OZONE SEASON SUMMARY 2020

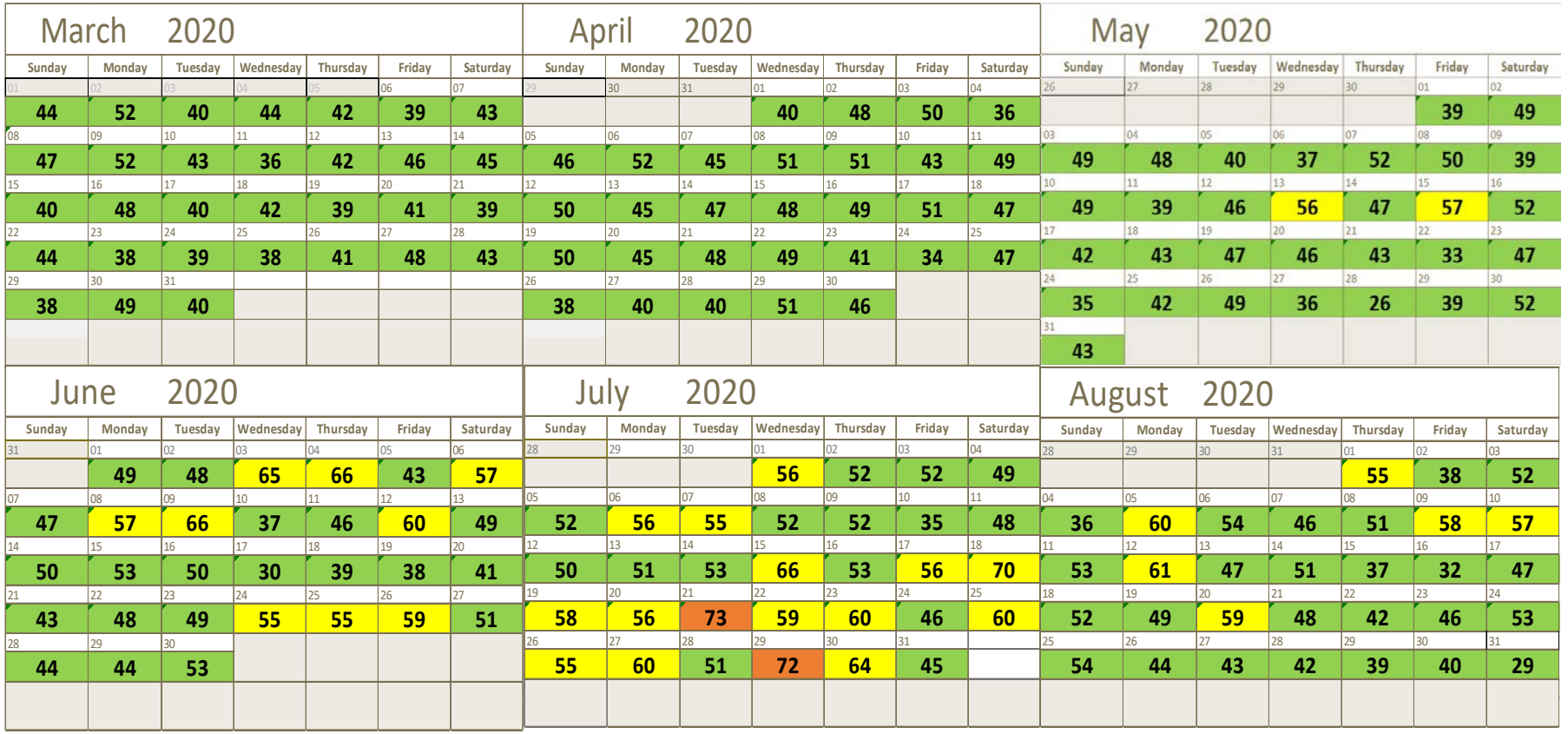
Sunil Kumar
Principal Environmental Engineer

MWAQC-Technical Advisory Committee
September 8, 2020

Agenda Item 2

Metropolitan Washington
Council of Governments

Peak 8-Hour Average Ozone Levels (ppb)



March 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01	02	03	04	05	06	07
44	52	40	44	42	39	43
08	09	10	11	12	13	14
47	52	43	36	42	46	45
15	16	17	18	19	20	21
40	48	40	42	39	41	39
22	23	24	25	26	27	28
44	38	39	38	41	48	43
29	30	31				
38	49	40				

April 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
29	30	31	01	02	03	04
			40	48	50	36
05	06	07	08	09	10	11
46	52	45	51	51	43	49
12	13	14	15	16	17	18
50	45	47	48	49	51	47
19	20	21	22	23	24	25
50	45	48	49	41	34	47
26	27	28	29	30		
38	40	40	51	46		

May 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26	27	28	29	30	01	02
					39	49
03	04	05	06	07	08	09
49	48	40	37	52	50	39
10	11	12	13	14	15	16
49	39	46	56	47	57	52
17	18	19	20	21	22	23
42	43	47	46	43	33	47
24	25	26	27	28	29	30
35	42	49	36	26	39	52
31						
43						

June 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
31	01	02	03	04	05	06
	49	48	65	66	43	57
07	08	09	10	11	12	13
47	57	66	37	46	60	49
14	15	16	17	18	19	20
50	53	50	30	39	38	41
21	22	23	24	25	26	27
43	48	49	55	55	59	51
28	29	30				
44	44	53				

July 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
28	29	30	01	02	03	04
			56	52	52	49
05	06	07	08	09	10	11
52	56	55	52	52	35	48
12	13	14	15	16	17	18
50	51	53	66	53	56	70
19	20	21	22	23	24	25
58	56	73	59	60	46	60
26	27	28	29	30	31	
55	60	51	72	64	45	

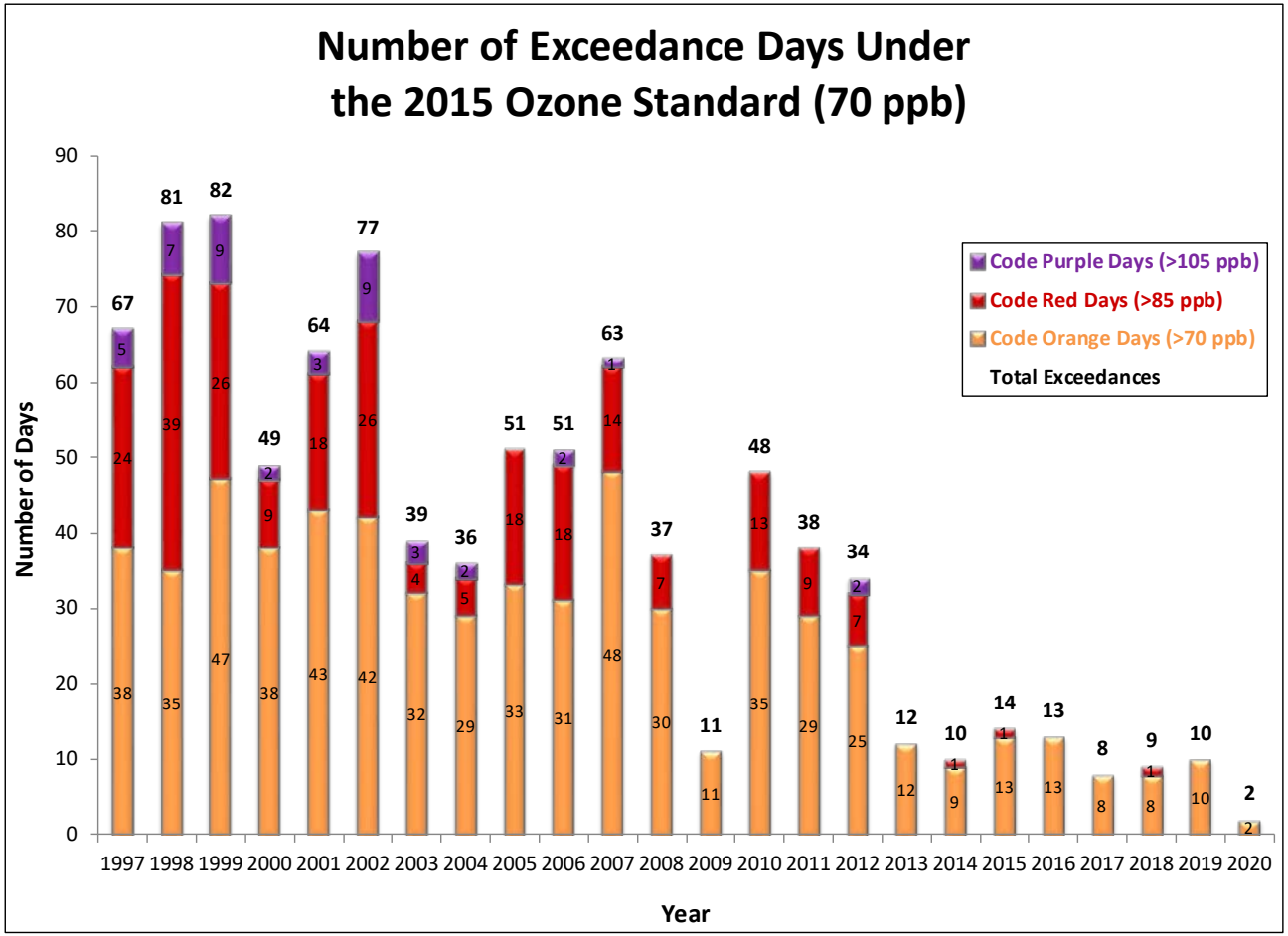
August 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
28	29	30	31	01	02	03
				55	38	52
04	05	06	07	08	09	10
36	60	54	46	51	58	57
11	12	13	14	15	16	17
53	61	47	51	37	32	47
18	19	20	21	22	23	24
52	49	59	48	42	46	53
25	26	27	28	29	30	31
54	44	43	42	39	40	29

