Agenda No: 25

2020 Ozone Season and Wildfire Impacts

Board Meeting

November 6, 2020

Presentation Outline

- 2020 ozone data and trends
- Unique meteorology in 2020
- Unique emissions in 2020
- 2020 PM2.5 data
- Policy Implications

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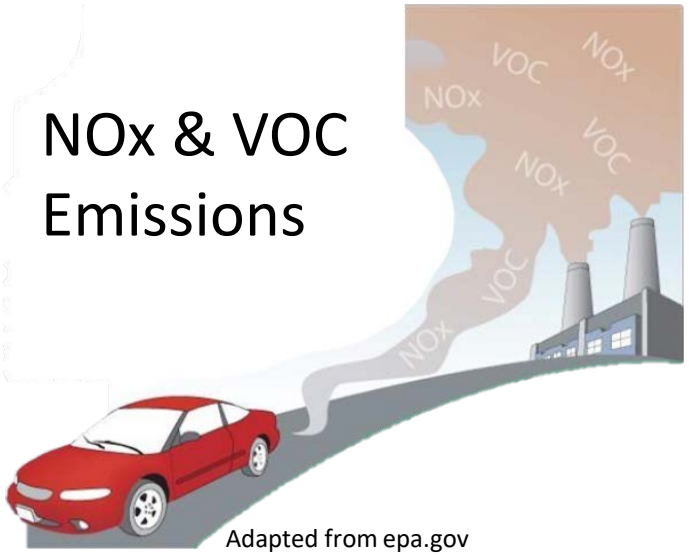
Factors Influencing Ozone Levels

NOx & VOC Emissions



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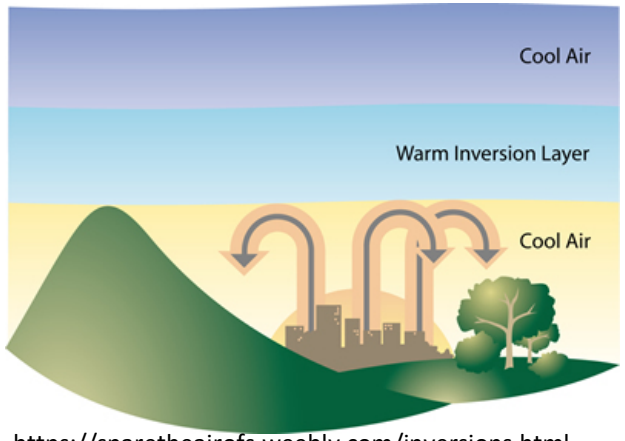

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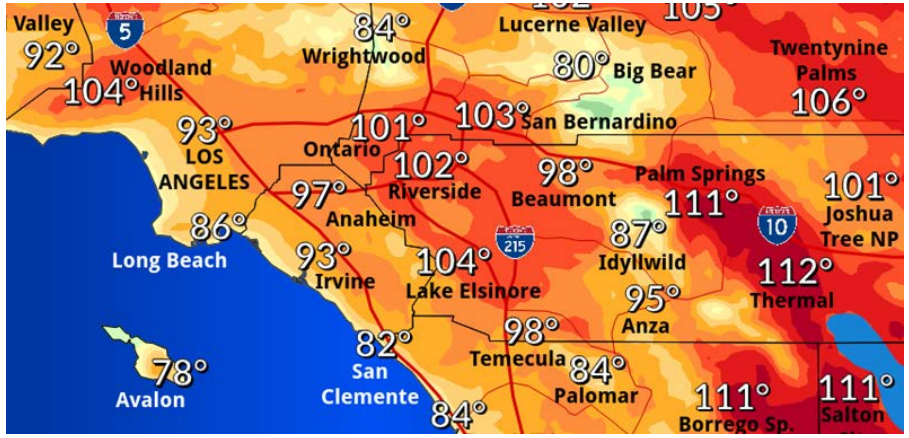
Season

Temperature



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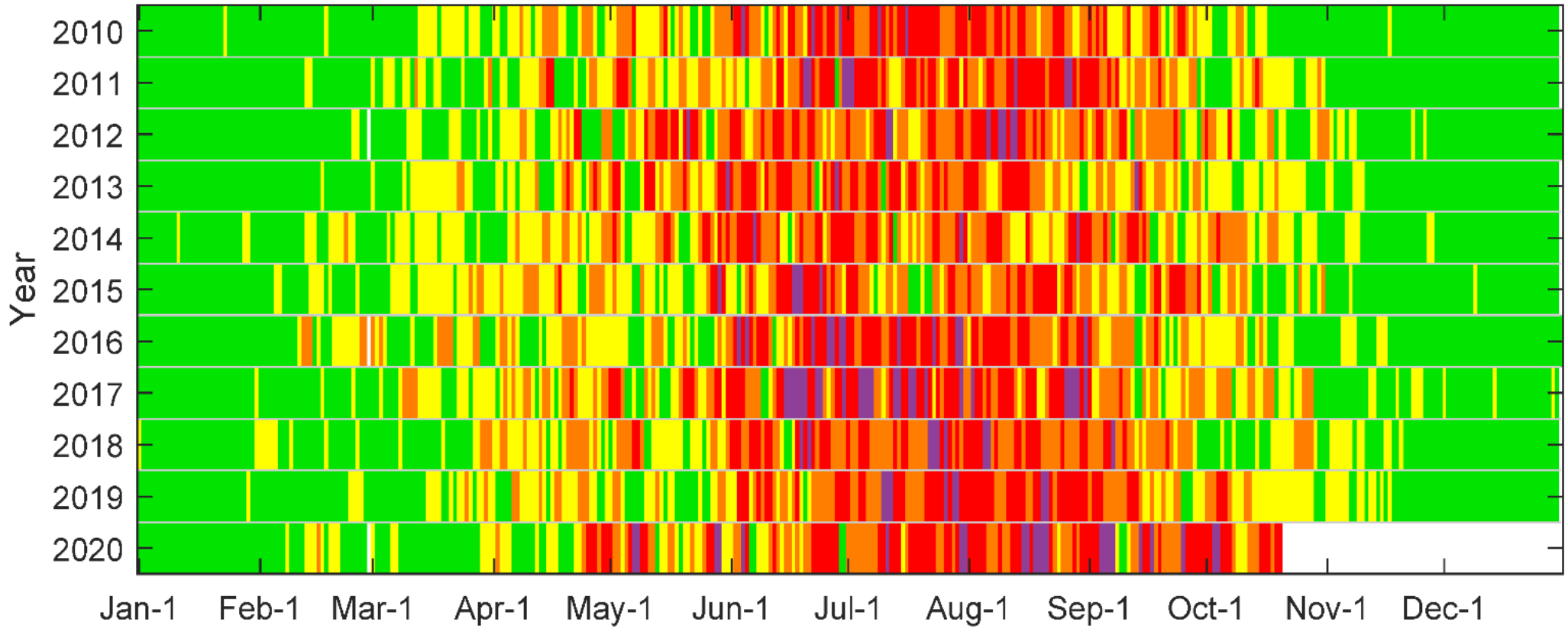
2020 Ozone Air Quality Unlike Previous Years



AQI color key

- Good
- Moderate
- Unhealthy for sensitive groups
- Unhealthy
- Very unhealthy
- Hazardous

