OZONE SEASON SUMMARY 2020

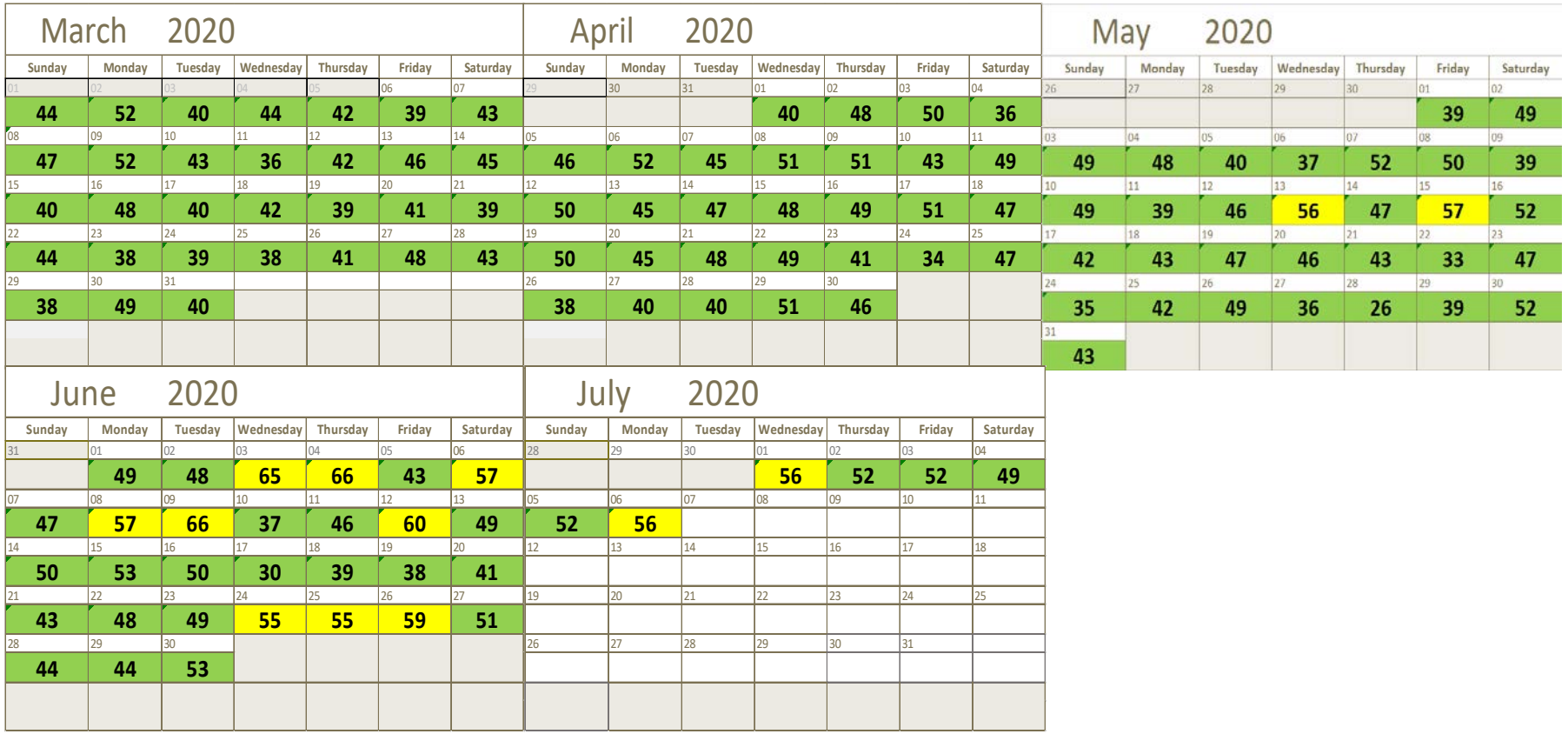
Sunil Kumar
Principal Environmental Engineer

MWAQC-Technical Advisory Committee
July 14, 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				

