



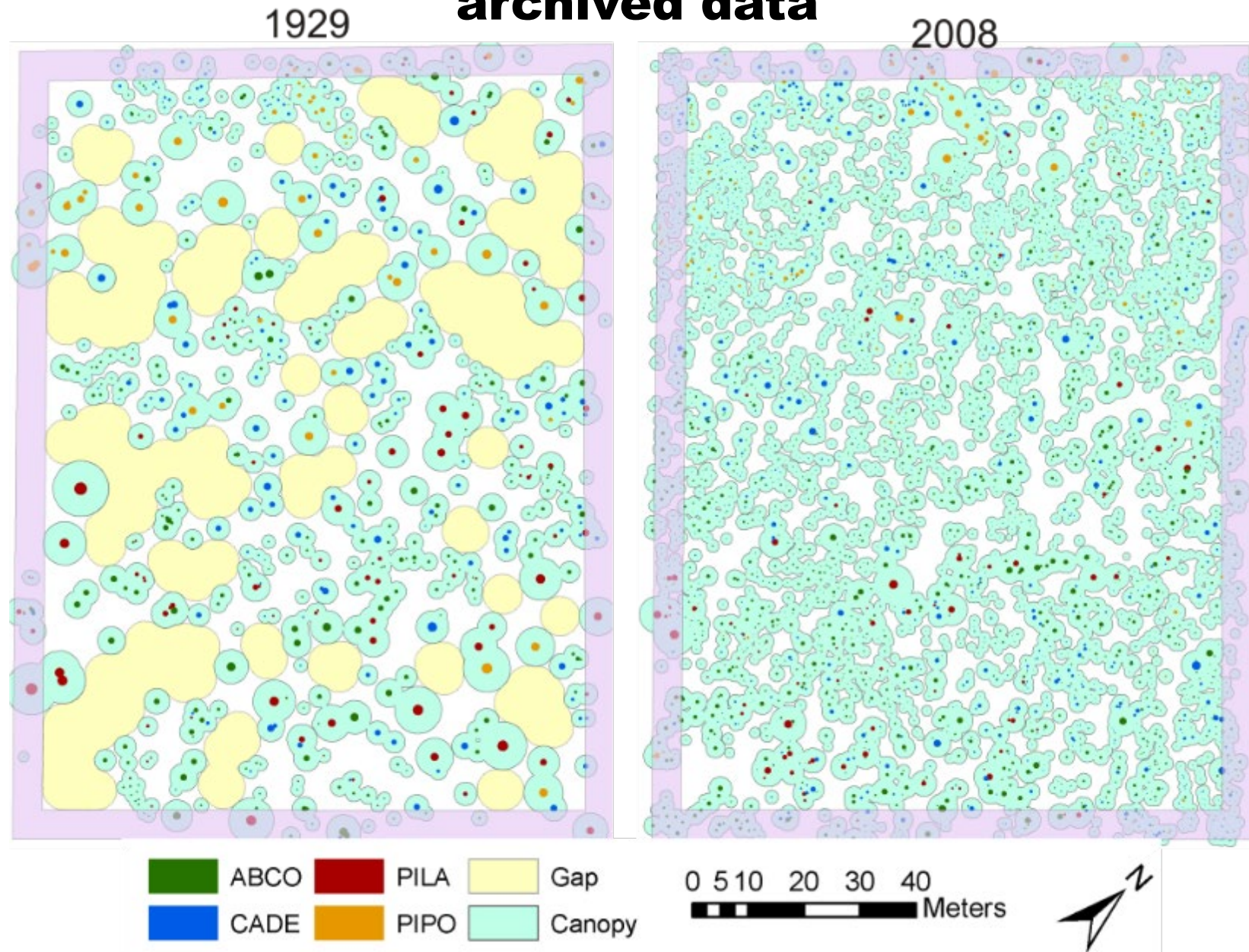
Wildfire, forest management, and sensitive wildlife: lessons from the Sierra Nevada

Legacy of past management in California's forests:

- **Eliminating fire from *fire-maintained* forests**
 - Fire suppression
 - Fire exclusion (removing intentional burning)
 - Grazing
- **Timber harvesting**
 - Overstory removal
 - Even-aged harvests



Historical forest structure and composition: archived data



Forest change = increased fuels

Crown fuels

Ladder fuels

Surface fuels

C240
P112 E
8-19-03
CONTROL

Field plot within Rim Fire (Stan. NF – 2013)

Pre-fire (15-Jul-2013)

Post-fire (25-Sep-2013)



Field plot within Rim Fire

Pre-fire (15-Jul-2013)

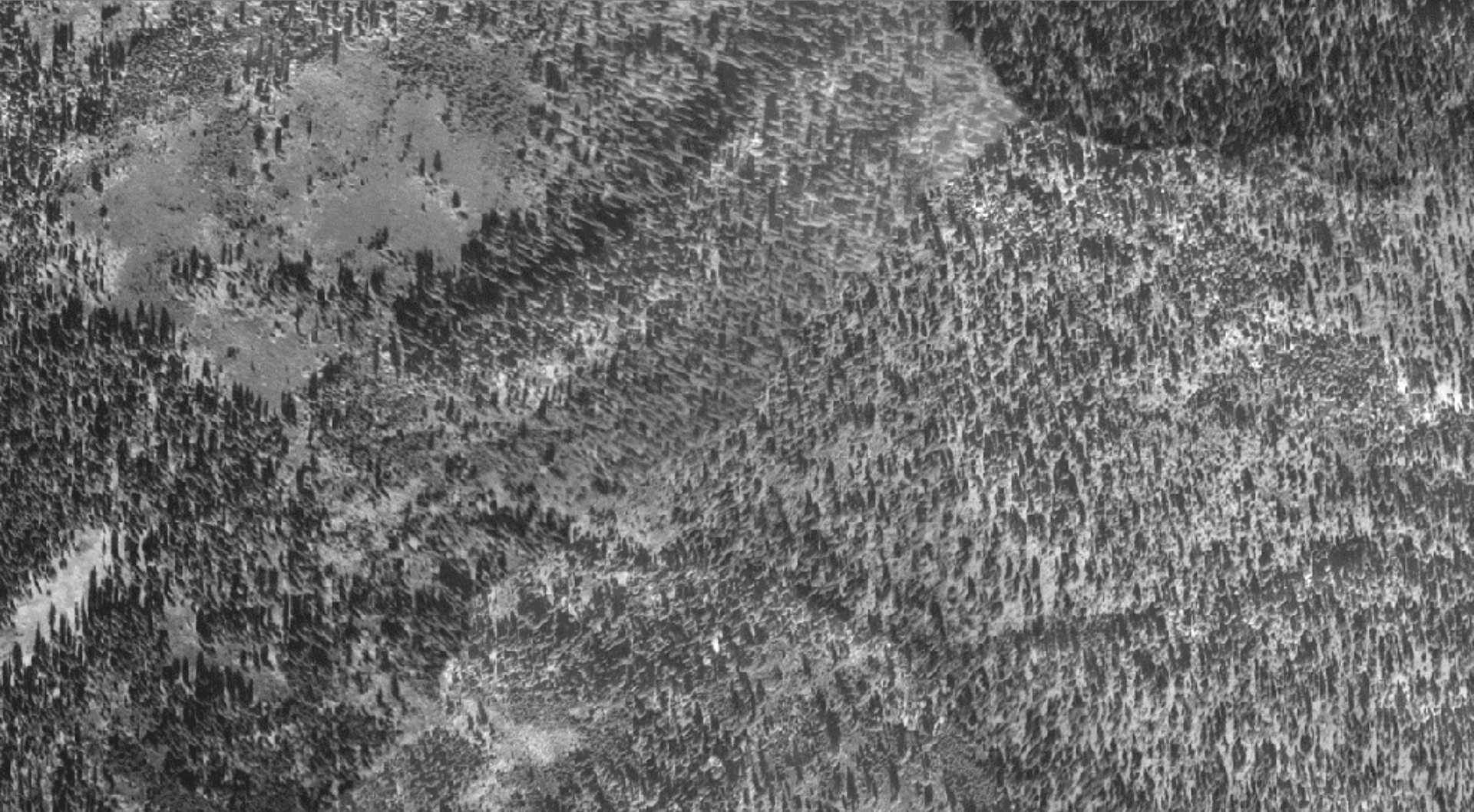


Post-fire (25-Sep-2013)

