# OZONE SEASON SUMMARY 2020

Sunil Kumar Principal Environmental Engineer

MWAQC-Technical Advisory Committee September 8, 2020



## Peak 8-Hour Average Ozone Levels (ppb)

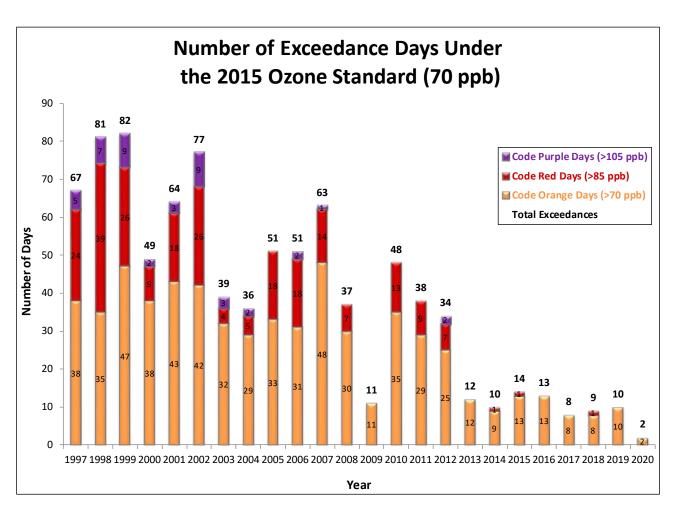
Ma	arch	2020	)				Ар	ril	2020	)				Ma	ay	2020	)			
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47	52	43	36	42	46	45	46	52	45	51	51	43	49	49	48	40	37	52	50	39
15	16	17	18	19	20	21	12	13	14		16	17	10			12	13	14	15	16
40	48	40	42	39	41	39	50	45	47	48	49	51	47	49	39	46	56	47	57	52
22	23	24	25	26	27	28	19	20	21		23	24				19	20	21	22	23
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#### 2 Code Orange, 31 Code Yellow Days, Rest All Code Green Days

Analysis is based on draft data as of August 31, 2020.

