

OZONE SEASON SUMMARY 2020

Sunil Kumar
Principal Environmental Engineer

MWAQC-Technical Advisory Committee
October 13, 2020

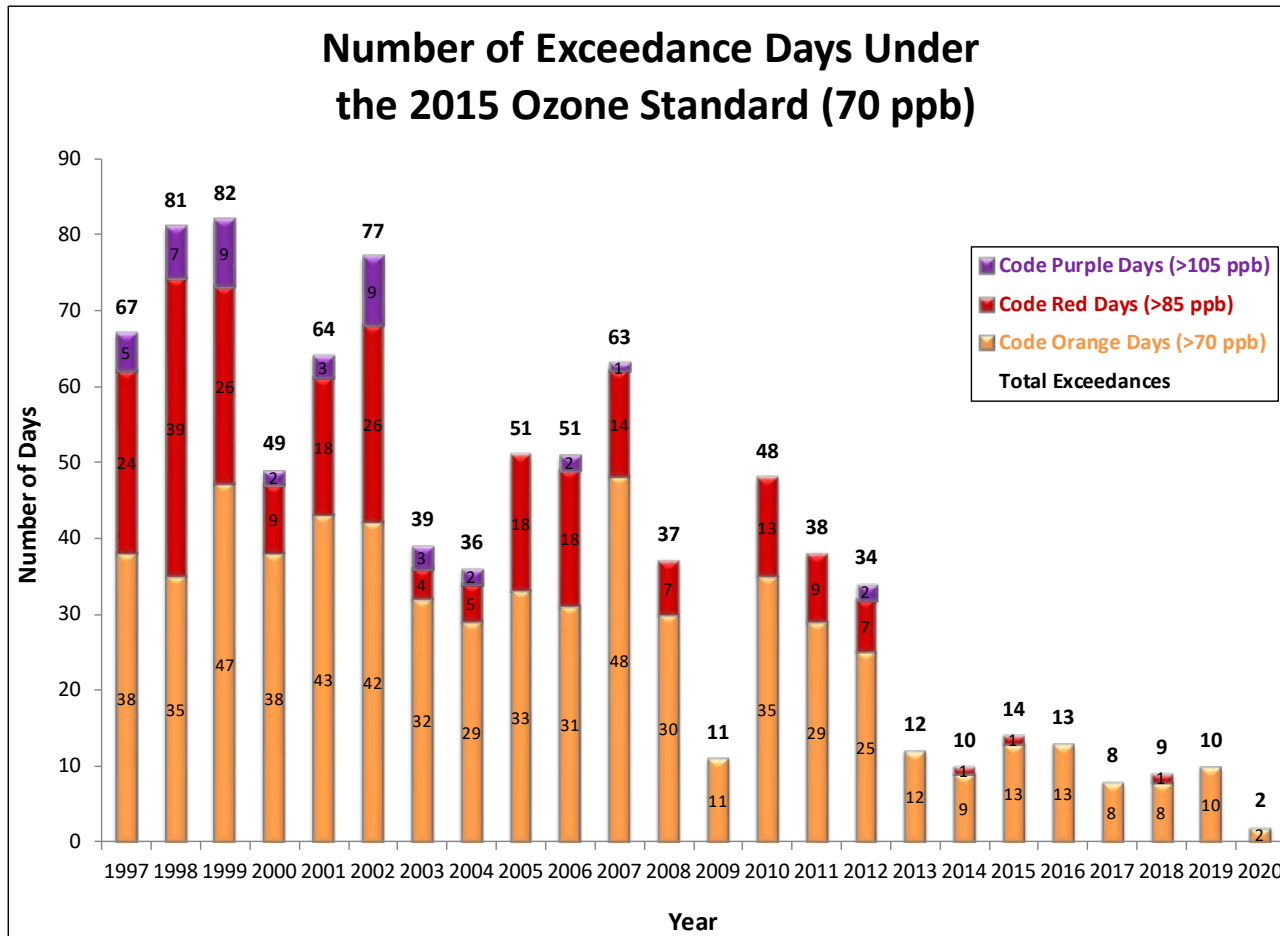
Peak 8-Hour Average Ozone Levels (ppb)

March 2020							April 2020							May 2020						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
44	52	40	44	42	39	43				40	48	50	36						39	49
47	52	43	36	42	46	45	46	52	45	51	51	43	49	49	48	40	37	52	50	39
40	48	40	42	39	41	39	50	45	47	48	49	51	47	49	39	46	56	47	57	52
44	38	39	38	41	48	43	50	45	48	49	41	34	47	42	43	47	46	43	33	47
38	49	40					38	40	40	51	46			35	42	49	36	26	39	52
														43						
June 2020							July 2020							August 2020						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	49	48	65	66	43	57				56	52	52	49					55	38	52
47	57	66	37	46	60	49	52	56	55	52	52	35	48	36	60	54	46	51	58	57
50	53	50	30	39	38	41	50	51	53	66	53	56	70	53	61	47	51	37	32	47
43	48	49	55	55	59	51	58	56	73	59	60	46	60	52	49	59	48	42	46	53
44	44	53					55	60	51	72	64	45		54	44	43	42	39	40	29
September 2020																				
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday														
40	29	31	37	42	45	46														
50	52	49	32	23	40	31														
38	35	30	36	26	34	36														
38	39	47	57	35	32	28														
33	32	29	33																	

2 Code Orange, 32 Code Yellow Days, Rest All Code Green Days

Analysis is based on draft data as of September 30, 2020.

