IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT

NBC 7 San Diego: "Weather Warnings issued for San Diego, Powerful Storm System Arrives" February 17, 2017:
https://www.nbcsandiego.com/news/local/Storm-Warnings-Powerful-Rain-Flooding-Arrives-in-San-Diego-414071053.html

February 17, 2017
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 Niland monitor in Niland, California on February 17, 2017

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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. 18
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. 31
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. 36

[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 17, 2017, 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. As early as Monday, February 6, 2017, the ICAPCD began advising the public of the potential for elevated concentrations of particulate matter caused by gusty winds on Friday, February 17, 2017. By Wednesday, February 15, 2017, the ICAPCD advised the public of the strong potential of elevated particulate matter resulting from the forecasted significant windstorm expected for Friday, February 17, 2017. On Friday, February 17, 2017, the ICAPCD notified the public that although the most significant affects to the areas surrounding Imperial County included significant rainfall and snow, strong gusty winds could potentially increase PM_{10} concentrations to moderate or unhealthy levels during the afternoon to evening hours of Friday, February 17, 2017. **Appendix C** contains copies of notices pertinent to the February 17, 2017 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 February 17, 2017, a naturally occurring event elevated particulate matter within San Diego, Riverside and Imperial Counties, causing an exceedance at the Niland monitor (06-025-4004). 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 Niland monitor on February 17, 2017. After review, CARB submitted the INPEE, for the February 17, 2017 event in July of 2018. The submitted request included a brief description of the meteorological conditions for February 17, 2017 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 17, 2017 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 concentration of 247 $\mu g/m^3$ measured by the Niland monitor on February 17, 2017.

(B) Concurrently with the Public Review period for the February 17, 2017 exceptional event, the ICAPCD is formally submitting to CARB for remittance to USEPA the Draft February 17, 2017 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 2017 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

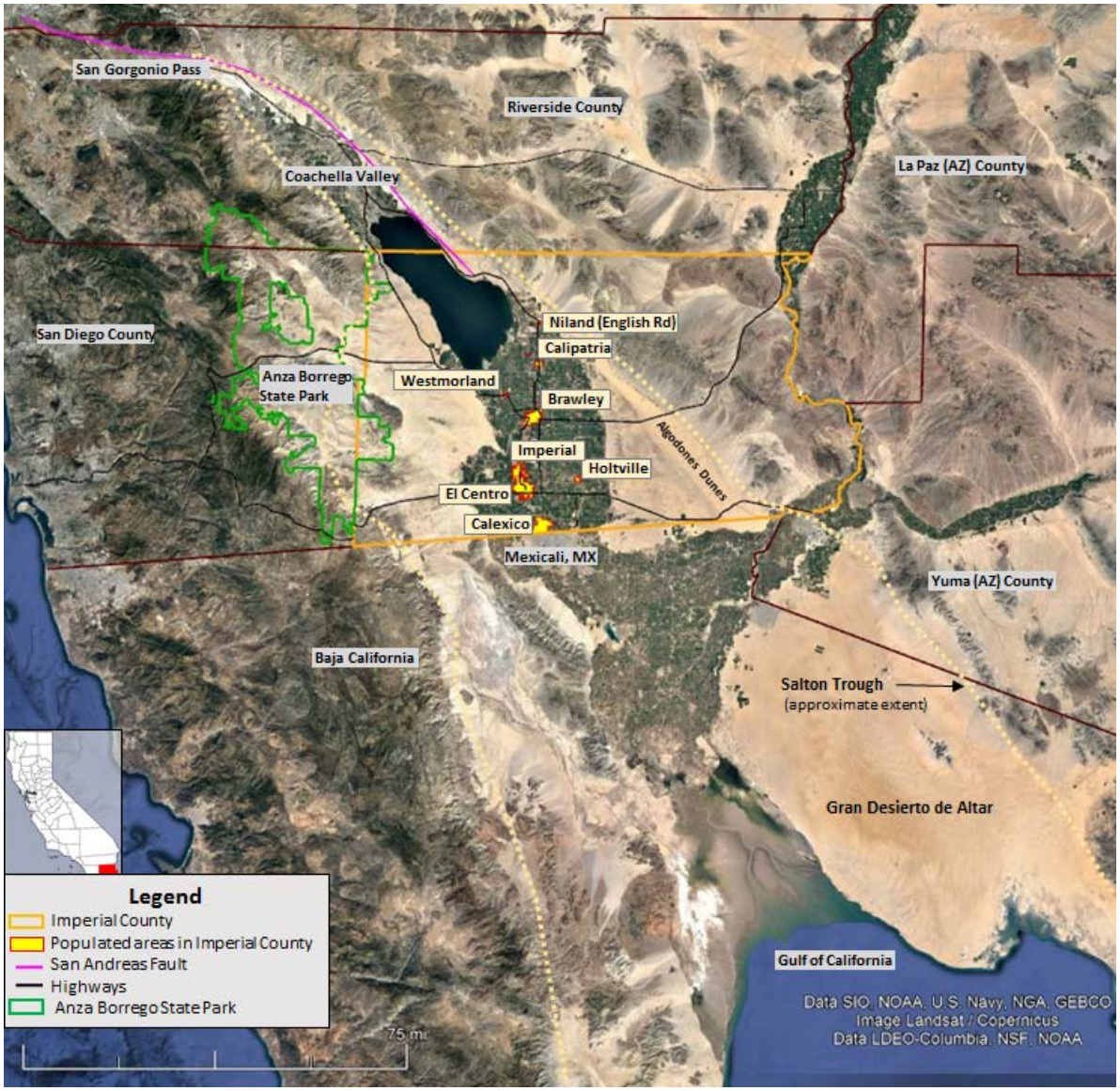


Fig 1-1: Imperial County a Southern California border region, within far southeast California bordering Arizona and Mexico has a small economically diverse region with a population of 174,528

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 monitor

II.1 Description of the event causing the exceedance

Days before and during Friday, February 17, 2017, the National Weather Service (NWS) office in San Diego described an approaching powerful Pacific storm expected to bring damaging winds, flooding and heavy mountain snow during the afternoon and evening hours of February 17, 2017. As a result, as early as February 15, 2017, the San Diego NWS office began issuing High Wind Watches for San Diego and Riverside Counties. The interpreted forecast models by the San Diego NWS office indicated very strong southerly winds developing Friday and peaking Friday afternoon and evening. In fact, by 241 pm Pacific Standard Time (PST), Friday, February 17, 2017 the San Diego NWS office changed the High Wind Watch status to a High Wind Warning with an ending at 200 am PST Saturday, February 18, 2017 within the forecast region. By 332 pm PST, the San Diego NWS office issued a Public Information Statement that identified wind reports for several areas within its forecast region. One of those areas identified was the Coachella Valley. The reported winds at the Thermal Airport measured the highest at 33 mph followed by Coachella at 31 mph, Thousand Palms (5 NE) at 24 mph and Thousand Palms at 23 mph. The evening report released by the San Diego NWS office at 946 pm PST indicated that the Pacific (winter) storm had brought strong winds and widespread heavy rainfall to the region. **Appendix A** contains all pertinent NWS notices.

By contrast the Phoenix NWS office did not issue any really pertinent wind forecast for Imperial County until 331 am Mountain Standard Time (MST) on Friday, February 17, 2017 indicating the need for a wind advisory. By 434 am MST, the Phoenix NWS issued a wind advisory for Imperial County.

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

On February 17, 2017, the air monitors in Imperial, Riverside and Yuma counties measured elevated concentrations of particulate matter when a forecasted Pacific storm with associated cold front brought high winds across Central and Southern California. Although the system brought a good deal of precipitation, strong gusty winds ahead of the cold front generated emissions from within the San Diego Mountains and surrounding deserts which were transported to the Niland monitor which caused an exceedance of the PM_{10} NAAQS (**Table 2-1**).

FIGURE 2-1
MONITORING AND METEOROLOGICAL SITES

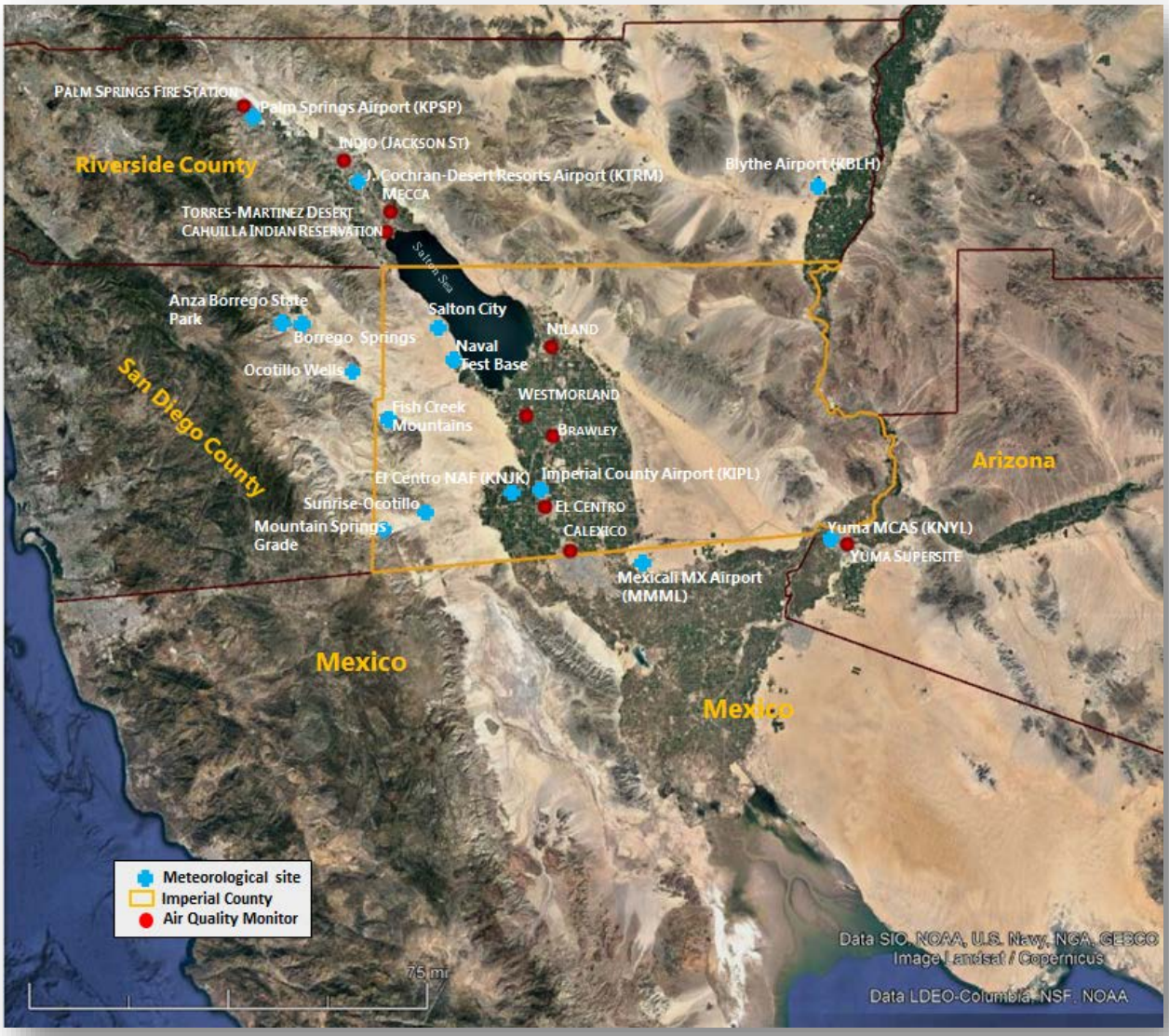


Fig 2-1: Includes a general location of the sites used in this analysis. The site furthest south is in Mexicali, Mexico and the site furthest north is the Palm Springs Fire Station