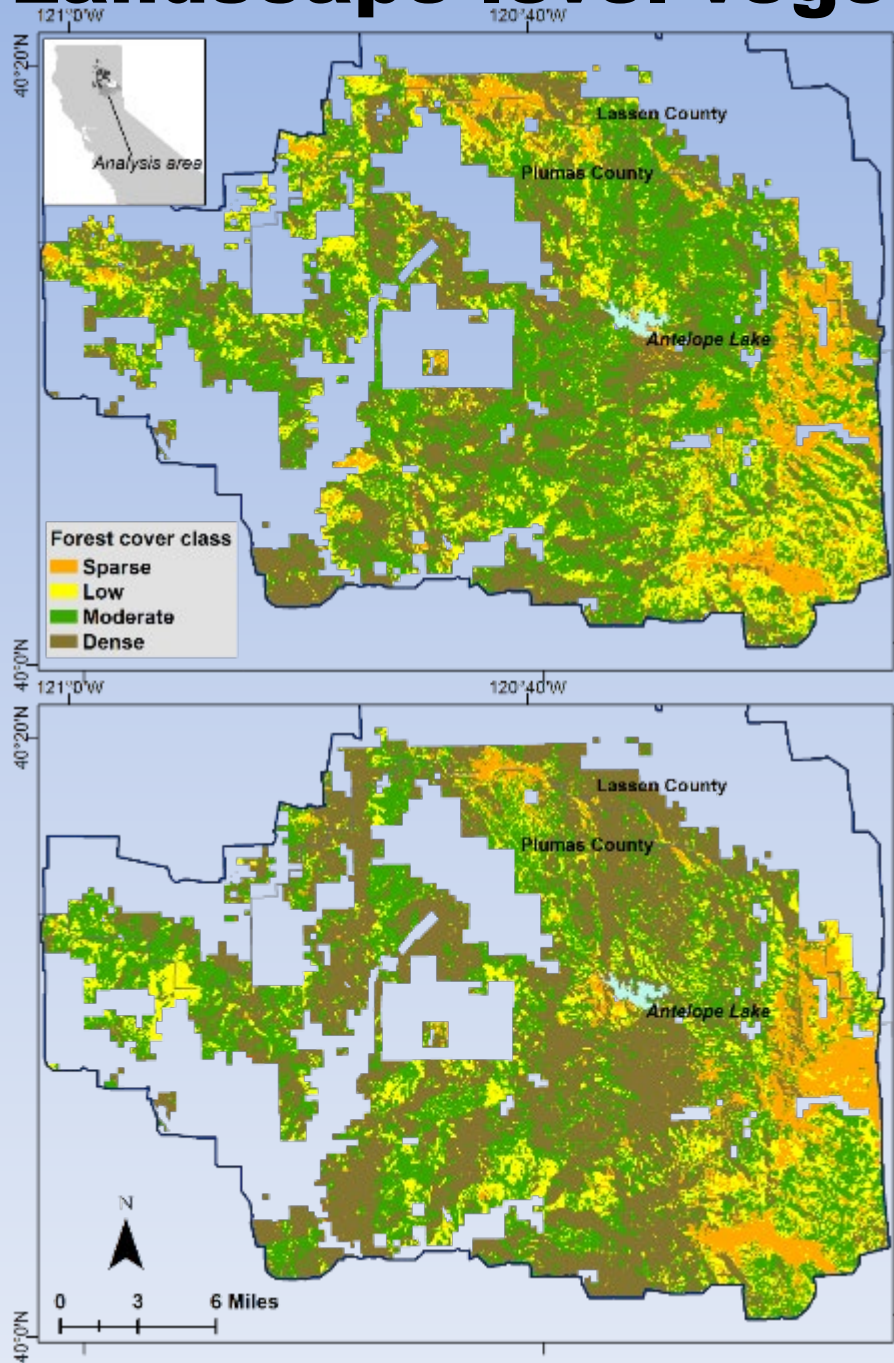


Landscape level vegetation change: Plumas NF

- **1941 aerial photos, wall-to-wall >250,000 ac**
- **Classified “segment” (polygons) into one of four forest cover classes, both 1941 and 2005**
- **Compared occurrence across time periods**

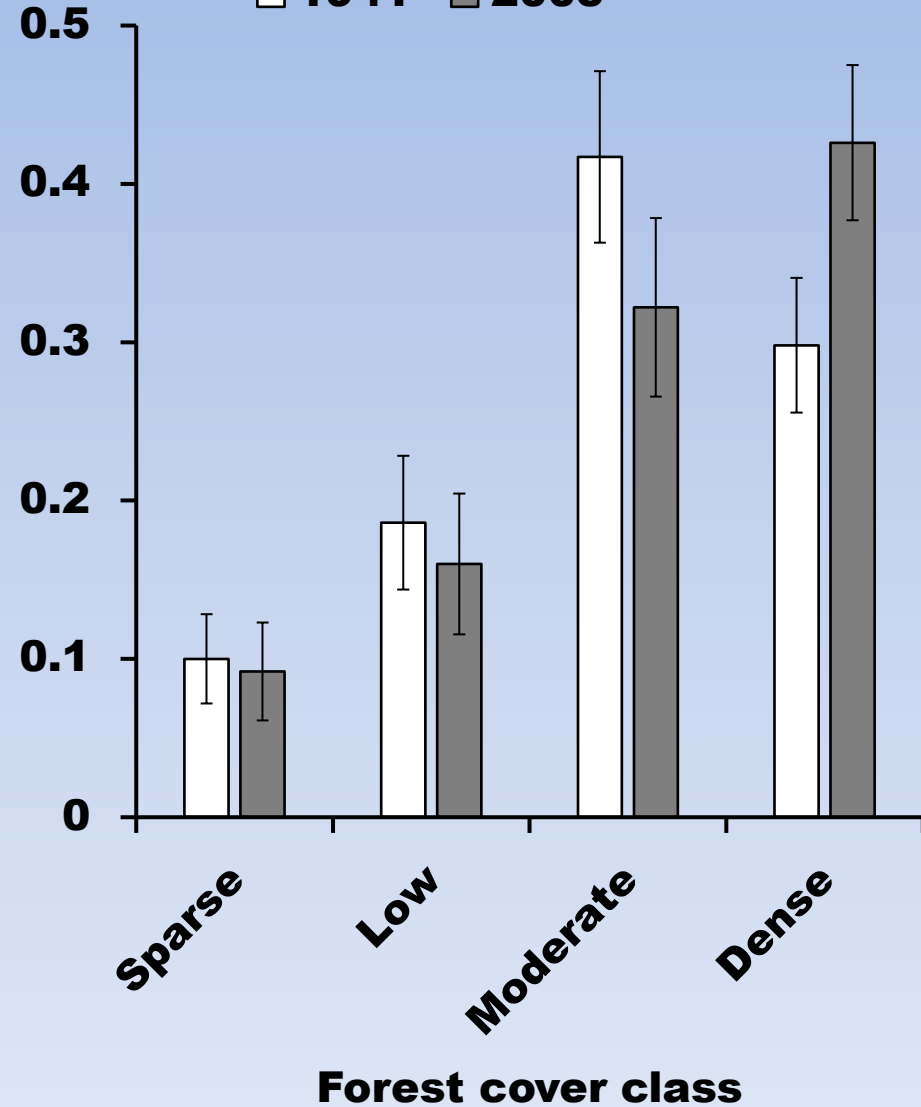


Landscape level vegetation change: Plumas NF



Proportion of landscape area

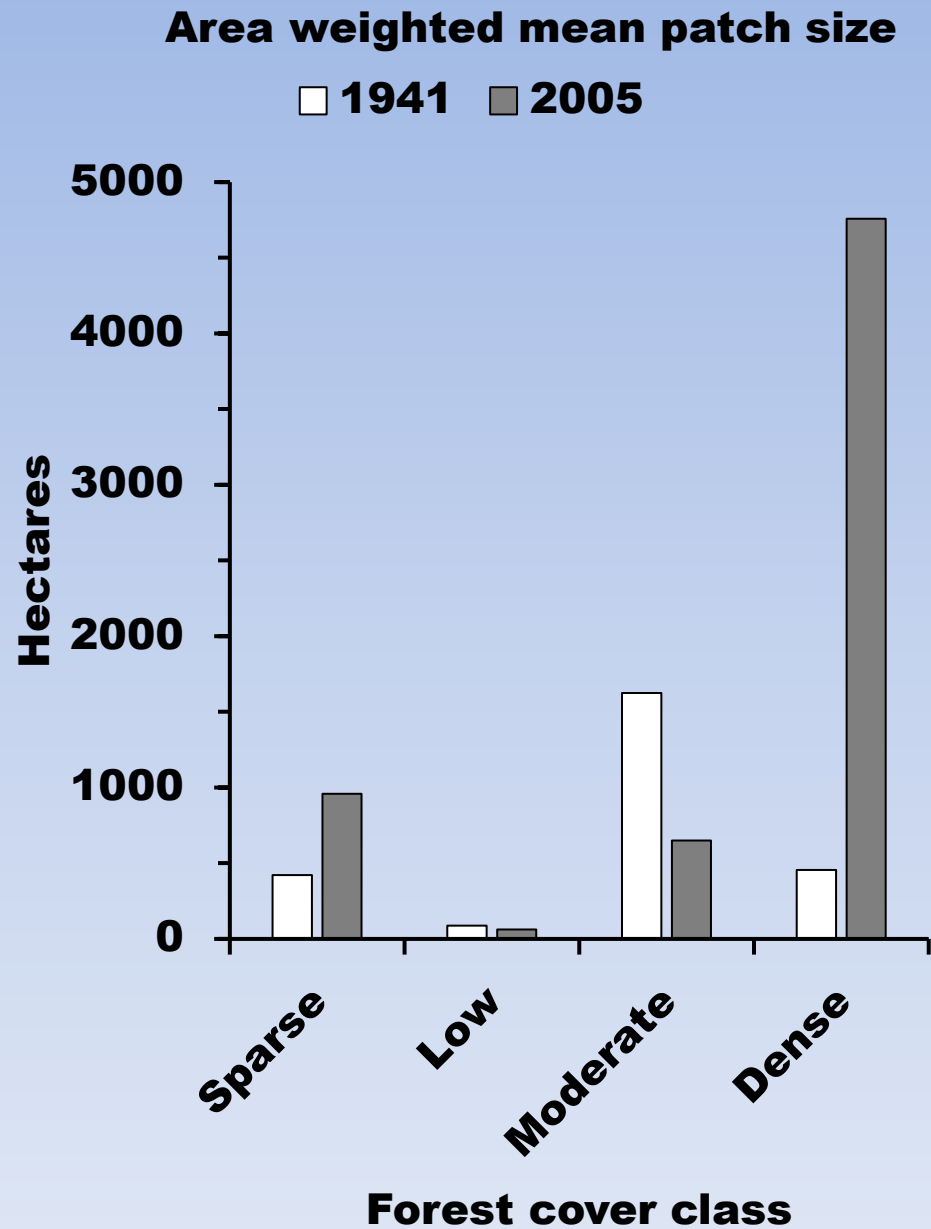
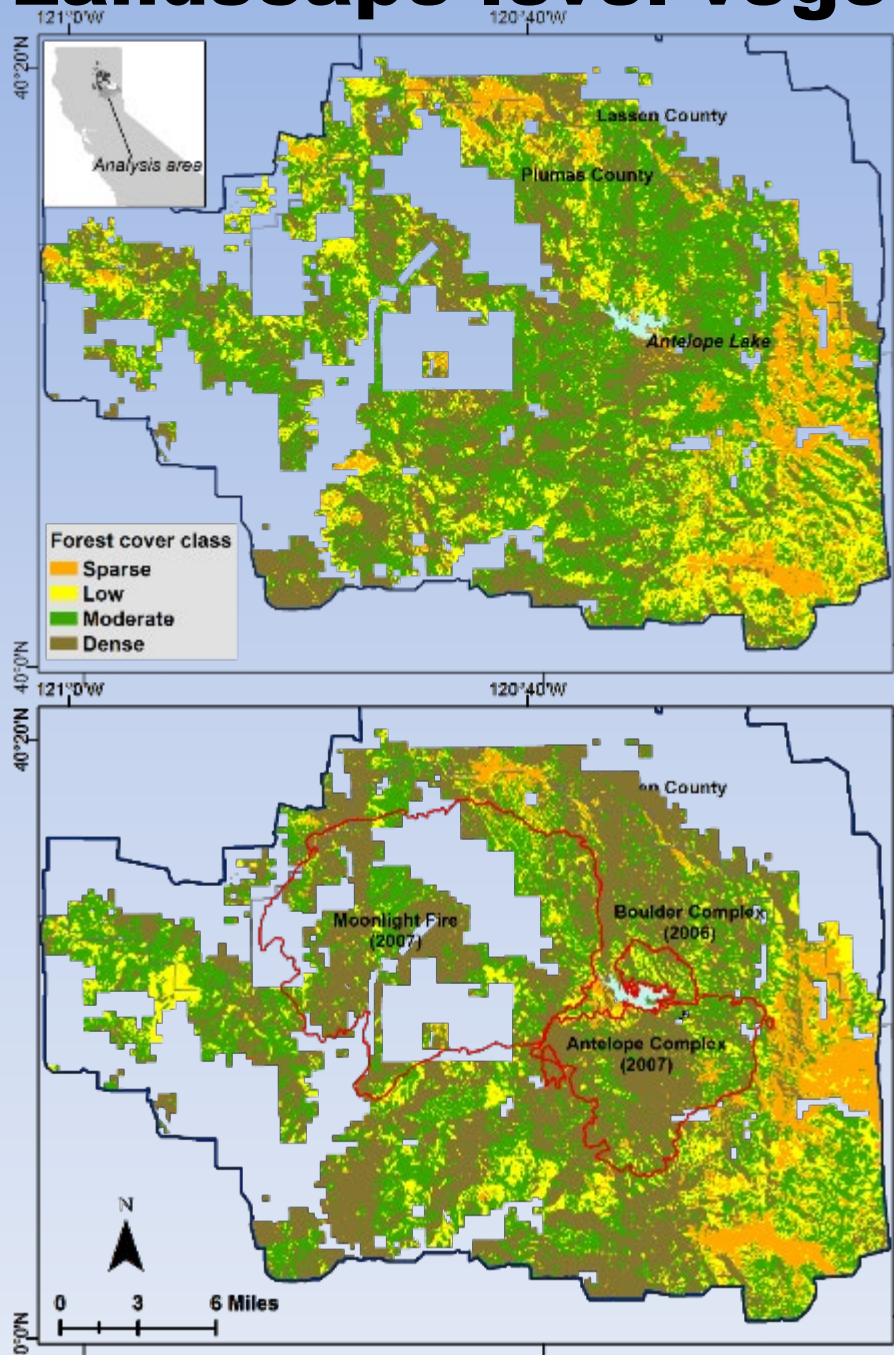
1941 2005