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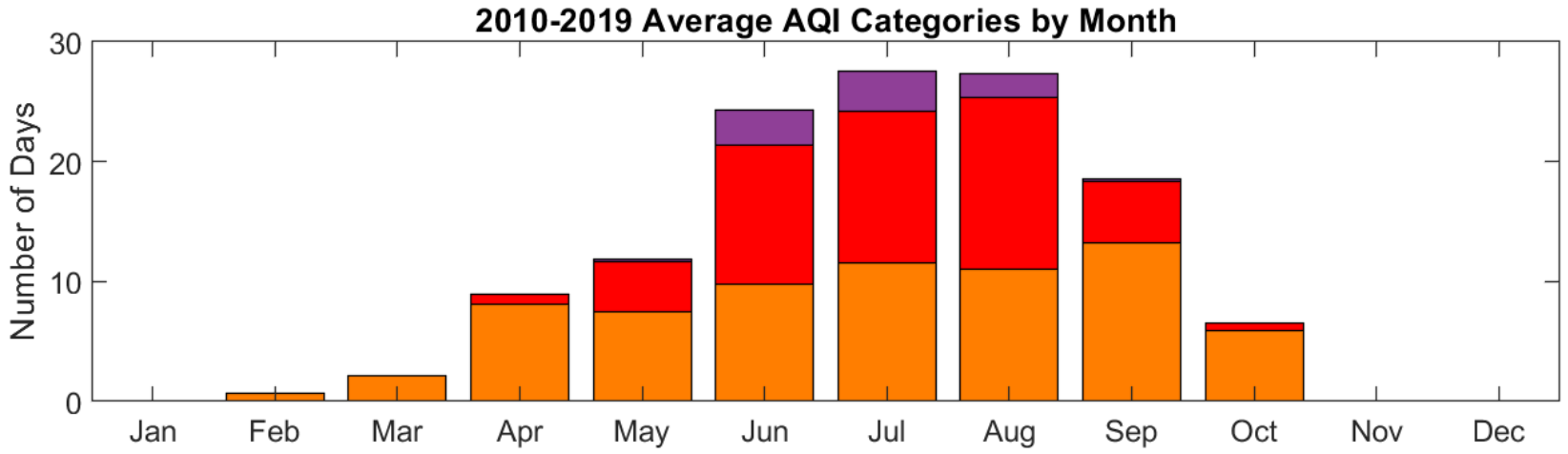
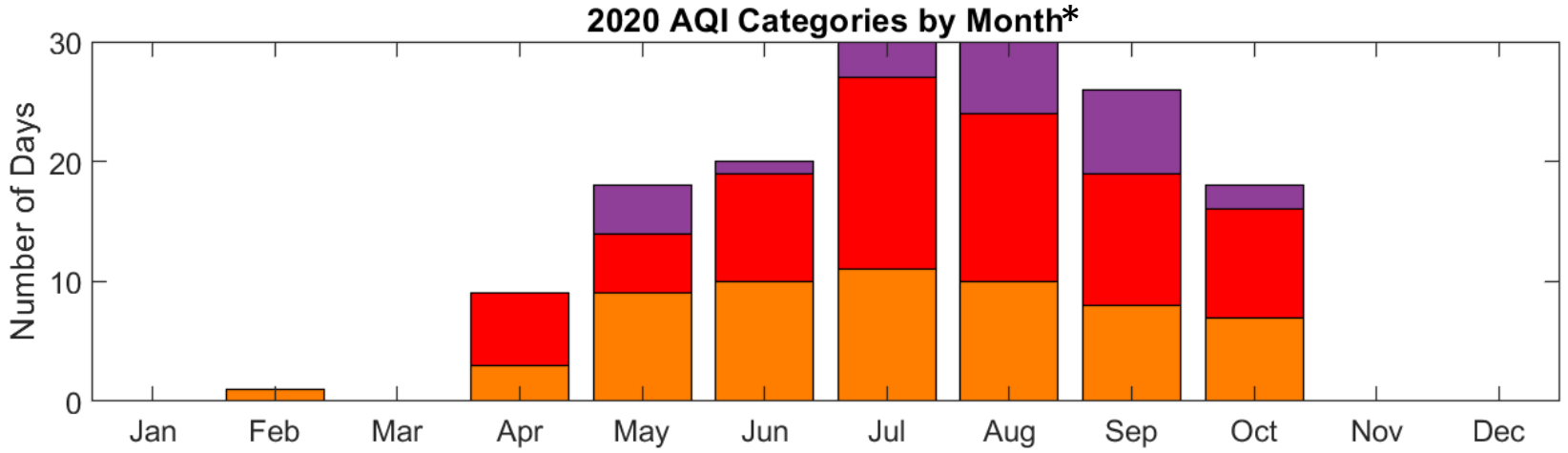
Ozone AQI Levels Compared to Past Years



128 Ozone Exceedance Days on Average

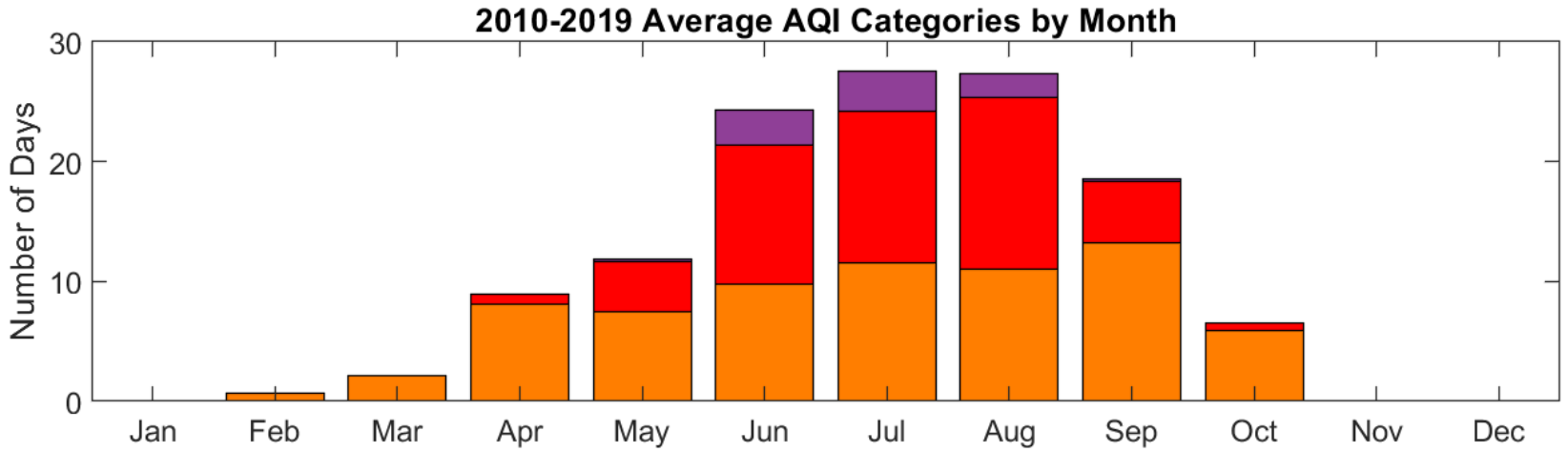


152 Ozone Exceedance Days in 2020‡

Unhealthy for sensitive groups Unhealthy Very unhealthy

* 2020 data is preliminary. ‡As of October 21.

Ozone AQI Levels Compared to Past Years



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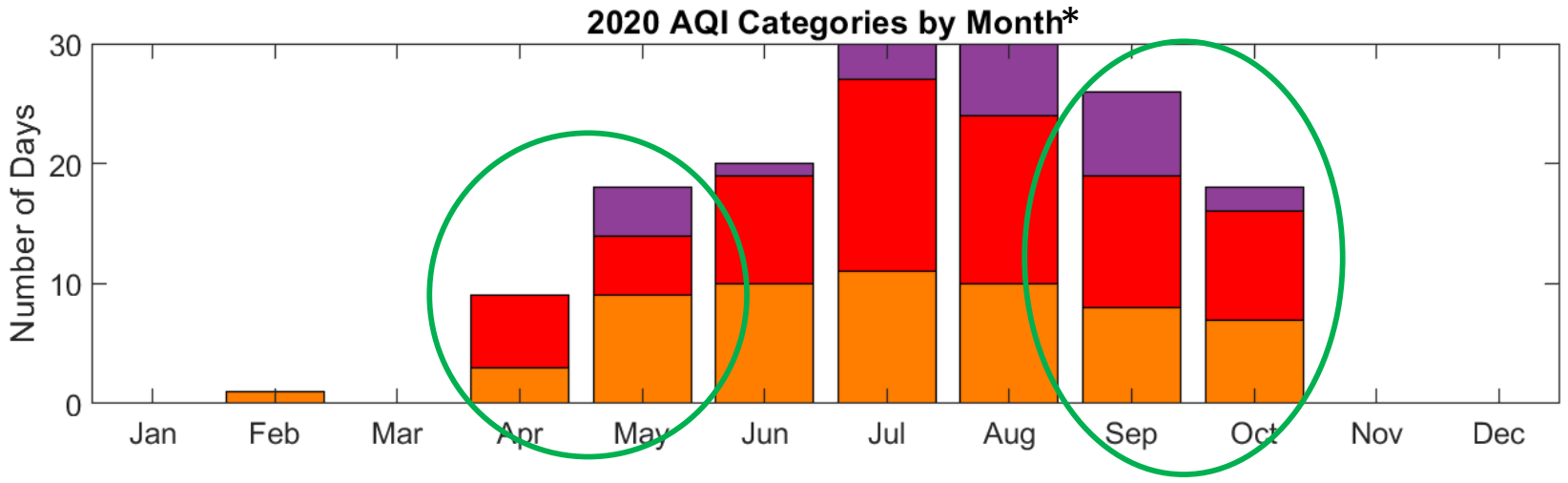

