Oceano Dunes State Vehicular Recreation Area

Rule 1001 Draft Particulate Matter Reduction Plan

Third Draft

March 29, 2013

State of California
Department of Parks and Recreation
Off-Highway Motor Vehicle Recreation Division

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Executive Summary

The California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division (OHMVR Division) has prepared this Particulate Matter Reduction Plan (PMRP) for Oceano Dunes State Vehicular Recreation Area (Oceano Dunes SVRA) to comply with Sections C.2. and F.1.b. of San Luis Obispo County Air Pollution Control District Rule 1001, Coastal Dunes Dust Control Requirements. In accordance with Rule 1001 requirements, this PMRP consists of:

- Dust Control Measures that will minimize emissions of particulate matter with an aerodynamic diameter of 10 micrometers or less (PM10) for the area under the control of the OHMVR Division and meet the performance requirement of Rule 1001;
- A PM10 Monitoring Network that will be operated and maintained to determine compliance with Rule 1001;
- A Track-Out Prevention Program that does not allow track-out of sand to extend onto paved public roads.

The measurement and control of dust from an active coastal dune setting on the scale required by Rule 1001 is unprecedented and will require a substantial investment of materials, staff, and economic resources by the OHMVR Division, as well as significant coordination with other government agencies. The OHMVR Division will employ an adaptive management approach to dust control that ensures clear objectives are set, projects are planned and implemented in a timely manner, and progress is measured and reviewed. The OHMVR Division will use its resources in the most efficient manner possible by following the approach described in this PMRP, which generally is: 1) Assess existing conditions; 2) Prioritize dust control measures; and 3) Monitor dust control measures. The OHMVR Division will consider potential dust control projects in the context of several criteria that affect the suitability of specific dust control projects in specific areas. Once the appropriate dust control project has been identified, it will be implemented in a timely manner. Most projects, however, cannot be implemented until all necessary environmental reviews are complete and all necessary permits obtained. The OHMVR Division expects individual control measures to achieve between approximately 50 to 99% control of local sand transport and associated PM10 emissions; however, the aggregate reduction in downwind PM10 emissions that will be measured by the PMRP Monitoring Network is uncertain at this time given the large area of open sand sheets that exist at and in the vicinity of Oceano Dunes SVRA. The OHMVR Division believes track-out control, while challenging, is achievable through a combination of structural installations and street-sweeping.

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Oceano Dunes SVRA Particulate Matter Reduction Plan
Third Draft

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LIST OF ACRONYMS AND ABBREVIATIONS

APCD	Air Pollution Control District
APCO	Air Pollution Control Officer
CCC	California Coastal Commission
CDP	Coastal Development Permit
CDPR	California Department of Parks and Recreation
CDVAA	Coastal Dune Vehicle Activity Area
CEQA	California Environmental Quality Act
DRI	Desert Research Institute
μ/m^3	Micrograms per cubic meter
OHMVR	Off-Highway Motor Vehicle Recreation
OHV	Off-Highway Motor Vehicle
PMRP	Particulate Matter Reduction Plan
SLO	San Luis Obispo
SVRA	State Vehicular Recreation Area

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1 INTRODUCTION

Oceano Dunes State Vehicular Recreation Area (Oceano Dunes SVRA) is an established, approximately 3,600-acre unit of the California State Parks system that provides motorized and non-motorized recreational opportunities. The SVRA is located on California's Central Coast, in southwestern San Luis Obispo (SLO) County, adjacent to the "Five Cities" area of Arroyo Grande, Grover Beach, Pismo Beach, Oceano, and Shell Beach.

Oceano Dunes SVRA, as well as adjoining Pismo State Beach and Pismo Dunes Natural Preserve, is located in the Guadalupe-Nipomo Dunes Complex, an approximately 18,000-acre, 18-mile long coastal dune landscape consisting of several distinct dune sheets. According to the California Geological Survey, Oceano Dunes SVRA is located within the youngest, most active area of the Callender dune sheet complex, where aeolian (wind) transport of sand is ongoing and dunes are actively migrating inland several feet per year (CGS 2007).

Oceano Dunes SVRA is one of the few coastal areas in California where on- and off-highway vehicles may be legally operated on the beach. Approximately 5 ½ miles of beach and 1,500 acres of sand dunes are open to vehicular use within Oceano Dunes SVRA.

1.1 REGULATORY BASIS FOR PMRP

In November 2011, the San Luis Obispo (SLO) County Air Pollution Control District (APCD) adopted Rule 1001, Coastal Dunes Dust Control Requirements. Rule 1001 requires the operator of a coastal dune vehicle activity area (CDVAA) greater than 100 acres in size to prepare and implement a Particulate Matter Reduction Plan (PMRP) to minimize emissions of particulate matter smaller than 10 micrometers in diameter (PM10) from the area under its control. Rule 1001, Section B.4., defines the term CDVAA as:

> *"B.4. "Coastal Dune Vehicle Activity Area (CDVAA)": Any area within 1.5 miles of the mean high tide line where public access to coastal dunes is allowed for vehicle activity."*

The OHMVR Division, as operator of the 1,500-acre open vehicle riding area at Oceano Dunes SVRA, is subject to the applicable requirements of Rule 1001, including the development of an SLO County Air Pollution Control Officer (APCO)-approved PMRP.

1.2 PMRP REQUIREMENTS

Rule 1001 does not explicitly define the term "Particulate Matter Reduction Plan." Certain sections of Rule 1001, however, expressly articulate the requirements and contents of a PMRP, including Sections B.13, C.2, and C.3. Table 1 below summarizes the key PMRP requirements that are articulated in Rule 1001.