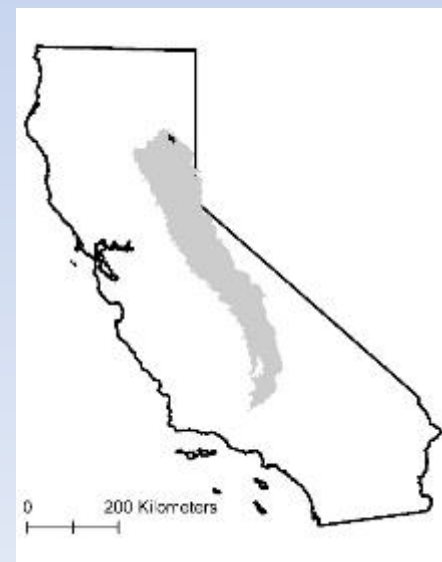
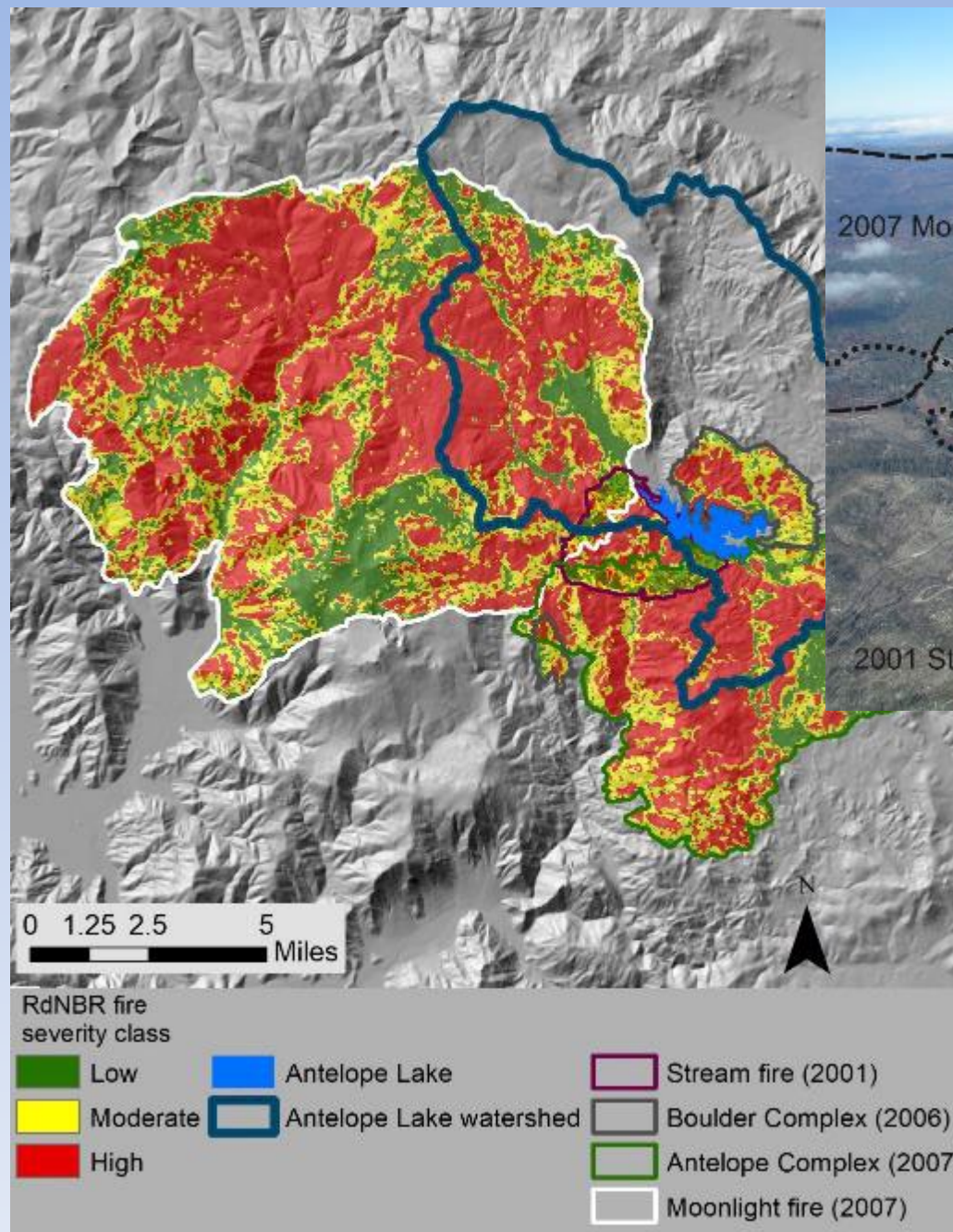




Landscape level vegetation change: Plumas NF



N. Sierra Nevada fires (2001-2007)



Fuel treatment: thinning (mechanical)



