

Measuring the Threat of Invasive Species, *Ehrharta calycina* in the Guadalupe Nipomo Dune Complex

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ABSTRACT

The Guadalupe Nipomo Dune Complex (GNDC) is within the California Floristic Province, an area recognized for its high rate of endemism and exceptional loss of habitat (Myers 2000). In 1980, the US Fish and Wildlife Service described the Guadalupe Nipomo Dunes Complex as, “the most unique and fragile ecosystem in the State of California,” and ranked it first on a list of 49 habitat areas needing state protection. It is the largest coastal dune area in California and it is one of the last remaining relatively intact ecosystems of its type and size in the Western United States (US Fish and Wildlife 2000). One of the major threats to this ecosystem is the introduction and spread of *Ehrharta calycina* (Purple Veldtgrass). Little is known about this perennial grass other than its increasing dominance in the coastal dune ecosystem. My research focuses on gaining imperative information about *E. calycina* which will aid in the restoration and preservation of native plant communities within the coastal dunes. I will introduce the preliminary data found in a field experiment to calculate rate of spread and the affects of the dormant seedbank on its proliferation. This information will help guide future management of *E. calycina* in the coastal dune habitat.



BACKGROUND

The Guadalupe Nipomo Dune Complex (GNDC) is located within San Luis Obispo and Santa Barbara Counties and spans the coast from Pismo Beach in the north to Point Sal in the south. The GNDC encompass over 22,000 acres and stretches along 18 miles of coastline (California Dept. Fish and Game 1976). These dunes support an abundant diversity of plant and animal species, many of which can only be found in this area.



The native flora of the GNDC is threatened by the introduction of invasive species with the largest threat being *E. calycina* (Purple veldtgrass). *Ehrharta calycina* is a perennial grass species originally from South Africa and holds a “High” CAL-IPC inventory rating. *Ehrharta calycina* is spreading very rapidly in the central coast region, where it invades dunes and shrublands (CAL-IPC, 2004). It is a prolific seeder and seeds may lay dormant in the sand, creating a substantial seedbank. The windy conditions of the coast also aid in dispersal of seeds. Established individuals also can rapidly increase their size by tillering, a process done by many grass species in which multiple new stems develop from the parent shoot, quickly increasing the mass of each plant. *Ehrharta calycina* is quickly iestablishing itself in critical habitat for many of our listed and endemic species and changing the coastal dune ecosystem dramatically.

