May 31, 2026

SAG Memo: <u>Contemplating DRI model refinements in anticipation of the 2026 ARWP</u>

From: Scientific Advisory Group (SAG)

To: Karl Tupper, SLO Air Pollution Control District (APCD)
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Cc: Sarah Miggins, California Department of Parks and Recreation (CDPR)

Significant progress toward dust mitigation in the Oceano Dunes State Vehicular Recreation Area (ODSVRA) has been achieved since the filing of the Stipulated Order of Abatement (SOA 2017-01) in May, 2018. Approximately 700 acres (inclusive of the 293-acre Plover Exclosure) have been subjected to dust control measures leading to a reduction in the number of hours of $PM_{10} > 300$ μg m^{-3} at CDF and Mesa2, a reduction in annual violations of Rule 1001, a reduction in the number of exceedances of the California Ambient Air Quality Standard (CAAQS) of 50 μg m^{-3} (averaged over 24 hours), and continued decrease in various indicators such as the SAG metric, the difference-in-difference analysis, and the ratio of Total PM_{10} over Total Wind Power Density. In the past three years, no new treatment projects were undertaken, and the indicators have stabilized accordingly, as documented in the 2025 ARWP. These are the tangible touchstones against which progress toward improved air quality can be judged in the most meaningful way. However, **the SOA evaluates regulatory compliance not according to these indicators but, rather, according to the current levels of dust emissions being less or equal to those from a pre-disturbance landscape scenario.**

A simulation model developed and curated by the Desert Research Institute (DRI) is relied upon to quantify the levels of dust emissions from both the pre-disturbance and current landscape scenarios. PI-SWERL measurements taken since 2013 are used to assess dust emission potential from the current landscape surface, with increasing confidence in the results given the large number of measurements that are now available. **The pre-disturbance surface, in contrast, has no measurements of dust emission potential, and therefore model simulations must depend on a number of assumptions about what the likely surface characteristics were prior to intensive human disturbance**. It is critical to appreciate that the primary objective in modeling the pre-disturbance landscape is not to be absolutely accurate (i.e., know with certainty how much dust might have been emitted in 1939) because there is no way to verify the model results. Instead, the approach is to use sound scientific judgement as to the likely conditions that existed at that time, and then to come to agreement about the predicted dust emissions as a baseline value against which current progress can be evaluated. **The baseline value is an operational target that cannot be assessed for absolute accuracy.** In this memo, the SAG strives to provide sufficient background material in support of a collegial discussion about parameterization (and updating) of the pre-disturbance scenario baseline value.

Over the past five years, on-going discussions between CDRP, APCD, and the SAG regarding quantification of dust emission potential from the ODSVRA have led to a series of modifications

to the DRI simulation model, which is continually being updated as new information becomes available. Last year, for example, a new modeling grid was constructed that covers the entire ODSVRA and new information was incorporated into simulation of the wind field. With respect to dust emissions from grid cells within Vegetated Islands (VIs), all of which were previously modeled as non-dust-emitting, consensus was reached recently regarding a revised rule set, as outlined in a previous SAG Memo[1] and agreed to during the SAG Semi-Annual meeting held via Zoom on April 13, 2026. The manner in which Treatment Projects (TPs) are to be parameterized remains a work in progress as of mid-May, 2026, awaiting a summary report with recommended guidelines from CDPR.

This memo deals specifically with concerns raised by APCD regarding how the pre-disturbance scenario is to be parameterized relative to the current landscape scenario. In particular, APCD has expressed concerns that zones (i.e., grid cells) that are unvegetated and classified as non-riding in the current landscape scenario are allocated emissivity profiles that yield less dust than equivalent areas in the pre-disturbance scenario. This applies specifically to the footprint of the Plover Exclosure (PE). Below, we outline what we believe are relevant points for consideration as well as some historical context that may inform discussions regarding a path forward.