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
YUMA SUPERSITE (MST)	20170216	17	16	24	8	28	19	19	55	42	41	36	25	18	24	13	18	14	19	28	36	35	34	12	9	55	24
	20170217	12	8	13	12	13	18	27	25	27		168	400	316	235	202	289	368	715	588	770	1030	726	1701	1058	**1701**	**379**
	20170218	1475		354	22	5	5	5	5	5	5	3	2	2	3	5	6	6	5	5	5	3	6	8	5	1475	84
YUMA SUPERSITE (PST)	20170216	16	24	8	28	19	19	55	42	41	36	25	18	24	13	18	14	19	28	36	35	34	12	9	12	55	24
	20170217	8	13	12	13	18	27	25	27		168	400	316	235	202	289	368	715	588	770	1030	726	1701	1058	1475	**1701**	**442**
	20170218		354	22	5	5	5	5	5	5	3	2	2	3	5	6	6	5	5	5	3	6	8	5	3	354	20
CALEXICO	20170216											34	21	24	38	31	46	53	61	108	102	38	21	28	26	108	45
	20170217	41	28	20	14	16	19	33	352	43	46	66	53	60	68	68	75	156	102	93	76	67	75	69	36	**352**	**69**
	20170218	21	12	8	12	8	6	14	15	12	13	26	24	13	14	9	9	5	6	10	15	27	18	19	21	27	14
EL CENTRO	20170216	12	13	7	3	5	11	21	45	54	28	34	28	17	30	37	41	47	70	74	33	21	16	11	8	74	27
	20170217	8	11	21	18	12	22	30	33	32	37	55	52	65	79	82	92	126	599	133	84	84	108	63	25	**599**	**77**
	20170218	17	6	7	6	9	9	7	4	13	10	10	8	7	5	5	8	6	6	5	4	15	21	9	11	21	8
NILAND	20170216	9	8	8	6	17	16	14	16	21	41	13	22	13	11	14	18	32	29	58	79	49	27	34	28	79	24
	20170217	20	14	17	16	18	20	37	18	17	16	15	30	73	57	101	56	167	259	867	995	995	995	995	147	**995**	**247**
	20170218	128	14	9	52	4	3	3	6	4	1	3	2	14	6	1	3	3	3	3	3	5	5	4	4	128	11
BRAWLEY	20170216	13	12	10	14	13	11	41	42	53	61	29	16	13	15	20	45	61	51	58	41	43	21	18	19	61	30
	20170217	16	8	8	19	16	11	16	31	20	19	28	37	64	74	58	61	95	135	200	466	525	220	120	38	**525**	**95**
	20170218	17	7	2	5	6	4	5	6	4	4	2	-3	4	5	7	8	7	7	4	0	0	5	23	23	23	6
WESTMORLAND	20170216	15	11	10	8	11	10	15	32	52	29	34	16	6	16	45	42	41	74	56	46	28	21	37	28	74	28
	20170217	25	9	7	13	16	25	27	17	21	20	42	38	38	59	92	54	72	114	163	315	562	172	75	26	**562**	**83**
	20170218	16	3	4	1	5	4	3	3	5	6	4	4	5	4	4	5	6	5	2	6	5	4	5	23	23	5
TM TRIBAL	20170216	43	28	18	14	12	14	70	41	36	28	11	12	20	7	8	12	31	46	76	53	38	33	17	18	76	28
	20170217	24	21	16	14	16	15	40	131	185	713	581	228	378	225	80	524	49	53	71	298	287	304	216	76	**713**	**189**
	20170218	23	27	23	30	17	20	16	0	-1	-3	3	3	0	1	4	3	3	5	6	5	5	2	3	4	30	8
MECCA	20170216																	19	54	50	19	29	40	37	31	54	34
	20170217	23	14	14	12	13	23	72	93	50	53	39	29	28	36	49	57	36	34	117	371	795	636	493	101	**795**	**132**
	20170218	56	49	107	29	18	12	8	5	5	6	5	3	5	6	4	3	4	5	4	5	5	4	7	5	107	15
INDIO	20170216	15	14	9	12	11	14	25	45	42	38	24	30	42	40	100	88	12	28	62	65	35	27	23	21	100	34
	20170217	15	15	24	22	21	15	36	52	64	102	393	685	202	465	265	91	49	39	144	334	642	337	489	255	**685**	**198**
	20170218	40	42	42	43	15	3	4	6	4	3	5	1	3	8	9	6	5	6	6	8	11	7	8	13	43	12
PALM SPRINGS FIRE STATION	20170216	13	11	11	8	11	9	12	17	24	14	10	9	10	15	20	24	16	20	24	20	13	13	10	9	24	14
	20170217	11	8	15	14	13	12	13	16	10	14	27	56	68	59	59	52	38	34	35	35	11	10	9	11	**68**	**26**
	20170218	7	4	1	3	4	3	4	5	4	6	4	3	3	5	7	8	7	9	9	12	15	9	9	10	15	6

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

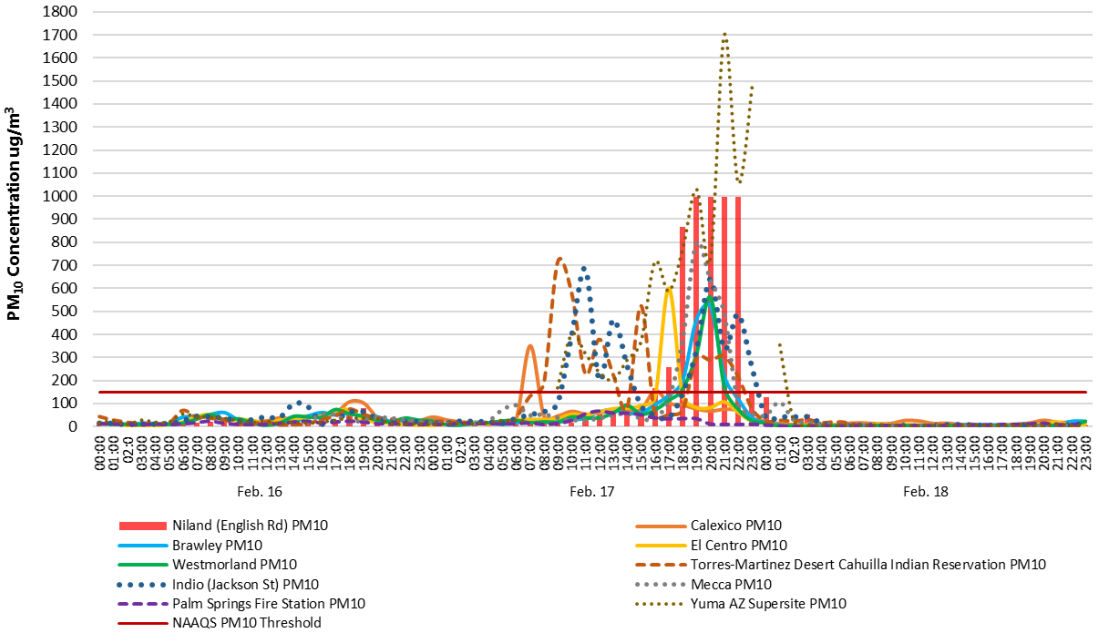


Fig 2-2: is a three-day graphical representation of the PM_{10} concentrations measured at the sites identified in **Table 2-1**. Note the Niland site, located within the far eastern portion of Imperial County measured the second highest 24-hr averaged concentration after the Yuma site

Wind speed, wind direction and the airflow patterns combined all help explain how windblown emissions resulting from the prefrontal winds associated with the passing of the Pacific storm affected the Niland monitor on Friday, February 17, 2017.

As mentioned above the early weather forecast notices issued by both the San Diego and Phoenix NWS offices indicated a strong winter storm, with prefrontal winds approaching southern California by Friday, February 17, 2017. The evening Area Forecast notices, issued by both NWS offices confirmed the effect of the prefrontal winds associated with the Pacific storm to the region. The San Diego NWS notice, issued at 946 pm PST identified strong winds and widespread heavy rainfall while the Phoenix NWS notice, issued 830 pm PST (930 pm MST) identified strong surface winds in the 30 and 40 mph range as still blowing along southeastern California and southwestern Arizona (**Appendix A**).

Figures 2-3 and 2-4 depict the compiled wind data for regional and neighboring airports and upstream sites. Airports within Imperial, Riverside and Yuma Counties measured wind speeds at or above 25 mph or measured wind gusts at or above 25 mph.

Sites further south and southeast of Imperial County measured elevated wind speeds much sooner than sites further west or within urbanized centers, coincident with measured elevated concentrations.

