

Temporal and spatial variability of the importance of germination microsite to *Abies magnifica* seedlings on arid range margins

Michelle Hochrein, michelle.hochrein@gmail.com

University of Nevada, Reno

Microhabitats created by vegetation can influence the emergence and establishment of conifer seedlings by altering temperature and soil moisture. *Abies magnifica* (California red fir) trees grow in a narrow band on the eastern slope of the Carson Range in the rain shadow of the Sierra Nevada. Microhabitat refugia may aid *A.magnifica* establishment and survival, particularly in dry years. We compared *A.magnifica* seedling establishment in open and shaded microhabitats across an altitudinal gradient. Seedlings and abiotic data were sampled in 2011 and 2012. In 2011 (a year with higher than average snowpack), seedling observations and soil moisture were uniform among microhabitats and elevations. However, in 2012 (a year with lower than average snowpack), soil moisture was non-uniform across microhabitats and elevations. Significantly more seedlings were observed in microhabitats with greater subsurface moisture: open microhabitats at high elevations and shrub-shaded microhabitats at low elevations. Fewer first-year seedlings were observed in 2012 than 2011, suggesting pulses of seedling emergence in wet years and declines in dry years. Shrub facilitation was important to *A.magnifica* seedling emergence, particularly at low elevations in dry years. Thus, shrub cover may be vital for maintaining forest structure and composition at lower elevations if snowpacks decline in a changing climate.

Key words: Microhabitat, Facilitation, *Abies magnifica*, Seedling emergence, Sierra Nevada