

The Changing California Coast: The Effect of a Variable Water Budget on Coastal Vegetation Succession

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ABSTRACT

The land-ocean interface along the central coast of California is one of the most diverse biogeographic regions of the state. This area is composed of a species-rich mosaic of coastal grassland, shrubland, and forest vegetation types. An acceleration of conifer encroachment into shrublands and shrub encroachment into grasslands along the coast has been recently documented. These vegetation changes are believed to be driven primarily by fire suppression and changing grazing patterns. Climatic variables such as precipitation, fog, cloud cover, temperature, slope, and elevation also play an important role in vegetation succession. Our study area is located along the central California coast, which is characterized by a precipitation gradient from the relatively wetter and cooler north to the drier and warmer south. Some studies indicate changing fog patterns along this coast, which may greatly impact vegetation. A decrease in water availability could slow succession processes. The primary objective of this project is to determine if vegetation succession rates are changing for the study area and to identify climate and ecosystem variables which contribute to succession, specifically the transition among grassland, shrubland, and forest. To identify vegetation types and rates of succession, we classified two Landsat TM 5 scenes from 1985 to 2010 with a resulting overall accuracy of 82.4%. Vegetation succession was correlated to changes in maximum and minimum temperatures, precipitation, and elevation for each sub-region of the study area. Fog frequency was then compared between the northern and southern regions of the study area for determining the spatial relation between fog frequency and the percent of vegetation change.