Table 1: PMRP Requirements		
Section	**Requirement**	**PMRP Reference**
B.13	"PMRP Monitoring Program": The APCO approved monitoring program contained in the PMRP that includes a detailed description of the monitoring locations; sampling methods and equipment; operational and maintenance policies and procedures; data handling, storage, and retrieval methods; quality control and quality assurance procedures; and related information needed to define how the CDVAA and Control Site Monitors will be sited, operated and maintained to determine compliance with Section C.3."	Section 4 Attachment 2
C.2	"The operator of a CDVAA shall prepare and implement an APCO-approved Particulate Matter Reduction Plan (PMRP) to minimize PM10 emissions for the area under the control of a CDVAA operator. The PMRP shall contain measures that meet the performance requirements in C.3 and include:"	Section 3 Attachment 1
	a. "An APCO-approved PM10 monitoring network containing at least one CDVAA Monitor and at least one Control Site Monitor."	Section 4 Attachment 2
	b. "A description of all PM10 control measures that will be implemented to reduce PM10 emissions to comply with this rule, including the expected emission reduction effectiveness and implementation timeline for each measure."	Section 3
	c. "A Track-Out Prevention Program that does not allow track-out of sand to extend 25 feet or more in length onto paved public roads and that requires track-out to be removed from pavement according to an APCO-approved method and schedule."	Section 5
C.3	"The CDVAA operator shall ensure that if the 24-hr average PM10 concentration at the CDVAA Monitor is more than 20% above the 24-hr average PM10 concentration at the Control Site Monitor, the 24-hr average PM10 concentration at the CDVAA Monitor shall not exceed 55 µg/m^3."	Section 4 Attachment 2

1.3 Overview of Coastal Dune Vehicle Activity Area and Control Sites

As defined by Rule 1001, an integral component of a PMRP is the siting and operation of APCO-approved PM10 monitors that measure the 24-hour average PM10 concentrations directly downwind of areas where vehicle activity is (i.e., a CDVAA) and is not (i.e., a Control Site) permitted.

For the purposes of this PMRP, there is one continuous CDVAA. This area encompasses approximately 1,500 acres of beach and sand dunes throughout two established park units,

Pismo State Beach and Oceano Dunes SVRA. The CDVAA covered by this PMRP is bound by the Grand Avenue Entrance to Pismo State Beach on the north, the open riding and camping area boundary of Oceano Dunes SVRA on the east and south, and the Pacific Ocean on the west. Figure 1 at the end of this section, CDVAA and Control Sites, depicts the CDVAA addressed in this PMRP.

From Grand Avenue to marker post (MP) 2, Oceano Dunes SVRA is open to street legal vehicles only. This portion of the SVRA is approximately two miles, or 10,560 feet long (3,225 meters), 400 feet wide (122 meters), and 110 acres in area (442,065 square meters).

Beach camping and off-highway motor vehicle (OHV) recreational opportunities are available south of MP2. This portion of Oceano Dunes SVRA is approximately four miles, or 21,120 feet long (6,534 meters). The width of this portion of the SVRA varies from as little as approximately 400 feet (122 meters) to as much as approximately 1.3 miles, or 6,855 feet (2,090 meters). This portion of the SVRA covers an approximate area of 1,400 acres (5,665,600 square meters). From March 1 to September 30 of each year, approximately 250 acres of sand dunes are excluded from motorized and non-motorized recreation due to the installation of fencing to protect nesting western snowy plover and California least tern, two federal listed species (threatened and endangered, respectively).

Vehicle recreation within the CDVAA is consistent with Coastal Development Permits (CDP) issued by the California Coastal Commission (CCC). The CDPs limit overall day use in this area to 4,300 vehicles (no more than 1,720 non street-legal vehicles and no more than 2,580 street legal vehicles). There are no designated camping sites, but camping is limited to no more than 1,000 registered camping units per day (one street legal vehicle registered to camp).

Rule 1001 does not explicitly define the term “Control Site”, however, the Control Site concept is articulated in Rule 1001, Section B.7:

> *“B.7. “Control Site Monitor”: An APCO-approved monitoring site or sites designed to measure the maximum 24-hour average PM10 concentrations directly downwind from a coastal dune area comparable to the CDVAA but where vehicle activity has been prohibited. At a minimum, the monitoring site shall be equipped with an APCO-approved Federal Equivalent Method (FEM) PM10 monitor capable of measuring hourly PM10 concentrations continuously on a daily basis, and an APCO-approved wind speed and wind direction monitoring system.”* (emphasis added)

Currently, there are four potential Control Sites where vehicle activity is prohibited that may be comparable to the CDVAA described above. Moving from north to south, the first Control Site is the Pismo Dunes Natural Preserve (Dune Preserve). The western and southern boundaries of the Dune Preserve border the area of Pismo State Beach and the area of Oceano Dunes SVRA

that is open to vehicle recreation (i.e., the CDVAA). The second Control Site is an area of private lands located immediately to the east of Oceano Dunes SVRA's open riding and camping area. The third Control Site is in the vicinity of Oso-Flaco Lake, south of Oceano Dunes SVRA's open riding area. Oso Flaco and Little Oso Flaco Lake, as well as agricultural fields, are located immediately south and east of this Control Site. The fourth Control Site is the public and private land in the vicinity of the Rancho Guadalupe Dunes County Park, approximately four miles south of Oceano Dunes SVRA, in Santa Barbara County. Portions of this potential Control Site are also subject to restrictions on recreation during the breeding season for western snowy plover (March 1 to September 30 of each year).

Figure 1: CDVAA and Control Sites

Figure 1 CDVAA and Control Sites

Oceano Dunes SVRA PMRP

TRA Environmental Sciences, Inc.

