



The impact of restoration treatments on the germination of *Quercus pacifica* on Santa Rosa Island

Dulce Lopez¹, Kathryn McEachern², and Ken Niessen³

¹Cal State Channel Islands, ²U.S. Geological Survey, ³Mountains Restoration Trust
¹dulcemlopez94@gmail.com, ²kathryn_mceachern@usgs.gov, ³kenneth_niessen@nps.gov



Introduction

Santa Rosa Island (SRI) is part of Channel Islands National Park off the coast of Santa Barbara County. SRI has an extensive ranching history. The island was grazed until 1998 and a deer and elk hunting business was run until 2011. These activities led to extensive ecological degradation. In December of 2015, the Cloud Forest Restoration Project began with the goal of restoring the island ecosystem on Soledad Ridge. Part of the restoration project involves the planting of *Quercus pacifica* (island scrub oak) acorns. This research project involved surveying the survivorship and germination success of island scrub oaks in an effort to understand the impact of active restoration on germination.



Cloud Forest on Soledad Ridge, Santa Rosa Island

Methods

Island scrub oak acorns were hand-collected in October of 2016 & an estimated 3000 were planted in December of 2016 at four sites located on Soledad Ridge.

- Acorns were planted along irrigation lines with emitters under each of these restoration treatments.
- Four oak acorns were planted at each emitter, and four more were planted at 12" west of each emitter.
- The number of oak seedlings at each emitter and 12" west of each emitter were counted and recorded in July 2017.



Quercus pacifica Seedlings

Restoration Treatments



Control Treatment

Wattle Treatment

Fog Fence Treatment

The control treatment is composed of an irrigation line with emitters spaced at one meter intervals. The purpose of the emitter is to provide supplemental water to seedlings.

The wattle treatment is composed of an irrigation line with emitters spaced at one meter intervals and a wattle for erosion control and sediment retention.

The fog fence treatment is composed of an irrigation line with emitters spaced at one meter intervals, a wattle for erosion control, and a fence designed to harvest fog for extra moisture.

Results

Germination of oak seedlings
Based on Treatment

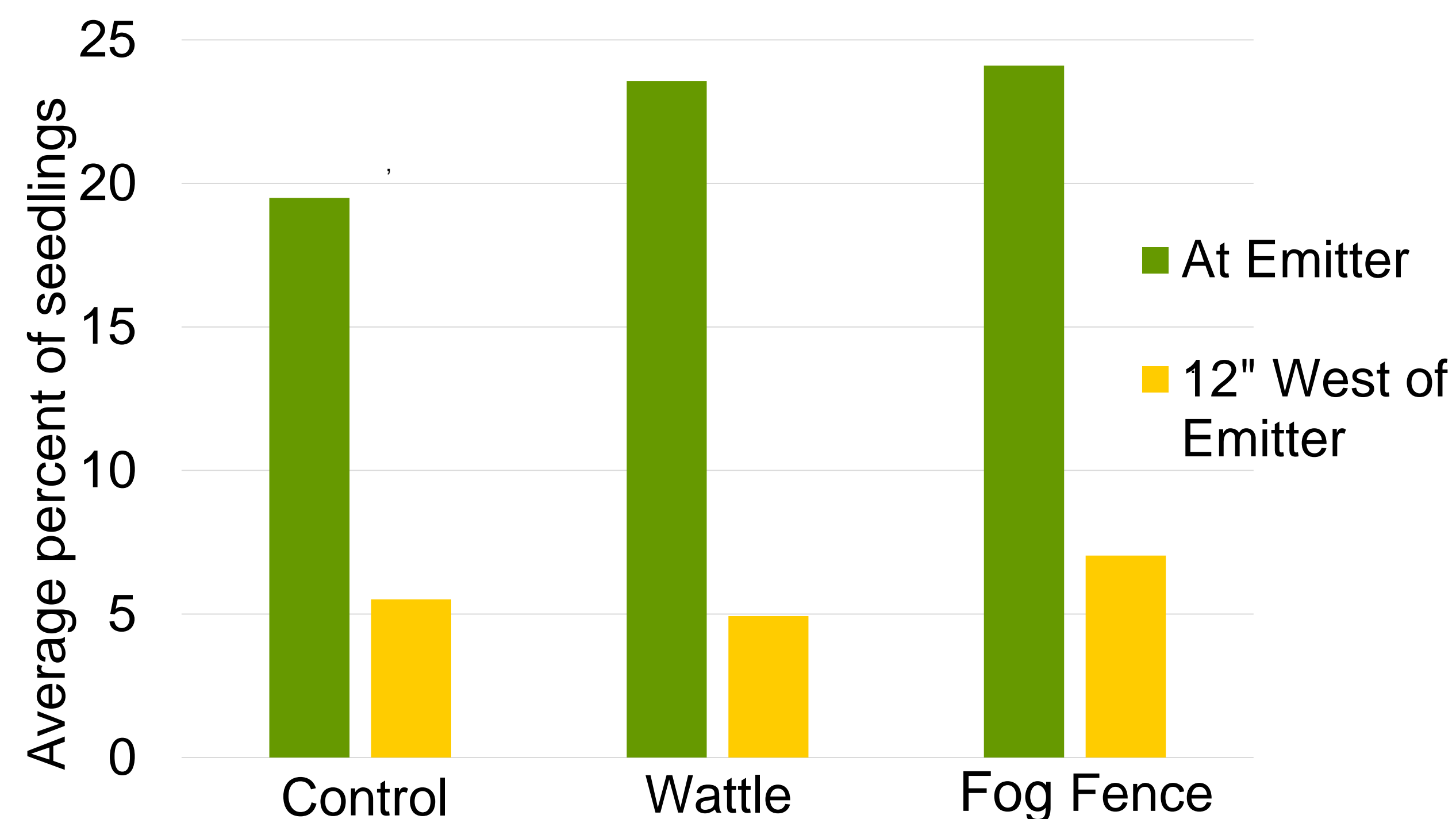


FIGURE 1: The figure above displays the average percentage of oaks that germinated from December 2016 to July 2017. The bar graph indicates there is a higher percentage of oaks that germinated at an emitter versus 12" west of the emitter. There appears to be a higher success of germination for the fog fence treatment in comparison to just the control treatment.

Discussion

The island scrub oak is an important species to the island plant community and overall plant ecosystem on the island. The unique leaf morphology of the island scrub oak allows for this plant species to harvest water from fog drip during episodes of dense fog. Due to the potential of fog harvesting from the scrub oaks, it is important to understand how we can better insure germination success of the island scrub oak and how germination rates are being impacted by active restoration. Success of the island scrub oak would aid in the long term success of sustainable vegetation. The next step of the study will focus on measuring and monitoring the growth and continued survivorship of the island scrub oak seedlings.

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