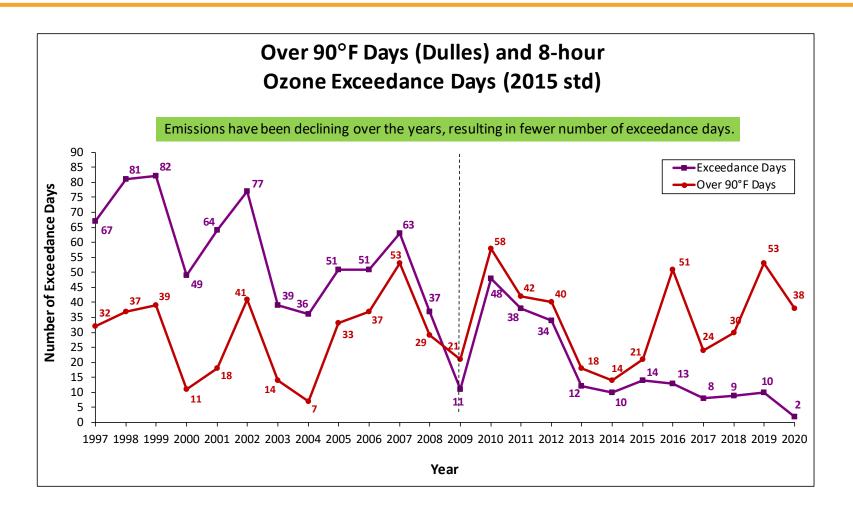


## **Ozone Exceedance Trend**



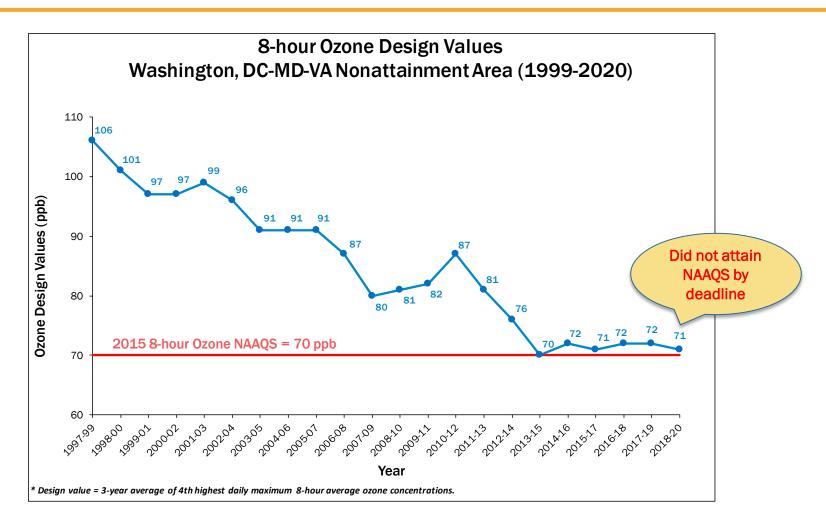


## **Ozone & Temperature Trend**





## Ozone Design Value Trend





## Why Fewer Exceedance Days Now?

#### **Emission Control Programs**

Federal	State	Local
Acid Rain Program (1996/2000)	Vehicle Inspection & Maintenance Programs	Renewable Energy Programs Regional Wind Power Purchase Program Clean Energy Rewards Program Renewable Portfolio Standards
Tier 2 (LD Vehicle) Rule (2004)	Maryland Healthy Air Act (2009/2012)	Energy Efficiency Programs LED Traffic Signal Retrofit program Building Energy Efficiency Programs
HD Diesel vehicle Rule (2004/2007)	Virginia CSAPR Rule	VRE Idling Reduction
NOX SIP Call (2004)	Ozone Transport Commission Rules	LOW VOC Paint
CAIR/CSAPR/CSAPR Update (2009/2015/2017)		Gas Can Replacement