2 PMRP IMPLEMENTATION

This section describes: 1) the main entity responsible for implementing this PMRP; 2) the adaptive management process that will be used to implement this PMRP; and 3) the relationship between this PMRP and other Rule 1001 compliance requirements.

2.1 RESPONSIBLE ENTITY

Section A. of Rule 1001 states that the provisions of Rule 1001 apply to the operator of a CDVAA greater than 100 acres in size. For Oceano Dunes SVRA, an established unit of the State Parks system, park operation follows a chain-of-command that includes administration and management at the local and state level. Locally, the Oceano Dunes District is the entity responsible for administering and managing local State Parks' units, including Pismo State Beach, Pismo Dunes Natural Preserve within Pismo State Beach, and Oceano Dunes SVRA. The Oceano Dunes District is led by the District Superintendent. Thus, the Oceano Dunes District Superintendent has initial responsibility for implementing development, review, and approval of PMRP-related activities. Per Public Resource Code Section 5090.32. (b), the OHMVR Division is responsible for the direct management, maintenance, administration, and operation of lands in SVRAs. The OHMVR Division is led by a Deputy Director appointed by the Governor headquartered in Sacramento. Thus, the Deputy Director of the OHMVR Division has final review and approval authority for PMRP-related activities. Both the District Superintendent and the Deputy Director may be assisted by other government agencies and consultants as deemed necessary to develop and implement this PMRP.

2.2 ADAPTIVE MANAGEMENT PROCESS

The OHMVR Division will implement this PMRP using the principles of adaptive management, which the OHMVR Division's Strategic Plan defines as (OHMVR Division 2009):

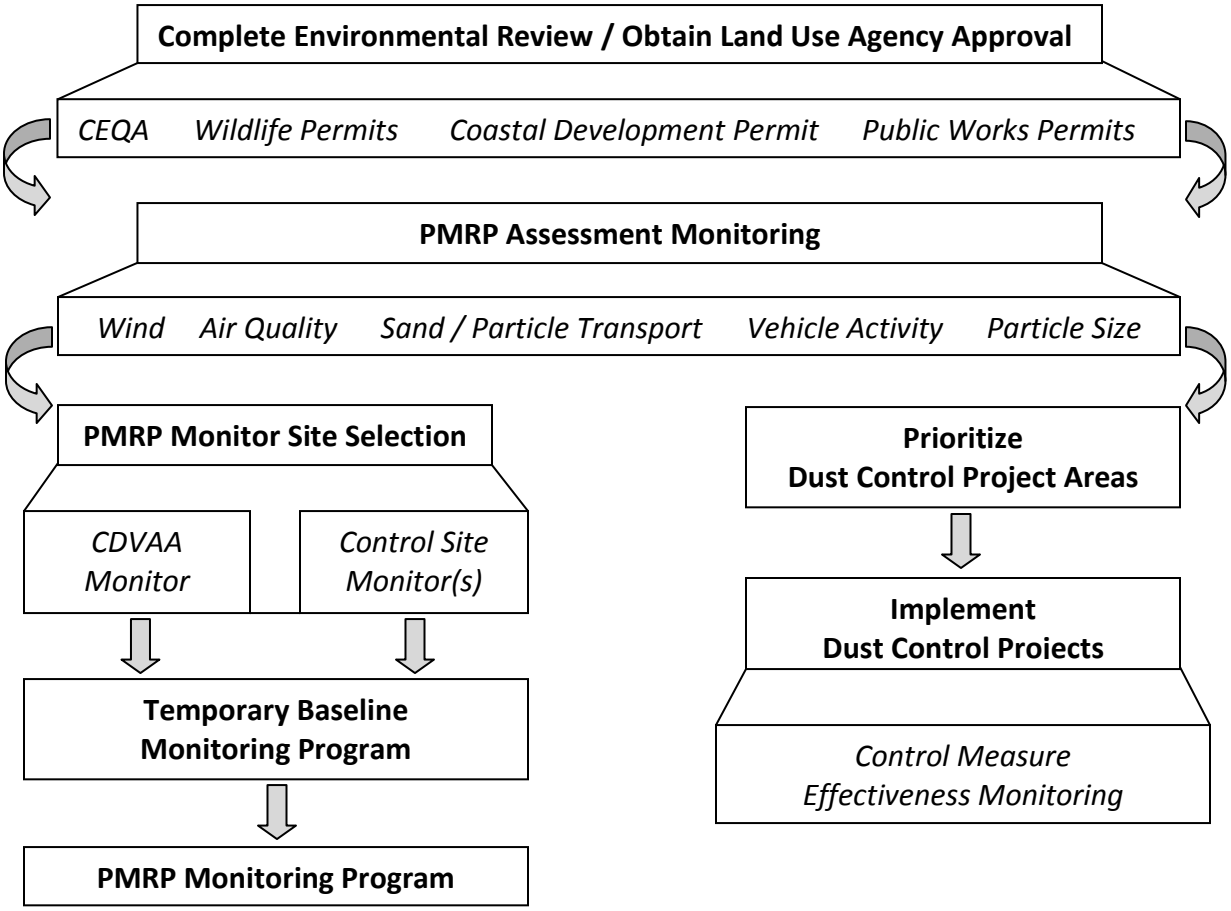
> "*A type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices*."

An adaptive management approach is appropriate for this PMRP because it involves assessing existing conditions, prioritizing the implementation of control measures, and evaluating the effectiveness of dust control measures. These actions will produce valuable, new information on the dynamics of dust generation at Oceano Dunes SVRA that is not currently available. The OHMVR Division will incorporate this new information into future iterations of this PMRP.