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

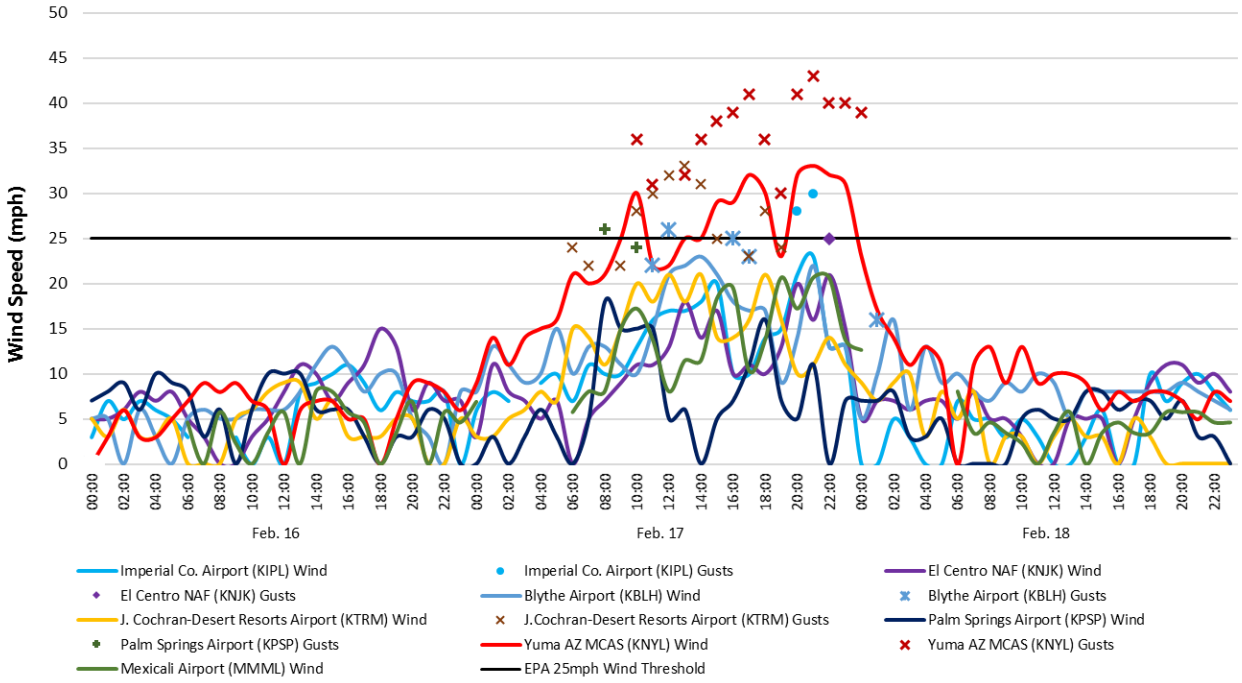


Fig 2-3: is a three-day graphical representation of the measured wind speed and wind gust (if available) from local and neighboring airports. Note the elevated wind speeds are consistent for sites with minor variations. All data derived from the Local Climatological Data Hourly Observations (LCDHO) reports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

FIGURE 2-4
WIND SPEEDS AND GUST UPSTREAM SITES

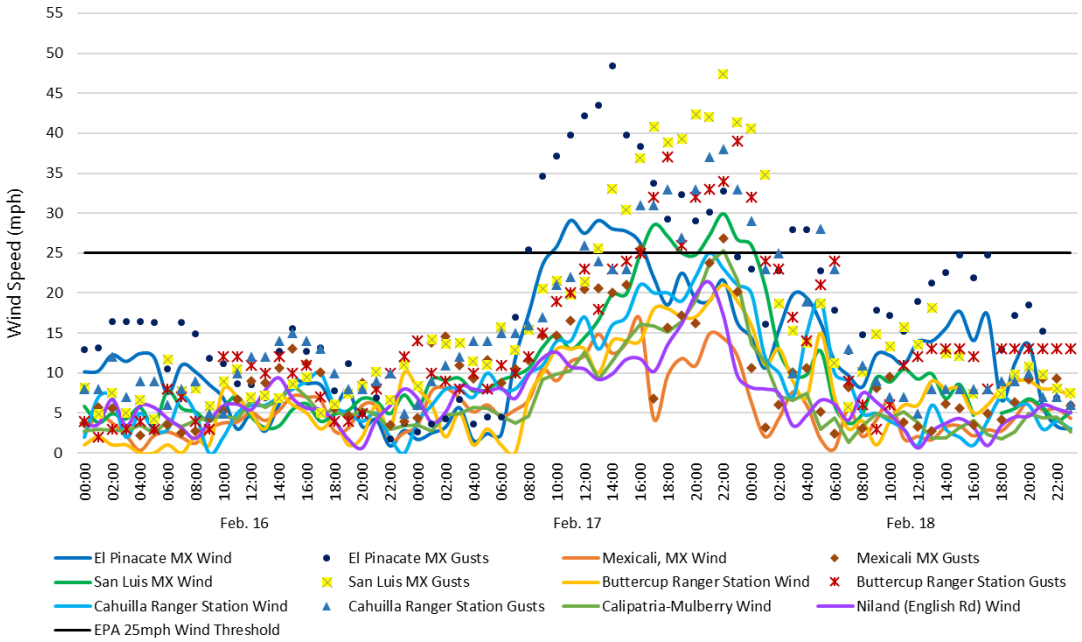


Fig 2-4: is a three-day graphical representation of the measured wind speed and wind gust (if available) from sites located upstream from the Niland monitor. All data derived from the University of Utah's Meso West https://mesowest.utah.edu/index.html

The National Oceanic and Atmospheric Administration (NOAA) Laboratory HYSPLIT back-trajectory models[4] provide supporting evidence of the southeasterly airflow within Imperial County on February 17, 2017. The HYSPLIT back-trajectory models **Figures 2-5 and 2-6** represent the 1300 PST hour when Niland first measured an elevated concentration above 100 µg/m^3, and the first peak hourly concentration at Niland 1900 PST.

[4] 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.

FIGURE 2-5
HYSPLIT MODEL All SITES FEBRUARY 17, 2017 1300 PST

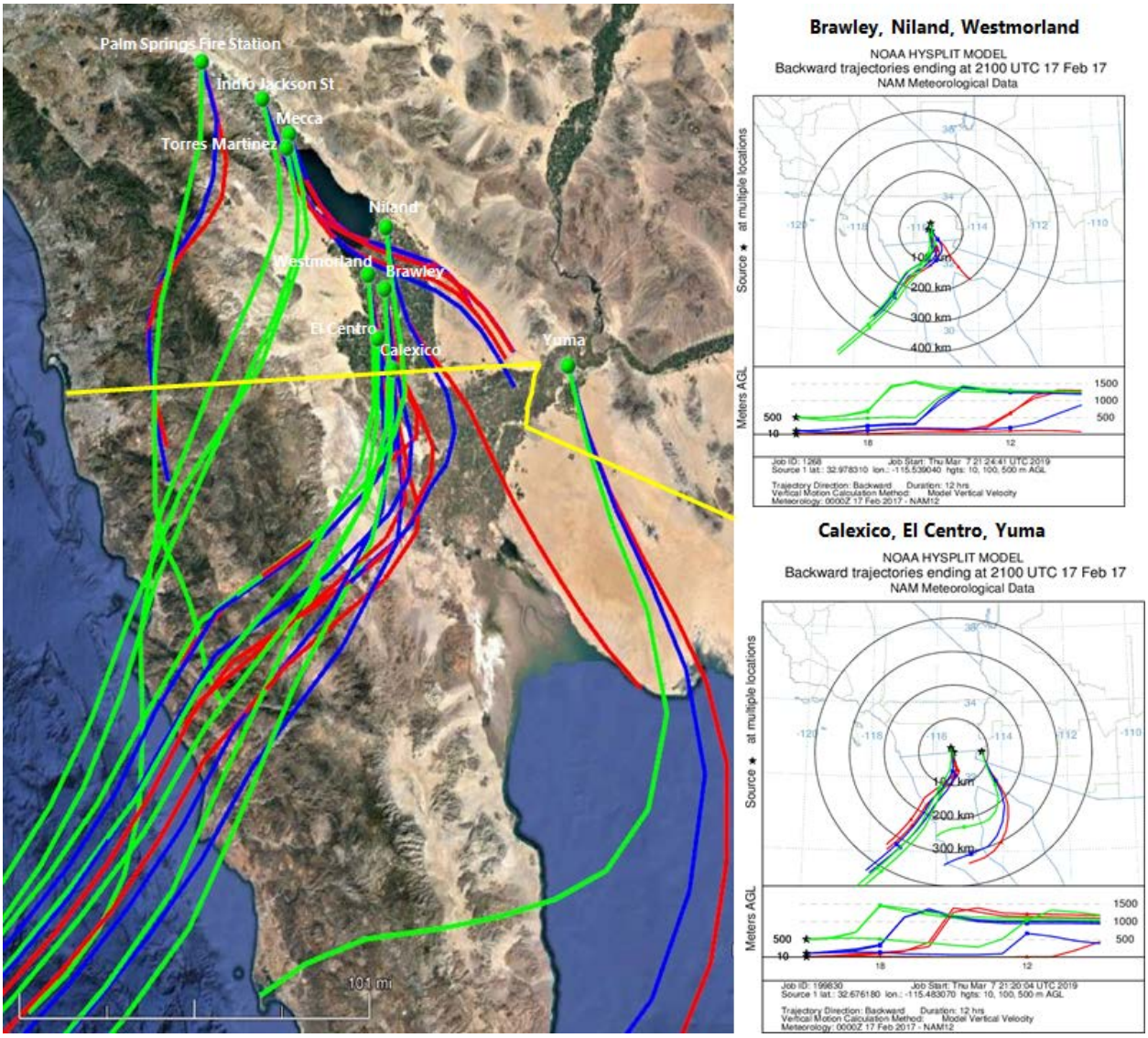


Fig 2-5: A 12-hour back-trajectory ending at 1300 PST for all sites identified in **Table 2-1**. Note the surface level (Red) airflow supporting the information provided in the Phoenix notice issued at 830pm PST. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow 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 IMPERIAL COUNTY SITES FEBRUARY 17, 2017 1900 PST