2 Code Orange, 31 Code Yellow Days, Rest All Code Green Days

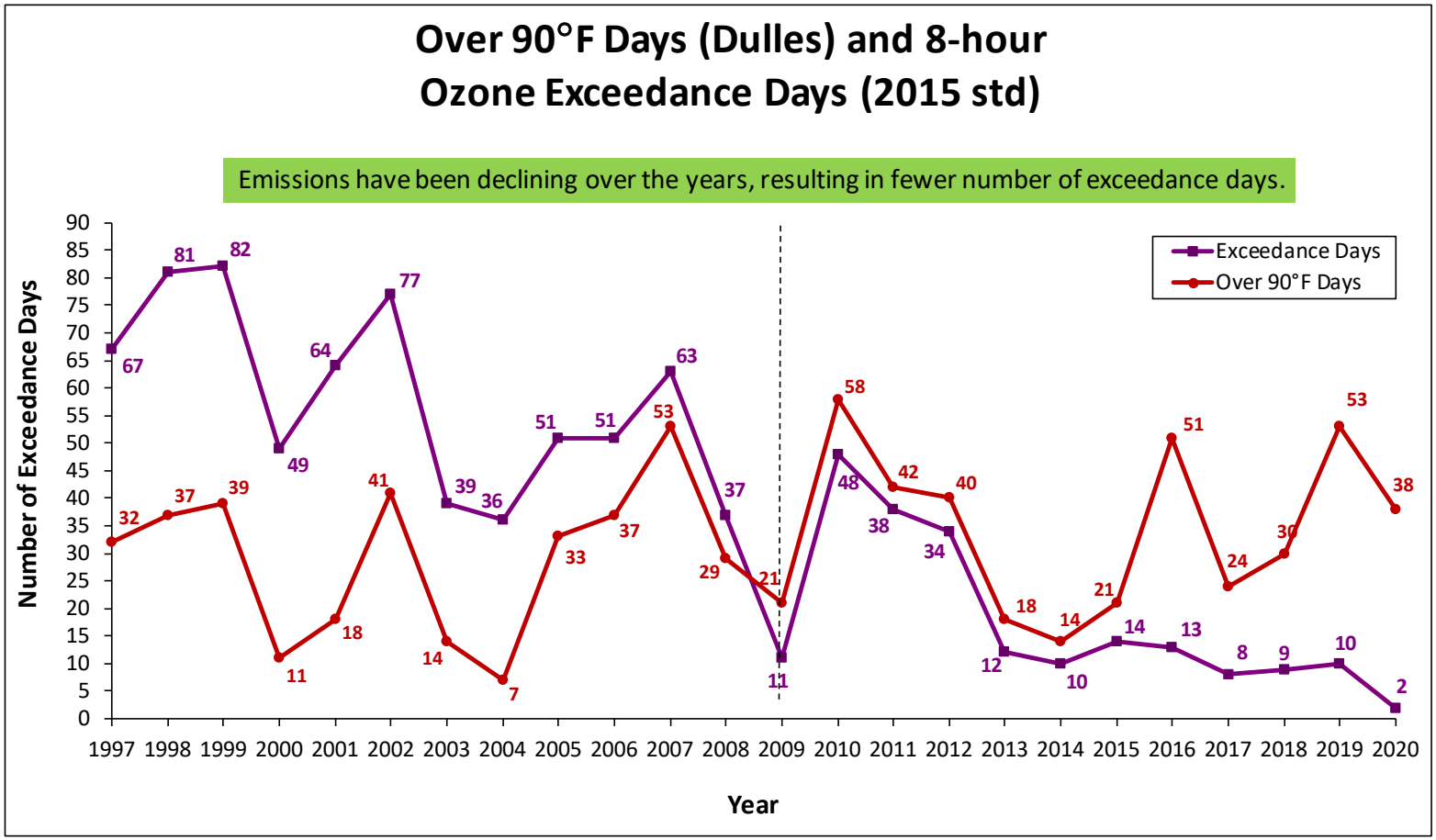
Analysis is based on draft data as of August 31, 2020.

Ozone Exceedance Trend



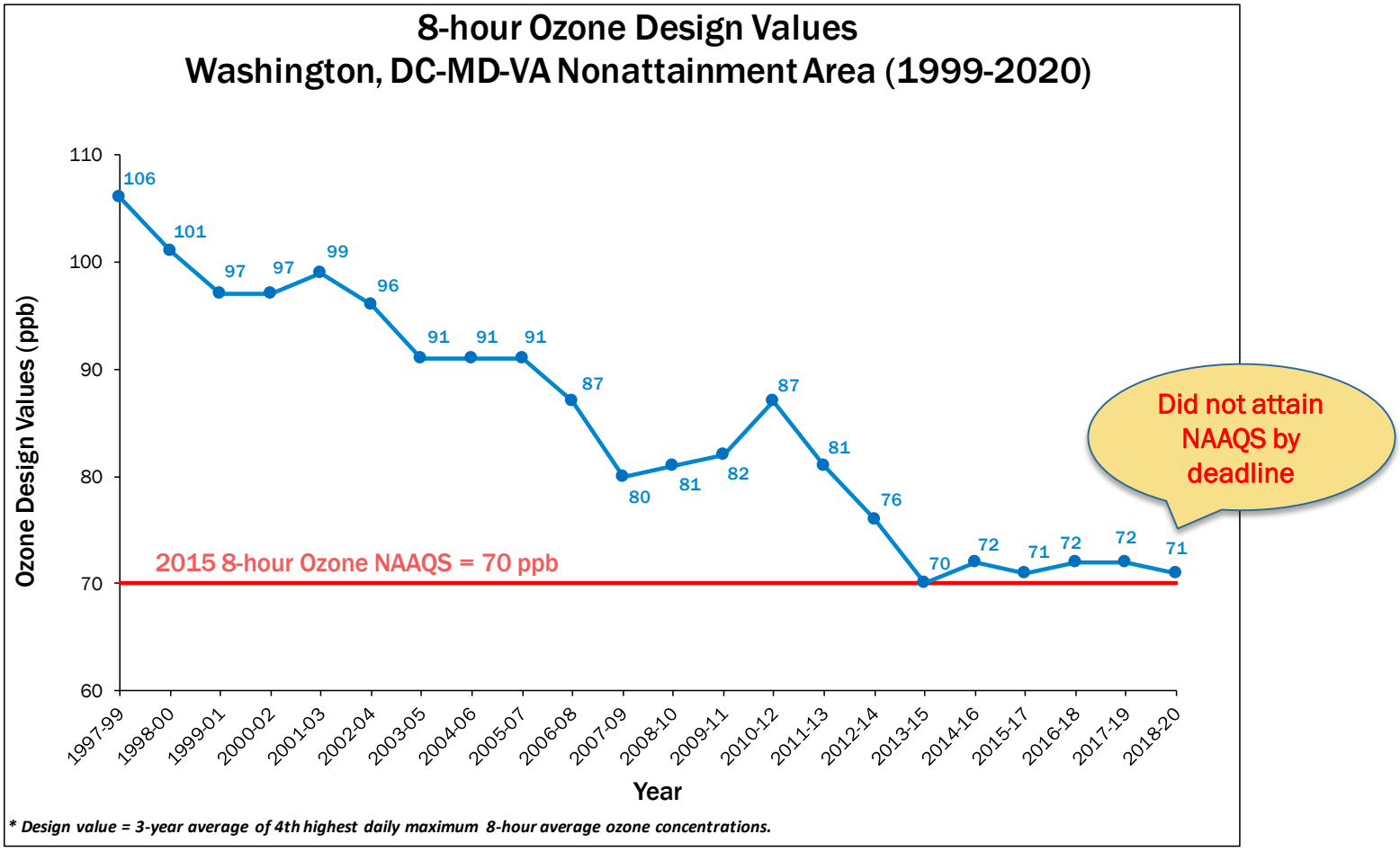
Analysis is based on draft and incomplete data as of August 31, 2020.