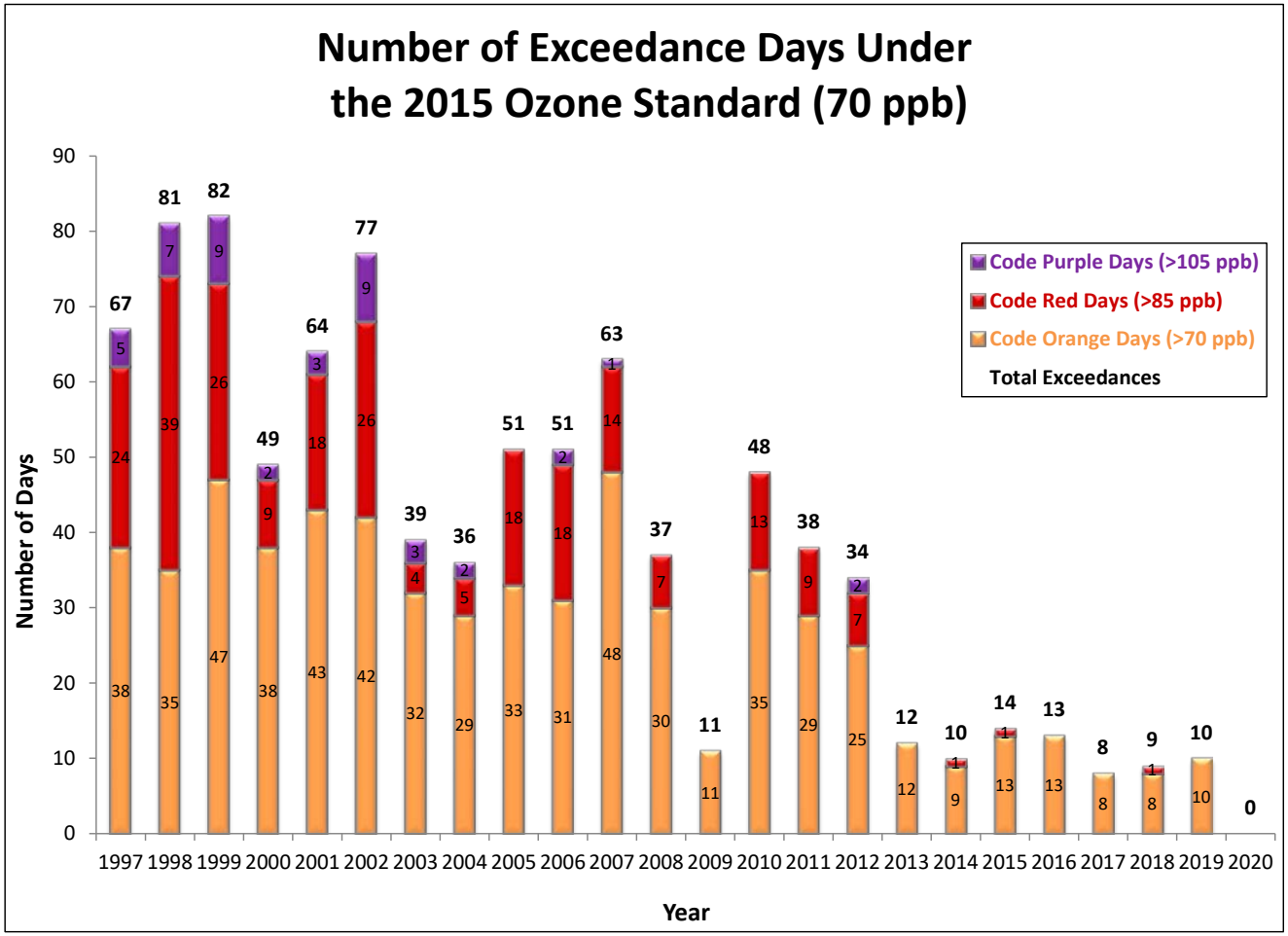
July 2020

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					
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