Fuel treatment: prescribed fire



Fuel treatments = reduced fuels

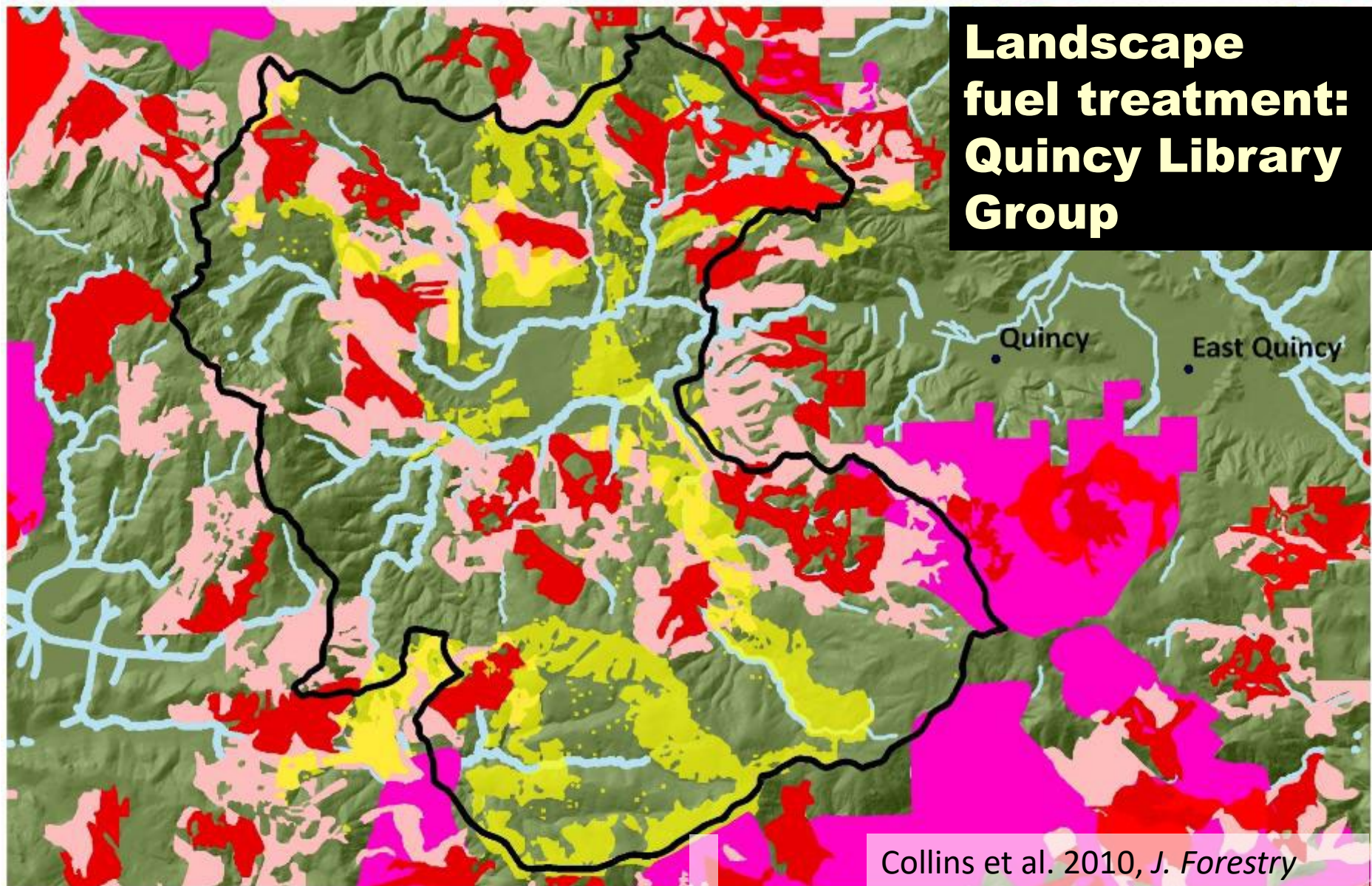
Crown fuels

Ladder fuels

Surface fuels

C 570
P113S
8-19-03
MECH&FIRE
POST TREAT

Landscape fuel treatment: Quincy Library Group



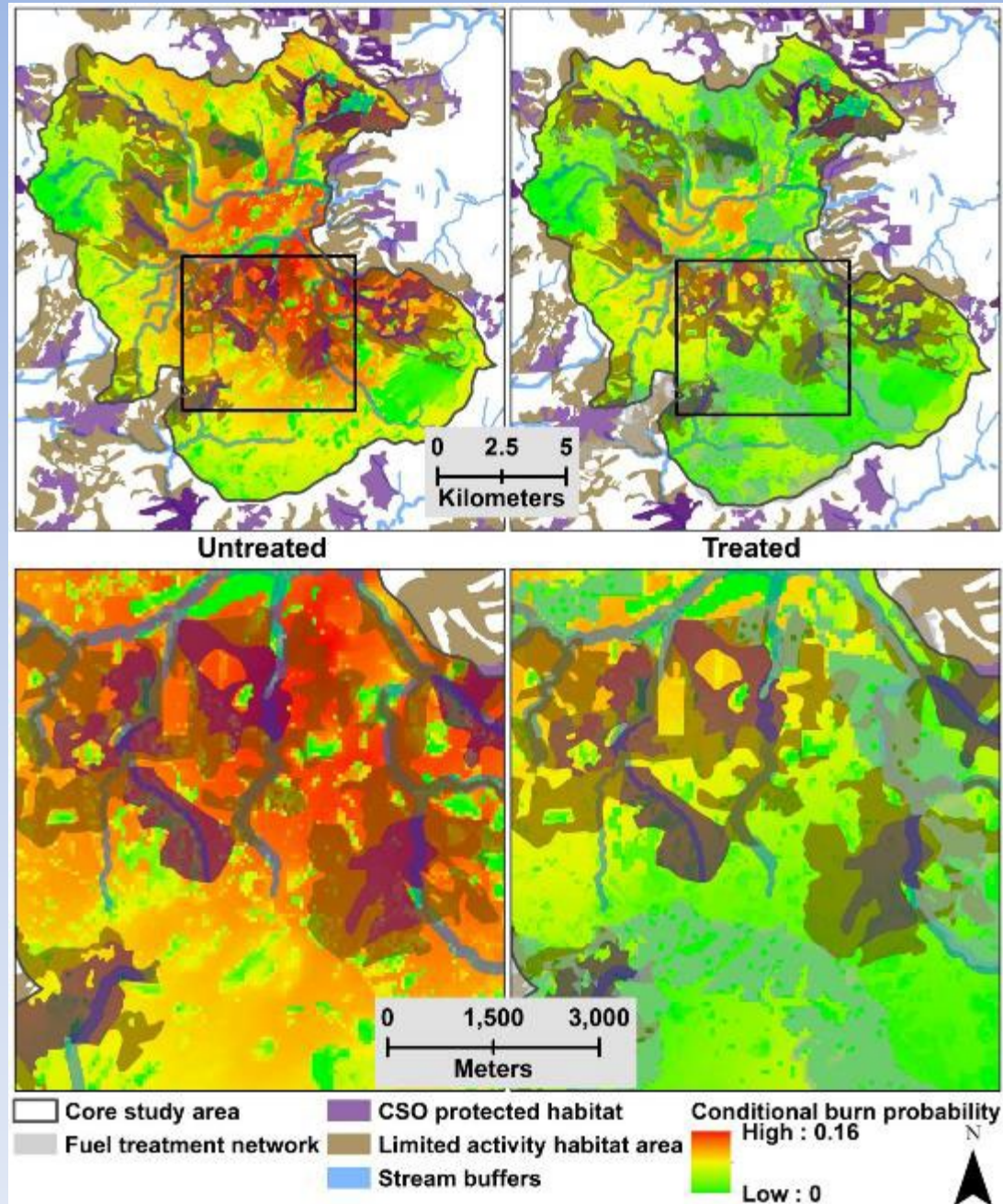
Collins et al. 2010, *J. Forestry*

- Core study area
- Actual treatments
- Protected habitat
- Limited activity habitat area
- Offbase/deferred
- Riparian buffer
- All other lands

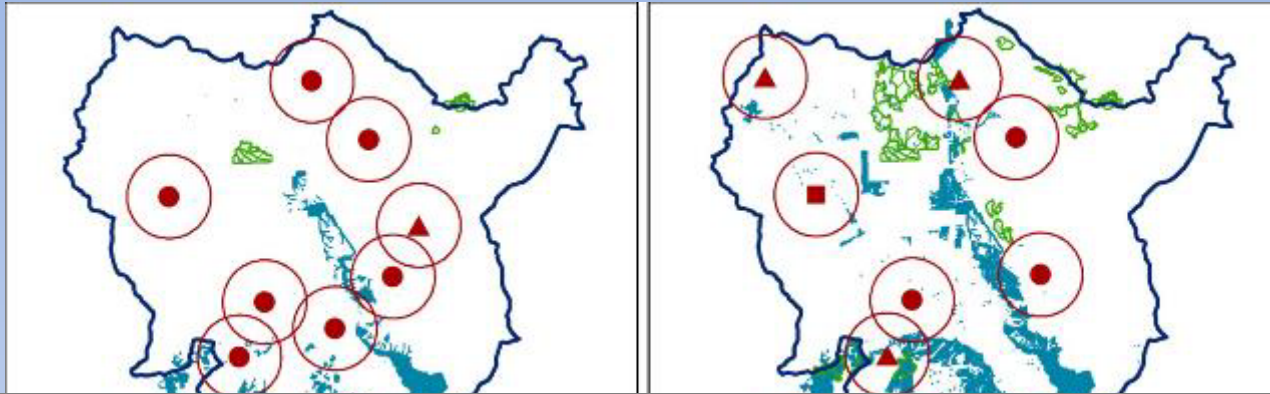


0 5,000
Meters

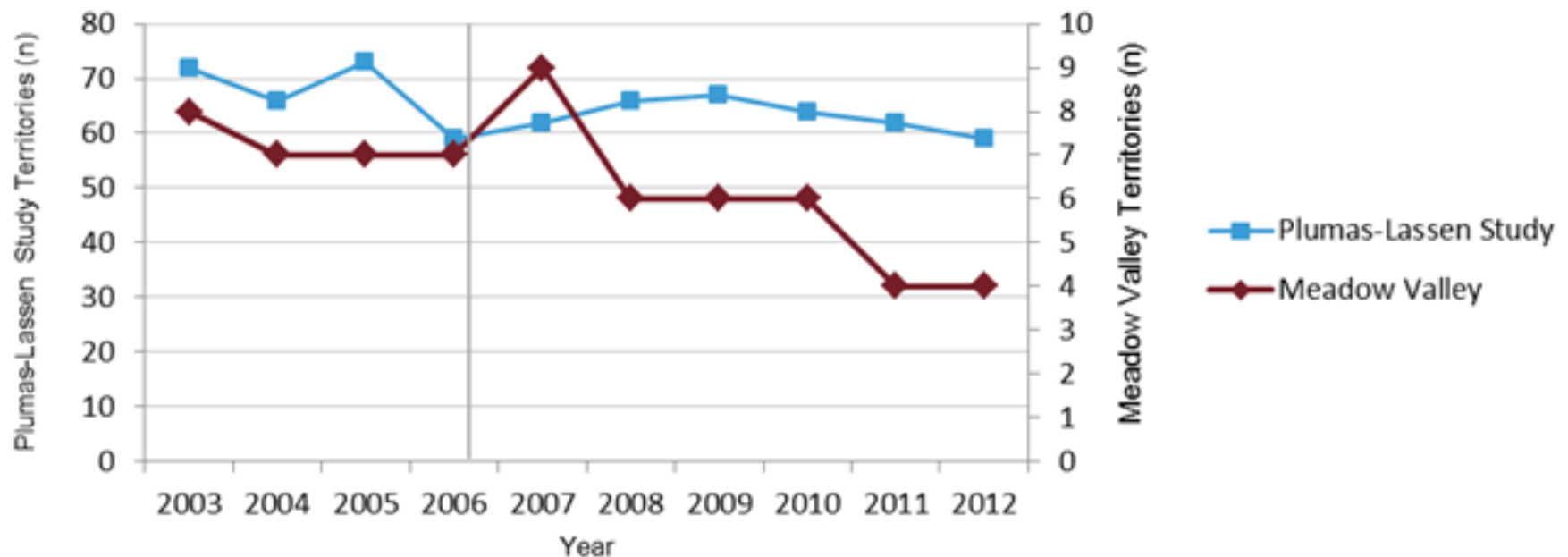
Hazardous fire potential in protected areas