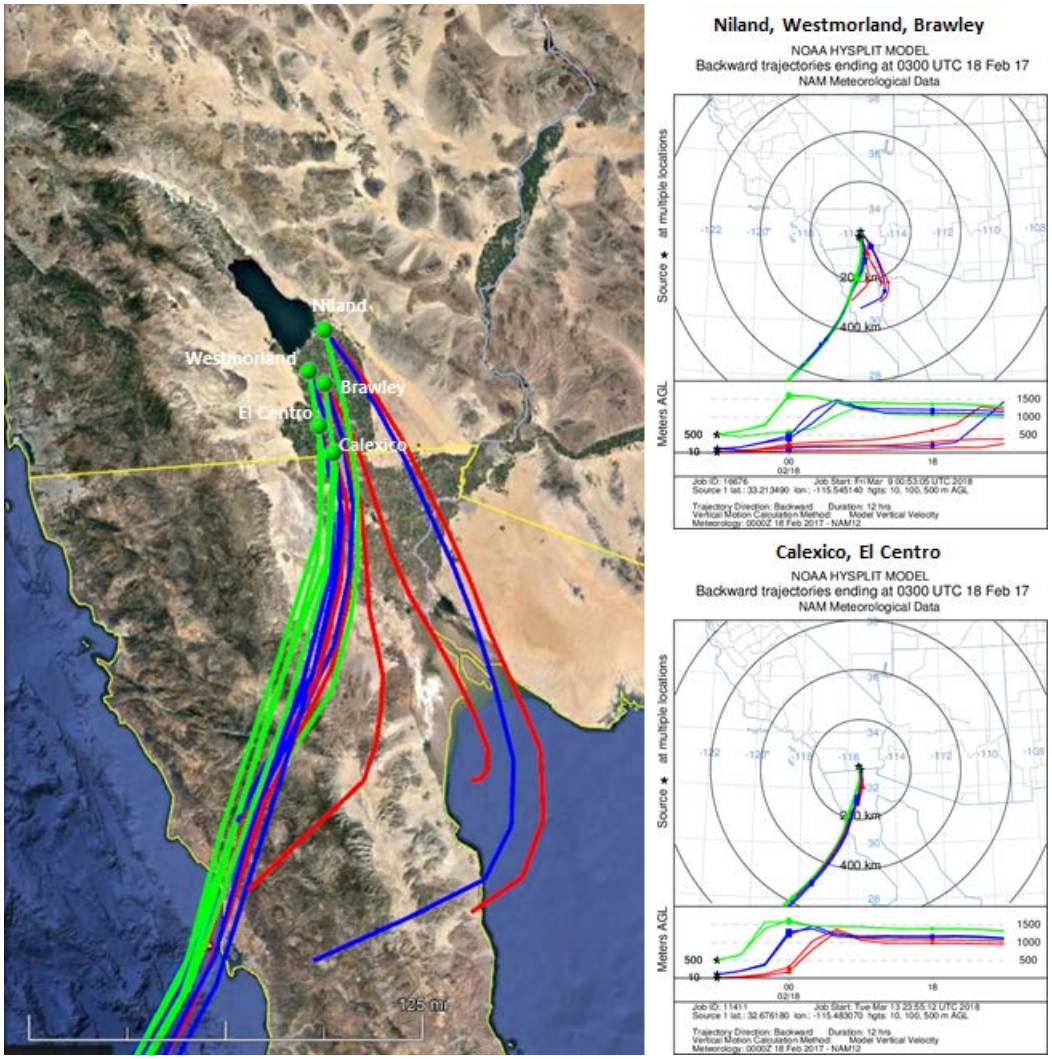


Fig 2-6: A 12-hour back-trajectory ending at 1900 PST for all Imperial County sites. Note the surface level airflow is much more prominent at the northern monitors, particularly the Niland monitor, than at the monitors located in El Centro or Calexico. Red trajectory indicates airflow at 10 meters AGL (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 southeasterly gusty winds blew over open natural desert areas south of Imperial County, fugitive windblown dust affected the more rural Niland monitor. The monitors located within more urbanized areas did not measure sufficient hours of elevated concentrations to cause an exceedance of the NAAQS. Although the Imperial County Airport (KIPL) and the El Centro Naval Air Facility (KNJK), both measured moderate level wind speeds ranging between 10 mph and 23 mph through the night. Both local airports measured wind gust at or above 25 mph during the late evening hours. KIPL measured 28 and 30 mph at 2053 and 2153, respectively and KNJK measured 25 mph at 2256.

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, gusty southerly winds ahead of the Pacific storm affected Southern California and Central Arizona. Although the system brought rain to rain-prone mountain areas and valleys, before saturation could set in gusty southerly winds caused windblown dust from outlaying open natural desert areas, located to the south and southeast of Imperial County to transport into Imperial County causing an exceedance at the Niland monitor.

While elevated wind speeds play a significant and important role in the transportation of dust, gust plays an equally significant role in deposition of particulates onto a monitor and the overall affect onto ambient air.[5] As winds increased on February 17, 2017 and windblown dust from outlaying open deserts entered Imperial County air quality degraded. As mentioned in section I.1 above the ICAPCD issued an advisory of the potential for elevated particulate matter and the potential of degradation of air quality to a moderate or unhealthy level. In addition, the NWS service issued Urgent Weather Messages advising of the potential for increased winds and the associated impacts.

The San Diego NWS began issuing Urgent Weather Messages containing a High Wind Watch as early as February 15, 2017. The watch included the San Diego County Mountains, Valleys, and foothills. By late evening, 932 pm PST the San Diego NWS changed the watch to a High Wind Warning and included the San Diego County Deserts (Borrego Springs). The San Diego NWS office issued the cancellation at 923 pm PST. By contrast the Phoenix NWS office issued it Urgent Weather Message containing a wind advisory at 231 am PST (331 am MST), Friday February 17, 2017. The advisory described the possibility of reduced visibility due to blowing dust. In addition, the advisory described possible hazardous driving conditions on Interstate 10 and Interstate 8 due to crosswinds. The Phoenix NWS office cancelled the Wind Advisory for Imperial County at 829 pm PST (929pm MST), Friday, February 17, 2017 (**Appendix A**).

Figure 3-1 below provides an illustration of some of the meteorological conditions, as described above and demonstrated in the HYSPLITs, for February 17, 2017, which affected air quality in Imperial County causing an exceedance at the Niland monitor. Unlike the air monitors in Brawley, Westmorland, El Centro and Calexico which are located in urbanized centers, the natural open deserts to the south and southeast of Niland and the

[5] 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

rural topography of the area provided little to no obstructions for the windblown dust to affect air quality in the area and cause an exceedance of the NAAQS.

FIGURE 3-1
VISUAL RAMP-UP ANALYSIS AS DISCUSSED FOR FEBRUARY 17, 2017

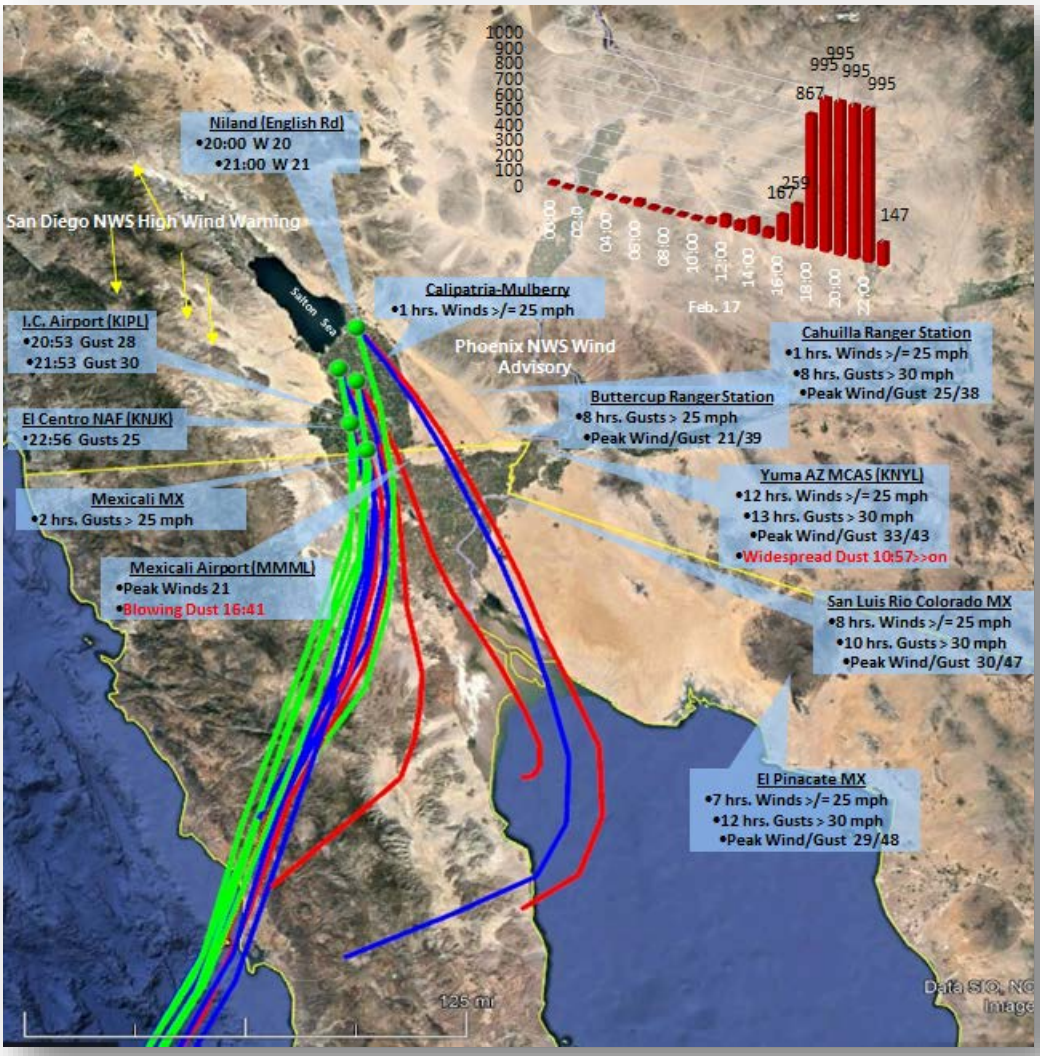


Fig 3-1: Gusty elevated winds at upstream sites transported dust into Imperial County from as far south as Mexico. The outlaying rural site of Niland laid directly in the path of windblown dust from the open natural desert to the east and southeast. Air quality data is from the EPA's AQS data bank. The 12-hour HYSPLIT back-trajectory ends at 1900 PST. Red trajectory depicts airflow at the 10m level; blue is 100m. Generated through NOAA's Air Resources Laboratory. Google Earth base map

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.[6]

The Yuma Marine Corps Air Station (MCAS) (KNYL), the Imperial County Airport (KIPL), the El Centro Naval Air Facility (KNJK) and the Mexicali Mexico Airport (MMML) all reported reduced visibility coincident with elevated wind speeds, wind gusts and hourly concentrations of particulates. **Figure 3-2** and **Tables 3-1 through 3-4** provide information regarding the reduced visibility in Imperial County and the relation to hourly concentrations at local air monitors.

While **Figure 3-2** is a graphical representation of the reduced visibility within Imperial County and surrounding areas, **Tables 3-1 through 3-4** provide a temporal relationship of wind speeds, wind direction, wind gusts (if available), and PM_{10} concentrations at the Niland, Westmorland and Brawley 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 3-2,** visibility at the Yuma MCAS (KNYL) reduced as early as 1100 am PST. Coincident with the hour just prior to the measured peak hourly concentrations at the Brawley, El Centro, Westmorland and Niland monitors the Mexicali Mexico Airport (MMML) reported reduced visibility (~400 pm). The Mexicali Mexico Airport is located southeast of the Niland monitor.