Background

All prior model simulations (reported extensively in previous ARWPs) were based on the 1939 pre-disturbance landscape being sub-divided into three primary zones (NRA North, NRA Central, NRA South). In contrast, the current landscape is sub-divided into ten zones that reflect the complexity inherent to the ODSVRA due to a range of management imperatives as informed by spatial differentiation of dust emission potential based on PI-SWERL measurements. A SAG memo[2] provides a detailed explanation of the SAG-recommended zonation as well as the emissivity power relations to be applied to each of the zones. These recommendations were adopted in late 2023, and the 2024 ARWP was the first to provide simulation results from the DRI model based on the new zonation and approach. The 2025 ARWP was similarly predicated on this approach, with incremental changes to the emissivity curves (i.e., power relations) as new PI-SWERL measurements were acquired, as per established protocols.

Most aspects of the modeling framework, as currently implemented, are non-controversial. For example, the emissivity curves developed for the NRA North (Dunes Preserve) and the NRA South (Oso Flaco) using all PI-SWERL data collected since 2013 are applied to these respective zones in both the pre-disturbance scenario and current landscape scenario. The only change in dust emission potential for each of these zones arises because of changes in vegetation cover (quantified using vegetation cover masks developed by UCSB) rather than dust-emitting potential of non-vegetated, bare sand surfaces, then versus now.

The primary difference between the pre-disturbance and current landscape scenarios in the DRI model is that the large central region of the ODSVRA—identified as NRA Central in the pre-disturbance scenario—has been sub-divided into many sub-units in the current landscape

[1] SAG Memo – ***Incorporating Vegetation Cover in the DRI Model***_April 9, 2026.
[2] SAG Memo - ***Updated SAG Recommendations for Establishing Emissivity Grids to be used in Modeling of Pre-Disturbance Conditions and Future Excess Emissions Reductions***_December 19, 2023.

scenario. The largest sub-units are the RA-Central North and RA-Central South, which have been, and continue to be, exposed to year-round human disturbance (OHV riding, camping, hiking, etc.) and are parameterized, accordingly, with emissivity curves specific to those areas in the contemporary environment. The footprint of both these management sub-units falls within the NRA Central zone of the pre-disturbance scenario, which is parameterized using the emissivity curve developed from PI-SWERL measurements made in the areas designated as non-riding in the central portions of the contemporary ODSVRA. This approach is also non-controversial, reflecting the fact that the grid cells in the currently-designated RAs are continually disturbed by OHV traffic and have greater dust emission potential than a pre-disturbance surface that was not exposed to OHV traffic.

The parameterization of several of the remaining management sub-zones (e.g., Foredune Restoration Area (FRA), Plover Exclosure (PE)) is less certain. Updated information from recent PI-SWERL measurements on dust emission potential across these sub-zones compels a re-examination of original assumptions regarding how these sub-zones were parameterized. Each of these zones (in the current landscape scenario) has a specific emissivity power relation assigned to it based on PI-SWERL measurements taken since 2022 in each of the respective sub-zones. In contrast, these areas in the pre-disturbance landscape are all assigned an emissivity curve based on PI-SWERL measurements taken in the NRA Central zone beginning in 2013. Several points are noteworthy in this respect.

1. The currently-implemented approach was adopted for the 2024 ARWP and utilized for the 2025 ARWP, with conditional approval from APCD in both years. Nevertheless, the APCD expressed early concern with the assumptions regarding the PE, as outlined in a letter dated February 9, 2024 (from Gary Willey to Sarah Miggins, regarding approval of the 2023 ARWP), which stated that,

   "The proposed methodology is rational and improves upon the previous approach; however, as noted in our comments on an earlier version of the recommendations, we have concerns about some assumptions for the Plover Exclosure, specifically, that the area has lower emissivity today than it did prior to disturbance by off-roading. Nonetheless, we defer to the SAG's expertise and hereby approve the proposed emissions assumptions for use in the current modeling."