Ozone & Temperature Trend



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

Ozone Design Value Trend



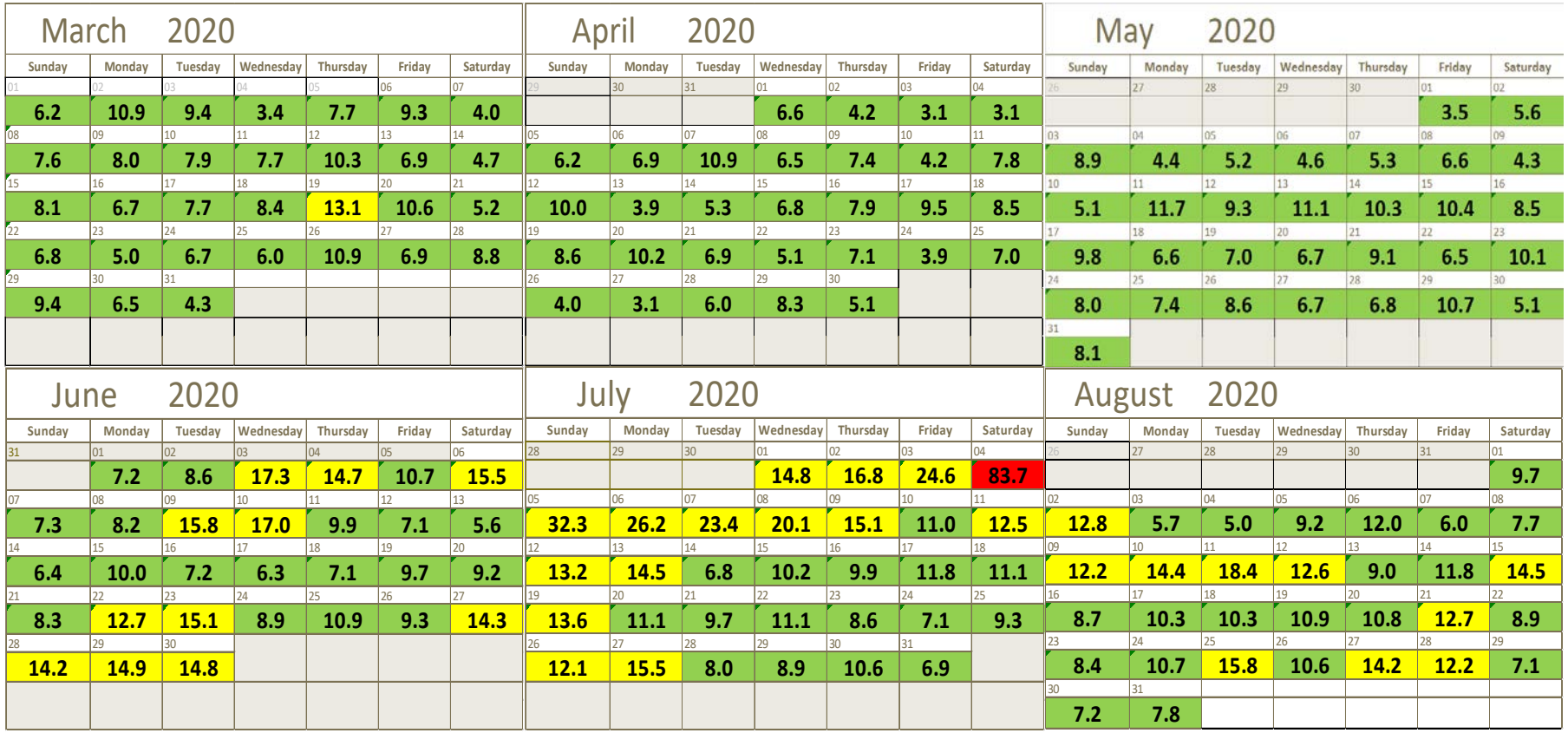
Analysis is based on draft and incomplete data as of August 31, 2020.

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)	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)



March 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01	02	03	04	05	06	07
6.2	10.9	9.4	3.4	7.7	9.3	4.0
08	09	10	11	12	13	14
7.6	8.0	7.9	7.7	10.3	6.9	4.7
15	16	17	18	19	20	21
8.1	6.7	7.7	8.4	13.1	10.6	5.2
22	23	24	25	26	27	28
6.8	5.0	6.7	6.0	10.9	6.9	8.8
29	30	31				
9.4	6.5	4.3				

April 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
29	30	31	01	02	03	04
			6.6	4.2	3.1	3.1
05	06	07	08	09	10	11
6.2	6.9	10.9	6.5	7.4	4.2	7.8
12	13	14	15	16	17	18
10.0	3.9	5.3	6.8	7.9	9.5	8.5
19	20	21	22	23	24	25
8.6	10.2	6.9	5.1	7.1	3.9	7.0
26	27	28	29	30		
4.0	3.1	6.0	8.3	5.1		

May 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26	27	28	29	30	01	02
					3.5	5.6
03	04	05	06	07	08	09
8.9	4.4	5.2	4.6	5.3	6.6	4.3
10	11	12	13	14	15	16
5.1	11.7	9.3	11.1	10.3	10.4	8.5
17	18	19	20	21	22	23
9.8	6.6	7.0	6.7	9.1	6.5	10.1
24	25	26	27	28	29	30
8.0	7.4	8.6	6.7	6.8	10.7	5.1
31						
8.1						

June 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
31	01	02	03	04	05	06
	7.2	8.6	17.3	14.7	10.7	15.5
07	08	09	10	11	12	13
7.3	8.2	15.8	17.0	9.9	7.1	5.6
14	15	16	17	18	19	20
6.4	10.0	7.2	6.3	7.1	9.7	9.2
21	22	23	24	25	26	27
8.3	12.7	15.1	8.9	10.9	9.3	14.3
28	29	30				
14.2	14.9	14.8				

July 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
28	29	30	01	02	03	04
			14.8	16.8	24.6	83.7
05	06	07	08	09	10	11
32.3	26.2	23.4	20.1	15.1	11.0	12.5
12	13	14	15	16	17	18
13.2	14.5	6.8	10.2	9.9	11.8	11.1
19	20	21	22	23	24	25
13.6	11.1	9.7	11.1	8.6	7.1	9.3
26	27	28	29	30	31	
12.1	15.5	8.0	8.9	10.6	6.9	

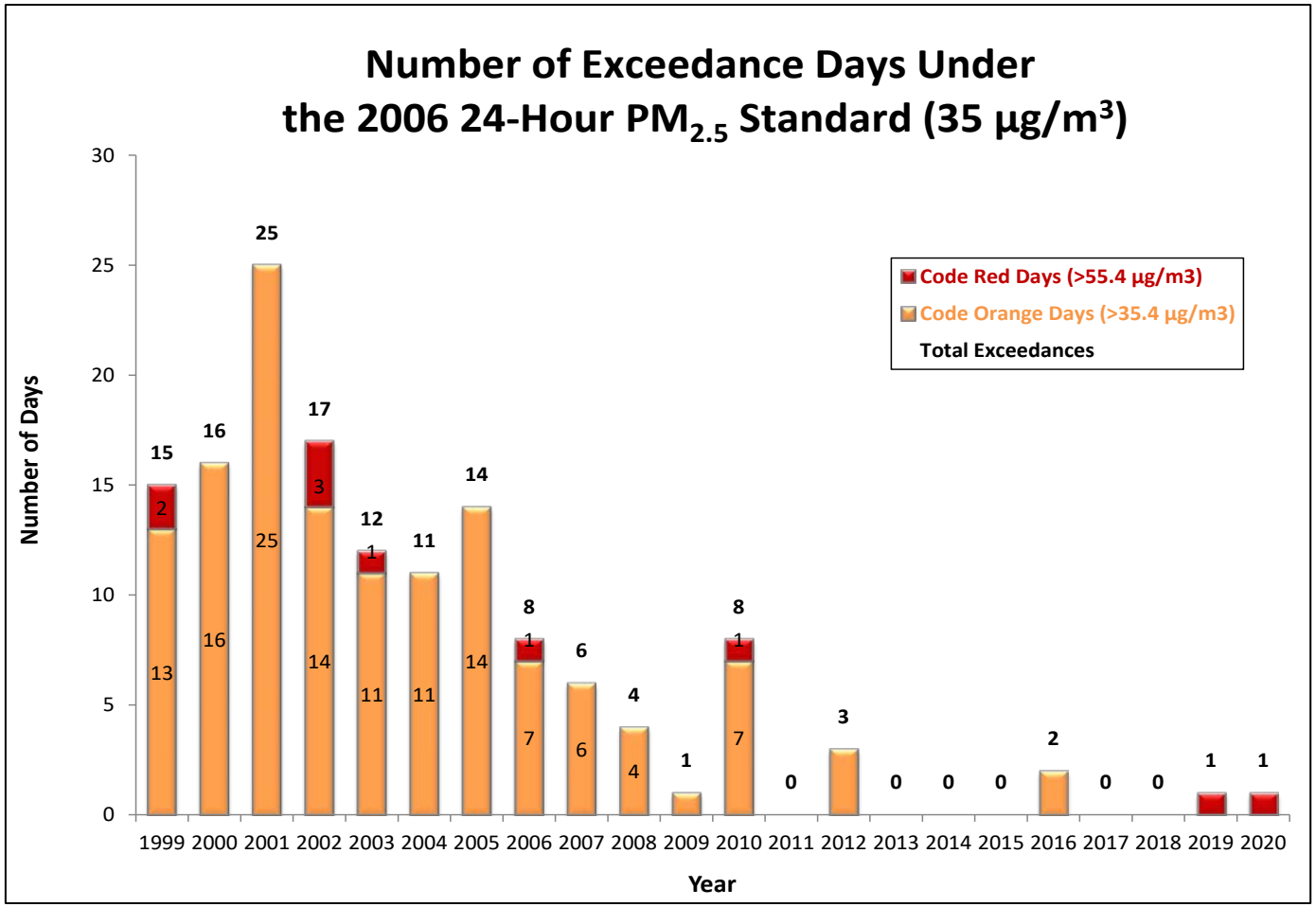
August 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26	27	28	29	30	31	01
						9.7
02	03	04	05	06	07	08
12.8	5.7	5.0	9.2	12.0	6.0	7.7
09	10	11	12	13	14	15
12.2	14.4	18.4	12.6	9.0	11.8	14.5
16	17	18	19	20	21	22
8.7	10.3	10.3	10.9	10.8	12.7	8.9
23	24	25	26	27	28	29
8.4	10.7	15.8	10.6	14.2	12.2	7.1
30	31					
7.2	7.8					