2.3 FACTORS OUTSIDE THE OHMVR DIVISION'S CONTROL

The ability to implement control measures and a PM10 Monitoring Network is dependent on certain factors outside the OHMVR Division's control, such as the need to obtain land use agency approvals before implementing PMRP projects needed to site CDVAA and Control Site PM10 monitors and identify and prioritize dust control project areas. Figure 2 below presents a flow chart describing how these factors affect implementation of the PMRP.

Figure 2: PMRP Implementation Flowchart



3 PMRP CONTROL MEASURES

This section describes: 1) PM10 control measures the OHMVR Division has identified for potential implementation, including the expected emission reduction effectiveness for the measure; 2) the process the OHMVR Division will use to identify areas where control measures should be implemented; 3) the process the OHMVR Division will use to implement specific dust control measures in specific dust control areas; 4) the monitoring the OHMVR Division will perform to ensure compliance with Rule 1001's performance requirement; and 5) the implementation schedule for PMRP control measures.

3.1 CONTROL MEASURE DESCRIPTIONS

Several sections of Rule 1001 articulate the objectives for PMRP control measures. Specifically, section C.2. of Rule 1001 requires:

1) The OHMVR Division to minimize PM10 emissions for the area under its control; and
2) The PMRP to contain and describe control measures that will be implemented to meet the performance requirements of Rule 1001, which is a dynamic, 24-hour average PM10 concentration, comparative monitoring-based standard, including the expected emission reduction effectiveness and implementation timeline for each measure.

The sand sheets that form the CDVAA and Control Sites described in Section 1.3 are ground level sources of fugitive dust. For such sources, the primary mechanism for the entrainment of dust particles in the wind is the saltation process, in which wind causes particles to creep or bounce along the ground surface and eject the dust-sized particles into the air flow where they are carried in suspension. Thus, any control measure implemented as part of this PMRP must be able to slow or stop sand movement and the corresponding PM10 emissions that occur during saltation.

Given the nature of the saltation process, the OHMVR Division has identified two categories of control measures that have the potential to minimize sand transport and PM10 emissions emanating from Oceano Dunes SVRA (i.e., the area under the control of the Oceano Dunes District): 1) Vegetation Projects, and 2) Artificial Surface Roughness Projects. The measures that will be implemented as part of this PMRP are described below.

The OHMVR Division has also eliminated several measures from inclusion in this PMRP, including soil stabilizers, site watering, vehicle activity management, and wind breaks. The reasons for eliminating these potential control measures are described in Section 3.1.3 below.

3.1.1 Vegetation Projects

Vegetation is generally accepted to be effective at reducing sand movement. Vegetation physically covers the ground surface, stabilizes or holds sand in place with roots and plant litter,

and breaks the flow of wind across the landscape, thereby reducing the amount of shear stress exerted on the ground surface.

PMRP vegetation projects will take two forms: enhancement of areas where vegetation already exists (e.g., adjacent to an existing vegetation island) and establishing vegetation in areas where no vegetation exists (e.g., an open sand area). While the OHMVR Division has developed dune vegetation techniques over the past 20 years to expand and protect existing vegetated areas, establishing vegetation in areas of bare sand is a greater challenge because the newly planted vegetation is exposed to more wind and sand movement. This was essentially observed in an analysis of the existing vegetation and sand dune geomorphology within Oceano Dunes SVRA's open riding and camping area conducted by the California Geological Survey (CGS 2007). The prospects for successful vegetation efforts increase when plantings were made adjacent to existing vegetation area in the lee of prevailing winds. These plantings established more quickly (within a season or two) and propagated more successfully than plantings on the lee side of unvegetated dunes and plantings on the windward sides of dunes (CGS 2007).

Expected Emission Reduction Effectiveness

In 2011, Desert Research Institute (DRI) assessed the effects of mature (approximately 2 – 4 feet high) vegetation on sand transport by collecting sand transport measurements in an area near Oso Flaco Lake that the OHMVR Division vegetated in the winter of 2007/08 (DRI 2011). The study area had between 25% and 67% vegetative cover and was dominated by silver bush lupine (*Lupinus chamissonis*). The study occurred over an approximate three-week period during the spring windy season. DRI concluded that sand transport was reduced by as much as 90-95% within the first 50 m from the upwind boundary of the vegetated area, and 90 – 99% further downwind, as measured by Cox Sand Catchers and Big Springs Number Eight (BSNE) dust traps.

Establishing vegetation as a means to control sand movement and dust emissions can take considerable time and effort in terms of planting and then waiting for it to grow to the dimensions necessary to be effective, and often requires an infrastructure to deliver water to maintain its viability. Newly planted seedlings can also be susceptible to sand blasting, which can cause a high mortality rate requiring re-planting. Protecting the seedlings with non-erodible roughness elements offers one method to provide a less severe environment in which plants can establish themselves and offer an environment that promotes healthy plant growth.

Vegetation Project Advantages and Disadvantages

Vegetation projects have advantages over artificial surface roughness projects, including:

- **Visual Compatibility:** The OHMVR Division considers Vegetation projects to be compatible with the existing visual setting of Oceano Dunes SVRA.

- **Lower Maintenance Requirements:** Vegetation projects have the inherent ability to respond to and potentially stabilize dynamic dune conditions, reducing the need for regular and routine maintenance once vegetation is established.

Vegetation projects also have disadvantages when compared to potential artificial surface roughness projects:

- **Establishment Period:** Vegetation projects take time to establish, and is hampered by a short growing season. The effectiveness of seedling vegetation projects is uncertain, but presumably lower than mature, established vegetated areas.
- **Use in Open Sand Areas:** The successful establishment of vegetation projects in bare sand areas is less proven at Oceano Dunes SVRA and at a minimum is likely to require greater material and staff resources than other vegetation projects adjacent to existing vegetated areas.

