

Landing State Beaches, and the Navy's restoration of 44 acres of beach area at the Naval Post Graduate School in the City of Monterey.

One of the more critical functions of the dune system is its role as habitat for a very unique flora and fauna. These are species that are specially adapted to the conditions and opportunities found in the dunes. Dune plants, in particular, play a special role by both stabilizing the dunes from the effects of wind erosion, and hosting rare fauna. However, as the natural dune system has been reduced and fragmented, the risk of extinction has increased for several species. Thus, each new impact within the dunes system has and will continue to contribute to the cumulative decline of these species.

Specifically, several native plants known to occur in the dunes are either already listed, or are on the candidate list for the federal register of endangered and threatened species. These include the Seaside bird's beak (*Cordulanthus rigidus littoralis*), sand gilia (*Gilia tenuiflora arenaria*), Sandmat manzanita (*Arctostaphylos pumila*), Eastwood's ericameria (*Ericameria fasciculata*), coast wallflower (*Erysimum ammophilum*), Menzies wallflower (*Erysimum menziesii*) and Monterey ceanothus (*Ceanothus rigidus*). The Seaside bird's beak is protected under the California Plant Protection Act of 1977. All seven species are recognized as rare by the California Native Plant Society. The sand gilia is both state-listed and federal-listed. Another sand-stabilizing plant species, the Monterey spineflower (*Chorizanthe pungens var. pungens*), is also found in the Monterey Bay dunes, and has been listed in the Federal Register as a threatened species (USFWS notice of February 14, 1994).

USFWS has also listed the western snowy plover as a threatened species. These birds forage along the shoreline and nest in the foredunes of the Flandrian system. The plovers are known to nest in various areas of the dunes, and have been the focus of significant conservation efforts by the State Department of Parks and Recreation (see below for more detail). Another species of concern existing within the dune system is the Smith's blue butterfly (*Euphilotes enoptes smithi*), a federally protected animal species listed as endangered by the U.S. Fish and Wildlife Service. Coast buckwheat (*Eriogonum parvifolium* and *E. latifolium*), are host plants to the Smith's blue butterfly, and occur in clusters that support localized populations of the butterfly. The black legless lizard (*Anniella pulchra nigra*), another native species of the Monterey Bay dunes, has previously been a candidate for federal listing as endangered, and is considered a Species of Concern by the California Department of Fish and Wildlife (CDFW) because of its limited distribution.

The distribution of these dune plants and animals can appear sparse, but over time the entire available dune surface is important to their survival. This is because the Flandrian component of the dunes complex is a dynamic system. The dunes present a rather harsh and difficult growing environment, where the wind keeps shifting the shape of the ground, rainfall rapidly percolates out of reach, and, lacking a distinct topsoil horizon, nutrients are quickly exhausted. Thus, a plant like Monterey spineflower may, over a year or two, use up the available moisture and nutrients at a particular site, and by means of wind-blown seed "move" to a neighboring area. In this simplified model, the original site remains a bare sand surface until life's necessities again accumulate at the original site, thereby allowing recolonization and repeating of the cycle. Therefore, the overall growing area ("habitat") needed over the long run is vastly larger than the area occupied by the plants at any one "snapshot" in time.