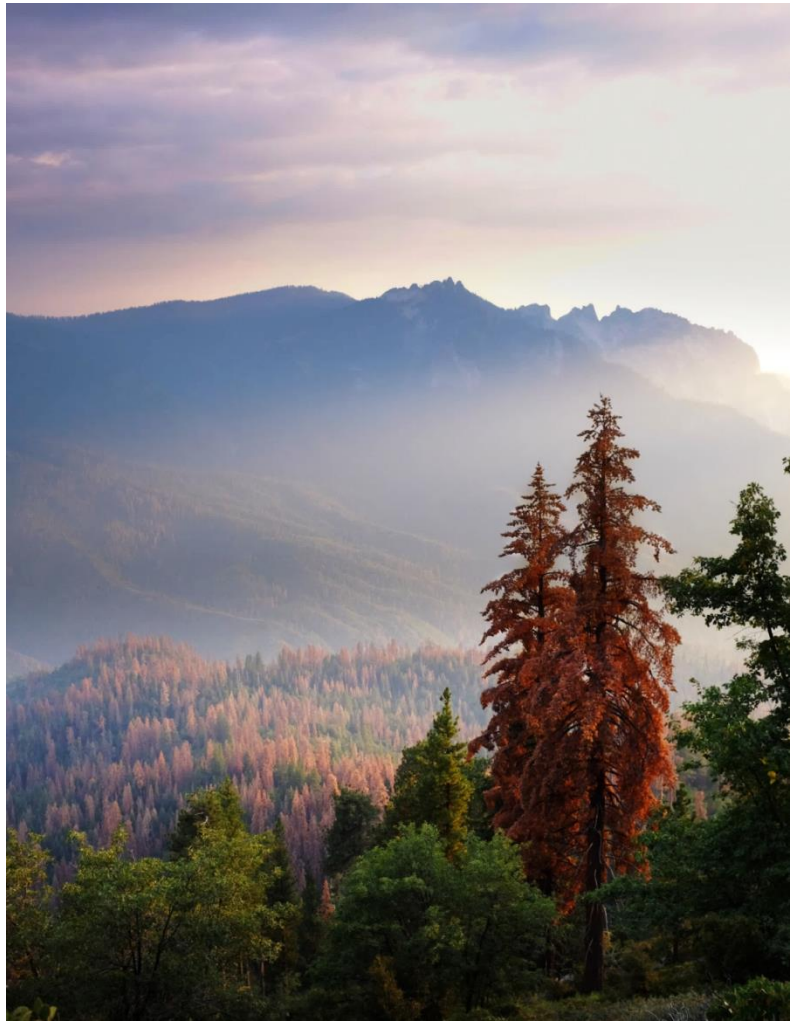
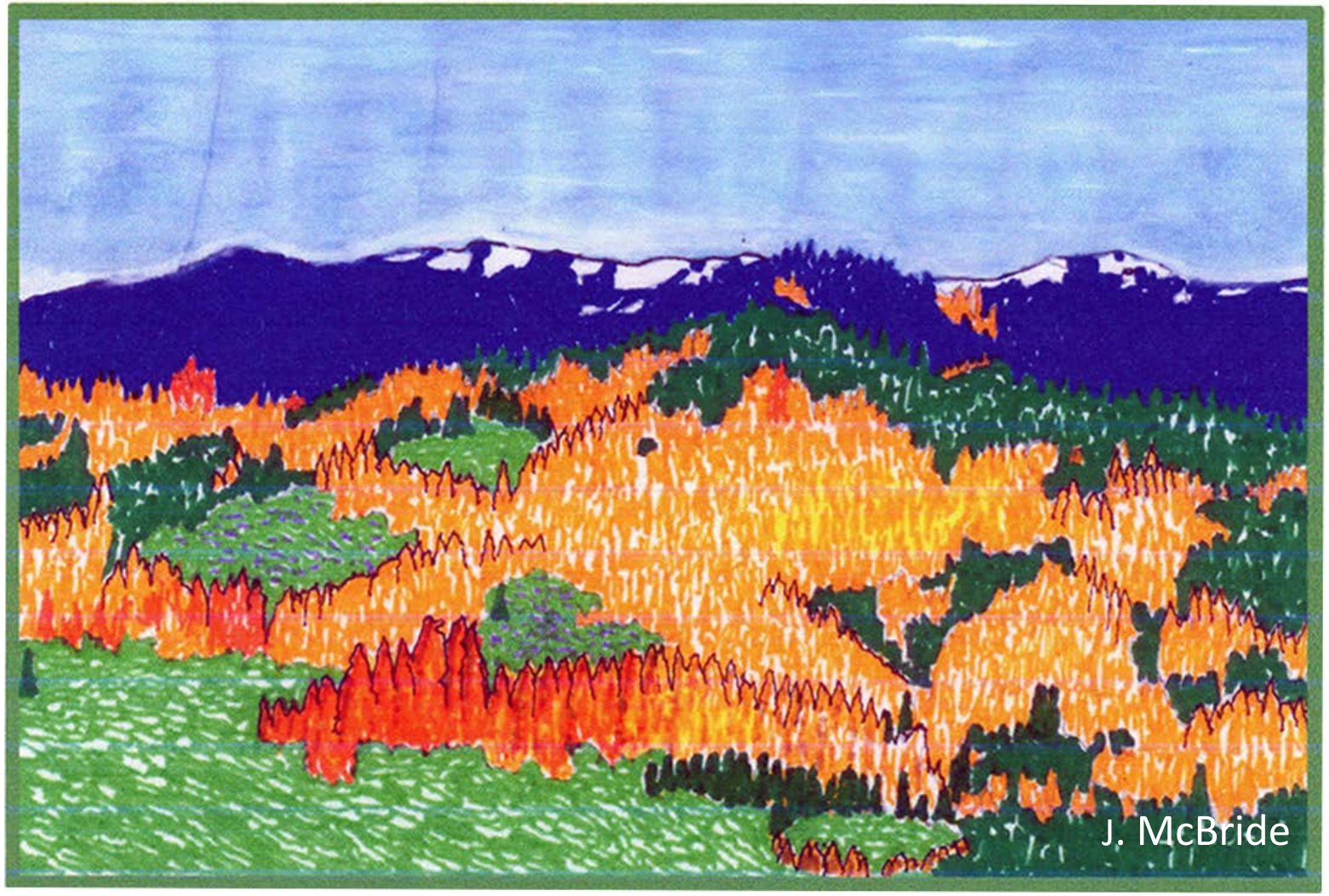
# Tree Drought Mortality Collaboration

**A Discussion with Stakeholders, March 12, 2018**





# Collaborators

CalFire

National Park Service

US Forest Service Forest Health Protection

US Forest Service Pacific Northwest Research Station

US Forest Service Pacific Southwest Research Station

US Forest Service Region 5

US Forest Service Rocky Mountain Research Station

United States Geological Service

University of California Berkeley

University of California Cooperative Extension

University of California Davis

University of Washington

# Tree Mortality and Bark Beetles in the Sierra Nevada

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# Outline

- Plot Network

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- Results from the 2017 field season