Finally, vegetation projects may face several policy and logistical limitations, such as:

- **Material Availability:** The use of large amounts of seed/seedlings is dependent on a reliable, local supply of these materials.
- **Native Plant Seed Mix Requirements:** CDPR statewide policies require the use of local genetic stock for all seed and plant material installed in Oceano Dunes SVRA.

3.1.2 Artificial Surface Roughness Projects

Artificial surface roughness refers to the placement of objects or other elements on or in the ground surface. Similar to vegetation, these artificial objects are generally accepted to be effective at reducing sand transport because they cover a portion of the sand surface, reduce the shear stress on the intervening surface among the elements thus reducing the transport capacity of the air flow, and also affect sand transport rate by virtue of the physical size and aerodynamic form.

PMRP artificial surface roughness projects may take one of four possible forms: straw bales, woodchips or other material berms, wind fences, and other feasible technologies that emerge, such as wind breaks.

Expected Emission Reduction Effectiveness

In 2011, DRI assessed the effects of artificial surface roughness on sand transport by collecting sand transport measurements in a grid of 210 straw bales with dimensions of 100 by 50 meters. DRI installed the bales in a staggered array that was designed to achieve a set roughness density. DRI concluded sand transport was reduced by 40 – 50% as measured by the Cox Sand Catchers and 60-70% as measured by BSNE traps. The effectiveness can be improved to greater amounts by increasing the number of roughness elements. The available empirical model of

Gillies and Lancaster can be used to guide the design to achieve the desired control effectiveness (Gillies and Lancaster 2012).

The effectiveness of wood chip berms used in California's Antelope Valley has been studied by multiple experts (Farber, Cowherd, *et al.* 2010). The effectiveness for a 6-foot high berm has generally been found to be greater than 90%.

Wind fencing (approximately 40 – 50% porosity) is a common control measure to arrest sand transport that has been documented to reduce sand transport by approximately 50 – 70 % (Grantz, Vaughn, *et al.* 1998, Farber, Cowherd, *et al.* 2010).

The OHMVR Division will also consider and evaluate other feasible methods of dust control that emerge or become feasible during this PMRP process. One example may be wind breaks, which have the potential to arrest saltating sand grains, potentially alter the travel path of entrained dust particles, and generally reduce wind speeds. The potential effectiveness of a wind break at or in the vicinity of Oceano Dunes SVRA is dependent on the material (e.g., tree rows, mesh netting, etc.) and the location of the measure. While open sand areas are unlikely to support tree rows, artificial wind breaks such as nets that could be engineered to remain in place may act as a large wind fence. A tree-row or large, artificial wind break installed at the eastern edge or downwind of an open sand area would not control sand transport and PM10 emissions from open sand areas as required by Rule 1001, but may potentially reduce downwind PM10 concentrations behind the wind break as a result of slowing wind speeds and particle deposition.

Artificial Surface Roughness Project Advantages and Disadvantages

Artificial surface roughness projects have advantages over potential vegetation projects:

- **Design Efficiency:** Using accepted theory, artificial surface roughness projects can be engineered to provide a specific roughness density and corresponding control efficiency.
- **Deployment:** Using machinery and equipment, Oceano Dunes District staff can deploy artificial materials over a large area relatively quickly. Artificial materials begin to provide sand transport and dust control upon deployment and do not require time to establish and achieve maximum control.
- **Seasonal Deployment:** Artificial surface roughness projects can be deployed on a seasonal basis and can be quickly removed at the end of a windy season or if operational or maintenance concerns dictate.

Artificial surface roughness projects also have disadvantages compared to potential -vegetation projects, including:

- **Reduced Effectiveness with Time**: Artificial materials do not have the ability to respond to dynamic dune conditions and thus become buried over time, reducing their ability to control and reduce sand transport and PM10 emissions and necessitating regular and routine maintenance and/or replenishment of materials by Oceano Dunes District staff.

Finally, artificial surface roughness projects may face several logistical limitations such as:

- **Material Availability:** The use of large amounts of artificial materials is dependent on a reliable, local supply of materials. For example, a 6-foot high wood chip berm is estimated to require approximately eight cubic yards of wood chips per linear foot of berm (AVD 2010).
- **Material Certification:** Straw bales must be certified weed free to reduce the potential to spread invasive exotic vegetation.

3.1.3 Dust Control Measures Eliminated from Further Consideration

The OHMVR Division considered soil stabilizers, site watering, and vehicle activity management as potential dust control measures but did not include these measures in this PMRP.

Soil stabilizers are highly effective at controlling dust emissions at construction sites and unpaved areas or roads, however, to be effective they require the area being treated to remain intact. In an active dune environment that is also subject to motorized and non-motorized recreation, soil stabilizers would not be an effective dust control solution. Similarly, watering would not be an effective dust control measure because high winds and solar radiation dry out the dune surface quickly. Wind breaks have the potential to arrest saltating sand grains and potentially alter the travel path of entrained dust particles. While a wind break may reduce PM10 concentrations immediately downwind of the wind break, numerous rows of windbreaks would be needed to meaningfully (i.e., measurably) reduce PM10 emissions from Oceano Dunes SVRA. The use of windbreaks, often requiring protruding posts and periodic maintenance, is not compatible with an area that is used frequently for recreational purposes from a safety and logistical standpoint. For these reasons, the OHMVR Division will not consider the use of soil stabilizers or site watering in this PMRP.

