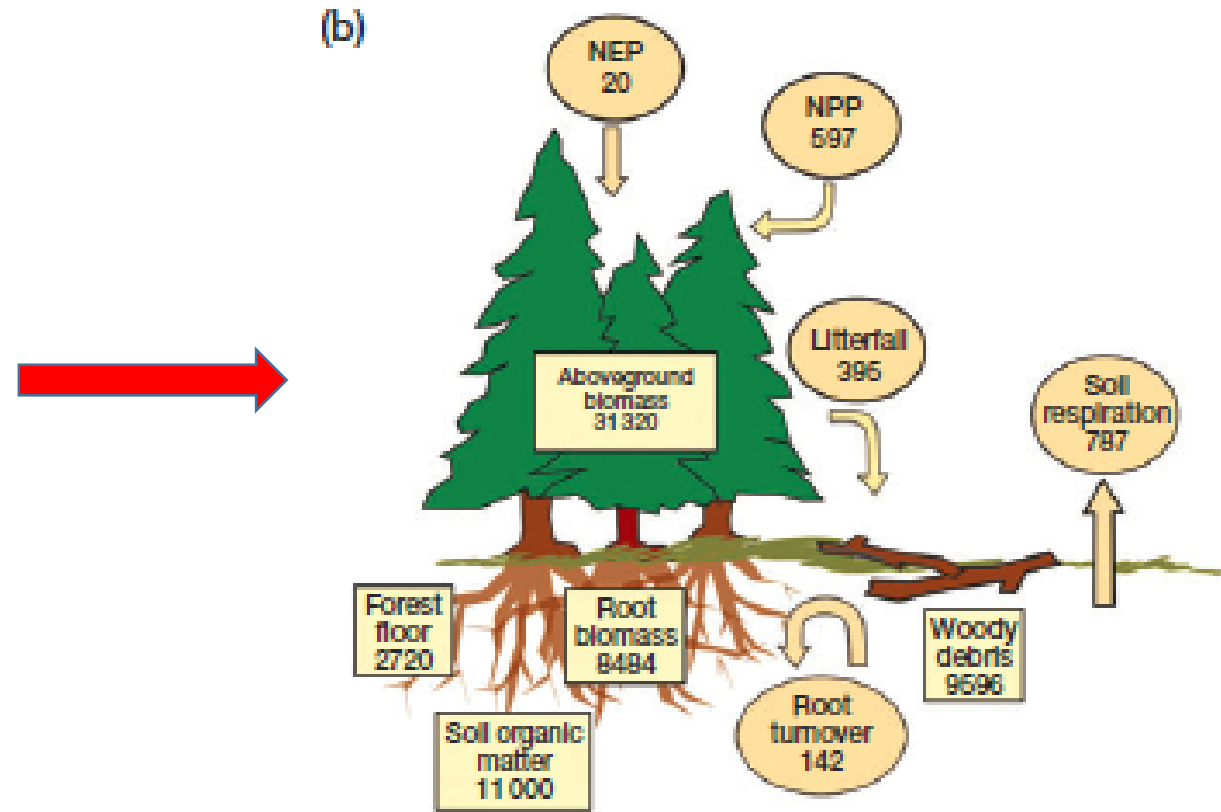


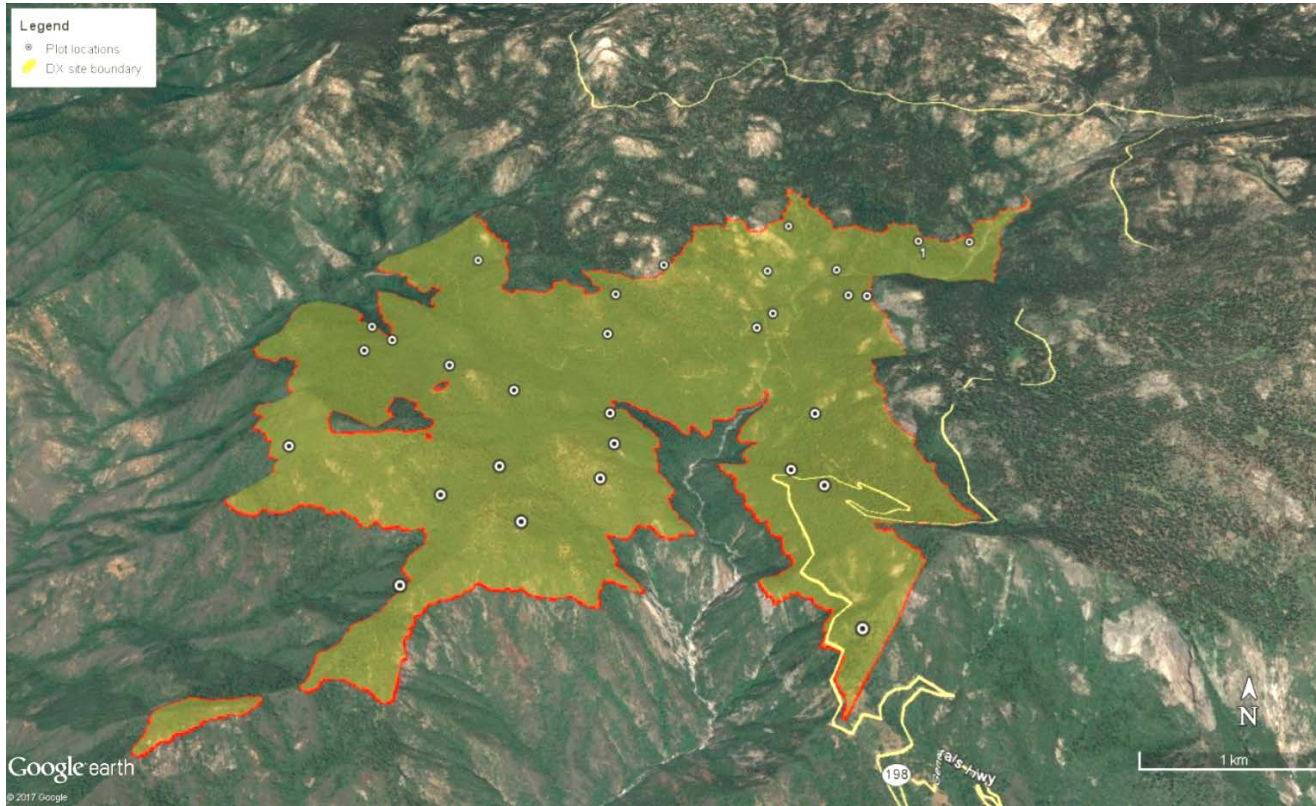
Drought Mortality: Implications for carbon and fuels