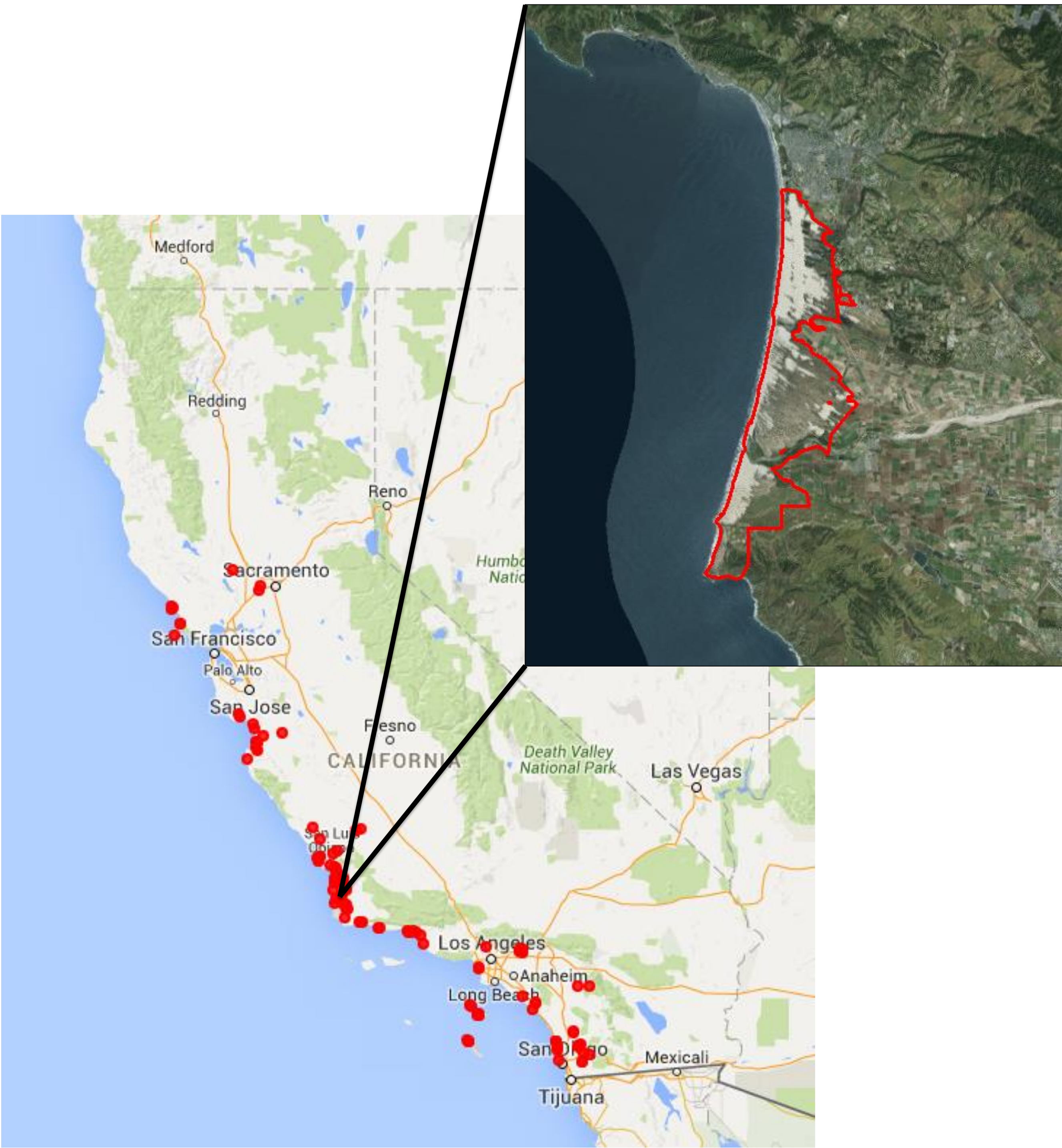
Question: What is the contribution of the seedbank to the spread of *Ehrharta calycina* in the coastal dune habitat?

EXPERIMENTAL DESIGN

My field experiment is currently being conducted on the Oceano California State Park in Nipomo, CA. An access agreement with California State Parks and the Land Conservancy of San Luis Obispo County has been made in order to survey the sites weekly. We randomly selected 10 sites from 18 locations where *E. calycina* is well established. We cleared two, one meter square plots at each site. In one of the plots at each site, the surface vegetation and debris was removed. On the other plot, we sifted the sand to remove the seedbank. Each survey visit, we used a transect of 5 cm squares to determine the presence or absence of *E. calycina* in each of those squares. Overtime, we will be able to calculate the rate of spread and the affect the seedbank plays in its establishment.



Figure 1. (a) plot within the “With Seedbank” treatment group with surface vegetation and debris removed. (b) plot within the “Seedbank Removed” treatment group. (c) demonstration how seedbank was removed from, “Seedbank Removed,” treatment group. (d) transect used to evaluate presence or absence.