   With respect to the 2024 ARWP, the final approval letter (October 31, 2024) from APCD did not mention this issue of applying different emissivity curves, although it expressed concerns with potential re-opening of the PE to OHV access. The same was true for the final approval letter (October 16, 2025) for the 2025 ARWP. Thus, it seems that a precedent has been set that sanctions the current modeling approach (as originally proposed in the December 19, 2023 SAG Memo). But, it is also apparent that APCD has expressed consistent and long-standing concerns (documented in review materials for draft ARWPs, as well as in verbal and written correspondence) with the use of different power relations applied to certain zones in the pre-disturbance and current landscape scenarios.[3]

[3] The APCD requested additional simulation runs that modeled the PE with an emissivity curve based on the NRA Central measurements in the current landscape scenario (i.e., ignoring the actual PI-SWERL measurements in the PE since 2022), and these results were incorporated into a table in the ARWP.

Specifically, APCD questions why the footprint of the PE in the pre-disturbance scenario is assigned a dust emission potential (based on the NRA Central measurements) that yields greater emissivity in 1939 relative to today, despite significant human disturbance in the decades between.

2. At the time of the reframing of the DRI model structure in late 2023 (to include various zones, each with a specific emissivity curve), there was sparse information and understanding of the surface emissivity of the PE and FRA. The PE was closed to OHV traffic and recreational use in October, 2021, which effectively dates back to March 1, 2021 given seasonal riding restrictions associated with breeding/nesting of the Western Snowy Plover before closure. Thus, at the time of the September, 2022, PI-SWERL campaign (the first to quantify emission potential in the PE footprint since closure), the area was only in its initial stages of landscape adjustment (i.e., vegetation growth, foredune development, textural sorting). Given documented annual variations in dust emissions within the ODSVRA, it was not known with any degree of certainty whether the 2022 PI-SWERL measurements were representative of a 'mature' surface that had not been recently disturbed. Similarly, the FRA was officially closed on January 1, 2020 (fencing efforts were initiated in mid-December 2019) and subsequently treated with experimental plantings, with each of the sub-units evolving differently. More PI-SWERL measurements were needed in subsequent years to better understand the emissive characteristics of the evolving surfaces, but the 2022 measurements were all that were available at the time of the 2023 ARWP.

   For the model simulation results that informed the 2024 ARWP, APCD stipulated (with SAG support and CDPR approval) that the 2022 PI-SWERL measurements were to be applied to the current landscape scenario in the PE and FRA because they most accurately reflected surface conditions at that time (rather than using a synthetic curve derived from other zones). However, **given the uncertainty associated with knowing whether the power relations derived from the 2022 measurements were stable and representative, it was agreed that the NRA Central power relation would be used when modeling the dust emissions from the pre-disturbance scenario in all the grid cells in the central portion of the ODSVRA**. The effect of this assignment of power relations to the footprint areas of the FRA and PE was that greater dust emissions were predicted from the pre-disturbance grid cells than for the same grid cells in the current landscape scenario in the PE and the FRA. APCD is of the opinion that this approach does not yield sensible results, and that any unvegetated grid cells where there are riding restrictions today should have the same (or greater) emissivity potential than for the pre-disturbance landscape.

3. In the SAG Memo[2] that made recommendations for establishing the zones, some justification was provided for treating the FRA and PE (and also the Seasonal Enclosure, SE) differently in the pre-disturbance scenario relative to the current landscape. Specifically, it was argued that the FRA, PE, and SE areas have all experienced modifications by human actions in one way or another, for lengthy periods of time. All three areas have been subject to OHV traffic up until fairly recently (and even today in the case of the SE), and the FRA has been modified with experimental planting. Since closure, the PE has also been modified with emplacement of large woody debris and broadcasting of wood chips and wrack in certain spots (personal communication with CDPR personnel).

Given this history of surface disturbance and modification in the FRA, PE, and SE, it is not unreasonable to conclude **that the current landscape might have a different dust emission potential than in 1939. In other words, there is no *a priori* reason to assume that they would be the same.** This is most clearly applicable to the SE (currently managed with seasonal opening/closure), for which there is no counterpart in the pre-disturbance landscape. In other words, we should expect that the emissive properties of the pre-disturbance surface could differ from what they are today in the SE footprint. Similarly, the experimental plantings in the FRA have no analog in the pre-disturbance landscape, despite the expectation that each of the six treated areas will ultimately equilibrate to some 'natural' state. Whether this evolving surface will mimic the conditions in 1939 can never be known with certainty. Thus, in the case of the FRA, we can similarly expect that the pre-disturbance emission potential might differ from that of the current landscape scenario.