John Battles, Professor
UC Berkeley

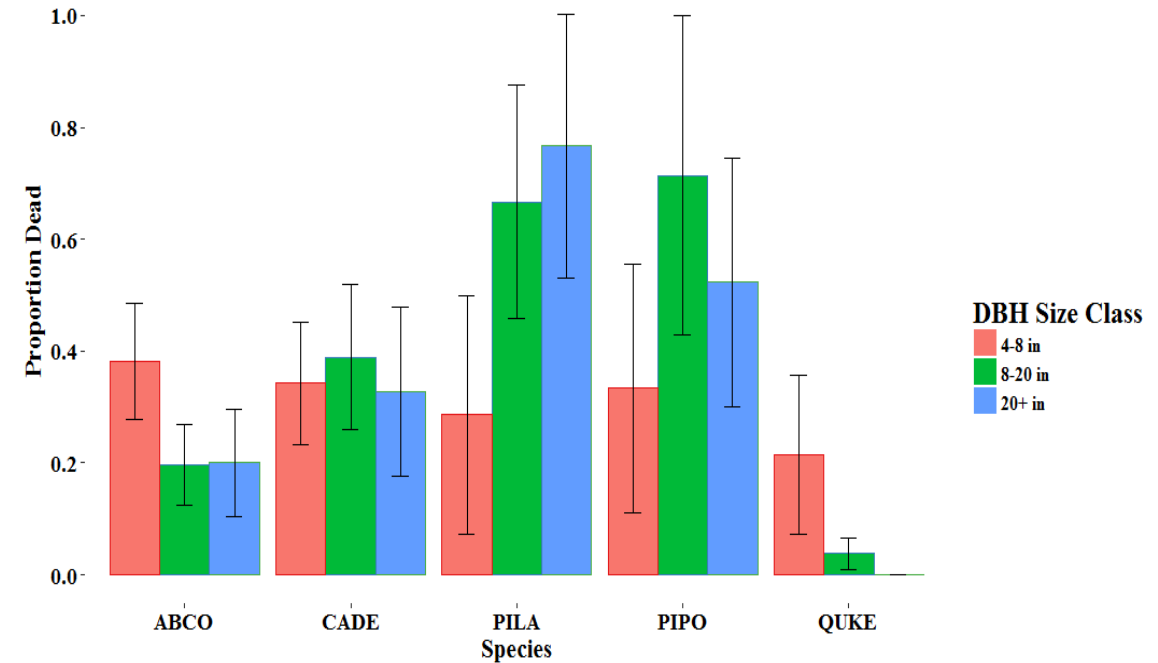


DX site: Sequoia Kings Canyon National Parks

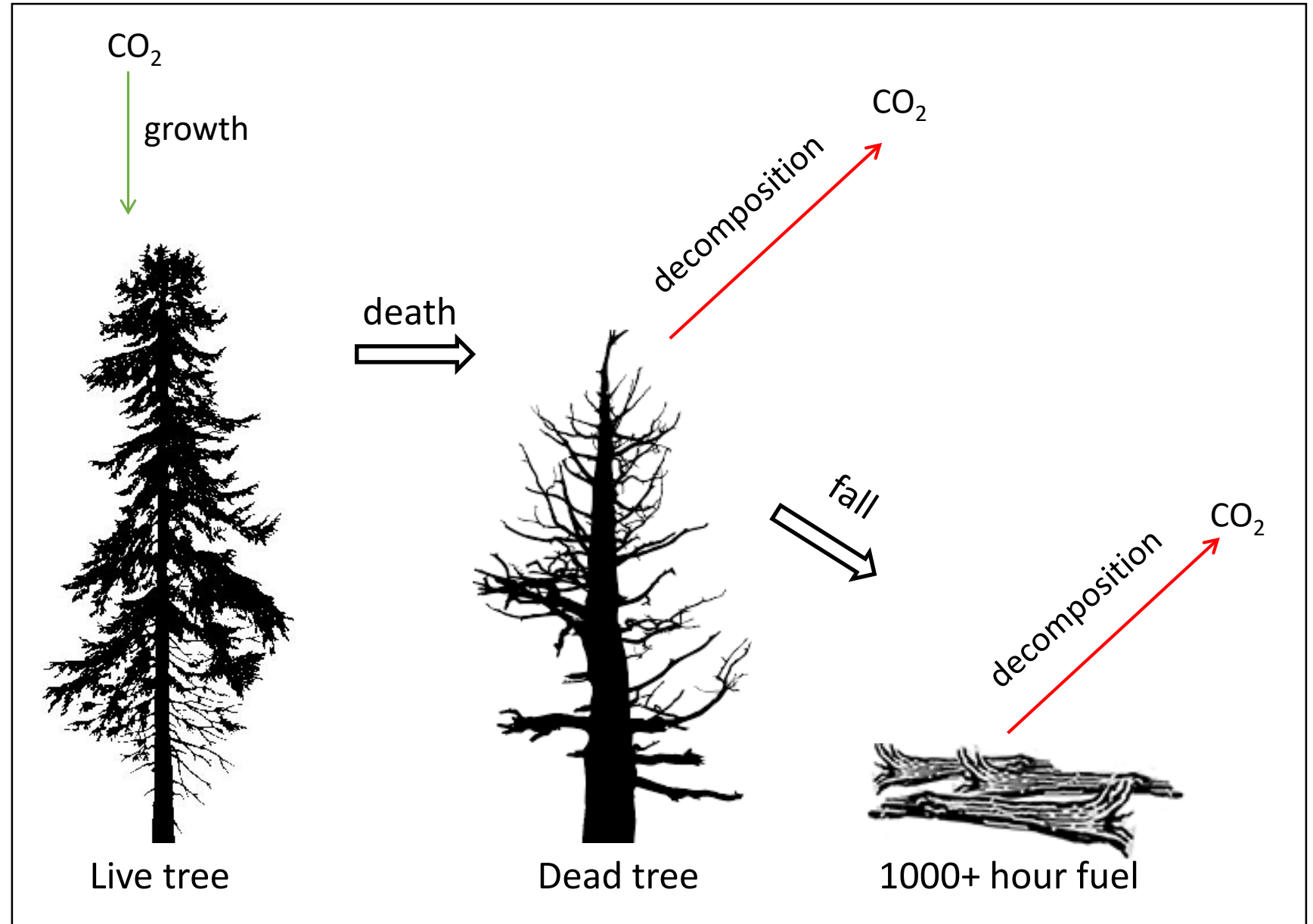
USGS Collaborators: Nate Stephenson and Adrian Das



Sequoia-Kings Canyon National Parks (SEKI)