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

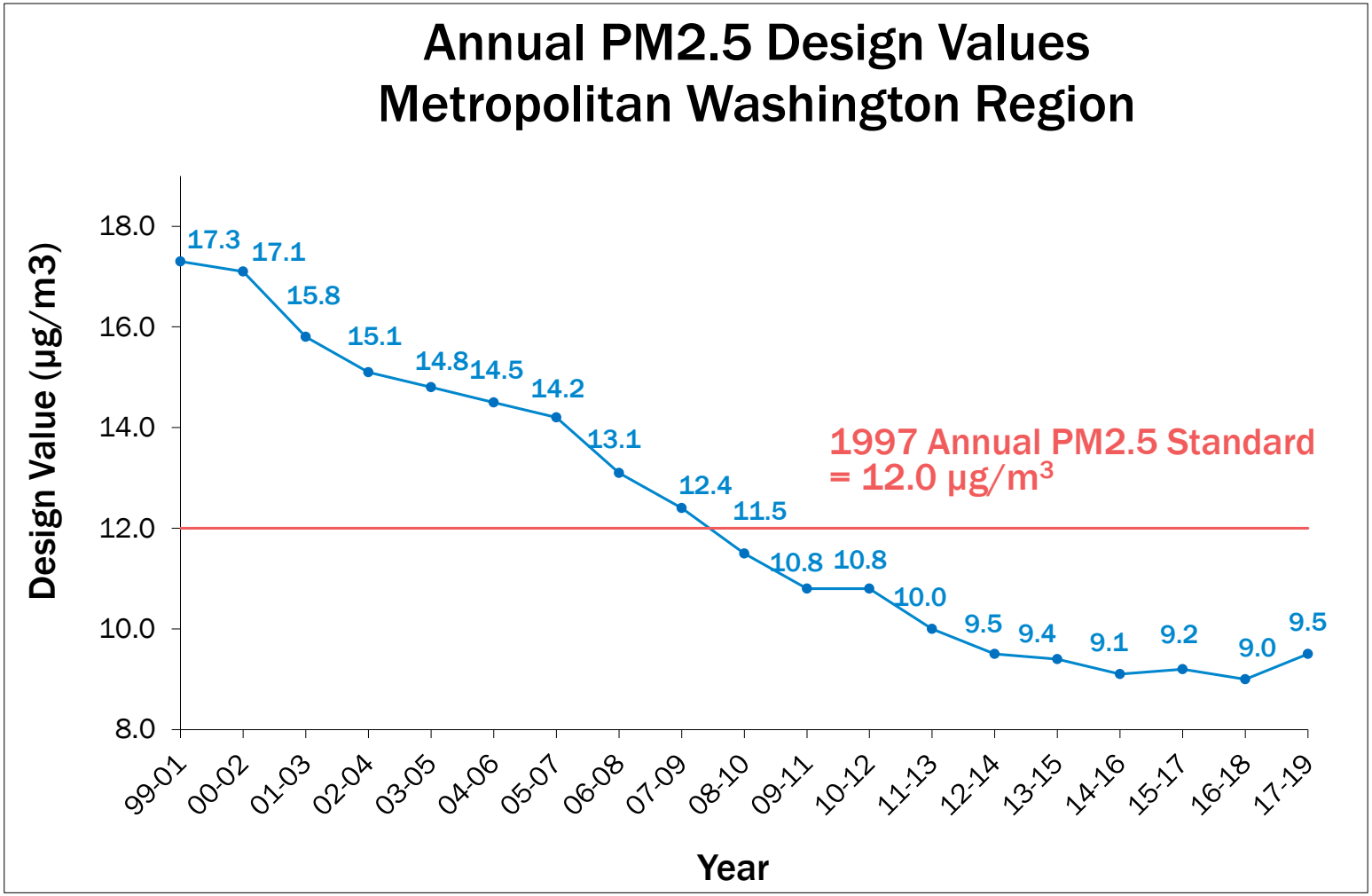
Analysis is based on draft data as of August 31, 2020.

PM2.5 Exceedance Trend

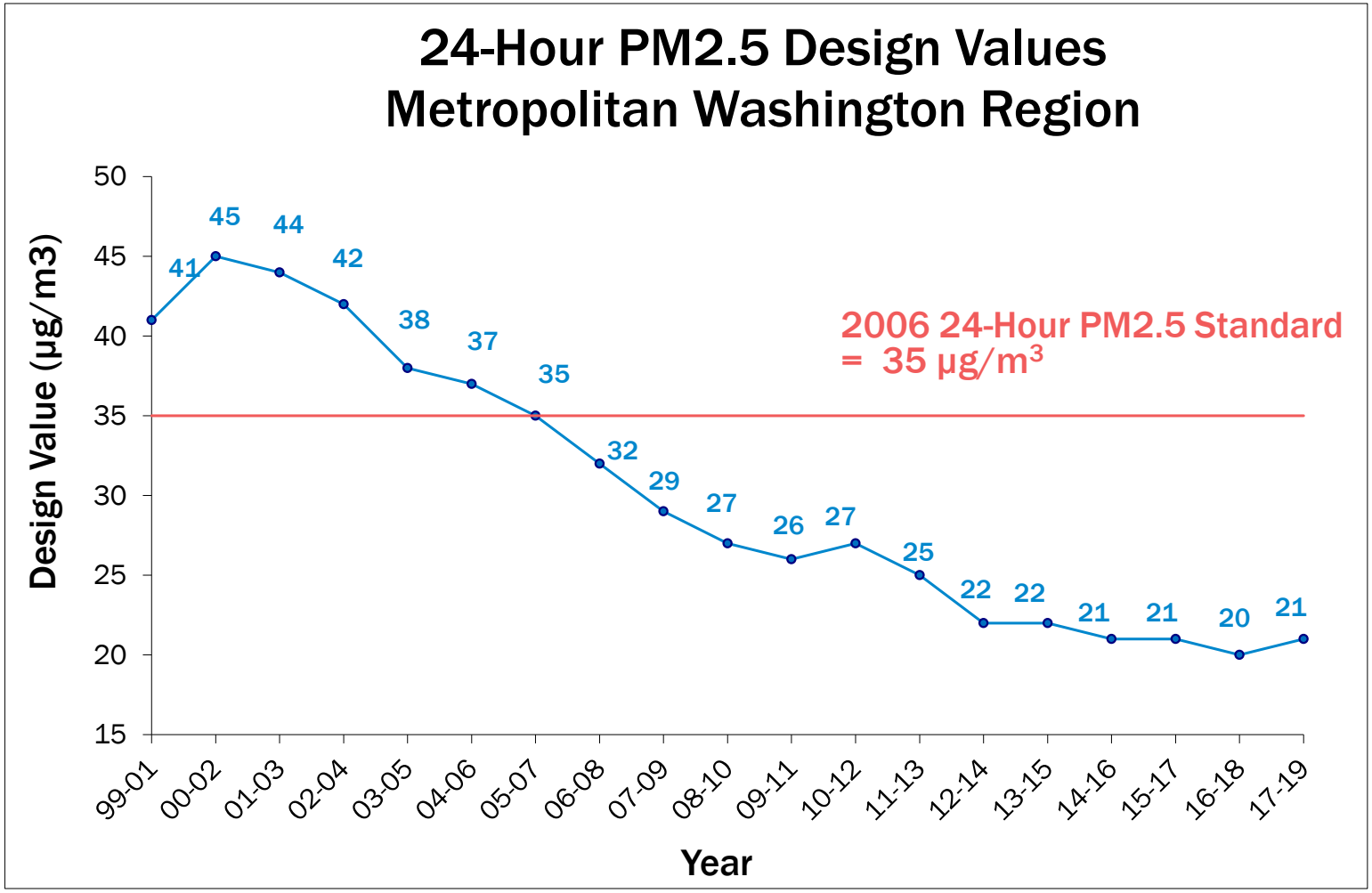


Analysis is based on draft and incomplete data as of August 31, 2020.
2019 & 2020 code red days recorded on July 4th.