Vehicle activity management is the temporary or permanent restriction of vehicle activity at Oceano Dunes SVRA. This control measure relies upon the premise that surface disturbance by motor vehicles increases sand transport rates and associated PM10 emissions above natural conditions under similar wind regimes. In 2011, DRI tested this hypothesis by investigating the dust emissions potential along two transects in comparable areas, one open to OHV riding and one closed to OHVs, to determine if vehicular surface disturbance increases sand transport and dust emissions under similar wind conditions. Some data indicated that dust emissions may be higher in the CDVAA than in the adjacent control sites, but DRI concluded that the effect of restricted driving on dust emissions is not certain because the range of emission rates obtained

overlaps to a considerable degree between the CDVAA and studied control sites (DRI 2011). The OHMVR Division does not consider vehicle activity restrictions to be as effective as a measure that slows or stops sand transport and corresponding PM10 emissions, such as vegetation and artificial surface roughness projects. For this reason, the OHMVR Division will not consider the use of vehicle activity management in this PMRP.

3.2 PROCESS FOR DETERMINING DUST CONTROL PROJECT AREAS

Rule 1001 does not specifically prescribe where the OHMVR Division must implement dust control measures within the area under its control. While the OHMVR Division values having flexibility to implement dust control measures, it is also essential to determine where and in what order dust control measures should be implemented to comply with Rule 1001. For example, a dust control measure in an area subject to lower than typical wind speeds or in an area that does not meet Rule 1001 performance requirements most likely should not be implemented if there is another project that will achieve a greater PM10 reduction and/or rule compliance. Thus, there is a fundamental need for the OHMVR Division to use staff, materials, and economic resources in the most efficient manner possible.

The APCD's 2007 Nipomo Mesa Particulate Study and South County Phase 2 Particulate Matter Study examined saltation and the high levels of PM10 the APCD has measured on the Nipomo Mesa (APCD 2008, 2010). While these important studies generally reported on the nature and extent of the high levels of PM10 concentrations observed by the APCD during air quality monitoring, they did not identify or recommend specific areas within the CDVAA or Control Sites where dust control measures should be installed.

Given the nature of the project and the lack of specific information on PM10 emissions emanating from within the CDVAA and Control Sites, the OHMVR Division will undertake an Assessment Monitoring Program to assess the existing meteorological, sand transport, and air quality conditions within the CDVAA and two of the four Control Sites described in Section 1.3. The OHMVR Division will use this information on existing conditions to assess whether wind regimes are similar between CDVAA and Control Sites and whether some areas have higher sand transport rates and emit more PM10 than others (i.e., whether "Hot Spots" are present or absent from the CDVAA and Control Sites). Presumably, this Assessment Monitoring Program may have one of three outcomes in regards to "Hot Spots":

1) Sand transport and PM10 emission Hot Spots will be present.
2) Sand transport and PM10 emission Hot Spots will be absent, but other spatial or temporal patterns of sand transport and PM10 emissions will be apparent.
3) Sand transport and PM10 emission Hot Spots or other patterns will be absent.

Such information will aid the OHMVR Division in characterizing the relative emissivity of an area as high, medium, or low and support prioritizing the implementation of dust control measures

in a scientifically defensible manner. The OHMVR Division's Assessment Monitoring Program is contained in Attachment 1 to this PMRP.

3.3 PROCESS FOR IMPLEMENTING SPECIFIC DUST CONTROL PROJECTS

The OHMVR Division will prioritize and select specific dust control projects for implementation by considering each dust control measure within the context of six criteria that affect the implementation of specific dust control projects in specific locations. These criteria are:

1) **Project Area Emissivity:** This criterion will consider if the dust control project is in an area of high, medium, or low emissivity, based on the results of the Temporary Assessment Monitoring Program. If hot spots or other patterns are not identified, the emissivity potential will be treated as equal for all potential projects.
2) **Rule 1001 / PMRP Requirements:** This criterion will consider the expected emission reduction effectiveness of the dust control project and whether it will meet the performance requirement of Rule 1001.
3) **Recreation Management:** This criterion will consider if the dust control project will reduce riding or non-riding recreational opportunities, results in visitor safety concerns, or restrict emergency access or law enforcement services (e.g., is the control area part of the sand highway or other access route).
4) **Resource Management:** This criterion will consider if the dust control project will require biological-related permits or otherwise impact a sensitive biological resource, affect known cultural resources, or pose a substantial aesthetic concern.
5) **Logistics:** This criterion will consider if dust control project materials can comply with CDPR policies and are available in needed quantities, if there are sufficient staff to install and maintain the dust control project, if dust control project access and maintenance will impact resources, and if the project can be effectively monitored.
6) **Project Costs:** This criterion will consider the capital and ongoing operational costs associated with the dust control project.

The OHMVR Division will evaluate potential dust control projects for their compatibility with these criteria using the best available information and professional judgment. The criteria will be considered together, however, incompatibility with certain factors may render a project not desirable or infeasible (e.g., the project dust not meet rule requirements or will result in impacts to sensitive biological resources).

3.4 DUST CONTROL PROJECT MONITORING

The OHMVR Division will monitor dust control project success using two types of monitoring: Effectiveness Monitoring and Compliance Monitoring.

Effectiveness Monitoring will involve monitoring control measures to make sure they are effective at minimizing sand transport and PM10 emissions. For selected control measures (i.e.,

not all), the OHMVR Division will install a temporary array of meteorological, sand flux, and air quality instruments upwind, within, and downwind of the control measure. The OHMVR Division would design the array to determine the degree of sand flux and PM10 emissions reduction occurring as a result of the control measure. Rule 1001 does not explicitly require the OHMVR Division to conduct Effectiveness Monitoring, however, the OHMVR Division believes such monitoring is necessary for two reasons:

1) Control measures may result in localized reductions of PM10 that are not adequately captured at PMRP monitoring locations.
2) Consultation and coordination with the APCD and other land use agencies may result in control measures that are not upwind of PMRP monitors.

