# X.0 DUNES AND COASTAL BLUFF

## X.1 OVERVIEW OF THE DUNES AND COASTAL BLUFF COMMUNITY

### Coastal Dunes

Coastal dunes are dynamic habitats that are affected by waves, tides, wind, and trampling (Cheadle Center for Biodiversity & Ecological Restoration, n.d.). Dunes develop when there is a substantial amount of blown, dry sand. The plants found on coastal sand dunes are primarily prostrate herbs with creeping stems and long taproots. The leaves are typically small, somewhat succulent, and often hairy and grayish in color. These features aid the plants in tolerating drought, salt stress, and intense sunlight. The two types of coastal dunes in San Diego are active coastal dunes and foredunes. Dunes and coastal bluff vegetation in the MSPA is included in the "other" vegetation community for mapping and acreage calculation, so the exact acreage of dunes and coastal bluffs in unknown.

Active coastal dunes occur on barren, mobile sand accumulations (Oberbauer, Kelly, and Buegge 2008). The size and shapes of these formations are determined by abiotic site factors such as, wind direction and speed, site topography, sand source, and grain size, rather than by stabilizing vegetation. Active coastal dunes are found along the Pacific Coast where sandy beaches are present and coastal headlands are absent. Coastal dunes are unvegetated and will often overrun adjacent foredunes.

Foredunes are similar to active coastal dunes, but with less wind and/or a smaller supply of sand and/or more available groundwater (Oberbauer, Kelly, and Buegge 2008). Foredunes are drier, slightly warmer, and exposed to weaker and less persistent onshore winds. The vegetation of foredunes is dominated by succulents, perennial herbs, and subshrubs. The vegetation lacks perennial grasses, but has a higher proportion of subshrubs that grow up to 30 cm tall. Coverage varies from complete to scattered. Growth and flowering occur in early to mid-spring. Species characteristic of the foredunes include native plants such as: red sand verbena (*Abronia maritima),* beach sand verbena *(A. umbellata),* beach bur (*Ambrosia chamissonis),* beach salt bush (*Atriplex leucophylla*), beach morning glory (*Calystegia soldanella*), shruby beach primrose (*Camissoniopsis cheiranthifolia suffruticosa*), inland saltgrass *(Distichlis spicata*), and Menzie's goldenbush (*Isocoma menziesii),* as well as nonnative plants such as European searocket (*Cakile maritima*) and iceplant *(Carpobrotus edulis).* The foredune vegetation community also includes the *Ambrosia chamissonis-Abronia maritima-Cakile maritima* Association (Sproul et al. 2011). This association includes *Ambrosia chamissonis* with *Abronia maritima* or *A. umbellata*, and/or the nonnative *Cakile maritima* as dominants in a low herbaceous canopy. This vegetation type is limited to coastal dune habitats throughout San Diego County.

### Coastal Bluffs

Coastal bluffs are escarpments or steep faces of rock, decomposed rock, or soil resulting from erosion, faulting, or folding of the land mass and are located in the coastal zone (The City of

San Diego 2000). A coastal bluff is a naturally formed precipitous landform that generally has a gradient of at least 200 percent (1:2 slope) with a vertical elevation of at least 10 feet.

The southern coastal scrub vegetation community exists on coastal bluffs (Oberbauer, Kelly, and Buegge 2008). Southern California bluff scrub is a low growing scrub up to 2 meters tall. The scrub forms continuous mats or may be more scattered. The vegetation consists of dwarf shrubs, herbaceous perennials, and annuals. Most plants are woody and/or succulent with most growth and flowering occurring from late winter through spring. Coastal bluff vegetation is exposed to varying, moisture-laden winds with high salt content. The soils on coastal bluffs are usually rocky and poorly developed. Species characteristic of this vegetation community include natives such as: saltbush (*Atriplex* spp.), coast morning glory (*Calystegia macrostegia ssp. cyclostegia)*, island morning glory (*C. macrostegia),* Indian paintbrush *(Castilleja affinis),* Orcutt's spineflower *(Chorizanthe orcuttiana),* giant coreopsis *(Leptosyne gigantean),* sea dahlia *(L. maritima),* dudleya *(Dudleya* spp.), California encelia (*Encelia californica),* seaside golden yarrow *(Eriophyllum staechadifolium),* goldenbush *(Ericameria* spp.), cliff aster (*Malacothrix saxatilis)*, chilicothe (*Marah macrocarpa)*, coast prickly pear *(Opuntia littoralis), and* lemonade berry *(Rhus integrifolia),* as well as nonnatives such as sea fig *(Carpobrotus aequilateralus)* and crystalline iceplant (*Mesembryanthemum crystallinum)*.

## X.2 MSP SPECIES USING DUNE AND COASTAL BLUFF VEGETATION

Nine MSP species are associated with dune and coastal bluff vegetation. Those species include one VG bird species, one SL bird species, two SO bird species, and five SL plant species. Of those five plant species, four are annuals and one is a subshrub. The nine SL and SO species will benefit incidentally from dune and coastal bluff vegetation management. There are no VF species associated with dune and coastal bluff vegetation.