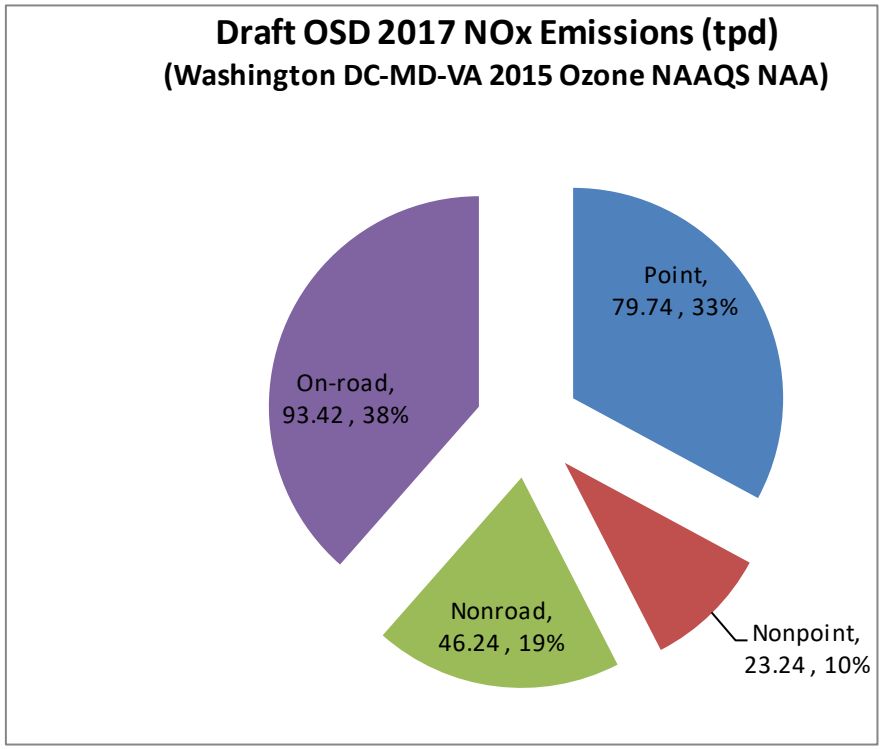
Annual PM2.5 Design Value Trend



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

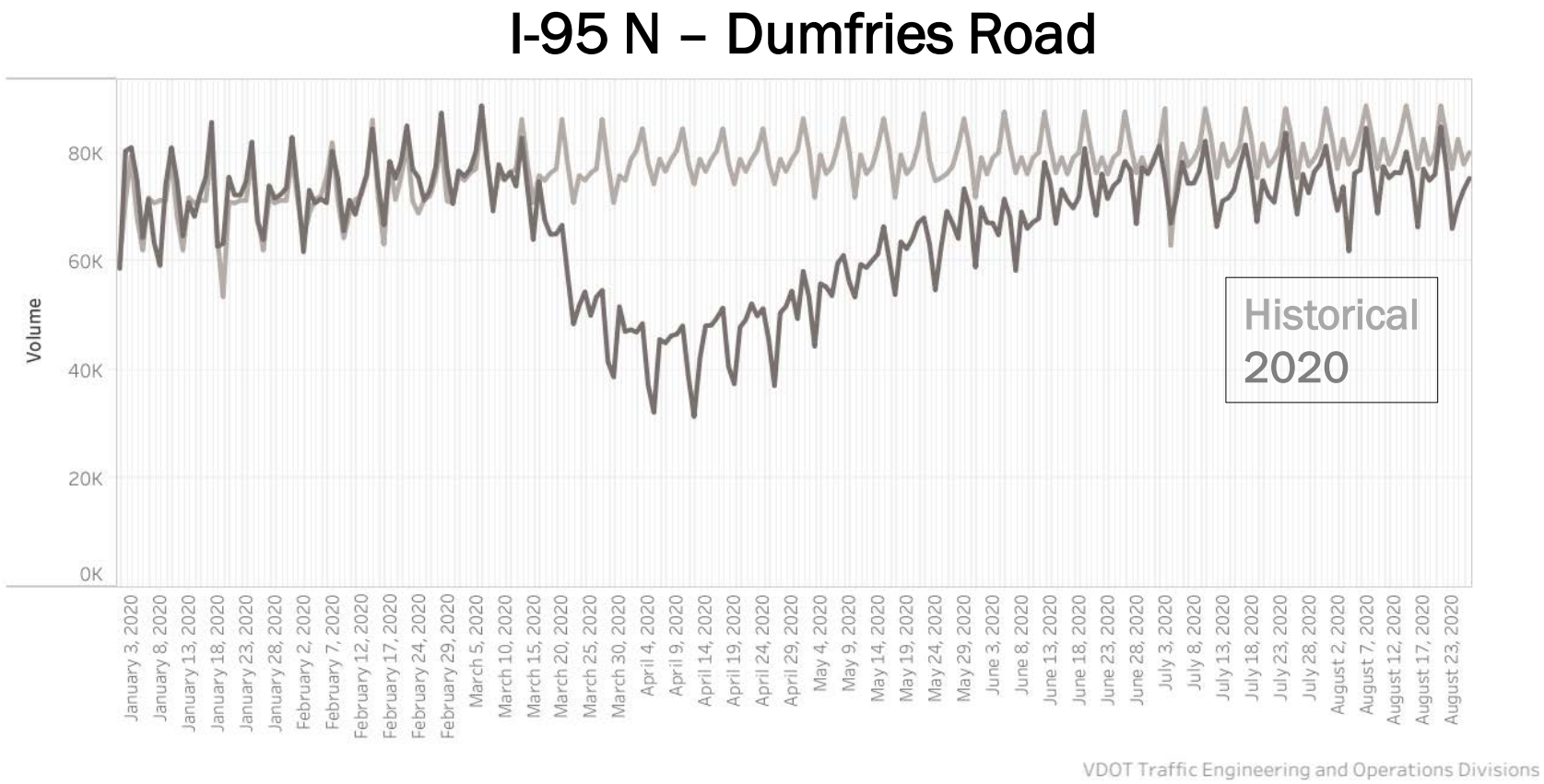
Increase in Vehicle Speed in Washington, DC

(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%

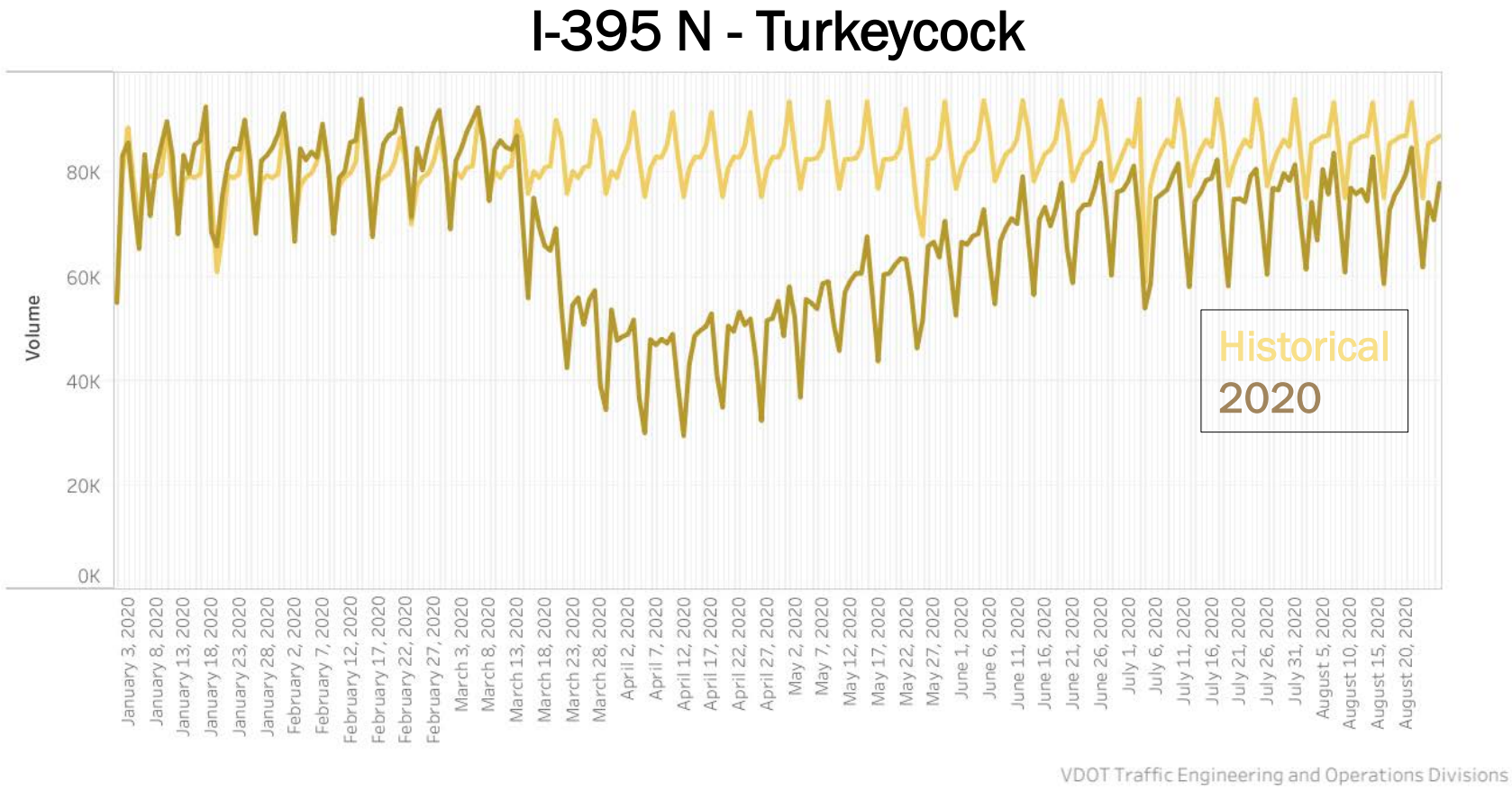
Source: INRIX Report - https://inrix.com/blog/2020/08/us-speeds/