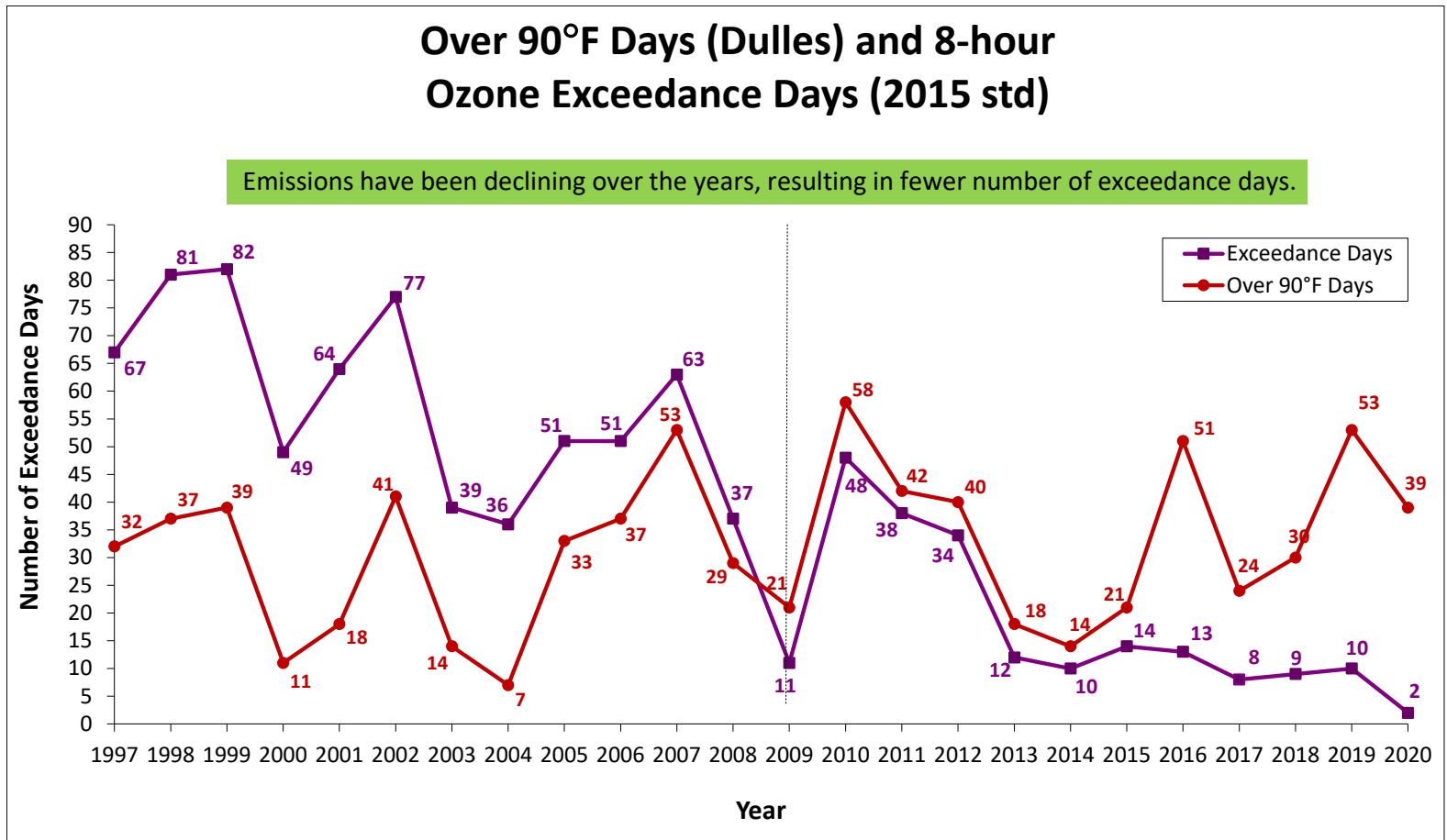
Ozone Exceedance Trend



Analysis is based on draft and incomplete data as of September 30, 2020.

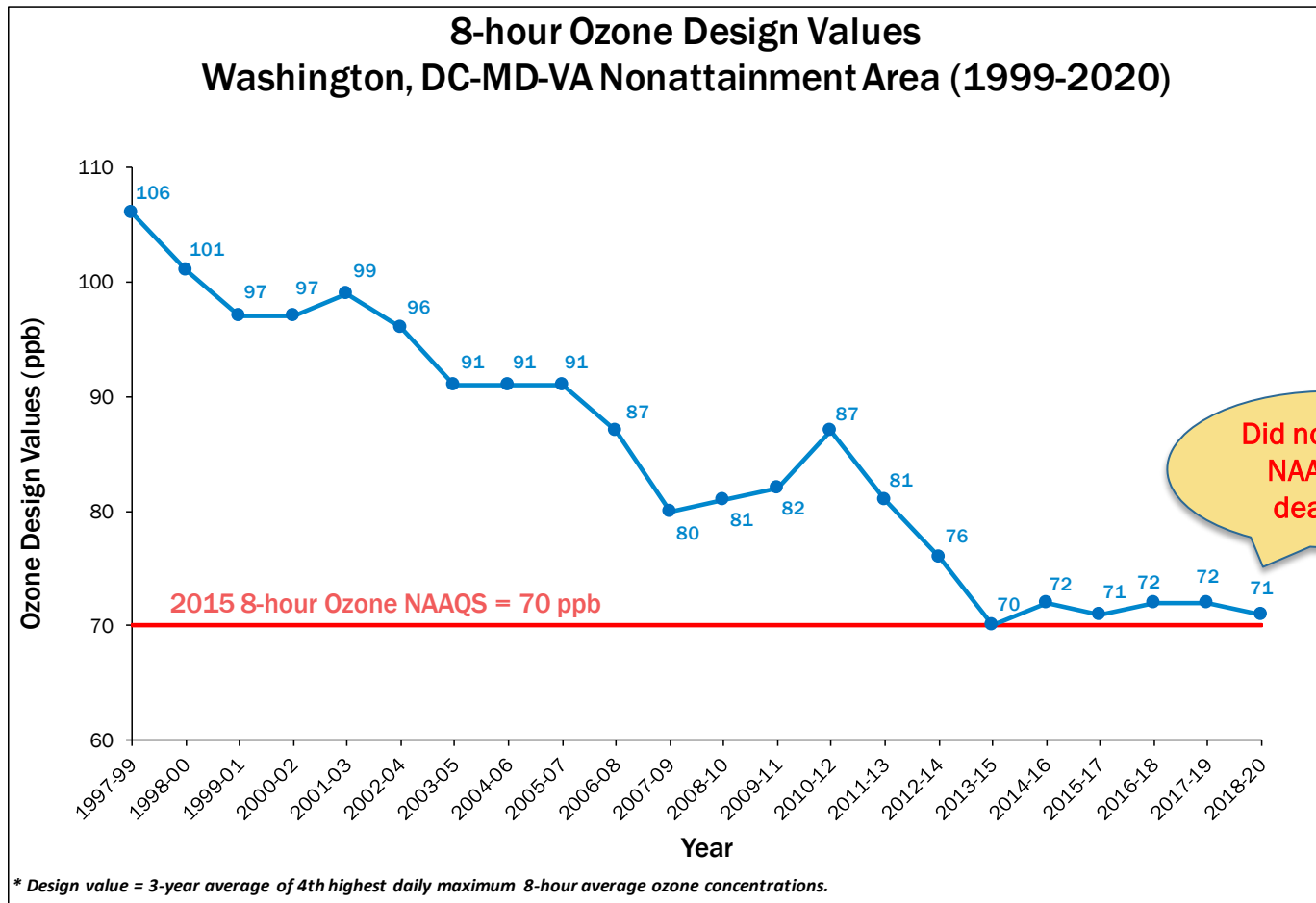


Ozone & Temperature Trend



Analysis is based on draft and incomplete data as of September 30, 2020.

Ozone Design Value Trend



Analysis is based on draft and incomplete data as of September 30, 2020.

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)	MD NOx regulation for coal-fired power plants	VRE Idling Reduction
NOX SIP Call (2004)	Virginia CSAPR Rule	LOW VOC Paint
CAIR/CSAPR/CSAPR Update (2009/2015/2017)	Ozone Transport Commission Rules	Gas Can Replacement