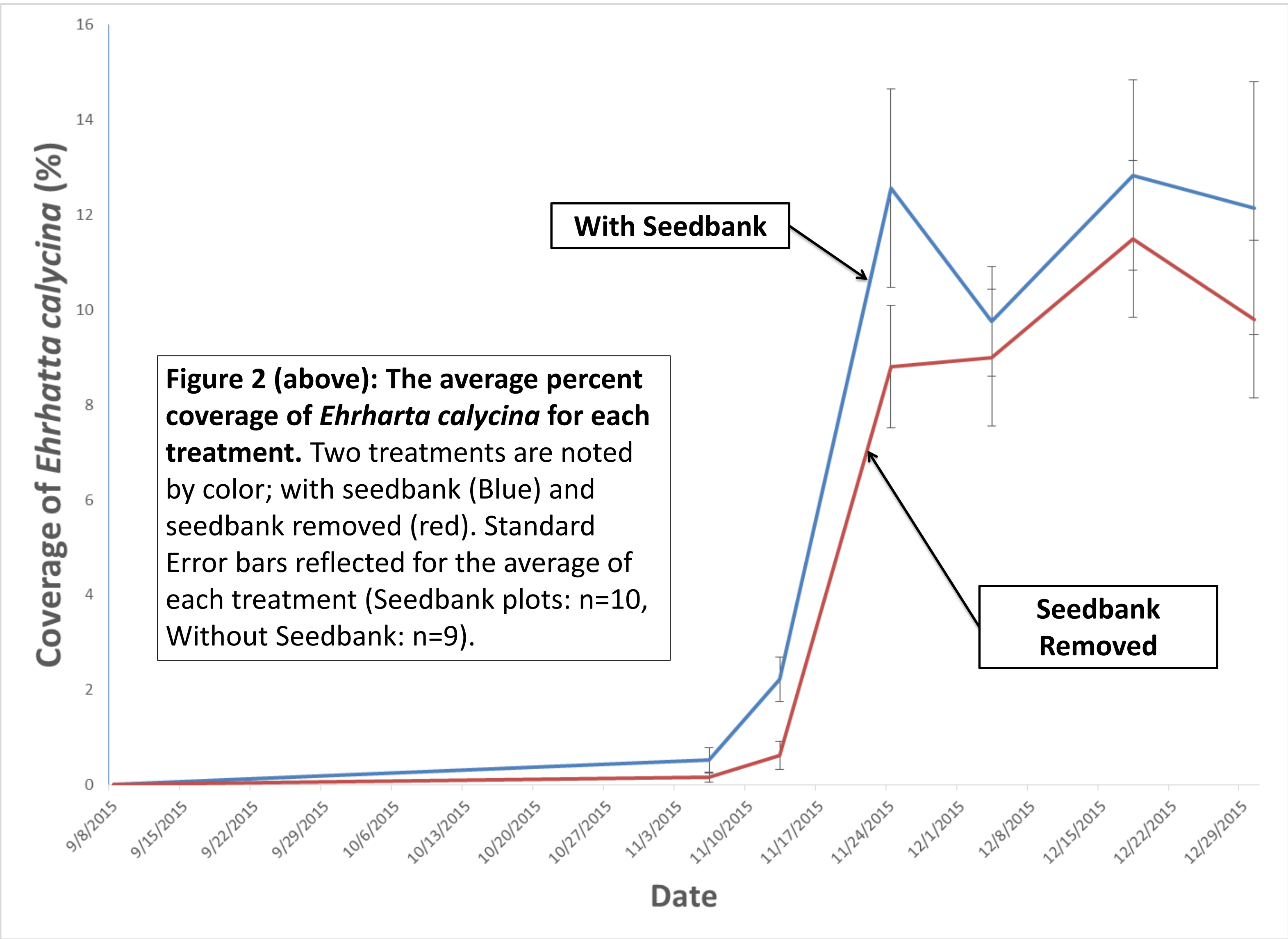
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PRELIMINARY RESULTS



DISCUSSION

The preliminary results observed show no significant difference between when the previous years seedbank is present or removed. The removal of previous years seedbank does not seem to affect the overall coverage of *E. calycina*. This indicates the importance of the current years seed dispersal as the most important method of proliferation in the coastal dune habitat. *Ehrharta calycina* produces a large amount of seeds compared to its native competitors and could be the explanation for its success in this habitat. It is also possible the seedbank plays a larger role in mid-season germination and data will continue to be collected through the rest of the season to answer that question. This data strengthens our knowledge about how to manage for this invasive species and stresses the importance of removal before fruit is produced. A new Biodiversity Conservation Plan is currently being created and these results will help in the modelling of *E. calycina* and the selection of protected areas using Marxan conservation selection software.



Figure 3: Plot with in “Seedbank Removed,” treatment after four months of observation. *Ehrharta calycina* is beginning to tiller and spread in the plot.