The situation in the PE is more nuanced and less certain because the intensity of recent human disturbance in the PE has been relatively minimal. However, there is little empirical evidence to indicate that the current surface has achieved a stable equilibrium state that mimics that of the pre-disturbance surface (in terms of vegetation cover, textural sorting vertically and horizontally) nor is there a robust method to ascertain what the dust-emitting potential was in the pre-disturbance landscape. We can never know with certainty whether the dust emission potential of the pre-disturbance surface was greater or lesser than it is today. APCD believes that the pre-disturbance surface was less emissive than (or equal to) what it is now. The SAG does not disagree but also allows for the possibility that the emissivity could have been greater in the pre-disturbance landscape given that the PE surface has been treated routinely in recent years.

4. Of all the zones that have been characterized by PI-SWERL measurements, the NRA Central is, perhaps, the one subject to most sampling bias. There are relatively few measurements from the thin, eastern strip along the northern portions of the NRA Central, in part because most of that zone has been replanted and is categorized as Treatment Projects (i.e., no longer in the NRA Central and therefore not sampled). In contrast, there is an extensive cluster of repeat measurements in the more southerly zone that extends much farther inland than the rest of the ODSVRA. Overall, the vast majority of NRA Central measurements were taken in locations that are at significantly large distances from the beach and foredune. Why is this important?

   It is generally understood (although difficult to prove unequivocally for the ODSVRA given existing data) that aeolian transport leads to a grain-size fining trend in the inland direction. In other words, foreshore and beach sediments tend to be poorly sorted with a substantial coarse fraction and a long tail of fines, foredune sediments tend to be finer on average, and sediments in the lee of the foredune and farther inland are typically the finest. There can be considerable variability in this general trend depending on the history of deposition over decades as well as recent process suites that modify the surface. However, if we take this fining-landward gradational sequence to be generally applicable to the ODSVRA (recognizing that there are intervening complexities associated with the non-riding areas adjacent to and immediately upwind of the NRA Central), and if we further assume that the

surfaces with the finest grain sizes are typically more emissive than those with coarse sediments, then it is reasonable to conclude that the power relation developed using the NRA Central measurements should yield greater dust emissions for the same wind speed as a power relation developed using PI-SWERL measurements taken in areas where there are coarse sediments, such as the beach and foredune. In other words, **applying the NRA Central power relation to sub-zones close to the beach (e.g., FRA, PE, SE) would likely lead to an over-prediction of the true dust-emitting potential from those areas**. This is why actual PI-SWERL measurements taken in the FRA, PE, and SE since 2022 are used to parameterize dust emissions from those zones in the current landscape scenario. There is no need to change this aspect of the model.

There are, however, implications for how the pre-disturbance scenario has been (and is being) modeled using the currently-implemented approach. The inland regions of the NRA Central are modeled using the NRA Central power relation, as is appropriate, but **it becomes less obvious that this is the power relation that is best suited to parameterize the areas closer to the beach, where grain sizes were undoubtedly coarser in the pre-disturbance scenario as they are today**. The challenge is to reach agreement on how to refine the DRI model, if at all, to accommodate this likelihood. In point #2 above, it was noted that there were insufficient data in 2023 to make any attempt to accommodate this putative landward trend in emissivity potential, so the default position was, by necessity, to use the NRA Central emissivity curve. The situation has changed in the intervening years with the acquisition of many more PI-SWERL measurements in the FRA, PE, and SE. These could be used to inform the construction of new power relations that may be more suitable in characterizing portions of the pre-disturbance landscape.

5. In terms of procedures, SAG has consistently embraced the principle to use all applicable data that are available to construct power relations, unless there are explicit reasons to eliminate some data from consideration. This principle has been articulated in many documents and used consistently in the past, and it should continue to be respected when contemplating the parameterization of power relations for the FRA, PE, SE, NRA Central, and all other zones. However, the specific mix of available data included in specific power relation applicable to the pre-disturbance scenario depends not simply on spatial location but also on reasoned arguments for why data from some zones are included while others are precluded.