152 Ozone Exceedance Days in 2020‡

Unhealthy for sensitive groups Unhealthy Very unhealthy

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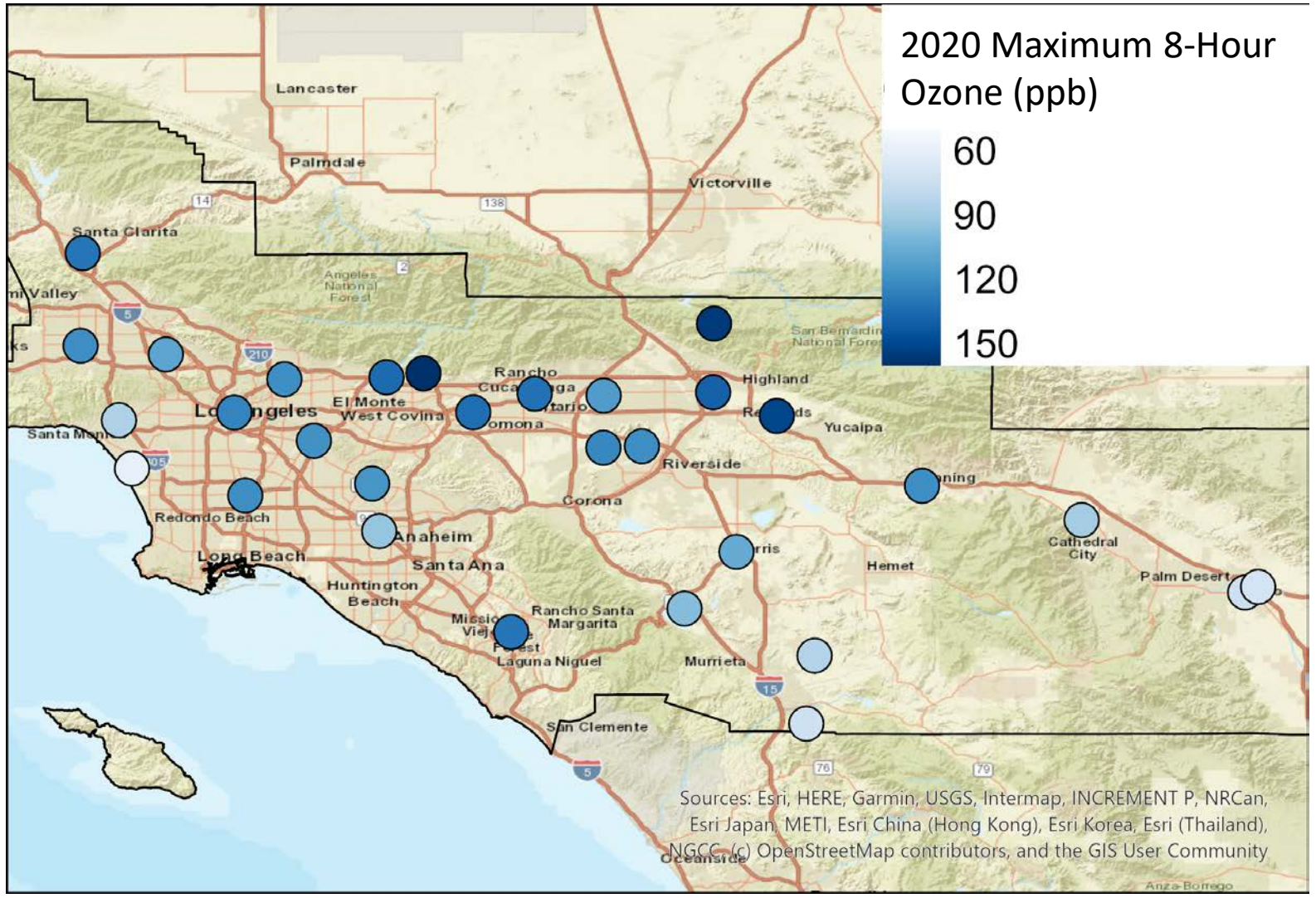
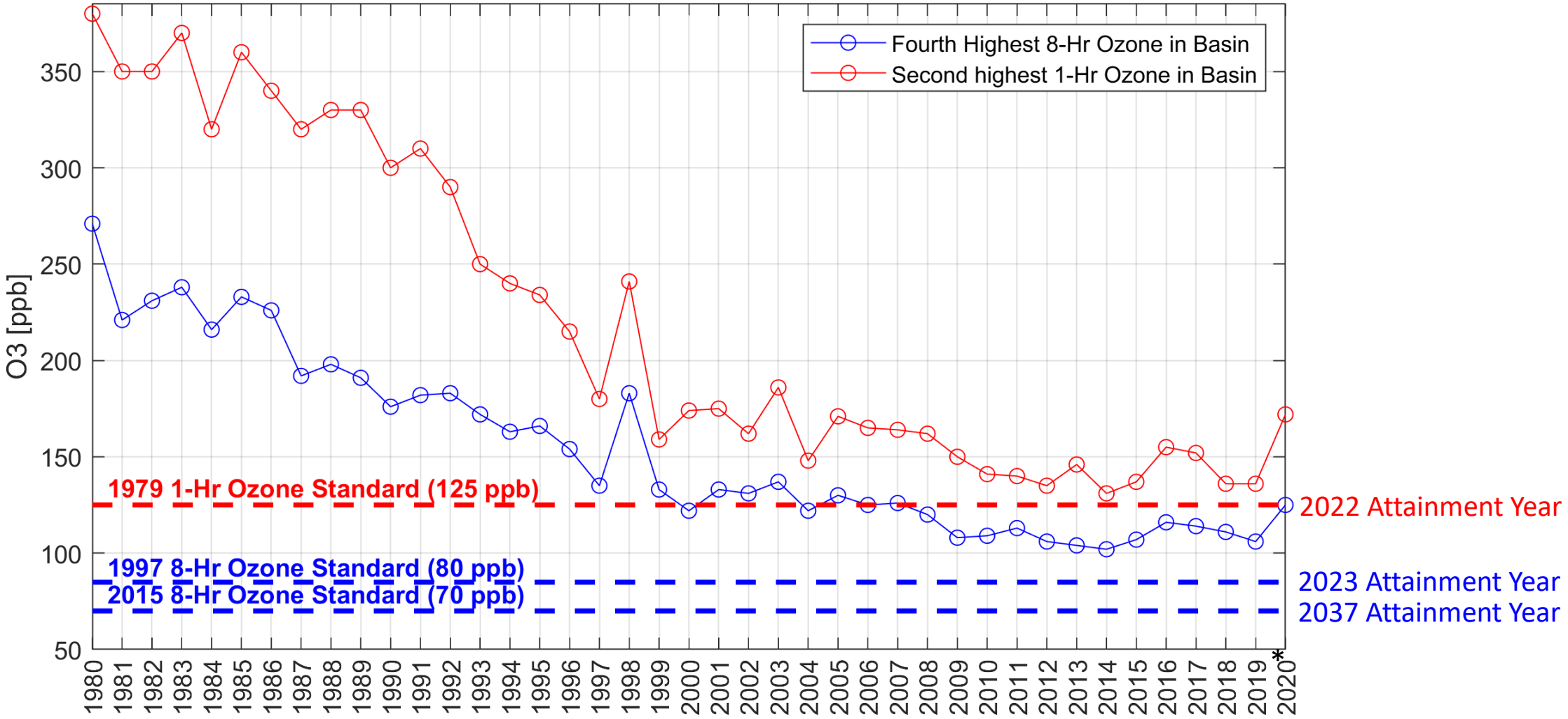
2020 Ozone Concentrations Were Abnormally High Throughout the Basin



- Basin-Max 1-hour value was 185 ppb (Central L.A.)
  - Highest reading in L.A. since 1994
  - Highest in Basin since 2003
- Basin-Max 8-hour value was 145 ppb (Glendora)
  - Highest in Basin since 2005