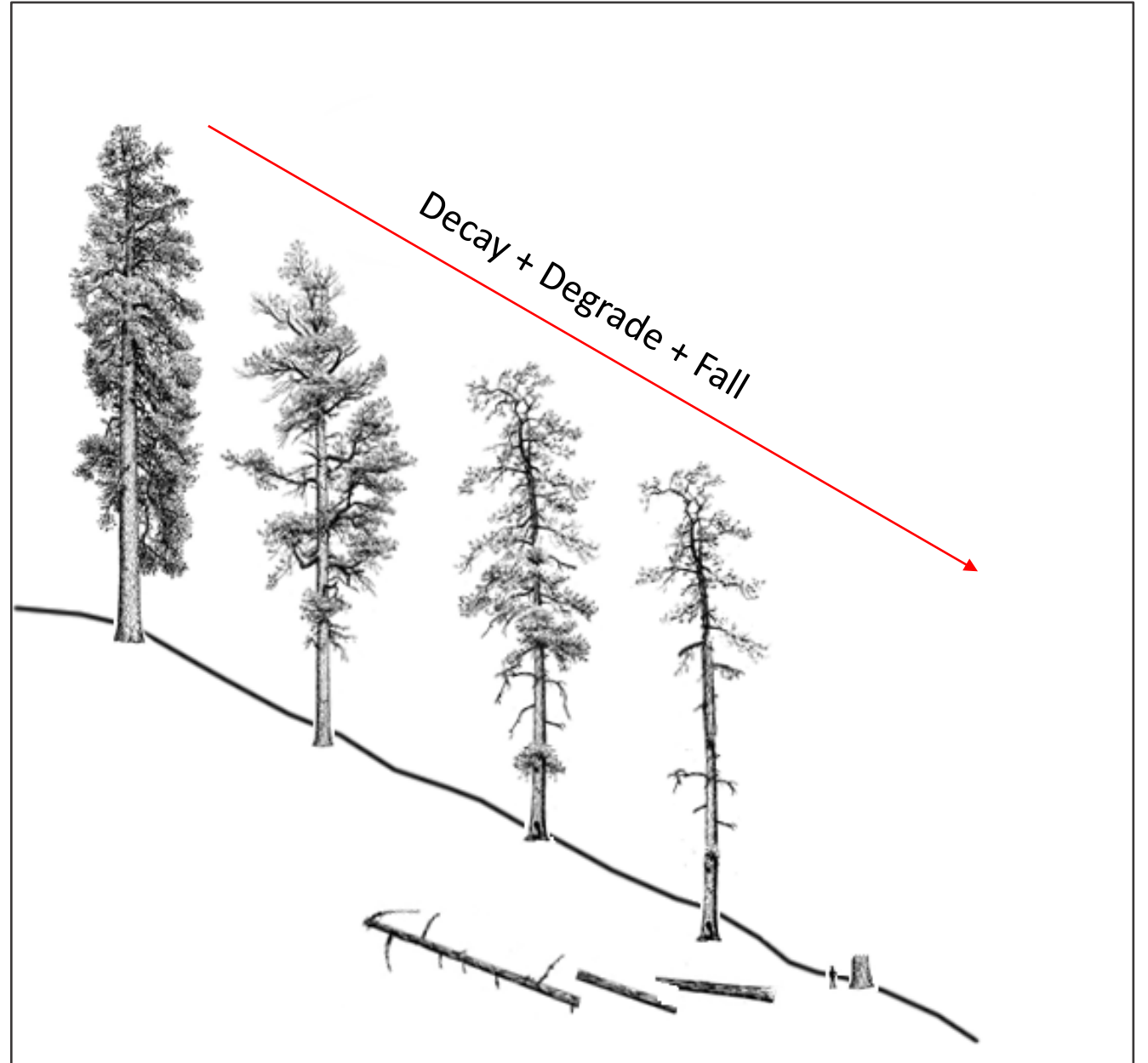


Dead tree cycle

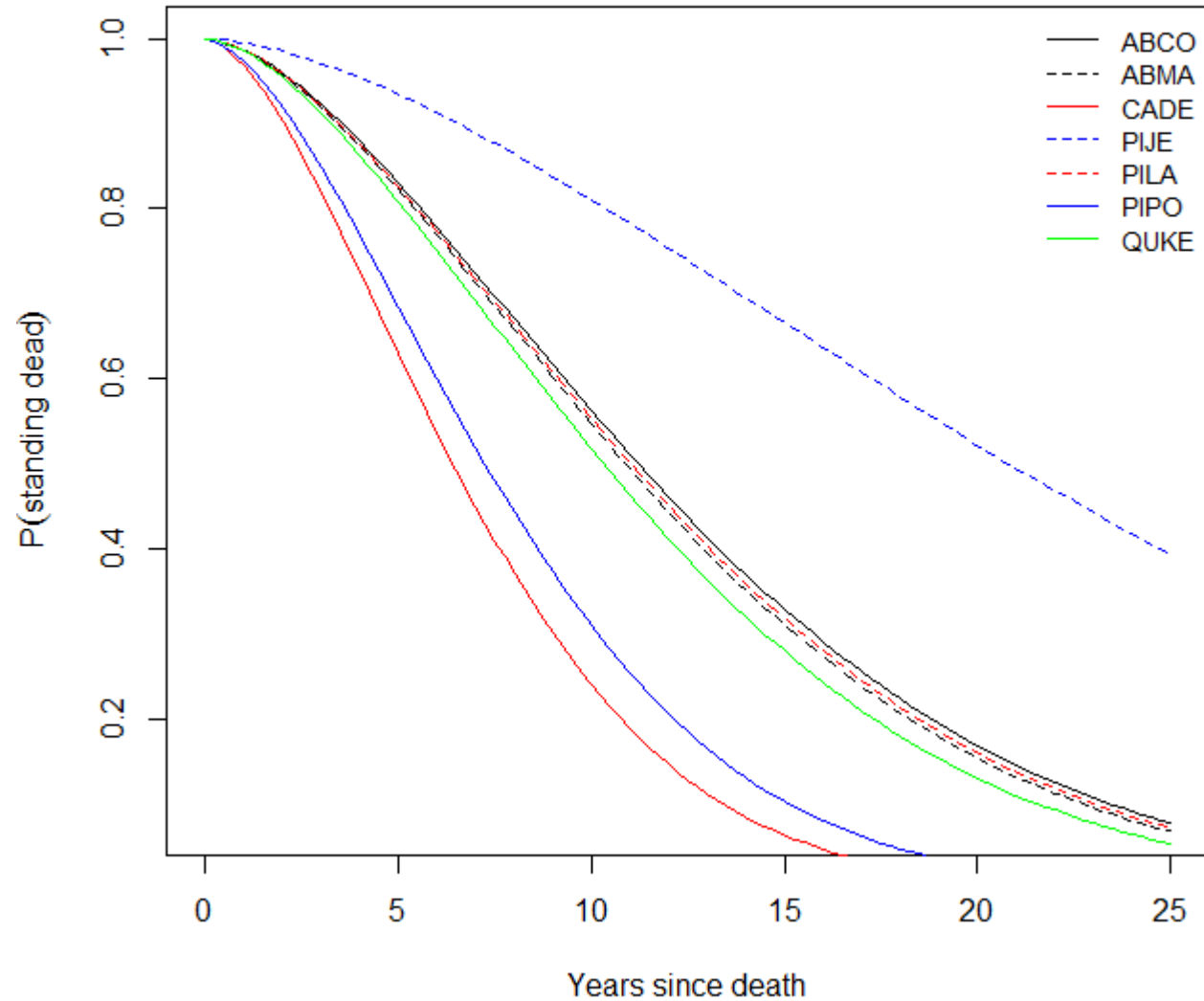
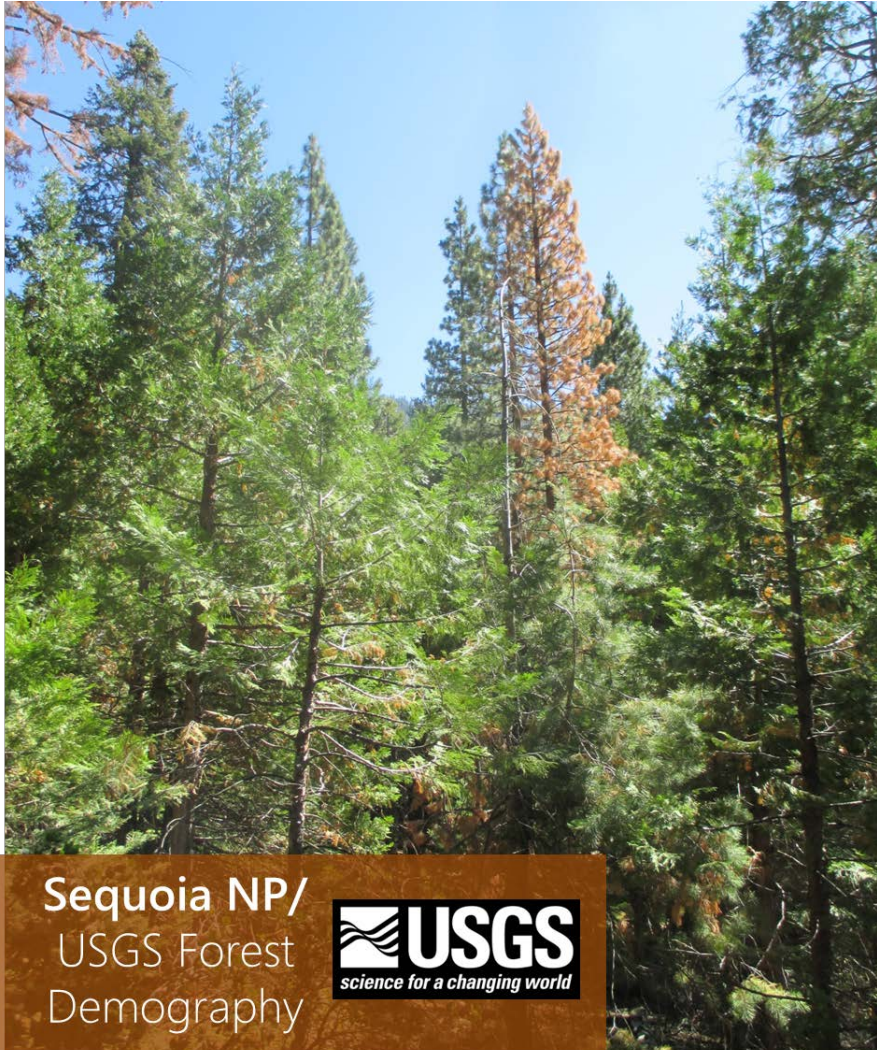


Fate of standing dead trees

1. Decay
2. Degrade
3. Fall



Species (and size) differences in fall rates



Wood Decay Rates

HARMON, M. E., CROMACK, K., JR., and SMITH, B. G. 1987. Coarse woody debris in mixed-conifer forests, Sequoia National Park, California. *Can. J. For. Res.* **17**: 1265-1272.