Recommendations

The SAG appreciates that any changes to the modeling framework will have consequences for total modeled dust emissions from the ODSVRA, and hence for SOA compliance assessments that may, in turn, have real-world consequences for park operations and management. Nevertheless, it is the SAG's responsibility to provide the best advice to CDPR and APCD based on scientific principles, theoretical reasoning, and empirical evidence, and also to respond to concerns expressed by either party to the SOA. The SAG considers the continually evolving nature of dust emissions from the ODSVRA as well as any new information that is relevant to the management challenge. We know much more about dust emissions from the ODSVRA than

we did in 2022 when the SOA was first re-framed to assess compliance on the basis of reductions of mass-based PM_{10} emissions within the ODSVRA to a level consistent with the pre-disturbance conditions. This new understanding leads us to make the following recommendations.

The SAG does not support a suggestion from APCD to apply the power relation from the NRA Central (or NRA South) to the entire footprint of the zone identified as the PE for BOTH the pre-disturbance and current landscape scenarios equally. This violates the general principle that all available data should be used unless there is a reason to exclude a portion of the data from consideration on reasoned grounds. The FRA, PE, and SE areas have been monitored since 2022, and those PI-SWERL measurements are the best indicator of dust-emitting potential from those zones in the current condition. These data should be utilized to parameterize the emission potential from the PE and not be ignored.

The SAG does not support the suggestion from CDPR to continue to model the entire NRA Central in the pre-disturbance scenario with the NRA Central power relation. Despite the precedent that has been set in prior ARWPs, the decision to apply the NRA Central power relation to the pre-disturbance scenario was the only viable option at the time. It was appreciated by all that this was an expedient solution to an uncertain problem, even though there was awareness amongst SAG members that there was likely an inland-fining trend in grain size that could influence dust emission potential. Unfortunately, there was little empirical evidence at hand to support the trend. Indeed, an attempt was made to investigate whether there were statistically-significant differences between PI-SWERL measurements in the western versus eastern portions of the ODSVRA (see page 18 and Appendix II of SAG Memo: Update SAG Recommendations for Establishing Emissivity Grids to be used in Modeling of Pre-Disturbance Conditions and Future Excess Emissions Reductions, December 19, 2023) but this line of inquiry, focused mainly on the RA, proved unfruitful at the time and was not pursued further.

A large number of PI-SWERL measurements from the PE are now available, and these indicate that there are statistical differences between the emissivity potential along the beach relative to farther inland in the lee of the foredunes. The limited number of samples from within the foredunes are not statistically different from those on the beach nor from those in the lee areas, suggesting that the foredunes are intermediary between two, more distinct populations (beach vs lee). Although a rigorous analysis has yet to be performed, the emission profile of the lee sediments appears similar to the NRA Central and NRA South, both of which comprise mostly inland measurement locations. To the extent that the pre-disturbance landscape had a similar landward-fining trend in sediment texture, it would be reasonable to conclude that even in the pre-disturbance landscape the emission potential of the beach and foredune surfaces would have been less than farther inland. Thus, **it seems inappropriate to apply the NRA Central emissivity power relation (based on inland only measurements) to the entire zone outlined as NRA Central in the pre-disturbance scenario (i.e., including those areas now identified as the FRA, PE, and SE).**

The SAG makes the following recommendation with respect to refining the dust emission potential of the pre-disturbance landscape.

The NRA Central region of the pre-disturbance landscape should be divided into two large sub-zones to better reflect the inland-fining trend that is likely to have existed in 1939, and as is found on most natural beach-dune systems across the world. There are two options to consider.

