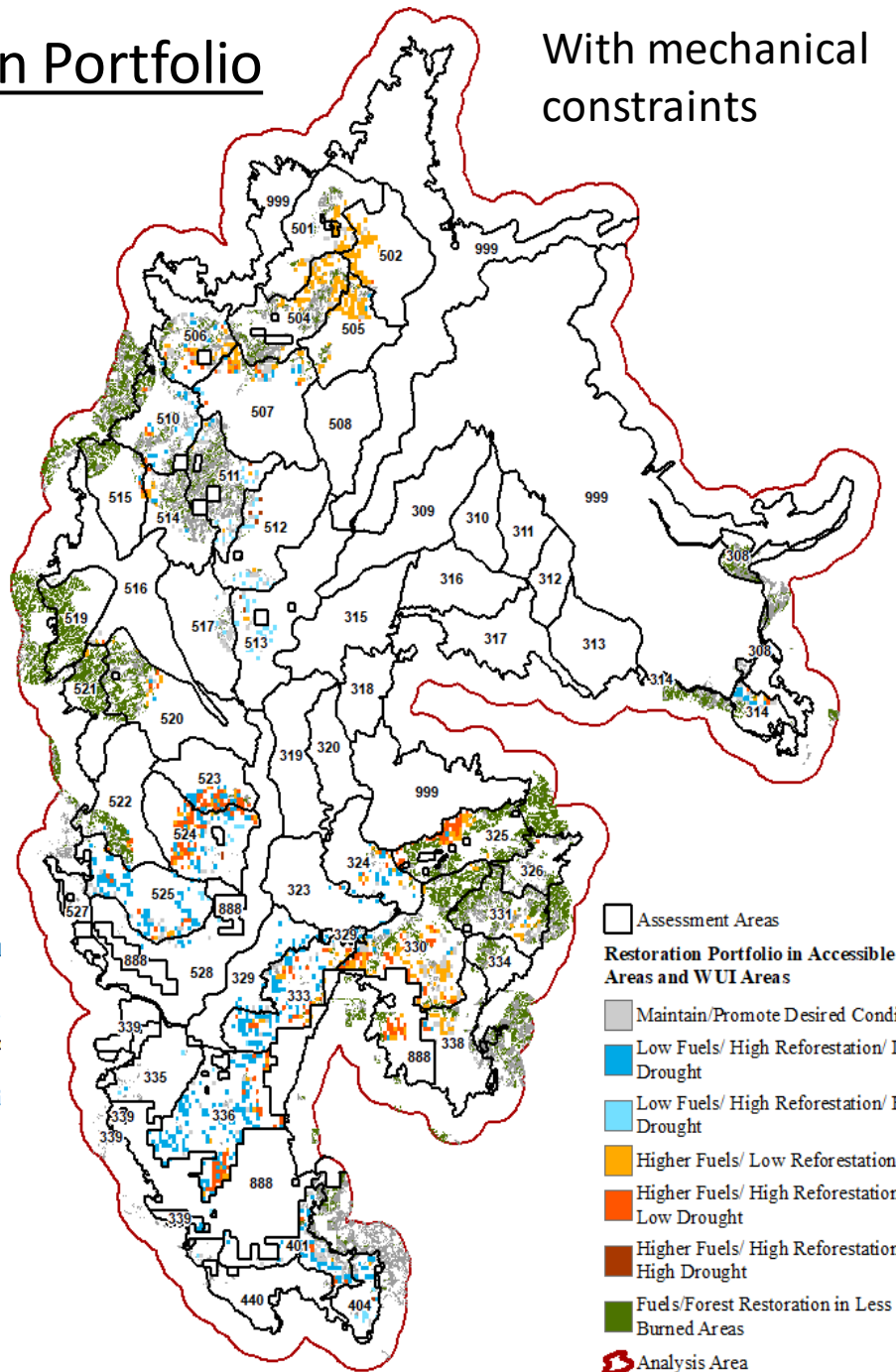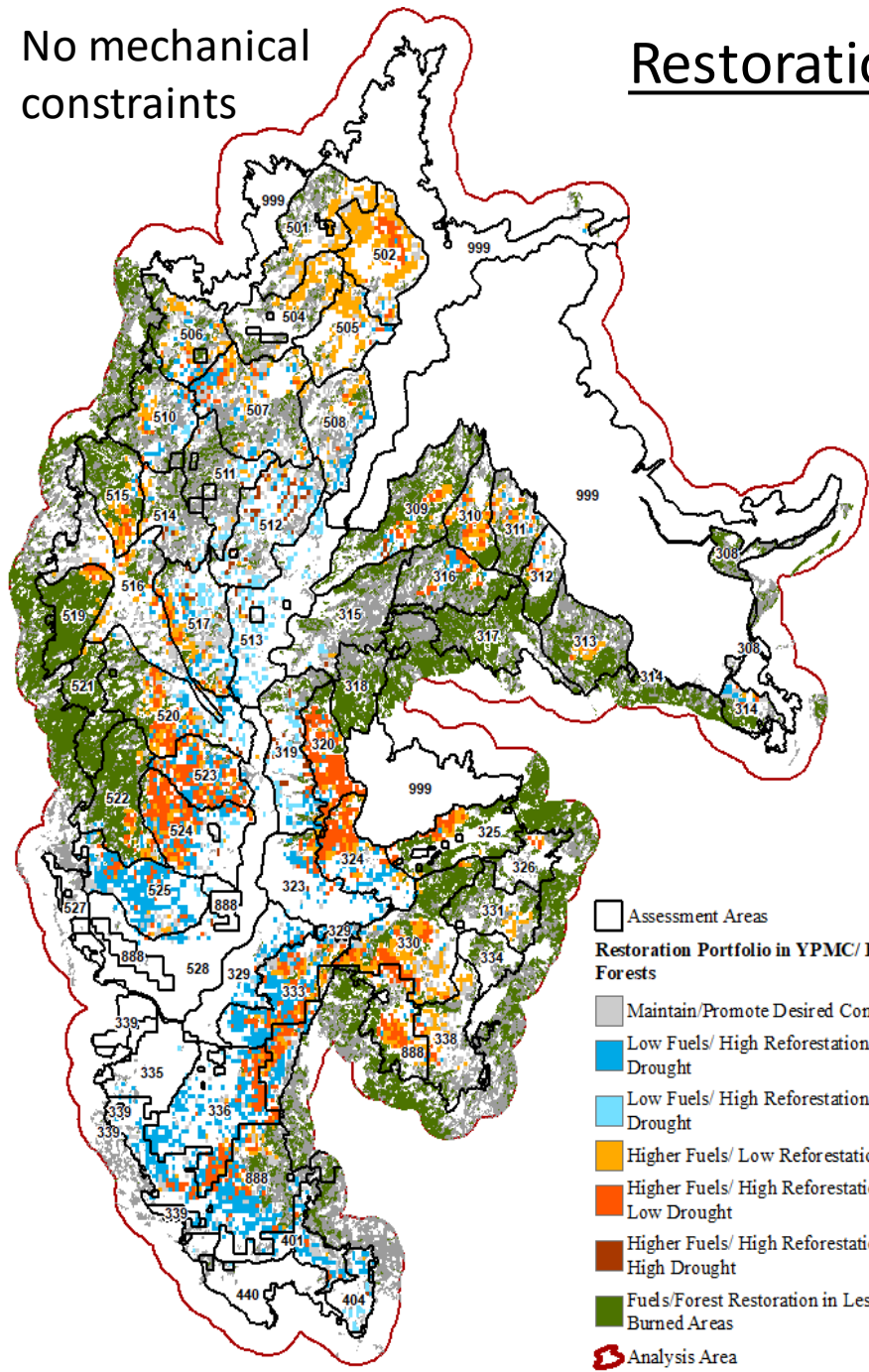

*Desired conditions

Framework Outputs

- Divide landscape into 3 zones:

  1. Beneficial fire effects – Maintain/promote DCs*

  2. Negative fire effects, actions feasible – Restore DCs*

time

*Desired conditions

Framework Outputs

- Divide landscape into 3 zones:

    1. Beneficial fire effects – Maintain/promote DCs*

    2. Negative fire effects, actions feasible – Restore DCs

    3. Negative effects, actions infeasible – Reevaluate DCs*

time

*Desired conditions

Framework Outputs

- Divide landscape into 3 zones:
  1. Beneficial fire effects – Maintain/promote DCs*
  2. Negative fire effects, actions feasible – Restore DCs
  3. Negative effects, actions infeasible – Reevaluate DCs*

- Develop Restoration Portfolio
  - Integrate management actions for 3 opportunities

Restoration Portfolio

No mechanical constraints

With mechanical constraints

Assessment Areas

Restoration Portfolio in YPMC/ Red Forests

Maintain/Promote Desired Conditi...

