



# Dunes Climate Ready Grant Update

February - April  
2017

## Seventh 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. To learn more about the project, previous updates can be found [here](#).

## 2017 Winter Field Survey

The first winter survey took place in early 2016 and the second survey took place in early 2017. Surveys consist of gathering dune profile information along with vegetation data along more than 60 transects located along a 32-mile stretch of coastline. This year's winter survey went quickly and smoothly with additional equipment, seasoned crewleaders, and an additional crewleader. There was also excellent participation both by local agency partners and by dedicated volunteers. All data from this year's and previous surveys have been cleaned and graphed. One final review of the results by Dr. Walker is needed before distributing the results.



Refuge interns Katelyn Southall (left) and Mackenzie Spencer (right) digging *Ammophila* resprouts.

## Lanphere Adaptation Site

The Lanphere adaptation site will compare the effects of planting three different assemblages of dune vegetation on sediment transport and deposition. The project started in 2015 with the removal of *Ammophila arenaria* (European beachgrass) from 1.25 acres of foredune. Following removal, three assemblages of native vegetation were transplanted, or seeds were dispersed, during the winter of 2016/2017.

The abnormally high rainy season no doubt contributed to significant growth of *Elymus mollis* (native dune grass), which was planted in the adaptation site in December. Survival of *Elymus* appears to be upwards of 90%. In contrast, other native transplants that were planted on the front side (nearest the ocean) of the foredune had low survivability. As the rainy season waned and winds picked up, many of the transplants dried out and died (e.g. seaside daisy, dune goldenrod). The most successful species in this area was the native grass, *Poa macrantha*. This result was not consistent with previous dune mat planting experiments, however, this was the first time planting was done on the foredune rather than more inland areas.

The backdune portion of the site had slightly less harsh conditions than the front side, and appears to have the highest survival of transplants for species such as yarrow (*Achillea millefolium*) and sea thrift (*Armeria maritima*). Seeds were dispersed at the beginning of the year and showed the lowest success, with only a few species germinating. Since this was the first time that some of these species were planted on a foredune locally, these results provide valuable information on suitability of different species planted as seeds or transplants. Additional planting using modified methods will be done this fall and winter.



The front face of the dune mat treatment, showing poor survivorship of all but the native grass *Poa macrantha*. The January scarp is visible on the right.

Relatively small amounts of *Ammophila* resprouts were removed by Research Assistants, refuge staff and volunteers at the Lanphere adaptation site over this reporting period. Resprouts will continue to be treated through the summer as they emerge. In addition, invasive annual grasses (particularly *Bromus diandrus*) that occur adjacent to the adaptation site were removed by flaming them.

Graduate student Alana Rader is nearing completion of her thesis, which includes a geomorphic change analysis of the adaptation site from the start of the project in 2015 (prior to *Ammophila* removal) through fall 2016, covering the removal portion of the project. Ground-based LiDAR scans of the site will be repeated in May and October.



*Elymus* treatment soon after planting in late January (left)  
New growth by early May, following high winds (right)

### Eel River Adaptation site

As reported in the last quarterly update, the *Elymus* plantings at Eel River have suffered effects of burial and excavation from winter storms. More recently, signs of grazing by mammals are evident on surviving plants. The use of planting alone as an adaptation measure do not appear promising in an overwash site such as this. Project partners met on the site in April to discuss next steps. If permits and funding can be obtained, a small scale pilot project will be implemented based off of plans for foredune rebuilding at the Eel River Estuary Preserve. This would involve re-contouring of sand and use of sand fencing in addition to planting.

The poor performance of *Elymus* at the Eel River adaptation site indicated potentially limiting environmental factors. To test this, two new plots of *Elymus* consisting of 100 plants each were established by Humboldt State University students in early April, one at Eel River and one at Ma-

le'l Dunes. An additional component of the study involves collecting sand from both sites and growing plants in controlled greenhouse conditions.

### **Bureau of Land Management Propagation Site**

As reported in the previous quarterly report, a new BLM propagation site was planted with *Elymus* earlier this winter. Two new topographic profiles were established to monitor geomorphic changes at the site.

### **Shoreline Trend Analysis**

Research Associate Kelsey McDonald and the consulting firm GHD are nearing completion of historic shoreline mapping of northern and southern portions of the study area. Digital Shoreline Analysis Software is being used to calculate rates of shoreline loss (erosion) and gain since 1939, the date of the earliest aerial photos. Additional mapping of geomorphic features such as blowouts and washovers will be used to describe events not captured by the shoreline analysis. This information, together with survey data, will be used to develop a preliminary analysis of sea level rise vulnerability.

Preliminary results indicate shoreline loss at the South Spit Eel River and the area north of the North Jetty (see preliminary map).

Shoreline gain was seen at Little River/Clam Beach, South Spit, and North Spit Eel River.

The remainder of the North Spit showed long-term stability, or slight gain of shoreline.

The final reports are scheduled to be completed this summer. These results will inform modeling of sea level rise impacts, and will be an important component of the vulnerability analysis.



### **Outreach**

#### Dunes Climate Ready Talk at the Tolowa Dunes

Sunday, July 30, 1 p.m. - 4 p.m.

Kim McFarland, Executive Director of Friends of the Dunes, will present an overview of the Dunes Climate Ready Study. The talk will be followed by a hike in the Tolowa Dunes.

#### Dunes Climate Ready Walk at Little River State Beach

Saturday, June 24, 10 a.m. - noon

The Dunes Climate Ready study has been tracking the movement of sediment along a 32 mile stretch of our coastline in order to understand threats of sea level rise and test adaptation strategies. Learn about the Dunes Climate Ready Study and the Little River State Beach nearshore dunes restoration project with Michelle Forys, Environmental Scientist, with California State Parks.



**For additional background information visit the following websites:**

- \* [Humboldt Bay National Wildlife Refuge](#)
- \* [State Coastal Conservancy](#)
- \* [Friends of the Dunes](#)

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