## 24-Hour Average PM2.5 Levels (µg/m³)

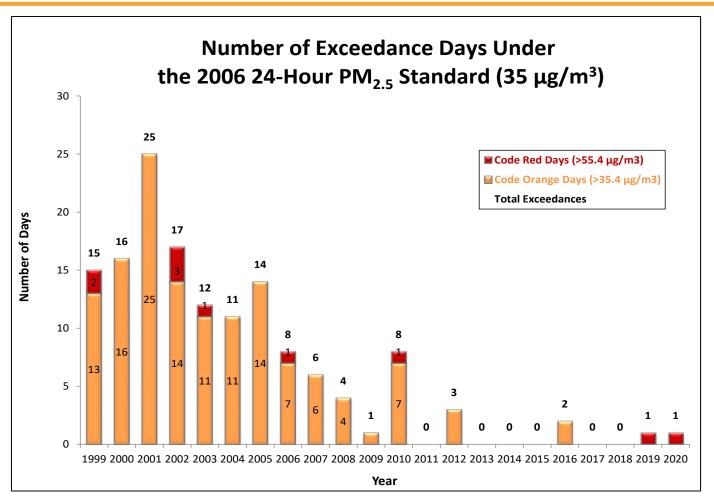
Ma	ırch	2020	)				Ар	ril	2020	)				M	ay	2020	)			
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7.6	8.0	7.9	7.7	10.3	6.9	4.7	6.2	6.9	10.9	6.5	7.4	4.2	7.8	8.9	4.4	5.2	4.6	5.3	6.6	4.3
15	16	17	18	19	20	21	12	13	14	15		17	18	10	11	12		14	15	16
8.1	6.7	7.7	8.4	13.1	10.6	5.2	10.0	3.9	5.3	6.8	7.9	9.5	8.5	5.1	11.7	9.3	11.1	10.3	10.4	8.5
22	23	24	25	26	27	28	19	20	21	_	23	24	25	17	18	19		21	22	23
6.8	5.0	6.7	6.0	10.9	6.9	8.8	8.6	10.2	6.9	5.1	7.1	3.9	7.0	9.8	6.6	7.0	6.7	9.1	6.5	10.1
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Sunday 31 07 <b>7.3</b>	7.2 08 8.2 15	Tuesday 02 8.6 09 15.8 16 7.2	Wednesday   03	14.7 11 9.9 18 7.1	05 10.7 12 7.1 19 9.7	15.5 13 5.6 20 9.2	Sunday 28 05 <b>32.3</b>	Monday 29 06 26.2 13 14.5 20 11.1	Tuesday 30 07 23.4 14 6.8 21 9.7	Wednesday 01 14.8 08 20.1 15 10.2 22 11.1	16.8 09 15.1 16 9.9 23 8.6	24.6 10 11.0 17 11.8 24 7.1	83.7 11 12.5 18 11.1	Aug sunday 26 12.8 09 12.2 16 8.7	Monday 27 03 5.7 10	Tuesday 28 04 5.0 11 18.4 18.4 10.3	Wednesday 29 05 9.2 12 12.6 19 10.9	06 12.0 13 9.0 20	31 07 6.0 14 11.8 21 12.7	9.7 9.7 7.7 15 14.5 22 8.9
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31 07 7.3 14 6.4	Monday 01 7.2 08 8.2 15 10.0	Tuesday 02  8.6 09  15.8 16  7.2 23	Wednesday 03 17.3 10 17.0 17 6.3	14.7 11 9.9 18 7.1	05 10.7 12 7.1 19 9.7 26	15.5 13 5.6 20 9.2	Sunday 28 05 32.3 12 13.2	Monday 29 06 26.2 13 14.5 20 11.1	Tuesday 30 07 23.4 14 6.8 21 9.7	Wednesday 01 14.8 08 20.1 15 10.2 22 11.1	16.8 09 15.1 16 9.9 23 8.6	24.6 10 11.0 17 11.8 24 7.1	83.7 11 12.5 18 11.1 25	Aug sunday 26 12.8 09 12.2 16 8.7 23	Monday 27 03 5.7 10 14.4 17 10.3 24 10.7	Tuesday 28 04 5.0 11 18.4 18.4 10.3	Wednesday 29 05 9.2 12 12.6 19 10.9	06 12.0 13 9.0 20	31 07 6.0 14 11.8 21 12.7	9.7 9.7 7.7 15 14.5 22 8.9
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#### 1 Code Red Day, 36 Code Yellow Day, Rest All Code Green Days

Analysis is based on draft data as of August 31, 2020.



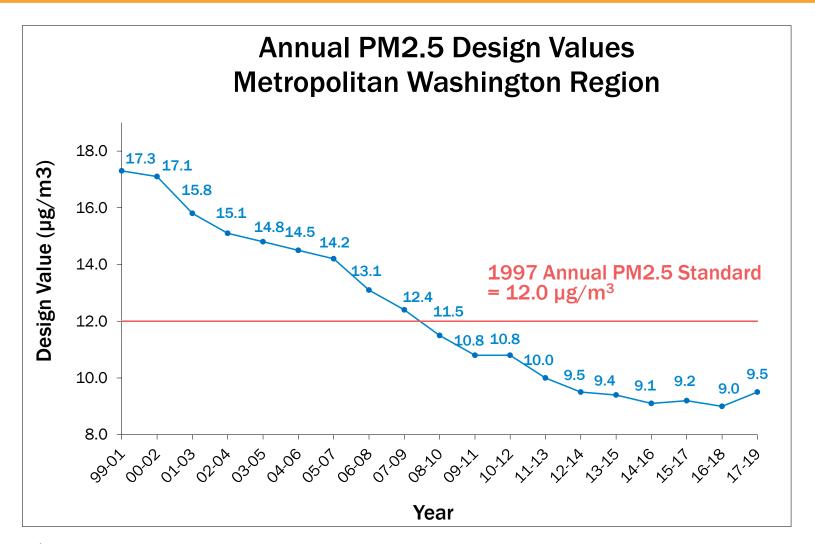
## PM2.5 Exceedance Trend



Analysis is based on draft and incomplete data as of August 31, 2020. 2019 & 2020 code red days recorded on July  $4^{th}$ .

