

Local Program Case Study | San Luis Obispo County, California

Dune Restoration Reduces PM₁₀ on California Coast

The Oceano Dunes State Vehicular Recreation Area ("Oceano Dunes") is an off-road vehicle park situated along the Pacific coast in San Luis Obispo County, California. The 5.5 square mile park draws over a million visitors per year, who drive dune buggies and ATVs as well as street legal vehicles up and down the beach and across sand dunes. The area is also prone to strong onshore winds, particularly in the spring and fall.

Nearly a century of intense use has destroyed natural beach vegetation and destabilized dune structures, resulting in enhanced dust generation during high wind events. Much higher PM₁₀ levels and more frequent violations of PM₁₀ standards are observed downwind of the Oceano Dunes than elsewhere in the county or along the California Coast. For example, the CDF monitoring station, located about 2.5 miles downwind, recorded 62 to 97 exceedances per year of the California PM₁₀ standard (50 µg/m³ over 24 hours) between 2010 when monitoring began and 2017 (the year before mitigation projects began in earnest). Over this same period, a total of 9 exceedances of the federal PM₁₀ standard (150 µg/m³ over 24 hours) were also observed.

In 2018, the San Luis Obispo County Air Pollution Control District entered into an agreement with the park operator to reduce dust emissions. As the high downwind PM₁₀ levels are caused by the wind blowing over disturbed sand rather than by vehicle rooster tails or tailpipe emissions, mitigation measures have focused on reducing the extent of the source area, rather than on limiting the number, type, or speed of the vehicles in the park. Restoring dune vegetation and excluding vehicular access to certain areas of the park are the main dust control strategies; as of 2025, 740 acres of the Oceano Dunes are being managed to provide dust control benefits.

These efforts have resulted in a dramatic decrease in PM₁₀ levels downwind. In 2025, only 26 exceedances of the California PM₁₀ were observed at the CDF monitoring site. While this was more than recorded the previous year (14 exceedances), it was also much windier this year than last. At the Mesa2 monitoring site, located about 3.5 miles downwind on the edge of large neighborhood, exceedances dropped from 30 to 55 per year prior to 2018, to just 15 last year. Annual average concentrations show similar decreases. These improvements are also corroborated by more sophisticated analyses that account for annual differences in the frequency of high wind events.

Thank you to the San Luis Obispo County APCD for the contribution of this case study. More on the SLOAPCD can be found at <https://www.slocleanair.org/air-quality/oceano-dunes-efforts.php>.

Figure 4: Acres of Dust Control Within the Oceano Dunes

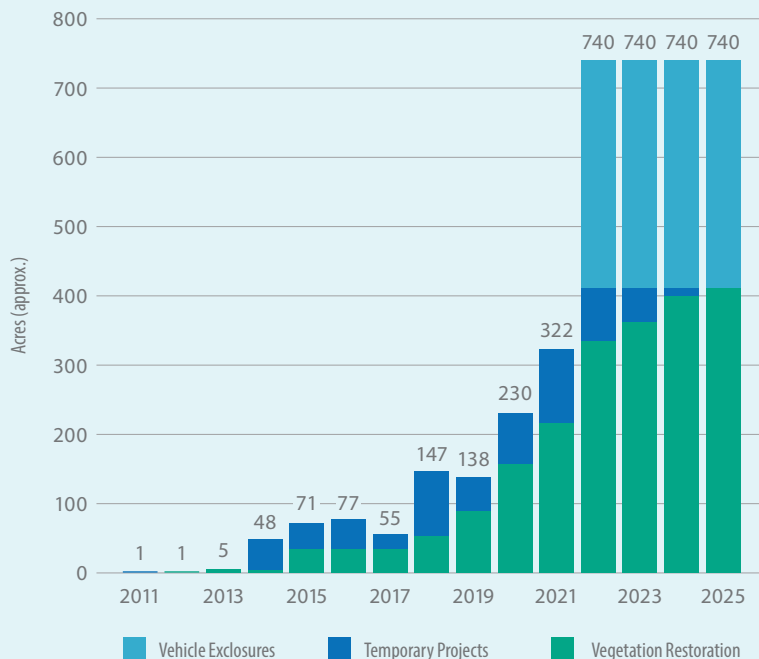


Figure 5: Annual Exceedances of California PM₁₀ Standard Downwind of Oceano Dunes