Option 1: A new sub-zone for the pre-disturbance scenario would comprise the footprint of the current management zones known as the Plover Exclosure, Foredune Restoration Area, and Seasonal Exclosure Area. The combination of these zones into one large pre-disturbance sub-zone accommodates the need to isolate these beach-proximal and foredune areas from the rest of the inland areas that likely have finer grain sizes and greater dust-emitting potential. Use of existing polygon boundaries for the PE, FRA, and SE will facilitate ease of modeling. However, this new sub-zone does not cover the full extent of the beach and foredune area in the ODSVRA to the north of the FRA.

Option 2: A new beach-foredune zone could be carved out of the NRA Central zone, and it would consist of a north-south trending strip of land bounded by the ocean shoreline to the west and an eastern boundary line placed approximately 200 - 400 m inland from the shore. Nominally, the north-south extent of the new zone covers the distance between Arroyo Grande Creek on the north to southern boundary of the Plover Exclosure (where it abuts with the Oso Flaco management zone). Thus, it most accurately reflects the entire latitudinal extent of the beach and foredune areas in the ODSVRA. A maximum width of 400 m for this new zone follows recommendations provided by a report from Swet et al., (2022; see Figure 1 on page 11)[4] that indicates that this is the average maximum width of the foredune zone along this stretch of coastline. However, a narrower width of this new sub-zone could be agreed to as long as it captures most of the foredune extent and doesn't cover too much of the landward lee area. Recent PI-SWERL measurements in the PE could be used to determine an appropriate average width. There are certain locations where the width of the new zone will be quite narrow, such as in the north where a wide strip would overlap substantially with the Dunes Preserve. The width of the sub-zone in the north would need to follow the fenced boundary of the Dune Preserve, which partitions it from the strip of beach that is currently used mainly as an access/egress corridor for OHV and street-legal traffic. Similarly in the south, the proposed zone will need to accommodate the fact that the North Oso Flaco management zone occupies a beach-foredune position and is not part of the NRA Central in the pre-disturbance scenario. **The detailed outline of such a new sub-zone would require further discussion.**

Under either Option 1 or Option 2 (creating a new sub-zone in the pre-disturbance scenario), the remainder of the NRA Central portion of the pre-disturbance scenario will continue to be modeled as it is now—i.e., using the power relation derived from PI-SWERL measurements from the NRA Central designated areas since 2013.

The new sub-zone will require the development of a synthetic power emission relation, and this will require additional discussion. Specifically, it will be important to decide which PI-SWERL measurements will be considered for inclusion, and which data to eliminate from consideration. For example, the SE has no direct analogue in the pre-disturbance scenario, and this area is

[4] Swet, N., Hilgendorf, Z., Walker, I., 2022. UCSB Historical Vegetation Cover Change Analysis (1930-2020) within the Oceano Dunes SVRA.

disturbed seasonally by OHV riding on an annual basis, which was not the case in the pre-disturbance era. For this reason, it seems reasonable to exclude PI-SWERL measurements taken in the SE from further consideration. In developing a synthetic power emission relation for the new sub-zone in the pre-disturbance scenario, there are two sensible options to consider, as follows:

Option A: Include all measurements taken since 2022 in both the PE and the FRA, and create a synthetic power relation based on these data. As noted above, both the PE and FRA have been closed to OHV and camping access since about 2021 and 2020, respectively, and therefore surface conditions have begun to return to a largely undisturbed state (despite sporadic management interventions). Whether this evolving state reflects a 'natural' condition that mimics what was there in 1939 is not known, but the PI-SWERL measurements in the PE and FRA since 2022 are the best representation of what might have been the pre-disturbance surface state in the new sub-zone. The NRA Central PI-SWERL measurements that were originally used are no longer under consideration because they represent the emissivity potential at inland locations where grain sizes are finer than the beach and foredunes.

Option B: Include all measurements taken since 2022 in the PE, but only those measurements from the control area (Treatment 1) within the FRA. The control area of the FRA was, in fact, not treated with plantings, despite being referred to as Treatment 1. It reflects how the foredune area would evolve naturally in the absence of OHV activity in terms of vegetation cover, foredune growth, sediment capture, and textural sorting. The five other treatment areas were subjected to a variety of surface modifications (e.g., sheepsfoot texturing, straw broadcasting), seeding strategies, and planting assemblages. Arguably, none of these five treatment areas has a direct analogue in the pre-disturbance landscape, although Treatment 6 ("Parks Classic") used randomly planted seedlings and native seeds and may therefore mimic a 'natural' foredune surface in the ODSVRA.