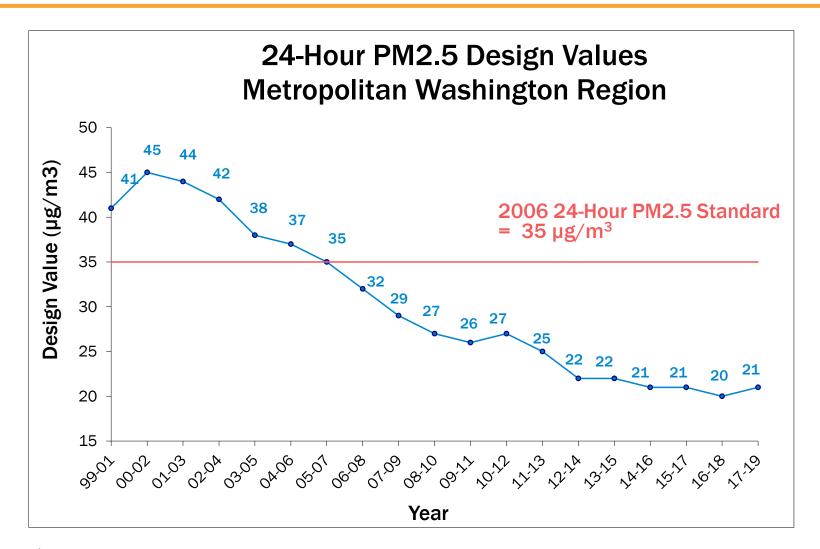


## **Annual PM2.5 Design Value Trend**



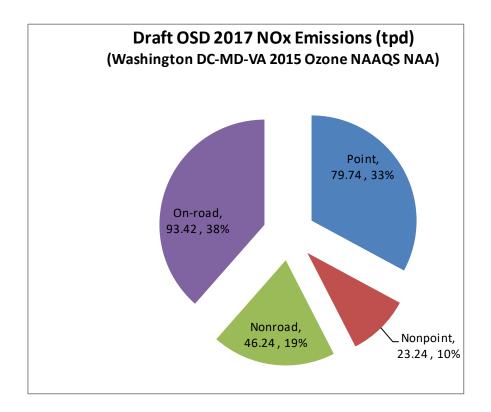


## 24-Hour PM2.5 Design Value Trend





## **Emission by Source**



 Since COVID-19 has affected operation of all sources, emissions have been affected accordingly.



#### Increase in Vehicle Speed in Washington, DC

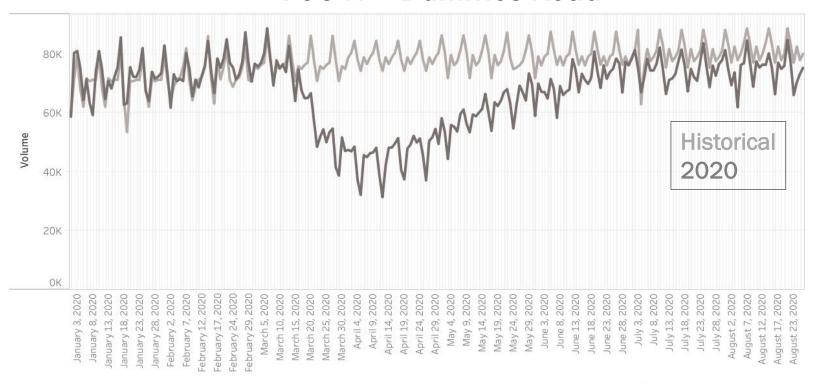
(Compared to Pre-COVID Level in February 2020)