[6] 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 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 3-2
72-HOUR TIME SERIES PM_{10} CONCENTRATIONS AND VISIBILITY

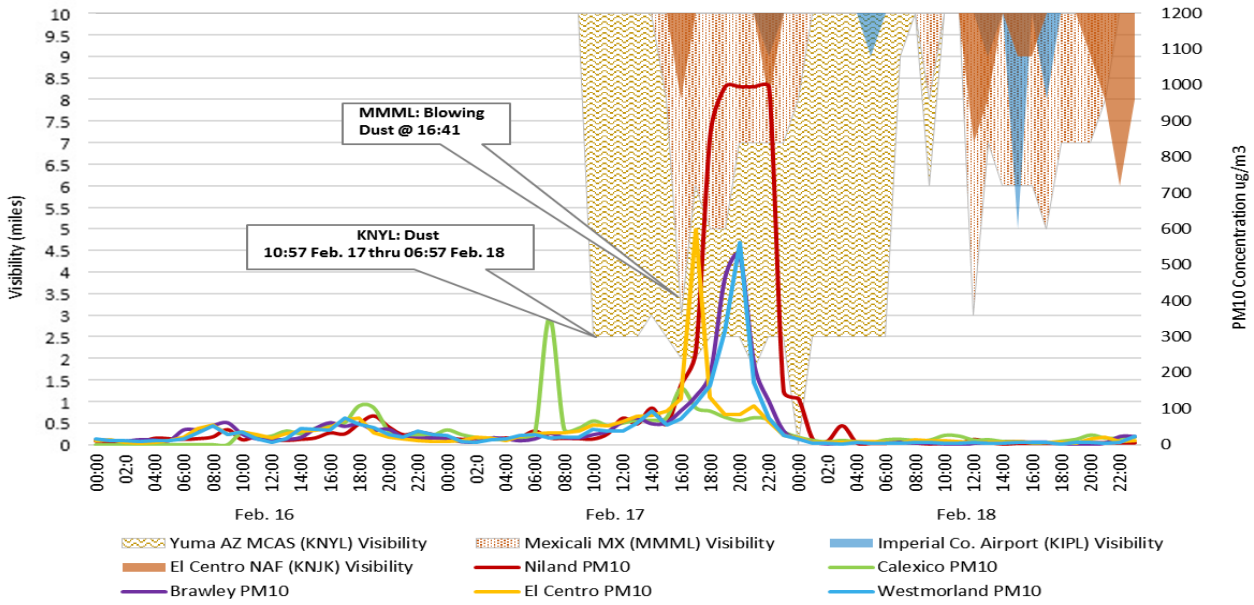


Fig 3-2: is a graphical representation of the compiled data from the Yuma MCAS (KNYL), the Imperial County Airport (KIPL), the El Centro NAF (KNJK) and the Mexicali Mexico Airport (MMML). Reported reduced visibility is coincident with elevated winds and hourly levels of concentrations either just prior 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[7] the **Tables 3-1 through 3-4** are provided in support of the relationship between the elevated winds and elevated concentrations. In each table the measured elevated concentrations of PM_{10} either follow or occur during periods of elevated winds or gusts. Each table has a select group of meteorological sites that compare the hourly winds with the closest measured hourly concentration at the Niland monitor with a final table comparing select meteorological sites with the Brawley and Westmorland monitors.

Table 3-1 below, compares the Niland hourly concentrations with the local and regional airports within Imperial County and to the airports to the east and south of Imperial County.

[7] "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 17, 2017

El Centro NAF (KNJK)				Imperial Co. Airport (KIPL)				Yuma, AZ MCAS (KNYL)					Mexicali, MX Airport (MMML)				Niland	
HR	W/S	W/G	W/D	HR	W/S	W/G	W/D	HR	W/S	W/G	W/D	Obs.	HR	W/S	W/D	Obs.	HOUR	PM_{10} ($\mu g/m^3$)
056	3		VRB	053	6		250	057	9		150		040	7	100		000	20
156	11		150	153	8		170	157	14		150		100				100	14
256	8		130	253	7		140	257	11		150		200				200	17
356	7		140	353				357	14		150		300				300	16
456	5		140	453	9		130	457	15		150		400				400	18
556	7		130	553	10		120	557	16		140		500				500	20
656	0		0	653	7		120	657	21		140		653	6	100		600	37
756	5		110	753	11		130	757	20		160		753	8	100		700	18
856	7		100	853	10		130	857	21		150		847	8	140		800	17
956	9		130	953	10		130	957	**25**		150		953	15	130		900	16
1056	11		140	1043	13		140	1057	**30**	**36**	150	**DU**	1044	17	110		1000	15
1156	11		140	1153	16		150	1157	22	**31**	150	**DU**	1150	14	110		1100	30
1256	13		140	1253	17		140	1257	22		150	**DU**	1252	8	120		1200	73
1356	18		140	000	17		130	1357	**25**	**32**	170	**DU**	1342	12	130		1300	57
1456	**14**		110	**1453**	**18**		120	**1457**	**25**	**36**	160	**DU**	**1445**	**12**	140		**1400**	**101**
1556	17		120	1553	20		160	1557	**29**	**38**	160	**DU**	1540	18	130		1500	56
1656	**10**		140	**1653**	**10**		120	**1657**	**29**	**39**	150	**DU**	**1641**	**20**	140	**BLDU**	**1600**	**167**
1756	**11**		70	**1753**	**10**		60	**1757**	**32**	**41**	150	**DU**	**1740**	**10**	130		**1700**	**259**
1856	**10**		110	**1853**	**14**		120	**1857**	**30**	**36**	170	**DU**	**1841**	**14**	140		**1800**	**867**
1956	**13**		110	**1953**	**15**		120	**1957**	**23**	**30**	160	**DU**	**1940**	**21**	120		**1900**	**995**
2056	**20**		130	**2053**	**21**	**28**	130	**2057**	**32**	**41**	160	**DU**	**2040**	**17**	120		**2000**	**995**
2156	**16**		140	**2153**	**23**	**30**	140	**2157**	**33**	**43**	170	**DU**	**2142**	**21**	120		**2100**	**995**
2256	**21**	**25**	150	**2253**	**13**		160	**2257**	**32**	**40**	160	**DU**	**2248**	**21**	140		**2200**	**995**
2356	**15**		210	**2353**	**13**		160	**2357**	**31**	**40**	160	**DU**	**2343**	**14**	150		**2300**	**147**

Wind data for KIPL, KNJK, and KNYL from the NCEI's QCLCD system. Wind data for Mexicali Airport (MMML) from the University of Utah's MesoWest system. Wind speeds = mph; Direction = degrees. BLDU = blowing dust. DU = widespread dust. 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

The Yuma MCAS (KNYL) measured strong SE to SSE winds. **Table 3-2**, below, provide meteorological data from sites located either directly southeast or south of the Niland monitor. Like the Yuma MCAS the San Luis Rio Colorado site measured strong SE to SSE winds allowing for winds to blow across the naturally open desert areas of northern Mexico and southwestern Arizona into Imperial County.

TABLE 3-2
WIND SPEEDS AND PM_{10} CONCENTRATIONS FEBRUARY 17, 2017

El Pinacate MX (PNSC6)				Mexicali MX (MXCB1)				San Luis Rio Colorado (SLRS6)				Niland			
HOUR	W/S	W/G	W/D	HOUR	W/S	W/G	W/D	HOUR	W/S	W/G	W/D	HOUR	W/S	W/D	PM_{10} ($\mu g/m^3$)
000	2	3	92	000	4	4	155	000	6	8	95	000	7	118	20
100	3	4	348	100	8	14	128	100	9	14	135	100	4	103	14
200	3	4	339	200	8	15	118	200	9	14	144	200	5	98	17
300	6	7	101	300	7	11	118	300	9	14	153	300	8	140	16
400	2	4	9	400	5	9	125	400	8	11	150	400	8	121	18
500	2	4	61	500	6	12	138	500	8	11	150	500	8	154	20
600	2	4	102	600	5	9	143	600	9	16	143	600	8	141	37
700	12	17	118	700	5	10	139	700	10	13	149	700	7	134	18
800	18	25	138	800	7	12	129	800	11	15	152	800	10	129	17
900	24	35	151	900	10	15	137	900	13	21	149	900	12	130	16
1000	26	37	158	1000	9	15	146	1000	15	22	148	1000	13	132	15
1100	29	40	160	1100	11	17	128	1100	13	20	146	1100	11	143	30
1200	27	42	164	1200	12	21	133	1200	14	21	168	1200	11	151	73
1300	29	44	171	1300	15	21	119	1300	17	26	172	1300	9	149	57
1400	**28**	**48**	168	**1400**	**12**	**20**	127	**1410**	**20**	**33**	185	**1400**	**10**	137	**101**
1500	28	40	172	1500	14	21	121	1510	20	30	177	1500	12	136	56
1600	**26**	**38**	169	**1600**	**17**	**26**	109	**1610**	**25**	**37**	173	**1600**	**12**	137	**167**
1700	**22**	**34**	168	**1700**	**4**	**7**	100	**1710**	**29**	**41**	170	**1700**	**10**	127	**259**
1800	**19**	**29**	156	**1800**	**10**	**16**	141	**1800**	**27**	**39**	168	**1800**	**14**	125	**867**
1900	**23**	**32**	173	**1900**	**12**	**17**	127	**1900**	**25**	**39**	177	**1900**	**16**	125	**995**
2000	**19**	**29**	168	**2000**	**11**	**16**	122	**2000**	**25**	**42**	176	**2000**	**20**	122	**995**
2100	**19**	**30**	163	**2100**	**15**	**24**	127	**2100**	**27**	**42**	173	**2100**	**21**	123	**995**
2200	**22**	**33**	161	**2200**	**14**	**27**	140	**2200**	**30**	**47**	171	**2200**	**17**	146	**995**
2300	**16**	**25**	162	**2300**	**12**	**20**	147	**2300**	**27**	**41**	170	**2300**	**10**	142	**147**

Wind data for El Pinacate Mx (PNSC6), Mexicali MX (MXCB1) and San Luis Rio Colorado (SLRS6), from the University of Utah's MesoWest system. Niland wind data from the AQS data bank. The Niland station does not measure wind gusts. 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 winds approached the Niland monitor gusty winds at the Buttercup Ranger Station, Cahuilla Ranger Station, and Calipatria-Mulberry would have kept the windblown dust suspended affecting air quality in Imperial County and affecting the Niland monitor. **Table 3-3** provides meteorological site information to the east and southeast of Niland.

TABLE 3-3
WIND SPEEDS AND PM_{10} CONCENTRATIONS FEBRUARY 17, 2017

Buttercup Ranger Station (BTTC1)				Cahuilla Ranger Station (QAC1)				Calipatria-Mulberry (CI068)			Niland			
HOUR	W/S	W/G	W/D	HOUR	W/S	W/G	W/D	HOUR	W/S	W/D	HOUR	W/S	W/D	PM_{10} ($\mu g/m^3$)
009	8	14	107	010	4	6	76	000	4	106	000	7	118	20
109	6	10	81	110	6	9	99	100	3	94	100	4	103	14
209	2	9	87	210	8	11	119	200	5	147	200	5	98	17
309	5	8	84	310	8	12	106	300	5	145	300	8	140	16
409	1	10	37	410	7	14	125	400	6	138	400	8	121	18
509	3	8	105	510	10	14	116	500	6	129	500	8	154	20
609	1	11	70	610	8	15	131	600	5	137	600	8	141	37
709	0	10		710	8	15	130	700	4	156	700	7	134	18
809	7	12	92	810	10	16	125	800	5	125	800	10	129	17
909	10	15	117	910	11	17	137	900	9	139	900	12	130	16
1009	13	19	117	1010	14	21	135	1000	10	147	1000	13	132	15
1109	13	20	112	1110	14	22	134	1100	10	158	1100	11	143	30
1209	13	23	121	1210	17	26	140	1200	13	167	1200	11	151	73
1309	10	18	142	1310	13	24	135	1300	9	167	1300	9	149	57
1409	**14**	**23**	131	**1410**	**16**	**23**	143	**1400**	**12**	161	**1400**	**10**	137	**101**
1509	14	24	130	1510	17	23	157	1500	14	150	1500	12	136	56
1609	**14**	**25**	127	**1610**	**21**	**31**	151	**1600**	**16**	154	**1600**	**12**	137	**167**
1709	**18**	**32**	122	**1710**	**20**	**31**	146	**1700**	**16**	156	**1700**	**10**	127	**259**
1809	**18**	**37**	133	**1810**	**20**	**33**	156	**1800**	**15**	156	**1800**	**14**	125	**867**
1909	**17**	**26**	126	**1910**	**19**	**27**	148	**1900**	**16**	155	**1900**	**16**	125	**995**
2009	**17**	**32**	126	**2010**	**22**	**33**	140	**2000**	**19**	152	**2000**	**20**	122	**995**
2109	**19**	**33**	128	**2110**	**25**	**37**	145	**2100**	**24**	150	**2100**	**21**	123	**995**
2209	**21**	**34**	137	**2210**	**23**	**38**	148	**2200**	**25**	151	**2200**	**17**	146	**995**
2309	**19**	**39**	135	**2310**	**21**	**33**	151	**2300**	**22**	162	**2300**	**10**	142	**147**

Wind data for Buttercup Ranger Station (BTTC1), Cahuilla Ranger Station (QAC1), and the Calipatria-Mulberry (CI068) from the University of Utah's MesoWest system. Niland wind data from the AQS data bank. Wind speeds = mph; Direction = degrees. Niland station does not measure wind gusts. 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

Table 3-4 compiles the PM_{10} concentrations at Brawley and Westmorland along with wind speeds at select sites on February 17, 2017. Brawley and Westmorland did not exceed but had the next highest concentrations of 95 $\mu g/m^3$ and 83 $\mu g/m^3$, respectively.