Fuel treatment impacts on Ca. spotted owls



Spotted Owl Territories 2003-2012

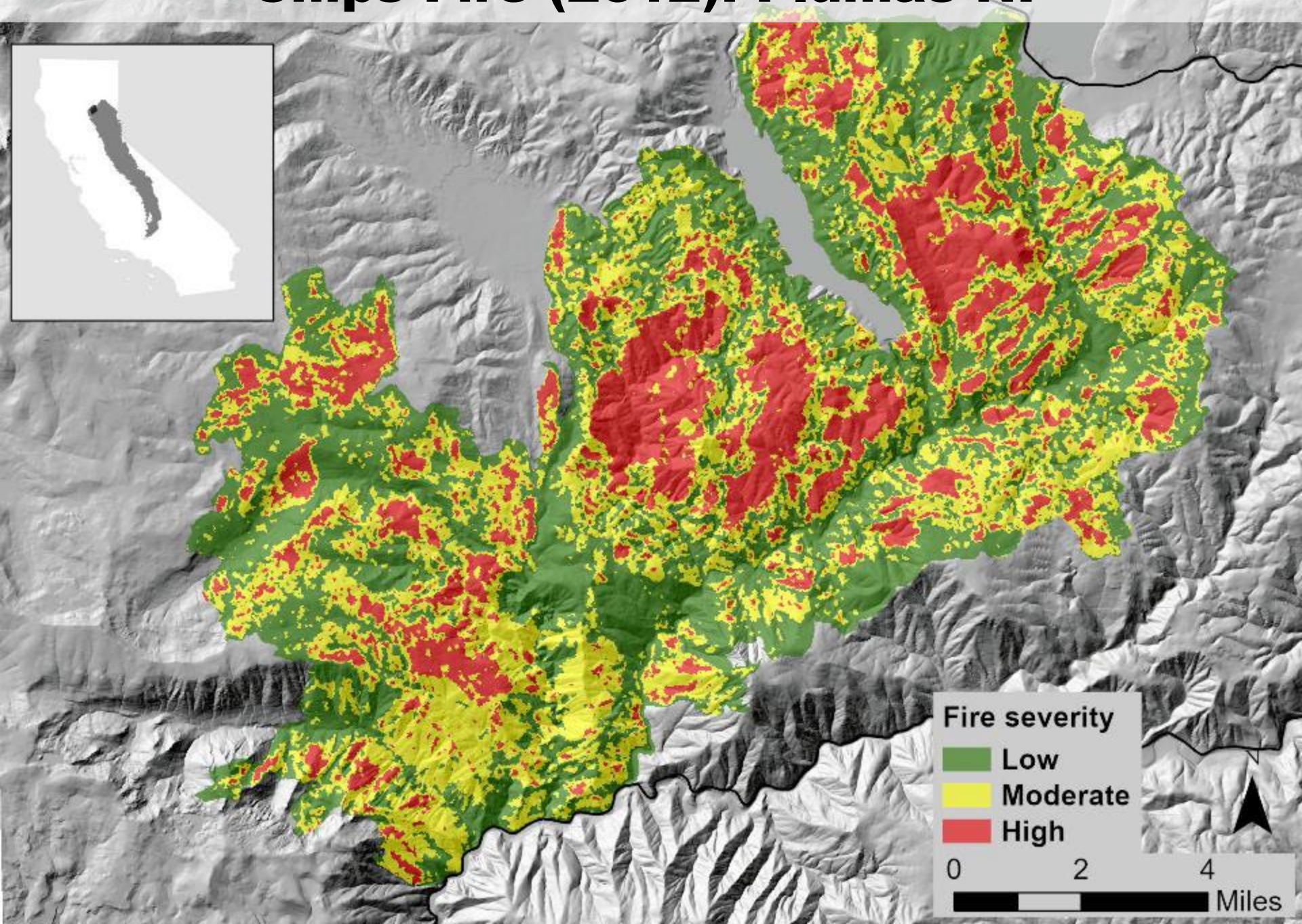


- Spotted Owl Single Male
- Spotted Owl Single Female
- Barred Owl Confirmed Pair

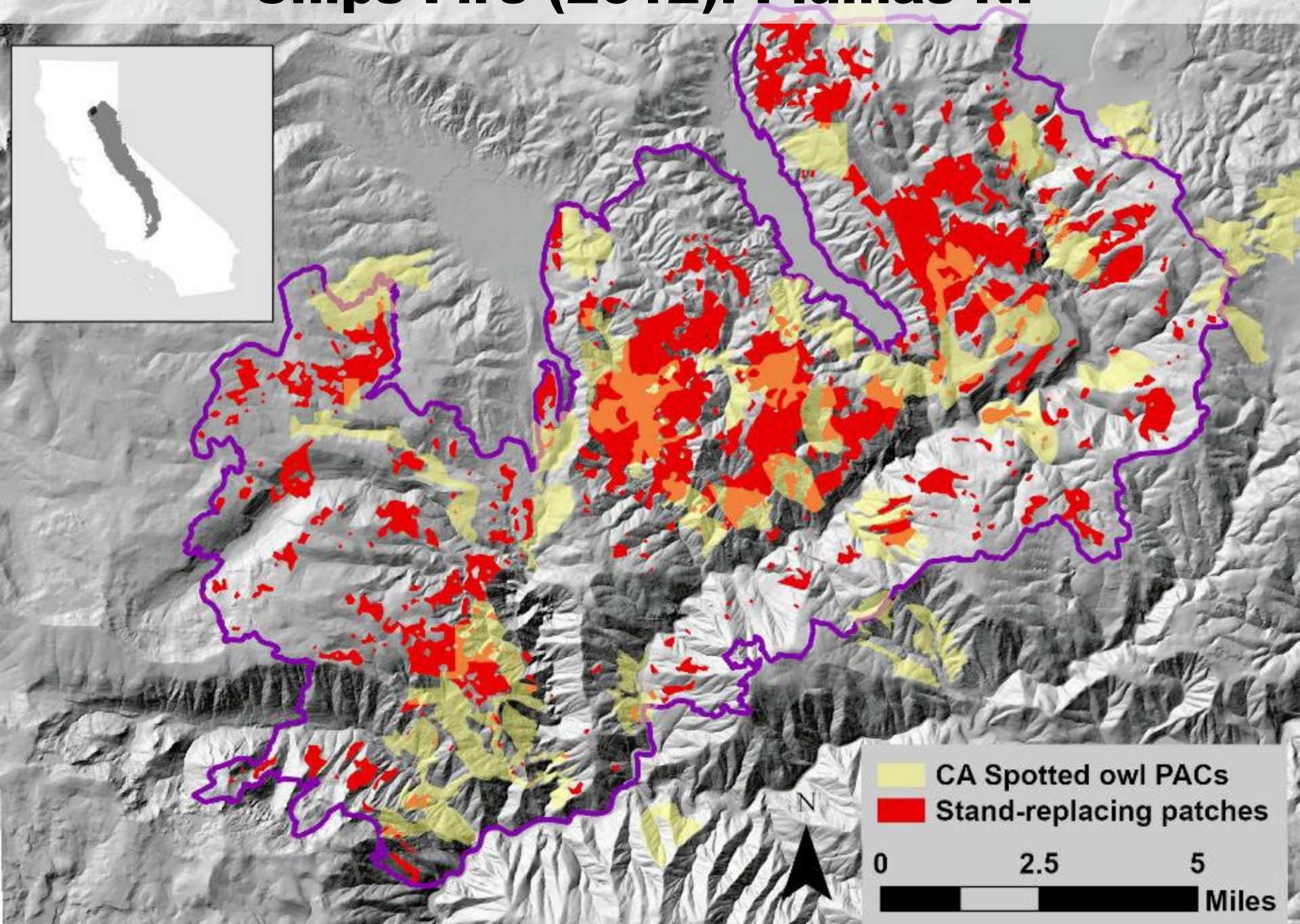
Prescribed Underburn

Study Area Boundary
0 2 4 6 8 10
Kilometers

Chips Fire (2012): Plumas NF



Chips Fire (2012): Plumas NF



Historical variability in fire effects

Show and Kotok (1924):

“Extensive crown fires...are almost unknown to the California pine region*.”

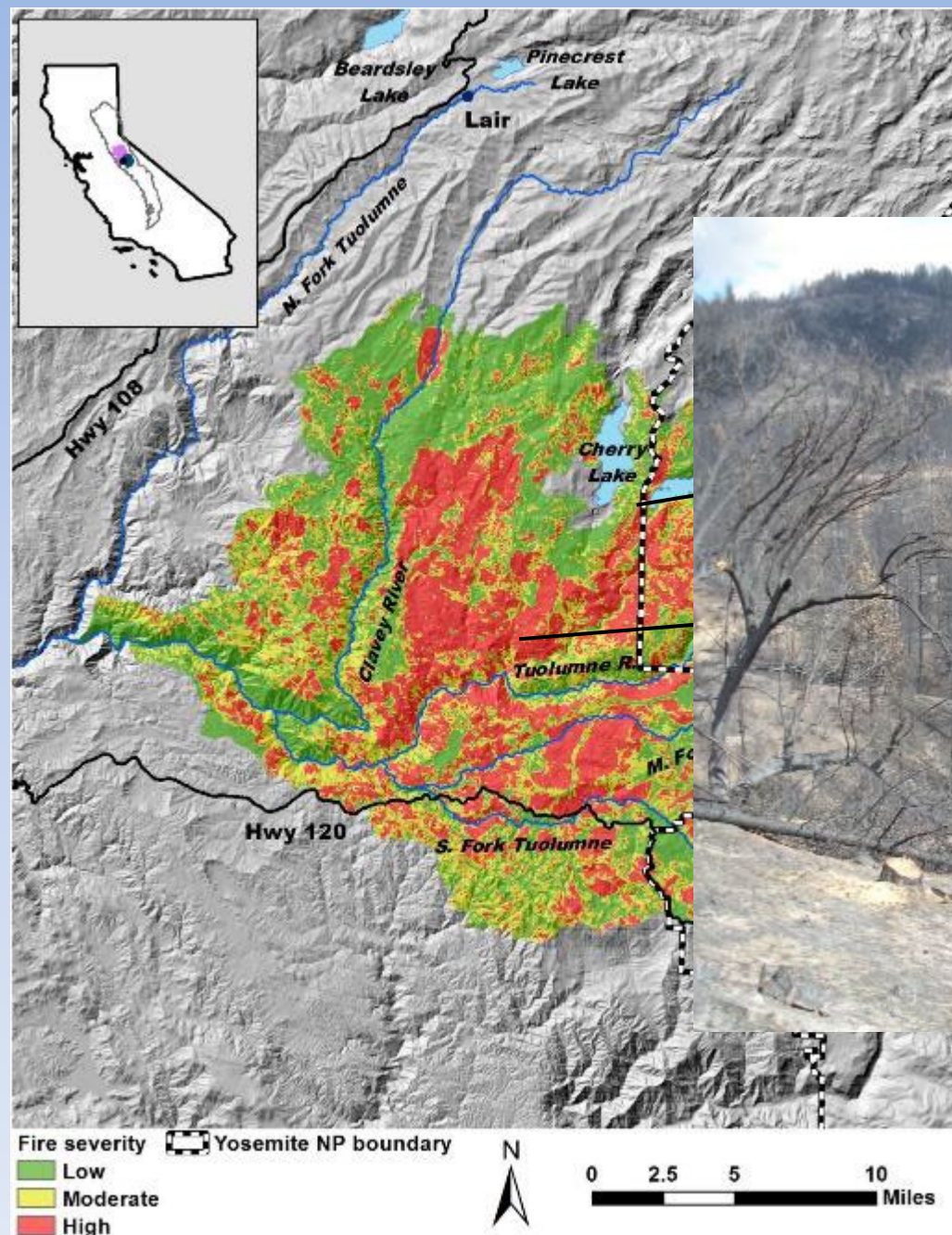
But...