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- Results from the 2017 field season
- **Results from collaborators**

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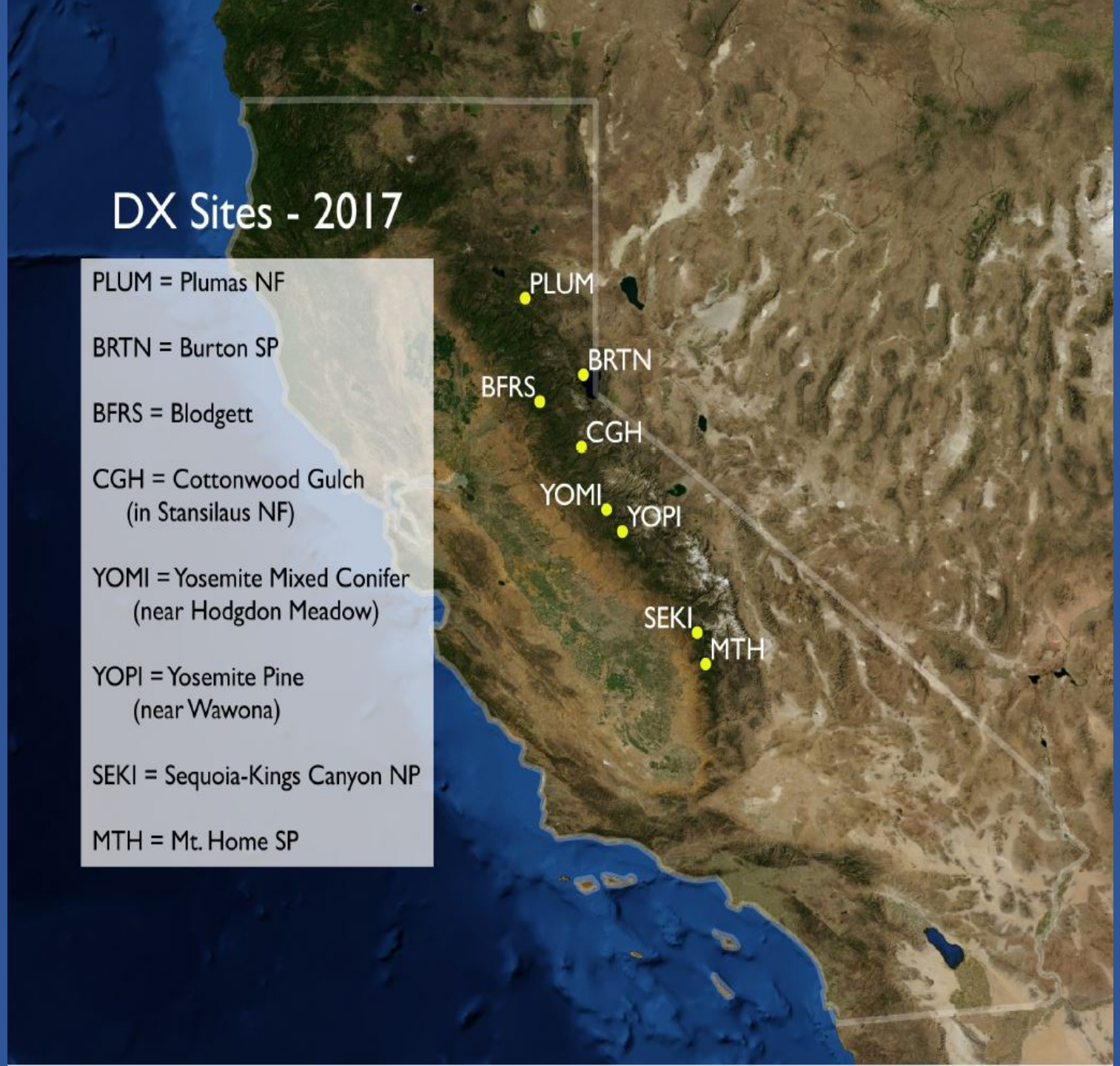
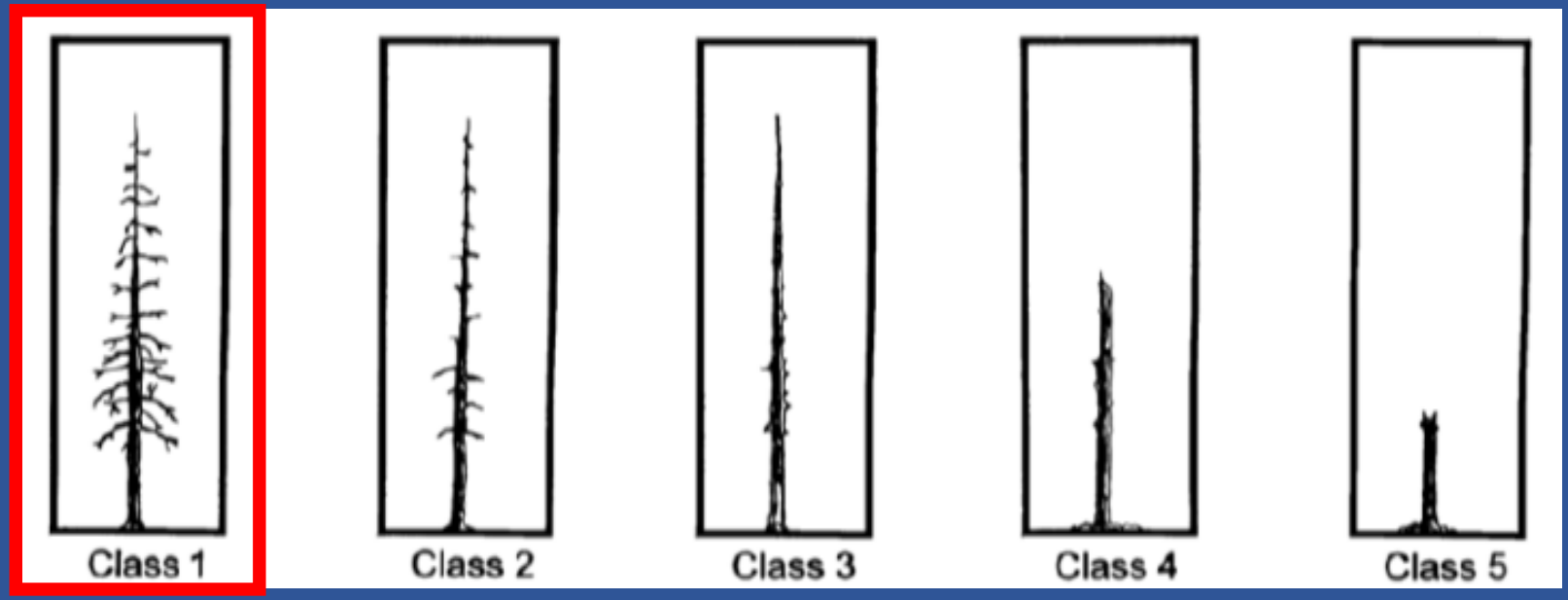
- Plot Network
- Results from the 2017 field season
- Results from collaborators
- **Key points**