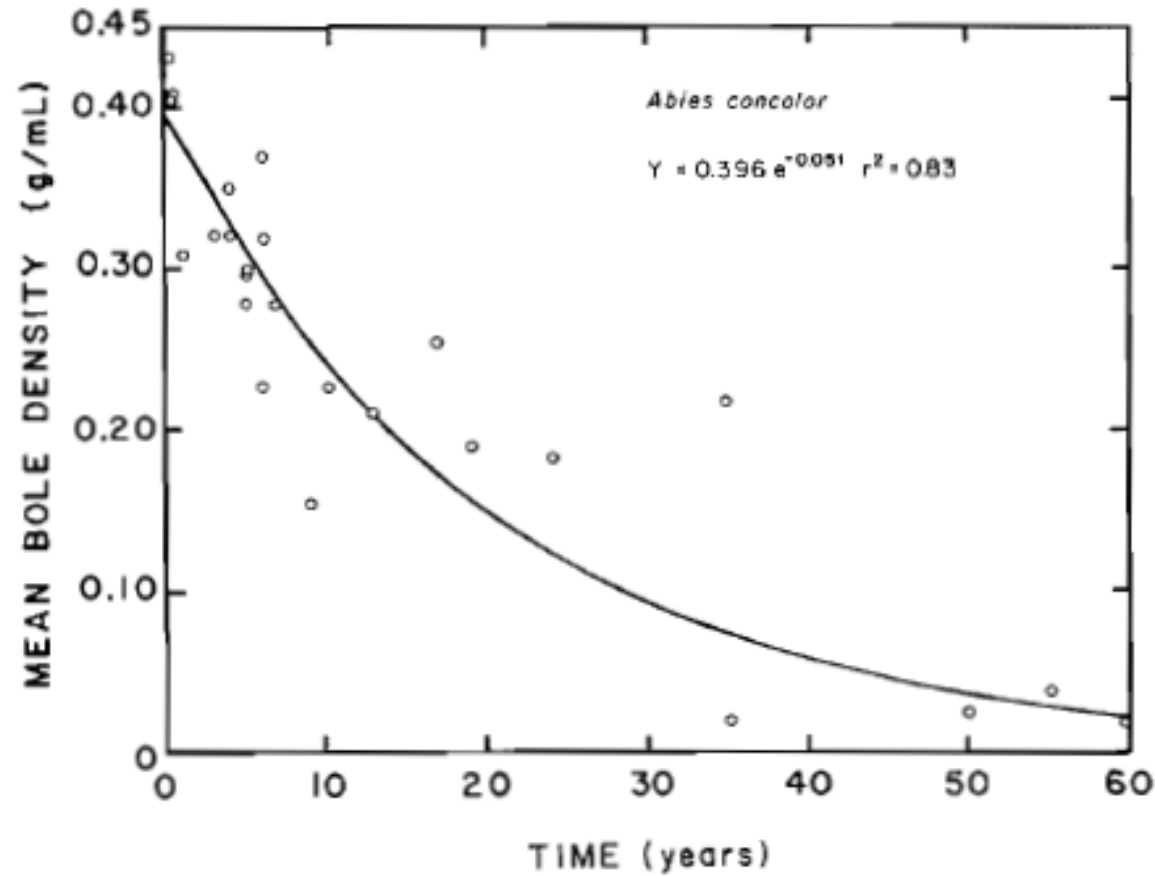
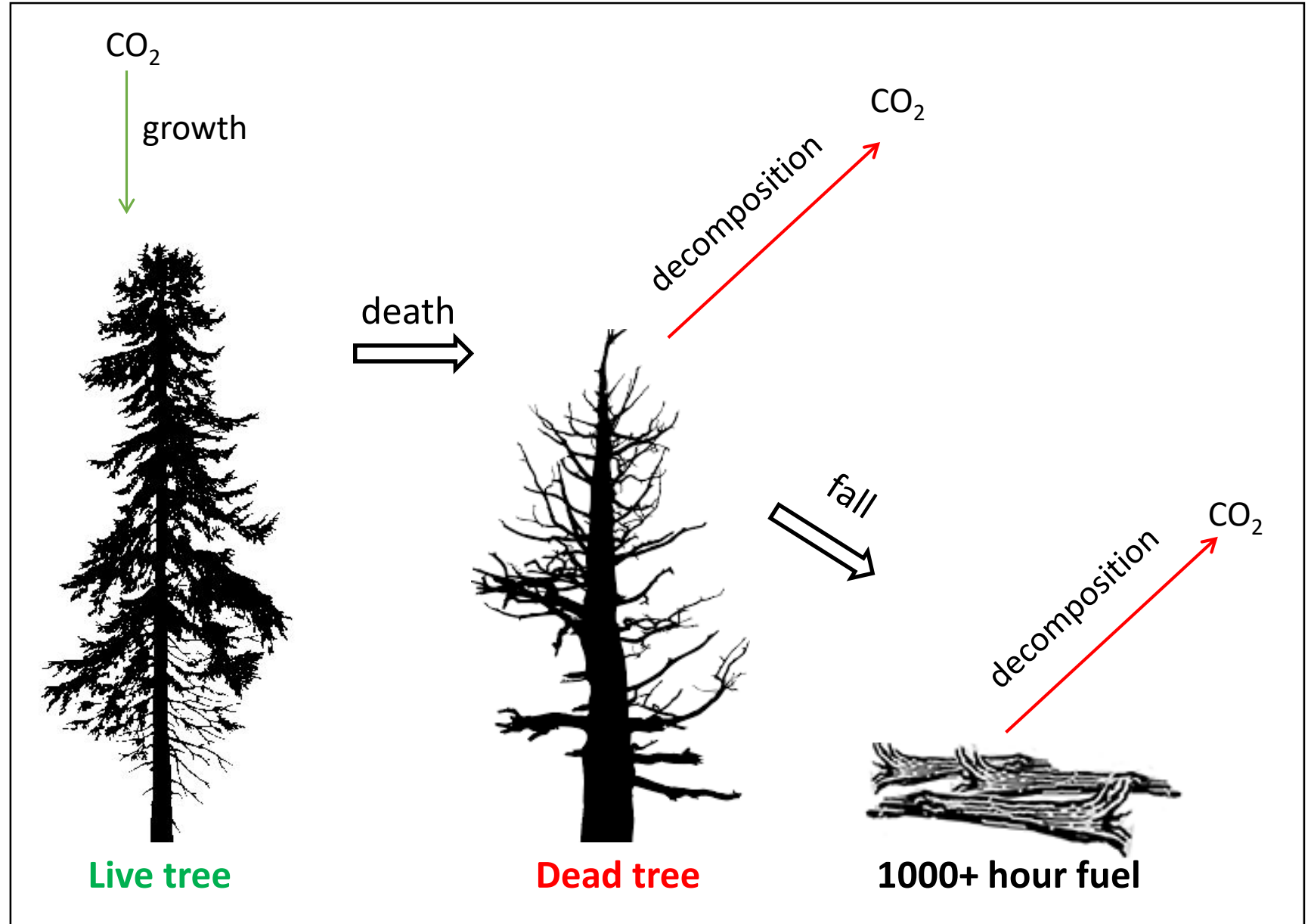


FIG. 1. Mean density of *Abies concolor* boles as a function of time since falling. The density of boles on the ground for more than 24 years was adjusted to reflect volume losses.

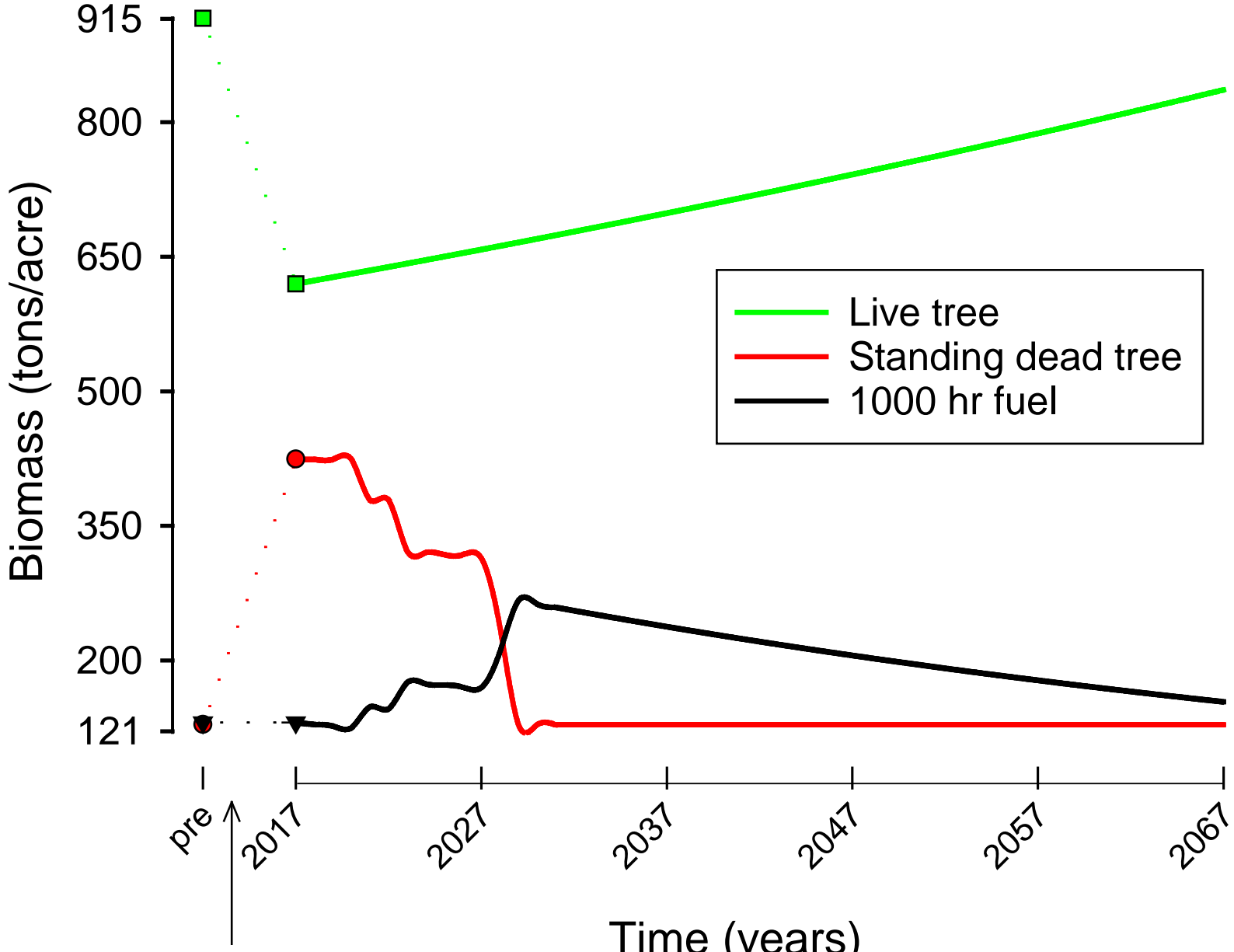
Dead tree cycle



Dead Tree Cycle: Preliminary model

Sequoia Kings Canyon National Parks

2014-2017 Mortality
31% loss of live tree biomass
330% increase in dead tree biomass



