IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT

Hikespeak.com: https://www.hikespeak.com/trails/wind-caves-trail-anza-borrego-desert/

February 19, 2018
Exceptional Event Documentation
For the Imperial County PM_{10} Nonattainment Area

An exceedance of the National Ambient Air Quality Standard (NAAQS) for PM_{10} at the Brawley, Calexico, Niland, and Westmorland monitors in Imperial County, California on February 19, 2018

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ACRONYM	DESCRIPTIONS
AOD	Aerosol Optical Depth
AQI	Air Quality Index
AQS	Air Quality System
BACM	Best Available Control Measures
BAM 1020	Beta Attenuation Monitor Model 1020
BLM	United States Bureau of Land Management
BP	United States Border Patrol
CAA	Clean Air Act
CARB	California Air Resources Board
CMP	Conservation Management Practice
DCP	Dust Control Plan
DPR	California Department of Parks and Recreation
EER	Exceptional Events Rule
EPA	Environmental Protection Agency
FEM	Federal Equivalent Method
FRM	Federal Reference Method
GOES-W/E	Geostationary Operational Environmental Satellite (West/East)
HC	Historical Concentrations
HYSPLIT	Hybrid Single Particle Lagrangian Integrated Trajectory Model
ICAPCD	Imperial County Air Pollution Control District
INPEE	Initial Notification of a Potential Exceptional Event
ITCZ	Inter Tropical Convergence Zone
KBLH	Blythe Airport
KCZZ	Campo Airport
KIPL	Imperial County Airport
KNJK	El Centro Naval Air Station
KNYL/MCAS	Yuma Marine Corps Air Station
KPSP	Palm Springs International Airport
KTRM	Jacqueline Cochran Regional Airport (aka Desert Resorts Rgnl Airport)
PST	Local Standard Time
MMML/MXL	Mexicali, Mexico Airport
MODIS	Moderate Resolution Imaging Spectroradiometer
MPH	Miles Per Hour
MST	Mountain Standard Time
NAAQS	National Ambient Air Quality Standard
NCAR	National Center for Atmospheric Research
NCEI	National Centers for Environmental Information
NEAP	Natural Events Action Plan
NEXRAD	Next-Generation Radar

NOAA	National Oceanic and Atmospheric Administration
nRCP	Not Reasonably Controllable or Preventable
NWS	National Weather Service
PDT	Pacific Daylight Time
PM_{10}	Particulate Matter less than 10 microns
$PM_{2.5}$	Particulate Matter less than 2.5 microns
PST	Pacific Standard Time
QA/QC	Quality Assured and Quality Controlled
QCLCD	Quality Controlled Local Climatology Data
RACM	Reasonable Available Control Measure
RAWS	Remote Automated Weather Station
SIP	State Implementation Plan
SLAMS	State Local Ambient Air Monitoring Station
SMP	Smoke Management Plan
SSI	Size-Selective Inlet
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTC	Coordinated Universal Time
WRCC	Western Regional Climate Center

I Introduction

In 2007, the United States Environmental Protection Agency (US EPA) adopted the "Treatment of Data Influenced by Exceptional Events Rule" (EER)[1] to govern the review and handling of certain air quality monitoring data for which the normal planning and regulatory processes are not appropriate. Under the terms of the EER, the US EPA may exclude monitored exceedances of the National Ambient Air Quality Standard (NAAQS) if a State adequately demonstrates that an exceptional event caused the exceedance.

The 2016 revision to the EER added sections 40 CFR §50.1(j)-(r) [Definitions], 50.14(a)-(c) and 51.930(a)-(b) to 40 Code of Federal Regulations (CFR). These sections contain definitions, criteria for US EPA concurrence, procedural requirements and requirements for State demonstrations. The demonstration must satisfy all of the rule criteria for US EPA to concur with the requested exclusion of air quality data from regulatory decisions.

Title 40 CFR §50.14(c)(3)(iv) outlines the elements that a demonstration must include for air quality data to be excluded:

TABLE 1-1 TITLE 40 CFR §50.14(c)(3)(iv) CHECKLIST EXCEPTIONAL EVENT DEMONSTRATION FOR HIGH WIND DUST EVENT (PM_{10})		DOCUMENT SECTION
1	A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s)	Pg. 9
2	A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation	Pg.17
3	Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement at paragraph (c)(3)(iv)(B) of this section	Pg. 28
4	A demonstration that the event was both not reasonably controllable and not reasonably preventable	Pg. 37
5	A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event	Pg. 44

[1] "Treatment of Data Influenced by Exceptional Events; Final Guidance", 81 FR 68216, October 2, 2016

Aside from the above, a State must demonstrate that it has met several procedural requirements during the demonstration process, including:

TABLE 1-2 PROCEDURAL CHECKLIST EXCEPTIONAL EVENT DEMONSTRATION FOR HIGH WIND DUST EVENT (PM_{10})		DOCUMENT SECTION
1	**Public Notification [40 CFR §50.14(c)(1)]** – In accordance with mitigation requirement at 40 CFR 51.930(a)(1), notification to the public promptly whenever an event occurs or is reasonably anticipated to occur which may result in the exceedance of an applicable air quality standard	Pg. 3 and Appendix C
2	**Initial Notification of Potential Exceptional Event [40 CFR §50.14(c)(2)]** - Submission to the Administrator of an Initial Notification of Potential Exceptional Event and flagging of the affected data in US EPA's Air Quality System (AQS) as described in 40 CFR §50.14(c)(2)(i),	Pg. 3
3	**Public Comment Process [40 CFR §50.14(c)(3)(v)]** - Documentation of fulfillment of the public comment process described in 40 CFR §50.14(c)(3)(v), and	Pg. 4 and Appendix C
4	**Mitigation of Exceptional Events [40 CFR §51.930]** - Implementation of any applicable mitigation requirements (Mitigation Plan) as described in 40 CFR §51.930	Pg. 4

The Imperial County Air Pollution Control District (ICAPCD) has been submitting criteria pollutant data since 1986 into the US EPA's Air Quality System (AQS). In Imperial County, prior to 2017, Particulate Matter Less Than 10 Microns (PM_{10}) was measured by either Federal Reference Method (FRM) Size Selective Instruments (SSI) or Federal Equivalent Method (FEM) Beta Attenuation Monitor's, Model 1020 (BAM 1020). Effective 2017 Imperial County stopped utilizing FRM instruments relying solely on BAM 1020 monitors to measure PM_{10}. It is important to note that the use of non-regulatory data within this document, typically continuous PM_{10} data prior to 2013, measured in local conditions, does not cause or contribute to any significant differences in concentration difference or analysis.

As such, this report demonstrates that a naturally occurring event caused an exceedance observed on February 19, 2018, which elevated particulate matter within San Diego, Riverside and Imperial Counties and affected air quality. The analyses contained in this report includes regulatory and non-regulatory data that provides support for the elements listed in **Table 1-1** and **Table 1-2**. This demonstration substantiates that this

event meets the definition of the US EPA Regulation for the Treatment of Data Influenced by Exceptional Events (EER)[2].

I.1 Public Notification [40 CFR §50.14(c)(1)]

The ICAPCD utilizes a web-based public notification process to alert the public of forecasted weather conditions and potential changes in ambient air concentrations that may affect the public. The ICAPCD identifies these public notifications as Advisory Events. Unfortunately, as of the writing of this documentation, due to ransomware, random archival files were deleted in order to protect the integrity of the network system. The February 19, 2018 archive was effectively deleted as an infected file.

In any event, both the San Diego and Phoenix National Weather Service (NWS) offices posted notices regarding the weather system that brought gusty westerly winds into southern California and southern Arizona. If available, **Appendix C** contains copies of notices pertinent to the February 19, 2018 event.

I.2 Initial Notification of Potential Exceptional Event (INPEE) [40 CFR §50.14(c)(2)]

When States intend to request the exclusion of one or more exceedances of a NAAQS as an exceptional event a notification to the Administrator is required. The notification process identified within the EER as the Initial Notification of Potential Exceptional Event (INPEE) is twofold: to determine whether identified data may affect a regulatory decision and whether a State should develop/submit an EE Demonstration.

On Monday, February 19, 2018, a naturally occurring event elevated particulate matter within San Diego, Riverside and Imperial Counties, causing an exceedance at the Brawley (06-025-0007), Calexico (06-025-0005), Niland (06-025-4004), and Westmorland (06-025-4003) air quality monitoring stations. Subsequently, the ICAPCD made a formal written request to the California Air Resources Board (CARB) to place preliminary flags on SLAMS measured PM_{10} hourly concentrations from the Brawley, Calexico, Niland, and Westmorland monitors on February 19, 2018. After review, CARB submitted the INPEE, for the February 19, 2018 event in July of 2019. The submitted request included a brief description of the meteorological conditions for February 11, 2018 indicating that a potential natural event occurred. The ICAPCD has engaged in discussions with US EPA Region IX regarding the demonstration prior to formal submittal.

[2] "Treatment of Data Influenced by Exceptional Events; Final Guidance", 81 FR 68216, October 2, 2016

I.3 Public Comment Process [40 CFR §50.14(c)(3)(v)(A-C)]

(A) The CARB and USEPA have reviewed and commented on the draft version of the February 19, 2018 exceptional event prepared by the ICAPCD. After addressing all substantive and non-substantive comments by both CARB and USEPA the ICAPCD has published a notice of availability in the Imperial Valley Press announcing a 30-day public review process. The published notice invites comments by the public regarding the request, by the ICAPCD, to exclude the measured concentrations of 224 µg/m^3 measured by the Brawley monitor; 182 µg/m^3 measured by the Calexico monitor; 230 µg/m^3 measured by the Niland monitor; and 193 µg/m^3 measured by the Westmorland monitor on October 20, 2017.

(B) Concurrently with the Public Review period for the February 19, 2018 exceptional event, the ICAPCD is formally submitting to CARB for remittance to USEPA the Final February 19, 2018 exceptional event.

(C) Upon the ending of the review period the ICAPCD will remit to CARB and USEPA all comments received during the Public Review period along with a formal letter addressing any comments that dispute or contradict factual evidence in the demonstration.

The ICAPCD acknowledges that with the submittal to US EPA of the 2018 exceptional events, there is supporting evidence of documented recurring seasonal events that affect air quality in Imperial County.

I.4 Mitigation of Exceptional Events [40 CFR §51.930]

According to 40 CFR §51.930(b) all States having areas with historically documented or known seasonal events, three events or event seasons of the same type and pollutant that recur in a 3-year period, are required to develop and submit a mitigation plan to the US EPA.

The ICAPCD received notice from US EPA September 15, 2016 identifying Imperial County as an area required to develop and submit a mitigation plan within two years of the effective date, September 30, 2016, of the final published notification to states with areas subject to mitigation requirements. On September 21, 2018, after notice and opportunity for public comment the ICAPCD submitted the High Wind Exceptional Event Fugitive Dust Mitigation Plan (Mitigation Plan) for review and verification. Subsequently, on November 28, 2018 CARB received verification from US EPA of its review and approval of the

Mitigation Plan. For a copy of the Mitigation Plan visit the Imperial County Air Pollution Control District website at
https://www.co.imperial.ca.us/AirPollution/otherpdfs/MitigationPlan.pdf

The Imperial County Mitigation Plan contains important geographical and meteorological descriptions, pages 3 through 6, of the areas within Imperial County and the surrounding areas that are sources of transported fugitive dust. **Figure 1-1** helps depict the geological aspects that are within Imperial County and outside of Imperial County that affect air quality.

Essentially, the Anza-Borrego Desert State Park, which lies in a unique geologic setting along the western margin of the Salton Trough, extends north from the Gulf of California (Baja California) to the San Gorgonio Pass and from the eastern rim of the Peninsular Ranges eastward to the San Andreas Fault zone along the far side of the Coachella Valley. These areas are sources of transported fugitive dust emissions into Imperial County when westerly winds funnel through the unique landforms causing in some cases wind tunnels that cause increase in wind speeds.

During the monsoonal season, natural open desert areas to the east, southeast, and south of Imperial County are sources of transported fugitive dust emissions when thunderstorms cause outflows to blow winds across natural opens desert areas within Arizona and Mexico.

FIGURE 1-1
IMPERIAL COUNTY

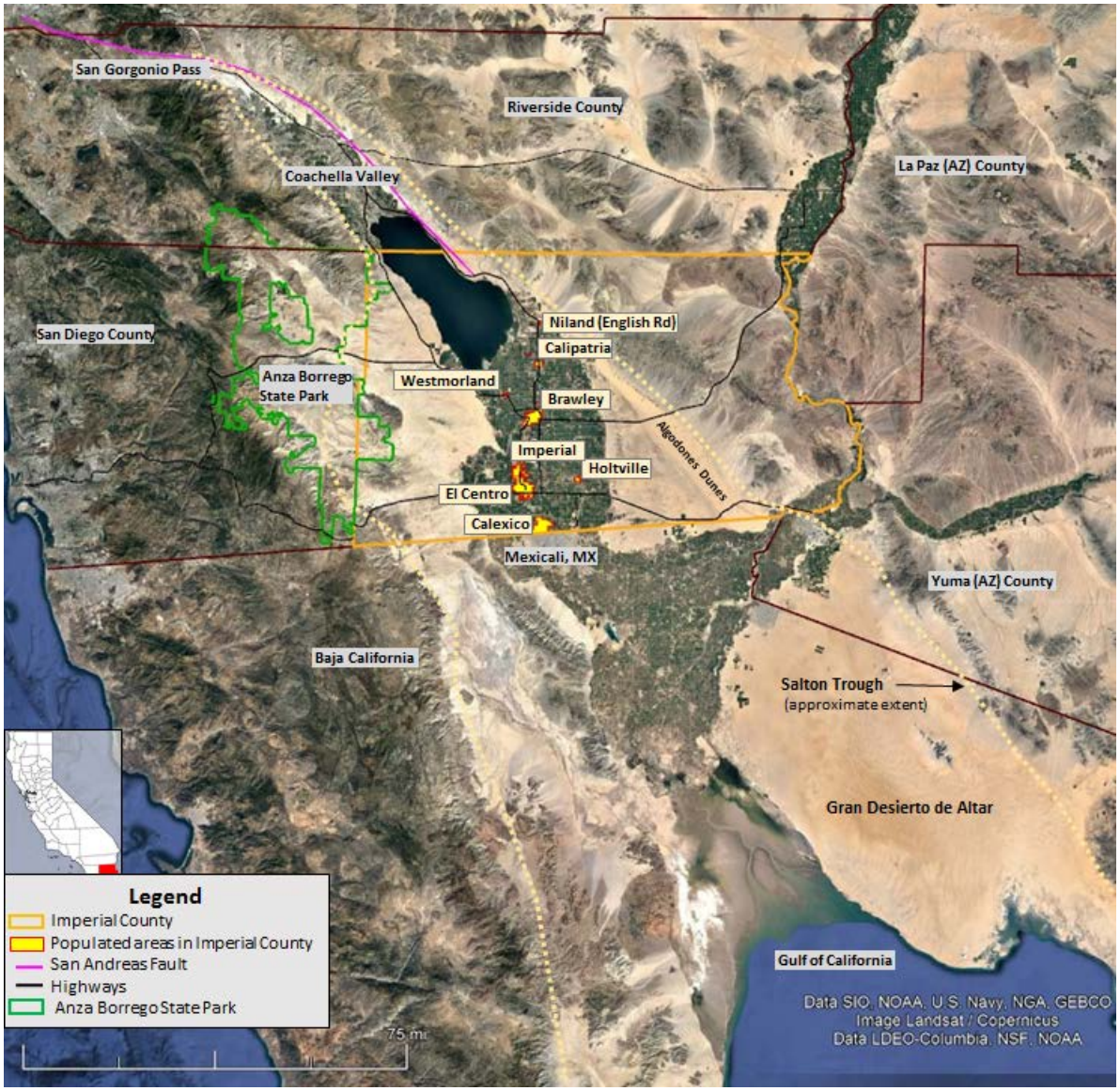


Fig 1-1: Imperial County a Southern California border region, within far southeast California bordering Arizona and Mexico has a small economically diverse region with a population of 174,528

Likewise, the Mitigation Plan contains a high wind event meteorological analysis broken down into four types of seasonal natural occurrences that cause elevated particulate matter that affects Imperial, San Diego, Riverside and Yuma Counties. The historical analysis has defined the meteorological events that lead to high winds and elevated PM_{10} events in Imperial County, page 7, as follows:

- **Type 1:** Pacific storms and frontal passages;
- **Type 2:** Strong pressure and surface pressure gradients;
- **Type 3:** Monsoonal Gulf Surges from Mexico; thunderstorm downburst, outflow winds and gust fronts from thunderstorms
- **Type 4:** Santa Ana wind events

A complete description of these events begins on page 8 of the Mitigation Plan. While there is some overlap in discussed components between the Mitigation Plan and this demonstration such as the public notification process and the warning process, the Mitigation Plan does elaborate a little further. The Mitigation Plan discusses in detail the educational component, the notification component, the warning component and the implementation of existing mitigation measures, such as Regulation VIII.

Finally, the Mitigation Plan contains a complete description of the methods, processes and mechanisms used to minimize the public exposure, page 14, retain historical and real-time data, page 15, and the consultation process with other air quality managers to abate and minimize air impacts within Imperial County, page 16.

In all, the Mitigation Plan helps explain the recurring events, by type and influence upon Imperial County and provides supporting justification of a natural event.[3]

[3] Title 40 Code of Federal Regulations §50.1 (k) defines a Natural Event as meaning an event and its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. For purposes of the definition of a natural event, anthropogenic sources that are reasonably controlled shall be considered to not play a direct role in causing emissions.

