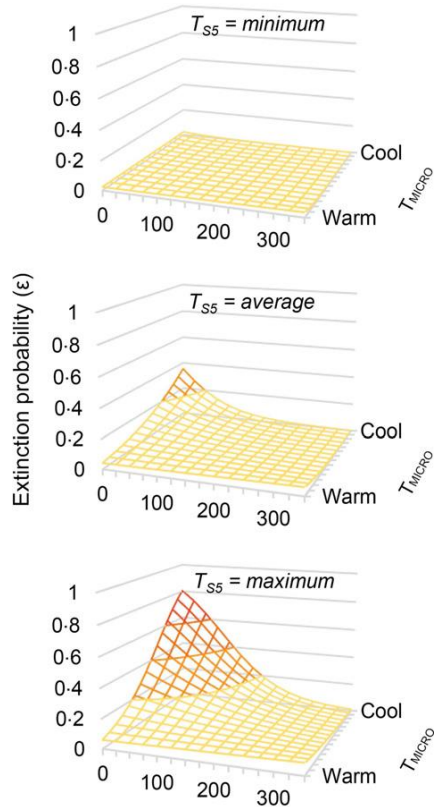


USFS Refugia Information Needs

In the Southern Sierra

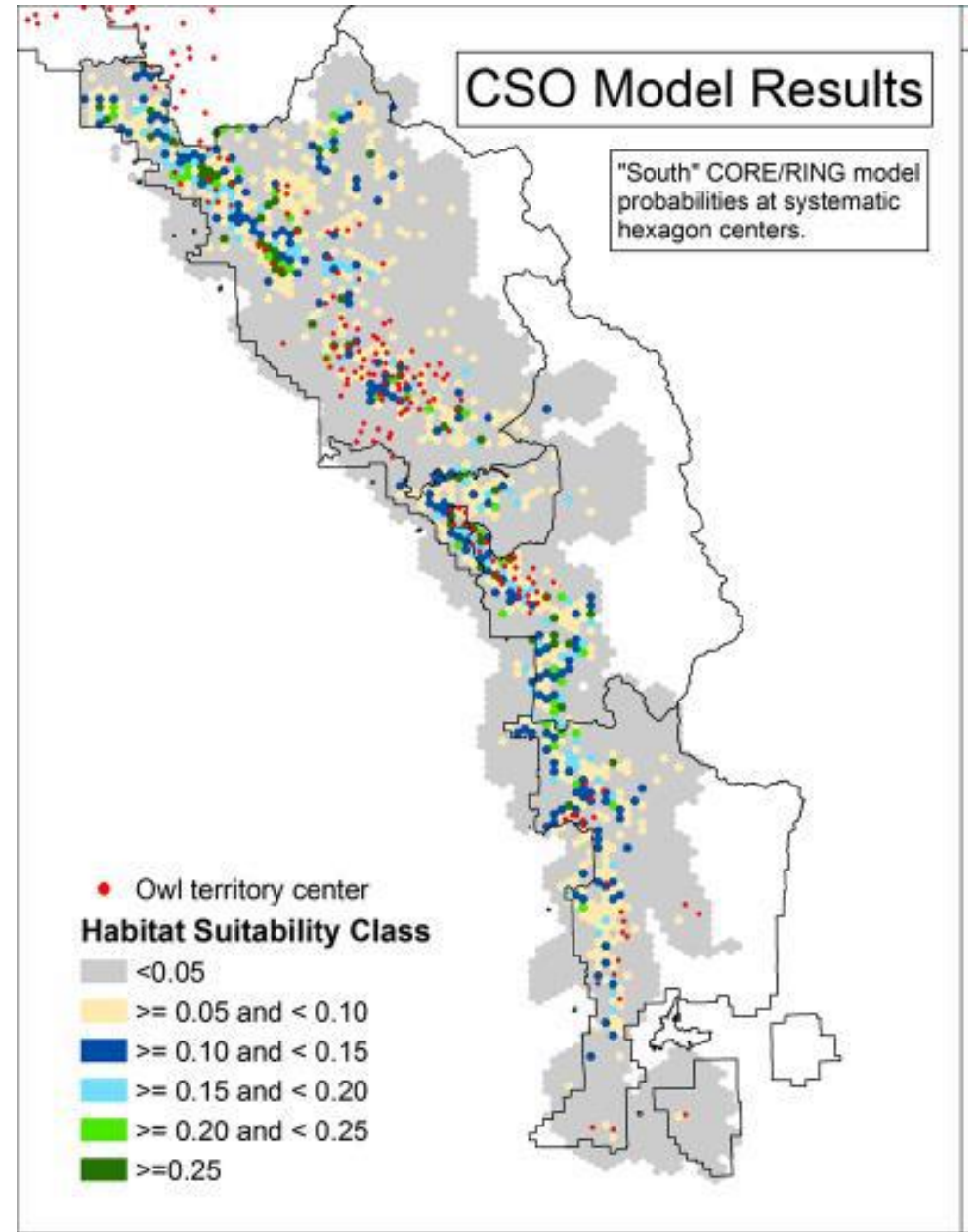
The 'future' wildlife habitat

- Where is 'big tree-high canopy cover' sustainable in the future?
 - CWD, topography, etc.