Low Fuels/ High Reforestation/ Lo... Drought

Low Fuels/ High Reforestation/ Hi... Drought

Higher Fuels/ Low Reforestation

Higher Fuels/ High Reforestation/ Low Drought

Higher Fuels/ High Reforestation/ High Drought

Fuels/Forest Restoration in Less Burned Areas

Analysis Area

Assessment Areas

Restoration Portfolio in Accessible Areas and WUI Areas

Maintain/Promote Desired Conditions

Low Fuels/ High Reforestation/ Low Drought

Low Fuels/ High Reforestation/ High Drought

Higher Fuels/ Low Reforestation

Higher Fuels/ High Reforestation/ Low Drought

Higher Fuels/ High Reforestation/ High Drought

Fuels/Forest Restoration in Less Burned Areas

Analysis Area
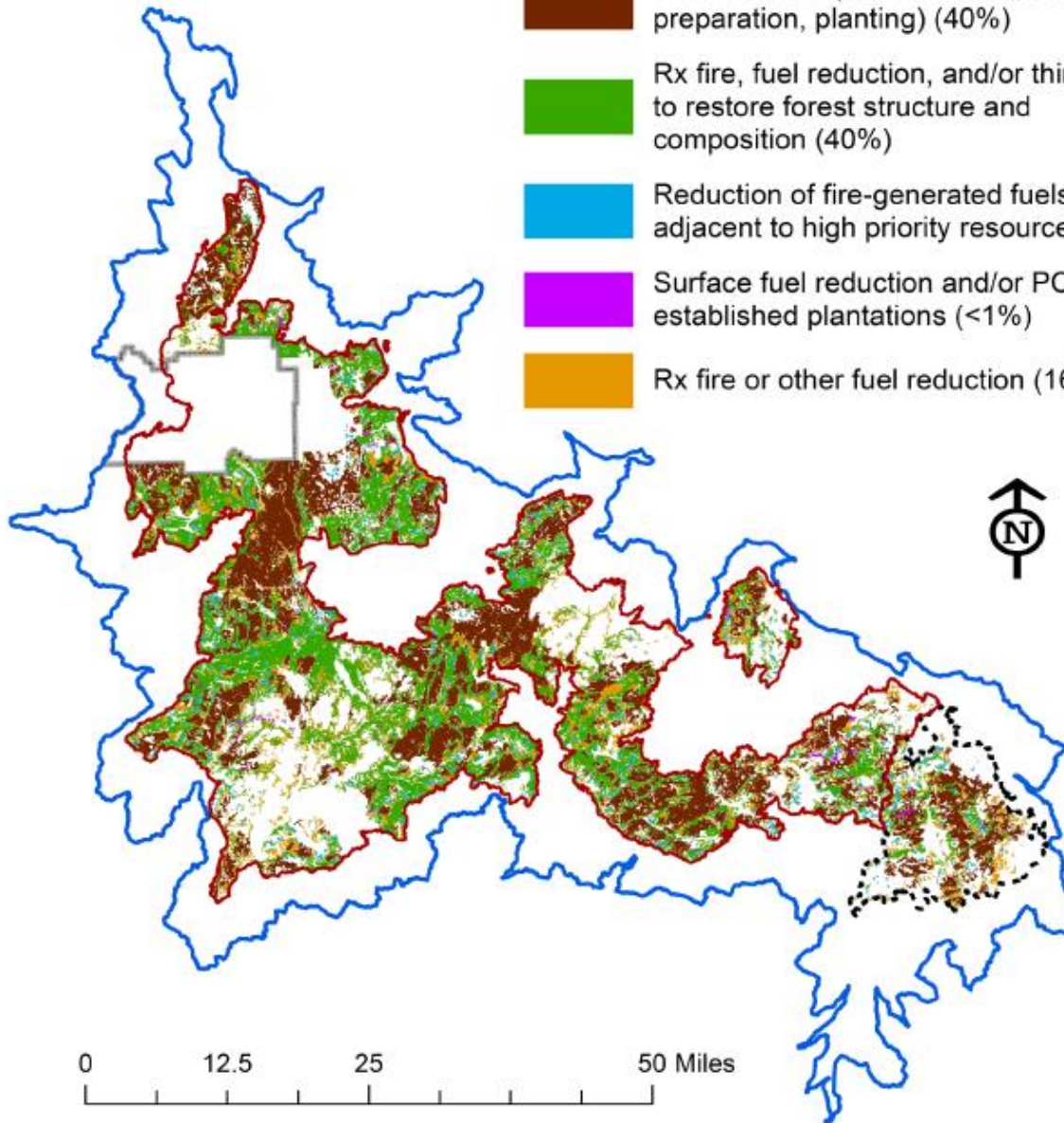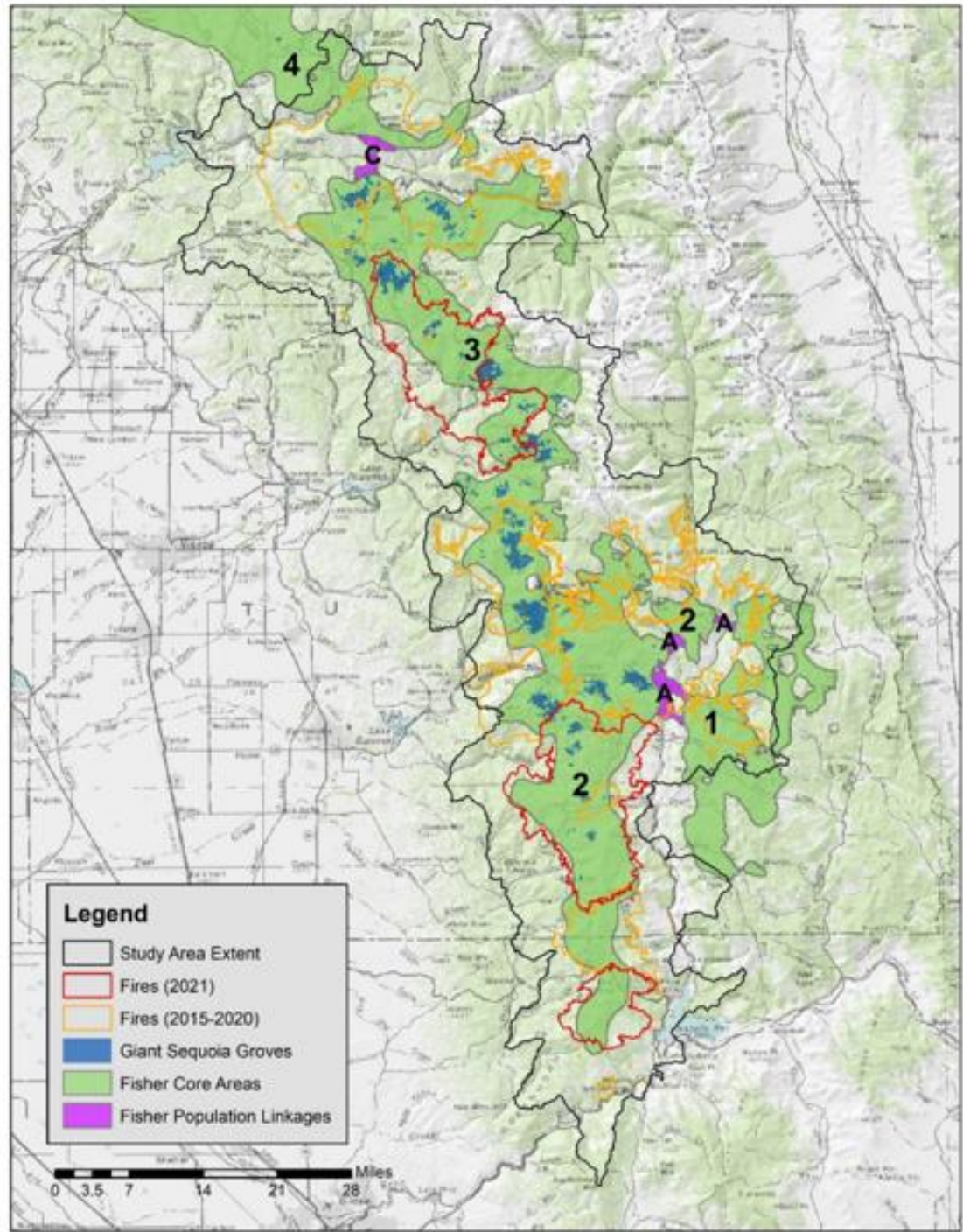
Legend