FIGURE 1-2
MONITORING SITES IN AND AROUND IMPERIAL COUNTY

Fig 1-2: Depicts a select group of PM_{10} monitoring sites in Imperial County, eastern Riverside County, and southwestern Arizona (Yuma County). Generated through Google Earth

II Conceptual Model – A narrative that describes the event causing the exceedance and a discussion of how emissions from the event led to the exceedance at the affected monitors

II.1 Description of the event causing the exceedance

As early as Friday, February 16, 2018, the National Weather Service (NWS) offices in Phoenix and San Diego issued Area Forecast Discussions describing a cold, low-pressure trough moving south into the Pacific Northwest on Sunday, February 18, 2018 tracking across the Great Basin on Monday, February 19, 2018.[4] As the system tracked across the Great Basin it caused surface pressure gradients to drop over the interior west forcing strong onshore flow across southern California.[5] The low-pressure system was expected to bring strong gusty westerly winds to the mountains and deserts, scattered light showers along and west of the mountains and snow at around 6000 feet dropping to 3000 feet Monday, February 19, 2018.[6]

The intensity of the winds prompted the NWS offices to issue a total of twenty-five (25) Urgent Weather Messages covering San Diego, Riverside and Imperial counties.[7] The Phoenix NWS office similarly issued wind and blowing dust advisories in Arizona. The specific areas of concern for this demonstration include all of Imperial County and the San Diego County deserts, including Coachella Valley. In all the Urgent Weather Messages areas of blowing dust were included.

Overall, the event, as it occurred, was described by the San Diego office as "…[a] longwave trough…" that crossed into the Great Basin on Monday, February 19, 2018, "…gazing SoCal with strong onshore winds and scattered light precipitation."[8] The result was periods of strong gusty westerly winds that blew through the San Diego County Mountains and deserts, with light precipitation and snow level was at 300-3500 feet.[9] Finally, winds weakened as the trough moved eastward and out of Southern California. However, gusts remained strong but limited along desert slopes during the late afternoon hours of Monday, February 19, 2018.[10] **Appendix A** contains all pertinent NWS notices.

[4] National Weather Service, Area Forecast Discussion, Feb. 16, 2018, San Diego office, 304am PST and Feb., 17, 2018, 302am PST
[5] National Weather Service, Area Forecast Discussion, Feb. 17, 2018, San Diego office, 120pm PST
[6] National Weather Service, Area Forecast Discussion, Feb. 18, 2018, San Diego office, 517am PST and Feb. 19, 2018, 400am & 827am PST
[7] National Weather Service, Urgent Weather Messages, Feb. 17, 2018 to Feb., 19, 2018, San Diego and Phoenix offices, various times
[8] National Weather Service, Area Forecast Discussion, Feb. 18, 2018, San Diego office, 150pm PST
[9] National Weather Service, Area Forecast Discussion, Feb. 19, 2018, San Diego office, 400am and 827am PST
[10] National Weather Service, Area Forecast Discussion, Feb. 19, 2018 and Feb. 20, 2018, San Diego office, 918pm and 240am PST

II.2 How emissions from the event led to an exceedance

On February 19, 2018, the air monitors in Imperial, Riverside and Yuma counties measured elevated concentrations of particulate matter when a forecasted cold, low-pressure trough that moved south into the Pacific Northwest on Sunday, February 18, 2018 then tracked across the Great Basin on Monday, February 19, 2018 brining gusty westerly winds to southeastern California and western Arizona. The strong gusty westerly winds ahead of the system generated emissions from within the open mountain ranges and surround open natural deserts within San Diego and Imperial Counties. These windblown dust emissions were transported to all the Imperial County regional air quality monitors causing an exceedance of the PM_{10} NAAQS (**Table 2-1**).

FIGURE 2-1
MONITORING AND METEOROLOGICAL SITES

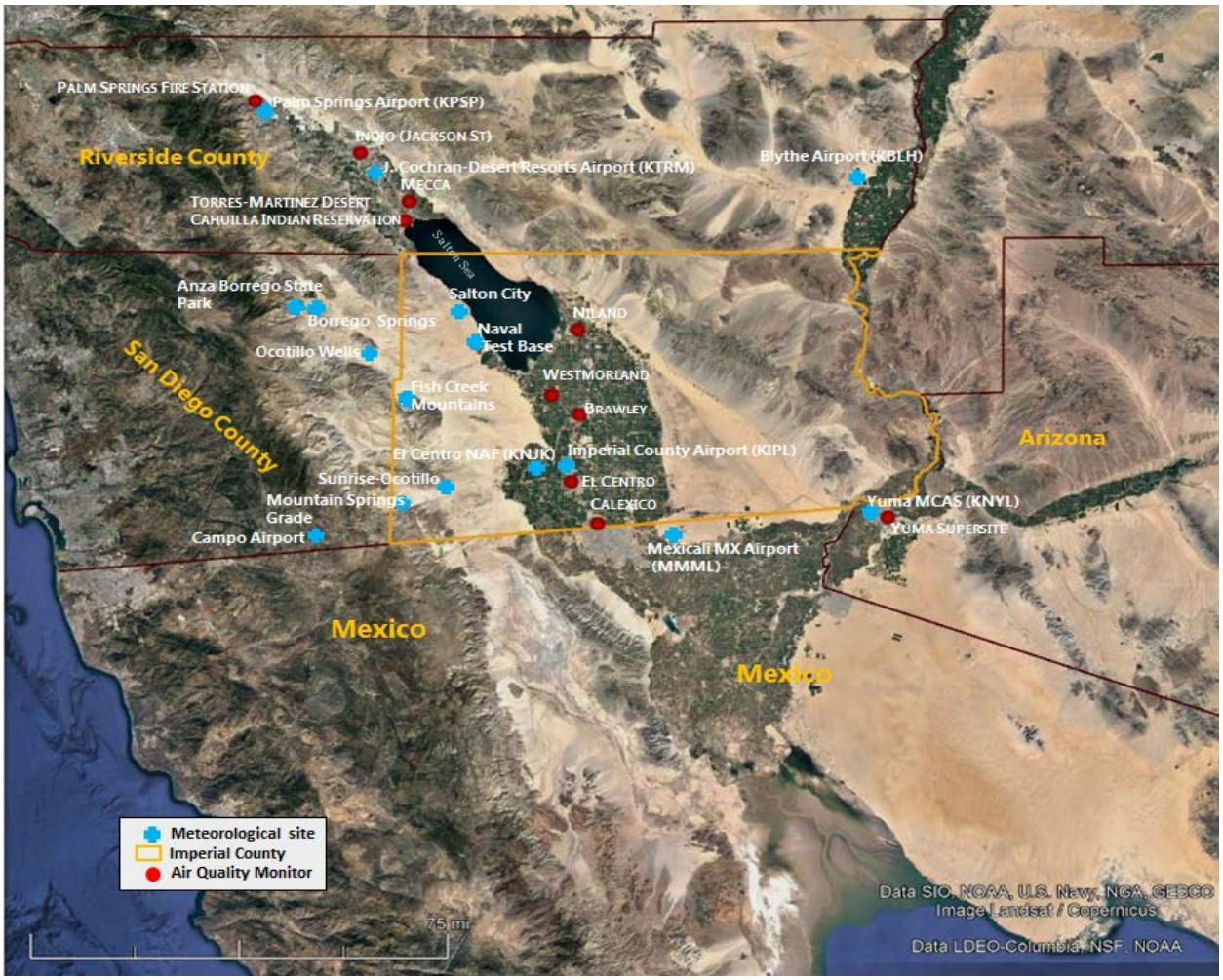


Fig 2-1: Includes a general location of the sites used in this analysis. The site furthest south is in Mexicali, Mexico and the site furthest north is the Palm Springs Fire Station

TABLE 2-1
HOURLY CONCENTRATIONS OF PARTICULATE MATTER

SITE	DATE	000	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Hrly MAX	24-Hr AVERAGE
PS FIRE STATION	20180218	15	15	13	11	12	13	15	16	14	13	15	14	13	13	11	12	12	12	15	18	50	25	15	13	50	15
	20180219	12	12	12	16	52	39	31	37	45	27	27	11	16	21	23	17	19	36	8	13	12	10	10	10	**52**	21
	20180220	10	8	8	8	9	9	9	12	13	12	10	10	8	8	9	10	11	14	17	19	14	13	11	16	19	11
INDIO	20180218	31	21	22	22	21	17	29	47	39	25	25	20	25	24	16	16	27	24	107	85	43	140	163	23	163	42
	20180219	24	24	26	38	15	19	45	215	61	62	278	172	40	24	36	53	46	40	65	12	16	11	18	11	**278**	56
	20180220	14	7	10	9	10	14	21	26	21	16	7	7	12	6	8	13	18	29	33	26	22	49	43	29	49	18
MECCA	20180218	26	28	32	21	20	13	17	23	24	22	13	26	17	20	24	20	21	37	44	46	44	101	178	427	427	51
	20180219	168	57	70	435	1175	435	200	151	190	1012	1388	85	45	18	514	104	104	55	74	30	23	1	7	4	**1388**	264
	20180220	8	6	3	7	10	9	49	25	36	14	5	11	17	16	7	31	32	24	32	8	8	10	9	24	49	16
TORRES MARTINEZ	20180218	34	32	28	22	20	19	19	31	22	20	35	36	24	25	23	18	16	19	24	108	157	71	66	137	157	41
	20180219	39	216	619	453		1644		120	114	1498		445	81	126	279	93	161	104	47	30	10	14	14	15	**1644**	291
	20180220	11	12	11	7	52	12	114	48	38	40	11	10	39	75	13	23	25	18	24	39	27	20	16	19	114	29
WESTMORLAND	20180218	27	35	59	58	54	46		56	56	49	21	25	24	28	37	120	167	178	106	239	140	238	176	634	634	111
	20180219	995	390	68	127	322	219	107	180	255	344	492	346	61	149	151	144	155	41	27	17	18	11	10	10	**995**	193
	20180220	12	15	10	10	7	12	22	19	15	17	13	9	10	12	16	15	26	27	40	20	42	40	63	19	63	20
BRAWLEY	20180218	34	45	33	33	34	35	34	57	53	32	20	19	10	35	56	82	111	192	124	43	48	184	45	126	192	61
	20180219	583	233	70	45	446	277	59	104	183	535	912	601	285	238	223	184	174	71	84	18	30	12	11	16	**912**	224
	20180220	8	12	10	7	7	15	17	50	29	19	52	0	0	0	0	0	0	0	0	0	0	0	0	0	52	9
NILAND	20180218	14	19	18	16	17	48	36	29	31	40	27	26	19	28	28	42	122	246	146	883	207	38	399	74	883	106
	20180219	71	111	41	138	327	301	384	760	823	371	739	358	214	32	145	258	258	89	34	29	11	13	8	12	**823**	230
	20180220	21	15	45	43	17	3	20	27	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	8
EL CENTRO	20180218	105	93	66	59	61	56	65	82	71	52	39	31	20	23	28	44	27	26	20	13	33	31	16	58	105	46
	20180219	351	44	16	6	14	125	126	774	995	151	169	199	170	104	65	41	38	16	13	21	12	9	9	8	**995**	144
	20180220	12	12	14	12	16	12	22	28	26	22	21	18	19	10	19	11	15	25	46	41	40	46	48	41	48	24
CALEXICO	20180218	121	54	43	81	85	76	77	85	71	49	39	23	24	32	20	24	34	27	31	24	22	20	65	20	121	47
	20180219	114	49	43	32	12	112	1616	65	433	537	338	210	172	145	177	143	50	41	19	22	13	12	11	9	**1616**	182
	20180220	13	11	7	13	17	12	28	33	30	24	22	23	25	17	21	22	12	12	45	56	81	68	46	36	81	28
YUMA SUPERSITE (PST)	20180218	42	66	55	41	34	25	24	29	23	36	13	14	14	12	11	11	16	14	16	18	14	16	18	23	66	24
	20180219	75	103	261	243	234	193	129	94	130	791	808	394	367	307	316	266	118	91	88	38	27	28	11	22	**808**	213
	20180220	23	14	11	13	28	24	51	22	35	25	25	14	30	19	12	30	14	18	25	20	12	31	20	14	51	22

Color coding information – **Red bold** highlighted sites indicate sites that exceeded the NAAQS. **Bold Blue** dates indicate date of Exceptional Event. **Red fill and Red bold** hourly concentrations represent concentrations above 100 µg/m^3. Pink squares around concentrations identify peak hourly concentrations

FIGURE 2-2
CONCENTRATIONS FOR ALL SITES LISTED IN TABLE 2-1

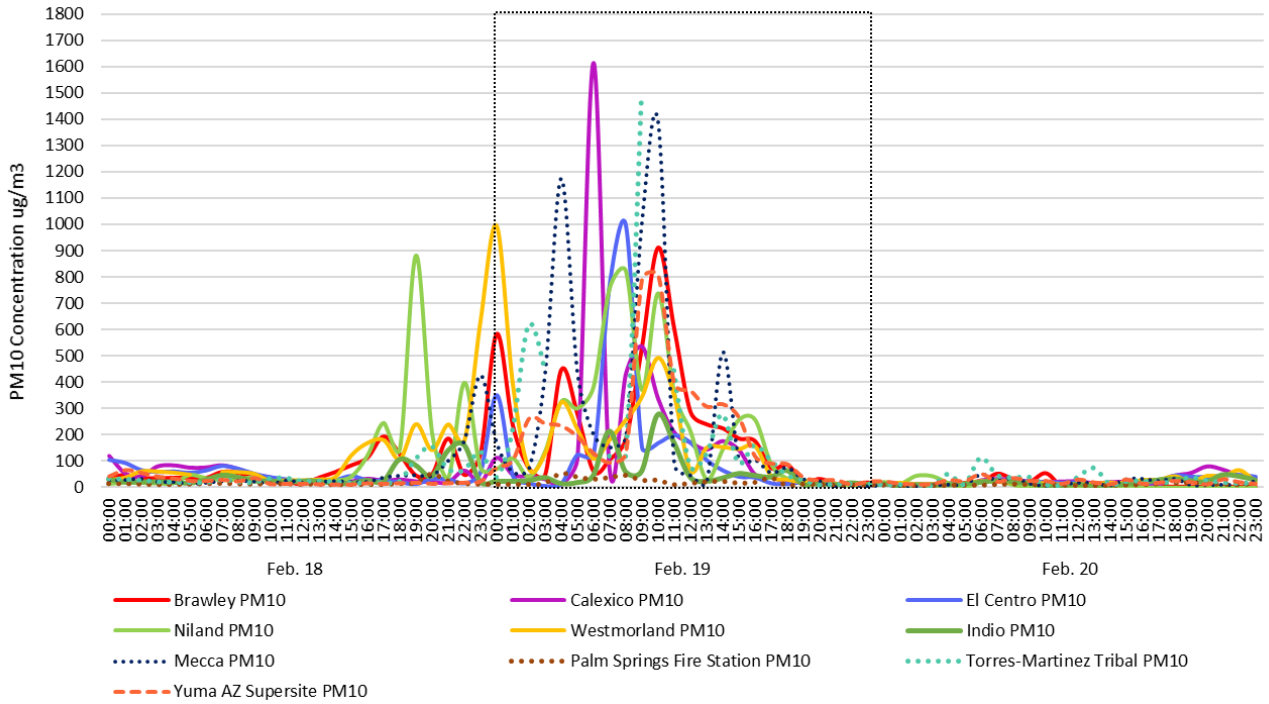


Fig 2-2: is a three-day graphical representation of the PM_{10} concentrations measured at the sites identified in **Table 2-1**. Note that nearly all of the monitors depicted, and in particular those in Imperial County, have high hourly concentrations on February 19, 2018 (boxed area)

Wind speed, wind direction and airflow patterns combined all help explain how windblown emissions resulting from the strong gusty westerly winds associated with the passing of the trough affected the all of the monitors in Imperial County on Monday, February 19, 2018.

As mentioned above, the early weather forecast notices issued by both the San Diego and Phoenix NWS offices indicated that cold, low-pressure trough that moved south into the Pacific Northwest on Sunday, February 18, 2018 then tracked across the Great Basin on Monday, February 19, 2018 brought strong gusty westerly winds across Southeastern California and Western Arizona. As mentioned above, twenty-five (25) Urgent Weather Messages were issued by the NWS office in San Diego and Phoenix advising of advisory level westerly winds within the Sand Diego Mountains and Imperial County.

Figures 2-3 and 2-4 depict the compiled wind data for regional and neighboring airports and upstream sites. Airports within San Diego and Imperial counties measured wind speeds at or above 25 mph or measured wind gusts at or above 25 mph. Sites west of

Imperial County all measured elevated wind speeds coincident with measured elevated concentrations.

