The influence of wildfire on mule deer habitat selection in eastern Oregon

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INTRO

- **Fire suppression** has drastically altered ecosystems across the western United States, resulting in more frequent, larger, high-intensity wildfires.
- Mule deer are considered **a landscape species** because they require a mosaic of habitat types, shift habitat requirements based on season or movement behavior, are vulnerable to land use changes, and are of socio-economic value to local communities.
- Understanding how mule deer in a mixed-migration population respond to wildfire can aid in **determining conservation or restoration opportunities** that are coordinated at a landscape scale.

METHODS

- GPS radio collar data from mule deer (winter, **n=148**; summer: high **n=94**; summer: low **n= 34**)
- **Wildfire Spatial Data**: 5 categories of time-since fire: 1-5yr (n=12), 6-10yr (n= 13), 11-15yr (n= 18), 15+yr (n= 10), and no burn
- We calculated 3 separate (winter range; summer: high elevation; summer: low elevation) resource selection functions (RSFs)

RESULTS

- **Summer:** wildfire had strong negative effects on habitat selection initially (years 1-5 post-fire) but a strong positive effect in years 10-15 following fire in the summer, regardless of elevation
- **Winter** wildfire had strong positive effects initially (years 1-5 post-fire) but a strong negative effect 10-20 following a fire.

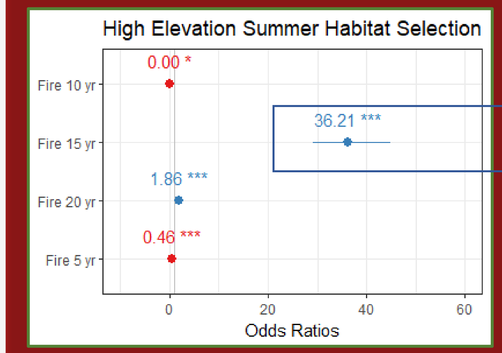
DISCUSSION

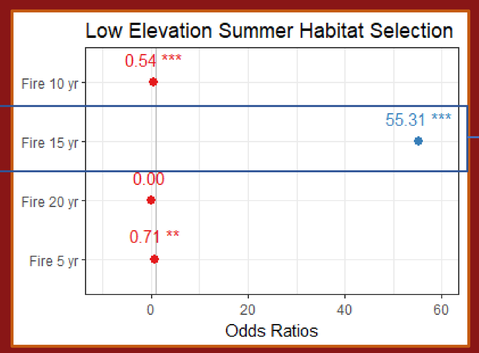
- Recently burned patches may offer **better forage**, however, the relative attractiveness of forage appears to vary by season and elevation.

- Mule deer use a mosaic of different aged burns throughout the year at a landscape scale. However, many other wildlife species benefit from burn heterogeneity or specialize in specific-aged burns making a patchwork of different-aged burns beneficial for a **multitude of taxa**.

A landscape with a mosaic of different-aged burns is beneficial to wildlife across seasons.

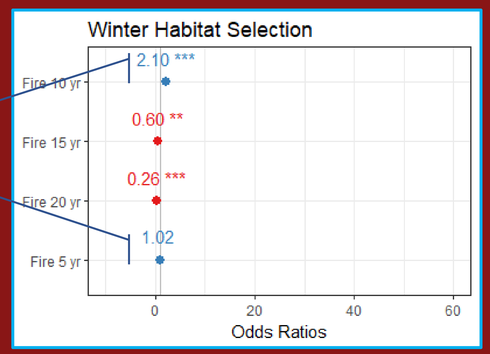
Figure 1 . Odds ratios for time since fire <5 years (Fire 5yr), time since fire 6-10 years (Fire 10yr), time since fire 11-15 years (Fire 15yr), and time since fire 15-20 years (Fire 20yr) obtained from resource-selection functions for adult female mule deer for the winter (Dec-Mar, *n* =148) and summer range ((Jun-Aug), high elevation (*n*=94), low elevevation (*n*=34)) in the Blue Mountain ecoregion Oregon, USA during 2015-2017. Odds ratios indicate the percent change (1 =no change) in odds of use by mule deer for each habitat type relative to when habitat is unburned. Blue symbolizes positive effect and red symbolizes negative effect. Asterisks represent levels of significance: 3 (*P* <0.0001), 2 (*P* <0.001), 1 (*P* <0.01), none (*P* <0.1).





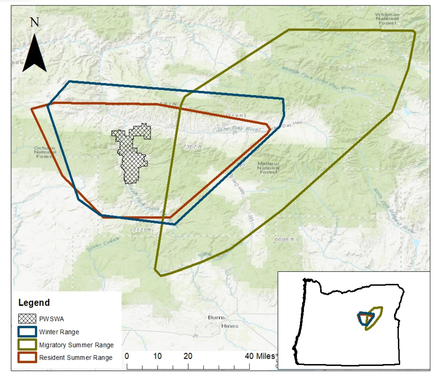
In the summer, mule deer strongly select for areas that have burned 11-15 years ago, regardless of elevation.

In the winter, mule deer strongly select for areas that have burned 0-10 years ago.



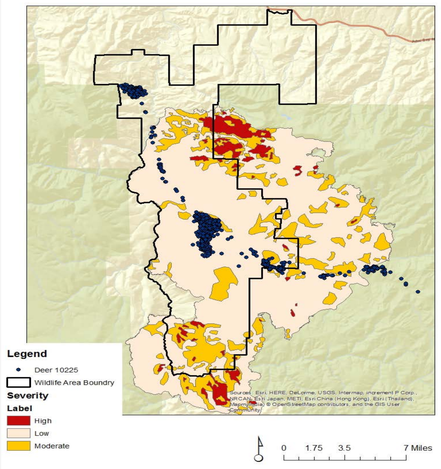
Study Area

Figure 2. Map of study area of adult female mule deer winter (Dec-Mar, *n* =148) and summer ranges ((Jun-Aug), migratory (*n*=94), resident (*n*=34)) in the Blue Mountain ecoregion Oregon, USA during 2015-2017.The cross-hatched polygon in the center is the Phillip Schneider Wildlife Area.



Spatial Data Example

Figure 3. Example of GPS collar data (blue dots) and wildfire remotely sensed data used in RSF model .



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