The OHMVR Division intends to use Effectiveness Monitoring to evaluate the overall effectiveness of PMRP actions. Compliance Monitoring will involve use of the PMRP Monitoring Network described in Section 4 of this PMRP. The OHMVR Division intends to use compliance monitoring for compliance determinations (i.e., to determine if control measures are meeting the Rule 1001 performance requirement).

3.5 DUST CONTROL PROJECT IMPLEMENTATION SCHEDULE

Rule 1001 requires the OHMVR Division to ensure control measures meet the performance requirement of Section C.3 by May 31, 2015. Prior to implementing any dust control project, however, the OHMVR Division may have to ensure the project is in compliance with applicable local, state, and federal regulations governing certain environmental resources, including but not limited to the California Environmental Quality Act (CEQA), the California Coastal Act, and the state and federal Endangered Species Acts.

The OHMVR Division's schedule for implementing dust control projects depends on whether the dust control measure can be implemented in a manner consistent with an existing CDP. Projects that can be implemented in a manner consistent with an existing CDP typically would not require review by the California Coastal Commission. Projects that cannot be implemented under an existing CDP will require a new CDP and will be subject to substantial environmental review.

3.5.1 Dust Control Projects Performed Under Existing CDPs

The OHMVR Division has vegetated dune habitats within Oceano Dunes SVRA since the Division began managing the park in 1982. The OHMVR Division performs these activities to protect critical park infrastructure and enhance existing vegetation and sensitive habitat areas from encroaching sand dunes. These activities are part of the ongoing management of Oceano Dunes SVRA, but they also reduce sand transport and PM10 emissions by covering open sand areas with vegetation and reducing the amount of wind that reaches open sand surfaces. From 2006 to 2012, the OHMVR Division planted vegetation on approximately 70 acres of dune habitat, or

approximately 12 acres per year. Most of the vegetation projects during this time period were implemented in the southern half of Oceano Dunes SVRA. In 2012, the OHMVR Division proceeded with 24.5 acres of vegetation projects, including:

- Vegetating 12.5 acres of open sand adjacent to eight vegetation islands throughout the open riding and camping area. These projects will install vegetation on sandy areas within the islands' existing fence lines.
- Supplemental planting on 11 acres of open or sparsely vegetated sand in six vegetated areas within Oceano Dunes SVRA.
- Installation of vegetation on one acre of bare sand located east of the OHV riding and camping area, on land leased from ConocoPhillips. This intent of this activity is to test the effectiveness of current vegetation practices on areas that are not adjacent to existing vegetation.

The OHMVR Division's ongoing vegetation and restoration work has and would continue to be performed in a manner consistent with existing Oceano Dunes SVRA Coastal Development Permit 4-82-300-A5 and does not require a new or amended CDP. Thus, these activities will proceed as planned by the OHMVR Division (i.e., approximately 10 – 20 acres per year of vegetation activities).

In addition to vegetation projects, the OHMVR Division is permitted to install wind fencing at Oceano Dunes SVRA. Each year, the OHMVR Division installs a total of approximately 1,700 linear feet of wind fencing directly upwind of Grand Avenue, Pier Avenue, and Strand Way from March to July. This activity will proceed as planned by the OHMVR Division.

3.5.2 Dust Control Projects Performed Under a New CDP

The OHMVR Division will likely not be able to implement extensive dust control projects under its existing CDPs. Such projects would be implemented upon completion of all necessary environmental and land use agency approvals, which would include, in order: 1) Complete CEQA review, 2) Obtain wildlife resource permits (if necessary), and 3) Obtain a CDP.

Vegetation Project Schedule Considerations

The OHMVR Division would implement vegetation projects in late fall of each year because weather conditions during this time are ideal for planting seeds and promoting establishment of newly planted vegetation.

Artificial Surface Roughness Project Schedule Considerations

The OHMVR Division would implement artificial surface roughness projects beginning in February of each year. Depending on the need, these projects may be implemented on a temporary (February to June) or permanent basis.

4 PMRP MONITORING NETWORK

This section describes the PMRP Monitoring Network the OHMVR Division will use to monitor compliance with the performance requirement of Rule 1001.

4.1 PMRP MONITORING NETWORK DESCRIPTION

Table 1As required by Rule 1001 Section C.2.a., the OHMVR Division's PMRP Monitoring Network will contain at least one CDVAA PM10 Monitor and at least one Control Site PM10 Monitor. Each CDVAA and Control Site PM10 Monitor will be a Federal Equivalent Method PM10 monitor capable of measuring hourly PM10 concentrations continuously on a daily basis, and the OHMVR Division will install a wind speed and wind direction monitoring system at each CDVAA and Control Site PM10 Monitor location.

CDVAA PM10 Monitor(s) would be located directly downwind of the CDVAA. Control Site PM10 Monitor(s) would be located directly downwind of a Control Site that is comparable to the CDVAA, but where vehicle activity is not permitted. The OHMVR Division's Monitoring Site Selection Plan describes the characteristics the OHMVR Division will consider when selecting comparable CDVAA and Control Site PM10 Monitor locations.

The CDVAA and Control Site PM10 Monitors that form the OHMVR Division's PMRP Monitoring Network will be used to conduct the Temporary Baseline Monitoring Program required by Rule 1001 (Section F.1.d.) and to determine if PMRP control measures are meeting the performance requirement of Rule 1001 (see Table 1, PMRP Requirements).