FIGURE 2-3
LOCAL AND VICINITY AIRPORT WIND SPEEDS AND GUST

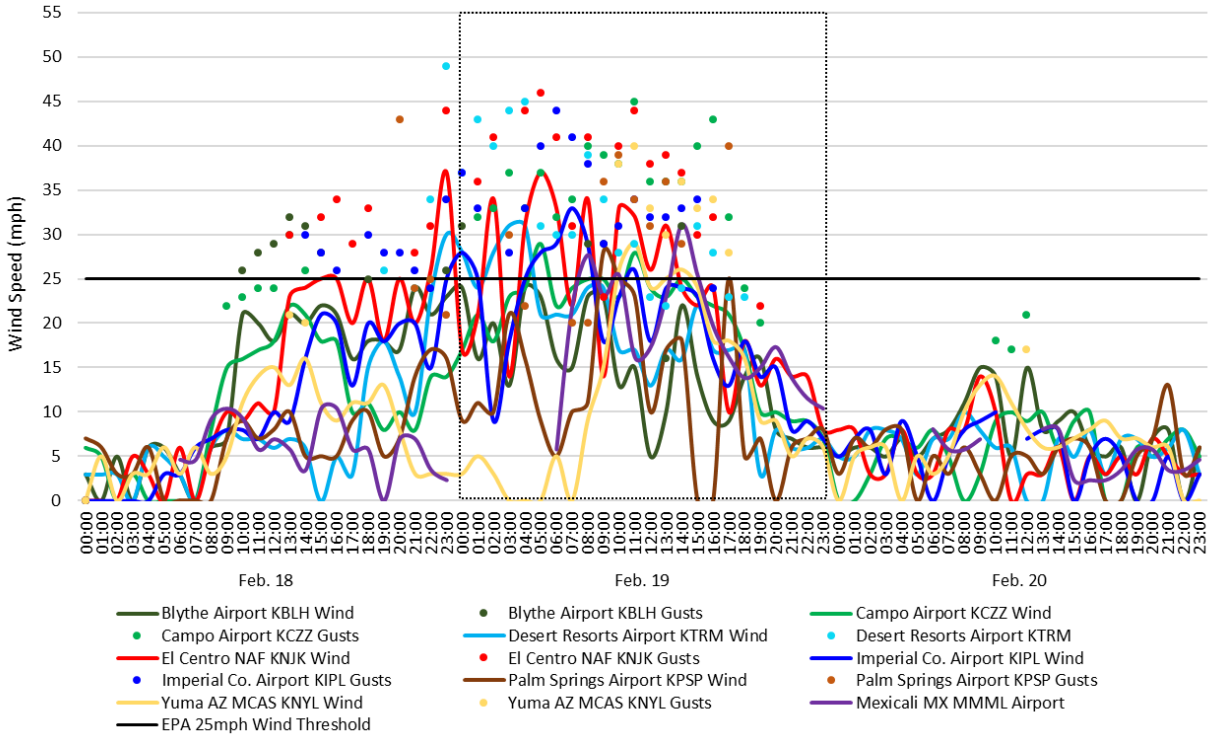


Fig 2-3: is a three-day graphical representation of the measured wind speed and wind gust (if available) from local and neighboring airports. Note the elevated wind speeds are consistent for sites with minor variations. All data derived from the Local Climatological Data Hourly Observations (LCDHO) reports released by the NOAA https://www.ncdc.noaa.gov/. MMML is from the University of Utah's Meso West https://mesowest.utah.edu/index.html

FIGURE 2-4
WIND SPEEDS AND GUST UPSTREAM SITES

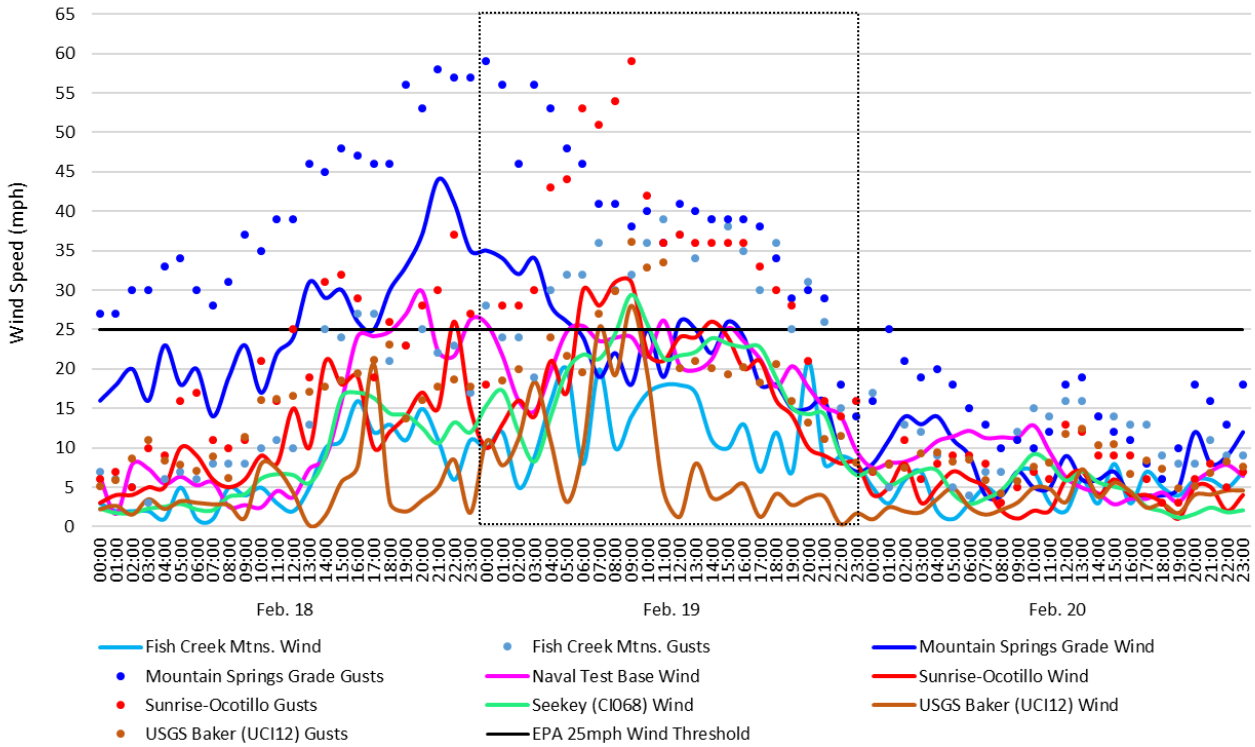


Fig 2-4: is a three-day graphical representation of the measured wind speed and wind gust (if available) from sites located upwind from the monitors in Imperial County. The sites depicted represent locations on the mountain desert slopes to the desert floor (see **Fig. 2-1**), All data derived from the University of Utah's Meso West https://mesowest.utah.edu/index.html

The National Oceanic and Atmospheric Administration (NOAA) Laboratory HYSPLIT back-trajectory models[11] provide supporting evidence of the westerly airflow within Imperial County on February 19, 2018. Although the event that affected Imperial County commenced during the evening hours of Sunday, February 18, 2018 the HYSPLIT back-trajectory models in **Figures 2-5 and 2-6** help illustrate the westerly airflow during the dawn hours (0000 PST) and the mid-morning hour (1000 PST) of February 19, 2018.

Figure 2-5 depicts the westerly airflow with a slight southwest component coincident with elevated concentrations above 100 µg/m^3 at all Imperial County air quality monitors except the Niland monitor. It is important to note that the air quality monitors did not have a specific hourly peak concentration. Each site peaked at different hours with only

[11] The Hybrid Single Particle Lagrangian Integrated Trajectory Model (**HYSPLIT**) is a computer model that is a complete system for computing simple air parcel trajectories to complex dispersion and deposition simulations. Used, currently, to compute air parcel trajectories and dispersion or deposition of atmospheric pollutants. One popular use of HYSPLIT is to establish whether high levels of air pollution at one location are caused by transport of air contaminants from another location. HYSPLIT's back trajectories, combined with satellite images (for example, from NASA's MODIS satellites), can provide insight into whether high air pollution levels are caused by local air pollution sources or whether an air pollution problem was blown in on the wind The initial development was a result of a joint effort between NOAA and Australia's Bureau of Meteorology. Source: NOAA/Air Resources Laboratory, 2011.

Westmorland measuring an hourly peak concentration at 0000 PST. Since all air quality monitors stopped measuring concentrations above 100 µg/m^3 at 1600 PST it seemed reasonable to pick the 1000 PST hour, coincidently when Brawley measured its hourly peak concentration. Therefore, **Figure 2-6** depicts the mid-morning westerly airflow with a slight northerly component.

FIGURE 2-5
HYSPLIT MODEL All SITES FEBRUARY 19, 2018 0000 PST

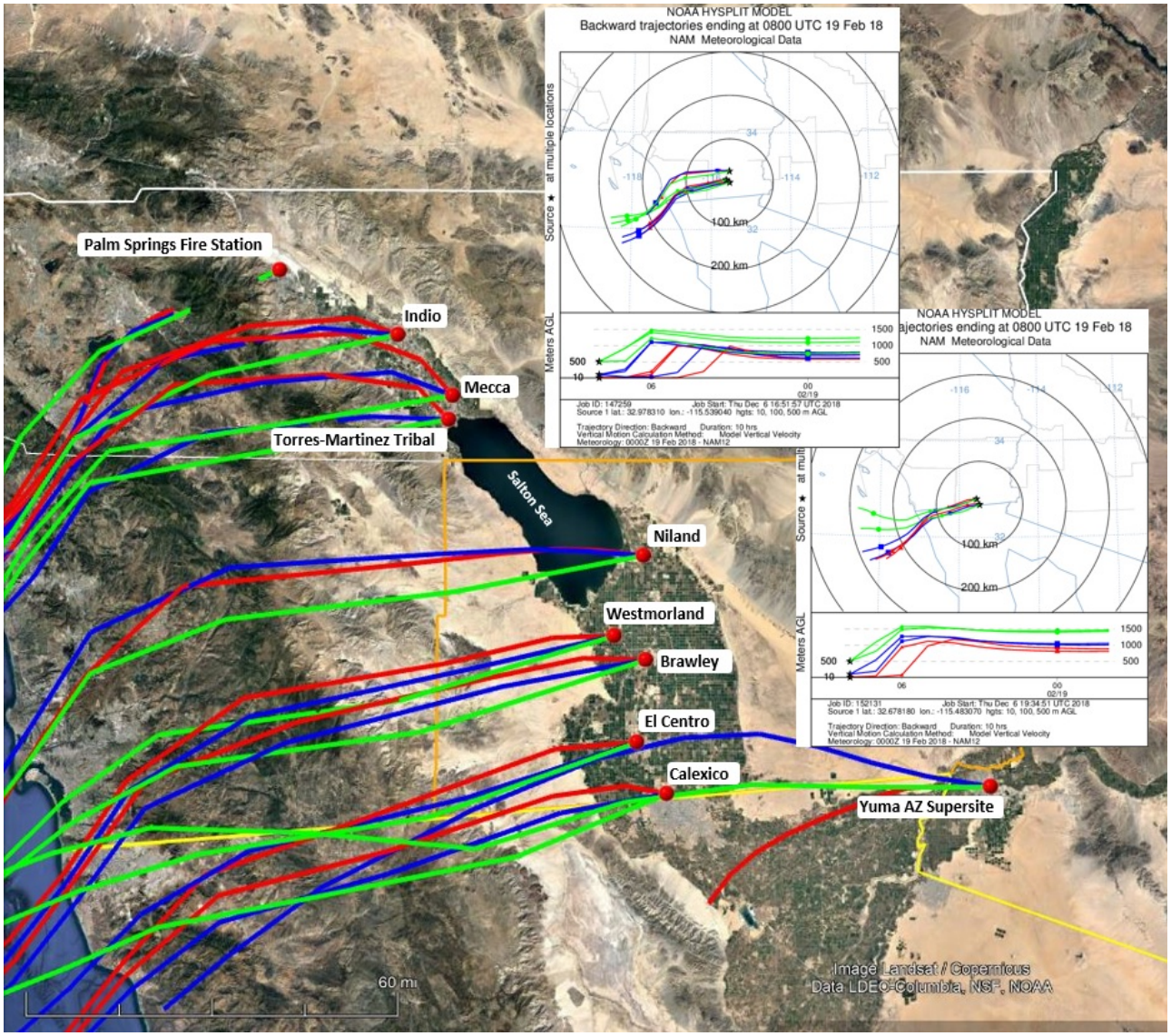


Fig 2-5: A 10-hour HYSPLIT back-trajectory ending at 0000 PST for all sites identified in **Table 2-1**. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100m; green indicates airflow at 500m. Yellow line indicates the international border. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

FIGURE 2-6
HYSPLIT MODEL All SITES FEBRUARY 19, 2018 1000 PST

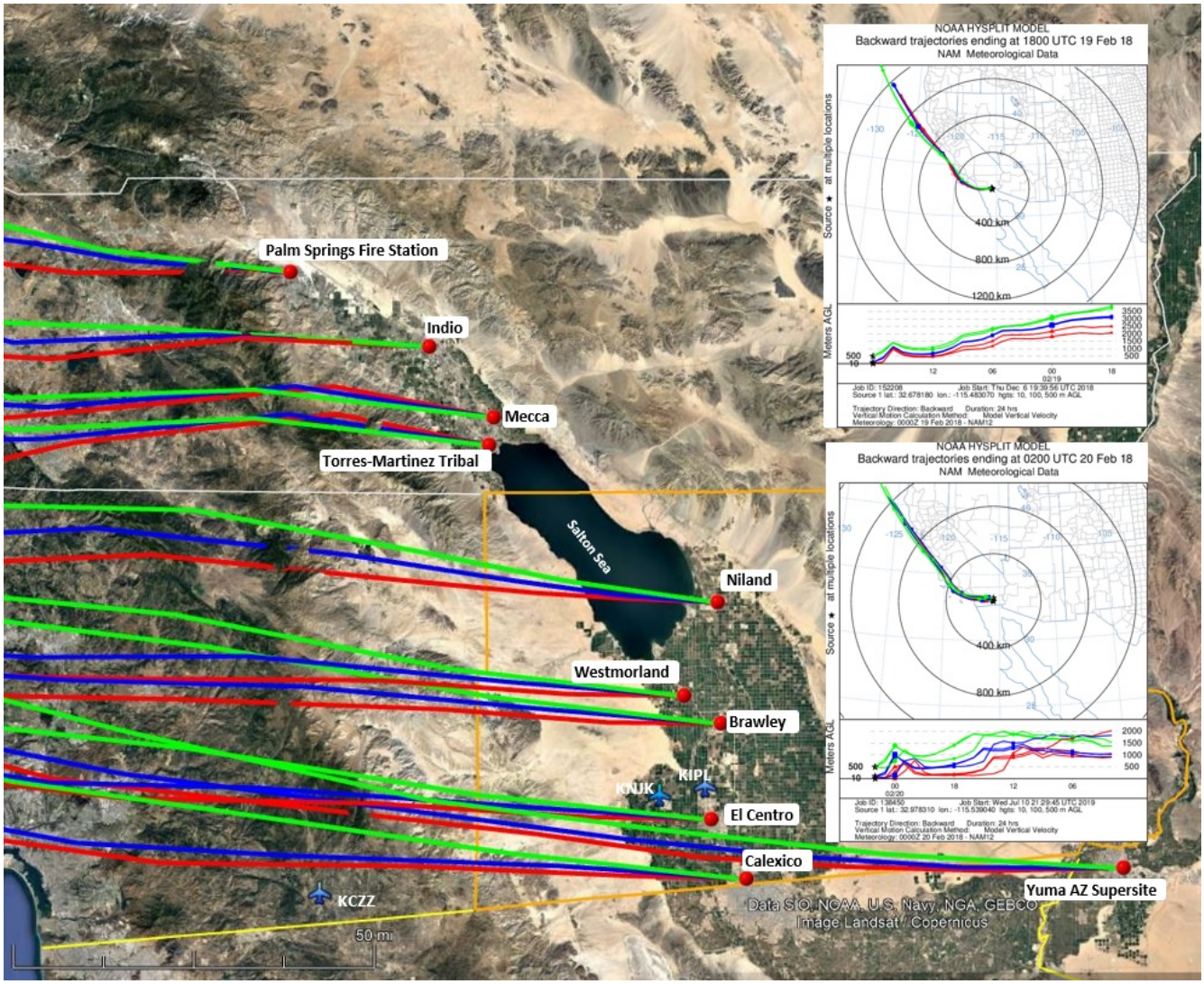


Fig 2-6: A 24-hour HYSPLIT back-trajectory ending at 1000 PST for all sites identified in **Table 2-1**. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100m; green indicates airflow at 500m. Yellow line indicates the international border. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

As strong gusty westerly winds blew over open natural mountains and desert areas west of Imperial County, fugitive windblown dust affected all air quality monitors throughout the southeastern region, except Palm Springs. As mentioned above, the NWS office to issued twenty-five (25) Urgent Weather Messages anticipating advisory level winds within the San Diego Mountains, forecasted with occasional gusts up to 55mph and Imperial County, forecasted 30 to 40 mph with gust up to 50 mph. The Campo Airport (KCZZ) in the San Diego Mountains, the El Centro NAF (KNJK) and the Imperial county Airport (KIPL) all measured several hours of elevated wind speeds and gusts at or above 25 mph.

III Clear Causal Relationship – A demonstration that the event affected air quality illustrating the relationship between the event and the monitored exceedance

As mentioned above, a cold, low-pressure trough moved south into the Pacific Northwest on Sunday, February 18, 2018 and tracked across the Great Basin on Monday, February 19, 2018 bringing strong gusty westerly winds to the mountains and deserts, scattered light showers and snow within the San Diego Mountains.[12] The system provided one to two tenths of an inch of rain in the mountains by the dawn hours of February 19, 2018, as a result, the strong gusty westerly winds easily generated emissions within the natural open mountains in San Diego and transported windblown dust into Imperial County during the morning and afternoon hours of February 19, 2018 causing an exceedance at all the air quality monitors in Imperial County, except at the El Centro monitor.[13] It is of some worth to point out that the El Centro monitor was indeed affected by the windblown dust reaching a 24-hr concentration of 144 µg/m^3. As the system moved eastward leaving behind some precipitation and snow within the mountains, windblown dust, continued in sufficient amounts to be captured by Satellite, at 1030 am PST and 130 pm PST, **Figures 3-1 and 3-2**. Finally, the Smoke Text Product, found in **Appendix C**, and issued by NOAA, described "…blowing dust…throughout southern California and southern Arizona."

