

Description: Patterns and drivers of change in dune extent between the mid-1800s and 2016 in central, southern and northern California.

Attributes:

- Difference: Habitat change category
- Area_km: Area in km²

Projected Coordinate System:

- CenCal and NoCal: NAD 1983 (2011) UTM Zone 10N
- SoCal: NAD 1983 (2011) UTM Zone 11N

Details:

Difference maps showing areas of dune loss and/or change over time were created by comparing the historical (1800s) and contemporary (2016) dune inventories, with specific drivers of change determined by identifying the dominant land-use and/or habitat type shown in modern aerial imagery (NAIP 4-Band Imagery). For example, infrastructure development was considered to be the main driver of change in areas where historical dunes had been replaced by residential buildings or roadways. In some cases, historical archives (i.e., aerial photographs, maps, and environmental reports) were also used to provide additional context. This includes, for example, historical aerial photographs from the California Coastal Records Project and University of California Santa Barbara (UCSB) Geospatial Collection that were used to qualitatively assess the impacts of dune-stabilizing invasive plant species on the geomorphic evolution of two dune systems in northern California, Gold Bluffs Beach (Mendocino County) and the Lanphere Dunes Unit (Humboldt County).

Drivers of change were classified into the following categories: (i) loss through coastal erosion, (ii) loss through river erosion or the redirection of waterways, (iii) loss through processes that facilitated the transformation of historical dunes to wetland, grassland, or forested environments, (iv) growth through the seaward progradation of foredunes, and (v) growth through the landward migration of dune systems due to aeolian transport. Changes in vegetation did not result in the classification of historical dunes as 'lost' in isolation. Loss was only considered for areas deemed to be both ecologically and geomorphologically distinct from adjacent dune ecosystems. This includes, for example, wetland environments and low-lying grassland and/or forested areas with little or no topography. As it was generally difficult to determine a single, causal mechanism that may have facilitated the transformation of historical dunes to wetland, grassland, or forested areas—whether through environmental, geomorphic, or anthropogenic drivers—these transitions were collectively classified as 'habitat change' in the inventory. This contrasts to historical dunes lost through human development and land-use change (e.g., industry, residential communities, transport links, agricultural land), that were more readily identifiable using high-resolution (1 m) aerial imagery and land cover data (i.e., Impervious Cover) from the NOAA Coastal Change Analysis Program (C-CAP).

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