TABLE 3-4
WIND SPEEDS AND PM_{10} CONCENTRATIONS, BRAWLEY & WESTMORLAND
FEBRUARY 17, 2017

Mexicali, MX Airport (MMML)				Yuma, AZ MCAS (KNYL)				El Centro NAF (KNJK)				Imperial Co. Airport (KIPL)				Brawley		Wstmld
HR	W/S	W/G	W/D	HR	W/S	W/G	W/D	HR	W/S	W/G	W/D	HR	W/S	W/G	W/D	HR	PM_{10} ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)
000	7		100	057	9		150	056	3		VRB	053	6		250	000	16	25
100				157	14		150	156	11		150	153	8		170	100	8	9
200				257	11		150	256	8		130	253	7		140	200	8	7
300				357	14		150	356	7		140	353				300	19	13
400				457	15		150	456	5		140	453	9		130	400	16	16
500				557	16		140	556	7		130	553	10		120	500	11	25
600	6		100	657	21		140	656	0		0	653	7		120	600	16	27
700	8		100	757	20		160	756	5		110	753	11		130	700	31	17
800	8		140	857	21		150	856	7		100	853	10		130	800	20	21
900	15		130	957	**25**		150	956	9		130	953	10		130	900	19	20
1000	17		110	1057	**30**	**36**	150	1056	11		140	1043	13		140	1000	28	42
1100	14		110	1157	22	**31**	150	1156	11		140	1153	16		150	1100	37	38
1200	8		120	1257	22		150	1256	13		140	1253	17		140	1200	64	38
1300	12		130	1357	**25**	**32**	170	1356	18		140	000	17		130	1300	74	59
1400	12		140	1457	**25**	**36**	160	1456	14		110	1453	18		120	1400	58	92
1500	18		130	1557	**29**	**38**	160	1556	17		120	1553	20		160	1500	61	54
1600	20		140	1657	**29**	**39**	150	1656	10		140	1653	10		120	1600	95	72
1700	**10**		130	**1757**	**32**	**41**	150	**1756**	**11**		70	**1753**	**10**		60	**1700**	**135**	**114**
1800	**14**		140	**1857**	**30**	**36**	170	**1856**	**10**		110	**1853**	**14**		120	**1800**	**200**	**163**
1900	**21**		120	**1957**	**23**	**30**	160	**1956**	**13**		110	**1953**	**15**		120	**1900**	**466**	**315**
2000	**17**		120	**2057**	**32**	**41**	160	**2056**	**20**		130	**2053**	**21**	**28**	130	**2000**	**525**	**562**
2100	**21**		120	**2157**	**33**	**43**	170	**2156**	**16**		140	**2153**	**23**	**30**	140	**2100**	**220**	**172**
2200	**21**	**25**	140	**2257**	**32**	**40**	160	**2256**	**21**	**25**	150	**2253**	**13**		160	**2200**	**120**	75
2300	14		150	2357	31	**40**	160	2356	15		210	2353	13		160	2300	38	26

Wind data for KIPL , KNJK, and KNYL from the NCEI's QCLCD system. Wind data for Mexicali Airport (MMML) from the University of Utah's MesoWest system. 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 Urgent Weather Messages containing either High Wind Watch, High Wind Warnings or a Wind Advisory described the southerly gusty winds for the region extending into the San Diego Mountains, Valleys, Central Arizona and Imperial County.

As the Pacific storm made landfall, the preceding southerly gusty winds affected different regional air monitors in Riverside County, Imperial County and 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.[8] As transported windblown dust entered Imperial County, air quality for the Niland area at 900 am PST changed from Good to Moderate. As southerly gusty winds continued through the day, the level of the AQI changed to a hazardous level by 900 pm PST. Overall, the preceding winds associated with the Pacific storm affected air quality in Imperial County.

FIGURE 3-3
IMPERIAL VALLEY AIR QUALITY INDEX FOR NILAND
FEBRUARY 17, 2017

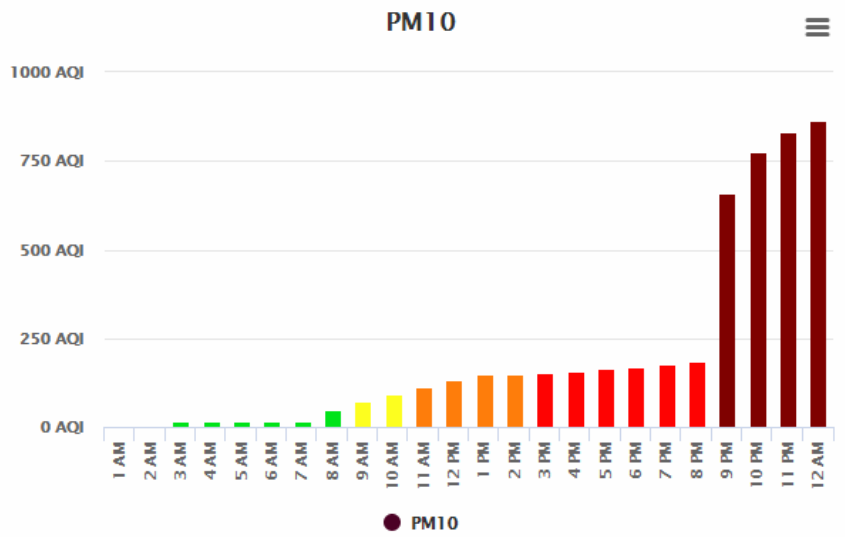


Fig 3-3: The degradation, or affect upon air quality, maybe determined when the AQI changes from a "Green" or Good level to a "Maroon" or Hazardous level

Finally, on Thursday, February 16, 2017 the NWS issued a High Pollution Advisory for Yuma County in anticipation of the widespread blowing dust from strong and gusty winds forecasted for the area on Friday, February 17, 2017.

[8] 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

III.1 Summary of Forecasts and Warnings

As early as 2141 PST on February 14, 2017 the NWS San Diego office issued a forecast concerning a large Pacific weather system that would bring stormy conditions by Friday, February 17, 2017. A forecast issued at 947 am PST on February 15, 2017 stated that a "high impact Pacific storm" with "very strong southerly winds will develop Friday and peak Friday afternoon and evening." A High Wind Watch (later changed to a High Wind Warning) issued by the NWS San Diego office at 312 am PST on February 16, 2017 included the San Diego County deserts (Borrego Springs). A Wind Advisory issued by the NWS Phoenix office at 139 am PST on February 17, 2017 included Imperial County and the neighboring areas in Central Arizona and Riverside. The advisory forecasted sustained wind from the south of 25 to 30 mph with gusts of 40 to 50 mph. Hazardous driving conditions were expected on local highways due to dangerous crosswinds and limited visibility due to blowing dust. A Weather Story issued at 532 am PST on February 17, 2017 by the NWS Phoenix office also warned of likely blowing dust and strong cross winds on east-west oriented highways. Earlier, on February 16, 2017 at 1057 am PST, the NWS Phoenix office issued a High Pollution Advisory for Yuma County due to the coarse particles expected to be stirred up by strong and gusty winds on Friday, February 17, 2017. Yuma was upstream from Imperial County during the February 17, 2017 wind event.

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 upstream from the Niland monitor. Data analysis indicates that on February 17, 2017 different sites measured wind speeds at or above 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 and 4-2 show the time series of available FRM and BAM 24-hr PM_{10} concentrations measured at the Niland monitor for the period of January 1, 2010 through February 17, 2017. 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).[9] 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 17, 2017, as measured by the Niland monitor, was used to establish the historical and seasonal variability over time.[10] All figures illustrate that the exceedance, which occurred on February 17, 2017, were 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.

[9] 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, 760 torr and 25 C). 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.

[10] FRM sampling ended December 2016.

FIGURE 4-1
NILAND HISTORICAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO FEBRUARY 17, 2017