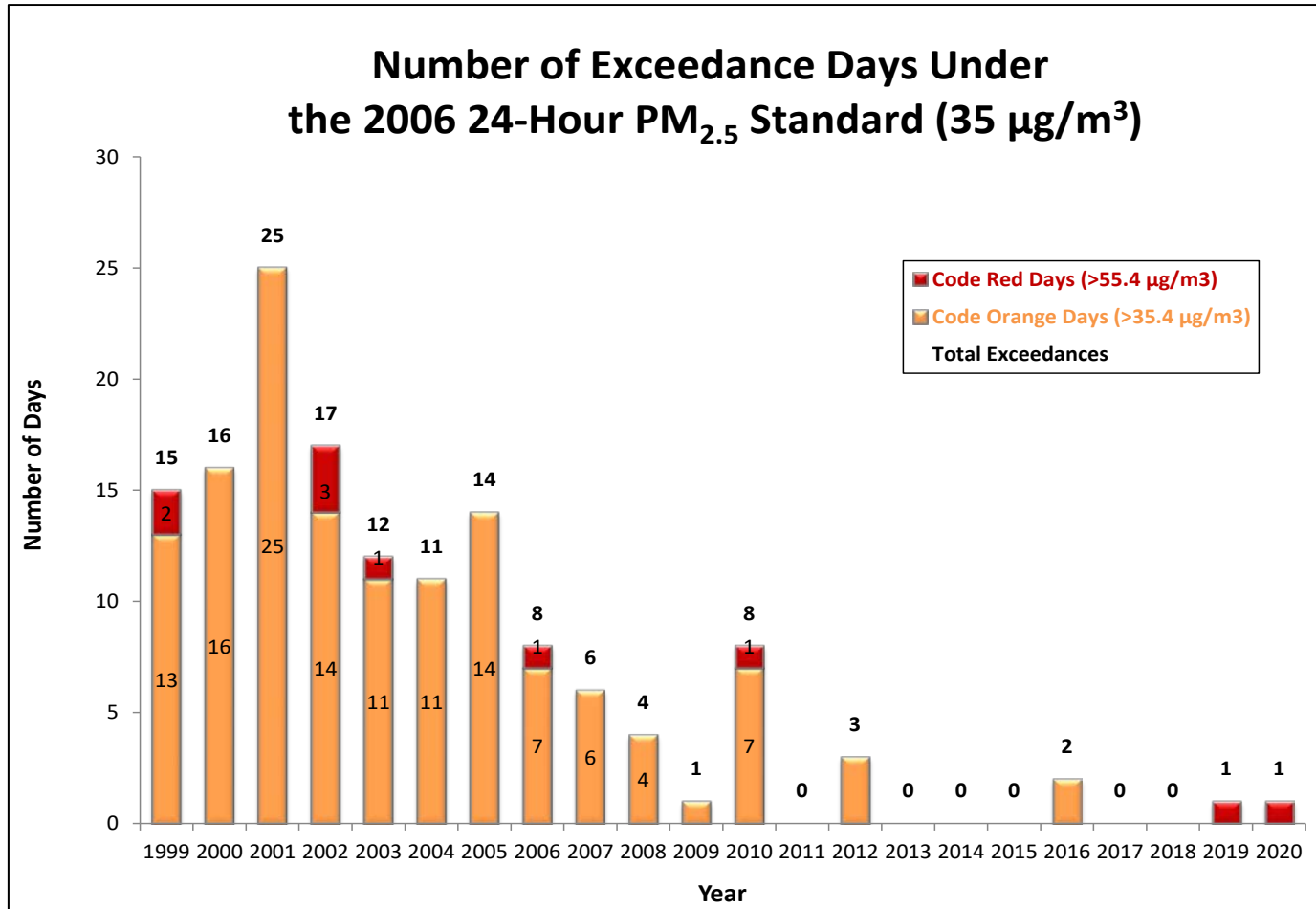
24-Hour Average PM2.5 Levels ($\mu\text{g}/\text{m}^3$)

March 2020							April 2020							May 2020						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
6.2	10.9	9.4	3.4	7.7	9.3	4.0				6.6	4.2	3.1	3.1						3.5	5.6
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
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
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
9.4	6.5	4.3					4.0	3.1	6.0	8.3	5.1			8.0	7.4	8.6	6.7	6.8	10.7	5.1
														8.1						
June 2020							July 2020							August 2020						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	7.2	8.6	17.3	14.7	10.7	15.5				14.8	16.8	24.6	83.7							9.7
7.3	8.2	15.8	17.0	9.9	7.1	5.6	32.3	26.2	23.4	20.1	15.1	11.0	12.5	12.8	5.7	5.0	9.2	12.0	6.0	7.7
6.4	10.0	7.2	6.3	7.1	9.7	9.2	13.2	14.5	6.8	10.2	9.9	11.8	11.1	12.2	14.4	18.4	12.6	9.0	11.8	14.5
8.3	12.7	15.1	8.9	10.9	9.3	14.3	13.6	11.1	9.7	11.1	8.6	7.1	9.3	8.7	10.3	10.3	10.9	10.8	12.7	8.9
14.2	14.9	14.8					12.1	15.5	8.0	8.9	10.6	6.9		8.4	10.7	15.8	10.6	14.2	12.2	7.1
														7.2	7.8					
September 2020																				
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday														
		7.2	9.3	10.4	10.3	5.7														
8.0	6.5	7.8	8.0	4.0	8.5	6.5														
6.9	5.6	5.0	7.7	10.3	10.1	6.7														
8.1	7.3	8.7	8.1	11.7	11.0	5.6														
5.8	8.5	6.0	4.5																	

1 Code Red Day, 36 Code Yellow Day, Rest All Code Green Days

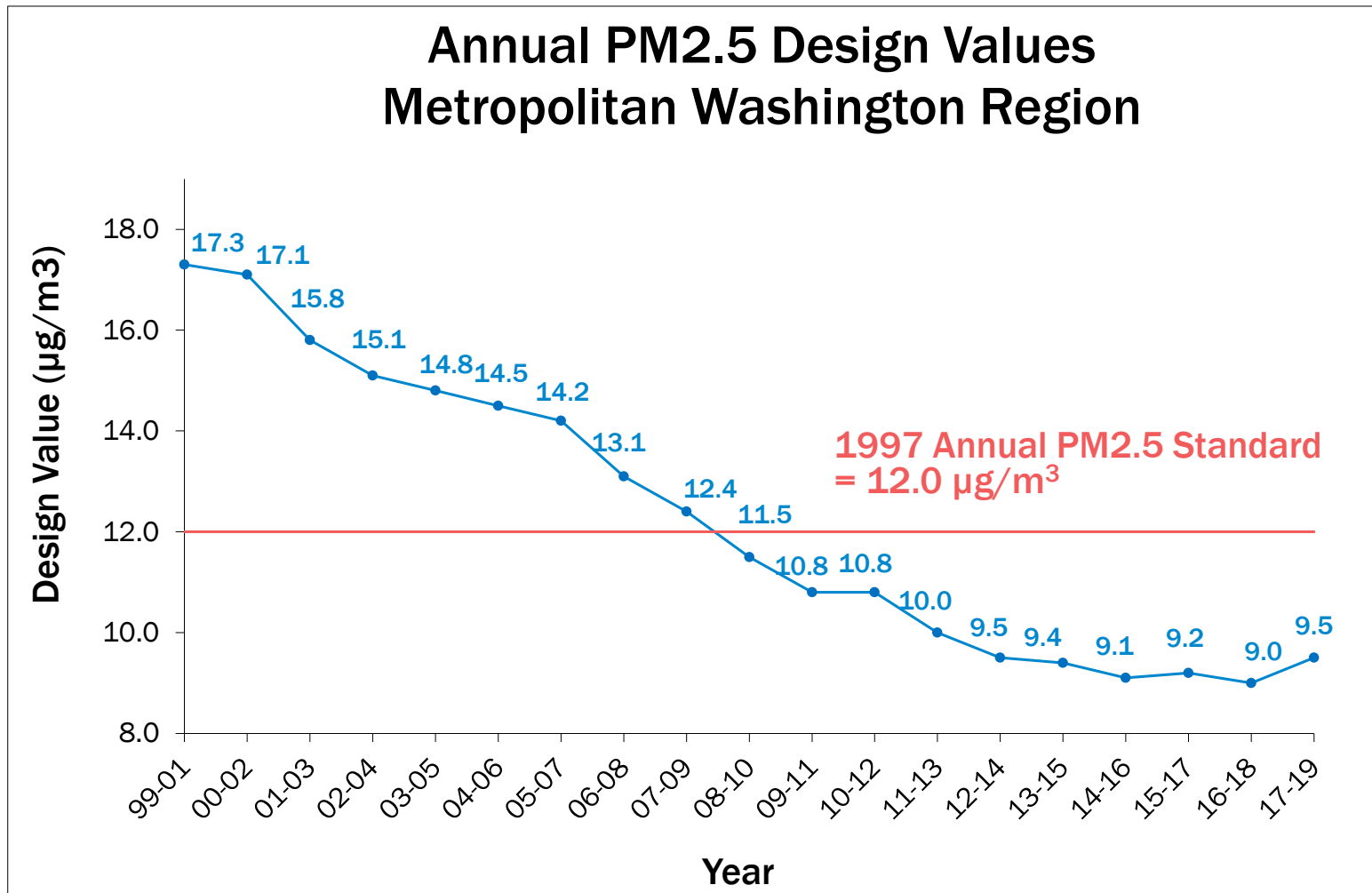
Analysis is based on draft data as of September 30, 2020.