Progress Towards Attaining Ozone Standards in the Basin



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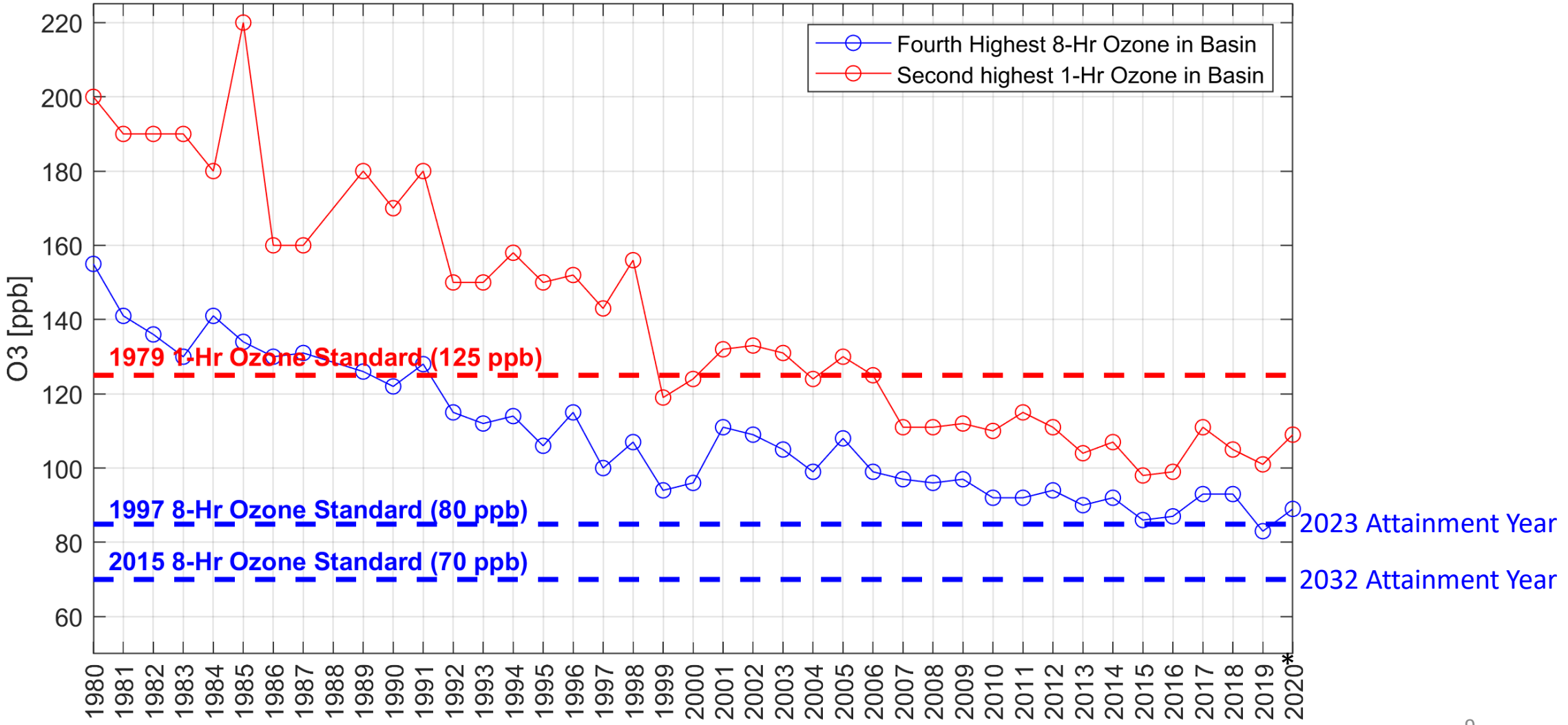
Progress Towards Attaining Ozone Standards in the Coachella Valley



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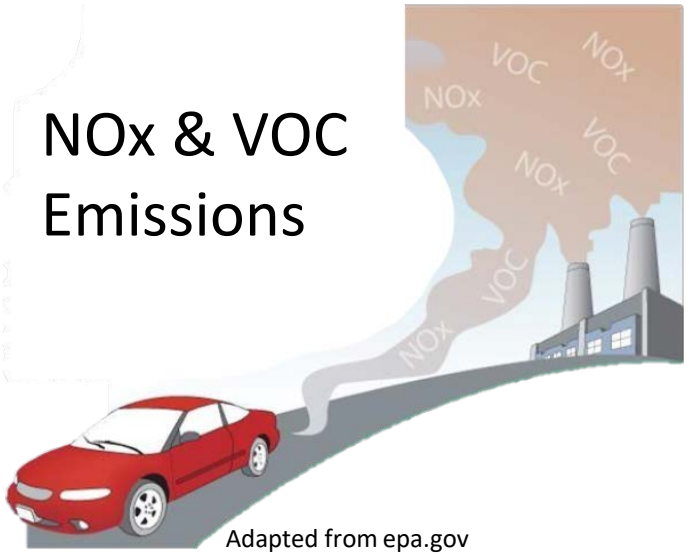
Why is the 2020 Ozone Season Unique?

NOx & VOC Emissions



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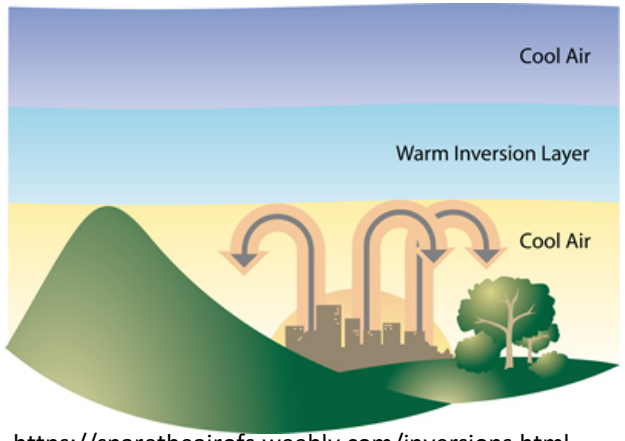

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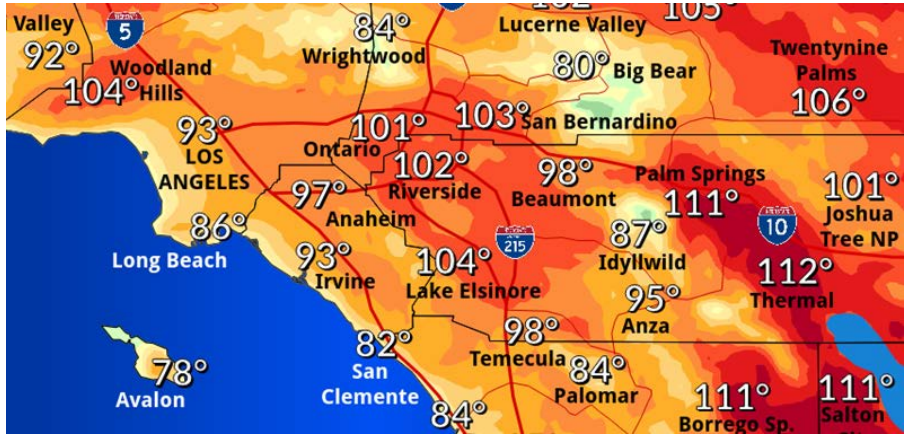
Season

Temperature



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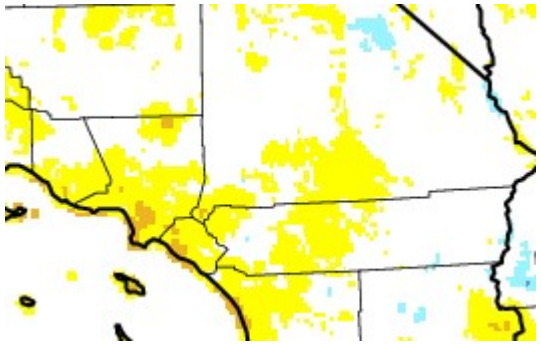
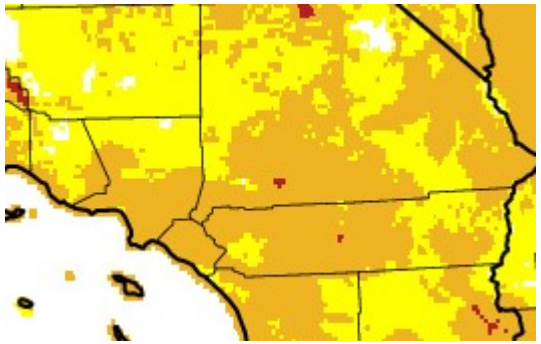
2020 Ozone Season was Extremely Hot