13 Code Yellow Days, Rest All Code Green Days

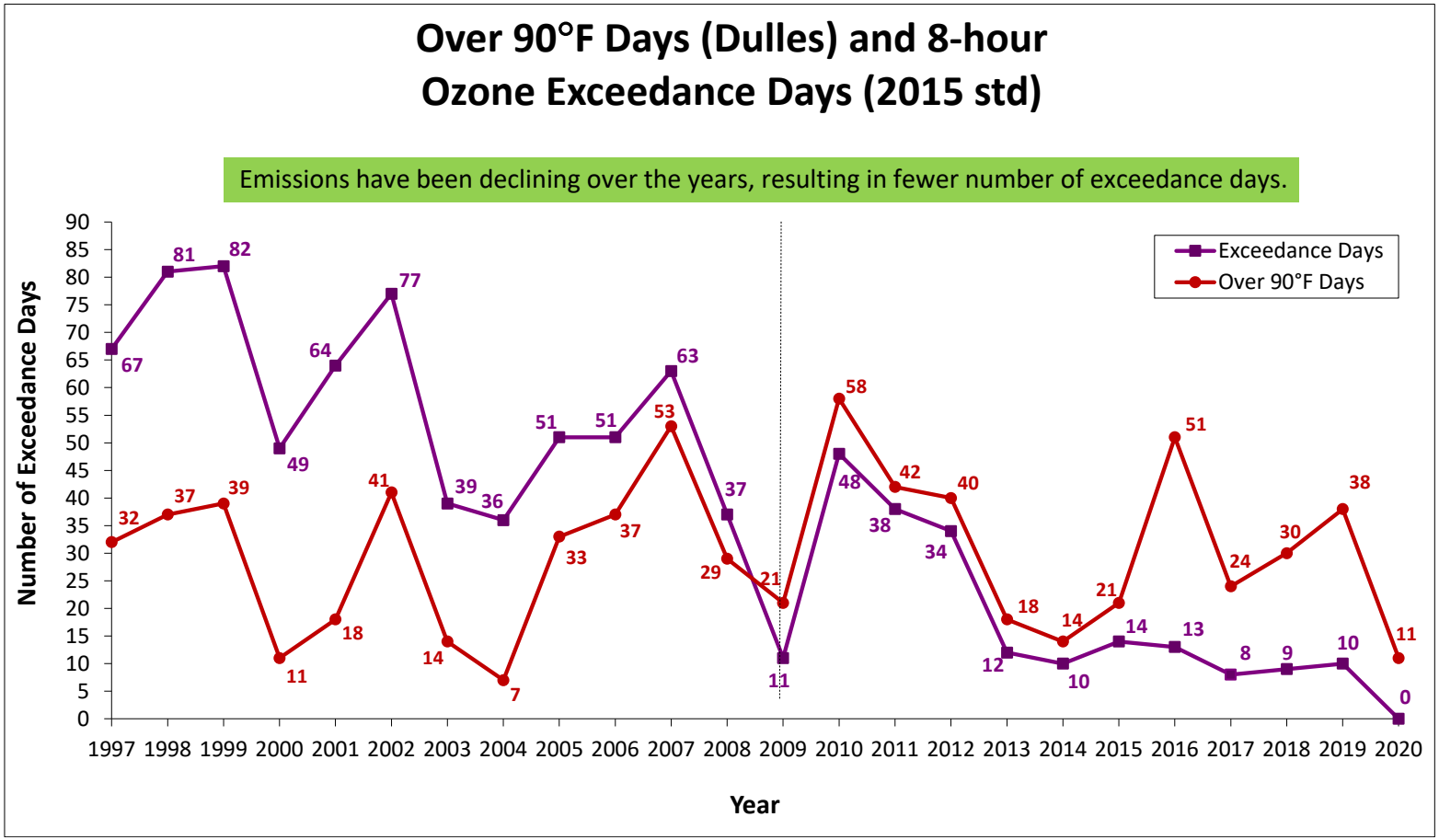
Analysis is based on draft data as of July 7, 2020.