PM2.5 Exceedance Trend

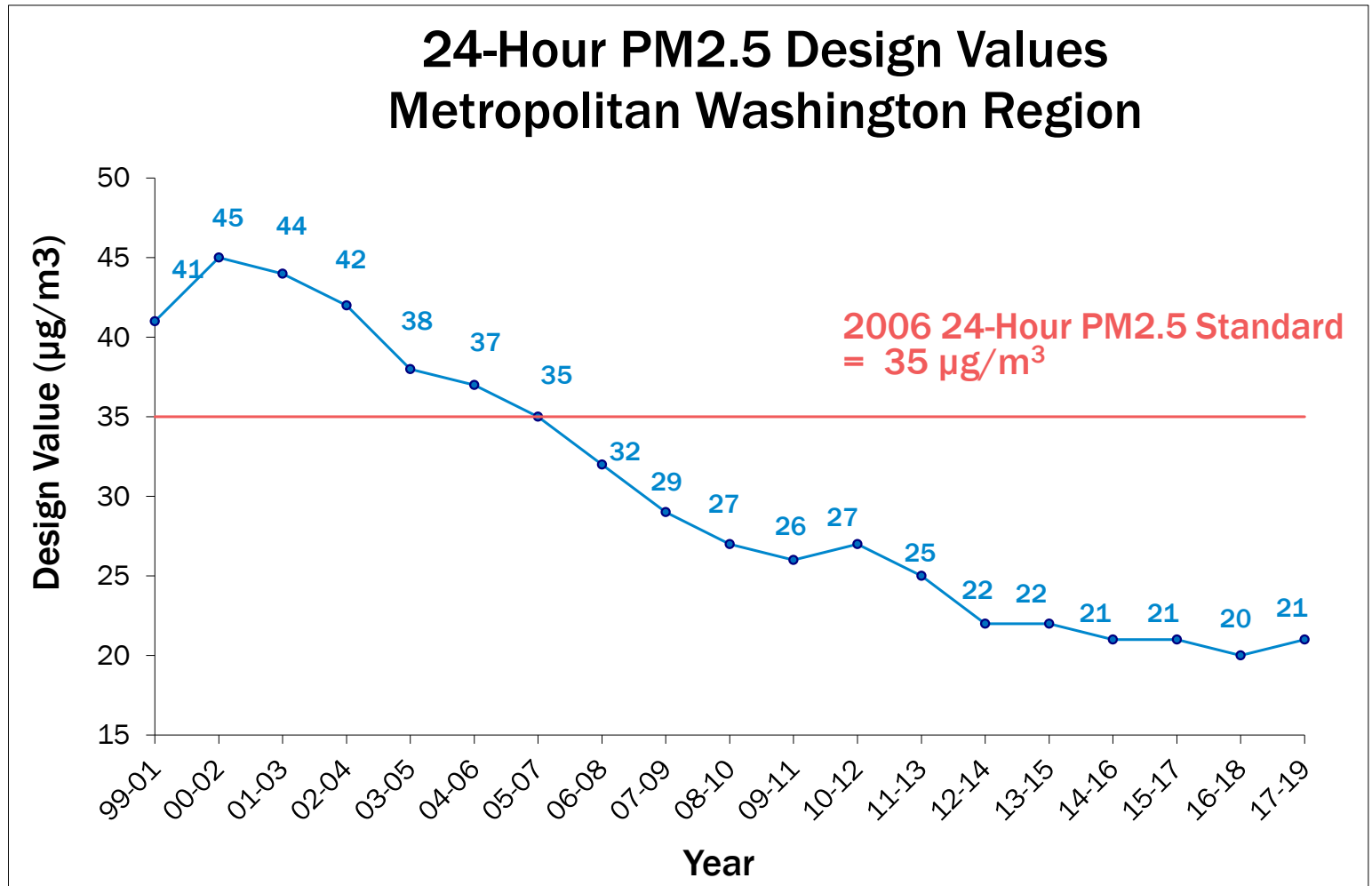


Analysis is based on draft and incomplete data as of September 30, 2020.
 2019 & 2020 code red days recorded on July 4th.

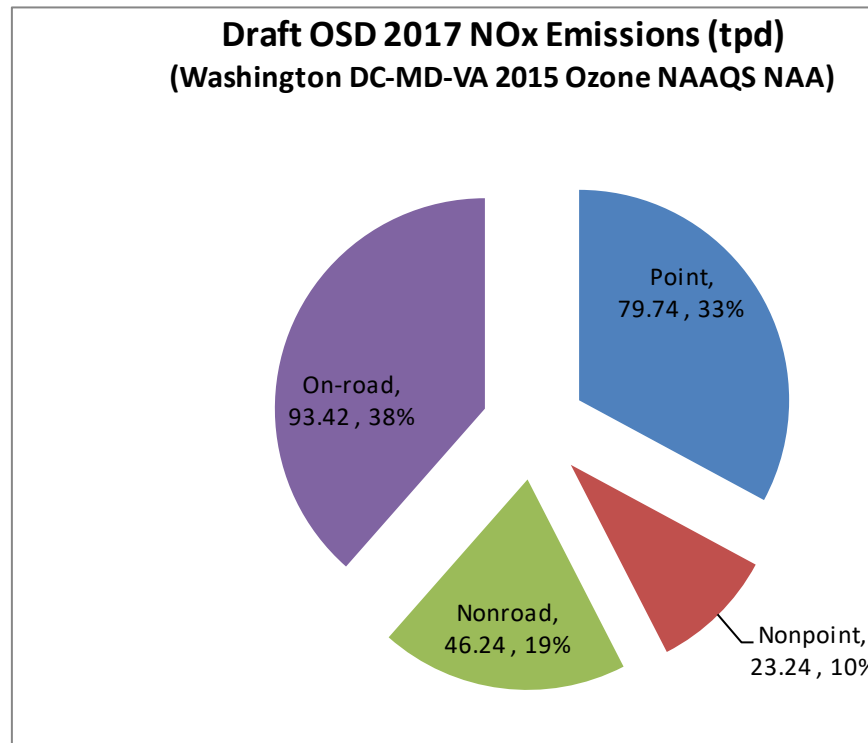
Annual PM2.5 Design Value Trend



24-Hour PM2.5 Design Value Trend



Emission by Source



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

IMPACT ON ON-ROAD SECTOR

Increase in Vehicle Speed in Washington, DC (Compared to Pre-COVID Level in February 2020)