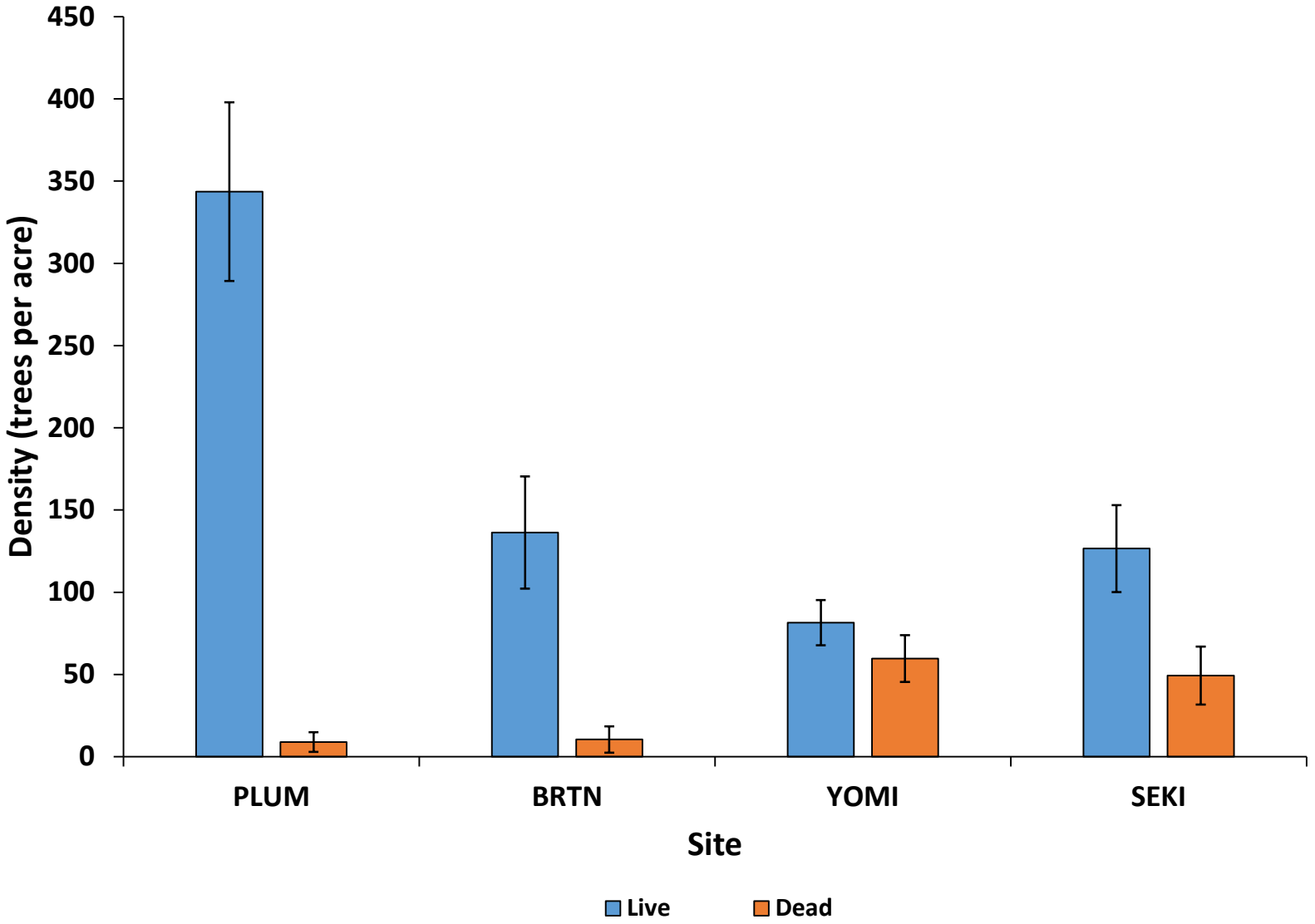

DX Sites - 2017
PLUM = Plumas NF
BRTN = Burton SP
BFRS = Blodgett
CGH = Cottonwood Gulch (in Stansilaus NF)
YOMI = Yosemite Mixed Conifer (near Hodgdon Meadow)
YOPI = Yosemite Pine (near Wawona)
SEKI = Sequoia-Kings Canyon NP
MTH = Mt. Home SP
PLUM
BRTN
BFRS
CGH
YOMI
YOPI
SEKI
MTH

# Plot Network

# Field Data


- Overstory trees: ≥ 4 in. DBH
- Assessed trees for bark beetles, pathogens, and other damage causal agents; also measured fuels, shrub cover, and regeneration
- Summaries only include live and recently dead trees






PLUM = PLUMAS NATIONAL FOREST

- DOMINANT SPECIES: PSME (36%); CADE (24%)

BRTN = BURTON CREEK STATE PARK

- DOMINANT SPECIES: ABCO (54%); PIJE (35%)

