# EXCESS (MASS) EMISSIONS ASSESSMENT FOR THE ODSVRA

SOA CASE NO. 17-01

SAG Presentation to the SLO APCD Hearing Board

October 15, 2024

#### **Scientific Advisory Group**

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### CONCEPTUAL FRAMEWORK (2018-2022)



## DUST EMISSION MEASUREMENT: PI-SWERL



Photo credits: DRI & Jack Gillies







#### POWER RELATIONS TO PREDICT DUST FLUX





#### Summary of PI-SWERL Measurements at ODSVRA

YEAR_Month(s)	<b>Riding Area</b>	Non-Riding Area		
2013_08	186	143		
2014_09	45	35		
2015_06	100	2		
2015_9/10	165	6		
2016_03	58	34		
2019_05	337	124		
2019_10	42	28		
2022_05	51	27		
2022_09		133		
TOTAL	984	532		

another  $\sim 266$  measurements in seasonally exclosed areas

 $\sim 500$  measurements in 2024 – not yet assimilated into model



#### Stipulated Order of Abatement (2022)

- 3. Sections 2a-2d of the Original Stipulated Order of Abatement are modified to read:
  - b. The plan shall be designed to **eliminate emissions in excess of naturally occurring emissions** from the ODSVRA that contribute to downwind violations of the state and federal PM<sub>10</sub> air quality standards. By October 16, 2024, in consultation with the SAG and CARB, the Respondent shall obtain Hearing Board approval of a final excess emissions goal.
  - c. To meet the objective of 2b, the Respondent shall initially **reduce mass-based PM**<sub>10</sub> **emissions within the ODSVRA to a level consistent with the** *pre-disturbance scenario* identified by the SAG in their "Scientific Basis for Possible Revision of the Stipulated Order of Abatement," dated February 7, 2022. Emissions shall be calculated using the meteorology of the 10 highest emissions days for the period May 1 through August 31, 2013, and a *representative emissivity grid derived from PI-SWERL measurements as recommended by the SAG*, and as determined by air quality modeling carried out by the California Air Resources Board (CARB), or other modeling groups subject to the review of the Scientific Advisory Group (SAG).

### CONCEPTUAL FRAMEWORK (2024-)



Outcome depends on (i) zones (type, area); and (ii) emissivity values

#### Zonation of the ODSVRA







### EMISSIVITY ZONES FOR CURRENT (2024) LANDSCAPE SCENARIO



For details see: SAG Memo\_Emissivity Grids for Future Modeling of Excess Emissions—2023.12.19 https://storage.googleapis.com/slocleanairorg/images/cms/upload/files/SAG%20Memo\_Emissivity%20Grids%20for%20Future%20M

odeling%20of%20Excess%20Emissions%20-%2020231219.pdf

### MASS EMISSIVITY POWER RELATIONS

	Non-Riding Areas		Riding Areas		FRA	PE	
	North	Central	South	Central- North	Central- South		
n =	111	221	67	403	574	110	23
u <sub>*</sub> (m s <sup>-1</sup> )							
0.381	0.039	0.021	0.001	0.094	0.024	0.006	0.003
0.534	0.307	0.193	0.142	0.640	0.432	0.068	0.032
0.607	0.932	0.610	0.388	1.349	0.964	0.192	0.107
$\mathbf{F} = \mathbf{a} \ (\mathbf{u}_*)^{\mathbf{b}}$							
a	66.376	51.649	20.786	24.340	24.395	10.710	11.416
b	8.547	8.893	7.972	5.795	6.466	8.060	9.355
r <sup>2</sup>	.999	.999	.999	1.000	0.999	1.000	1.000

Major changes to modeling:

- 1. Zones rather than grid
- 2. Use all available data (2013-2022<sup>+</sup>)
- 3. Use MEDIAN rather than MEAN





Zone	Total Emissions metric tons/day (10 Highest Emissivity Days May 2013)						
1939							
Non Riding Area Central	122						
Non Riding Area North	20						
Non Riding Area South	24						
Total	166						
Current							
Foredune Restoration							
Area	1						
Non Riding Area Central	18						
Non Riding Area North	16						
Non Riding Area South	16						
Plover Exclosure	4						
Riding Area Central- North	30						
Riding Area Central- South	63						
Seasonal Exclosure	1						
Vegetation Islands	0						
Revegetation	0						
Total		148					

Dust emissions are less today (2024) than from the pre-disturbance (natural) landscape

#### Dust Emission from Current and Pre-Disturbance Landscape Scenarios





Dust emissions (g m<sup>-2</sup> day<sup>-1</sup>) for current (left panel) and pre-disturbance (right panel) scenarios based on the meteorology of the 10 highest PM<sub>10</sub> emission days in 2013.





719