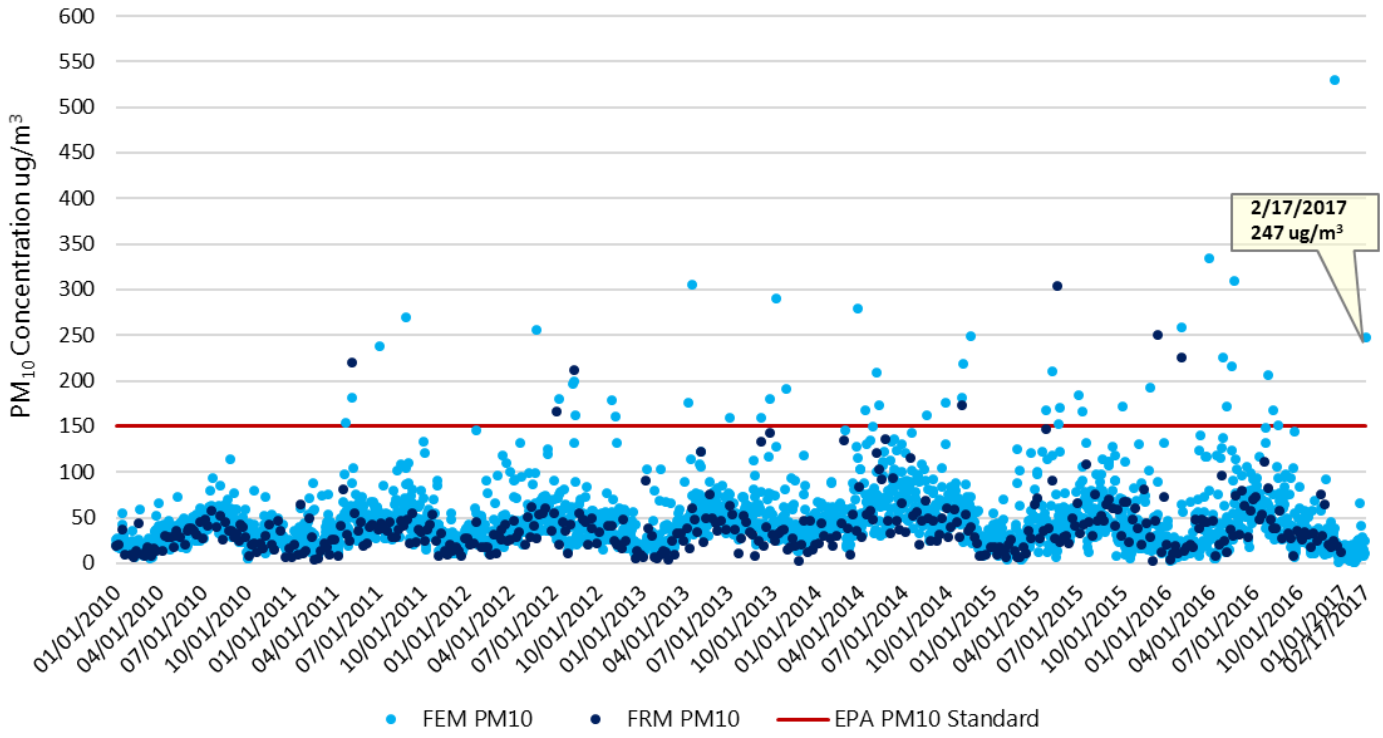
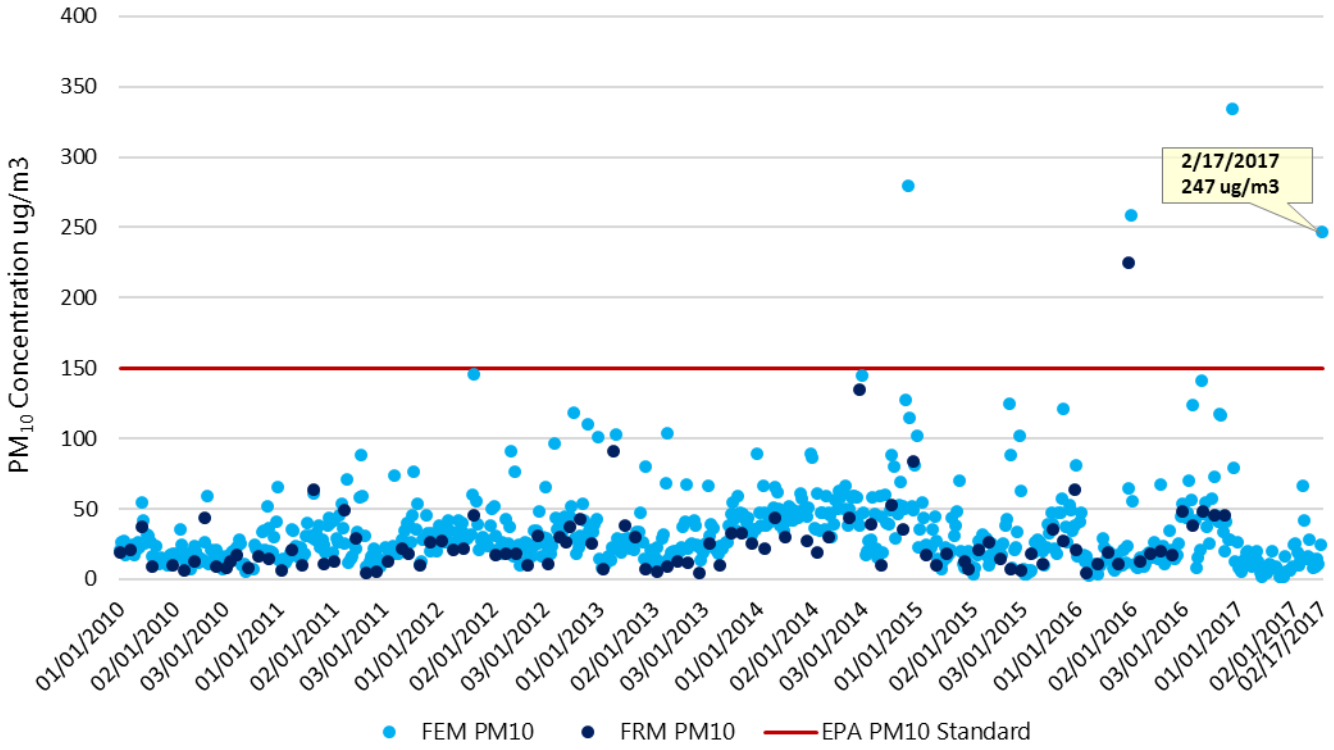


Fig 4-1: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 247 µg/m^3 on February 17, 2017 by the Niland monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-1,** for Niland complied and plotted 2,605 sampling days, and 3,008 credible samples of which 47 exceedance days were measured. This translates into an exceedance occurrence rate less than 2%. Historically, there were four (4) exceedance days measured during the first quarter, seventeen (17) exceedance days measured during the second quarter, fifteen (15) exceedance days measured during the third quarter, and eleven (11) exceedance days measured during the fourth quarter.

FIGURE 4-2
NILAND SEASONAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
***JANUARY 1, 2010 TO FEBRUARY 17, 2017**



***Quarterly: January 1, 2010 to February 28, 2016 and January 1, 2017 to February 17, 2017**
Fig 4-2: A comparison of PM_{10} seasonal concentrations demonstrate that the measured concentration of 247 µg/m^3 by the Niland monitor on February 17, 2017 was outside the normal seasonal concentrations when compared to similar event days and non-event days

Figure 4-2 illustrates the seasonal fluctuations over a period of 680 sampling days, 780 credible samples and four (4) exceedance days. This translates to less than a 1% seasonal exceedance occurrence rate.

Examining the historical and seasonal time series concentrations as they relate to the February 17, 2017 measured exceedance, the exceedance measured on February 17, 2017 is 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 in Mexico and Arizona. Since Imperial County does not have jurisdiction over emissions emanating from Mexico or Arizona, it is not reasonably controllable or preventable by Imperial County.

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

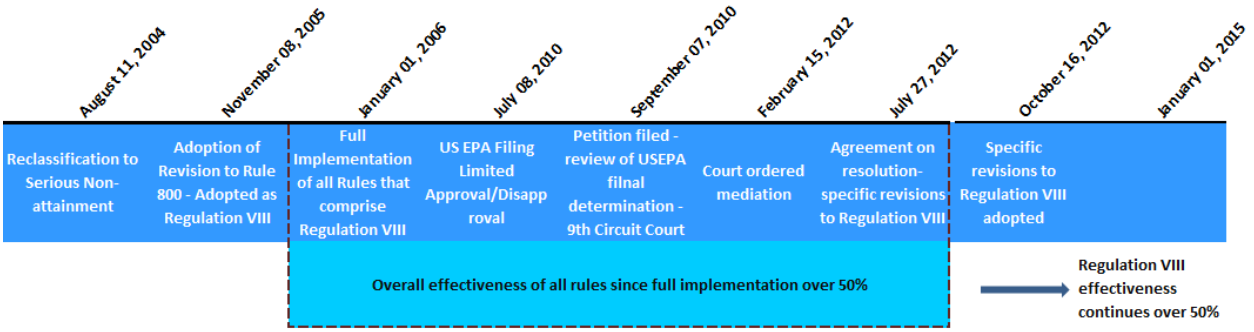


Fig 5-1: Regulation VIII Graphic Timeline

V.1 Wind Observations

As previously discussed, wind data analysis indicates that on February 17, 2017 different sites measured wind speeds at or above 25mph. Wind speeds of 25 mph are normally sufficient to overcome most PM_{10} control measures. During the February 17, 2017 event, wind speeds were above the 25 mph threshold, overcoming the BACM in place.

V.2 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 Niland during the February 17, 2017 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 17, 2017, officially declared as No Burn days, related to agricultural burning, waste burning or dust.

FIGURE 5-2
PERMITTED SOURCES

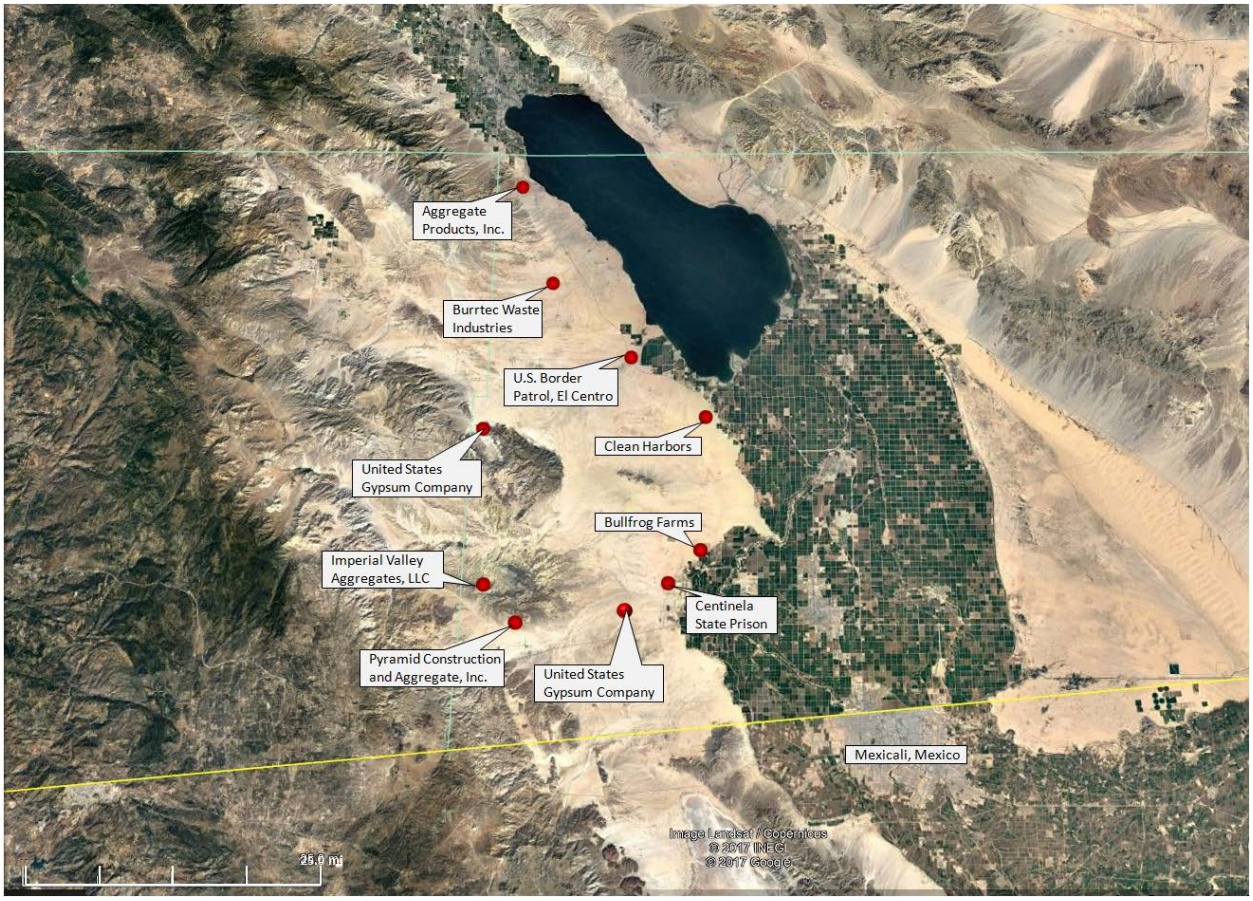


Fig 5-2: The above map identifies those permitted sources located west, northwest and southwest of the Niland monitor. The green line to the north denotes the political division between Imperial and Riverside counties. The yellow line below denotes the international border between the United States and 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