Potential Management Actions

- Reforestation (fuel reduction, site preparation, planting) (40%)
- Rx fire, fuel reduction, and/or thinning to restore forest structure and composition (40%)
- Reduction of fire-generated fuels adjacent to high priority resources (4%)
- Surface fuel reduction and/or PCT in established plantations (<1%)
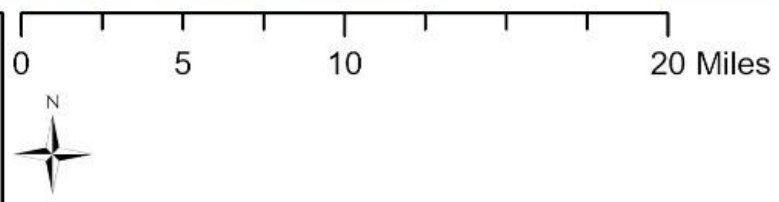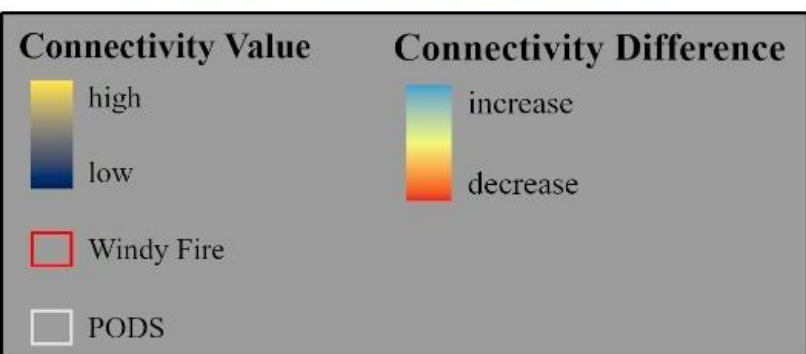- Rx fire or other fuel reduction (16%)

N

0   12.5   25   50 Miles

Legend

	Study Area Extent
	Fires (2021)
	Fires (2015-2020)
	Giant Sequoia Groves
	Fisher Core Areas
	Fisher Population Linkages

