



Dunes Climate Ready Grant Update

August 2016 - October 2016

DUNES CLIMATE READY GRANT QUARTERLY UPDATE

The Dunes Climate Ready Grant (Coastal Vulnerability and Adaptation Study) is funded in part by the State Coastal Conservancy's Climate Ready Program. It is designed to further our understanding of how climate change will impact Humboldt's coastal dunes and test the effectiveness of different adaptation strategies. We expect our coastal dunes to be affected by sea level rise as they are forced to adapt and move east, away from the encroaching ocean. As part of the education and outreach component of the grant, quarterly email updates are sent to email subscribers keeping them up to date on the progress of the grant.

Fifth Quarterly Update, August 2016 - October 2016

The Dunes Climate Ready Grant is at approximately the halfway point. To learn more about the project, previous updates can be found [here](#).

2016 Summer Field Survey

Most of the summer survey was completed by early October. In-kind matches of labor from other collaborators were an important contribution, comprising more than 50% of the labor needed to complete the survey. Work is now underway to review and clean all collected data from the winter and summer surveys. Having two intervals for most of the transects gives us the ability to look for inconsistencies for the first time. Once the data has been cleaned it will then be ready for analysis.

Lanphere Adaptation Site

The 1.25 acre Lanphere adaptation site is part of a controlled experiment to examine the effects of native vs. invasive plants on sand deposition and other aspects of dune ecology and response to climate change. The experiment was intended to be completed with manual *Ammophila* (European beach grass) removal. However, unforeseen scheduling conflicts caused a delay in manual removal, and the emergence of re-sprouts prompted the need for additional treatment. Because the study involves measuring sand deposition and other dune attributes, hand-pulling at the time would have caused excessive sand movement, compromising the integrity of the study. These circumstances are what prompted the US Fish & Wildlife Service (USFWS) to apply herbicide to *Ammophila* resprouts in March. Mortality from the herbicide application was approximately 50% and *Ammophila* resprouts continued to grow during summer months. To maintain the integrity of the study, plants needed to remain in place, and thus were resprayed in September by USFWS. Planting of native plants is scheduled for the current rainy season. The remaining live *Ammophila* will be manually removed prior to planting.



A 3d rendering of the North Spit Adaptation Site in April 2016 by Alana Rader, created from aerial kite imagery. The control area where *Ammophila* was retained is visible on the lower right.

University of Victoria Master's student Alana Rader revisited the site during the first week in September and completed a terrestrial LiDAR survey and kite mapping of the site. Yes, a camera was attached to a kite, and with the help of a coastal breeze, was flown to help map the dunes! Alana will be analyzing morphodynamic changes in the adaptation site from before the *Ammophila* removal through the first year.

Eel River Adaptation Site

The objective of this adaptation site is to test methods of rebuilding the foredune at a small breach/washover site on the Eel River Estuary Preserve. The transplanted native dune grass (*Elymus mollis*) culms planted in March were monitored in late September. Of the 270 plants that had survived to May, 189 or 70% survived to October. This survival rate was surprisingly high given the low initial survival of 25% after the *Elymus* was transplanted. The cause of summer mortality was not determined, but the photopoints demonstrate that there was little additional sand burial, which was the main cause of the high mortality in the two months following planting. This adaptation site will receive additional planting this winter. More driftwood was placed on the site by the Wildlands Conservancy this summer to help capture sand.

Friends of the Dunes (FOD) Adaption Site

The FOD propagation site was monitored in October. In contrast to the Eel River *Elymus* planting, this propagation site (which had shown high survival of 70% ten weeks after initial planting) underwent significant mortality between May and October. Of the culms still present on the site, only 37% were alive. The poor performance of the plants was probably in large part due to rabbit grazing. Almost 60% of the surviving plants showed signs of severe grazing, and rabbit pellets were abundant in the area. The fact that *Elymus* was present in small

but concentrated numbers, and surrounded by less palatable *Ammophila* may have caused grazing pressure to be much higher than in areas where it is mature and abundant.

Rather than trying to fence the area to keep herbivores out, it has been proposed to establish a new propagation site, possibly just north of the FOD boundary on Bureau of Land Management land where *Ammophila* was removed some time back. At a boundary between removed and retained *Ammophila*, there is commonly elevated erosion north of the boundary due to wind steering around the *Ammophila*. By establishing the propagation site there, *Elymus* plantings would be expected to slow the wind acceleration and reduce erosion of sand. Less grazing by rabbits would also be expected because the site is not be surrounded on three sides by *Ammophila* which provides habitat for and concentrates herbivores.



Top: Initial *Elymus* planting March 3, 2016

Bottom: Same site on November 1, 2016

El Niño Erosion

Mapping and photo-documentation of the scarps, measured after the winter El Niño storms, was resumed in October and will continue into November to determine the extent to which ramping has occurred and scarps have healed. Scarps are nearly vertical cliffs that often occur on the foredune during storm surges, and separate the otherwise level beach from the dunes above it.

Outreach

On August 31, Dr. Patrick Hesp, an internationally renowned expert on dune geomorphology, gave a public talk on Coastal Dune Systems and Sea Level Rise. His talk focused on the evolution of barrier dune systems, such as Humboldt Bay, and described the different ways in which foredunes can migrate inland during sea-level rise.

There are no outreach events scheduled at this time. We are working on scheduling a public walk in early 2017 and will send an email to this list serve as soon as it is confirmed.



Native yellow sand verbena.

For additional background information visit the following websites:

- * [Humboldt Bay National Wildlife Refuge](#)
- * [University of Victoria Dune Dynamics Lab](#)
- * [State Coastal Conservancy](#)
- * [Friends of the Dunes](#)