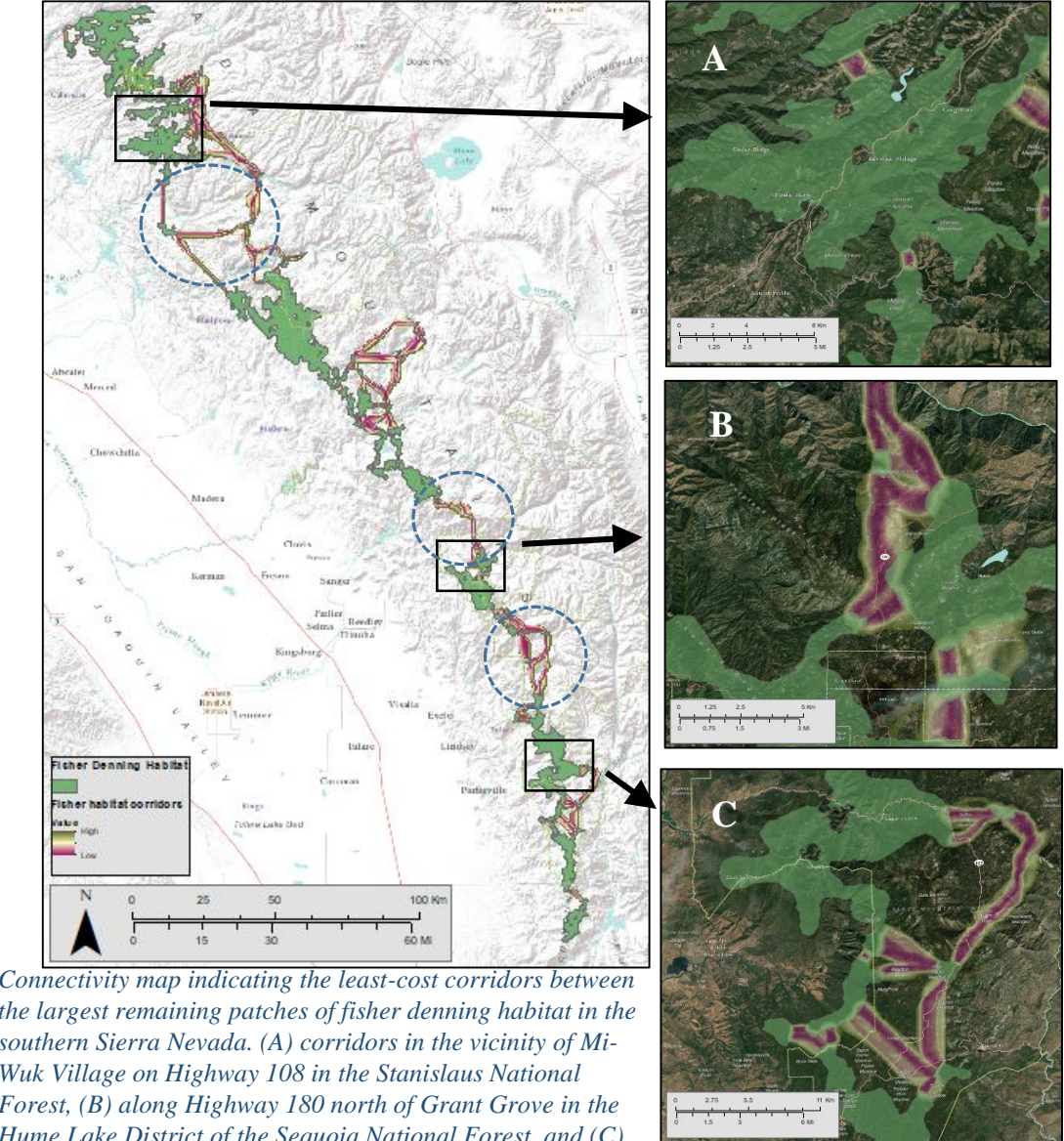
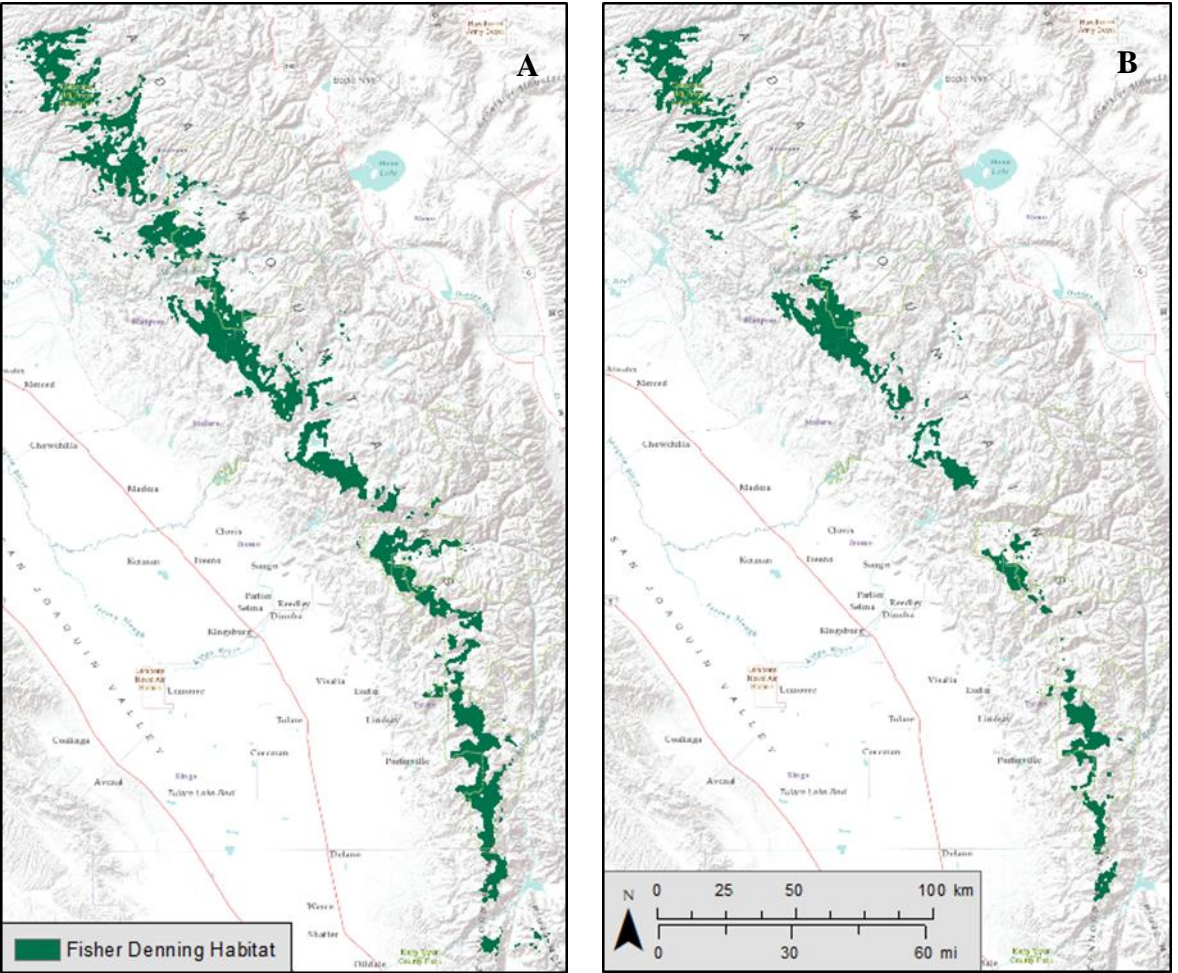
“the negative impacts of warming on spotted owl occupancy became less severe as the amount of closed-canopy forest increased”