2014-2017 mortality event

Fuel Distribution 2017 vs 2030

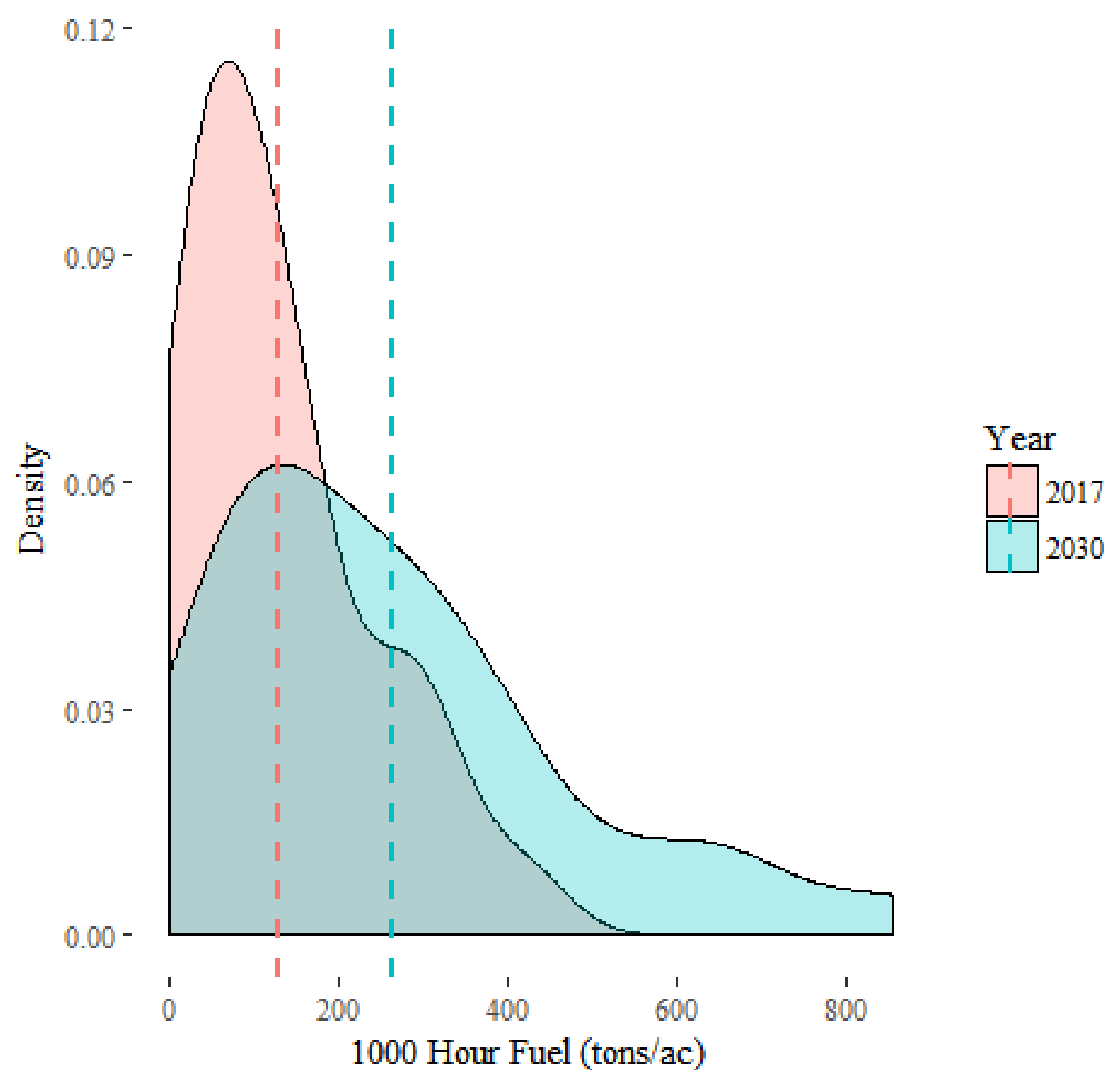
By 2030

1000+ hour fuel load doubles

75% of the plots > 100 tons/ac

90% have a least 60 tons/ac

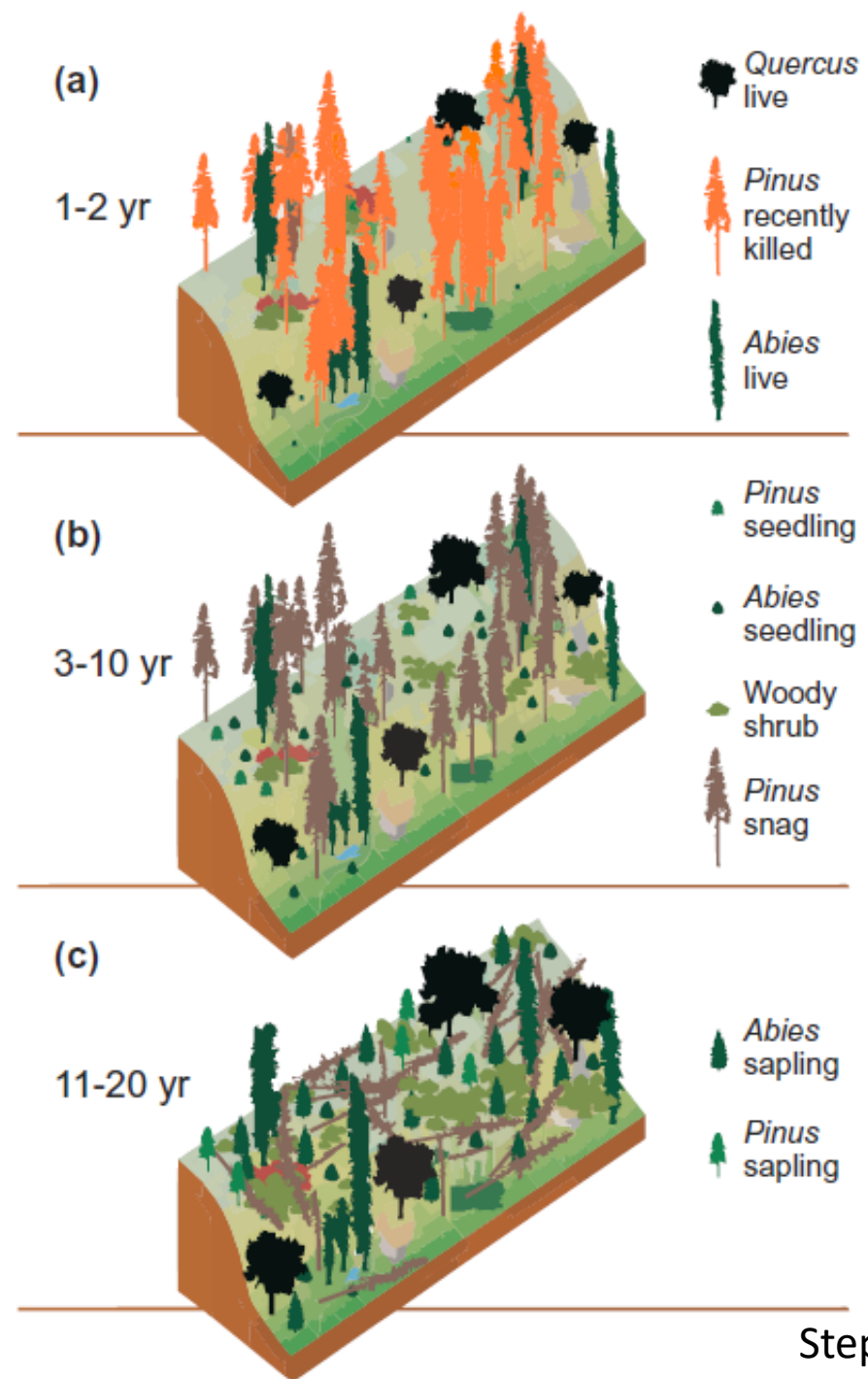
All plots with some 1000+ fuel



Quantifying theoretical risk

The scale of present tree mortality is so large that greater potential for “mass fires” exists in the coming decades...