While elevated wind speeds play a significant and important role in the transportation of dust, gust and precipitation play an equally significant role in deposition of particulates onto a monitor and the overall affect onto ambient air.[14] As winds and gusts increased on February 19, 2018 and transported windblown dust from open natural mountains and deserts blew into Imperial County air quality degraded. As mentioned in section I.1 above, the ICAPCD advisory for February 19, 2018 was deleted however, as described above several Area Forecast Discussions and twenty-five (25) Urgent Weather Messages attest to the elevated winds. These gusty westerly winds elevated particulate matter degrading air quality to unhealthy levels.

[12] National Weather Service, Area Forecast Discussion, Feb. 16, 2018 to Feb. 19, 2018, San Diego office, 913pm PST; 302am PST; 120pm PST; 517am PST; 400am PST; and 827am PST

[13] National Weather Service, Area Forecast Discussion, Feb. 19, 2018, San Diego office, 400am PST

[14] Gust is a rapid fluctuation of wind speed with variations of 10 knots or more between peaks and lulls; National Weather Service Glossary https://w1.weather.gov/glossary/index.php?letter=g

FIGURE 3-1
TERRA MODIS SATELLITE FEBRUARY 19, 2018

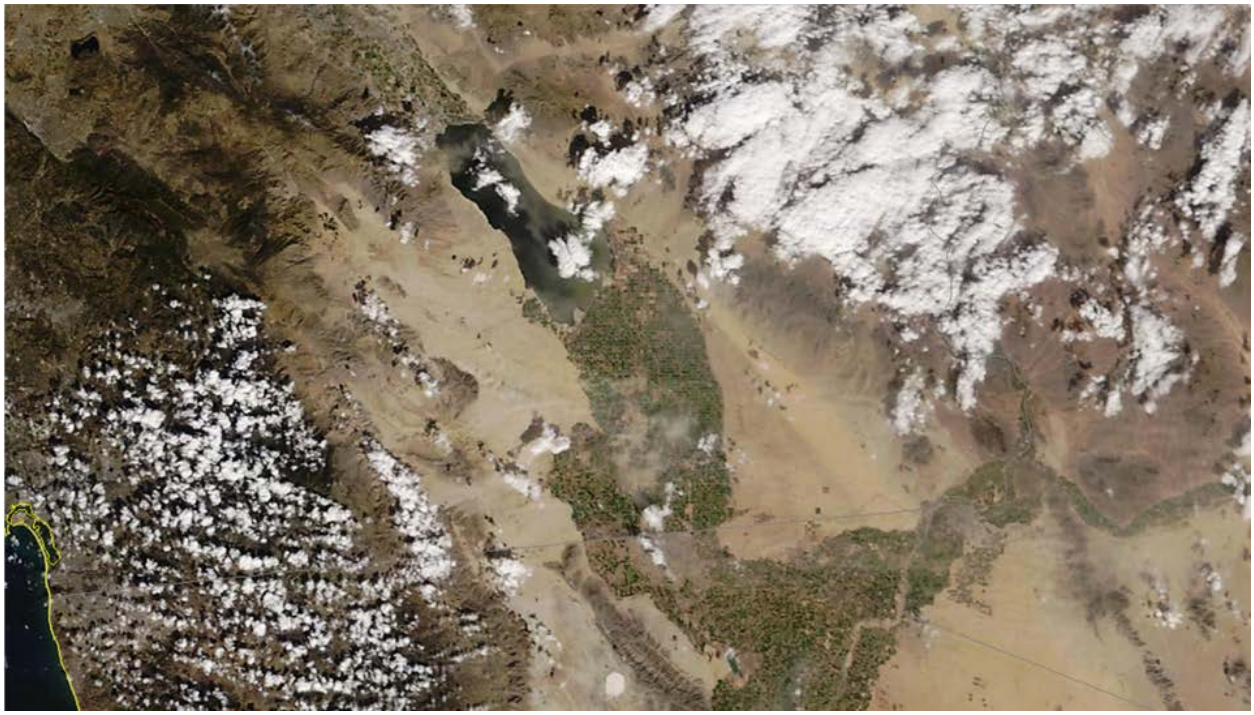


Fig 3-1: Although precipitation levels within the mountains increased slightly, gusty westerly winds were strong enough on February 19, 2018 to generated and transport windblown dust into Imperial County. Image captured by the MODIS instrument onboard the Terra satellite as it made its pass at around 1030 PST (http://ge.ssec.wisc.edu/modis-today/)

FIGURE 3-2
AQUA MODIS SATELLITE FEBRUARY 19, 2018

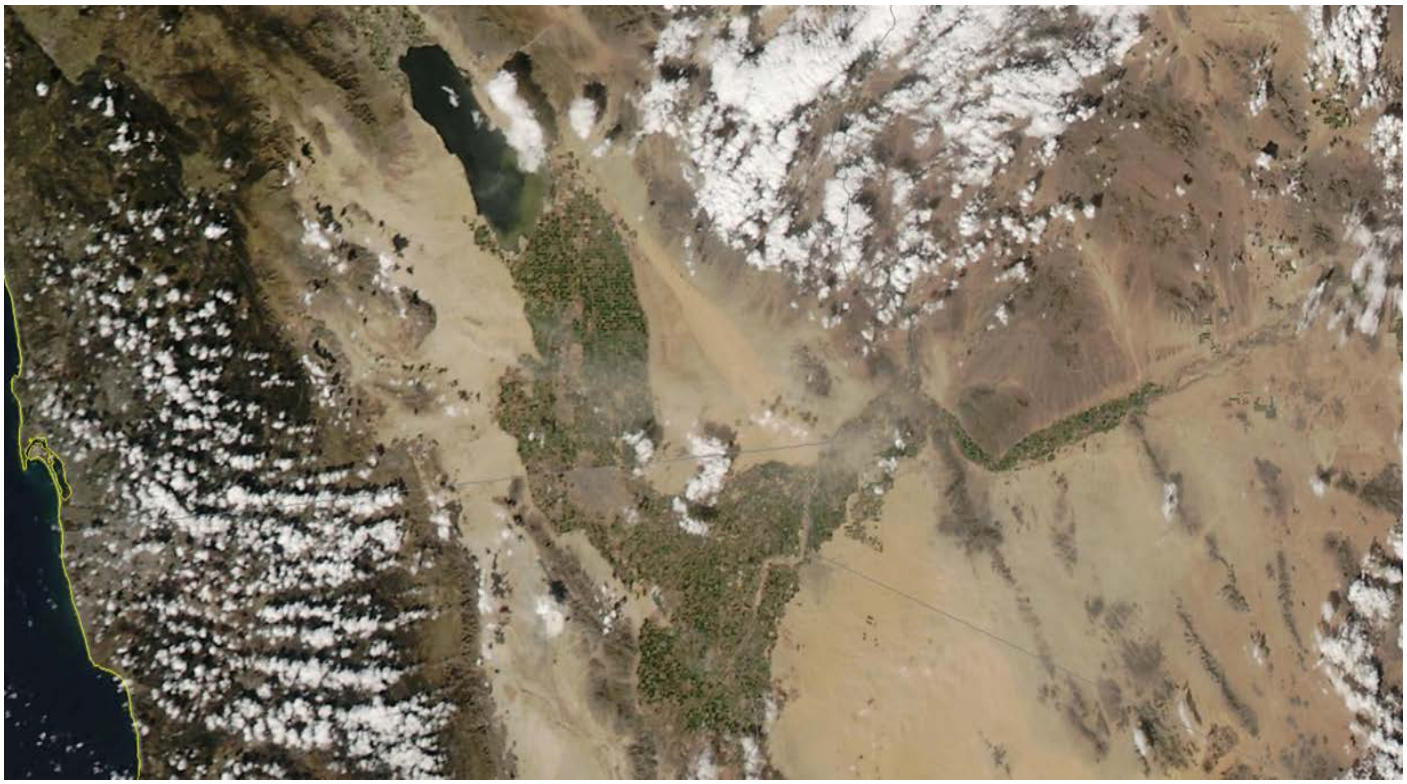


Fig 3-2: Although precipitation levels within the mountains increased slightly, gusty westerly winds were sufficient on February 19 to continue to transport windblown dust through Imperial County and into Arizona. Image captured by the MODIS instrument onboard the Aqua satellite as it made its pass at around 1330 PST (http://ge.ssec.wisc.edu/modis-today/)

Figure 3-3 below provides an illustration of some of the meteorological conditions as described above and demonstrated in the HYSPLITS, for February 19, 2018, which affected air quality in Imperial County causing an exceedance at all Imperial County monitors, except the El Centro monitor. As windblown dust emissions, generated within the natural open mountains within San Diego County, blew into and over natural open deserts within Imperil County air quality was affected by a significant amount of dust.

FIGURE 3-3
VISUAL RAMP-UP ANALYSIS AS DISCUSSED FOR FEBRUARY 19, 2018

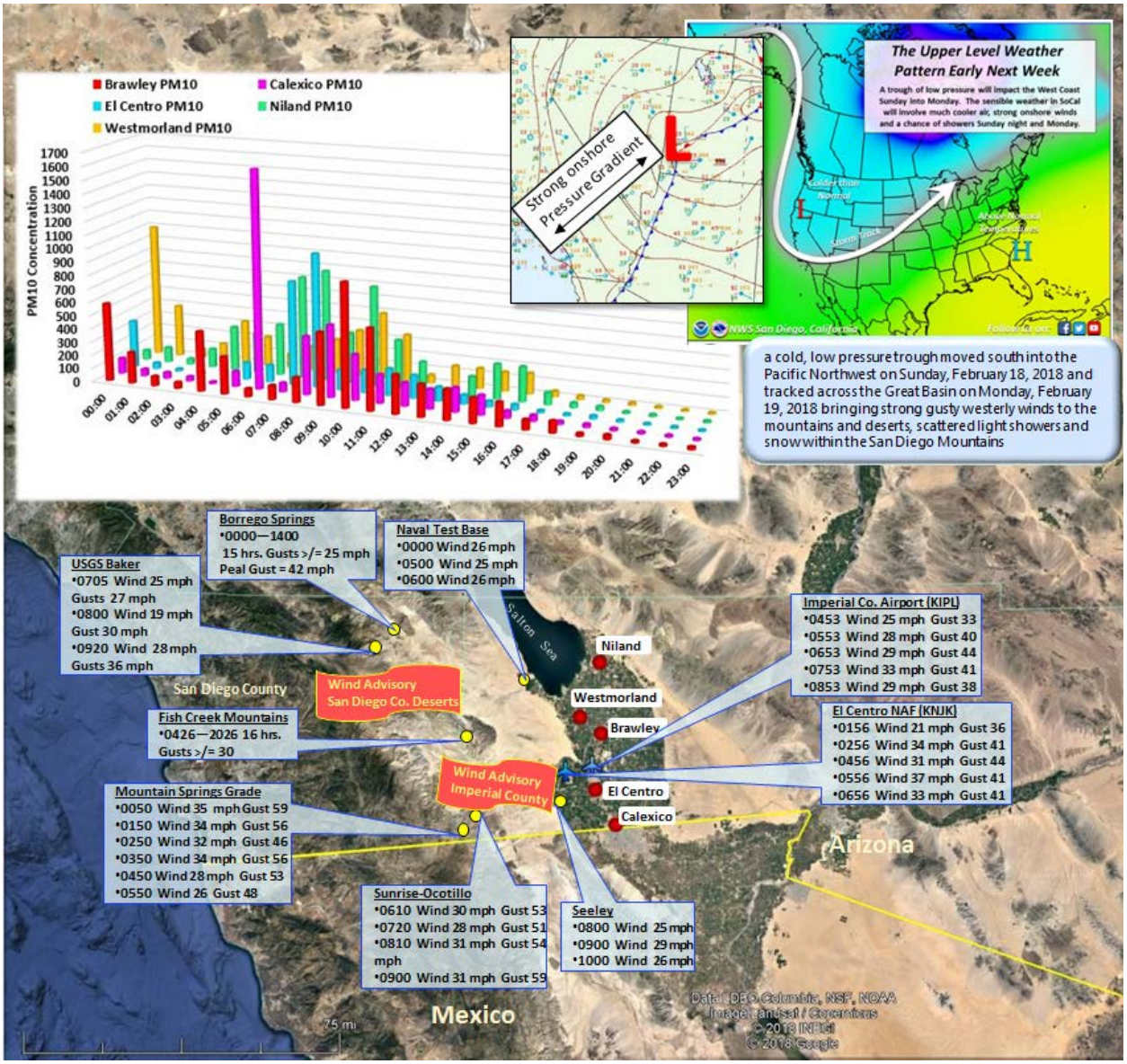


Fig 3-3: Gusty westerly winds, associated with the passing of low-pressure trough, generated and transported fugitive emissions from the San Diego Mountains and deserts into Imperial County. Google Earth base map. Top graphic from NWS San Diego Weather Story (**Appendix C**). Middle graphic base image from NWS WPC Archives (https://www.wpc.ncep.noaa.gov/)

An indicator of the affect to air quality can be discerned from the level of visibility at any given time and day. While the ICAPCD air monitoring stations do not measure levels of visibility the local and surrounding airports do.[15] The El Centro NAF (KNJK) and Jaqueline

[15] According to the NWS there is a difference between human visibility and the visibility measured by an Automated Surface Observing System (ASOS) or an Automated Weather Observing System (AWOS). The automated sensors measure clarity of the air vs. how far one can "see". The more moisture, dust, snow, rain, or particles in the light beam the more light scattered. The sensor measures the return every 30 seconds. The visibility value transmitted is the average 1-minute value from the past 10 minutes. The sensor samples

Cochran-Desert Resorts Airport (KTRM) reported reduced visibility coincident with elevated wind speeds and hourly PM_{10} concentrations on February 18, 2018. KNJK, KTRM and the Imperial County Airport (KIPL) all reported reduced visibility during the morning hours of February 19, 2018, coincident with elevated wind speeds and hourly PM_{10} concentrations at all monitors. **Figure 3-4** and **Tables 3-1 through 3-6** provide information regarding the reduced visibility in Imperial County and the relation to hourly concentrations at local air monitors.

While **Figure 3-4** is a graphical representation of the reduced visibility within Imperial County and surrounding areas, **Tables 3-1 through 3-6** provide a temporal relationship of wind speeds, wind direction, wind gusts (if available), and PM_{10} concentrations at all monitors. Together, the data provides the supporting relationship between the elevated winds, blowing dust and reduced visibility.

According to the compiled information found in **Figure 3-4,** visibility reduced at three of the major airports, the El Centro NAF (KNJK), the Imperial County Airport (KIPL) and the Desert Resorts Airport (KTRM) the evening prior to February 19, 2018 and during the morning and afternoon of February 19, 2018 coincident with elevated hourly concentrations at the air quality monitors in Imperial County.

only a small segment of the atmosphere, 0.75 feet. Therefore, a representative visibility utilizes an algorithm. Siting of the visibility sensor is critical and large areas should provide multiple sensors to provide a representative observation; http://www.nws.noaa.gov/asos/vsby.htm

FIGURE 3-4
72-HOUR TIME SERIES PM_{10} CONCENTRATIONS AND VISIBILITY

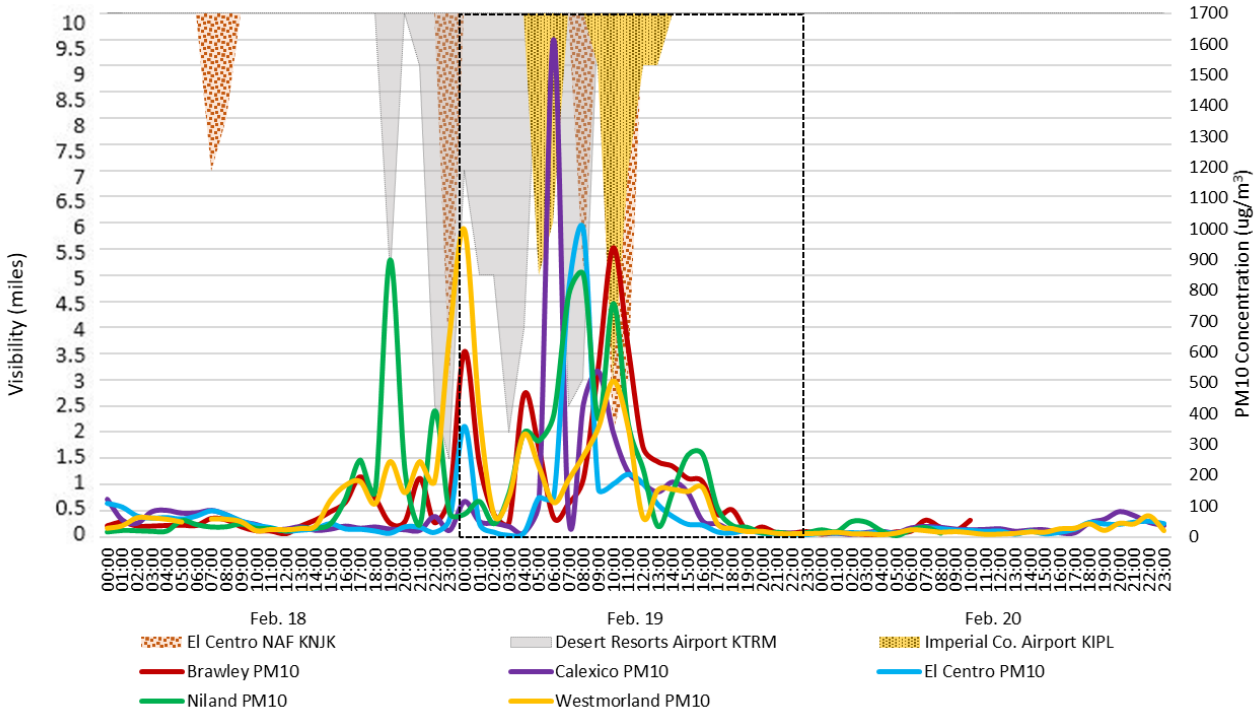


Fig 3-4: is a graphical representation of the compiled data from the Jaqueline Cochran-Desert Resorts Airport (KTRM), Imperial County Airport (KIPL), and the El Centro NAF (KNJK). Reported reduced visibility is coincident with elevated winds and hourly levels of concentrations either just prior to peak concentrations or after. Visibility data from the NCEI's QCLCD data bank

Because the EPA accepts a high wind threshold for sustained winds of 25 mph in California and 12 other states[16] **Table 3-1** is provided in support of the relationship between the elevated winds and elevated concentrations. In the table the measured elevated concentrations of PM_{10} either follow or occur during periods of elevated winds or gusts. The table has a select group of meteorological sites that compare the hourly winds with the closest measured hourly concentration at each of the exceeding monitors.