“...no large fires occur without a certain amount of heat-killing”

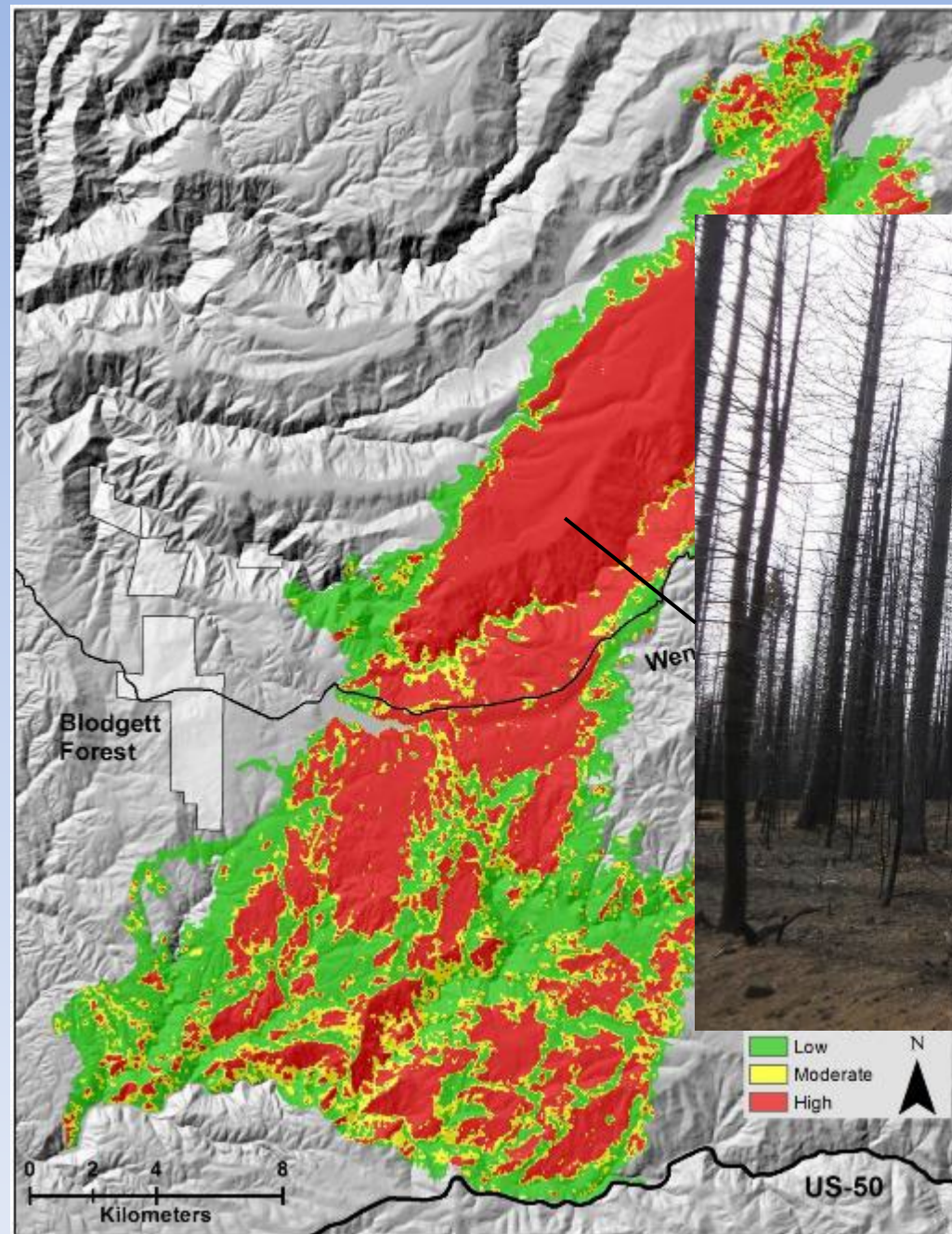
“This loss... represents the complete... wiping out of small patches of the stand”



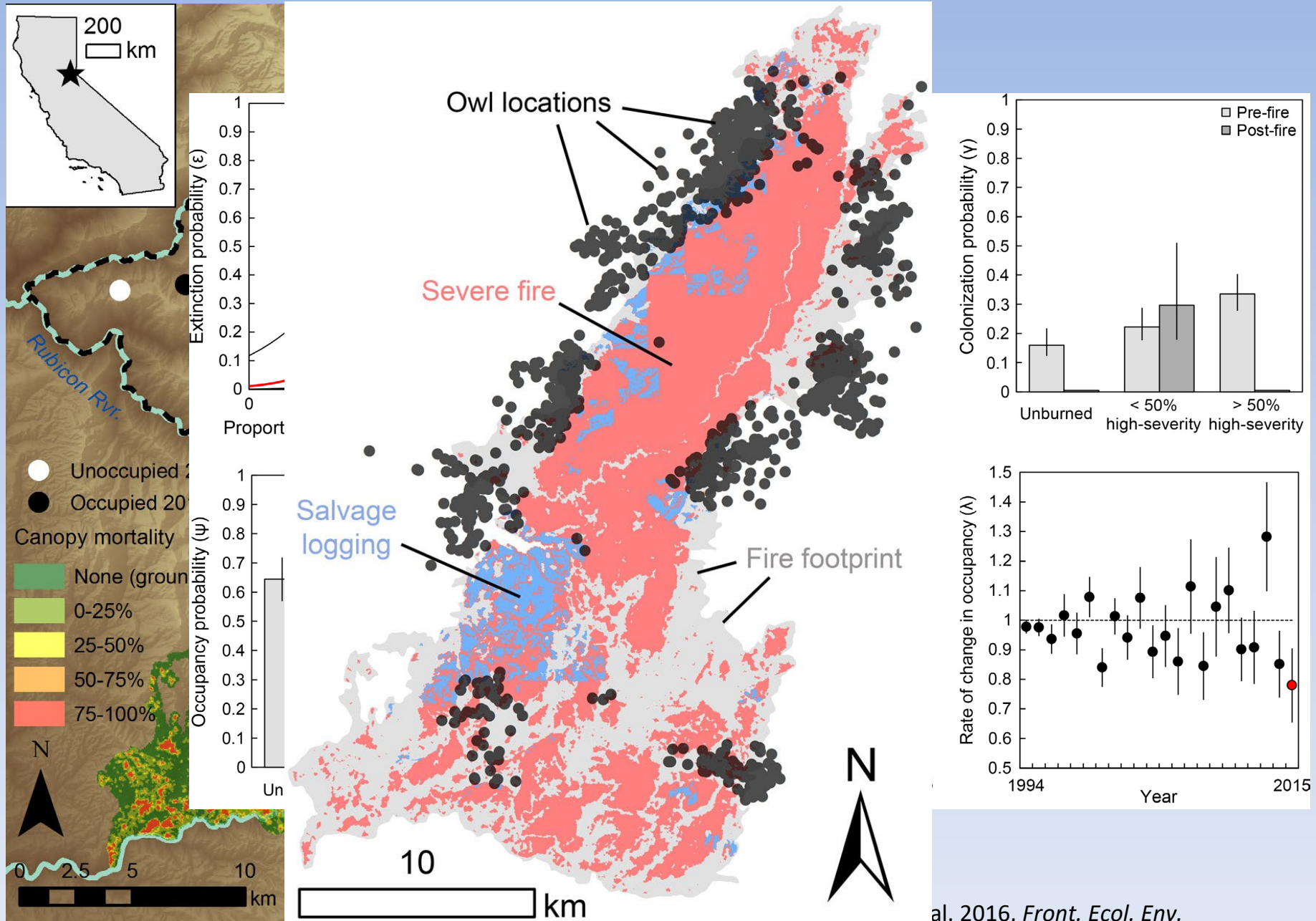
Rim Fire (2013)



King Fire (2014)



“Megafire” effects on CA spotted owls



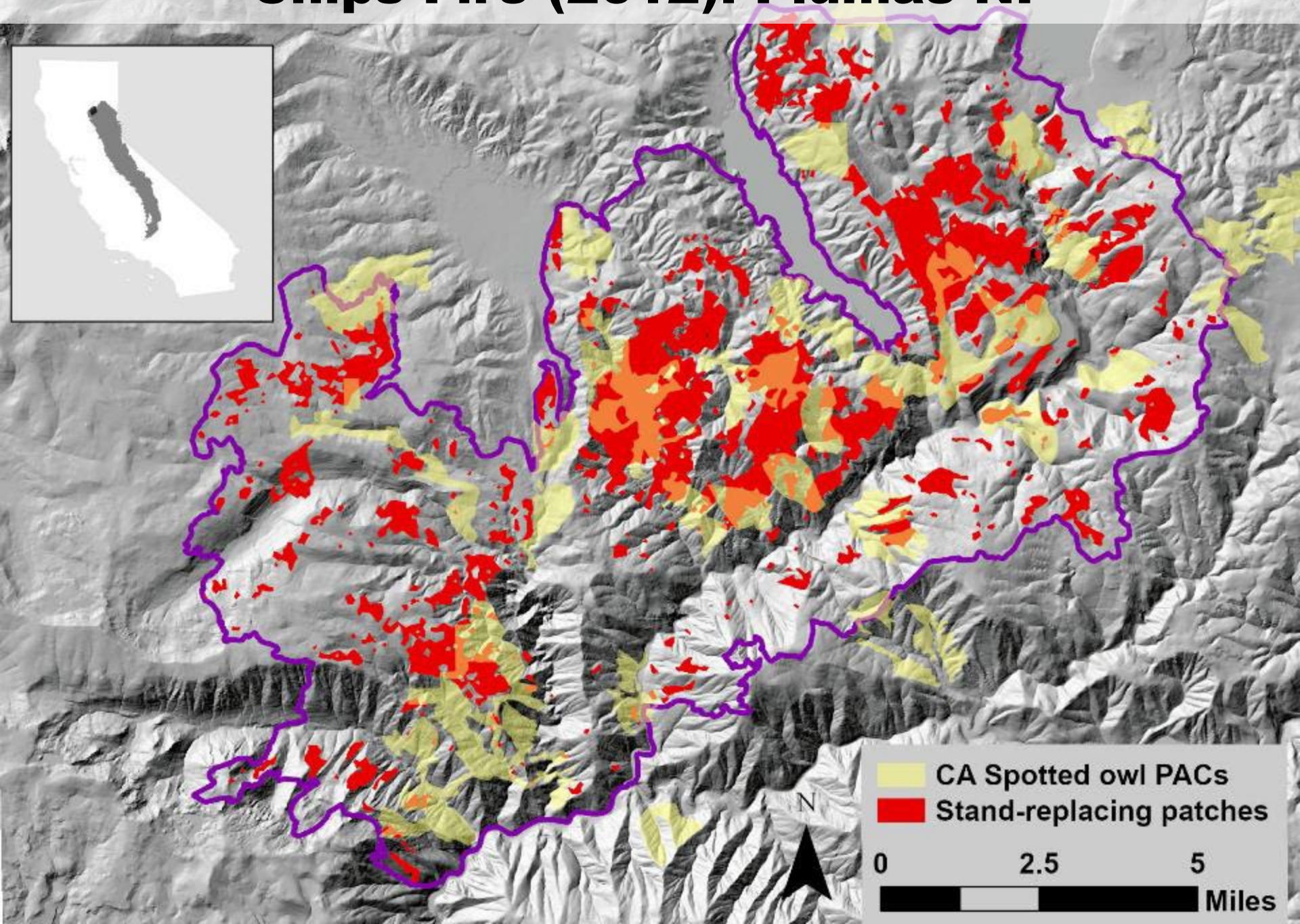
Ten years after stand-replacing fire: Plumas NF