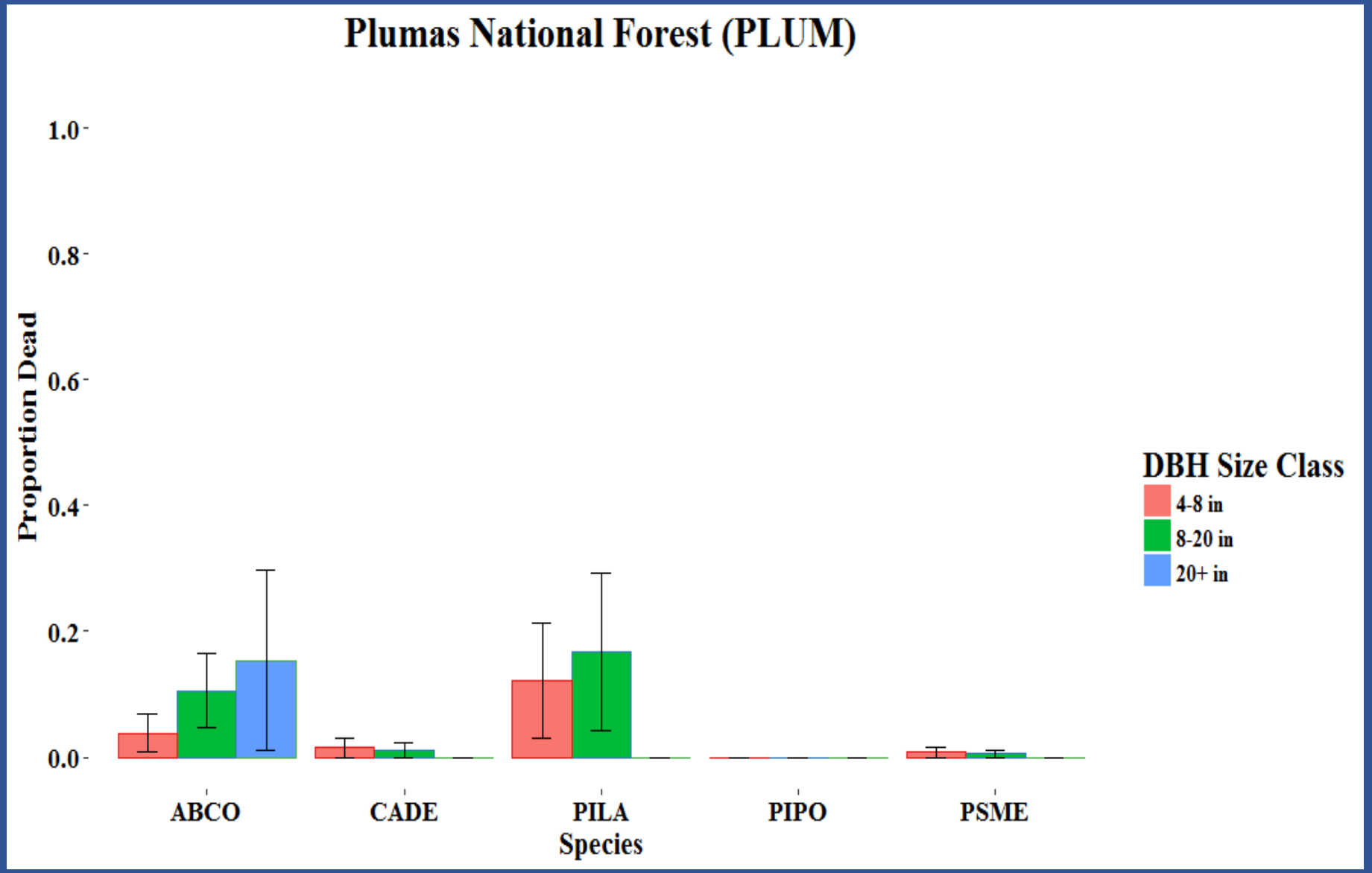
YOMI = YOSEMITE NATIONAL PARK – MIXED-CONIFER SITE

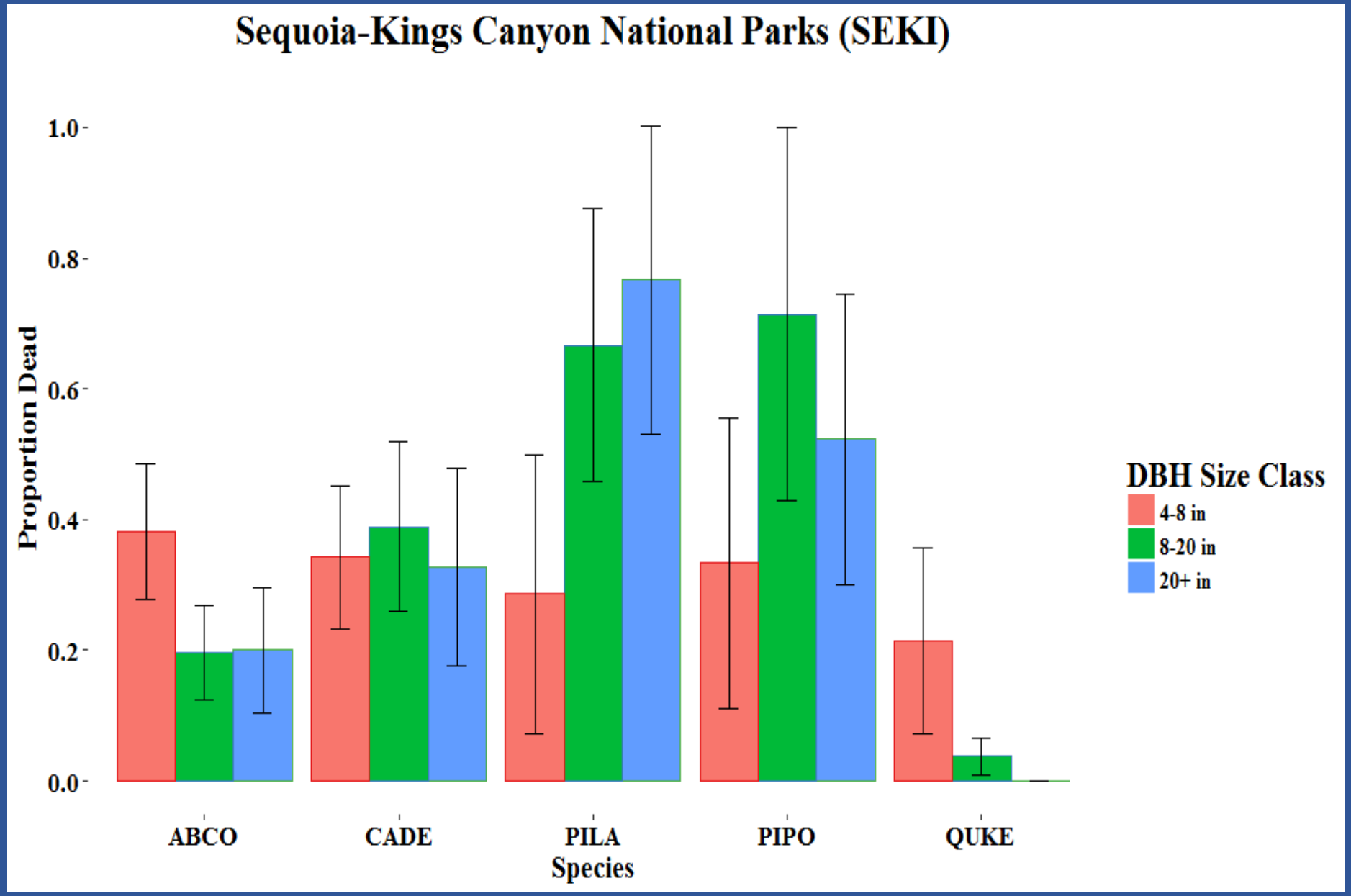
- DOMINANT SPECIES: CADE (25%); ABCO (20%)