[16] "Treatment of Data Influenced by Exceptional Events; Final Guidance", FR Vol. 81, No. 191, 68279, October 3, 2016

TABLE 3-1
WIND SPEEDS AND PM_{10} CONCENTRATIONS FEBRUARY 19, 2018

	MOUNTAIN SPRINGS GRADE (TNSC1)			SUNRISE-OCOTILLO (IMPSD)			EL CENTRO NAF (KNJK)			IMPERIAL COUNTY AIRPORT (KIPL)			NAVAL TEST BASE		BRLY	CX	EC	NLD	WEST
HOUR	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/D	PM_{10} (µg/m³)				
0000	34.99	59.01	SW	10	18.01	WNW	17		W	28	37	W	26	W	583	114	351	71	995
0100	34	55.99	SSW	13	28.01	WSW	21	36	WSW	25	33	WSW	22	W	233	49	44	111	390
0200	32.01	45.99	WSW	15.99	28.01	WSW	34	41	WSW	9		WSW	16	W	70	43	16	41	68
0300	34	55.99	WSW	14	30	W	14		WSW	18	28	WSW	15	WSW	45	32	6	138	127
0400	28.01	53.02	WSW	21	42.99	W	31	44	WSW	25	33	WSW	20	W	446	12	14	327	322
0500	25.99	48	WSW	17	44	W	37	46	SW	28	40	SW	25	W	277	112	125	301	219
0600	24	45.99	WSW	30	52.99	W	33	41	SW	29	44	SW	26	W	59	1616	126	384	107
0700	18.99	41	WSW	28.01	51	W	22	31	SW	33	41	WSW	24	WSW	104	65	774	760	180
0800	22.01	41	W	31	54	W	34	41	WSW	29	38	WSW	24	WSW	183	433	995	823	255
0900	18.01	38.01	WSW	31	59.01	W	14	23	W	18	29	W	24	WSW	535	537	151	371	344
1000	24.99	40	WSW	22.01	41.99	W	33	40	W	23	31	W	22	WSW	912	338	169	739	492
1100	18.99	35.99	W	21	35.99	W	32	44	W	26	34	WNW	26	W	601	210	199	358	346
1200	25.99	41	W	24	37	W	26	38	W	18	32	WNW	21	W	285	172	170	214	61
1300	24.99	40	WSW	24	35.99	W	31	39	W	24	32	W	20	W	238	145	104	32	149
1400	22.01	38.99	WSW	25.99	35.99	WNW	24	37	W	24	33	W	21	WSW	223	177	65	145	151
1500	25.99	38.99	WSW	24	35.99	WNW	22	30	W	23	34	W	25	WSW	184	143	41	258	144
1600	24	38.99	WSW	20	35.99	W	24	32	W	16	24	W	24	WSW	174	50	38	258	155
1700	18.01	38.01	W	21	32.99	W	10		W	13		WSW	21	WSW	71	41	16	89	41
1800	18.01	34	WSW	15.99	30	W	18		WSW	18		WSW	18	WSW	84	19	13	34	27
1900	14.99	28.99	W	14	28.01	W	13	22	W	14		WSW	20	WSW	18	22	21	29	17
2000	14.99	30	W	10	21	W	16		WSW	15		WSW	18	WSW	30	13	12	11	18
2100	15.99	28.99	WSW	8.99	15.99	W	14		WSW	8		W	15	WSW	12	12	9	13	11
2200	8.99	18.01	WSW	8.01	14	WNW	14		W	9		SW	14	W	11	11	9	8	10
2300	7	14	WSW	8.01	15.99	W	8		SSW			WSW	10	W	16	9	8	12	10

Wind data for KIPL and KNJK from the NCEI's QCLCD system. Wind data for Mountain Springs Grade (TNSC1) and Sunrise-Ocotillo (IMPSD) from the University of Utah's MesoWest system. Wind data for Naval Test Base from AQMIS2. Wind speeds = mph; Direction = degrees. Due to the different times that wind data and air quality data is sampled at various sites, the hour given represents the hour in which the measurement was taken

As mentioned above, Area Forecast Discussions or Urgent Weather Messages containing a Wind Advisory described the gusty westerly winds for the region extending from the San Diego County Mountains and deserts in Imperial County. As the cold, low-pressure trough approached and passed through southern California preceding strong gusty westerly winds affected different regional air monitors in Riverside County, Imperial County and southwest Arizona (**Table 2-1**).

The ICAPCD monitors air quality for each of its stations and issues web-based Air Quality Indices in response to changes in air quality.[17] As transported windblown dust entered Imperial County during the evening hours of February 18, 2018 through the morning and afternoon hours of February 19, 2018 air quality degraded throughout Imperial County. Overall, the strong gusty westerly winds associated with the low-pressure system affected air quality in Imperial County.

FIGURE 3-5
IMPERIAL VALLEY AIR QUALITY INDEX FOR BRAWLEY
FEBRUARY 19, 2018

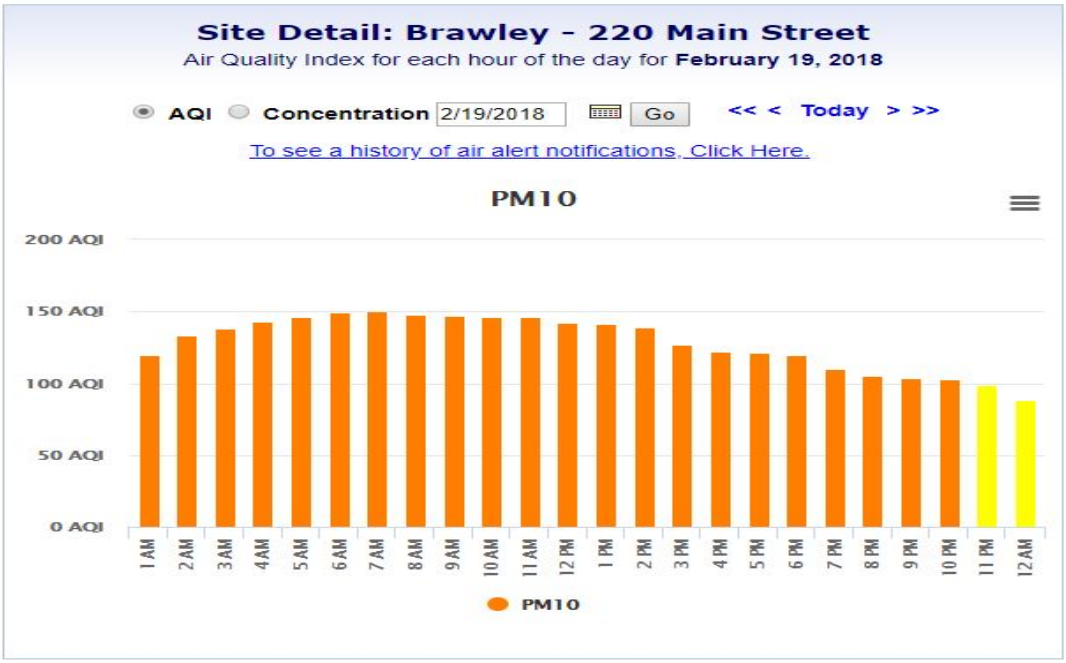


Fig 3-5: The degradation, or affect upon air quality, maybe determined when the AQI changes to an "Orange" level or Unhealth for Sensitive Groups. Here, air quality improved during the final two hours of the day

[17] The AQI is an index for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health affects you may experience within a few hours or days after breathing polluted air. EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established national air quality standards to protect public health .Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in this country. Source: https://airnow.gov/index.cfm?action=aqibasics.aqi

FIGURE 3-6
IMPERIAL VALLEY AIR QUALITY INDEX FOR CALEXICO
FEBRUARY 19, 2018

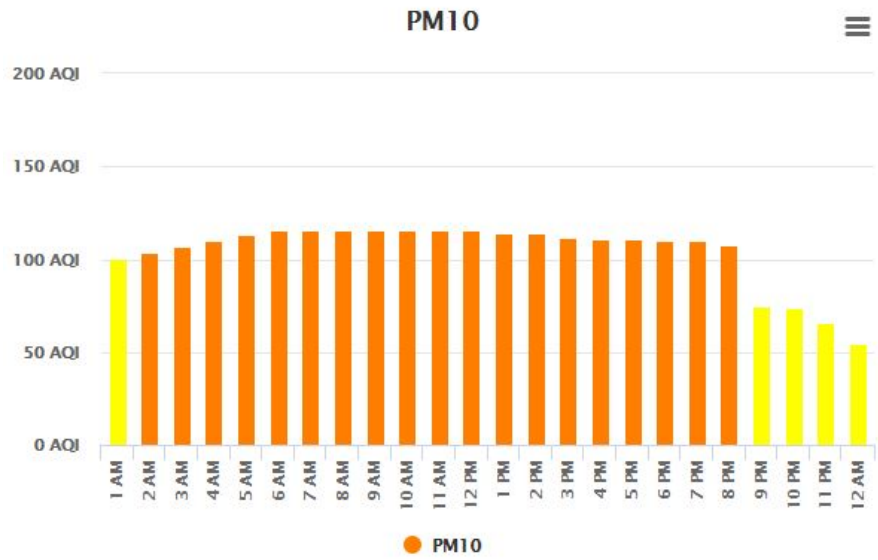


Fig 3-6: The degradation, or affect upon air quality, may be determined when the AQI changes from a "Yellow" or Moderate level to an "Orange" level or Unhealthy for Sensitive Groups

FIGURE 3-7
IMPERIAL VALLEY AIR QUALITY INDEX FOR NILAND
FEBRUARY 19, 2018

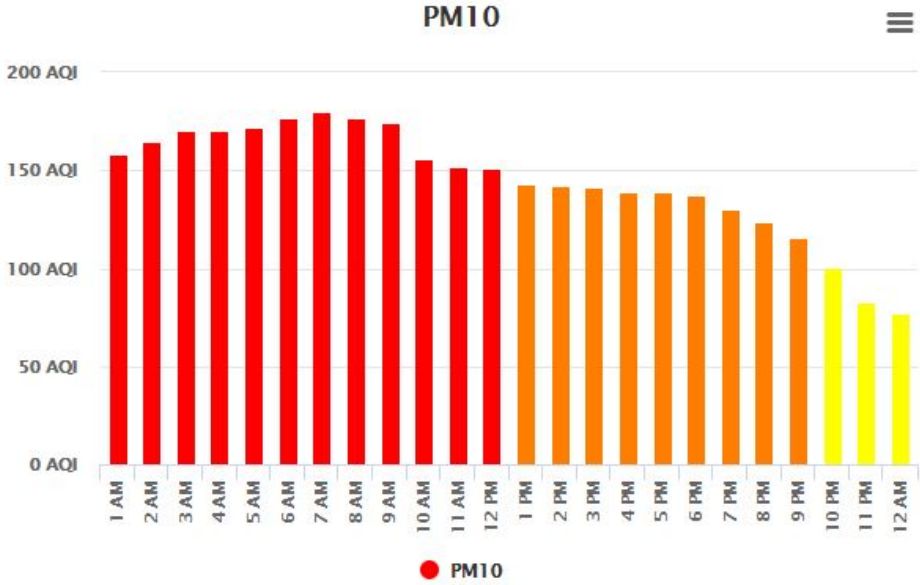


Fig 3-7: The improvement of degraded air quality, may be determined when the AQI changes from a "Red" or Unhealthy level to an "Orange" level or Unhealthy for Sensitive Groups

FIGURE 3-8
IMPERIAL VALLEY AIR QUALITY INDEX FOR WESTMORLAND
FEBRUARY 19, 2018

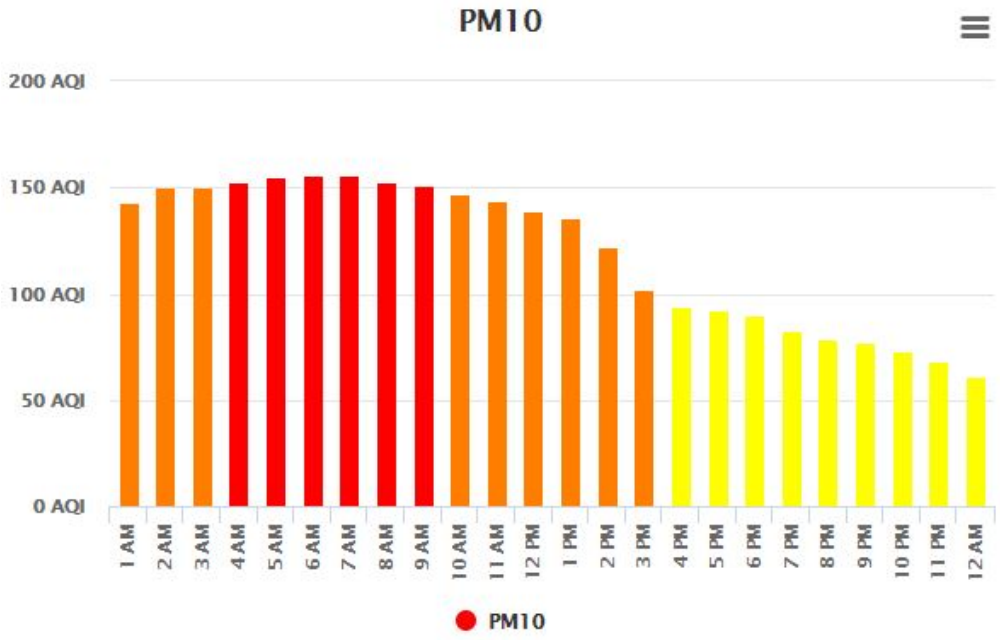


Fig 3-8: The degradation, or affect upon air quality, maybe determined when the AQI changes from an "Orange" level or Unhealthy for Sensitive Groups to a "Red" or Unhealthy level

III.1 Summary of Forecasts and Warnings

Area Forecast Discussions issued by the NWS offices in Phoenix and San Diego described a cold, low-pressure trough that moved south into the Pacific Northwest on Sunday, February 18, 2018 and tracked across the Great Basin on Monday, February 19, 2018 bringing strong gusty westerly winds to the mountains and deserts, scattered light showers and snow within the San Diego Mountains.[18] Both NWS offices issued several Area Forecast Discussions anticipating gusty westerly winds through the region by Monday, February 19, 2018. The magnitude of the winds caused the NWS offices to issue Urgent Weather Message, containing wind advisories and blowing dust advisories. It is interesting to note, that both NWS office updated their aviation in anticipation of the strong gusty westerly winds. In all twenty-five (25) separate Urgent Weather Messages in anticipate of advisory level winds within the San Diego Mountains, adjacent deserts and Imperial County were issued. **Appendix A** contains all pertinent NWS notices.

[18] National Weather Service, Area Forecast Discussion, Feb. 16, 2018 to Feb. 19, 2018, San Diego office, 913pm PST; 302am PST; 120pm PST; 517am PST; 400am PST; and 827am PST

III.2 Summary of Wind Observations

As demonstrated above wind data during the event were available from airports in eastern Riverside County, southeastern San Diego County, southwestern Yuma County (Arizona), northern Mexico, and Imperial County as well as from other automated meteorological instruments upwind from the monitors. Data analysis indicates that on February 19, 2018 different sites measured wind speeds at or above (some in far excess of) 25 mph.

IV Concentration to Concentration Analysis – An analyses comparing the event-influenced concentrations to concentrations at the same monitoring site at other times

While naturally occurring high wind events may recur seasonally and at times frequently and qualify for exclusion under the EER, historical comparisons of the particulate concentrations and associated winds provide insight into the frequency of events within an identified area.

Figures 4-1 through 4-8 show the time series of available FRM and BAM 24-hr PM_{10} concentrations at all the air quality monitors for the period of January 1, 2010 through February 19, 2018. The compiled data set below includes non-regulatory data prior to 2013. As a consequence, continuous monitoring data (hourly concentrations) prior to 2013 were not reported into the US EPA Air Quality System (AQS).[19] The difference between the standard and local condition concentrations is not significant enough to change the outcome of the analysis.

Compiled and plotted 24-hour averaged PM_{10} concentrations, between January 1, 2010 and February 19, 2018, as measured by the Brawley, Calexico, Niland and Westmorland monitors, were used to establish the historical and seasonal variability over time.[20] All figures illustrate that the exceedance, which occurred on February 19, 2018, was outside the normal historical concentrations when compared to event and non-event days. Air quality data for all graphs obtained through the EPA's AQS data bank.

[19] Pollutant concentration data contained in EPA's Air Quality System (AQS) are required to be reported in units corrected to standard temperature and pressure (25 C, 760 mm Hg). Because the PM_{10} concentrations prior to 2013 were not reported into the AQS database all BAM (FEM) data prior to 2013 within this report are expressed as micrograms per cubic meter (mg/m^3) at local temperature and pressure (LTP) as opposed to standard temperature and pressure (STP 760torr and 25C). The difference in concentration measurements between standard conditions and local conditions is insignificant and does not alter or cause any significant changes in conclusions to comparisons of PM_{10} concentrations to PM_{10} concentrations with in this demonstration.