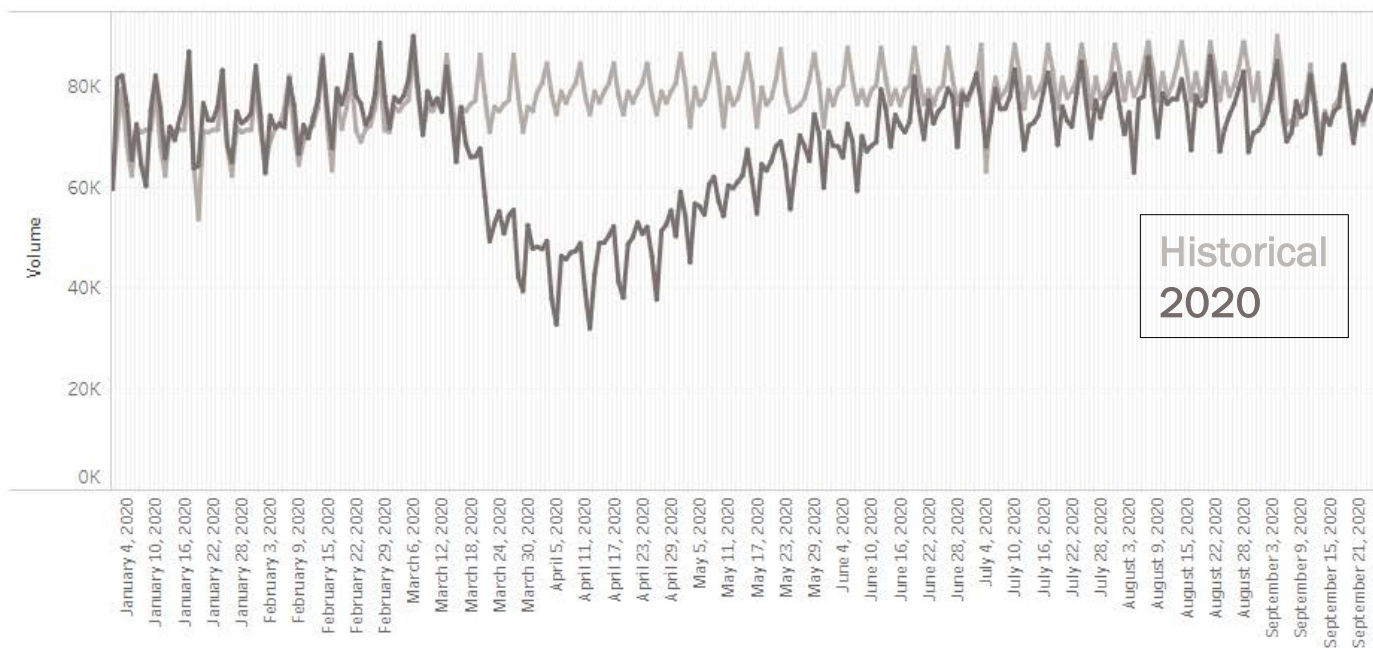
	March	April	May	June	July
8 AM	22%	19%	18%	20%	20%
5 PM	30%	29%	26%	18%	17%

Source: [INRIX Report - https://inrix.com/blog/2020/08/us-speeds/](https://inrix.com/blog/2020/08/us-speeds/)



IMPACT ON ON-ROAD SECTOR

I-95 N – Dumfries Road



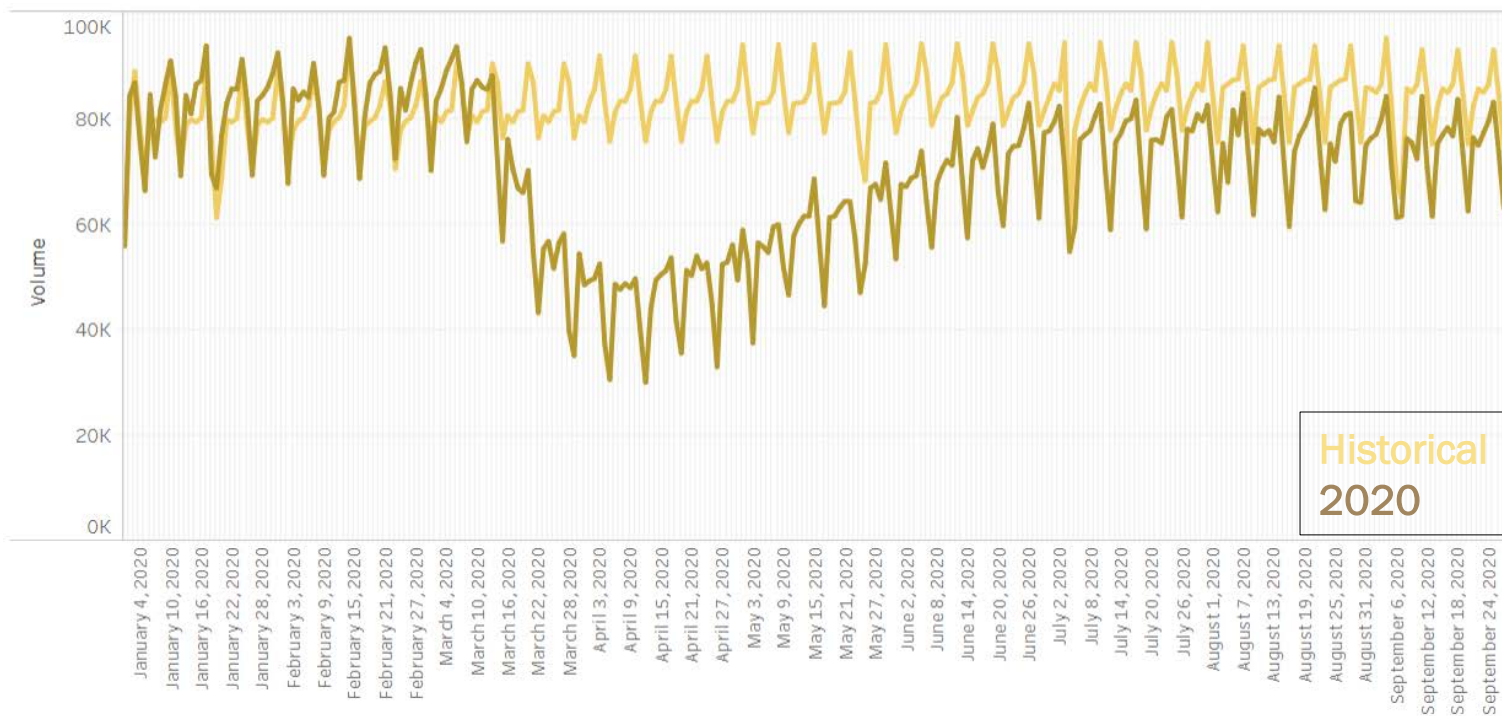
VDOT Traffic Engineering and Operations Divisions

- Vehicle traffic continues to increase after a decrease during mid-March to mid April.
Source: VDOT



IMPACT ON ON-ROAD SECTOR

I-395 N - Turkeycock



VDOT Traffic Engineering and Operations Divisions

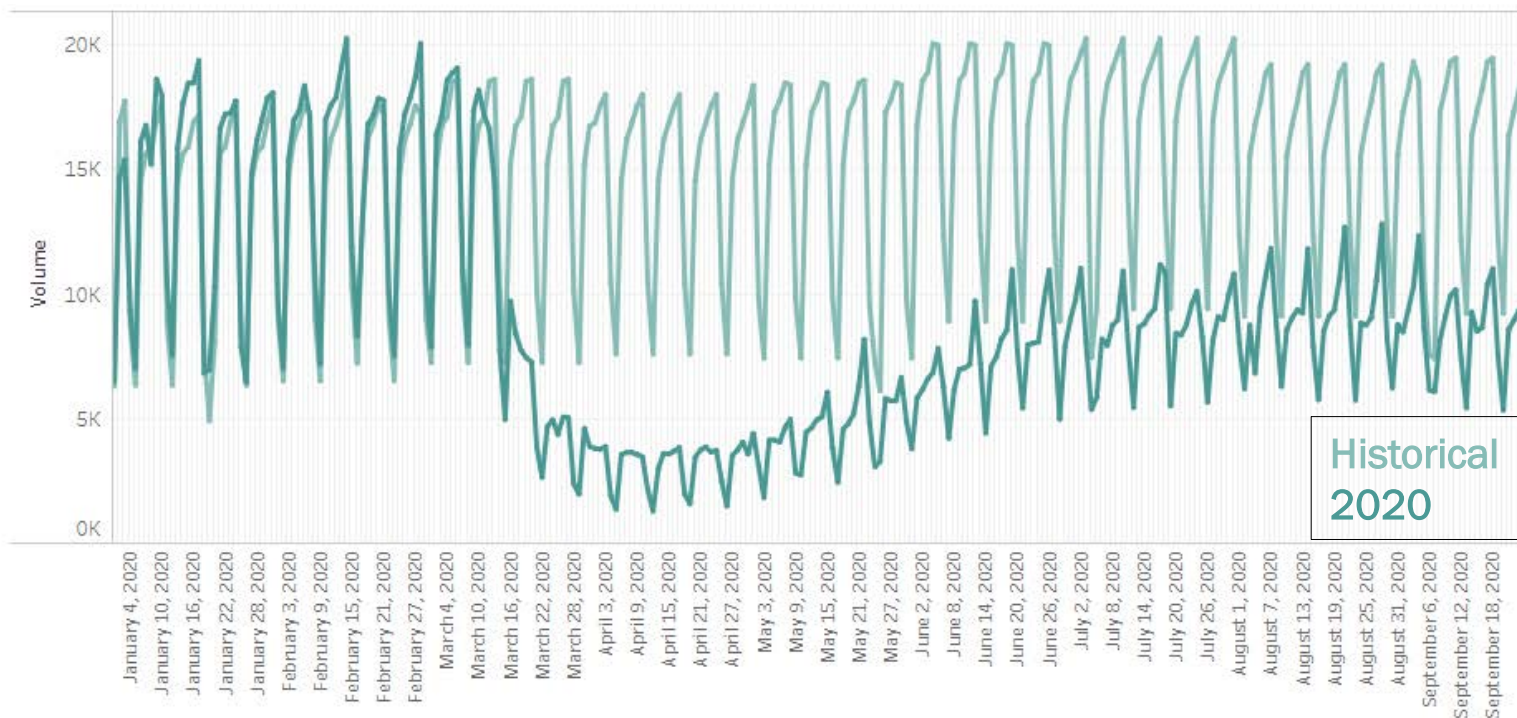
- Vehicle traffic continues to increase after a decrease during the mid-March to mid-April.