Area of closed-canopy forest (ha)
 Jones et al. 2016: Relationships between closed-canopy forest, thermal microclimate and the extinction rate when 5-year summer temperature is held to its (a) min, (b) avg, (c) max values observed over the study period.



J. Keane unpublished

Connectivity for threatened terrestrial mammal



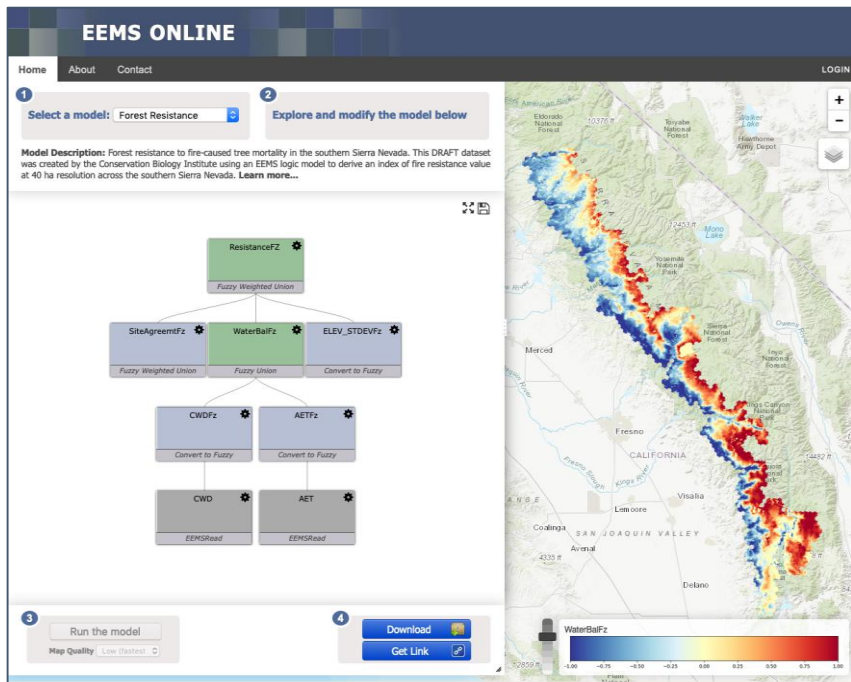
Connectivity map indicating the least-cost corridors between the largest remaining patches of fisher denning habitat in the southern Sierra Nevada. (A) corridors in the vicinity of Mi-Wuk Village on Highway 108 in the Stanislaus National Forest, (B) along Highway 180 north of Grant Grove in the Hume Lake District of the Sequoia National Forest, and (C) along the border of the Tule River Reservation and the Sequoia National Forest near Highway 107. Dashed circles indicate regions where long, linear corridors exist without intermediate habitat patches.