**Table V2C.X-2. Dune and coastal bluff associated MSP species.**

| | Scientific Name | Common Name | Management Category | Summary Page Link |
|---|---|---|---|---|
| **Plants** | | | | |
| | Acmispon prostratus | Nuttall's acmispon | SL | https://portal.sdmmp.com/view_species.php?taxaid=820047 |
| | *Aphanisma blitoides* | Aphanisma | SL | https://portal.sdmmp.com/view_species.php?taxaid=20679 |
| | *Atriplex coulteri* | Coulter's saltbush | SL | https://portal.sdmmp.com/view_species.php?taxaid=20523 |
| | *Dudleya blochmaniae* | Blochman's dudleya | SL | https://portal.sdmmp.com/view_species.php?taxaid=502165 |
| | Erysimum ammophilum | Coast wallflower | SL | https://portal.sdmmp.com/view_species.php?taxaid=22928 |
| **Birds** | | | | |
| | Charadrius nivosus nivosus | Western snowy plover | SL | https://portal.sdmmp.com/view_species.php?taxaid=824565 |
| | *Circus cyaneus* | Northern harrier | SO | https://portal.sdmmp.com/view_species.php?taxaid=175430 |
| | *Sternula antillarum browni* | California least tern | SO | https://portal.sdmmp.com/view_species.php?taxaid=825084 |
| | *Thalesseus elegans* | Elegant tern | VG | https://portal.sdmmp.com/view_species.php?taxaid=176931 |

## X.3 THREATS TO DUNES AND COASTAL BLUFF VEGETATION

Coastal dunes in California have been significantly threatened and reduced by development, off road vehicle use, and exotic species invasion (Cheadle Center for Biodiversity & Ecological Restoration, n.d.). Human disturbance and competition for the use of beaches by beach-goers can endanger birds that rely on beaches for nesting habitat, such as the least tern (*Sternula antillarum*) and snowy plover (*Charadrius nivosus*)(Audubon, n.d.).

Coastal bluffs are threatened by the increasing pressure to develop shorelines as well as a number of natural processes. High tides and large waves can contribute to cliff failure and can threaten the coastal scrub bluff vegetation community. Large waves facilitate coastal bluff erosion by removing protective beach sediment and allowing waves to directly attack the toe cliff (Storlazzi and Griggs 2000). Moderate-to high-intensity ENSO events can elevate sea levels and lead to high wave energy, which can cause sea-cliff erosion and shoreline recession. Problems from coastal bluff failures have emerged from Torrey Pines to San Onofre (Diehl 2016). In March 2016 a large sea cave opened up beneath a Carlsbad bluff, and in August 2018 large chunks of the Del Mar cliffs collapsed, impacting train traffic and narrowly missing sunbathers below (Self and Nakamo 2018).

## X.4 MANAGEMENT AND MONITORING APPROACH

This section provides the rationale for management and monitoring objectives for dunes and coastal bluff vegetation and associated MSP species. The management and monitoring approach is based on an adaptive management framework intended to refine and improve the effectiveness of the management strategy over time.

### X.4.1 General Approach Objectives

There are no objectives for dunes and coastal bluff vegetation in the MSP Roadmap 2017-2021 planning cycle. For the most up-to-date goals, objectives, and actions, go to the MSP Portal: https://portal.sdmmp.com/tracker.php?Target=veg+community&Species=SDMMP_vegcom_13&ActionStatus=&ManagementUnit=&ObjectiveType=&Year=&Preserve=&Short=Long&submit=Submit.

### X.4.2 Species-Specific Approach Objectives

There are not any dune or coastal bluff VF species in the MSPA that have specific vegetation characteristics that need to be managed for persistence in the MSPA. However, there are management actions for SL and SO species that may incidentally benefit dunes and coastal bluff vegetation. From 2017-2021, routine habitat management befitting the California least tern and northern harrier (*Circus cyaneus*) will incidentally benefit coastal dunes. These actions include invasives removal, sand replenishment, nest preparation, and protecting occurrences from disturbance through fencing, signage, and enforcement. Routine management actions for rare plants such as aphanisma (*Aphanisma blitoides*), Blochman's dudleya (*Dudleya blochmaniae*), coast wallflower (*Erysimum ammophilum*), and Nuttall's acmispon (*Acmispon*

*prostratus*) will also incidentally benefit coastal dune and bluff vegetation. These management actions include, protecting occurrences from disturbance through fencing and enforcement and controlling invasive non-native plant species to an absolute cover of twenty percent or less.

## X.5 DUNES AND COASTAL BLUFF REFERENCES


Audubon. n.d. “Priority Birds.” *Guide to North American Birds*. https://www.audubon.org/birds/priority.

Cheadle Center for Biodiversity & Ecological Restoration. n.d. “Coastal Dune.”

Diehl, Phil. 2016. “Erosion Makes Coastal Bluffs Dangerous.” *San Diego Union Tribune*. http://www.sandiegouniontribune.com/news/environment/sdut-erosion-makes-coastal-bluffs-dangerous-2016mar24-htmlstory.html.

Oberbauer, T. A., M. Kelly, and Jeremy Buegge. 2008. *Draft Vegetation Communitties of San Diego County. Based on “Preliminary Descriptions of the Terrestrial Natural Communities of California”, Robert F. Holland, Ph.D., October 1986*. San Diego, CA.

Self, Zac, and Rina Nakamo. 2018. “Cliff Collapses in Del Mar, Briefly Halting Train Traffic.” *10 News*. https://www.10news.com/news/cliff-collapses-in-del-mar-halting-train-traffic.

Sproul, F., T. Keeler-Wolf, P. Gordon-Reedy, J. Dunn, A. Klein, and K. Harper. 2011. *Vegetation Classification Manual for Western San Diego County*. First. San Diego, CA.

Storlazzi, Curt D, and Gary B Griggs. 2000. “Influence of El Niño – Southern Oscillation ( ENSO ) Events on the Evolution of Central California ’ S Shoreline,” no. 2: 236–49.

The City of San Diego. 2000. “Land Development Code Coastal Bluffs and Beaches Guidelines.” San Diego, CA. https://www.sandiego.gov/sites/default/files/legacy/development-services/pdf/industry/landdevmanual/ldmcoastal.pdf.