IMPACT ON ON-ROAD SECTOR



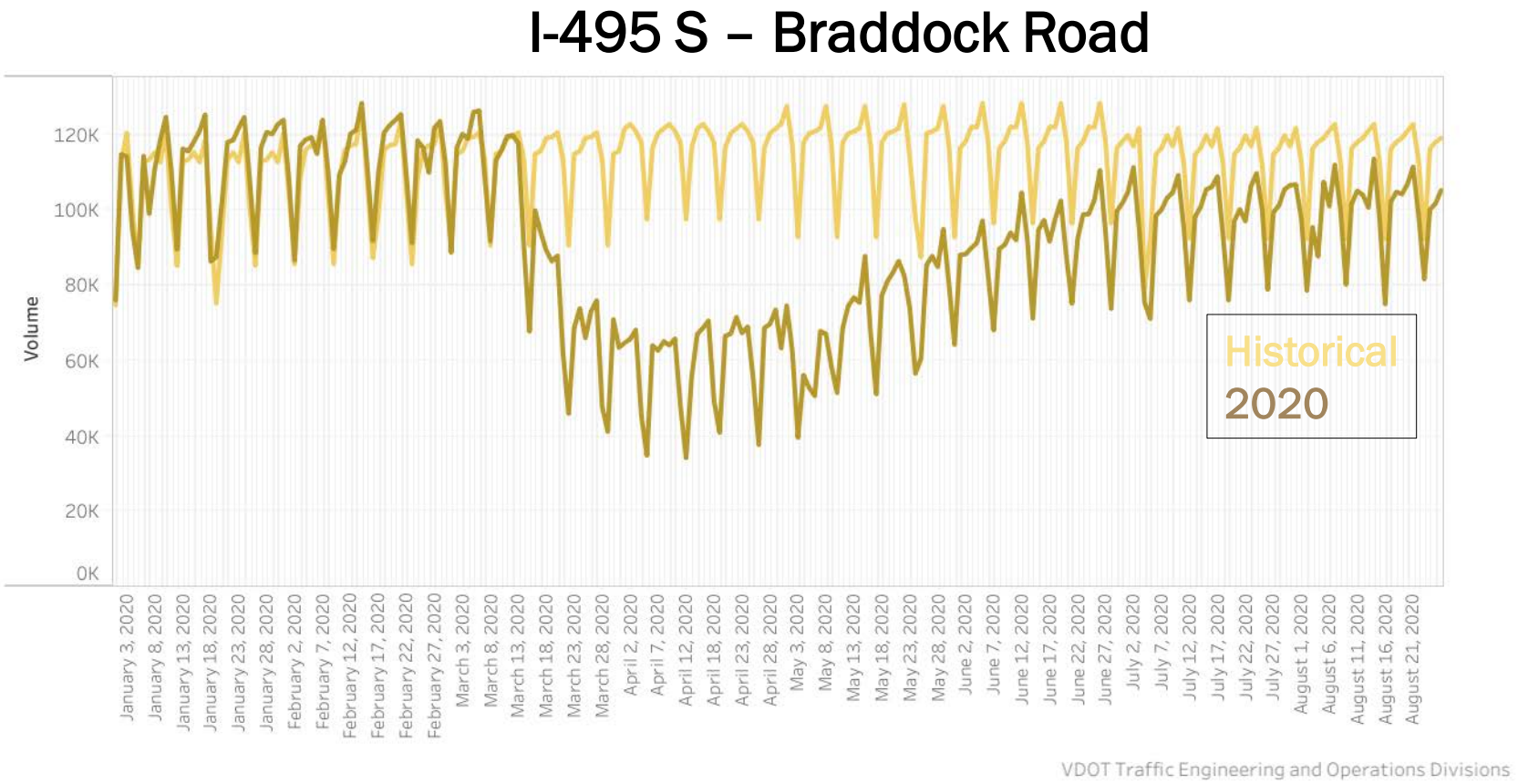
- Heavy-duty vehicle traffic became slightly higher than normal after mid-April. Rest of the vehicle traffic continues to increase after a decrease during mid-March to mid April. Source: VDOT

IMPACT ON ON-ROAD SECTOR



- 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

IMPACT ON ON-ROAD SECTOR



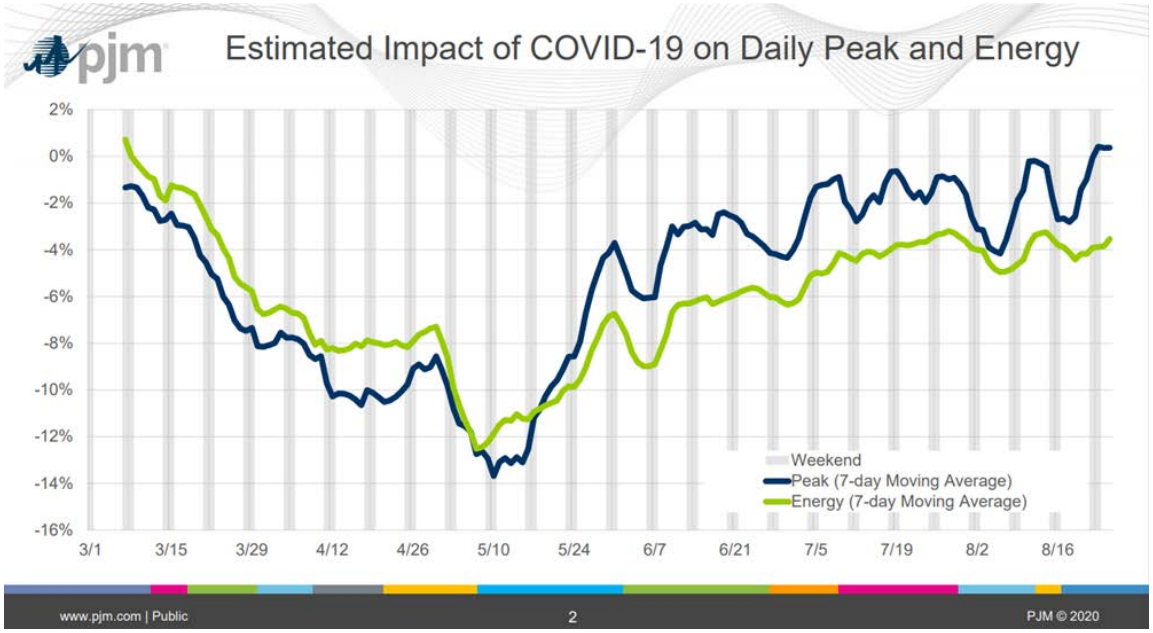
- Heavy-duty vehicle traffic became slightly higher than normal after mid-April. Rest of the vehicle traffic continues to increase after a decrease during mid-March to mid-April. Source: VDOT

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.