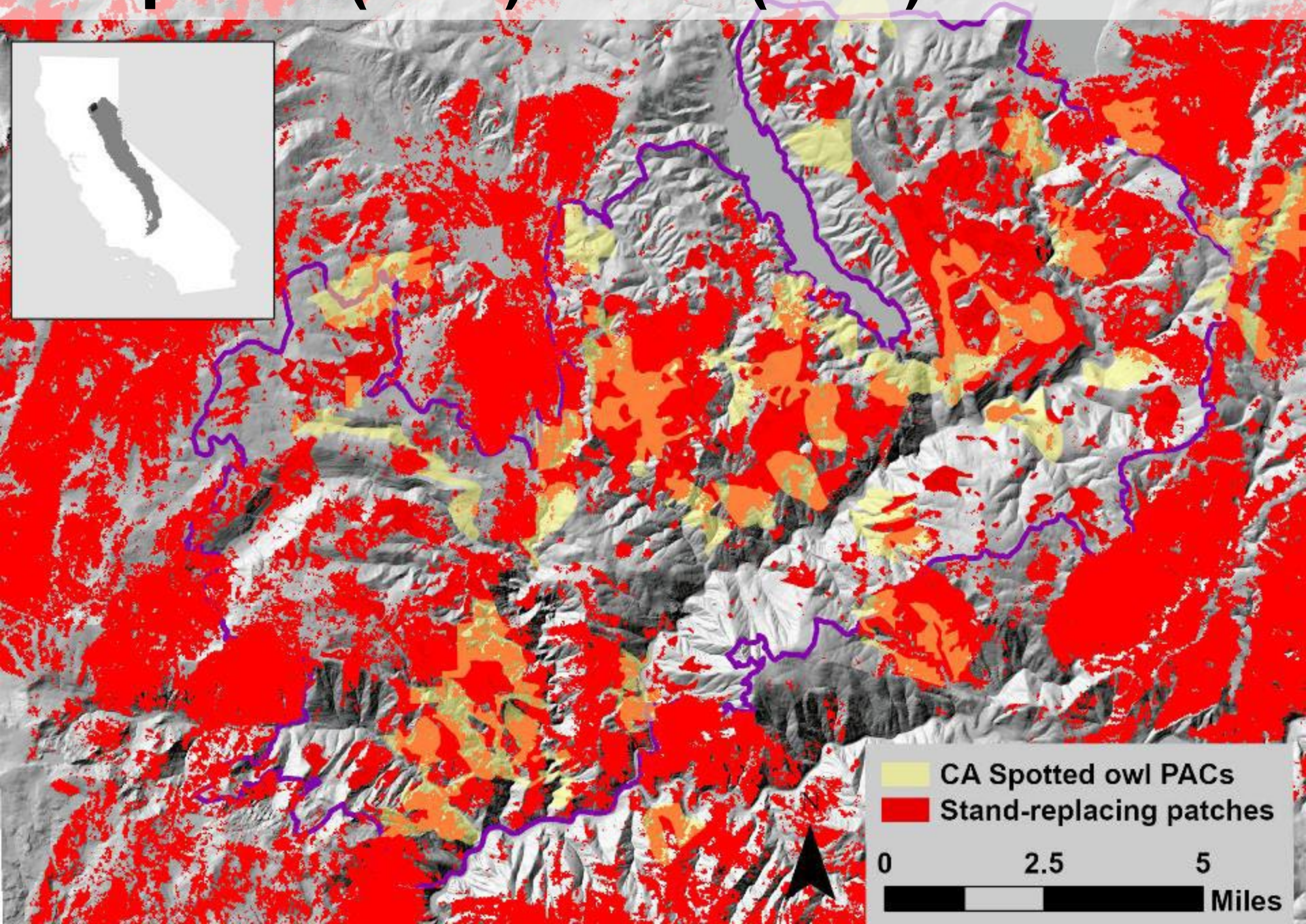
2021 Dixie Fire reburning 2007 Moonlight Fire: Plumas NF