	March	April	May	June	July
8 AM	22%	19%	18%	20%	20%
5 PM	30%	29%	26%	18%	17%

Source: INRIX Report - https://inrix.com/blog/2020/08/us-speeds/



#### I-95 N - Dumfries Road

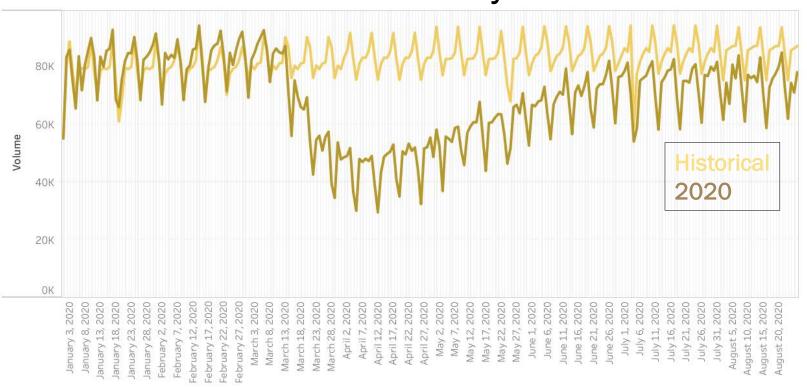


VDOT Traffic Engineering and Operations Divisions

 Heavy-duty vehicle traffic became slightly higher than normal after mid-April. Rest of the vehicle traffic continues to increase after a decrease during mid-March to mid April. Source: VDOT



#### I-395 N - Turkeycock

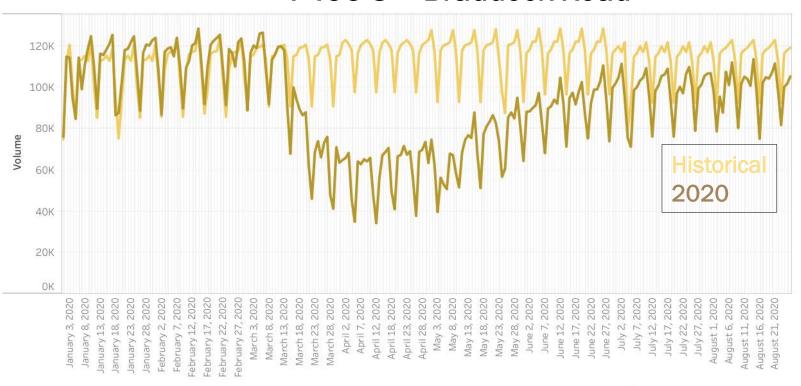


VDOT Traffic Engineering and Operations Divisions

 Heavy-duty vehicle traffic increased during April/May. Rest of the vehicle traffic continues to increase after a decrease during the mid-March to mid-April. Source: VDOT



#### I-495 S - Braddock Road



VDOT Traffic Engineering and Operations Divisions

 Heavy-duty vehicle traffic became slightly higher than normal after mid-April. Rest of the vehicle traffic continues to increase after a decrease during mid-March to mid-April. Source: VDOT



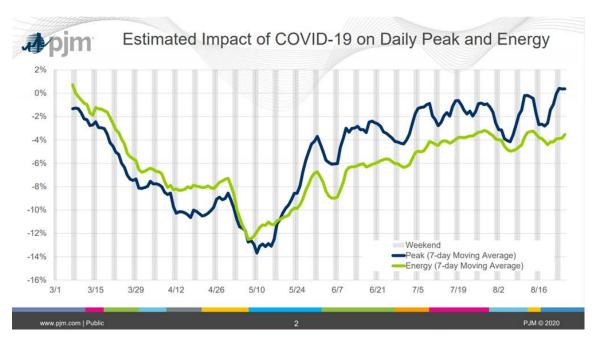
# IMPACT ON NONPOINT & NONROAD SECTORS

 Emissions are still expected to be lower as activities related to nonroad sources (e.g., construction, commercial, industrial, aircraft, railroad, etc) and nonpoint sources (dry cleaners, restaurants, portable fuel containers, auto repair facilities, etc) have still not resumed to pre-COVID-19 levels.