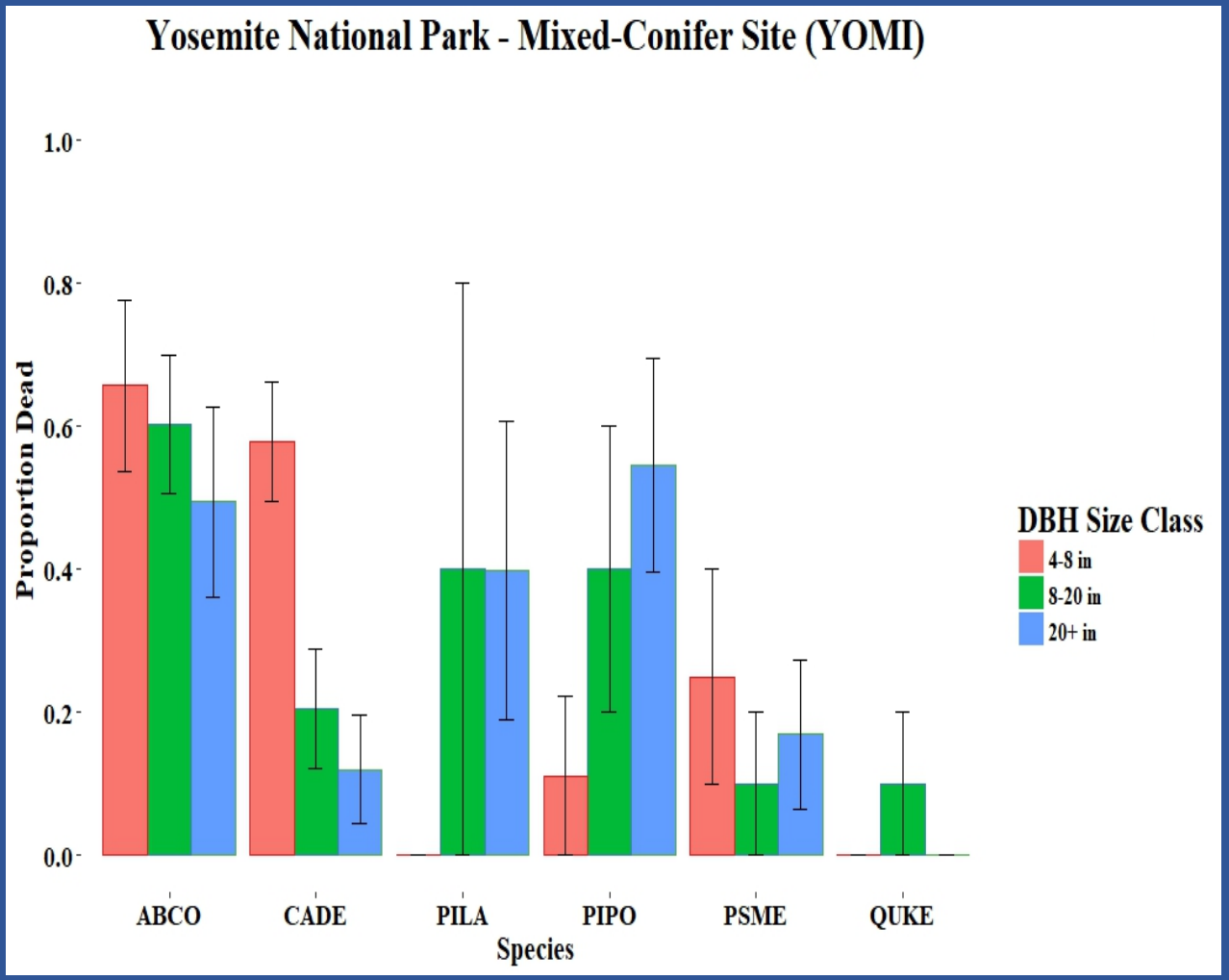
SEKI = SEQUOIA-KINGS CANYON NATIONAL PARKS

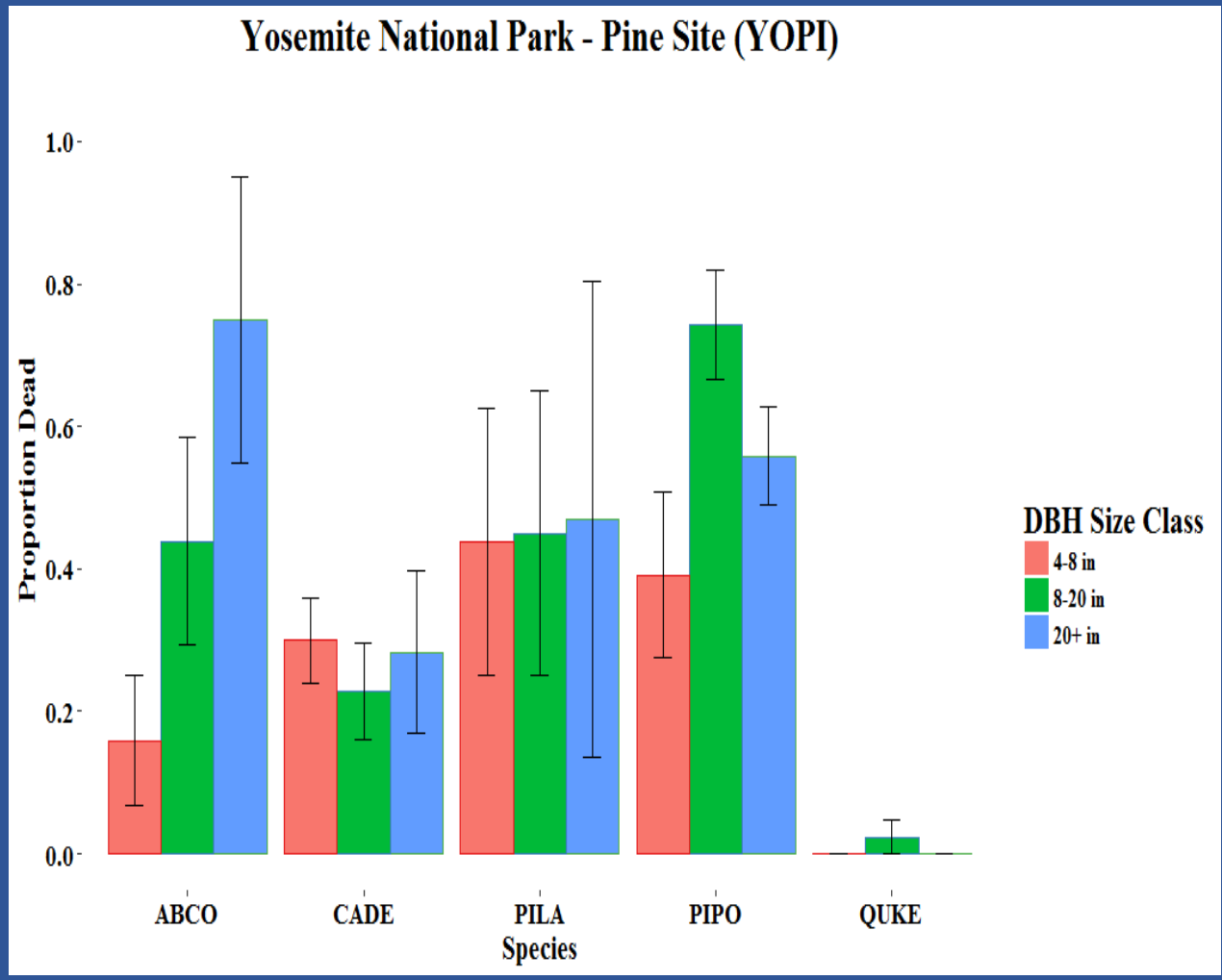
- DOMINANT SPECIES: ABCO (32%); CADE (26%)

# Recent Mortality by Species and Size Class




Sequoia-Kings Canyon National Parks (SEKI)
Proportion Dead
1.0
0.8
0.6
0.4
0.2
0.0
ABCO
CADE
PILA
PIPO
QUKE
Species
DBH Size Class
4-8 in
8-20 in
20+ in