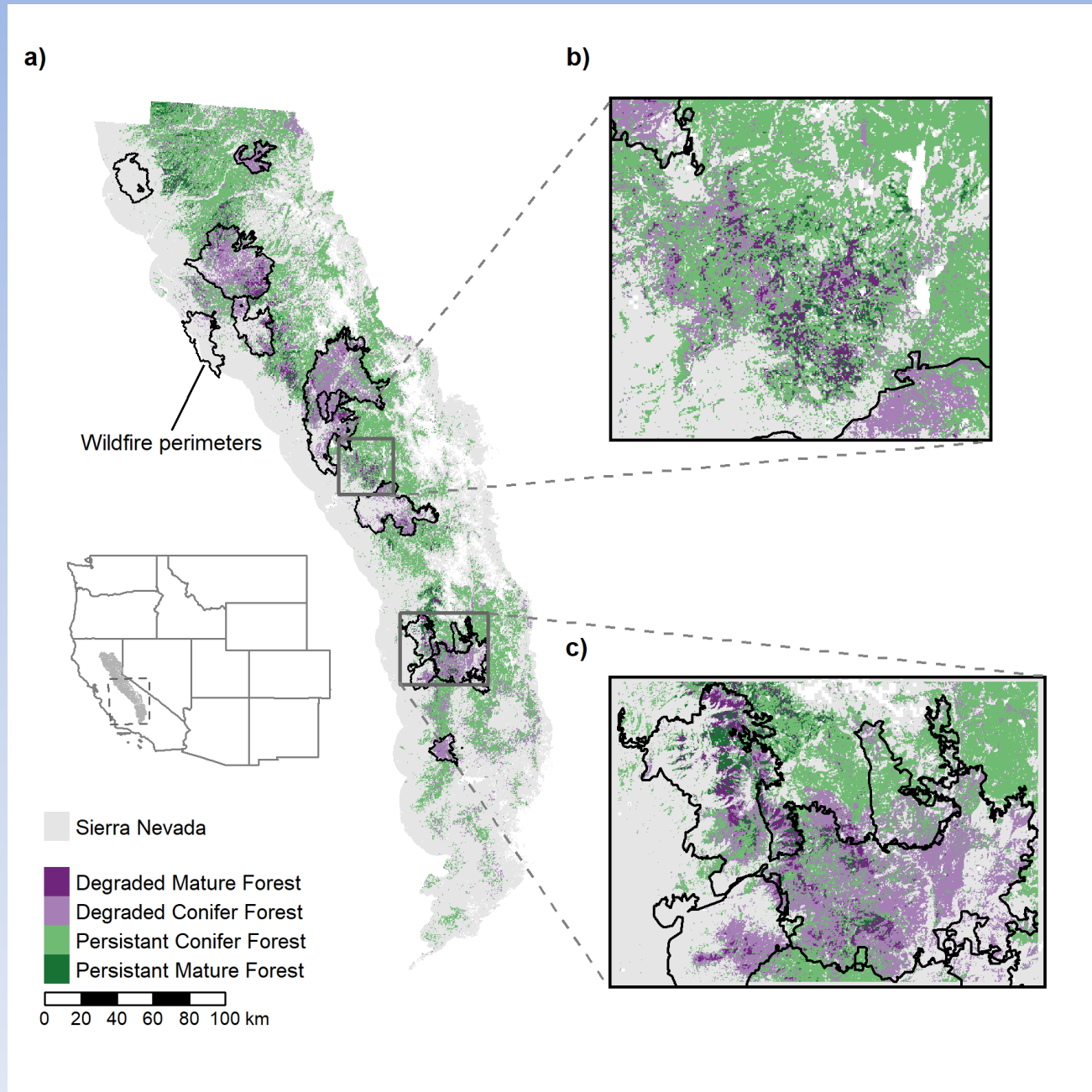
Chips Fire (2012): Plumas NF



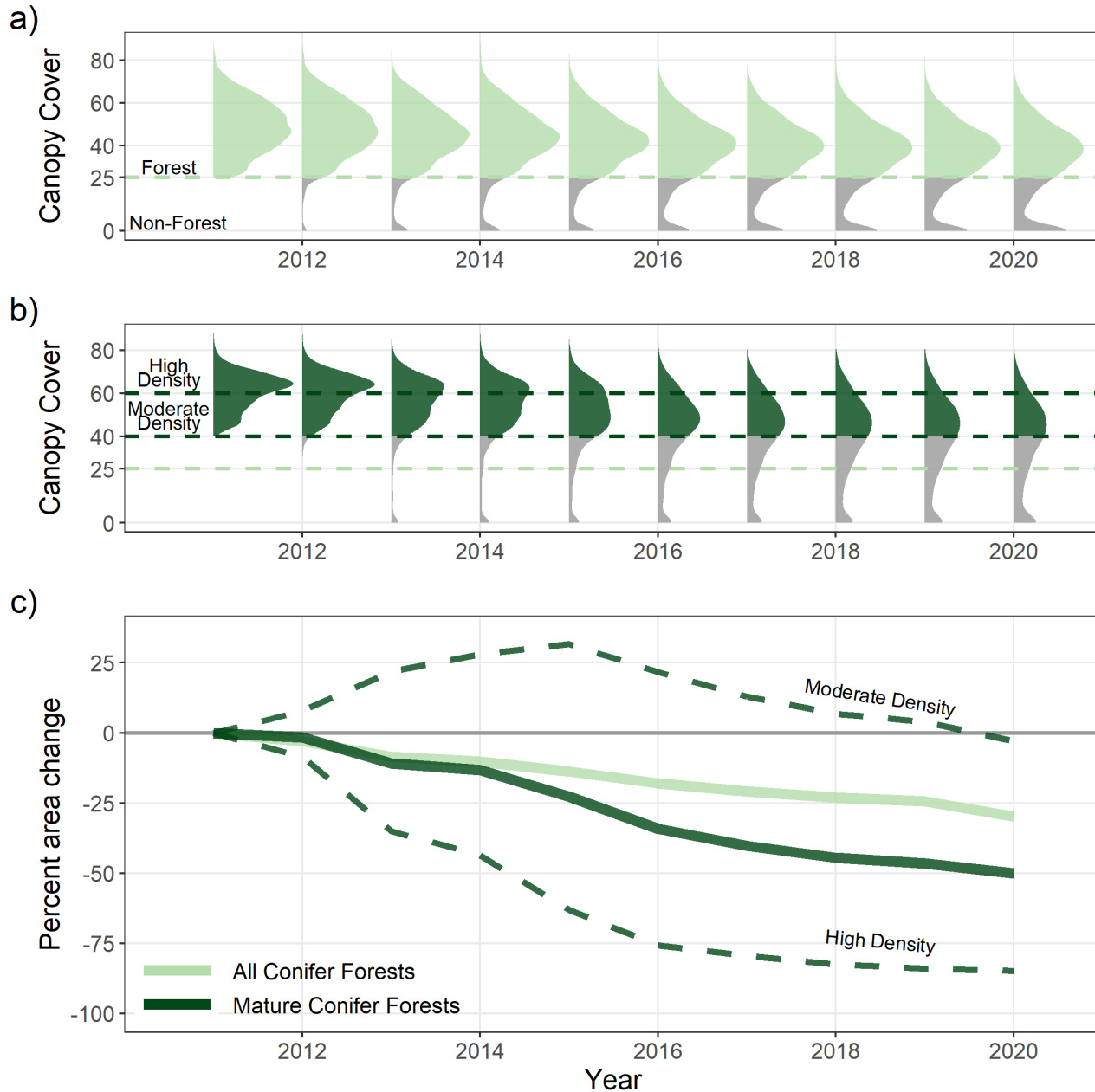
Chips Fire (2012) + Dixie (2021): Plumas NF



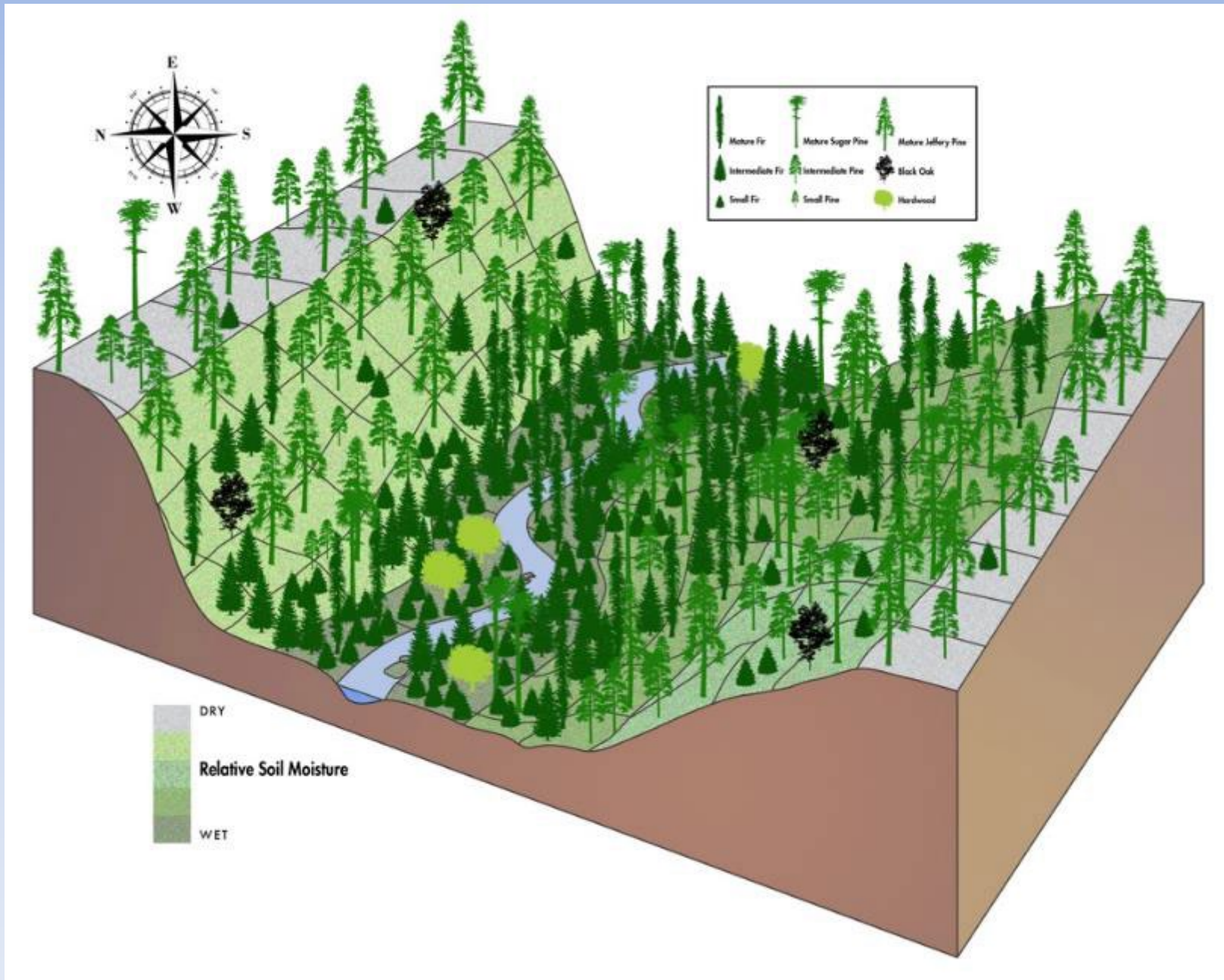
Change in mature forest habitat: 2011-2020



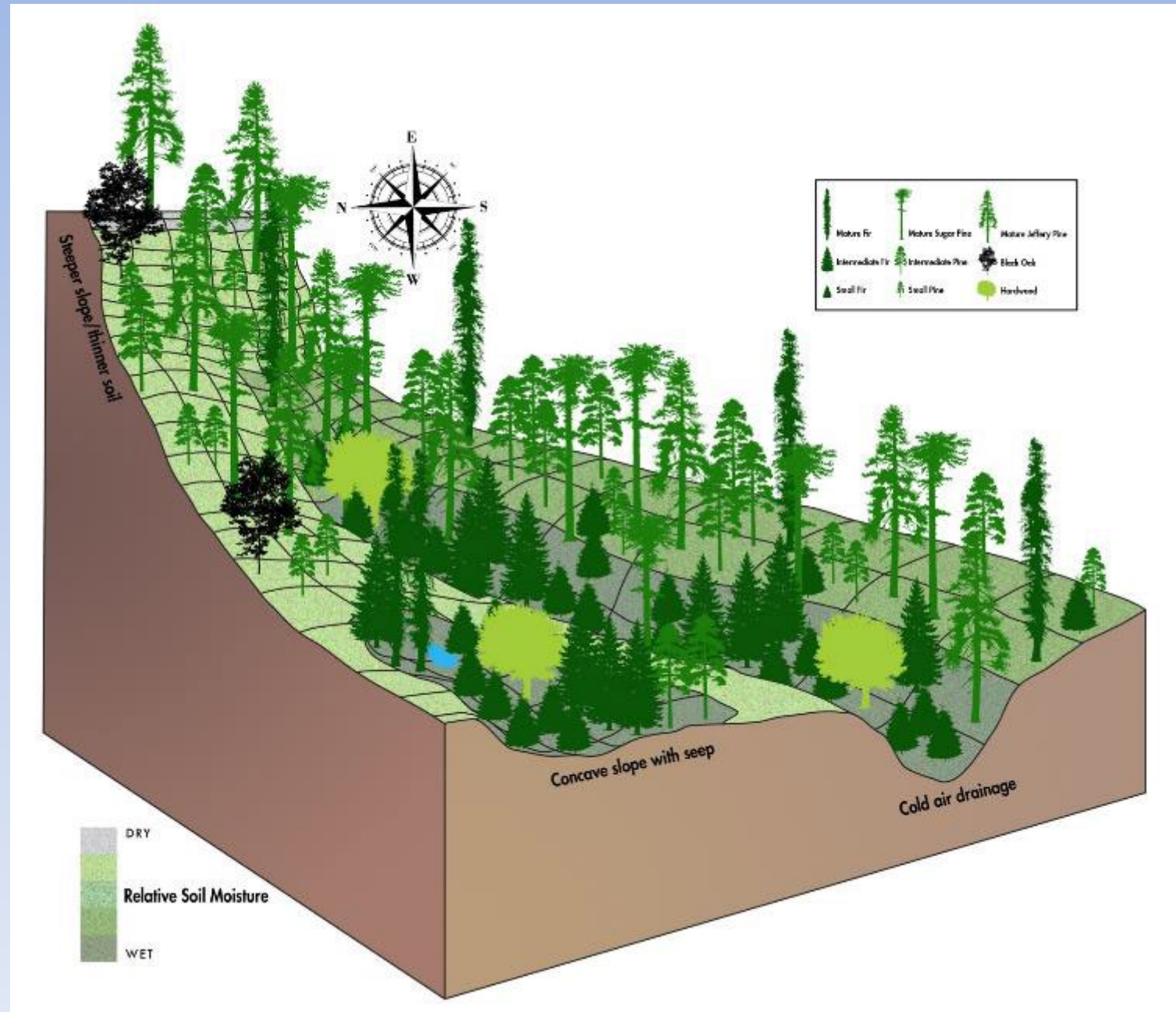
Change in mature forest habitat: 2011-2020



Variability in forest structure/composition



Variability in forest structure/composition



Forest management implications:

- **Historical forests were generally low density, yet highly variable**
 - **Maintaining high density, mature forest habitat is UNLIKELY**
- **Forest change = greater vulnerability to fire AND drought-related mortality**
 - **Vegetation/fuel development following these can lead to long-term forest loss**
- **Large-scale forest restoration is needed**
 - **A plan for EVERY acre...not just strategic placement**
 - **Creative and varied silvicultural approaches with fire use**