Mean Temperature Percentile

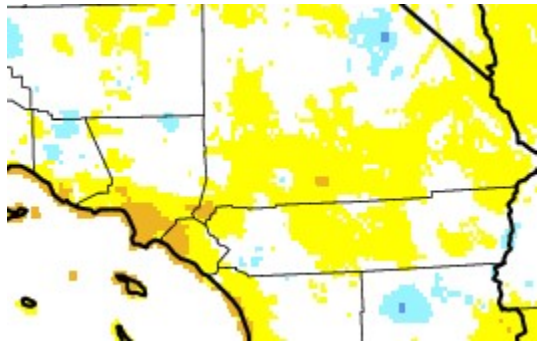
April



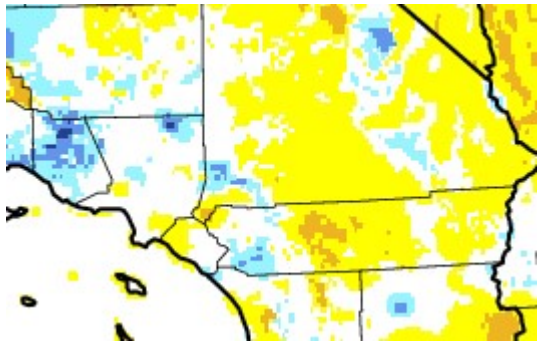
May



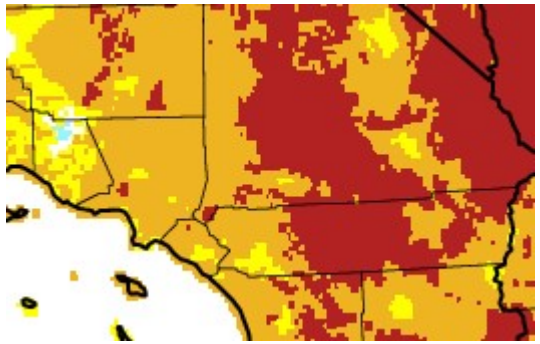
June



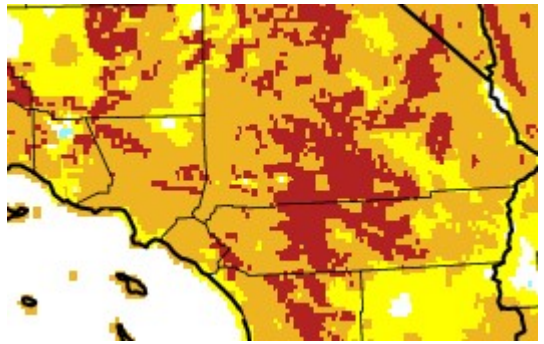
July

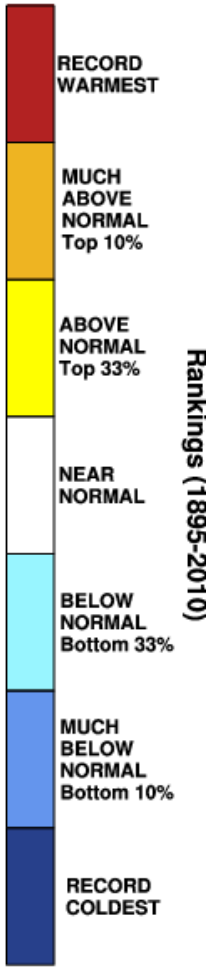


August



September





WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 11 OCT 2020

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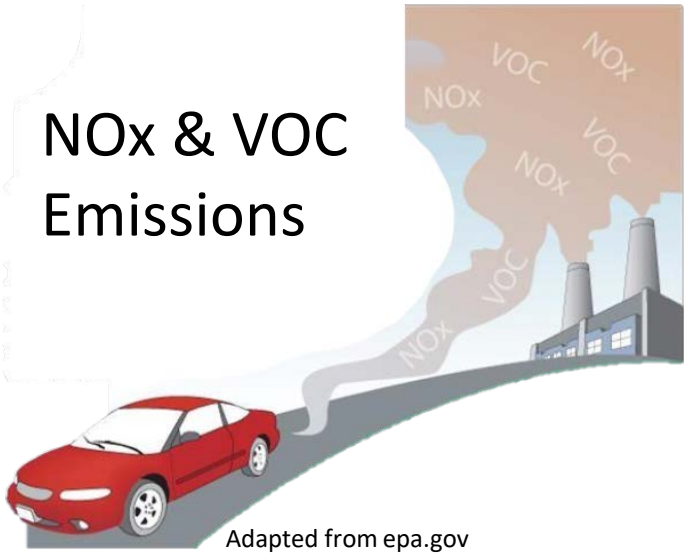
Why is the 2020 Ozone Season Unique?

NOx & VOC Emissions



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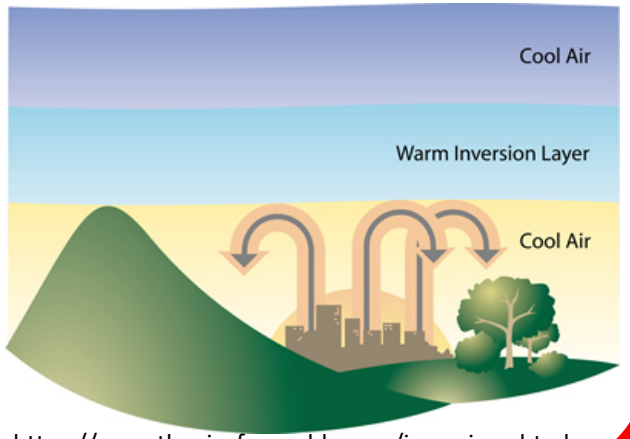

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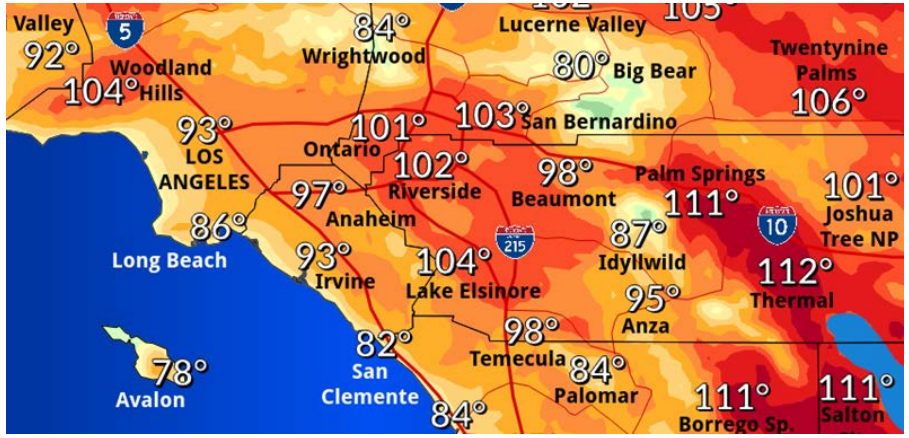
Season