Yosemite National Park - Mixed-Conifer Site (YOMI)
Proportion Dead
1.0
0.8
0.6
0.4
0.2
0.0
ABCO
CADE
PILA
PIPO
PSME
QUKE
Species
DBH Size Class
4-8 in
8-20 in
20+ in


Yosemite National Park - Pine Site (YOPI)
Proportion Dead
1.0
0.8
0.6
0.4
0.2
0.0
ABCO
CADE
PILA
PIPO
QUKE
Species
DBH Size Class
4-8 in
8-20 in
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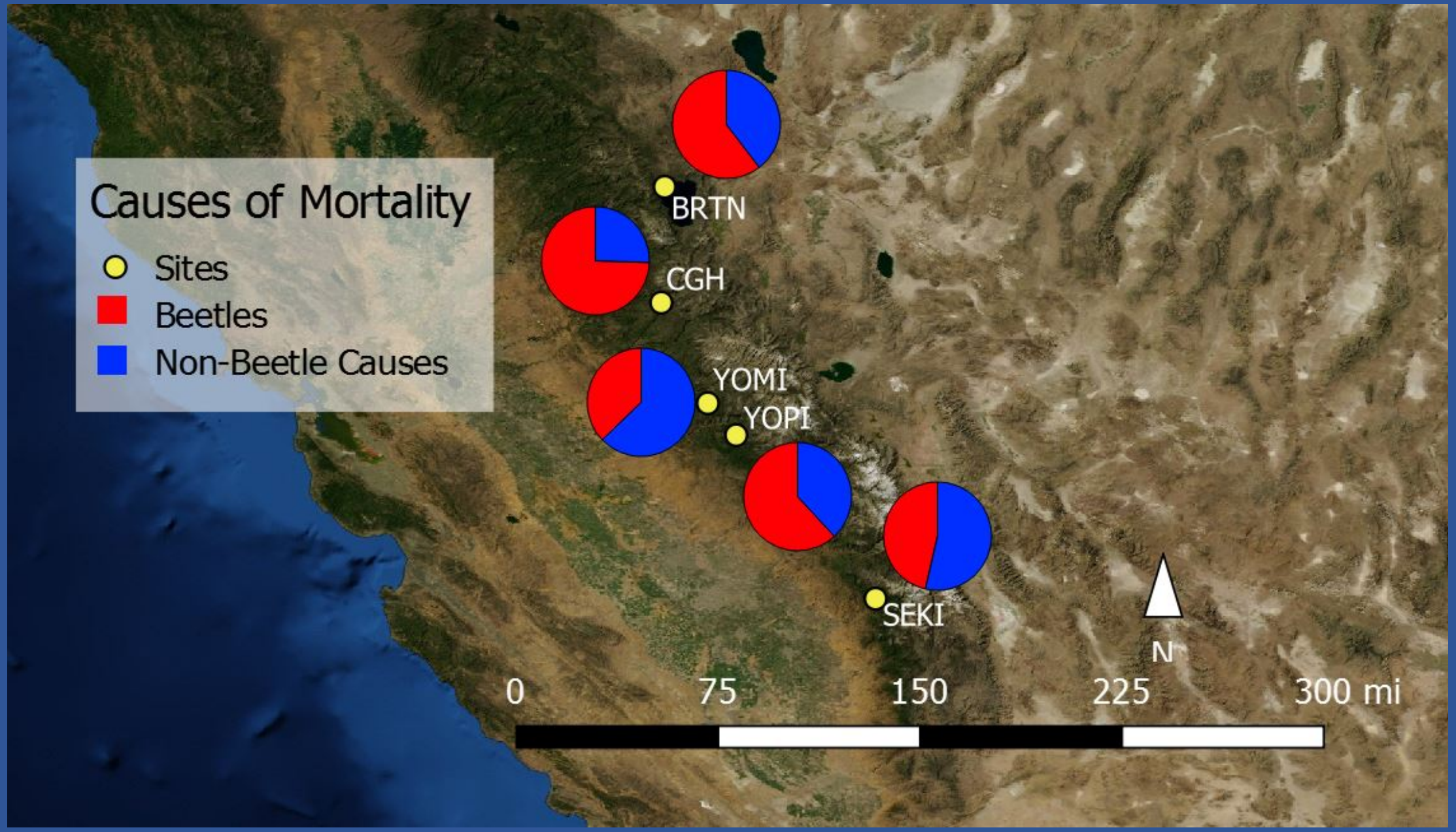
# Causes of Tree Mortality