Ozone Exceedance Trend



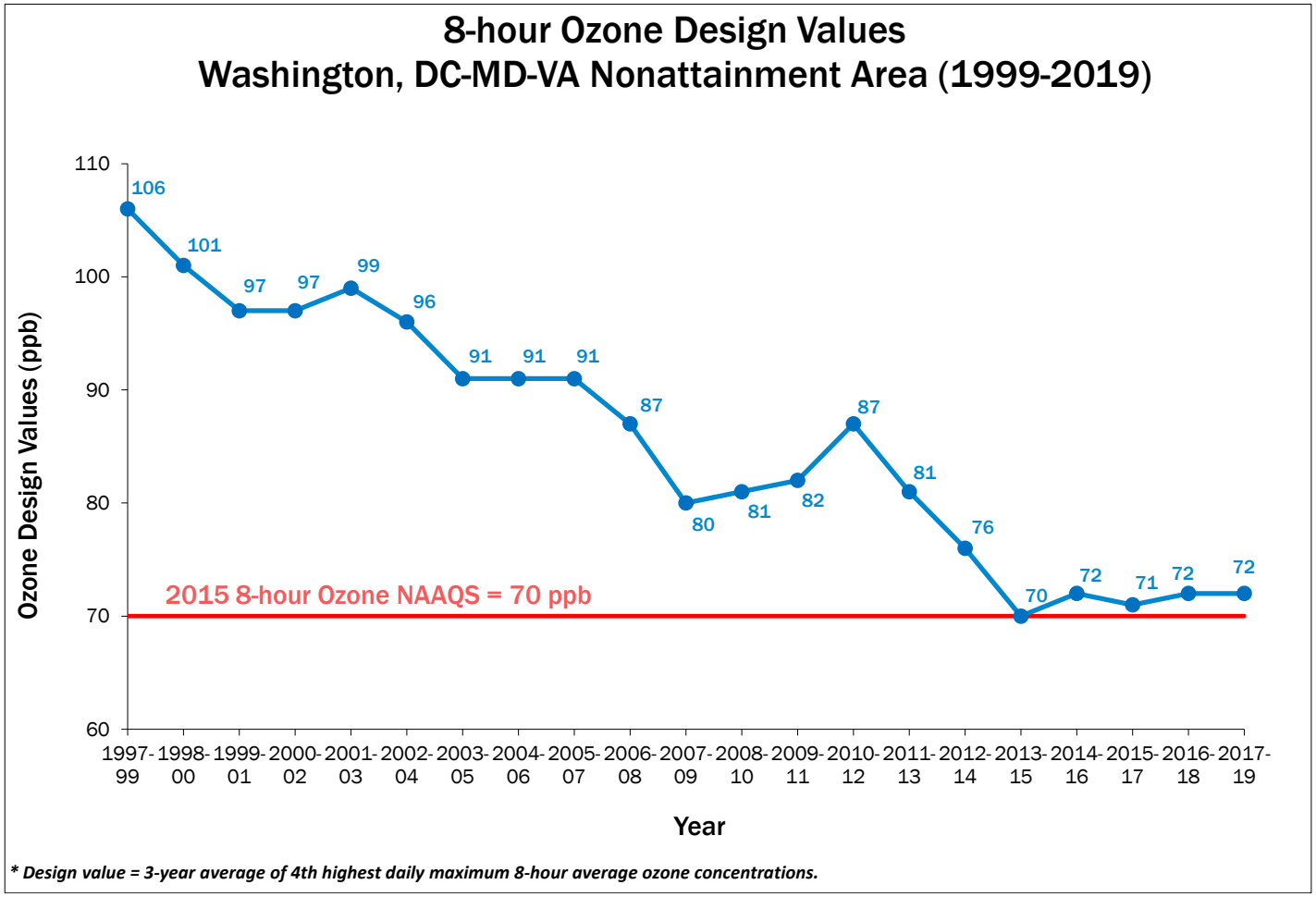
Analysis is based on draft and incomplete data as of July 7, 2020.

Ozone & Temperature Trend



Analysis is based on draft and incomplete data as of July 7, 2020.

Ozone Design Value Trend



** Design value = 3-year average of 4th highest daily maximum 8-hour average ozone concentrations.*

4th Highest Daily 8-Hour Max Ozone - 2020

- Minimum 4th highest daily 8-hour max ozone (by monitor) in 2020 that can lead to nonattainment (71 ppb) based on 2018-2020 Design Value