Temperature



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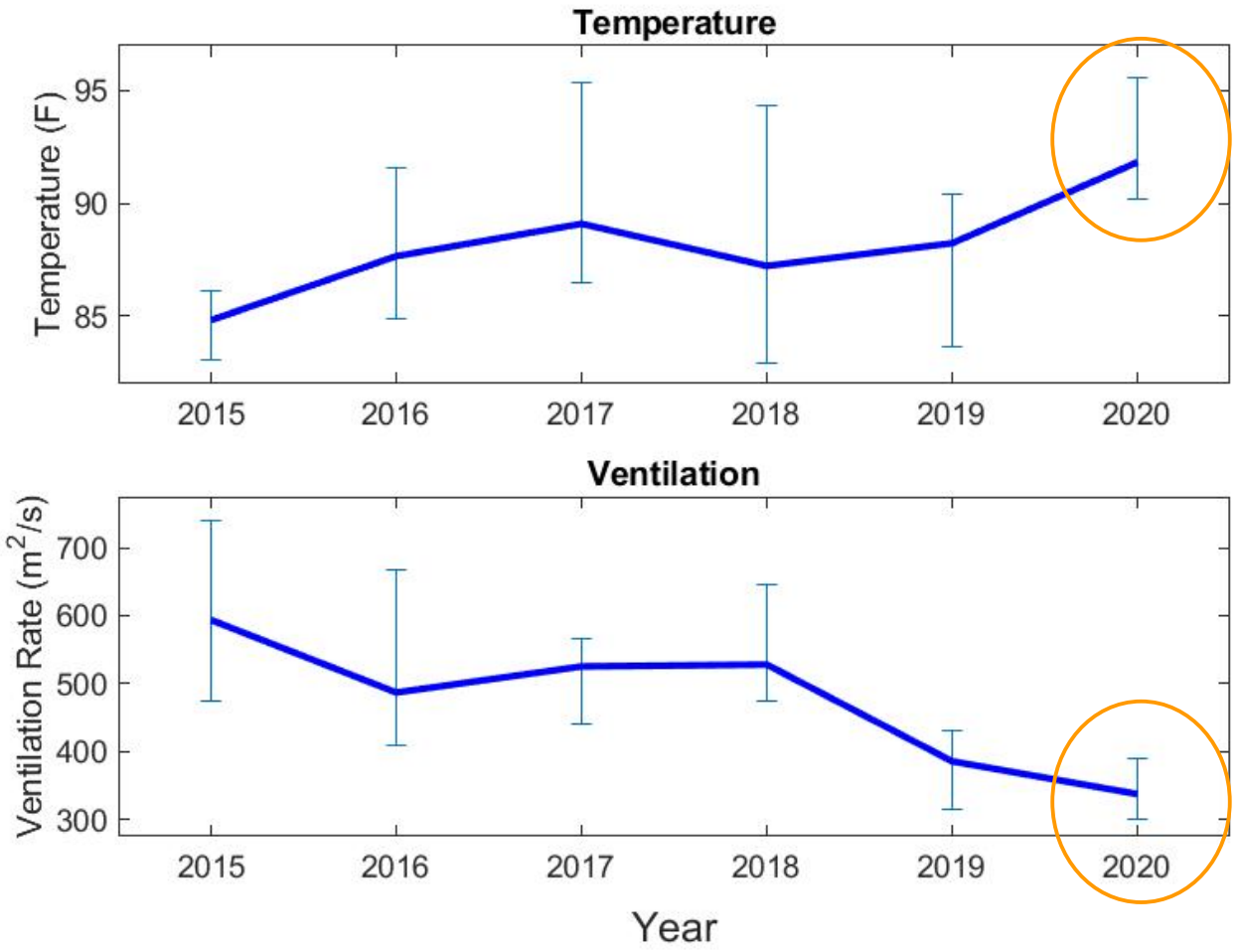
Ozone Exceedance Days Were Abnormally Hot and Stagnant

Weather on Highest Ozone Days Each Year in Los Angeles

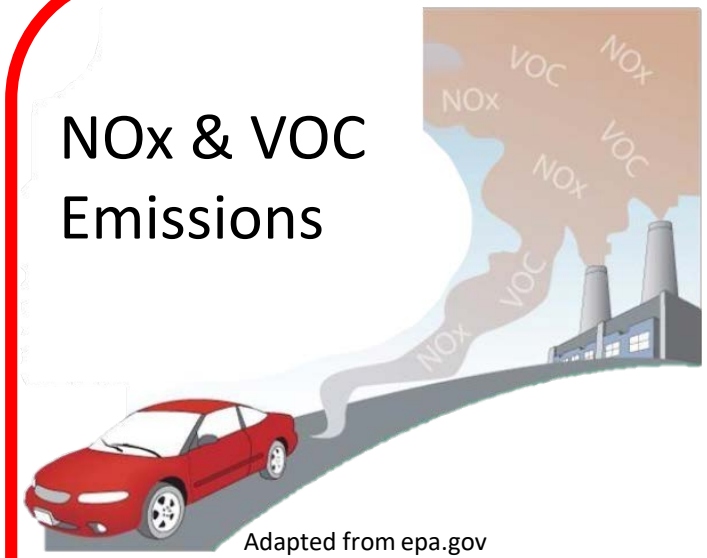


Hotter

More Stagnant

Why is the 2020 Ozone Season Unique?

NOx & VOC Emissions



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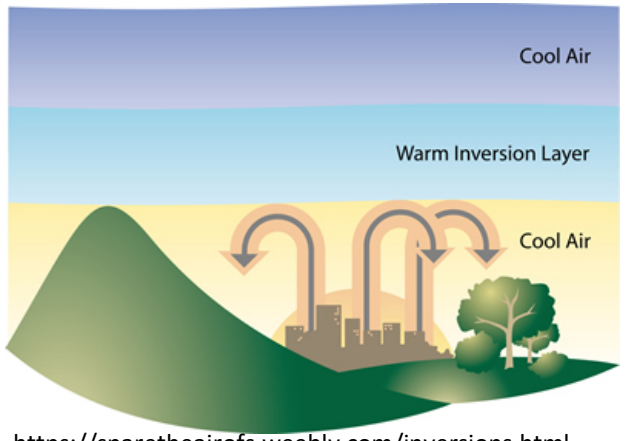

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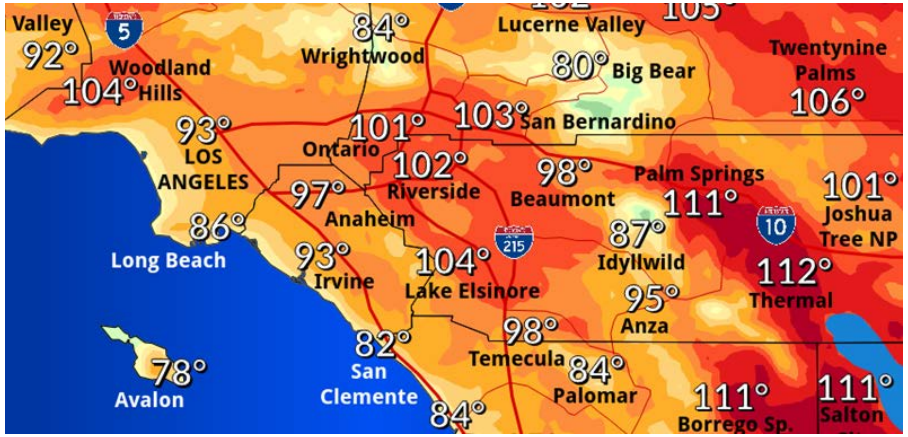
Season

Temperature



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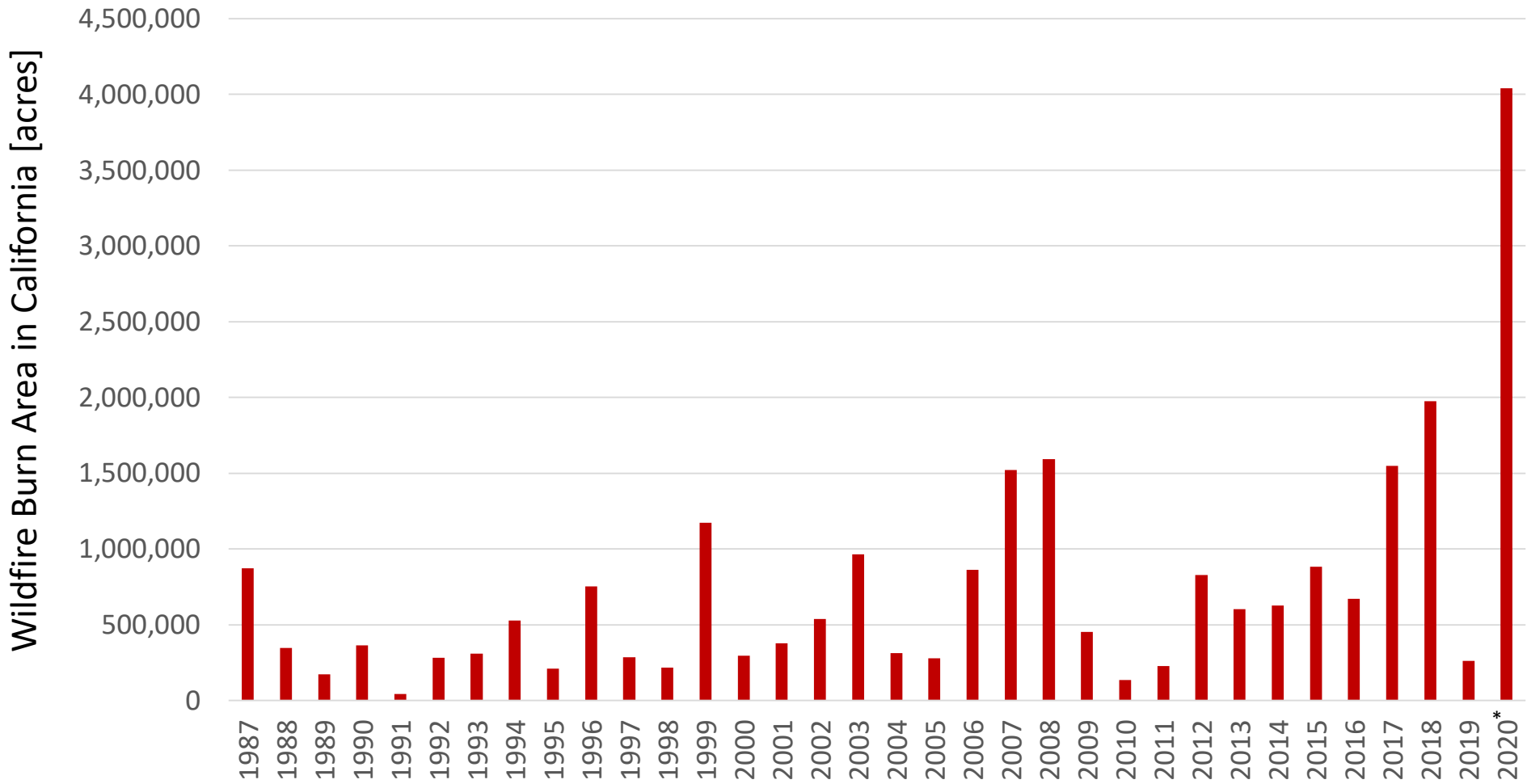
Record Wildfire Area Burned in California