### IMPACT ON POINT SECTOR

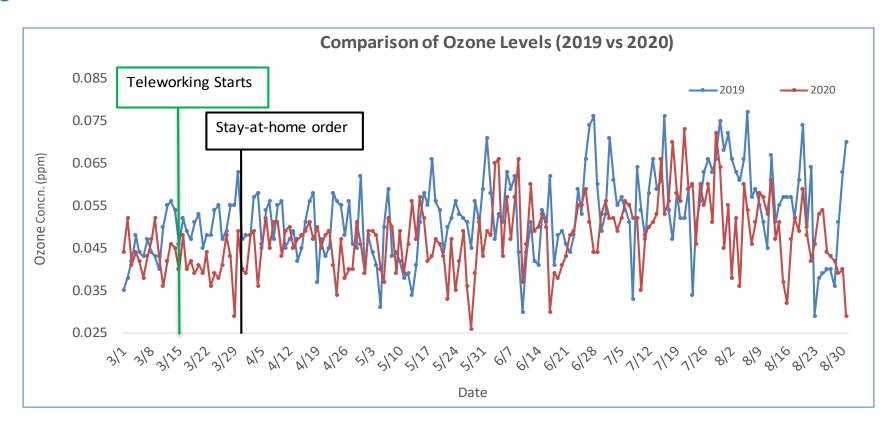
- Electricity consumption in the region is about 4% below the pre-COVID-19 level as many offices, businesses, schools, etc. remain closed & people are still teleworking/staying at home.
- Note recent PJM-wide data may differ from metropolitan Washington due to differing rates of reopening across the PJM territory.



https://www.pjm.com/~/media/committees-groups/pandemic/postings/estimated-impact-covid-19-daily-peak-and-energy.ashx



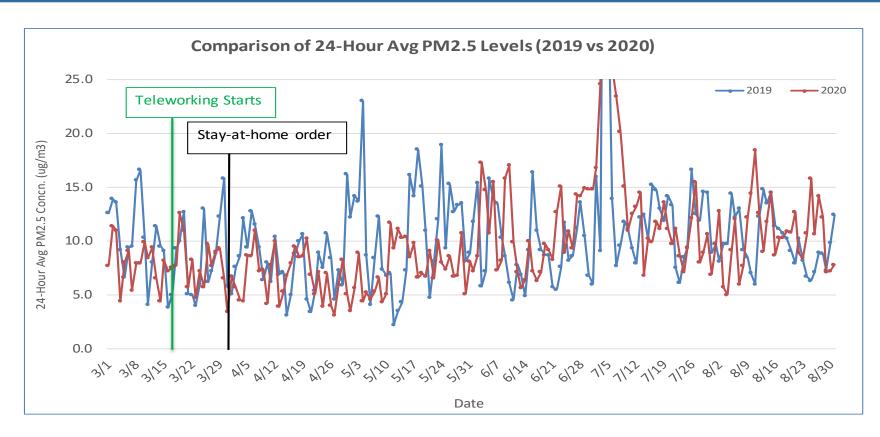
# Comparison of Ozone Levels – 2019 vs 2020



Note: Draft data valid as of August 31, 2020.



# Comparison of PM2.5 Levels – 2019 vs 2020



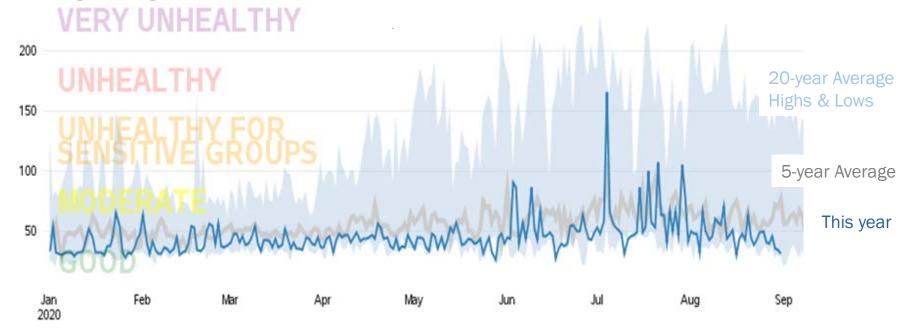
Note: Draft data valid as of August 31, 2020.