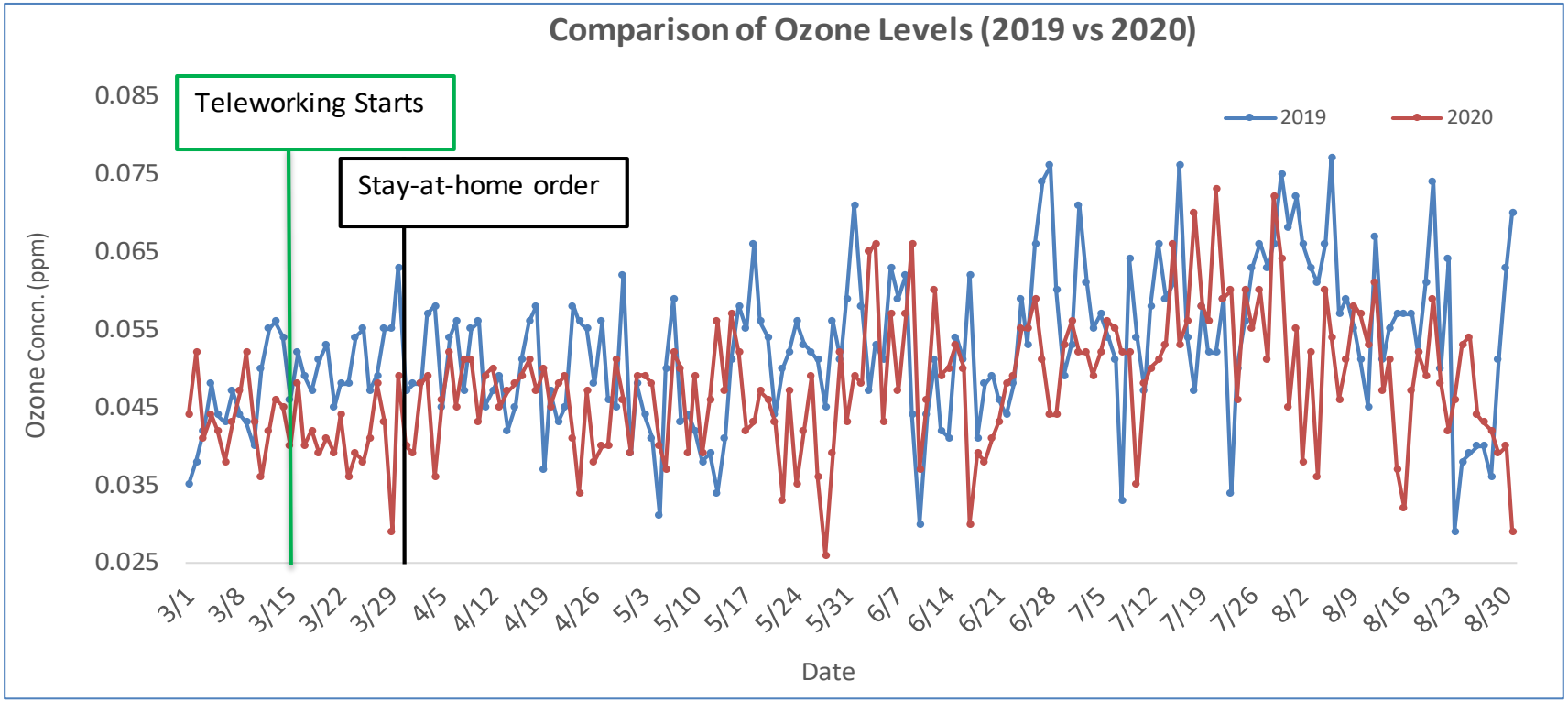
IMPACT ON POINT SECTOR

- 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.



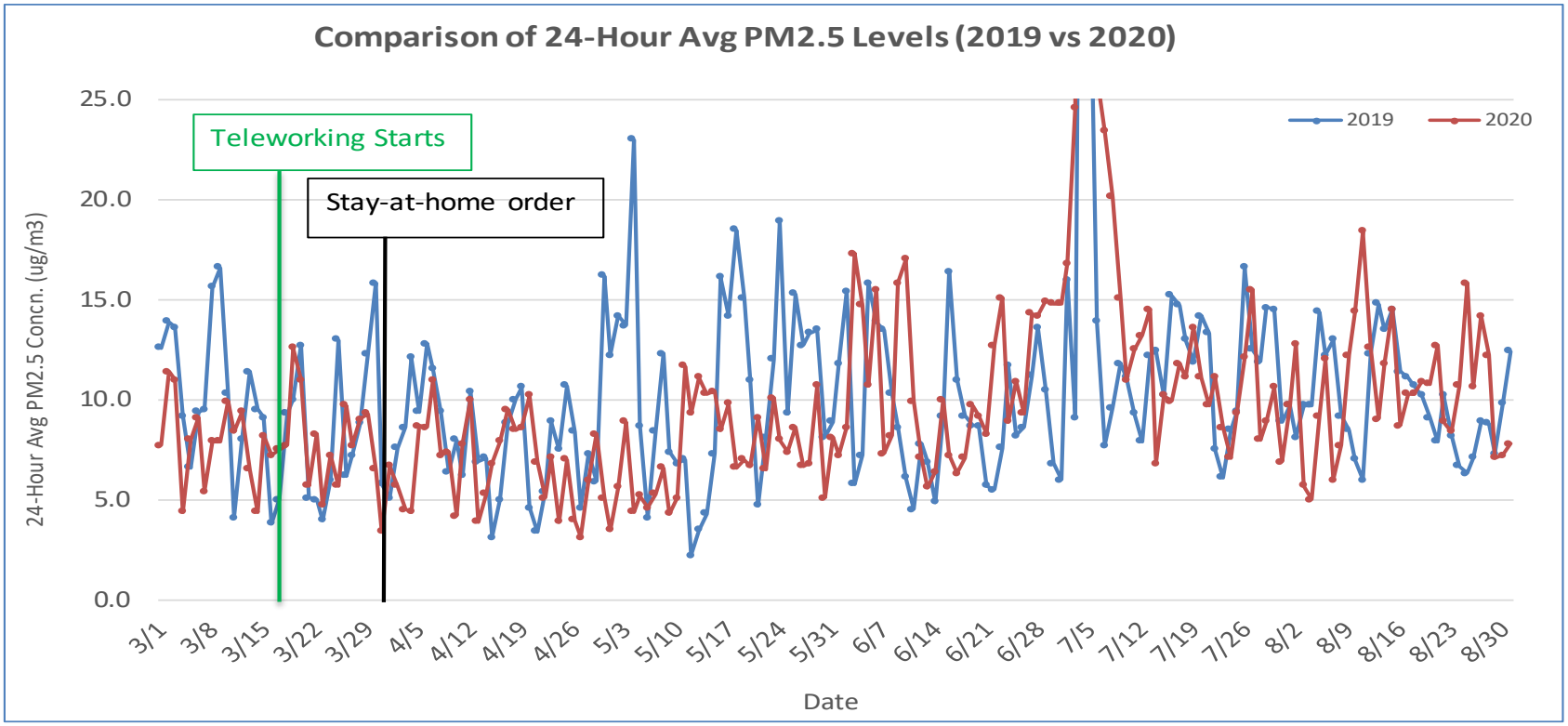
https://www.pjm.com/~/media/committees-groups/pandemic/postings/estimated-impact-covid-19-daily-peak-and-energy.ashx

Comparison of Ozone Levels – 2019 vs 2020



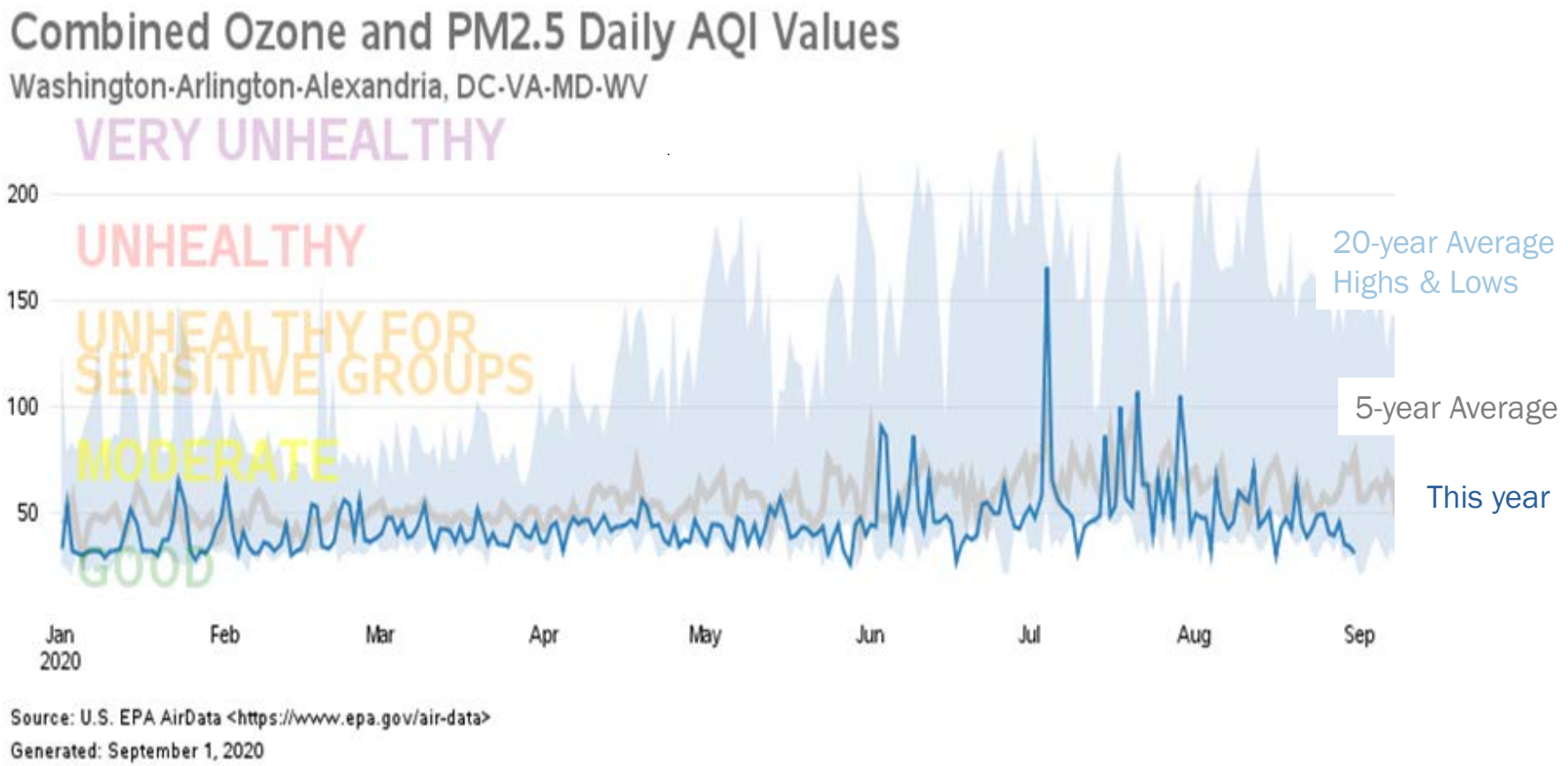
Note: Draft data valid as of August 31, 2020.