Stephens et al. 2018
Bioscience



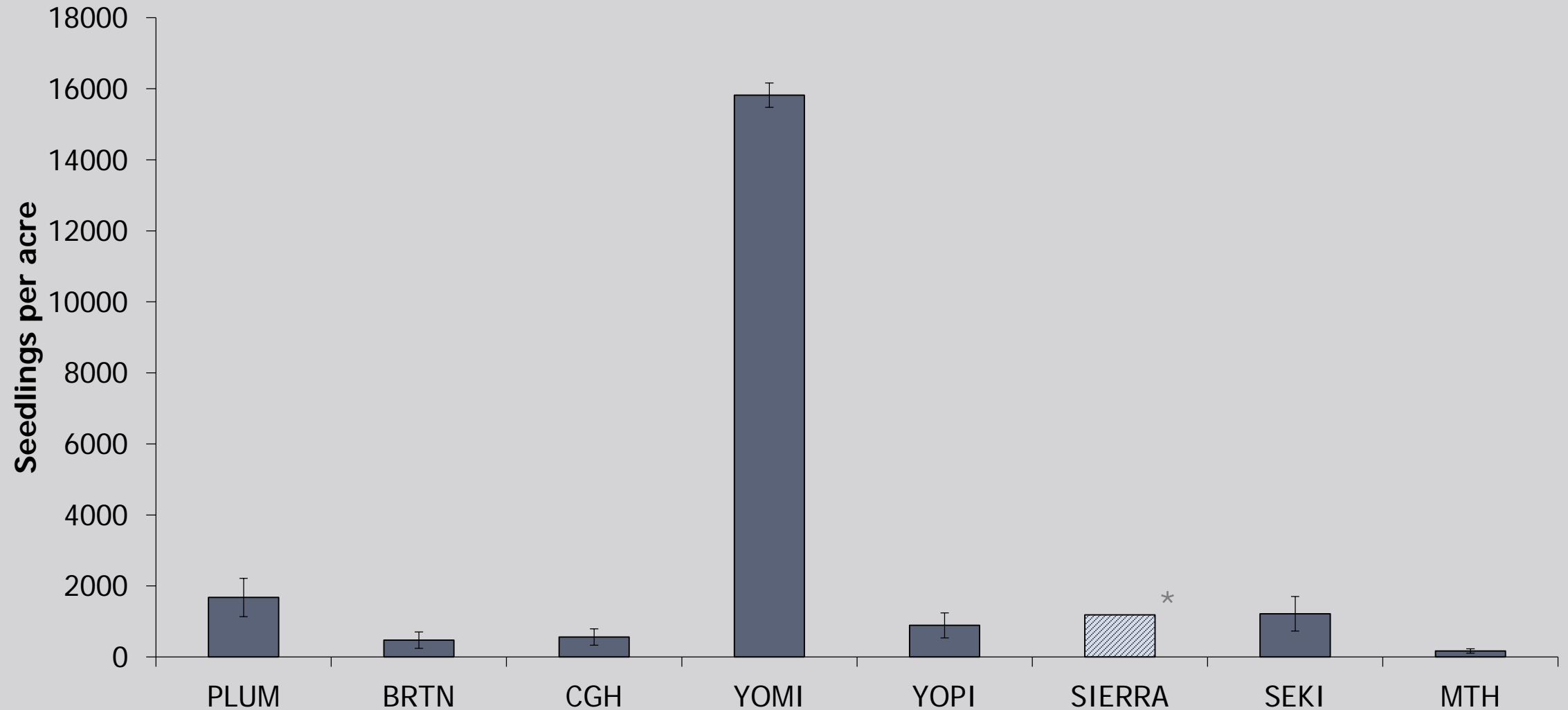
FOREST RECOVERY AFTER DROUGHT MORTALITY: PRELIMINARY RESULTS FROM SUMMER 2017

Lauren Cox, PhD student, UC Berkeley



Seedlings

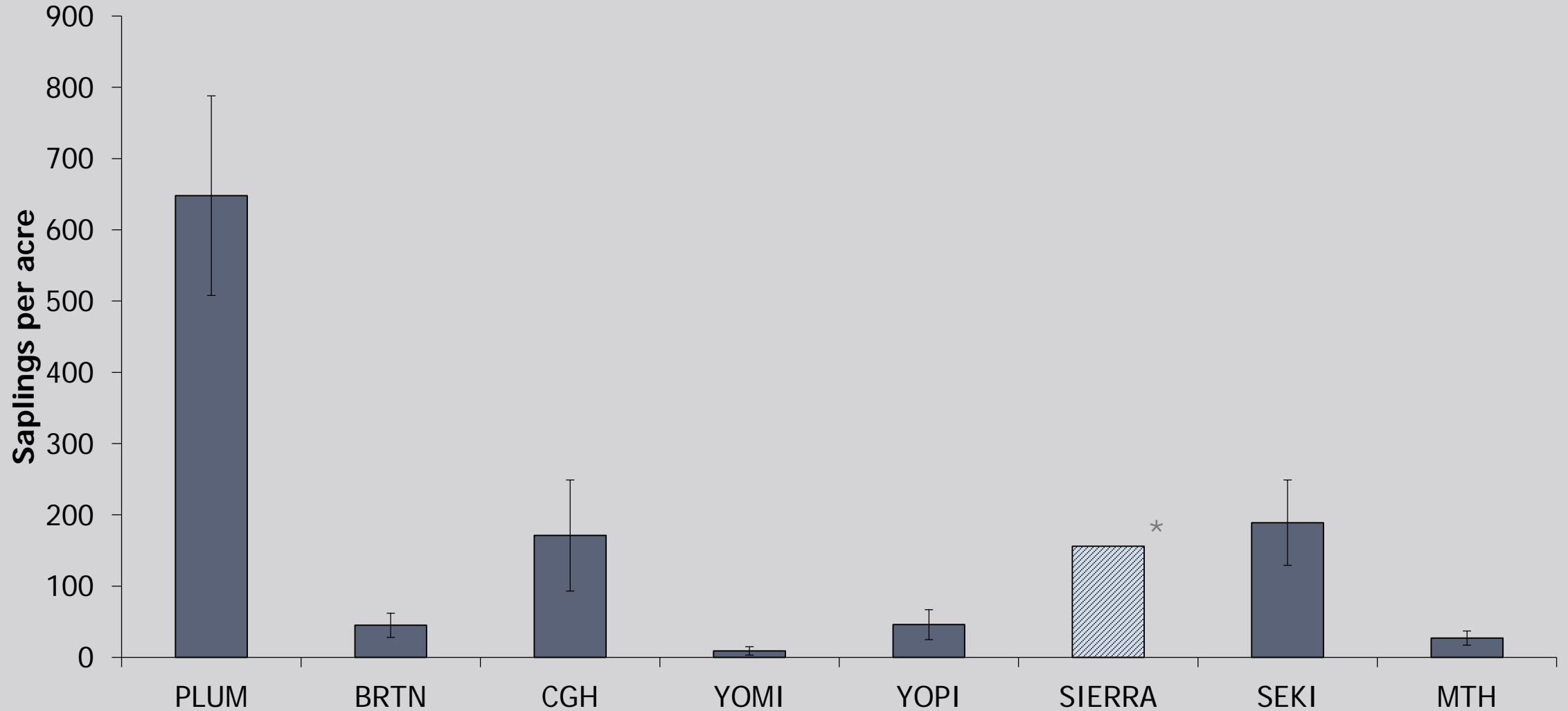
stems < 4.5 ft



* Data shared by Sharon Hood

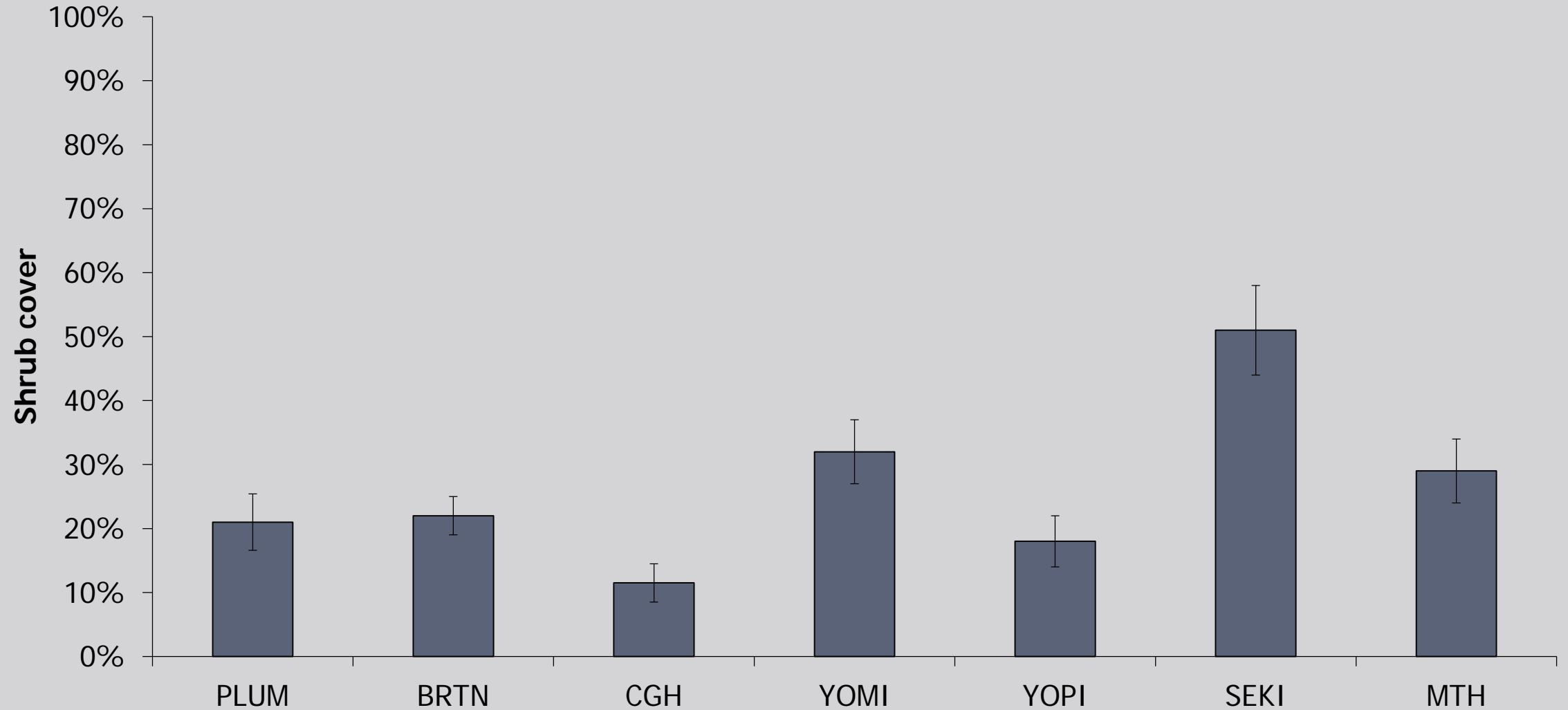