4.2 PMRP MONITORING PROGRAM

The OHMVR Division will operate its PMRP Monitoring Network in accordance with its PMRP Monitoring Program. As listed in Table 1, PMRP Requirements , this Program describes:

- A detailed description of CDVAA and Control Site PM10 Monitor locations;
- CDVAA and Control Site PM10 Monitor sampling methods and equipment;
- Equipment operating and maintenance procedures;
- Monitoring data handling, storage, and retrieval methods;
- Quality control and quality assurance procedures;
- Related information needed to define how the CDVAA and Control Site Monitors will be sited, operated, and maintained to determine compliance with the performance requirement of Rule 1001.

The OHMVR Division has not completed development of its PMRP Monitoring Program because it has not yet received the land use agency authorizations necessary to assess wind speed and wind direction conditions. The completed PMRP Monitoring Program will constitute Attachment 2 to this PMRP, and will be submitted with a future iteration of this PMRP.

5 TRACK-OUT PREVENTION PROGRAM

This section describes 1) the track-out prevention devices the OHMVR Division has identified for potential use, and 2) the OHMVR Division's schedule for implementing its Track-Out Prevention Program.

5.1 OCEANO DUNES SVRA PUBLIC ENTRANCE POINTS

Rule 1001 track-out prevention is intended to prevent track-out of sand onto paved, public roadways. In the case of Oceano Dunes SVRA, there are two paved, public roadways that provide ingress and egress to the park: Grand Avenue in Grover Beach and Pier Avenue in Oceano (an unincorporated area of SLO County).

During a typical summer weekend (Friday – Sunday), up to 11,500[1] vehicles can pass through the Grand and Pier Avenue entrances to Oceano Dunes SVRA. A busy weekend like July 4 or Memorial Day could see over 5,100[2] vehicles entering and exiting the park in a single day. A wide range of vehicle types and sizes pass through these entrances, including cars, trucks, trailers, recreational vehicles, and commercial vehicles.

5.2 TRACK-OUT PREVENTION MEASURES DESCRIPTIONS

The OHMVR Division has identified two types of track-out prevention measures for potential implementation: structural solutions and street-sweeping.

In addition, the OHMVR Division effectively uses wind fencing at Oceano Dunes SVRA to prevent track-out of sand onto paved, public roadways. The wind fencing is not specifically installed to prevent vehicle track-out from the beach onto public streets; it is installed to prevent natural sand drift from the beach onto public roads, parking areas, and other infrastructure (see Section 3.5.1). However, this wind fencing does capture a large amount of sand that naturally blows up the park's sand ramps and onto Grand Avenue and Pier Avenue. Without this fencing, natural blown sand would deposit on the streets and be prone to movement from vehicles and winds.

[1] Vehicle use numbers are from an analysis of mechanical vehicle counters during 2011. Each counter records two bumps as a single vehicle. A vehicle pulling a trailer would count as more than one vehicle in this analysis. Grand Avenue would average 4,000 vehicle trips per weekend while Pier Avenue can range from 4,000 – 7,600 trips per non-holiday summer weekend.

[2] IBID.

5.2.1 Structural Solutions

Rule 1001 Section B.16. defines a track-out prevention device as a gravel pad, grizzly, rumble strip, wheel wash system, or a paved area that is located at the point of intersection of an unpaved area and a paved road. The OHMVR Division will work to install these or other similar structural devices at the Grand and Pier Avenue entrances to remove sand from vehicles before it reaches these streets.

The OHMVR Division must overcome some technical and logistical challenges to install any structural track-out prevention device at Oceano Dunes SVRA. The biggest technical challenge is to develop a system that can deal with the quantities of sand expected in the area. In addition to accommodating the sand that adheres to vehicles, the structural devices would need to function with the large quantity of naturally blowing sand from the beach area. The biggest logistical challenge is maintenance. Structural devices would need to be easy to use and would need to quickly remove sand attached to vehicles. The public would need to be comfortable using a structural device and park exits would need to be designed to funnel all vehicles through the device.

5.2.2 Street Sweeping

The OHMVR Division currently operates a program to sweep Grand and Pier Avenues regularly to remove sand that accumulates on these public streets. Two or three times per week, Oceano Dunes SVRA staff maintains portions of the Pier Avenue entrance with a small CDPR-owned sweeper. This area extends approximately 100 feet from the Pier Avenue Entrance Station to the ramp leading to the beach. Since 2011, the OHMVR Division has contracted with a private party to regularly sweep Pier Avenue two times per week. This sweeping occurs along approximately 1,000 linear feet of Pier Avenue from Air Park Drive to the Pier Avenue Entrance Station. The street sweeping complements efforts by SLO County to sweep the entire length of Pier Avenue from Highway 1 to the entrance station. SLO County operates this street sweeping program using in-lieu funds generated from registration fees for off-highway vehicles Similarly, two to three times per week, the OHMVR Division sweeps a 550-foot length of Grand Avenue using an existing CDPR-owned sweeper.

5.3 TRACK-OUT CONTROL PROJECT SCHEDULE

The OHMVR Division's schedule for implementing its track-out prevention program depends on the nature of the prevention method.

5.3.1 Schedule for Structural Track-Out Prevention Devices

Structural solutions are not covered under an existing CDP and will therefore be subject to environmental review and land use agency approvals.

In addition, any structural solution will be a capital outlay project that requires the appropriation of funds by the State Legislature. Once funds are appropriated, the OHMVR Division can initiate the process to receive proposals for professional services to design and install an effective track-out control system. The OHMVR Division can concurrently work to obtain agency approvals and proposals, however, an 18 – 24 month timeline from the appropriation of funds is anticipated before track-out prevention devices would be fully operational.

5.3.2 Schedule for Street Sweeping

The OHMVR Division's existing street sweeping efforts would continue as is during the term of the PMRP, although schedules are subject to change based on the availability of equipment, staff, and funding to implement private contracts.

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