*Current as of Oct 4, 2020

Source: CalFire

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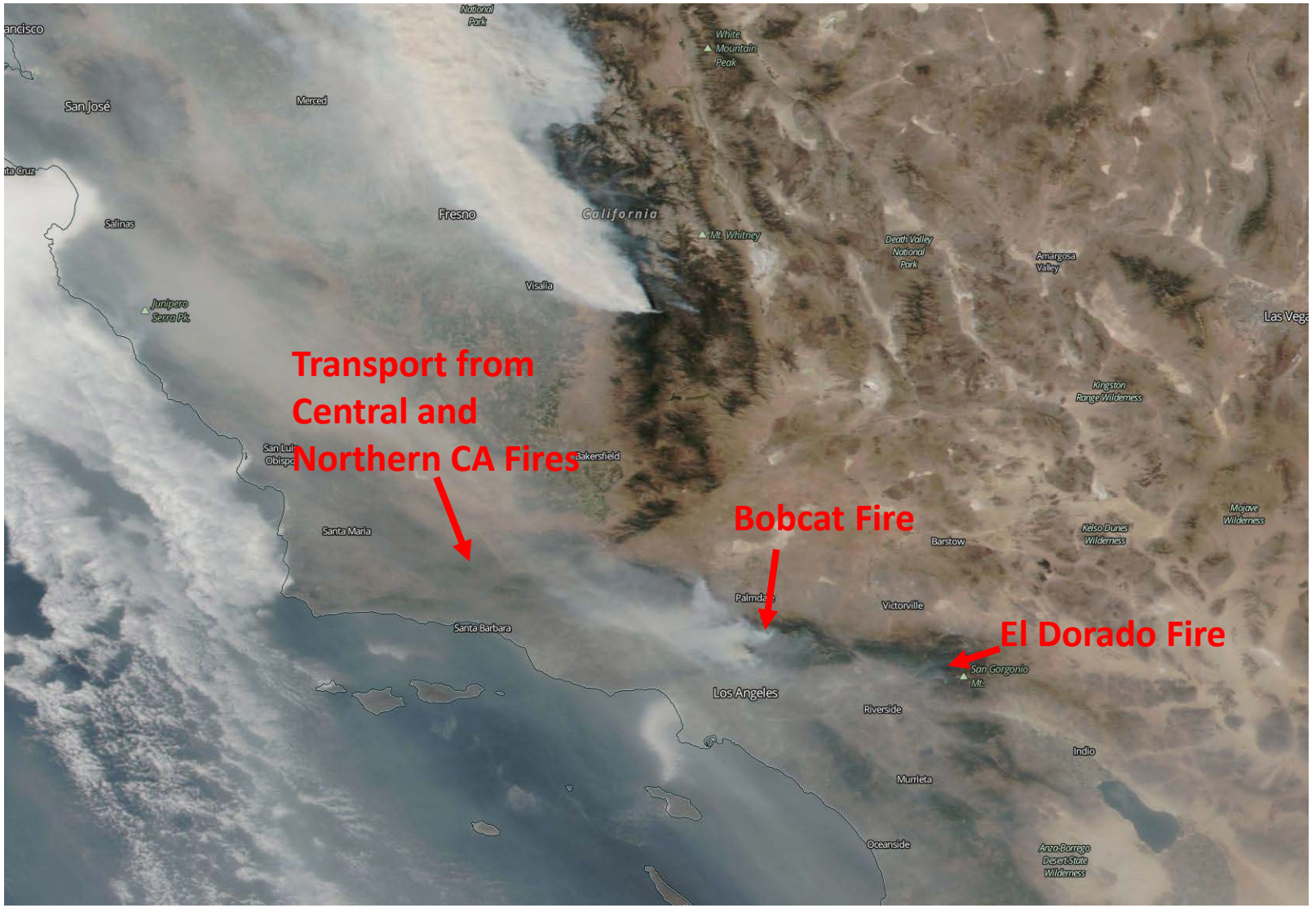
Strong and Frequent Wildfire Smoke Influence



Sept. 13th, 2020
Suomi NPP/VIIRS

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Wildfire Plumes May Have Led to Higher Ozone

- Increases in ozone from local and distant wildfires still uncertain and under active investigation
- Preliminary analysis indicates that there may have been increases in areas that were frequently downwind of the Bobcat fire

Perimeters of the Bobcat and El Dorado Fires were downloaded from the National Interagency Fire Center: https://data-nifc.opendata.arcgis.com/datasets/wildfire-perimeters

Possible Changes in Ozone Levels Due to COVID Response

Ozone concentrations depend on NOx and VOC emissions along with the NOx to VOC ratio

NOx	VOC/NOx	VOC
	?	?

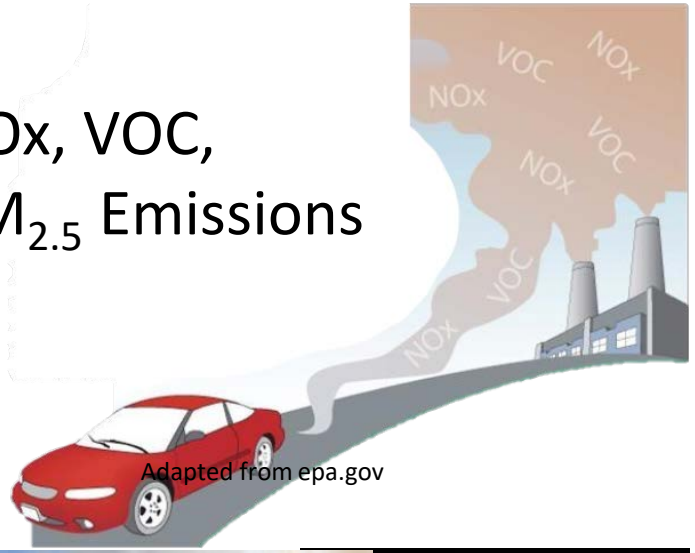
Apr.	Significant Emission Reductions
May	Significant Emission Reductions
Jun.	Significant Emission Reductions
Jul.	Modest Emission Reductions
Aug.	Typical Anthropogenic Emissions
Sep.	Typical Anthropogenic Emissions
Oct.	Typical Anthropogenic Emissions

- Increased VOC emissions from disinfecting?