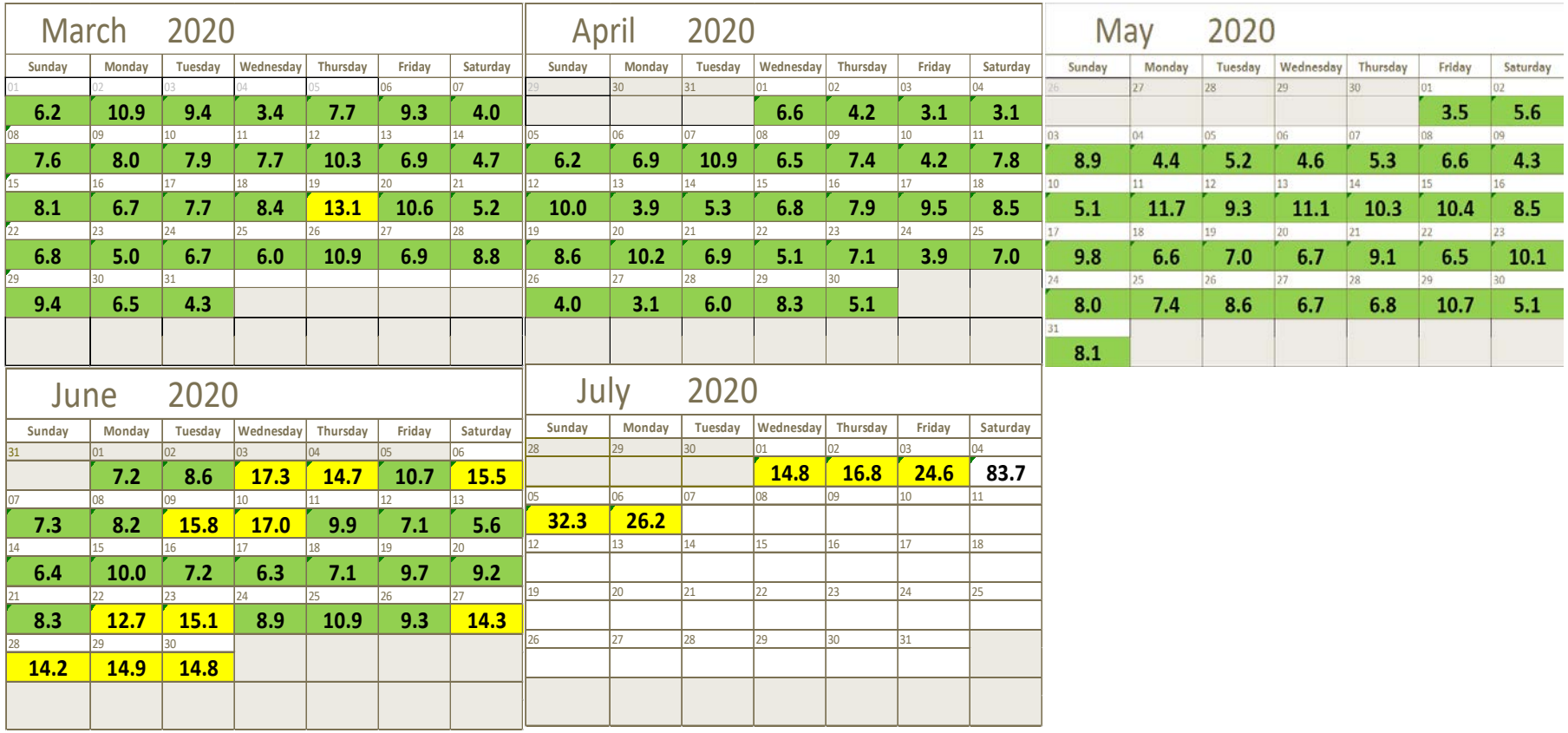
Monitor	County, State	4th Highest Daily Maximum 8-Hour Ozone Concentration (ppb)			
		2018	2019	2020 (Minimum needed for nonattainment)	2020 (Actual as of July 7th) [Top 4 Daily 8-Hour Max Values]
Beltsville	Prince George's, MD	73	72	65	57 [65,65,60,57]
McMillian Ncore	District of Columbia	73	71	69	58 [61,60,59,58]
HU- Beltsville	Prince George's, MD	70	71	72	57 [66,63,62,57]
Takoma	District of Columbia	73	66	74	57
Arlington	Arlington, VA	70	68	75	55
PG Equestrian	Prince George's, MD	70	65	78	57
Franconia	Fairfax, VA	66	68	78	56
Frederick	Fredrick, MD	67	65	81	57
Rockville	Montgomery, MD	69	62	82	52
S. Maryland	Charles, MD	68	60	85	52
Ashburn	Loudoun, VA	65	60	88	54
Long Park	Prince William, VA	65	60	88	53
Calvert	Calvert, MD	67	57	89	52
River Terrace	District of Columbia	50	61	102	50