Saplings

stems \geq 4.5 ft ht, $<$ 4 in DBH

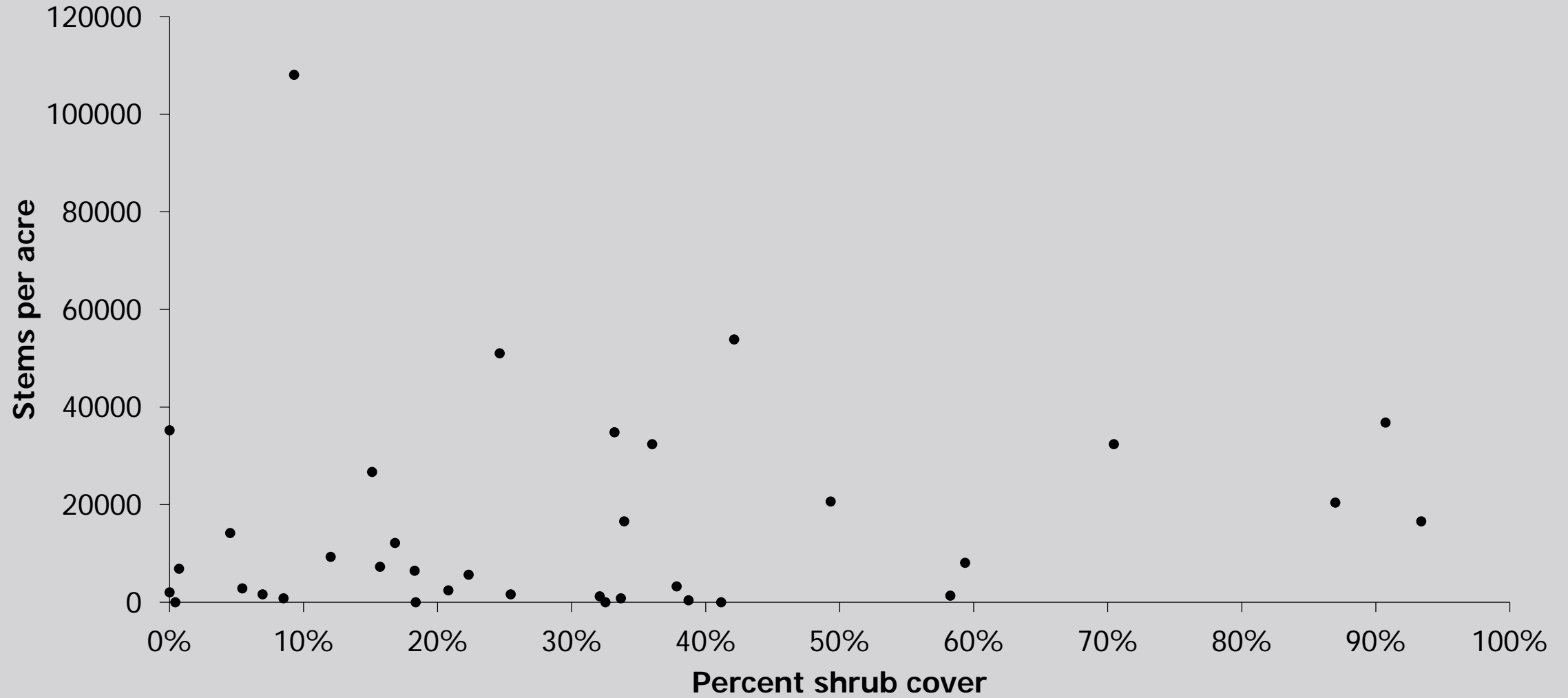


* Data shared by Sharon Hood

Shrub Cover

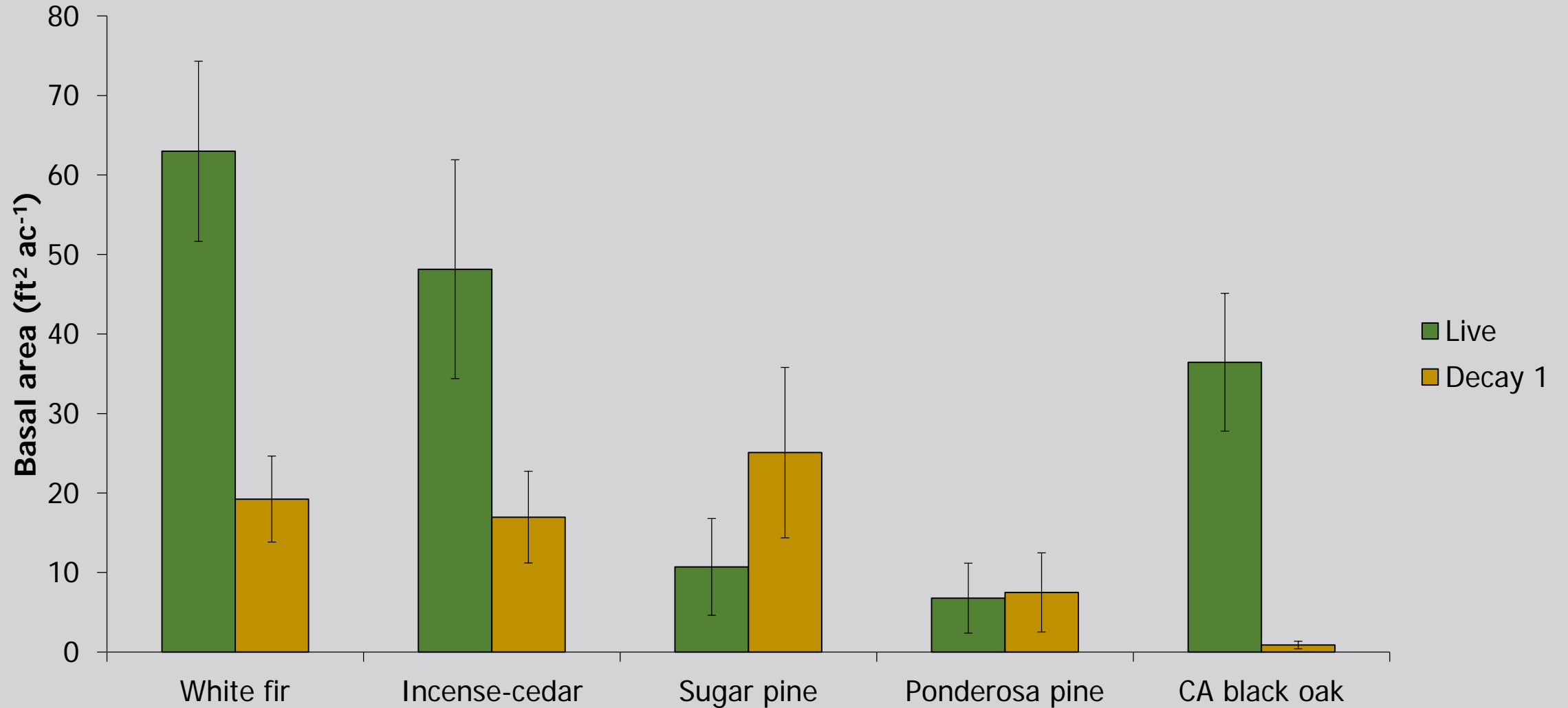


Yosemite Mixed Conifer Site



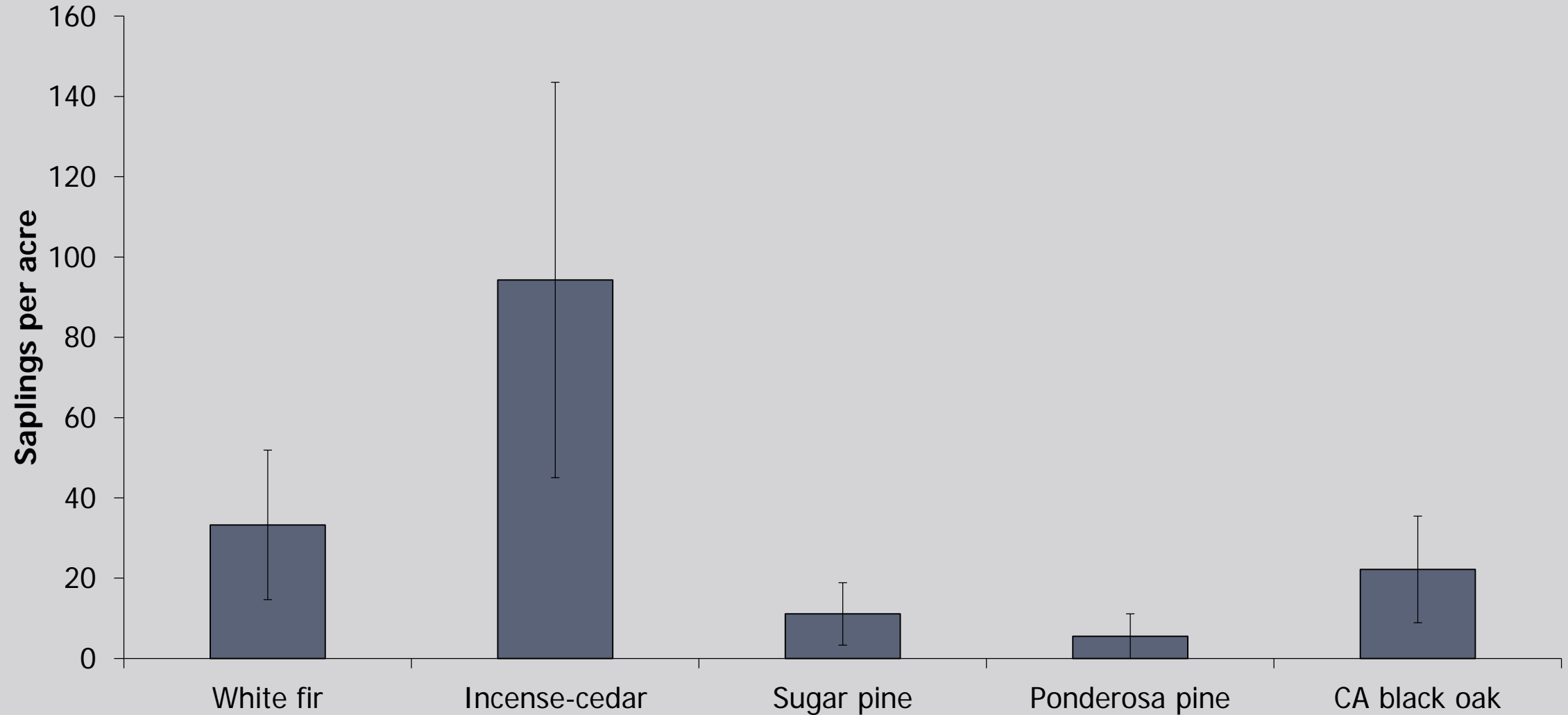
Sequoia-Kings Canyon

Trees: stems ≥ 4 in DBH