[20] FRM sampling ended December 2016.

FIGURE 4-1
BRAWLEY HISTORICAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO FEBRUARY 19, 2018

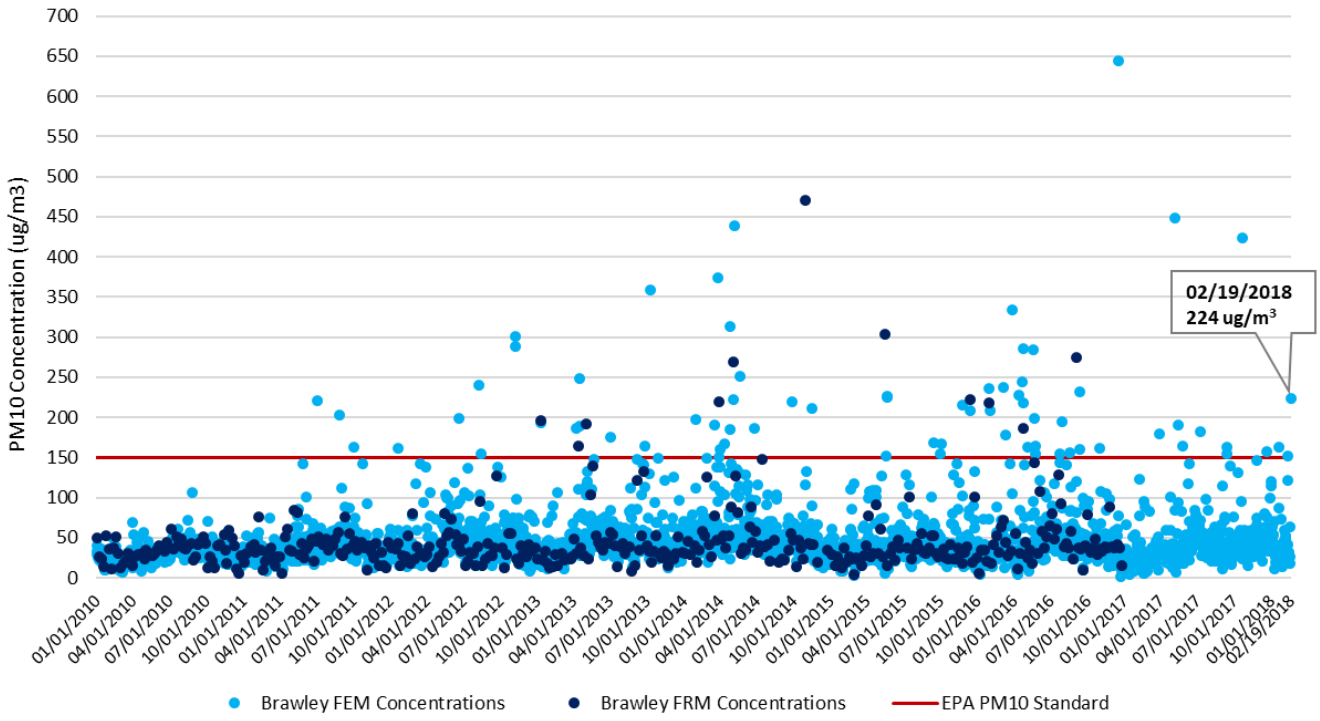


Fig 4-1: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 224 µg/m^3 on February 19, 2018 by the Brawley monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-1,** for Brawley included 2,972 sampling days (January 1, 2010 through February 19, 2018). Of the 2,972 sampling days the Brawley monitor measured 70 exceedance days which translates into an occurrence rate less than 2.5%. Historically, there were thirteen (13) exceedance days measured during the first quarter, twenty-seven (27) exceedance days measured during the second quarter, sixteen (16) exceedance days measured during the third quarter; and thirteen (13) exceedance days measured during the fourth quarter.

FIGURE 4-2
CALEXICO HISTORICAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO FEBRUARY 19, 2018

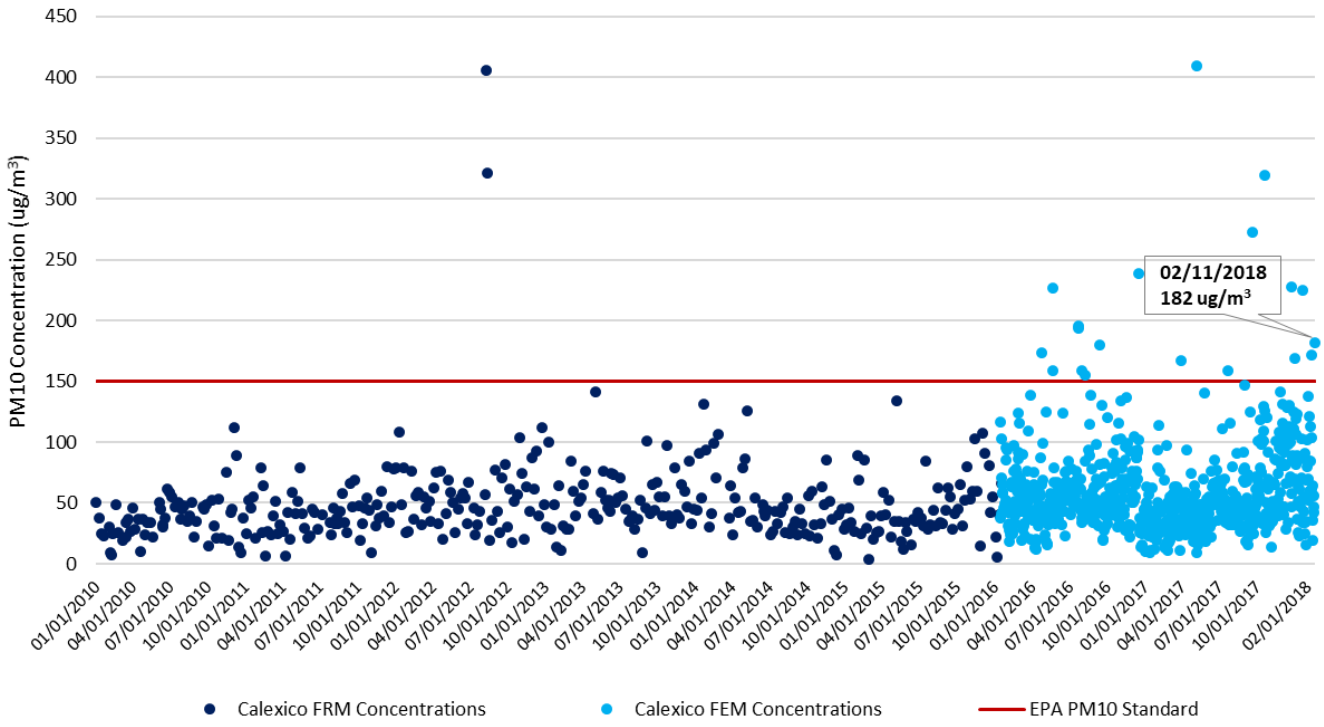


Fig 4-2: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 182 µg/m³ on February 19, 2018 by the Calexico monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-2,** for Calexico included 1,183 sampling days (January 1, 2010 through February 19, 2018). Of the 1,183 sampling days the Calexico monitor measured 21 exceedance days which translates into an occurrence rate less than 2%. Historically, there were four (4) exceedance day measured during the first quarter, four (4) exceedance days measured during the second quarter, nine (9) exceedance days measured during the third quarter; and three (3) exceedance days measured during the fourth quarter.

FIGURE 4-3
NILAND HISTORICAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO FEBRUARY 19, 2018

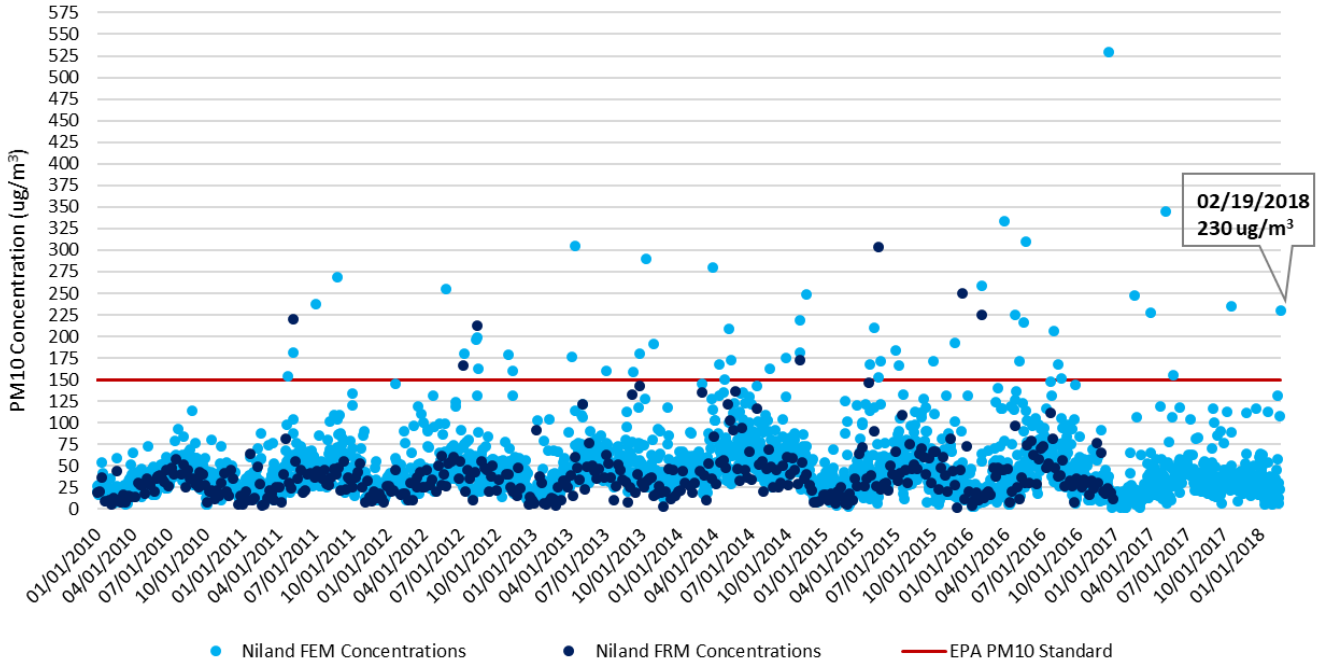


Fig 4-3: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 230 µg/m^3 on February 19, 2018 by the Niland monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-3,** for Niland included 2,972 sampling days (January 1, 2010 through February 19, 2018). Of the 2,972 sampling days the Niland monitor measured 51 exceedance days which translates into an occurrence rate less than 2%. Historically, there were six (6) exceedance day measured during the first quarter, eighteen (18) exceedance days measured during the second quarter, fifteen (15) exceedance days measured during the third quarter; and twelve (12) exceedance days measured during the fourth quarter.

FIGURE 4-4
WESTMORLAND HISTORICAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO FEBRUARY 19, 2018

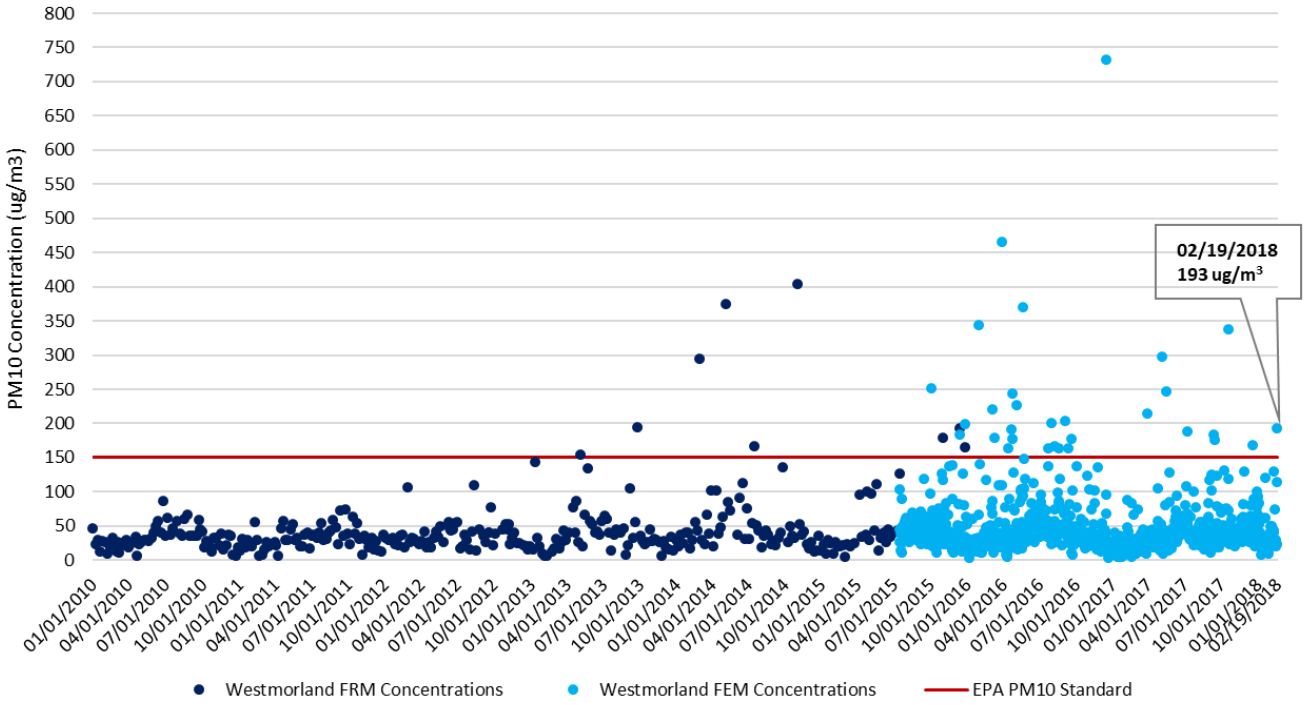
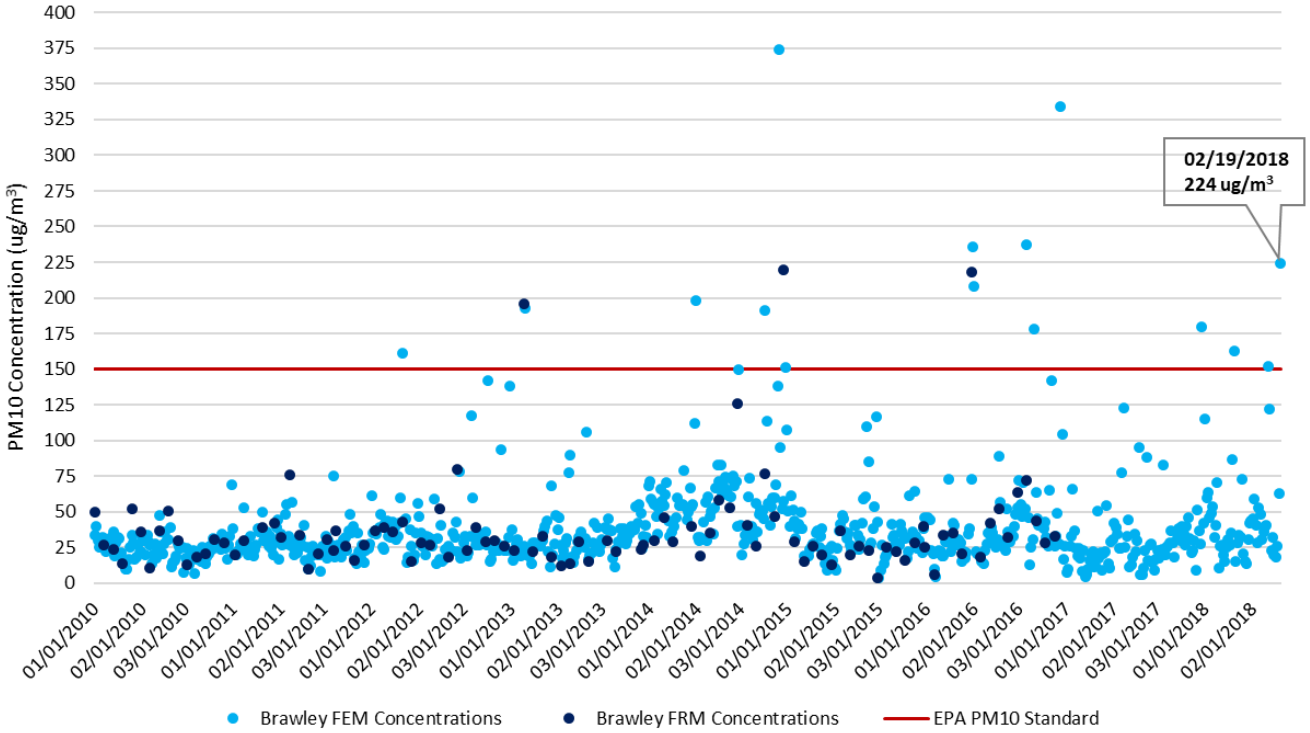


Fig 4-4: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 193 µg/m^3 on February 19, 2018 by the Westmorland monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-4,** for Westmorland included 1,301 sampling days (January 1, 2010 through February 19, 2018). Of the 1,301 sampling days the Westmorland monitor measured 37 exceedance days which translates into an occurrence rate less than 3%. Historically, there were seven (7) exceedance days measured during the first quarter, ten (10) exceedance days measured during the second quarter, twelve (12) exceedance days measured during the third quarter; and eight (8) exceedance days measured during the fourth quarter.