An analysis of the PI-SWERL data included in Option A and Option B was conducted, and despite a reduction in the total number of available data points for Option A (n = 286) to Option B (n =136), there is virtually no difference in the power emissivity relations. This also applies to a case where PI-SWERL measurements from both Treatment 1 and Treatment 6 were considered (n = 176). The medians for each of the three PI-SWERL speeds were essentially the same (see Table 1), although the means and standard deviations differed slightly, which reflects the fact that the FRA is generally characterized by a larger data range and greater extremes (especially in Treatments 2 – 5) than for the PE. Table 1 presents the medians and the coefficients (a) and exponents (b) for the power emissivity relations derived using the medians, as per established protocols. Figure 1 is a graphical representation of the three curves, demonstrating the negligible difference between Option A and Option B (both T1 and T1+T6).

Table 1: Median dust flux values (mg m^{-2} s^{-1}) as a function of the three PI-SWERL speeds for Option A (PE + FRA) and Option B (two approaches). Regression parameters for the power relation $F = a\ (u_*)^b$ where F is the flux (emissivity) magnitude (mg m^{-2} s^{-1}) are included at the bottom of the table. Power regression results calculated using SigmaPlot© software.

u*	PE + FRA	PE + T1 + T6	PE + T1
***n* =**	*286*	*176*	*136*
	median	median	median
0.381	0.005	0.004	0.003
0.534	0.066	0.064	0.063
0.607	0.180	0.180	0.180
a	8.929	10.150	10.890
b	7.821	8.076	8.218
Rsqr	1	1	1

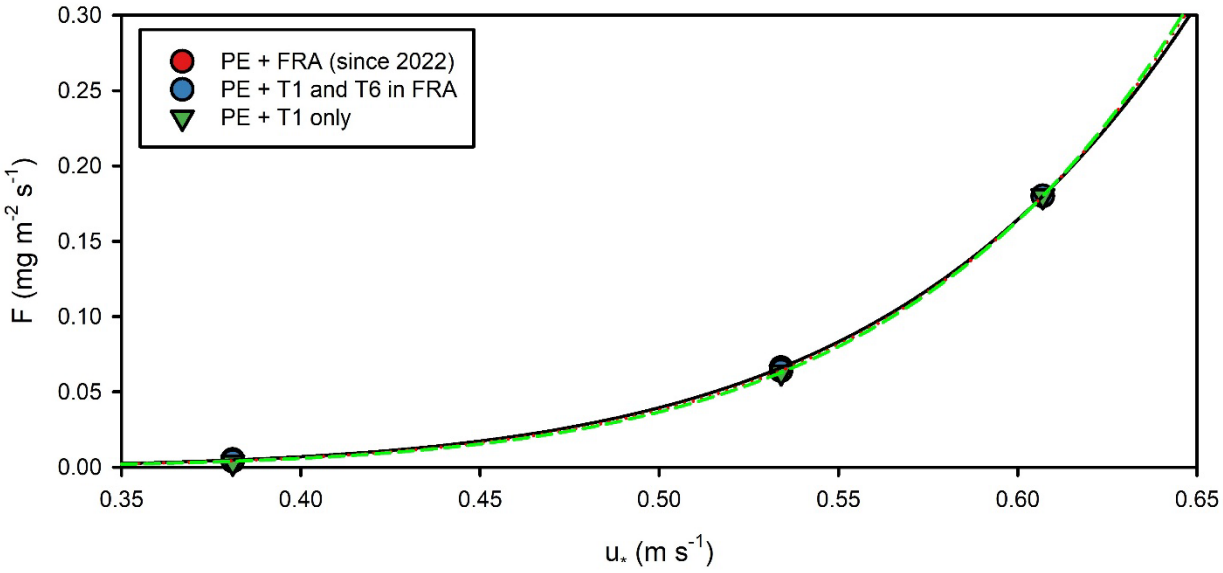

Figure 1: Graphical representation of the three power relations for which the regression parameters appear in Table 1.