2020 PM2.5 Data and Trends

Factors Influencing $PM_{2.5}$ Levels

NOx, VOC, $PM_{2.5}$ Emissions



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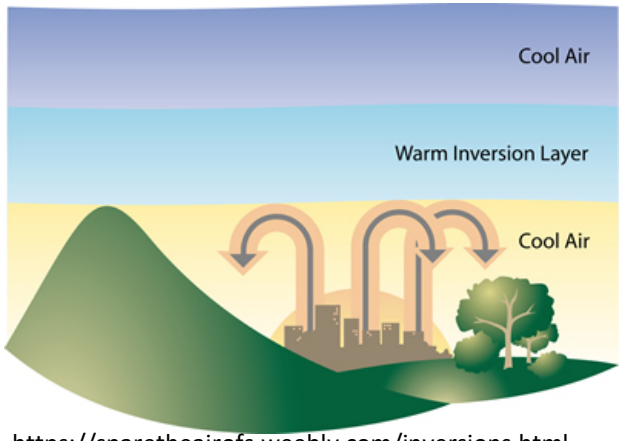

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Fog and Humidity

Sunlight

Storms

Elevated PM2.5 Levels Due to Fires and Independence Day Fireworks

Number of PM2.5 Basin Exceedance Days*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2015	12	10	1	1	0	1	2	0	0	0	0	0	27
2016	3	4	3	0	0	1	2	0	0	1	0	8	22
2017	0	0	4	0	0	1	2	0	0	1	5	6	19
2018	6	2	0	1	0	1	2	2	0	0	4	4	22
2019	1	0	0	0	0	0	2	0	0	0	3	0	6
2020	4	1	0	0	0	0	2	3	9	4#			23#

Independence Day Fireworks

2020 Wildfires

* Calculated using continuous PM2.5 measurements

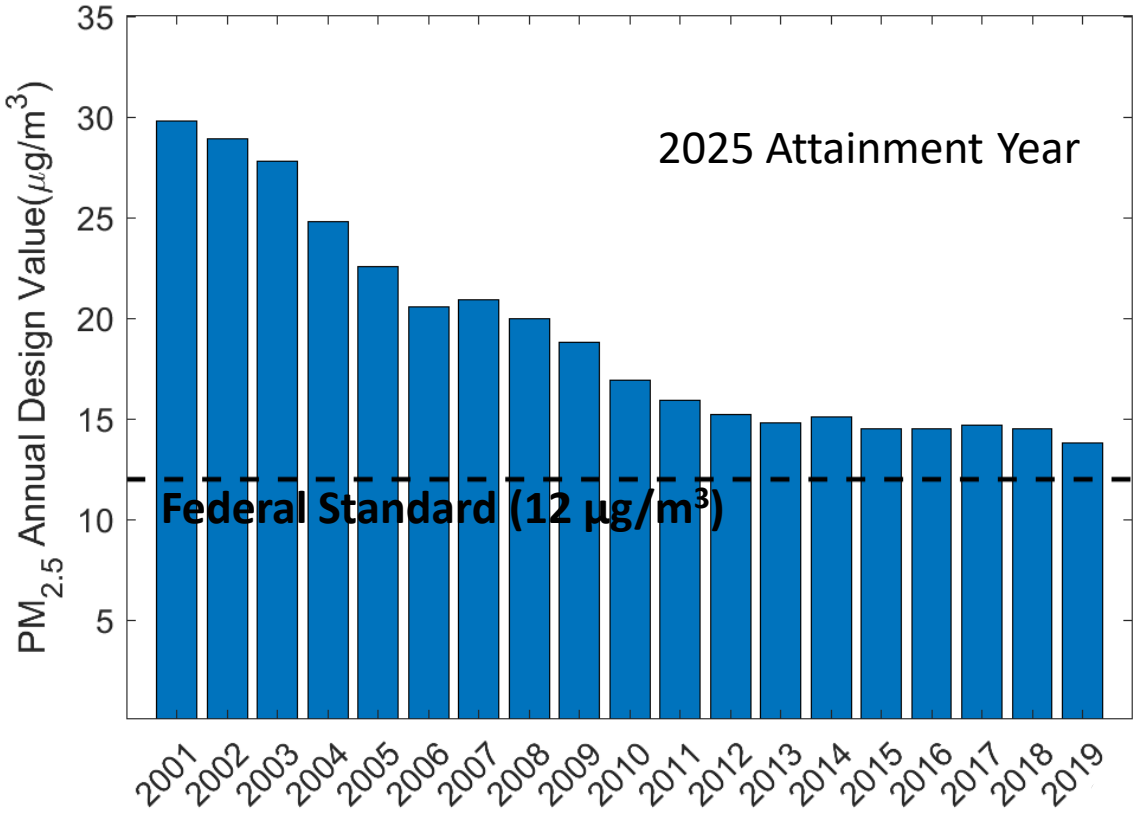
Calculated using measurement data through Oct. 14, 2020

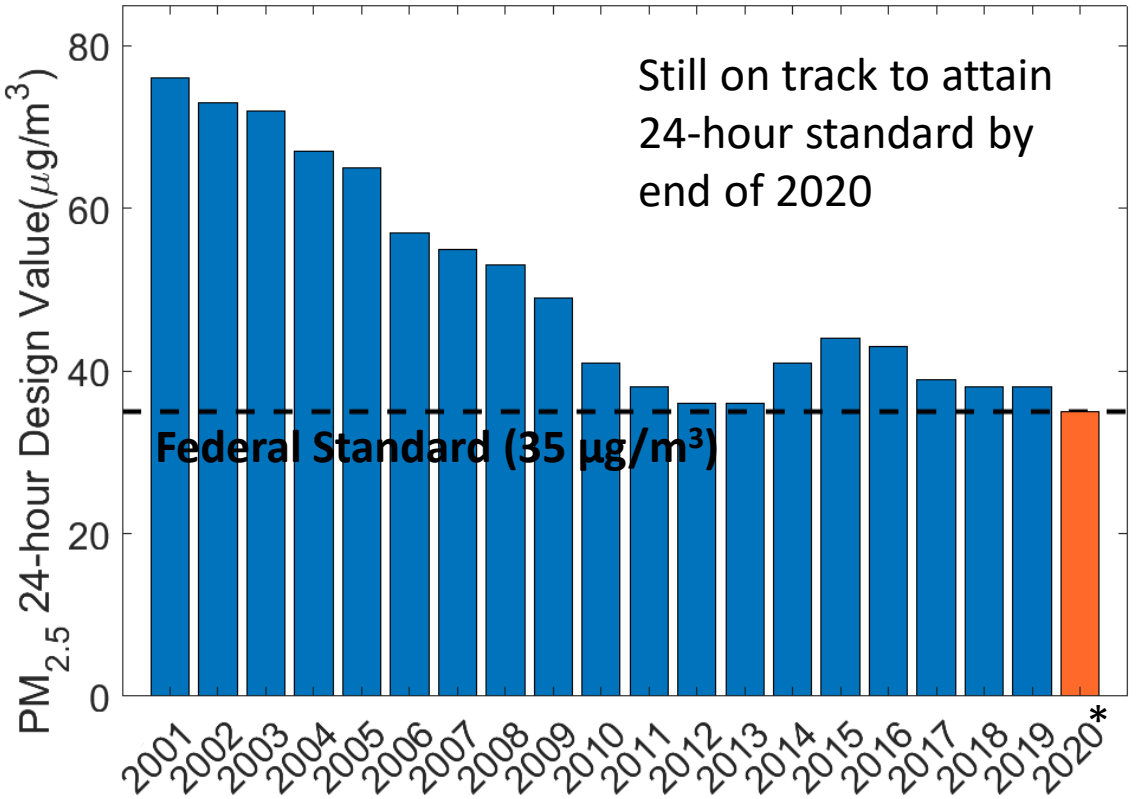
Definition of Exceptional Events

- An exceptional event meets all these criteria:
  - The emissions from the event(s) caused the monitored exceedance(s)
  - The event is not reasonably controllable or preventable
  - The event is either:
    - Natural; or
    - Caused by human activity but is unlikely to recur at that same location

Exceedances caused by exceptional events can be removed when determining attainment of federal standards

Progress Towards Attainment of PM2.5 Standards





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* Preliminary estimation based on the FRM PM2.5 data from the first two quarters of 2020. Exceedances likely to be approved as exceptional events removed in 2017-2020 data.

Conclusions

- High ozone values recorded during the 2020 ozone season were due to several reasons
  - Record high temperatures
  - Abnormally stagnant meteorology
  - Increased emissions of VOCs and NOx from historic wildfire season
  - Possible changes in emissions due to COVID response
- Relative impacts of each of these factors are complicated and will take time to sort out
- High PM2.5 values recorded during the summer of 2020 attributed to local fires and smoke transport from fires along the west coast

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Attainment Implications

24-Hour PM2.5 Standard	• Still on track to attain by the end of 2020 • PM2.5 in Nov. & Dec. along with successful exceptional event demonstrations are critical
1-Hour Ozone Standard	• Based on preliminary 2020 data, it will not be possible to attain the 1-hour ozone standard by the 2022 deadline as we have recorded more than three exceedances at a single station during the 2020-2022 period
8-Hour Ozone Standard	• Elevated ozone values in 2020 will not affect attainment of the 80 ppb ozone standard as the 2023 deadline is based on data collected in 2021-2023
Overall Ozone Attainment Goals	• If a changing climate causes these extreme weather and wildfire events to continue or get worse, attainment of future standards will be even more challenging

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