Miles
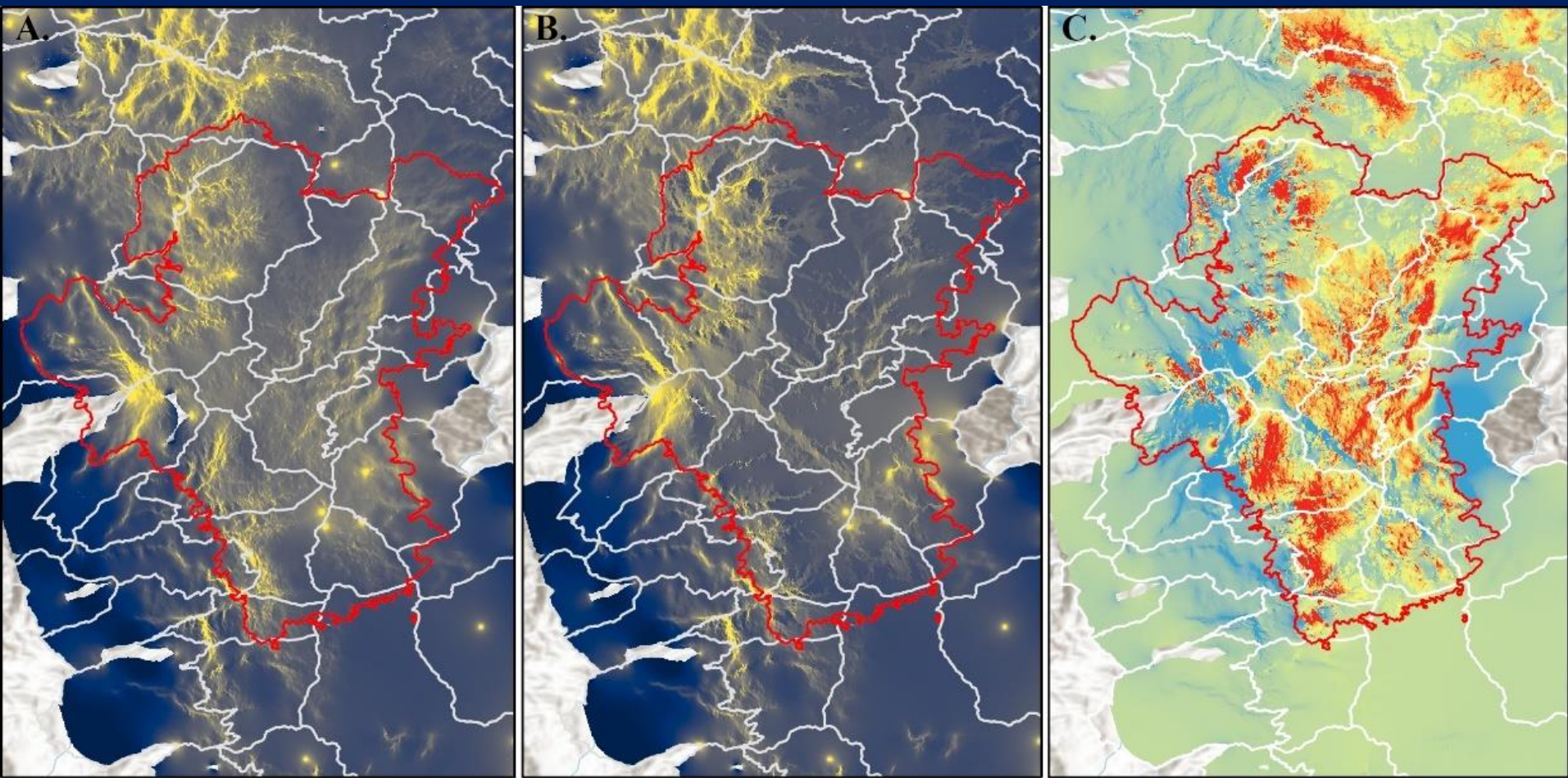0   3.5   7   14   21   28

- Fisher habitat and connectivity degraded by 2021 and other wildfires
  - >200,000 ac of high severity impacts to habitat
    - >71,000 ac from 2021 wildfires
    - ~87,000 ac of HS fire in reproductive habitat
 - >52,000 ac of habitat connectivity degradation

Connectivity Value	Connectivity Difference
high	increase
low	decrease
▭ Windy Fire	
▭ PODS	

0   5   10   20 Miles

N

PODs Prioritization
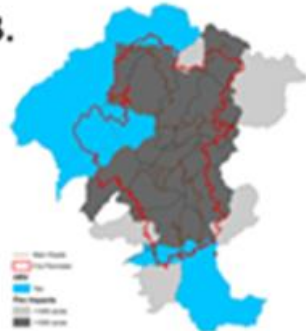
A1. Which areas were impacted by the wildfire?

A. Where were fire effects within the natural (NRV) or historic (HRV) range of variation?

B. Fire effects within NRV/HRV (improved/maintained)

B1. Areas still at future risk of high severity fire?

C. Fire Effects outside of NRV/HRV

C1. Where are priority ecological resources with the impacted area?