Figure 2. Pre- and post-drought distribution of fisher denning habitat across the Southern Sierra Nevada. Left panel (A) shows habitat based on 2012 vegetation data and pre-2014 fisher locations. Right panel (B) shows the same habitat model based on 2016

Fire Mortality of Giant Sequoia (in hydrologic refugia)



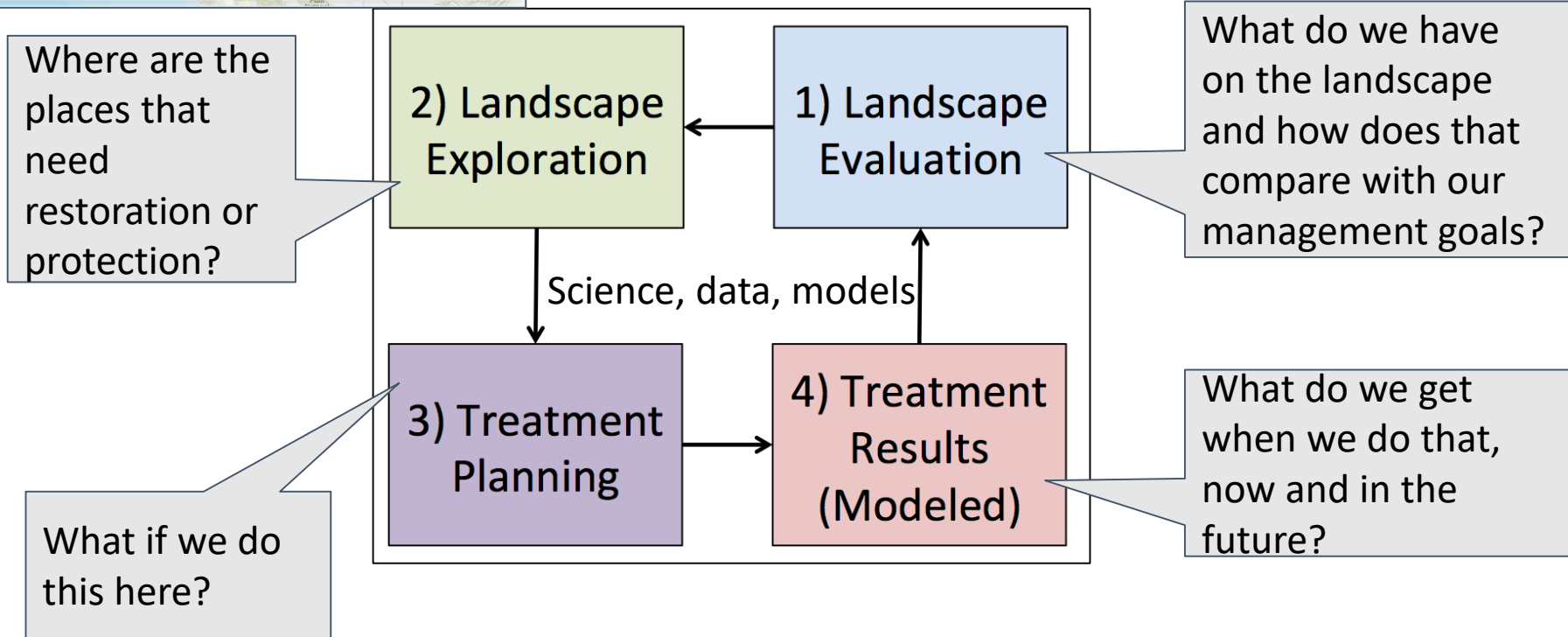
Fuels reduction work to protect groves: prioritize groves based on most vulnerable or most likely to be successful (varying degrees of refugia quality) to help focus where and how



Forest Resilience Initiative

Objectives:

- Map forest resilience on the landscape to help prioritize areas for management actions.
- Provide tools to explore treatment scenarios and refine projects
- Monitor changes in habitat quality and resilience over time



And more...

- Pinyon pine is both experiencing higher than normal mortality in persistent woodlands AND expanding into bi-state sage-grouse habitat (sage-grouse tend to not select habitat near trees). Historical studies have shown pinyon pine is very sensitive to climate change. We need to
 - How to balance removing pinyon from expanding areas that threaten sage-grouse habitat with allowing pinyon to move into climate refugia that will help them maintain populations?
- Piute cypress groves (a rare cypress species only found near Lake Isabella) are blinking out due to too frequent human caused fire and insect related mortality. Some groves are doing well (perhaps they are located in climate and fire refugia).
 - How to identify why some are doing better, and inform potential to protect those groves with more intense management (e.g. fuel breaks)