## **AQI Value Trends**

#### Combined Ozone and PM2.5 Daily AQI Values

Washington-Arlington-Alexandria, DC-VA-MD-WV



Source: U.S. EPA AirData <a href="https://www.epa.gov/air-data">https://www.epa.gov/air-data</a>

Generated: September 1, 2020

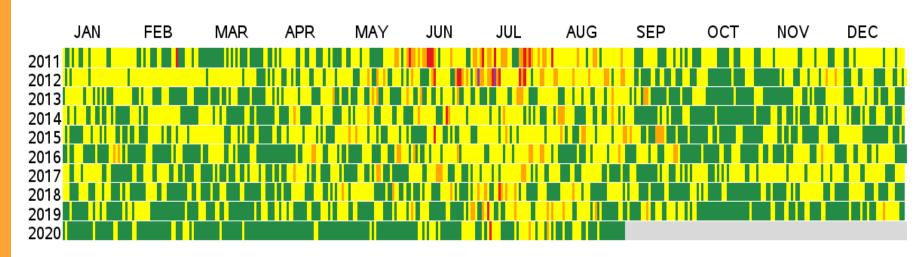
Note: Data shown above is for the Washington-Arlington-Alexandria CBSA.



## **AQI Value Trends**

#### Daily AQI Values, 2011 to 2020

Washington-Arlington-Alexandria, DC-VA-MD-WV



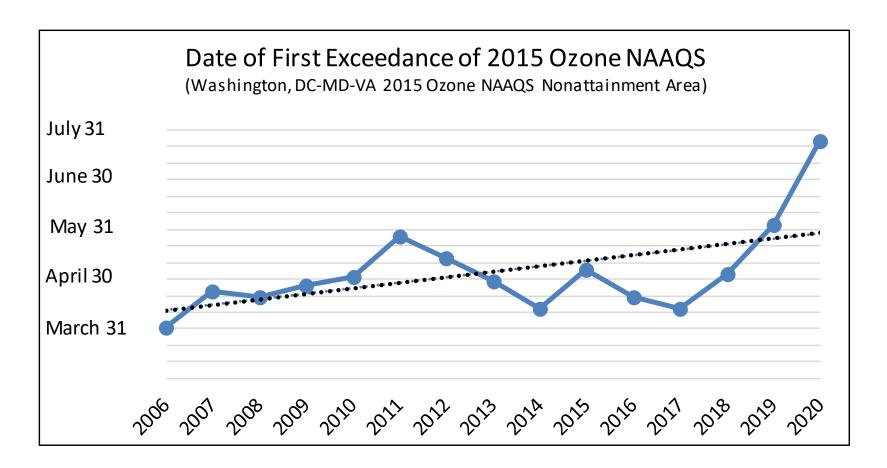
Source: U.S. EPA AirData <a href="https://www.epa.gov/air-data">https://www.epa.gov/air-data</a>

Generated: September 1, 2020

Note: Data shown above is for combined AQI values for ozone, PM2.5, PM10, CO, NO2, and SO2 for the Washington-Arlington-Alexandria CBSA.



## **Trend - Day of First Code Orange**





## **WEATHER & AIR QUALITY**

- Weather plays an important role in determining air quality besides emission.
- March 2020 Warmer and drier than March 2019 and normal.
- April 2020 Colder and much wetter than April 2019 and normal.
- May 2020 Much Colder and drier than May 2019 and normal. Cloudier than May 2019. Coolest since 2008 and driest since 2007.
- June 2020 Warmer and drier than normal and warmer and wetter than June 2019. 8<sup>th</sup> warmest on record.
- July/August 2020 Warmer and wetter than July/August 2019 and normal.