Source: VDOT



IMPACT ON ON-ROAD SECTOR

I-495 S – Braddock Road



VDOT Traffic Engineering and Operations Divisions

- Vehicle traffic continues to increase after a decrease during mid-March to mid-April.

Source: VDOT



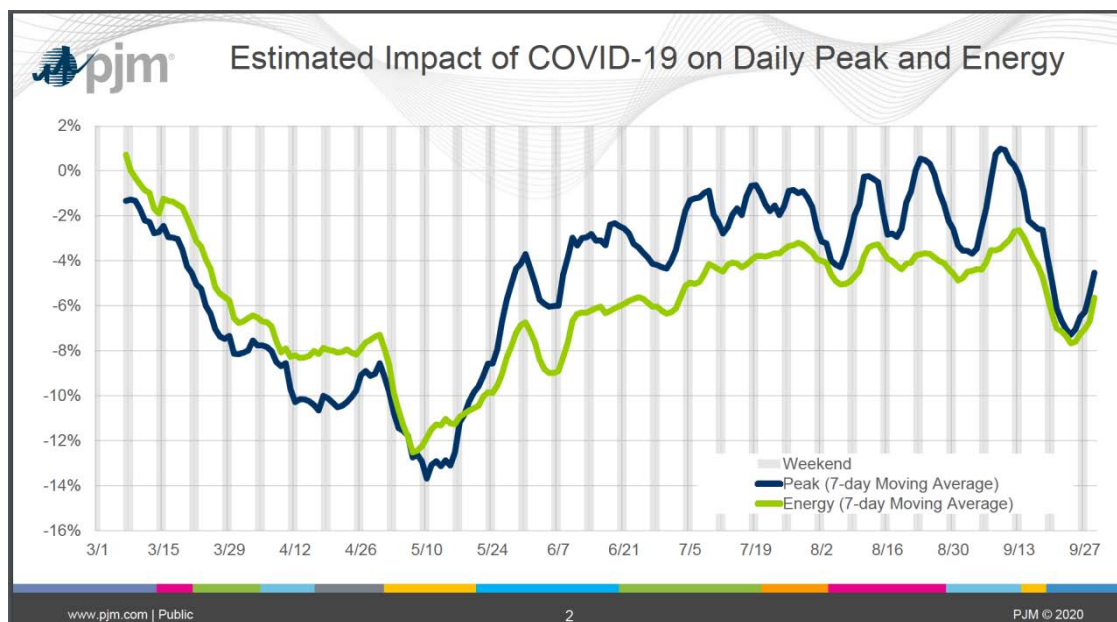
IMPACT ON NONPOINT & NONROAD SECTORS

- Emissions are still expected to be a little bit lower as activities related to nonroad sources and nonpoint sources have still not resumed to pre-COVID-19 levels.



IMPACT ON POINT SECTOR

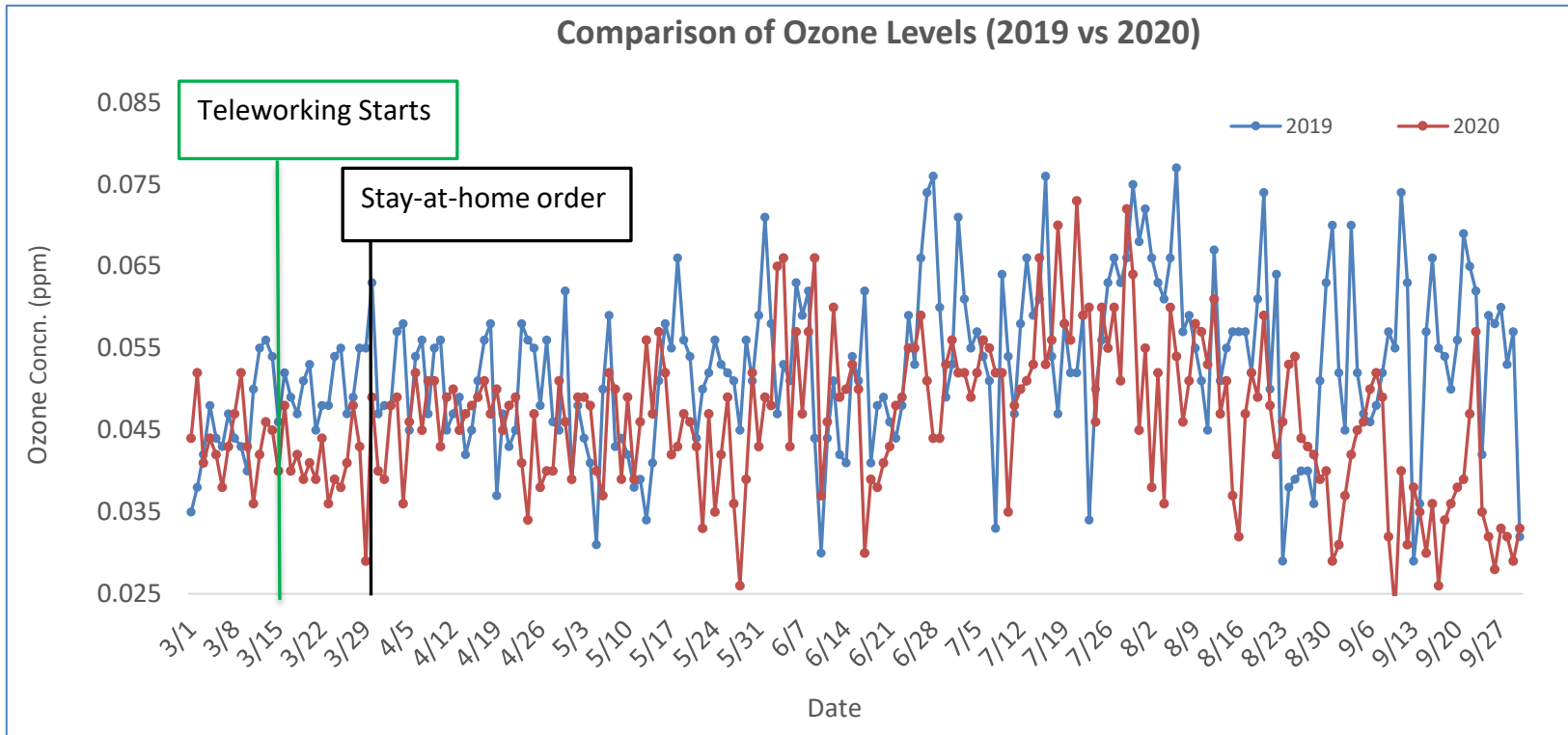
- Electricity consumption in the region is about 4% below the pre-COVID-19 level as many offices, businesses, schools, etc. remain closed & people are still teleworking/staying at home.
- Note recent PJM-wide data may differ from metropolitan Washington due to differing rates of reopening across the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