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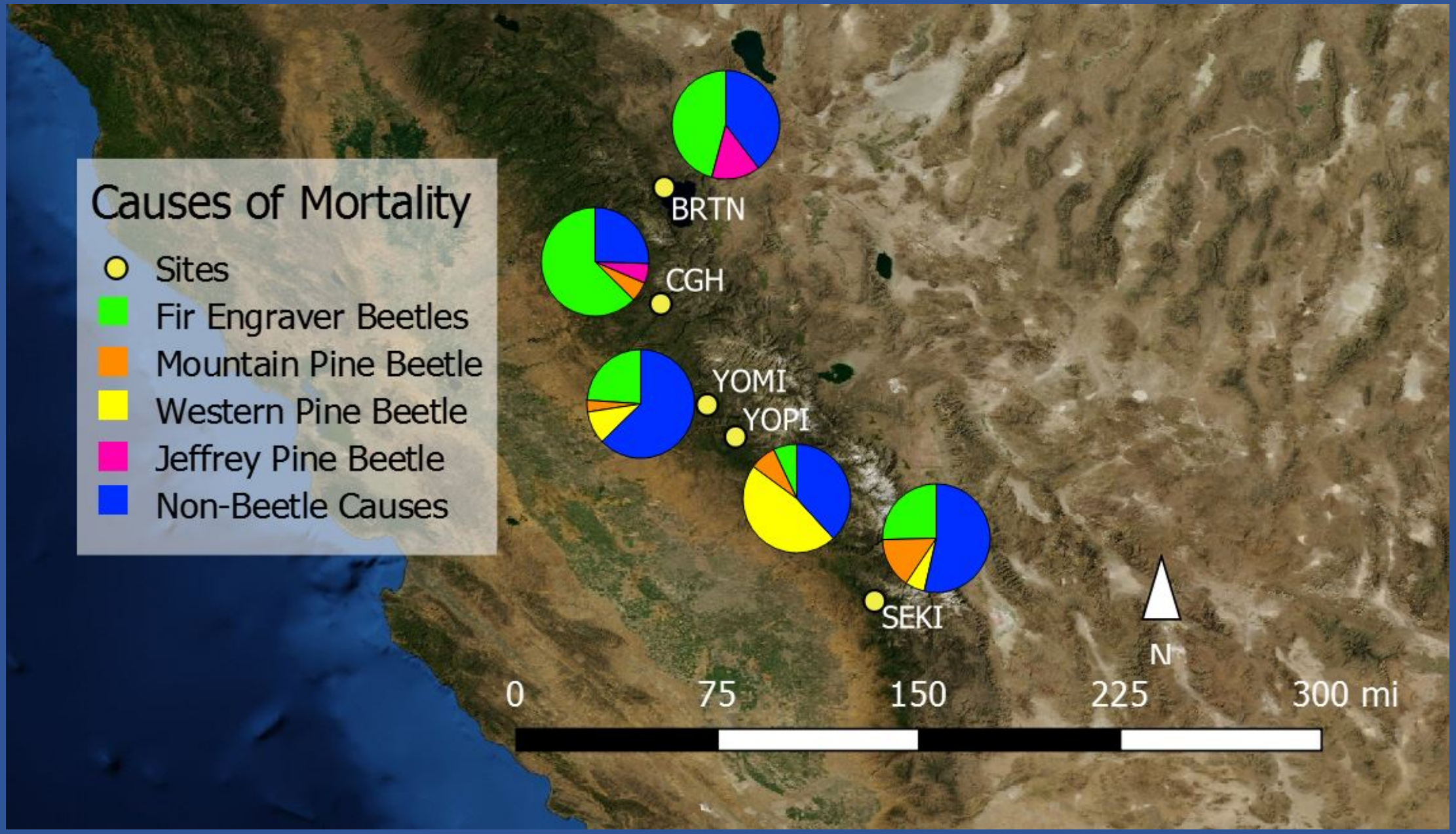
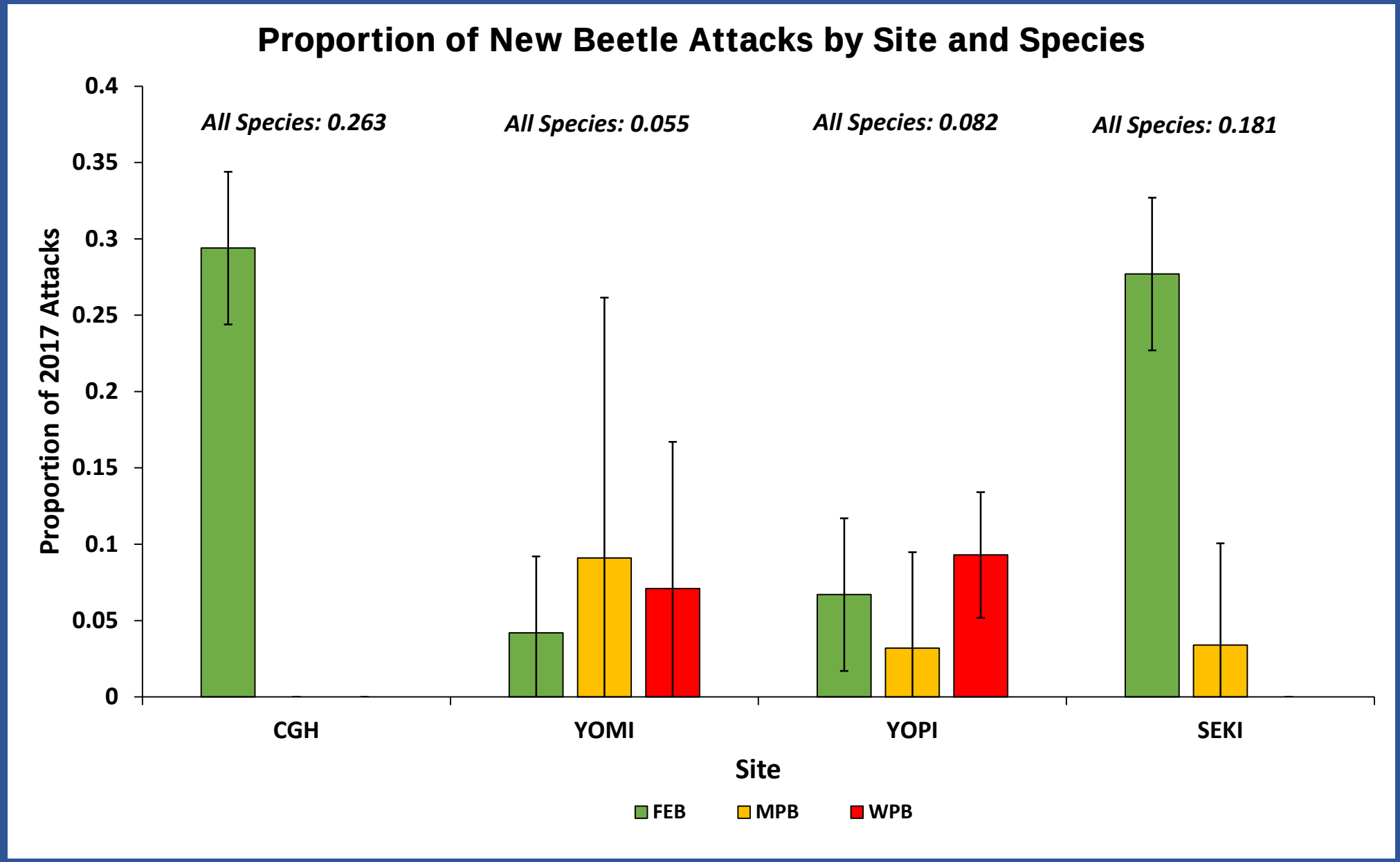
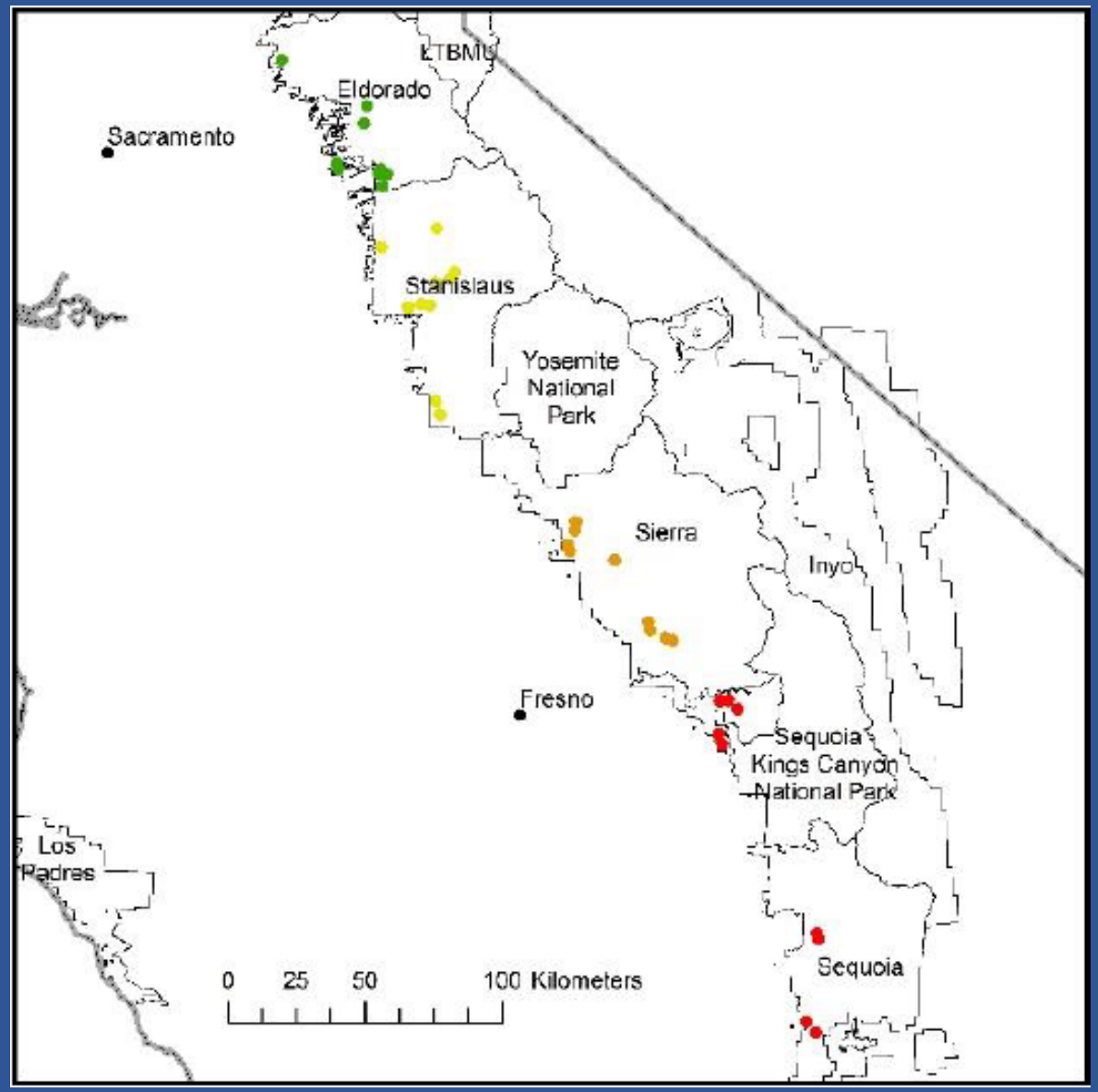