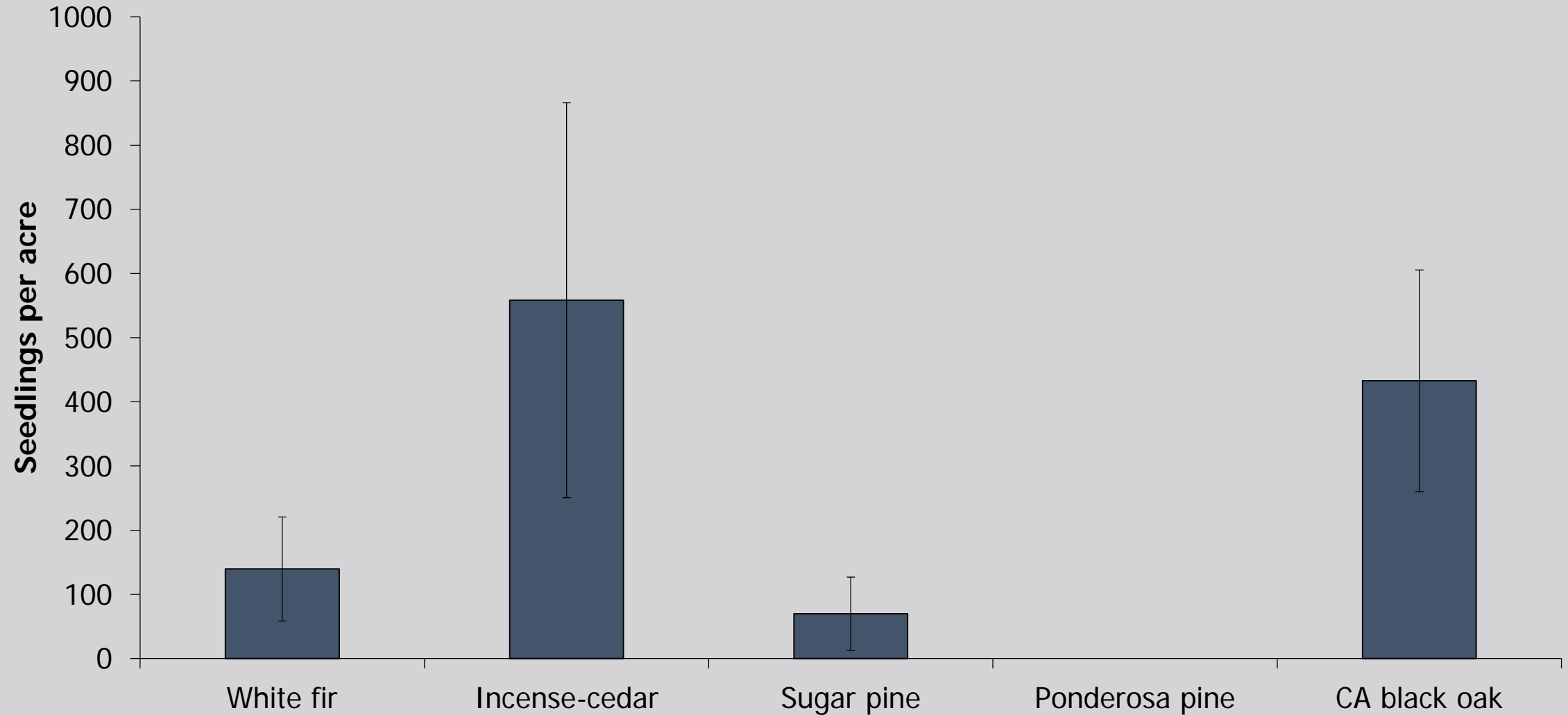
Sequoia-Kings Canyon

Saplings: stems ≥ 4.5 ft ht, < 4 in DBH



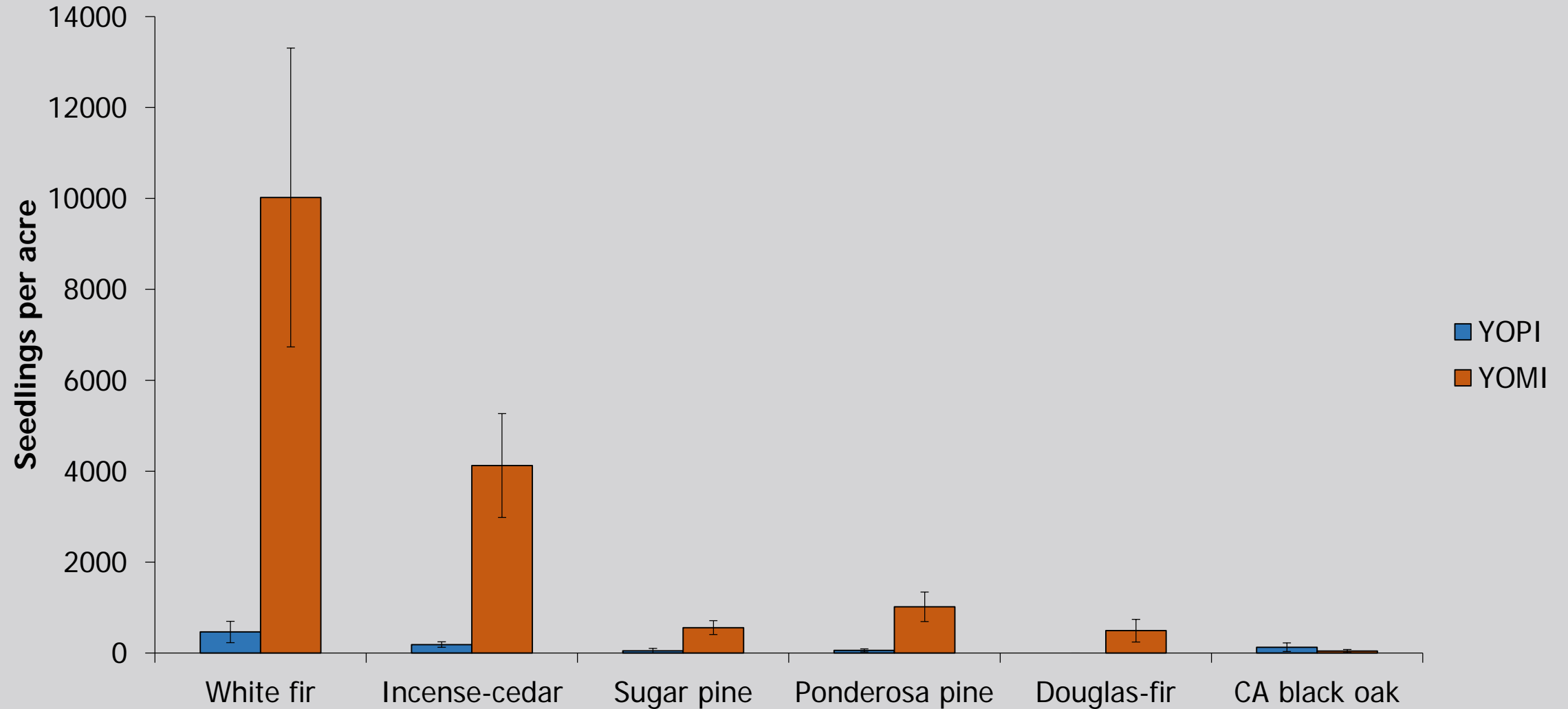
Sequoia-Kings Canyon

Seedlings: stems \leq 4.5 ft ht



Yosemite DX Sites

Seedlings: stems < 4.5 ft ht



Yosemite DX Sites

Saplings: stems ≥ 4.5 ft ht, < 4 in DBH