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



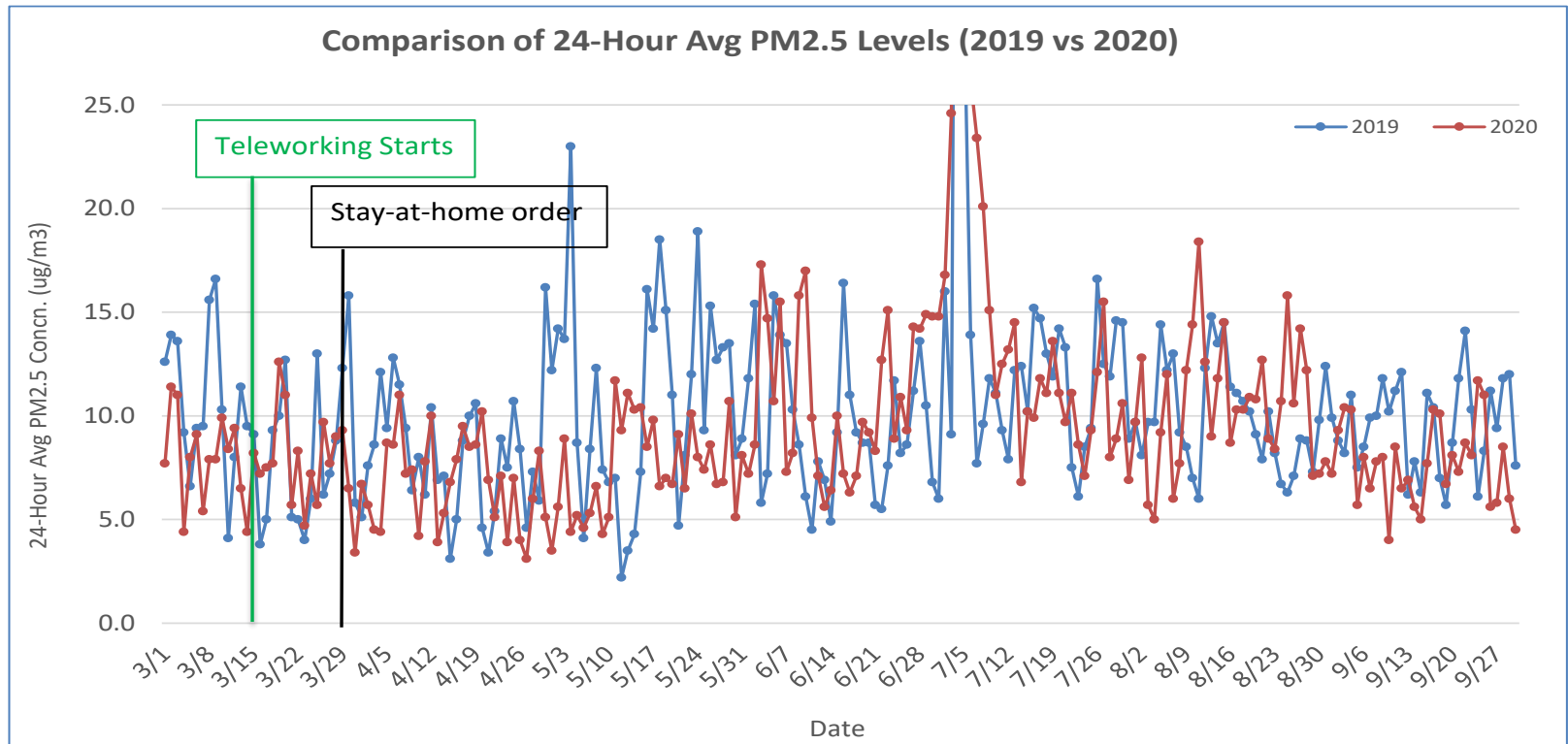
Comparison of Ozone Levels – 2019 vs 2020



Note: Draft data valid as of September 30, 2020.



Comparison of PM2.5 Levels – 2019 vs 2020



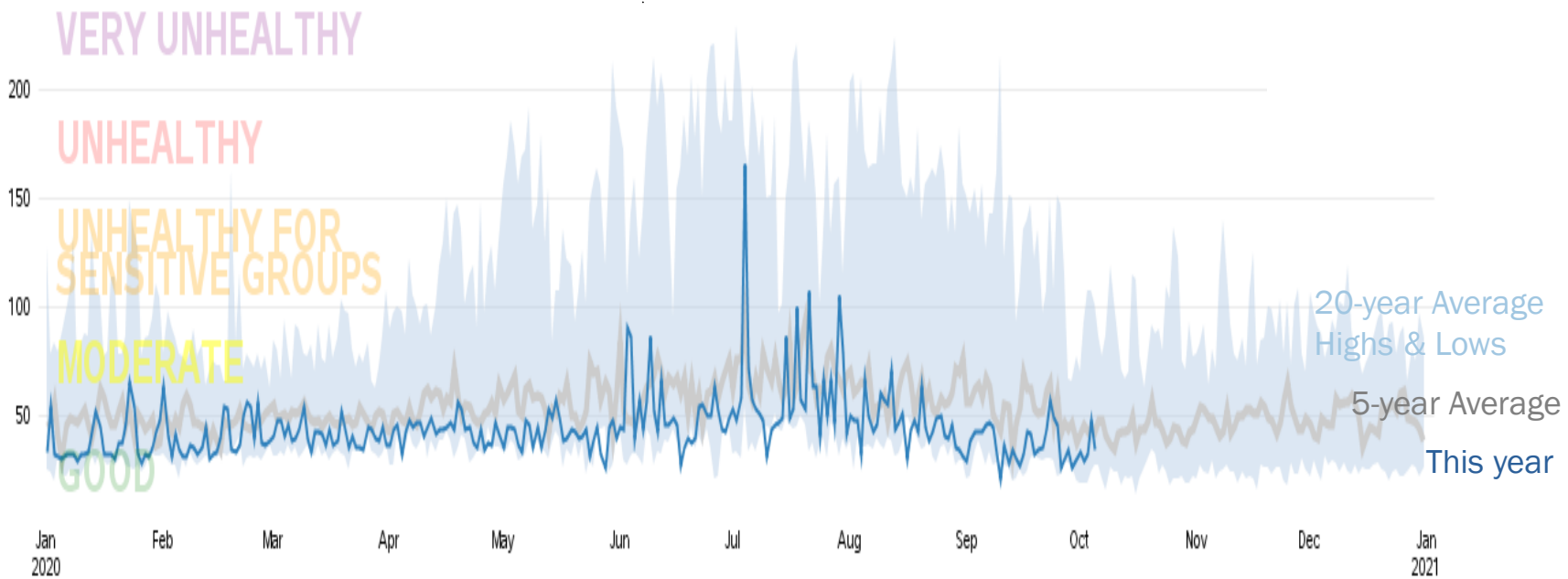
Note: Draft data valid as of September 30, 2020.