# New vs. Old Beetle Activity



# Results from Collaborators

## USFS PSW: Fettig and Mortenson (data from 2014-2017)



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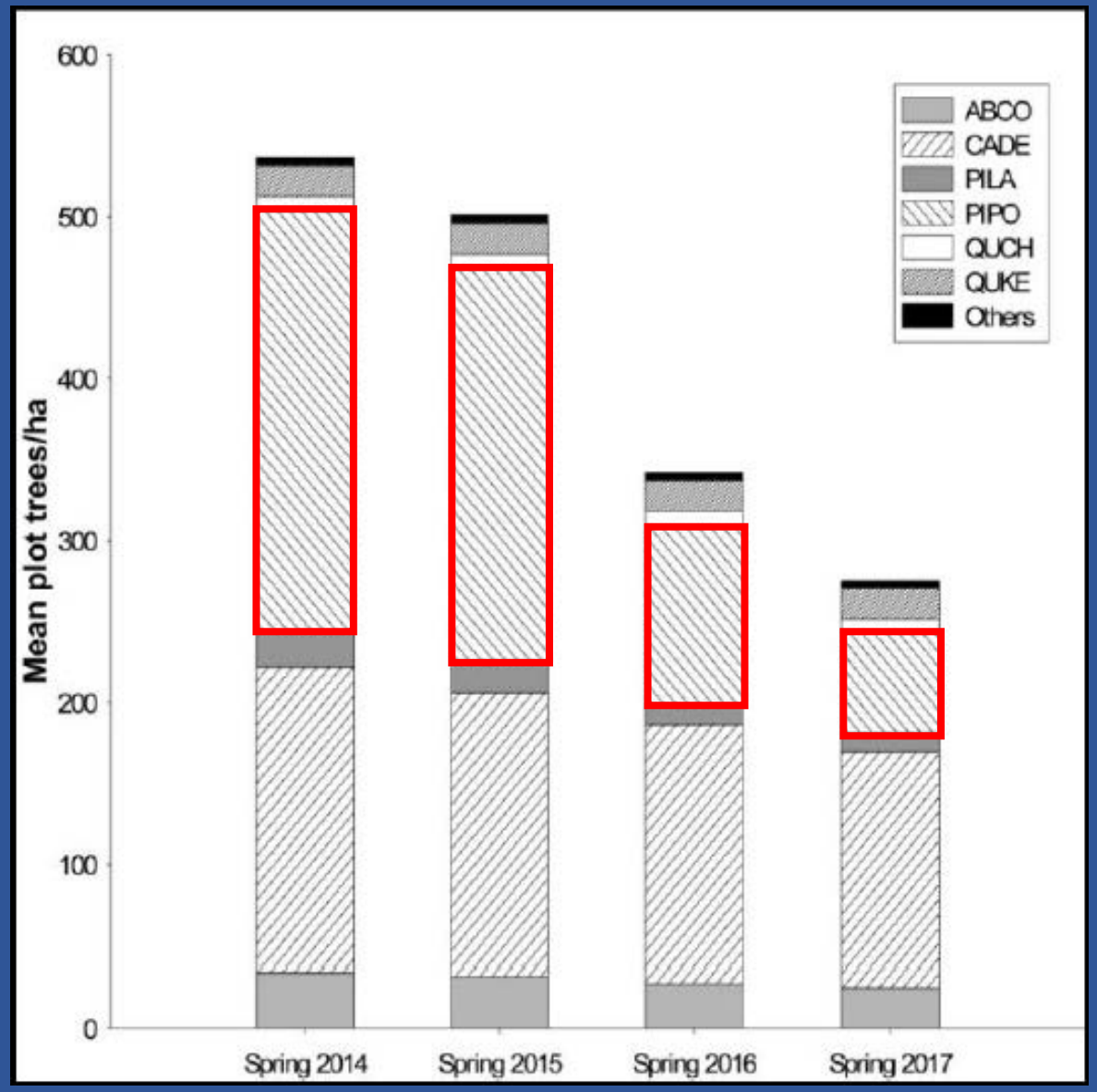

# Results from Collaborators

## USFS RMRS: Hood et al. (data from 2016-2017)


Basal area and DBH by tree status and plot mortality type for the Los Padres site. Only trees ≥ 5 in groundline diameter included.

| Mortality Level | Plots | Total Basal Area ($ft^2$/ac) | Dead Basal Area ($ft^2$/ac) | Dead Basal Area (%) | Live DBH (in) | Dead DBH (in) |
|---|---|---|---|---|---|---|
| Low | 17 | 132.0 | 34.0 | 26 | 11.1 | 10.5 |
| High | 10 | 122.8 | 91.0 | 74 | 9.2 | 13.3 |

# Key Points

- Clear north-south mortality gradient
- A lot of beetle-caused mortality, but not exclusive
- Emerging threat of fir engraver beetles
- Mortality extends beyond Sierra Nevada