

VEGETATION ENHANCEMENT PILOT PROJECT

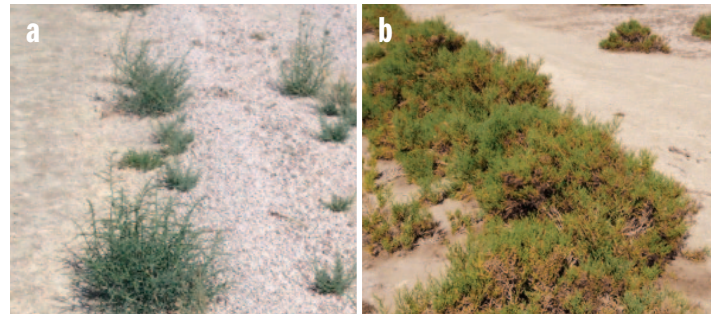
VEGETATION AS A DUST CONTROL MEASURE

Vegetation is widely recognized as an effective dust control measure on bare, unprotected surfaces and is an approved Best Available Control Measure (BACM) by Imperial County Air Pollution Control District (ICAPCD). BACM are measures designated by the EPA and the ICAPCD as the *best available* to control PM₁₀ emissions.

As the Sea recedes, existing plant communities along the shoreline are naturally expanding onto the playa (**Figures 1 and 2**). This occurs most often on historic linear 'beach ridges' formed by wave action as the Sea recedes. Vegetation patterns observed around the Salton Sea suggest that after initial establishment by beach ridge species, many other species fill in the gaps between ridges, eventually leading to more continuous vegetation. The central concept of this pilot study is to understand these natural processes, and use that information to speed the rate of vegetation establishment as the Sea recedes. Establishing vegetation on otherwise bare playa will pro-actively reduce the potential for future PM₁₀ emissions as the Sea recedes.

PURPOSE OF PILOT STUDY

The purpose of this pilot study is to perform an operational field test to determine the best practices for enhancing and creating vegetated beach ridges. The study will evaluate the diversity of native species seeded; vegetative cover characteristics; agronomic characteristics of the soil; playa surface and subsurface conditions; groundwater depth and quality; and beach ridge orientation and composition. Results will be used to inform pro-active dust control through the creation and enhancement of vegetated beach ridges.



1 *Allenrolfea occidentalis* (iodine bush) seedlings (20 to 30 cm tall) and established iodine bush (1 m tall) on beach ridges around the Salton Sea (photos 1a and 1b, respectively).

Planning and design is underway, and implementation is expected in spring 2016. The study sites will be monitored during initial establishment, and periodically during development. A report summarizing establishment results will be completed by mid-2017.

PLANNING AND DESIGN

Vegetated beach ridges will be enhanced or created at four study sites: Bombay Beach, Salton City Wash, Poe Road, and near 76th Ave in Coachella (**Figure 3**). Planning and design for each site includes the following:

- **Plants and Seeding** *Allenrolfea occidentalis* and *Atriplex lentiformis* are the main species observed on recently exposed beach ridges around the Sea. Over time, many

2 A series of aerial images of Bombay Beach showing the development of natural beach ridges and vegetation since 2009. Vegetation grew larger and more dense between 2009 and 2015.





Study sites for the Vegetation Enhancement Pilot Study.

other species also establish in these areas. To achieve similar diversity in the pilot studies, and to capture adaptive genetic diversity, seed from 10 native species was collected from numerous locations around the Sea (**Figure 4**). The species diversity should also enhance the rate of succession. The seed was dried and tested to determine Percent Live Seed, which will inform the amount of applied seed necessary to vegetate the beach ridges. Plant establishment will be monitored regularly to determine percent cover, vegetative density, and other important growth characteristics.

- **Reclamation and Irrigation** Although the native plant species are exceptionally tolerant of salinity after establishment, high soil salinity can significantly reduce germination. To achieve maximum germination, and therefore establishment, beach ridges will be leached (reclaimed) to a target of 20 dS/m. Irrigation, compost, and fertilizer will support initial seed germination and establishment until the plants are able to access shallow groundwater.



4 A vigorous, seed-producing *Allenrolfea occidentalis* (iodine bush) shrub on a beach ridge at the Salton Sea (April 2015).

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- **Soils and Salt Crusts** In general, beach ridge sediment consists of a mixture of sand, barnacles, and organic material (fish and other dead / decaying material) (**Figure 5**). The organic material improves fertility and water holding capacity of the soil. Playa soils in intervening areas may be amended with compost or other organic materials to achieve the same productivity as native ridges. Intervening playa salt crusts will be mapped and monitored throughout the study to assess erosional characteristics of the surfaces. Agronomic soil parameters will also be monitored to ensure adequate nutrients are available to the plants.



5 Beach ridge soil is high in organic matter, which improves fertility and water holding capacity.

- **Groundwater Depth and Quality** Understanding groundwater depth and quality across the gradient of successional plant communities is essential. Groundwater depth and quality will be monitored to understand the factors conducive to successful establishment of beach ridge species. The hydrologic and lithological characteristics of groundwater are being evaluated at each site. Groundwater depth will be monitored continuously using pressure transducers, and groundwater quality will be monitored quarterly.

DUST CONTROL MODELING AND MONITORING

Pro-active dust control achieved through the establishment of vegetation will be modeled and monitored. Reductions in potential sand motion/saltation (which drive dust emissions) will be modeled using the Single Event Wind Erosion Evaluation Program (SWEEP). An aerometric monitoring network, including Cox sand catchers, will be used to demonstrate overall control efficiency. In addition, dust plumes originating from surfaces within the study sites will be recorded on video.

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