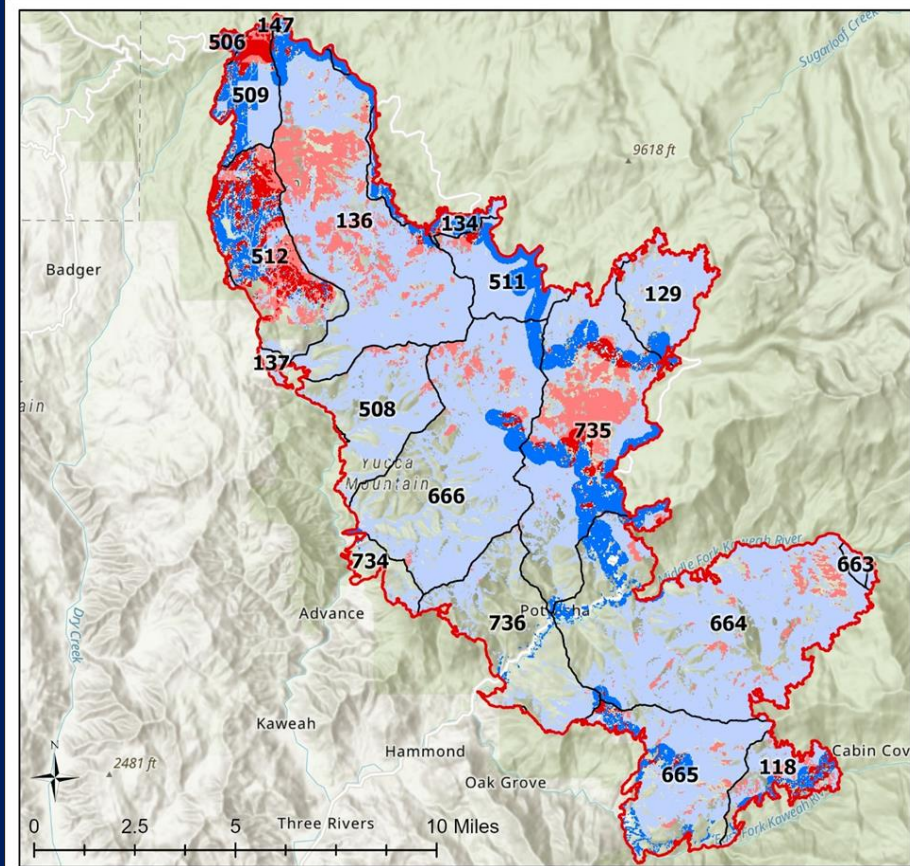# Restoration Portfolio by POD (broad-scale)

Windy Fire
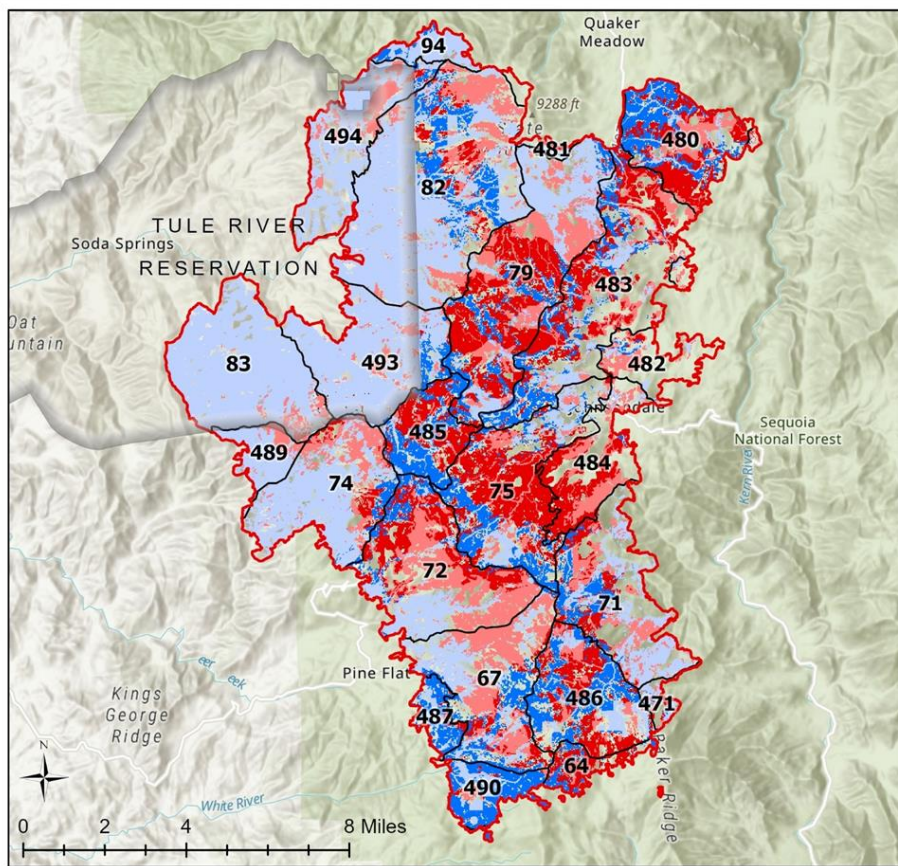
KNP Complex

Blue – Rx fire & other fuel reduction; Red– reforestation

Multi-tiered Approach

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