FIGURE 4-5
BRAWLEY SEASONAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
***JANUARY 1, 2010 TO FEBRUARY 19, 2018**

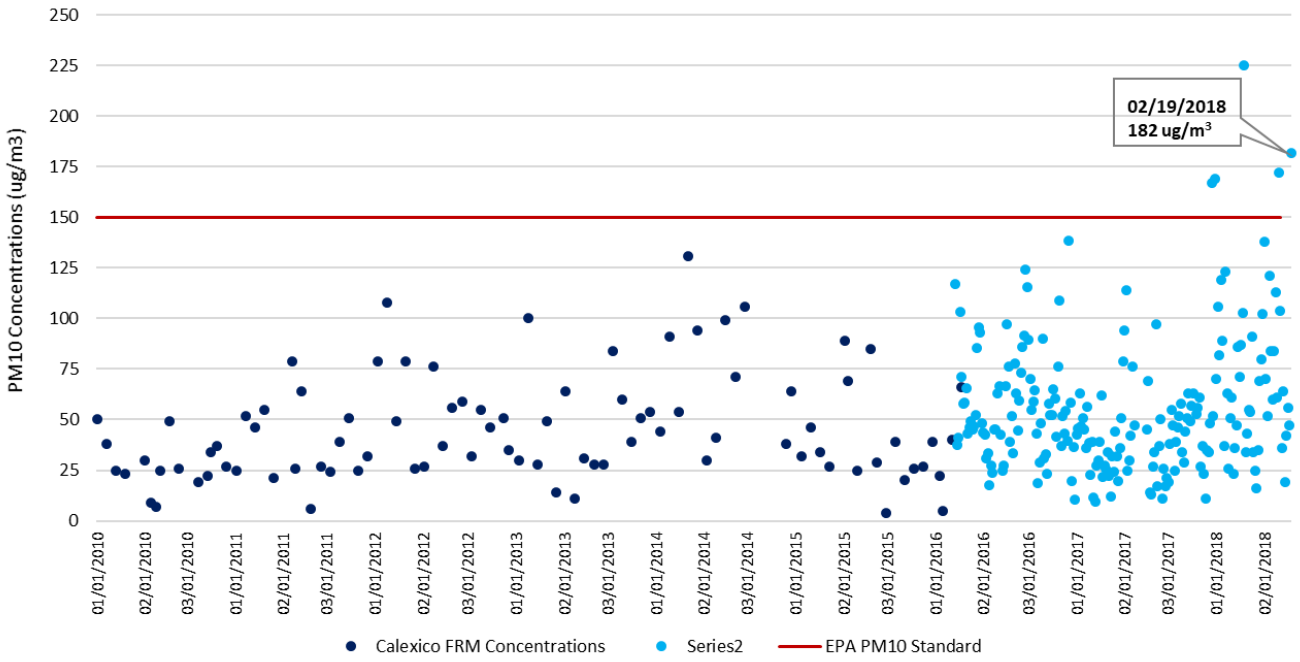


*** Quarterly: January 1, 2010 to March 31, 2018 and January 1, 2018 to February 19, 2018**

Fig 4-5: A comparison of PM_{10} seasonal concentrations demonstrates that the measured concentration of 224 µg/m^3 on February 19, 2018 by the Brawley monitor was outside the seasonal concentrations when compared to similar event days and non-event days

Figure 4-5 illustrates the seasonal fluctuations over a period of 772 sampling days, 874 credible samples and thirteen (13) exceedance days. This translates to less than a 2% seasonal exceedance occurrence rate.

FIGURE 4-6
CALEXICO SEASONAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
***JANUARY 1, 2010 TO FEBRUARY 19, 2018**

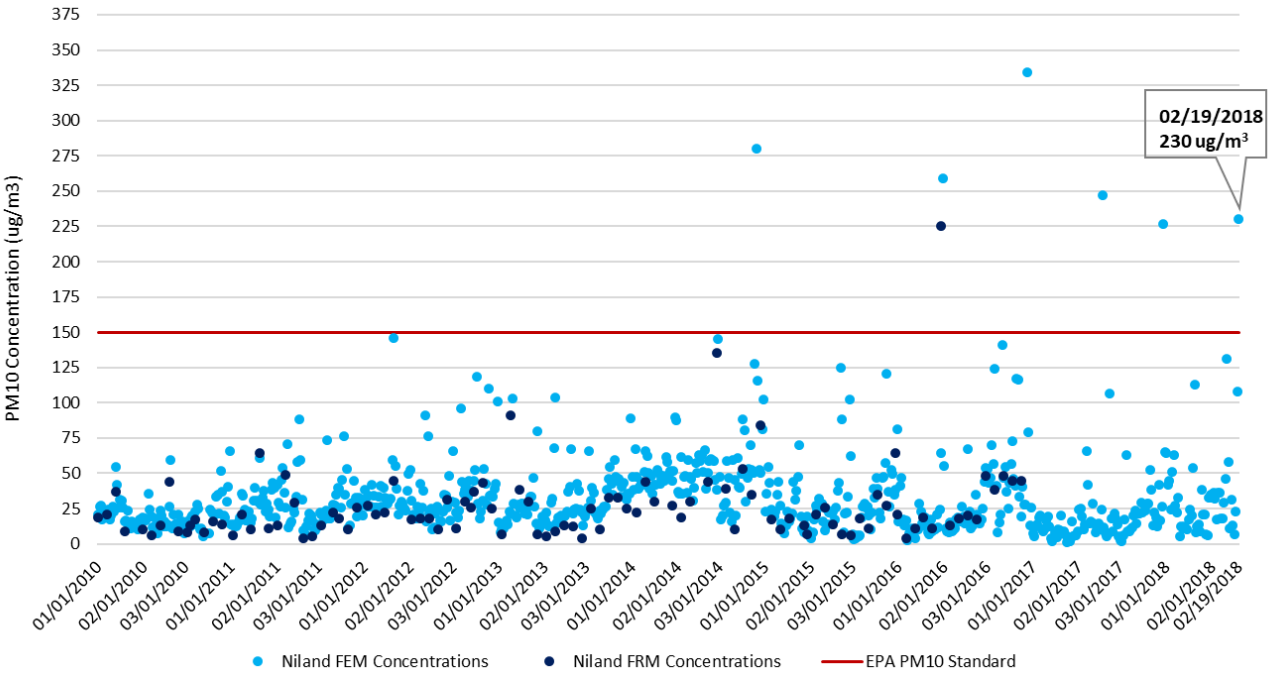


*** Quarterly: January 1, 2010 to March 31, 2018 and January 1, 2018 to February 19, 2018**

Fig 4-6: A comparison of PM_{10} seasonal concentrations demonstrates that the measured concentration of 182 µg/m^3 on February 19, 2018 by the Calexico monitor was outside the seasonal concentrations when compared to similar event days and non-event days

Figure 4-6 illustrates the seasonal fluctuations over a period of 319 sampling days, 300 credible samples and four (4) exceedance days. This translates to less than a 2% seasonal exceedance occurrence rate**.**

FIGURE 4-7
NILAND SEASONAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
***JANUARY 1, 2010 TO FEBRUARY 19, 2018**

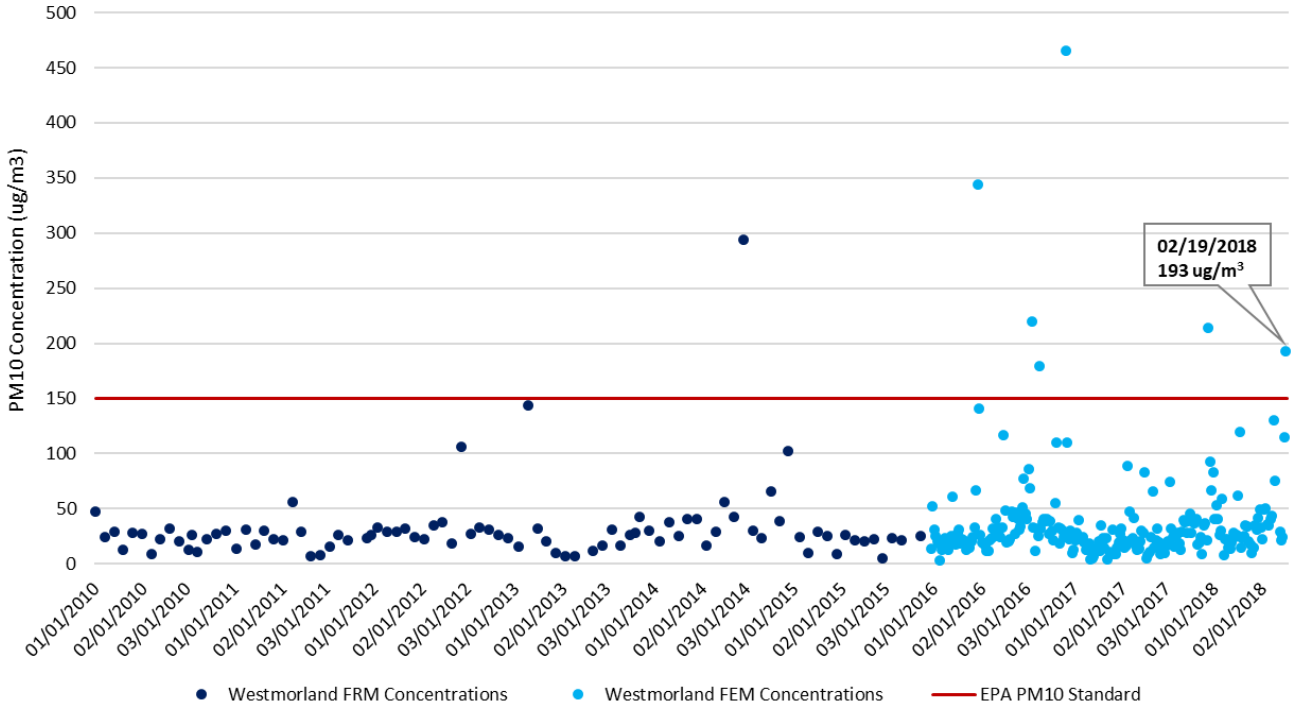


*** Quarterly: January 1, 2010 to March 31, 2018 and January 1, 2018 to February 19, 2018**

Fig 4-7: A comparison of PM_{10} seasonal concentrations demonstrates that the measured concentration of 230 µg/m^3 on February 19, 2018 by the Niland monitor was outside the seasonal concentrations when compared to similar event days and non-event days

Figure 4-7 illustrates the seasonal fluctuations over a period of 772 sampling days, 872 credible samples and six (6) exceedance days. This translates to less than a 1% seasonal exceedance occurrence rate.

FIGURE 4-8
WESTMORLAND SEASONAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
***JANUARY 1, 2010 TO FEBRUARY 19, 2018**



*** Quarterly: January 1, 2010 to March 31, 2018 and January 1, 2018 to February 19, 2018**

Fig 4-8: A comparison of PM_{10} seasonal concentrations demonstrates that the measured concentration of 193 µg/m^3 on February 19, 2018 by the Westmorland monitor was outside the seasonal concentrations when compared to similar event days and non-event days

Figure 4-8 illustrates the seasonal fluctuations over a period of 324 sampling days, 318 credible samples and seven (7) exceedance days. This translates to less than a 2.5% seasonal exceedance occurrence rate.

Examining the historical and seasonal time series concentrations as they relate to the February 19, 2018 measured exceedances, the exceedances measured on February 19, 2018 are clearly outside the normal concentration levels when comparing to similar event days and non-event days.

V Both Not Reasonably Controllable and Not Reasonably Preventable – A demonstration that the event was both not reasonably controllable and not reasonably preventable

The analysis above, under the Clear Causal Relationship, indicates that the primary sources affecting air quality in Imperial County originated within the natural open areas of the San Diego Mountains and the natural open deserts to the west and southwest of Imperial County. The origination of these emissions from these areas affected all the air quality monitors significantly on February 19, 2018. Since Imperial County does not have jurisdiction over emissions emanating from San Diego County, it is not reasonably controllable or preventable by Imperial County. For a brief description of the controls implemented by sources beyond the control of Imperial County see section V.1 below.

As mentioned above in section I.4, Mitigation of Exceptional Events contains significant information regarding the application of Best Available Control Measures that are used as measures to abate or minimize contributing controllable sources of identified pollutants (**Page 12, sub-section II.2 of the High Wind Mitigation Plan**). In addition, the mitigation plan explains the methods utilized to minimize public exposure to high concentrations of identified pollutants, the process utilized to collect and maintain data pertinent to any identified event, and the mechanisms utilized to consult with other air quality managers within the affected area regarding the appropriate responses to abate and minimize affects.

Inhalable particulate matter (PM_{10}) contributes to effects that are harmful to human health and the environment, including premature mortality, aggravation of respiratory and cardiovascular disease, decreased lung function, visibility impairment, and damage to vegetation and ecosystems. Upon enactment of the 1990 Clean Air Act (CAA) amendments, Imperial County was classified as moderate nonattainment for the PM_{10} NAAQS under CAA sections 107(d)(4)(B) and 188(a). By November 15, 1991, such areas were required to develop and submit State Implementation Plan (SIP) revisions providing for, among other things, implementation of reasonably available control measures (RACM).

Partly to address the RACM requirement, ICAPCD adopted local Regulation VIII rules to control PM_{10} from sources of fugitive dust on October 10, 1994, and revised them on November 25, 1996. USEPA did not act on these versions of the rules with respect to the federally enforceable SIP.

On August 11, 2004, USEPA reclassified Imperial County as a serious nonattainment area for PM_{10}. As a result, CAA section 189(b)(1)(B) required all BACM to be implemented in the area within four years of the effective date of the reclassification, i.e., by September 10, 2008.

On November 8, 2005, partly to address the BACM requirement, ICAPCD revised the Regulation VIII rules to strengthen fugitive dust requirements. On July 8, 2010, USEPA finalized a limited approval of the 2005 version of Regulation VIII, finding that the seven Regulation VIII rules largely fulfilled the relevant CAA requirements. Simultaneously, USEPA also finalized a limited disapproval of several of the rules, identifying specific deficiencies that needed to be addressed to fully demonstrate compliance with CAA requirements regarding BACM and enforceability.

In September 2010, ICAPCD and the California Department of Parks and Recreation (DPR) filed petitions with the Ninth Circuit Federal Court of Appeals for review of USEPA's limited disapproval of the rules. After hearing oral argument on February 15, 2012, the Ninth Circuit directed the parties to consider mediation before rendering a decision on the litigation. On July 27, 2012, ICAPCD, DPR and USEPA reached agreement on a resolution to the dispute, which included a set of specific revisions to Regulation VIII. The October 16, 2012 adopted revision reflects the specific revisions to Regulation VIII, which USEPA approved on April 22, 2013. Since 2006, ICAPCD had implemented regulatory measures to control emissions from fugitive dust sources and open burning in Imperial County.

FIGURE 5-1
REGULATION VIII GRAPHIC TIMELINE DEVELOPMENT

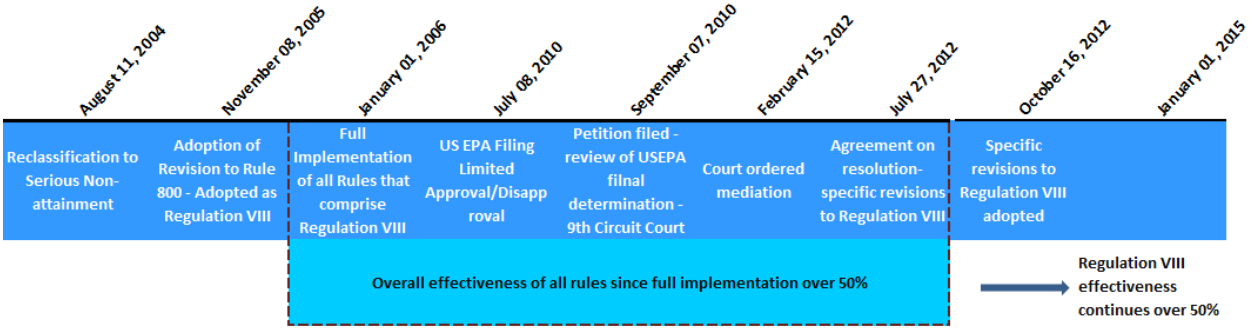


Fig 5-1: Regulation VIII Graphic Timeline

V.1 Other PM_{10} Control Measures

In addition to the rules and regulations listed above, other PM_{10} control measures have been committed to, and implemented by, local California air districts bordering ICAPCD. San Diego County (to the west of Imperial County) and eastern Riverside County (outside

of the Coachella Valley Planning Area and to the north and northeast of Imperial County) are both designated unclassified for the PM_{10} NAAQS and are not required to have BACM controls for PM_{10}. The Coachella Valley Planning Area in Riverside County, to the north and northwest of Imperial County, is designated a PM_{10} nonattainment area, and a redesignation request and maintenance plan were submitted to USEPA in 2010. These three areas and their relevant PM_{10} rules are indicated in **Tables 5-1 to 5-3**.

TABLE 5-1
SAN DIEGO AIR POLLUTION CONTROL DISTRICT (SDAPCD)

RULES REGULATING EXISTING AND NEW NON-POINT SOURCES IN SAN DIEGO COUNTY	
RULE NUMBER AND TITLE	DESCRIPTION
Rule 52 – Particulate Matter	Limits the amount of particulate matter that may be discharged from any source.
Rule 52.1 – NSPS and NESHAPS Particulate Matter Requirements	Ensures that sources subject to NSPS or NESHAPS also conform to Regulation X and XI, respectively.
Rule 54 – Dust and Fumes	Minimizes the amount of dust that can be discharged in a specified time period.
Rule 55 – Fugitive Dust Control	Provides a mechanism to regulate operations that may cause fugitive dust emissions.
Rule 101 – Burning Control	Establishes conditions, including high winds, under which burning would be curtailed or prohibited.