Comparison of PM2.5 Levels – 2019 vs 2020



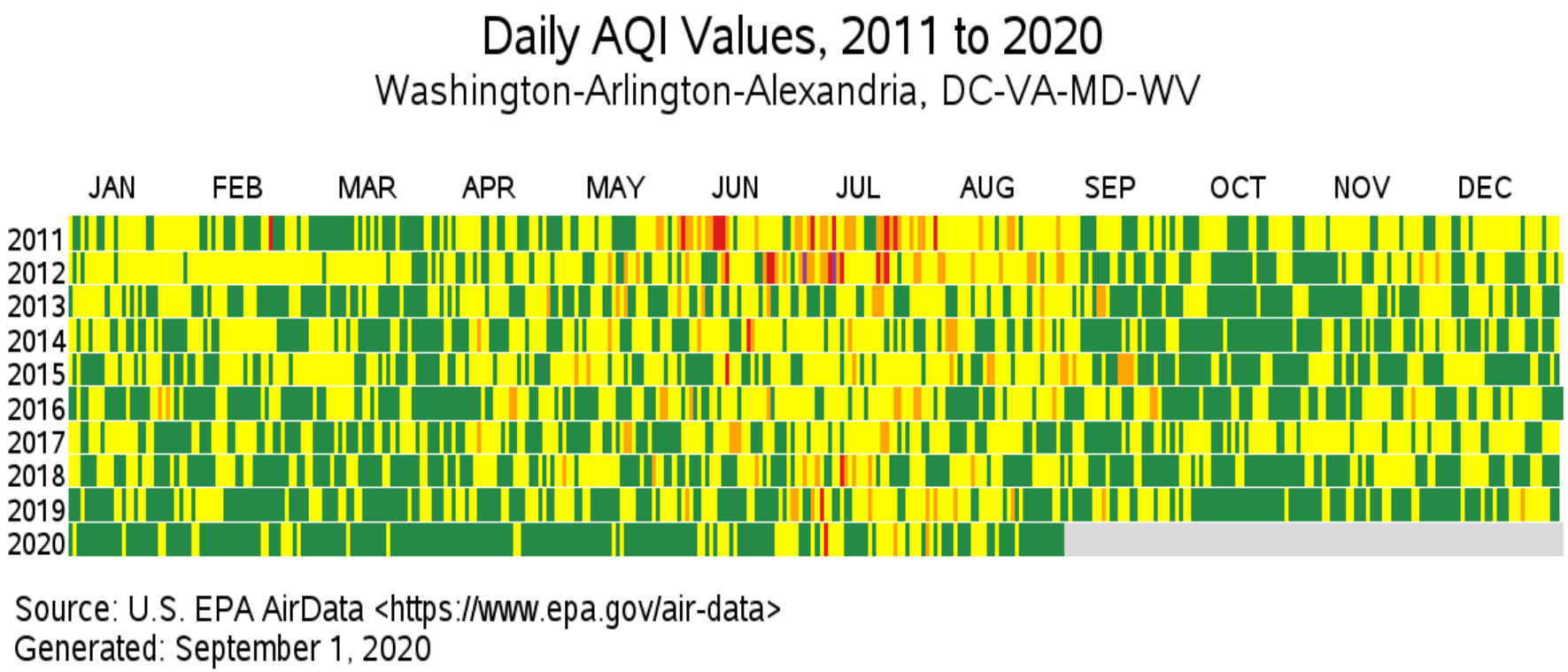
Note: Draft data valid as of August 31, 2020.

AQI Value Trends



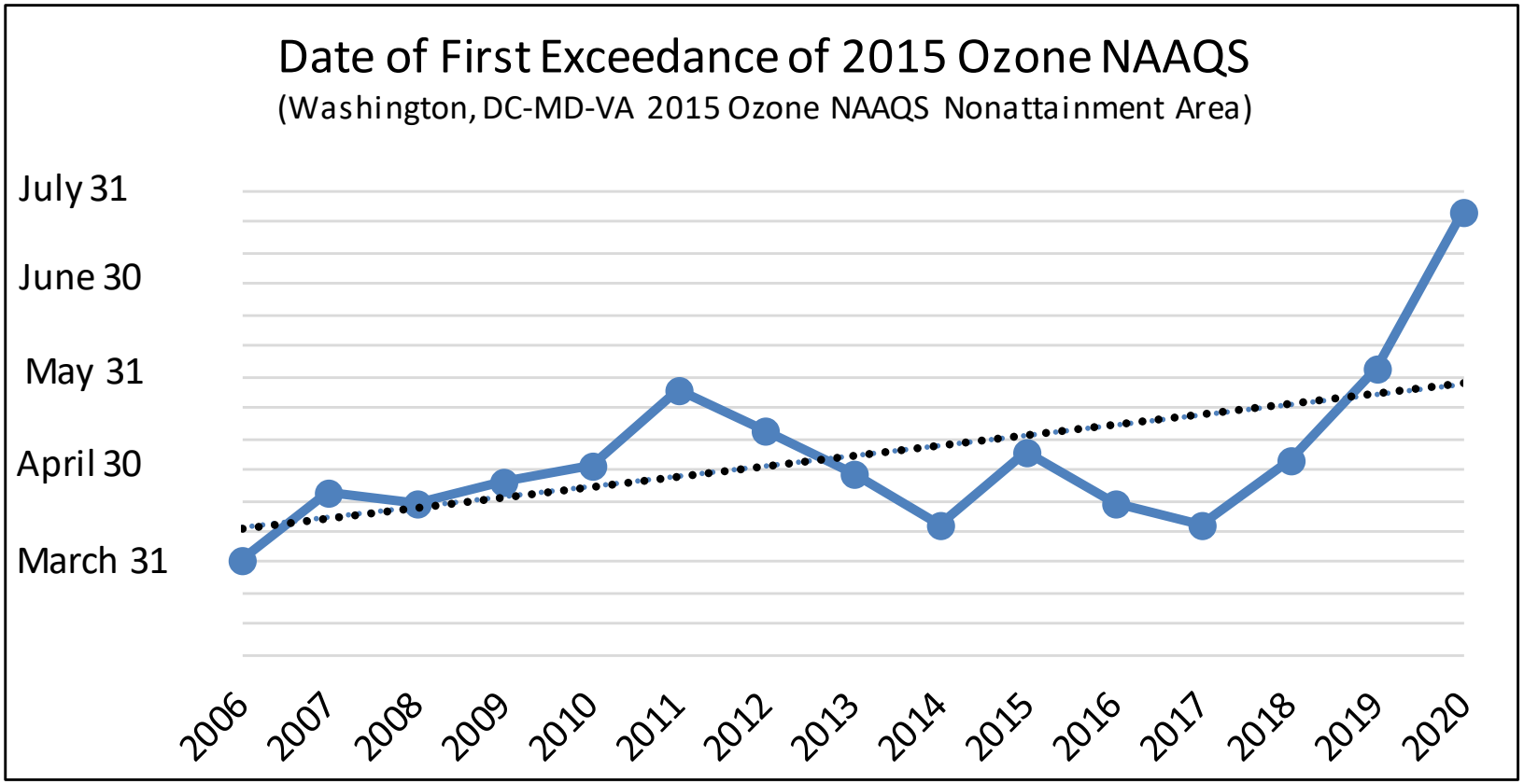
Note: Data shown above is for the Washington-Arlington-Alexandria CBSA.

AQI Value Trends



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 August 31, 2020.

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. 8th warmest on record.
- July/August 2020 – Warmer and wetter than July/August 2019 and normal.

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

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.

Ozone Planning - Probable Next Steps

Monitor	County, State	Ozone Concentration (ppb)			
		Draft 2018-20 Design Value	4th Highest Daily Max 8-Hr Avg Ozone (2019)	4th Highest Daily Max 8-Hr Avg Ozone (2020)	Lowest 4th 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 August 31, 2020.

Ozone Planning - Probable Next Steps

- 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.

Ozone Planning - Probable Next Steps

- The lowest 4th 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 4th 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 ?).

Ozone Planning - Probable Next Steps

- 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.