Source: <a href="https://w2.weather.gov/climate/index.php?wfo=lwx">https://w2.weather.gov/climate/index.php?wfo=lwx</a>



#### CONCLUSIONS

- Ozone levels were overall lower in 2020 compared to 2019 as COVID-19 related restrictions were implemented in the Washington region.
- PM2.5 levels were also overall lower though they seem to be higher starting June end onwards due to higher humidity.
- Reduction in emissions due to lower traffic and fuel/ electricity consumption coupled with weather contributed towards lower pollutant levels.
- The Washington region did not attain the 2015 ozone NAAQS based on draft 2018-2020 data (71 ppb). The attainment deadline is August 3, 2021 and the attainment is based on 2018-2020 data.



Monitor	County, State	Ozone Concentration (ppb)							
		Draft 2018-20 Design Value	4 <sup>th</sup> Highest Daily Max 8-Hr Avg Ozone (2019)	4 <sup>th</sup> Highest Daily Max 8-Hr Avg Ozone (2020)	Lowest 4 <sup>th</sup> Highest Daily Max 8-Hr Avg Ozone needed for continued nonattainment (71 ppb) in 2021				
Beltsville	Prince George's, MD	71	75	65	73				
McMillian Ncore	District of Columbia	69	71	63	79				
HU- Beltsville	Prince George's, MD	68	71	64	78				
Takoma	District of Columbia	67	67	63	83				
Arlington	Arlington, VA	66	68	62	83				
PG Equestrian	Prince George's, MD	65	65	60	88				
Franconia	Fairfax, VA	64	70	57	86				
Frederick	Fredrick, MD	65	65	63	85				
Rockville	Montgomery, MD	63	62	59	92				
S. Maryland	Charles, MD	60	61	52	100				
Ashburn	Loudoun, VA	61	60	60	93				
Long Park	Prince William, VA	60	60	57	96				
Calvert	Calvert, MD	59	58	54	101				
River Terrace	District of Columbia	55	62	54	97				



- The Washington region did not attain the standard by the deadline, but its max 4th highest daily max 8-hour avg ozone concentration in 2020 is 65 ppb.
- Since this value ≤ 70 ppb, the region is eligible to apply for an extension of the attainment date by one year.
- This will push the attainment date to August 3, 2022. The attainment will then be based on Design Value for the period 2019-2021.
- This will give the region more time for attainment and avoid getting bumped up to Moderate nonattainment Area.



- The lowest 4<sup>th</sup> highest daily 8-hour max avg ozone concentration that can keep the region in nonattainment in 2021 is 73 ppb at Beltsville.
- This monitor recorded 73 ppb and 75 ppb respectively in 2018 and 2019 so it is capable of recording 73 ppb and therefore keeping the region in nonattainment in 2021 if pre-COVID level emissions generating activities resume next year.
- The region would be able to apply for a second one-year extension to August 2023 (attainment DV to be based on 2020-22 data) if the average of the regional highest 4<sup>th</sup> max values for 2020 and 2021 is 70 ppb or less, a scenario which seems likely.
- However, if the region is not able to attain in 2022, EPA may bump-up the region to a higher nonattainment level sometime after May 2023 (after QA/QC of 2022 data is available) and the region will need to submit 15% RFP plan and an attainment SIP soon after that (within 1 year of bump-up?).



- Another possibility is that EPA may wait until May 2024 and bump-up the region to a Serious nonattainment area if the region does not attain by the end of 2023 as the Moderate NAA attainment deadline is August 2024 (attainment DV to be based on 2021-23 data).
- Considering all the above scenarios, the region could request for the first extension and then start working on a 15% RFP and attainment demonstration plan.
- This will ensure the region's 15% RFP and attainment plans will be ready for submittal by 2023/2024, if needed.

