Adapted from Longcore, T. (ed.). 2005. *Beach Bluffs Restoration Project Master Plan*. Beach Bluffs Restoration Project Steering Committee, Redondo Beach, California. *www.urbanwildlands.org/Resources/BBRP**masterplan**.pdf*

The Beach Bluffs Restoration Project Master Plan implements the goals of the steering committee to enhance the natural ecology through restoration, to improve recreational opportunities, to promote aesthetic improvements, and to educate the public about the bluffs, their history, and their ecology.
Specifically for habitat restoration, the objective of the Master Plan is to increase the ecological values of the bluffs and dunes, such that the restored areas 1) contribute to the recovery of the El Segundo blue butterfly, 2) provide habitat for unique and rare plants of the El Segundo dunes, 3) increase biological connectivity between remnant populations of dune species, and 4) support more diverse bird, reptile, and arthropod communities.

Geomorphology of Dunes and Bluffs

The Santa Monica Bay dune field is composed of four separate dune systems extending southward as a series of ridges and troughs from the mouth of Ballona Creek to the Palos Verdes Peninsula The dune systems rest upon a lowland comprising marine and non-marine terrace materials (Cooper 1967). Santa Monica Bay is characterized by net southward drift of currents along the beach, which provides sediment to beaches, from which sand is blown inland by prevailing northwest winds. The lowland character of the coast south of Ballona Creek has long allowed the development of coastal dunes as far south as the Palos Verdes Peninsula. All dunes in this region have been greatly modified by human activities over the past century but their general form remains decipherable beneath the urban and industrial framework of the coastal communities. The bluffs that are the subject of this project are made of consolidated sandy soils that were formed from old coastal dune systems. These formations are exposed near the beach, with the active dune system perched on top of them.

Biota of the Dunes

The *strand* community is dominated by those plant species that can tolerate the harsh conditions of constant mechanical disturbance, salt spray, and occasional inundation (Barbour and Johnson 1988). Such plants have extraordinary abilities to conserve water in a desiccating salty environment and to withstand being partially buried by shifting sand from wind and sometimes wave action. Important among these plants are two species of what might be considered the local ecological equivalent of iceplant. Sand verbenas (both *Abronia umbellatum* and *Abronia maritima*) thrive in the strand community, they have strikingly beautiful purple flowers and succulent leaves well adapted to water conservation. They are also notoriously difficult to grow in the nursery environment. Beach burr-bush (*Ambrosia psilostachys*) is also found in the strand environment. It is a hearty

plant that can withstand burying and is one of the few native plants, along with beach evening primrose (*Camissonia chieranthifolia*), that is found seaward of the coastal path in the study area. It is important for stabilizing the soil to allow other species to establish. Other plants of the strand include the locally rare *Atriplex pacifica*, beach evening primrose, and saltgrass (*Distichlis spicata*). Farther from the ocean and away from the immediate salt influence is the foredune vegetation community. While still characterized by active sand transport and open ground, more shrubs are present and the substrate is more stable. Plant species from the strand are also found here, but are joined by deerweed (*Lotus scoparius*, in its prostrate growth form), the coastal ecotype of California poppies (*Eschscholzia californica*; perennial with yellow flowers), silvery blue lupine (*Lupinus chamissonis*), coastal sagebrush (*Artemisia californica*), California sunflower (*Encelia californica*), coast buckwheat (*Eriogonum parvifolium*), goldenbush (*Ericameria ericoides*), and many annual wildflowers. This community would have been found on the sandy portions of the slopes in the project area. Some portions of the subject sites have more consolidated soils from the underlying consolidated dune systems. This creates different soil conditions that would allow the establishment of a bluff scrub vegetation community. This vegetation would have been dominated more by shrubs, such as black sage (*Salvia mellifera*), California sagebrush, goldenbush, butterbush (*Senecio californicus*), bladderpod (*Isomeris arborea*), and *Rhus integrifolia*. Also included in the consolidated soils would be cacti (*Opuntia littoralis* and *Opuntia prolifera*), and many annual species. With these vegetation types would be found a number of species that are now considered rare. Among these are the local wallflower population, pacific saltbush, beach spectaclepod (*Cardionema ramosissimum*), the now-extinct coastal dunes milkvetch (*Astragalus tener titi*), and the El Segundo spineflower (*Mucronea californica* var. *suksdorfii*).

What's so important about native plants?

Native plants are the habitat for our native wildlife. Some butterflies depend on just one species of native plant. The El Segundo blue butterfly cannot live without coast buckwheat, one of the plants of the coastal dune and bluff. Native plants are part of our history and symbolize our state, like the California poppy. Native plants have deep root systems that reduce erosion and stabilize the bluff.

Maintenance

Trampling presents a danger to the success of plantings. Fencing to discourage cutthrough traffic should remain up one more year to allow for greater shrub establishment. The largest concern about restoration projects is often "weed control". The reality of restoration in urban areas is that weed sources will always be nearby and complete control of weeds is impossible. It is important therefore to distinguish between weeds that may displace the newly established vegetation

(e.g, perennials) and those that are do not (e.g., annuals). In the dune scrub system, annual weeds are essentially impossible to eradicate. They will decrease in abundance as the native shrubs mature and eliminate the conditions that allow their germination. The common weeds that fit this description are sow thistle (*Sonchus* sp.), ox tongue (*Picris* sp.), pigweed (*Chenopodium* sp.), and three grasses (oats and two brome species). These species do not need to be eradicated as long as shrub cover is gradually eliminating regeneration possibilities.

Other Native Plant resources for more information

California Native Plant Society	www.**cnps**.org/
Natural Landscapes	http://www.natural-landscapes.com/

A short list of books:

California Native Plants for the Garden, Carol Bornstein, David Fross and Bart O'Brien. Cachuma Press. 2005

Care and Mainenance of Southern California Native Plant Gardens. Bart O'Brien, Betsey Landis, Ellen Mackey Rancho Santa Ana Botanic Gardens. 2006

Designing California Native Gardens: The Plant Community Approach. Glenn Keator, Alrie Middlebrook. University of California Press 2007

Flowering Plants of the Santa Monica Mountains. Nancy Dale, 2000

Growing California Native Plants. Marjorie Schmidt. University of California Press 1980

Introducation to the Plant Life of Southern California. Philip Rundel and Robert Gustafson. Univeristy of California Press

Native Treasures: Gardening with the Plants of California M. Nevin Smith. UC Press 2006

If you want to collaborate with SEA Lab and their Native Plant Nursery contact Denise at the SEA Lab.