TABLE 5-2
MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT (AQMD)

RULES REGULATING EXISTING AND NEW NON-POINT SOURCES IN EASTERN RIVERSIDE COUNTY OUTSIDE OF THE COACHELLA VALLEY PLANNING AREA	
RULE NUMBER AND TITLE	DESCRIPTION
Rule 403 – Fugitive Dust	Limits the amount of particulate matter that may be discharged from specific sources, not including unpaved public roads or farm roads, or industrial or commercial facilities.
Rule 404 – Particulate Matter Concentration	Limits the concentration of PM_{10} allowed in discharged gas.
Rule 405 – Solid Particulate Matter Weight	Limits the amount of PM_{10} that can be discharged on an hourly basis.

TABLE 5-3
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

RULES REGULATING EXISTING AND NEW NON-POINT SOURCES IN RIVERSIDE COUNTY AND THE COACHELLA VALLEY, INSIDE OF THE COACHELLA VALLEY PLANNING AREA	
RULE NUMBER AND TITLE	DESCRIPTION
Rule 403– Fugitive Dust	Requires implementation of control measures to prevent, reduce, or mitigate fugitive dust emissions.
Rule 403.1 – Supplemental Fugitive Dust Control Requirements for Coachella Valley Sources	Establishes special requirements for Coachella Valley dust sources under high-wind conditions and requires SCAPCD approval of dust control plans for sources not subject to local government ordinances.
Rule 1156 – Further Reductions of Particulate Emissions from Cement Manufacturing Facilities	Establishes requirements to reduce particulate matter emissions from cement manufacturing operations and properties.
Rule 1157 – PM_{10} Emission Reductions from Aggregate and Related Operations	Establishes additional source specific performance standards and specifies operational PM_{10} controls specific to aggregate and related operations.
Rule 1186 – PM_{10} Emissions from Paved and Unpaved Roads and Livestock Operation	Limits the amount of particulate matter entrained as a result of vehicular travel on paved and unpaved public roads, and at livestock operations.
Rule 1466 – Control of Particulate Emissions from Soils with Toxic Air Contaminants	Establishes a PM_{10} ambient dust concentration limit, dust control measures, and notification requirements prior to earth-moving activities or when PM_{10} dust concentrations are exceeded.

V.2 Wind Observations

As previously discussed, wind data analysis indicates that on February 19, 2018 different sites measured wind speeds at or above (many in excess of) 25 mph. Wind speeds of 25 mph are normally sufficient to overcome most PM_{10} control measures. During the February 19, 2018 event, wind speeds were above the 25 mph threshold, overcoming the BACM in place.

V.3 Review of Source Permitted Inspections and Public Complaints

A query of the ICAPCD permit database was compiled and reviewed for active permitted sources throughout Imperial County and specifically around the Brawley, Calexico, Niland, and Westmorland monitors during the February 19, 2018 PM_{10} exceedance. Both permitted and non-permitted sources are required to comply with Regulation VIII requirements that address fugitive dust emissions. The identified permitted sources are Aggregate Products, Inc., US Gypsum Quarry, Imperial Aggregates (Val-Rock, Inc., and Granite Construction), US Gypsum Plaster City, Clean Harbors (Laidlaw Environmental Services), Bullfrog Farms (Dairy), Burrtec Waste Industries, Border Patrol Inspection station, Centinela State Prison, various communications towers not listed and various agricultural operations. Non-permitted sources include the wind farm known as Ocotillo Express, and a solar facility known as CSolar IV West. Finally, the desert regions are under the jurisdiction of the Bureau of Land Management and the California Department of Parks (Including Anza Borrego State Park and Ocotillo Wells).

An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM_{10} emissions. There were no complaints filed on February 19, 2018, officially declared as No Burn Day, related to agricultural burning, waste burning or dust.

FIGURE 5-2
PERMITTED SOURCES

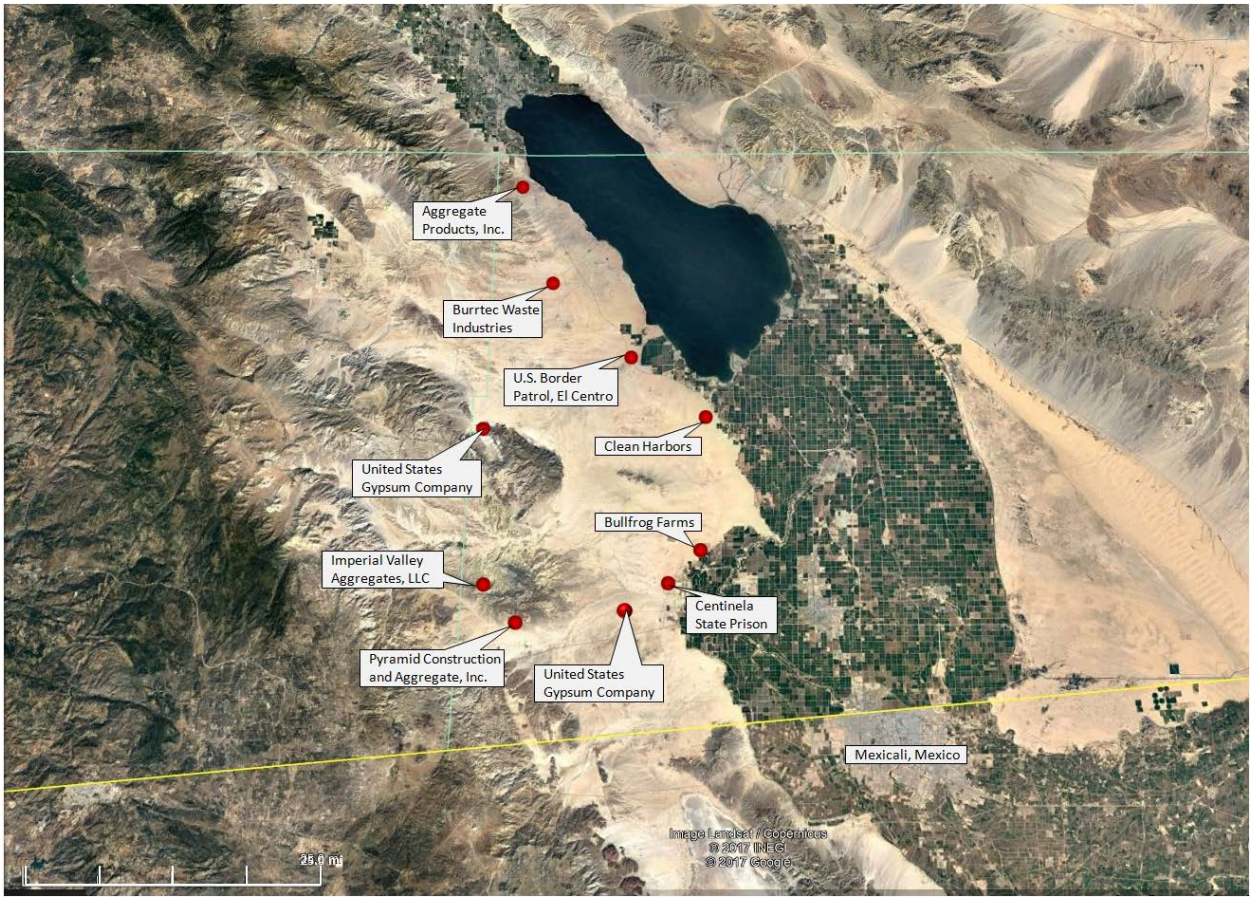


Fig 5-2: The above map identifies those permitted sources located west, northwest and southwest of the Brawley, Calexico, Niland, and Westmorland monitors. The green line to the north denotes the political division between Imperial and Riverside counties. The yellow line below denotes the international border between the United States and Mexico. The green checker-boarded areas are a mixed use of agricultural and community parcels. In addition, either the Bureau of Land Management or the California Department of Parks manages the desert areas. Base map from Google Earth

FIGURE 5-3
NON-PERMITTED SOURCES

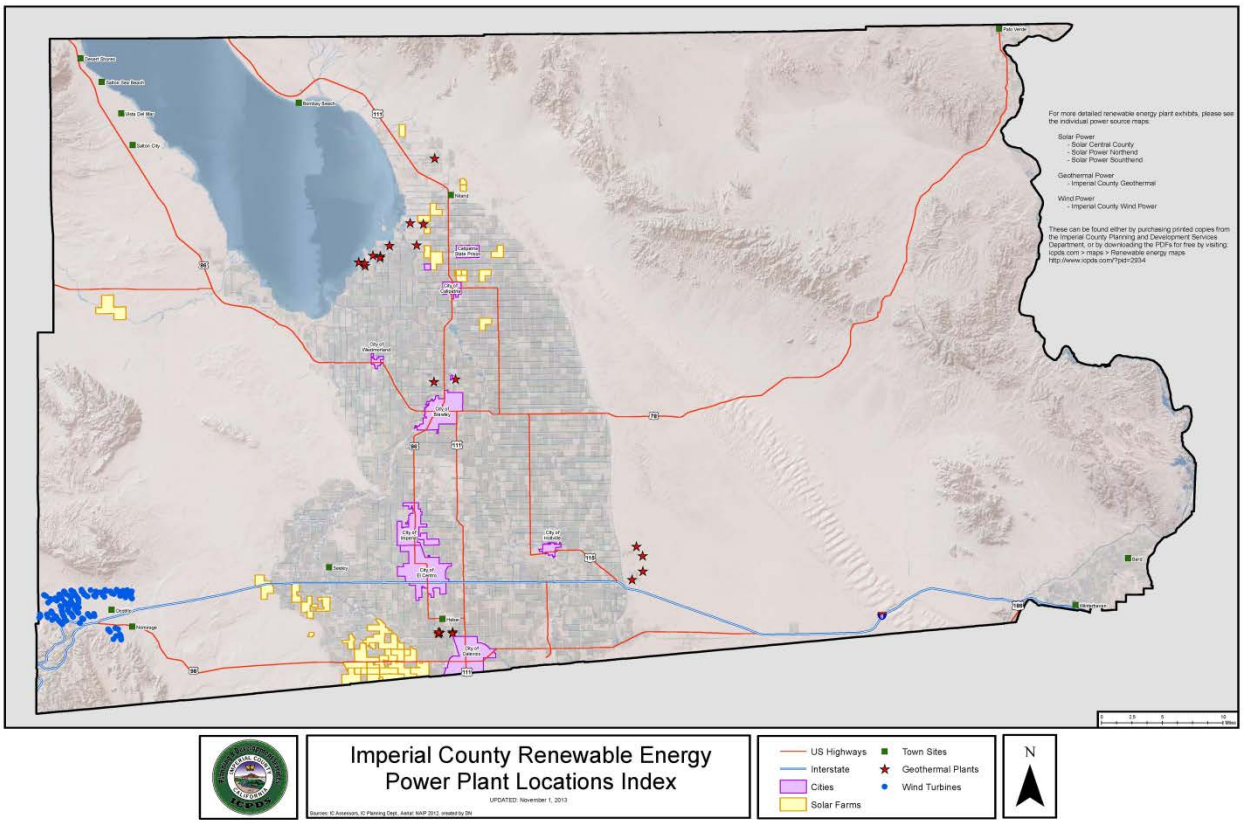


Fig 5-3: The above map identifies those power sources located west, northwest and southwest of the Brawley, Calexico, Niland, and Westmorland monitors. Blue indicate the Wind Turbines, Yellow are the solar farms and stars are geothermal plants

VI A Natural Event – A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event.

Typically, Pacific weather disturbances during this time of year will bring westerly winds. The strong gusty westerly winds on February 19, 2018 resulted from what the NWS identified as a cold, low-pressure trough that moved south into the Pacific Northwest on Sunday, February 18, 2018 tracking across the Great Basin on Monday, February 19, 2018.[21] As the system tracked across the Great Basin it caused surface pressure gradients to drop over the interior west forcing strong onshore flow across southern California.[22] The low-pressure system brought preceding strong gusty westerly winds to the mountains and deserts, scattered light showers along and west of the mountains and snow at around 6000 feet dropping to 3000 feet Monday, February 19, 2018.[23] The intensity of the winds prompted the NWS offices to issue a total of twenty-five (25) Urgent Weather Messages covering San Diego, Riverside and Imperial counties.[24]

Overall, the event, as it occurred, was described by the San Diego office as "…[a] longwave trough…" that crossed into the Great Basin on Monday, February 19, 2018, "…gazing SoCal with strong onshore winds and scattered light precipitation."[25] The result was periods of strong gusty westerly winds that blew through the San Diego County Mountains and deserts, with light precipitation and snow level was at 300-3500 feet.[26] Finally, winds weakened as the trough moved eastward and out of Southern California. However, gusts remained strong but limited along desert slopes during the late afternoon hours of Monday, February 19, 2018.[27] Finally, the intensity of the gusty westerly winds was sufficient to overcome BACM in place, in Imperial County.

VI.1 Affects Air Quality

The preamble to the revised EER states that an event is considered to have affected air quality if it can be demonstrated that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation. Given the information presented in this demonstration, particularly Section III, we can reasonably conclude that there exists a clear causal

[21] National Weather Service, Area Forecast Discussion, Feb. 16, 2018, San Diego office, 913pm PST and Feb., 17, 2018, 302am PST
[22] National Weather Service, Area Forecast Discussion, Feb. 17, 2018, San Diego office, 120pm PST
[23] National Weather Service, Area Forecast Discussion, Feb. 18, 2018, San Diego office, 517am PST and Feb., 19, 2018, 400am & 827am PST
[24] National Weather Service, Urgent Weather Messages, Feb. 17, 2018 to Feb. 19, 2018, San Diego and Phoenix offices, various times
[25] National Weather Service, Area Forecast Discussion, Feb. 18, 2018, San Diego office, 150pm PST
[26] National Weather Service, Area Forecast Discussion, Feb. 19, 2018, San Diego office, 400am and 827am PST
[27] National Weather Service, Area Forecast Discussion, Feb. 19, 2018 and Feb. 20, 2018, San Diego office, 918pm and 240am PST

relationship between the monitored exceedance and the February 19, 2018 event, which changed or affected air quality in Imperial County.

VI.2 Not Reasonably Controllable or Preventable

In order for an event to be defined as an exceptional event under section 50.1(j) of 40 CFR Part 50 an event must be "not reasonably controllable or preventable." The revised preamble explains that the nRCP has two prongs, not reasonably preventable and not reasonably controllable. The nRCP is met for natural events where high wind events entrain dust from desert areas, whose sources are controlled by BACM, where human activity played little or no direct causal role. This demonstration provides evidence that the primary source areas of windblown dust transported into Imperial County came from San Diego County where Imperial County has no jurisdiction. In any event, despite BACM in place within Imperial County, high winds overwhelmed all BACM controls where human activity played little to no direct causal role. The PM_{10} exceedance measured at the Brawley, Calexico, Niland, and Westmorland monitors were caused by naturally occurring strong gusty westerly winds that transported windblown dust into Imperial County and other parts of southern California from areas located within the Sonoran Desert regions to the west of Imperial County. These facts provide strong evidence that the PM_{10} exceedance at the Brawley, Calexico, Niland, and Westmorland monitors on February 19, 2018, was not reasonably controllable or preventable.

VI.3 Natural Event

The revised preamble to the EER clarifies that a "Natural Event" (50.1(k) of 40 CFR Part 50) is an event with its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. Anthropogenic sources that are reasonably controlled are considered not to play a direct role in causing emissions. As discussed within this demonstration, the PM_{10} exceedance that occurred at the Brawley, Calexico, Niland, and Westmorland monitors on February 19, 2018, was caused by the transport of windblown dust into Imperial County by strong westerly winds associated with a large low-pressure system that passed through the region. At the time of the event, anthropogenic sources, within Imperial County were reasonably controlled with BACM. The event therefore qualifies as a natural event.

VI.4 Clear Causal Relationship

The comparative analysis of different meteorological sites to PM_{10} concentrations measured at the Brawley, Calexico, Niland, and Westmorland monitors in Imperial County demonstrates a consistency of elevated gusty westerly winds with elevated

concentrations of PM_{10} on February 19, 2018. In addition, temporal analysis indicates that the elevated PM_{10} concentrations and the gusty westerly winds were an event that was widespread, regional and not preventable. Days before the high wind event PM_{10} concentrations were well below the NAAQS. Overall, the demonstration provides evidence of the strong correlation between the natural event and the transported windblown dust to the exceedance on February 19, 2018.

VI.5 Concentration to Concentration Analysis

The historical annual and seasonal 24-hr average PM_{10} measured concentrations at the Brawley, Calexico, Niland, and Westmorland monitors were outside the normal historical concentrations when compared to event and non-event days.

VI.6 Conclusion

The preceding discussion, graphs, figures, and tables provide wind direction, speed and concentration data illustrating the spatial and temporal effects of the strong gusty westerly winds that preceded the identified cold low-pressure trough as it passed through the southern region of California. The information provides a clear causal relationship between the entrained windblown dust and the PM_{10} exceedance measured at all but one of the air quality monitors in Imperial County on February 19, 2018.

In particular, the clear causal relationship and not reasonably controllable or preventable sections provide evidence that high gusty westerly winds transported fugitive emissions from open natural mountain and desert areas, located within San Diego County and Imperial County (all part of the Sonoran Desert). In addition, because anthropogenic sources in upwind areas were reasonably controlled at the time of the event, this event meets the definition of a Natural Event.[28]

[28] Title 40 Code of Federal Regulations part 50: §50.1(k) Natural event means an event and its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. For purposes of the definition of a natural event, anthropogenic sources that are reasonably controlled shall be considered to not play a direct role in causing emissions.