Figure 2 shows the power relation derived using Option A data (PE and FRA since 2022) relative to power relations for other management zones in the ODSVRA. Not surprisingly, the Option A curve sits approximately half-way between the curves for the PE (lowest) and the FRA (higher).

All three curves have emissivity potentials less than the three Non-Riding Areas (NRA South, NRA Central, NRA North). As described above, the current DRI model parameterizes the footprints of the PE and FRA in the pre-disturbance scenario using the NRA Central curve, which yields and outcome where the pre-disturbance surface yields greater modelled dust emissions than today. With the adoption of Option A (or Option B), the outcome will be that there will be slightly greater dust emissions from the FRA today than in the pre-disturbance era BUT the reverse will be true for the PE. That is, there will continue to be smaller dust emissions from the PE today than from the pre-disturbance landscape, although the difference will be significantly smaller than when the NRA Central curve was used. As noted above, the SAG does not find this to be problematic given on-going management interventions in the PE.

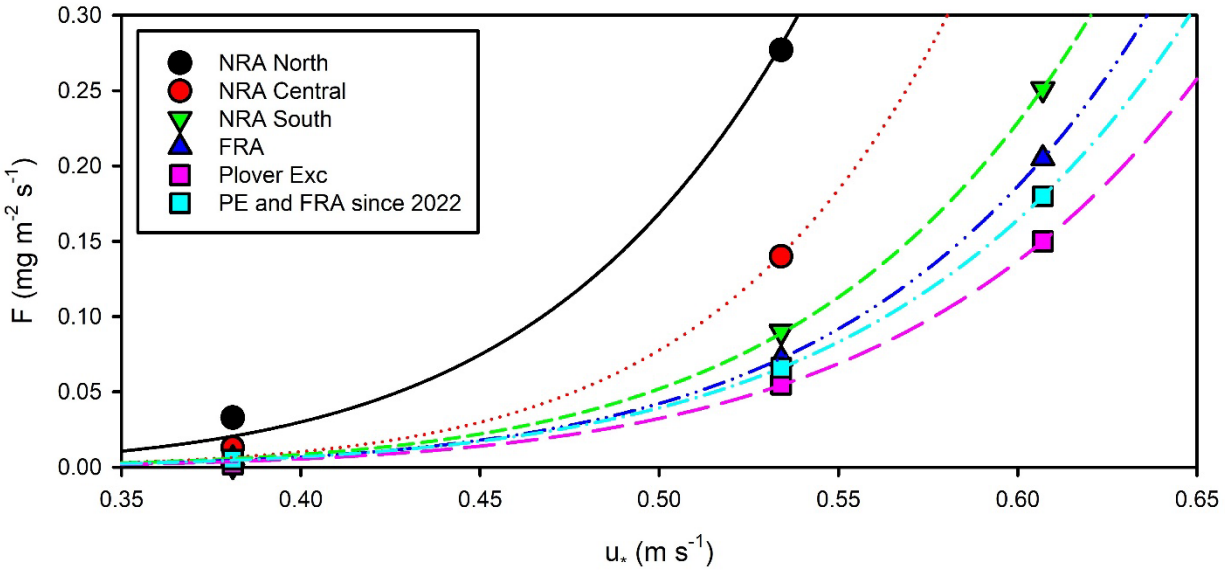

Figure 2: Comparison of the power relation for Option A with those from other management zones in the ODSVRA.

Should CDPR and APCD agree to adopting Option 1 or Option 2 (with respect to a new sub-unit within the pre-disturbance scenario), the complexity of the DRI model increases only marginally. The SAG believes it will improve the reliability and acceptance of the results as regards establishing a defensible pre-disturbance emission baseline, as required by the SOA. We anticipate fruitful and collegial discussion on this matter in advance of the 2026 ARWP.

Respectfully,

The Scientific Advisory Group

Bernard Bauer (Chair), Jack Gillies, Jenny Hand, Leah Mathews, Ian Walker