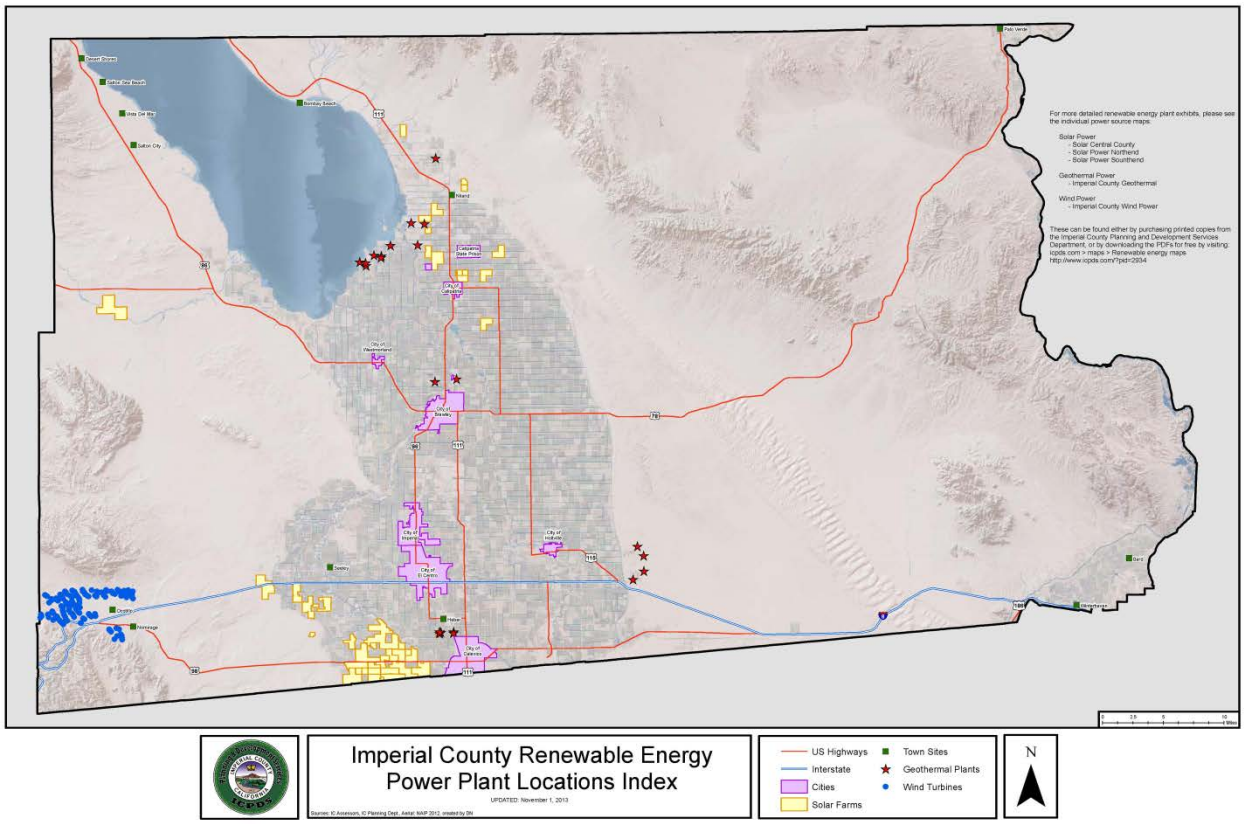


Fig 5-3: The above map identifies those power sources located west, northwest and southwest of the Niland monitor. Blue indicate the Wind Turbines, Yellow are the solar farms and stars are geothermal plants

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. Due to a strong southeasterly low-level flow that accompanied this weather system, surface winds were predominantly from the southeast to south-southeast. Strong SE to SSE winds blew across the deserts of northern Mexico and southwestern Arizona and into Imperial County. There, gusty winds at Buttercup Ranger Station, Cahuilla Ranger Station, and Calipatria-Mulberry kept the windblown dust suspended affecting air quality in Imperial County.

The exceedance at the Niland monitor occurred when strong gusty southerly winds preceding a Pacific storm transported and suspended windblown dust in Imperial County. The monitors located in urbanized areas such as in Brawley, Westmorland, Calexico and El Centro measured differing levels of elevated concentrations (**Table 2-1**) depending on the distance from the southeastern border of Imperial County and the nature of the urbanized development. For trajectory information regarding airflow please, see **Figures 2-5 and 2-6** and **Figure 3-1**.

As winds reduced early February 18, 2017, wind gust remained elevated. However, because of the saturation of moderate precipitation that accompanied the storm along upstream sites, measured of levels of PM_{10} remained low (**Table 6-1**). **Figure 6-1** provides and illustration of the affect the precipitation levels within the region affected the lower levels of measured PM_{10} in Imperial County.

TABLE 6-1

PRECIPITATION TOTALS		
LOCATION*	**2/17/2017**	**2/18/2017**
Palomar Mountain (CA038 KCAPALOM8)	0.6	0.54
Campo Airport (KCZZ)	0.4	0.23
Borrego Desert Air Ranch (KCABORRE4)	0.07	0.06
Imperial County Airport (KIPL)	0.07	0.24

*KCZZ and KIPL from QCLCD. Palomar Mountain and Desert Air Ranch from Weather Underground

FIGURE 6-1
PRECIPITATION HELPS SUPPRESS DUST

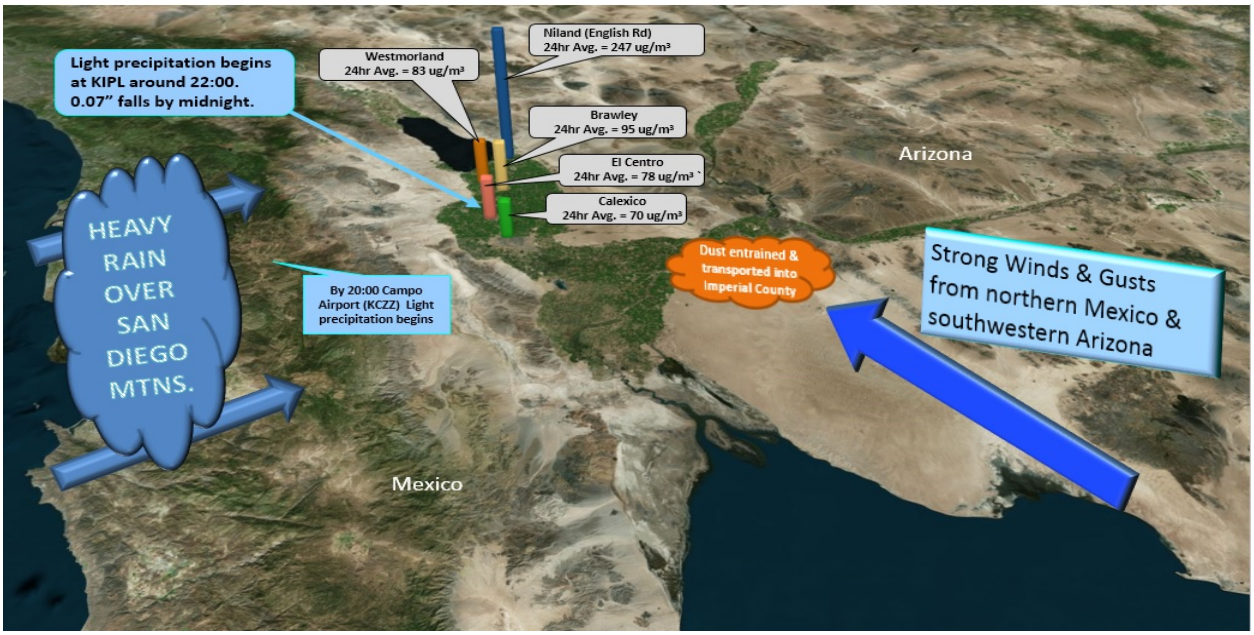


Fig 5-12: Although winds remained gusty into February 18, 2017 precipitation both in the mountains and on the desert floor suppressed fugitive dust. Map from Bing Maps and Earth Star Graphics

Finally, BACM in Imperial County also helped suppress entrainment. As a result, Niland had twice the 24-hour average than Brawley, the station with the second-highest 24-hour average concentrations.

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 relationship between the monitored exceedance and the February 17, 2017 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 Arizona and Mexico 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 Niland monitor were caused by naturally occurring strong gusty southerly winds that transported windblown dust into Imperial County and other parts of southern California from areas located within the Sonoran Desert regions to the south and southeast of Imperial County. These facts provide strong evidence that the PM_{10} exceedance at Niland on February 17, 2017, 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 Niland on February 17, 2017, was caused by the transport of windblown dust into Imperial County by strong southerly winds associated with a storm 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 Niland, Brawley and Westmorland monitors in Imperial County demonstrates a consistency of elevated gusty southerly winds with elevated concentrations of PM_{10} on February 17, 2017. In addition, temporal analysis indicates that the elevated PM_{10} concentrations and the gusty southerly 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. Although winds remained elevated the day following, moisture from the storm saturated areas to the east and southeast of Imperial County sufficiently to keep PM_{10} 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 17, 2017.

VI.5 Concentration to Concentration Analysis

The historical annual and seasonal 24-hr average PM_{10} measured concentrations at the Niland monitor was 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 southerly winds that preceded the identified Pacific storm as it made landfall and 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 the Niland monitor on February 17, 2017.

In particular, the clear causal relationship and the not reasonably controllable or preventable sections provide evidence that high winds associated with the February 17, 2017 high wind dust event generated emissions from the natural open desert areas located as far as northern Mexico, southwestern Arizona, and Imperial County (all part of the Sonoran Desert). In addition, during the February 17, 2017 event, anthropogenic sources within upwind areas were reasonably controlled at the time of the event, thus the February 17, 2017 event meets the definition of a Natural Event.[11]

[11] 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.