AQI Value Trends

Combined Ozone and PM2.5 Daily AQI Values

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



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

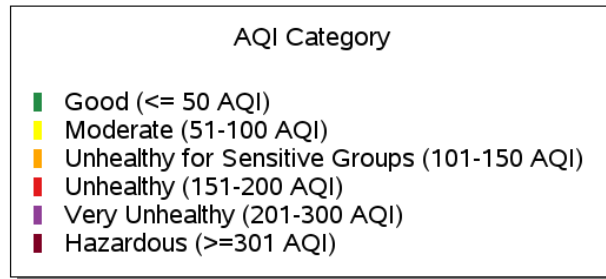
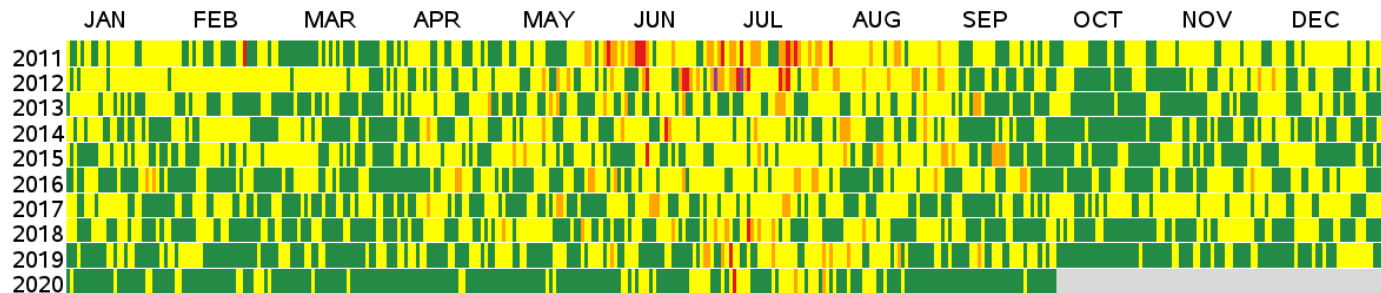
Generated: October 6, 2020

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



AQI Value Trends

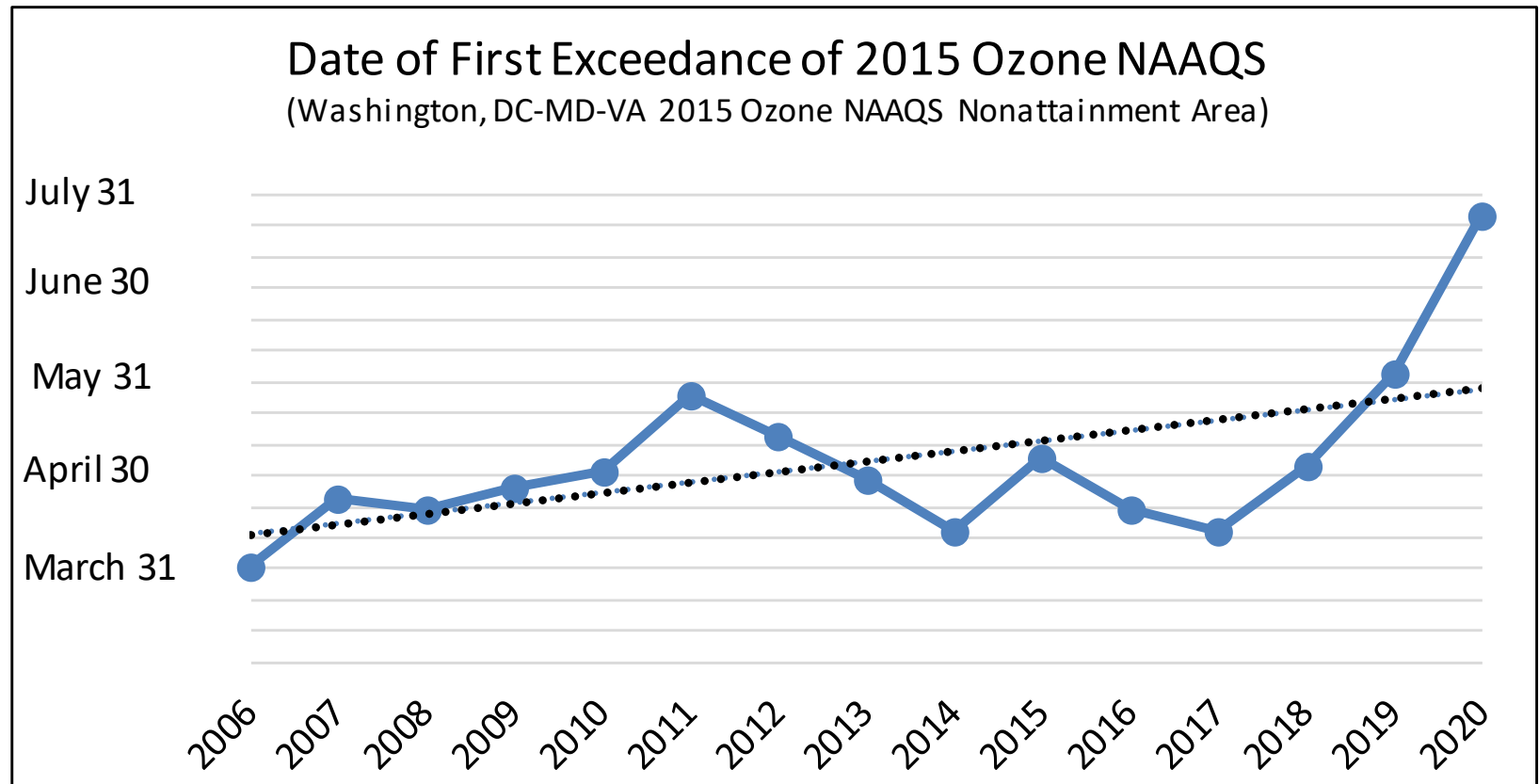
Daily AQI Values, 2011 to 2020
Washington-Arlington-Alexandria, DC-VA-MD-WV



Source: U.S. EPA AirData <<https://www.epa.gov/air-data>>
Generated: October 2, 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



Analysis is based on draft and incomplete data as of September 30, 2020.

WEATHER & AIR QUALITY

- Weather plays an important role in determining air quality besides emission.
- **April 2020** – Colder and much wetter than normal.
- **May 2020** – Much Colder and drier than normal.
- **June 2020** – Warmer and drier than normal.
- **July/August 2020** – Warmer and wetter than normal.
- **September 2020** – Colder than drier than normal

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



CONCLUSIONS

- Ozone and PM2.5 levels were overall lower in 2020 compared to 2019 as COVID-19 related restrictions were implemented in the Washington region.
- 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.

Ozone Planning - Probable Next Steps

Monitor	County, State	Ozone Concentration (ppb)			
		Draft 2018-20 Design Value	4 th Highest Daily Max 8-Hr Avg Ozone (2019)	4 th Highest Daily Max 8-Hr Avg Ozone (2020)	Lowest 4 th 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

Analysis is based on draft and incomplete data as of September 30, 2020.

Ozone Planning - Probable Next Steps

- The Washington region did not attain the standard by the deadline but is eligible to apply for an extension of the attainment date by one year as 4th highest daily max 8-hour avg ozone concentration in 2020 is 65 ppb (≤ 70 ppb).
- Extension will push the attainment date to August 3, 2022 (attainment DV based on 2019-2021 data).
- This will give the region more time for attainment, avoid getting bumped up to Moderate nonattainment Area immediately, and the opportunity to develop a 15% RFP and an attainment demonstration plan.
- This will ensure that these plans will be ready for submittal when needed.

Ozone Planning - Probable Next Steps

- The region seems likely be able to request a second one-year extension to August 2023 (attainment DV based on 2020-22 data).
- Depending on EPA's timeline of action, the region may get bumped up to Moderate or even Serious NAA if the region fails to attain after second extension and would need to submit RFP and attainment plans within a short period of time after that.
- Considering above scenarios, it seems appropriate that the region requests for the first extension and then start working on a 15% RFP and attainment demonstration plan to ensure timely availability of these plans when needed.
- After attainment, the region needs to keep working to maintain that status in future. This will be especially important after 2022 when the abnormally low ozone values from 2020 will be excluded from design value calculations.