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				

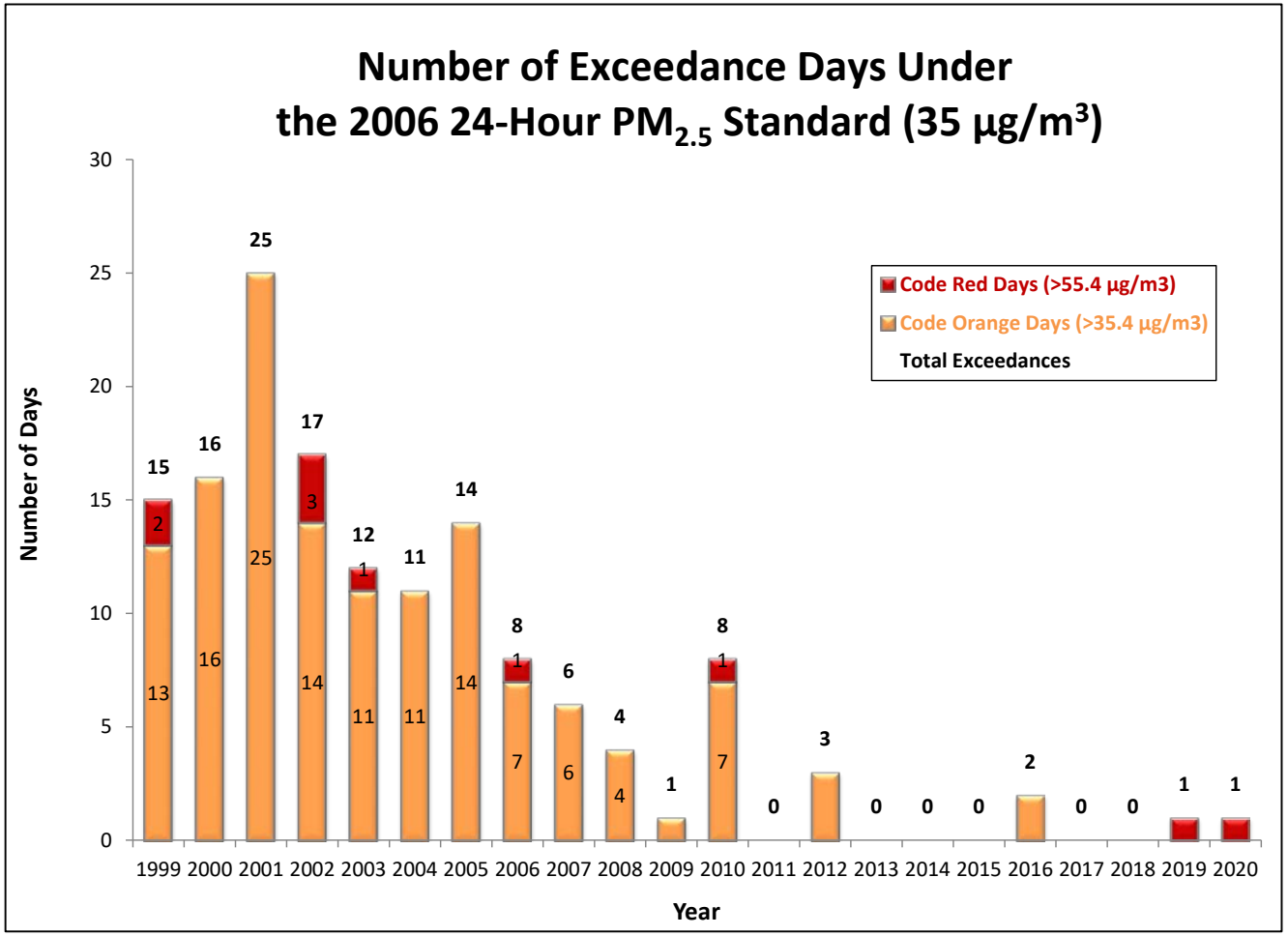
July 2020

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					
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

17 Code Yellow Day, Rest All Code Green Days

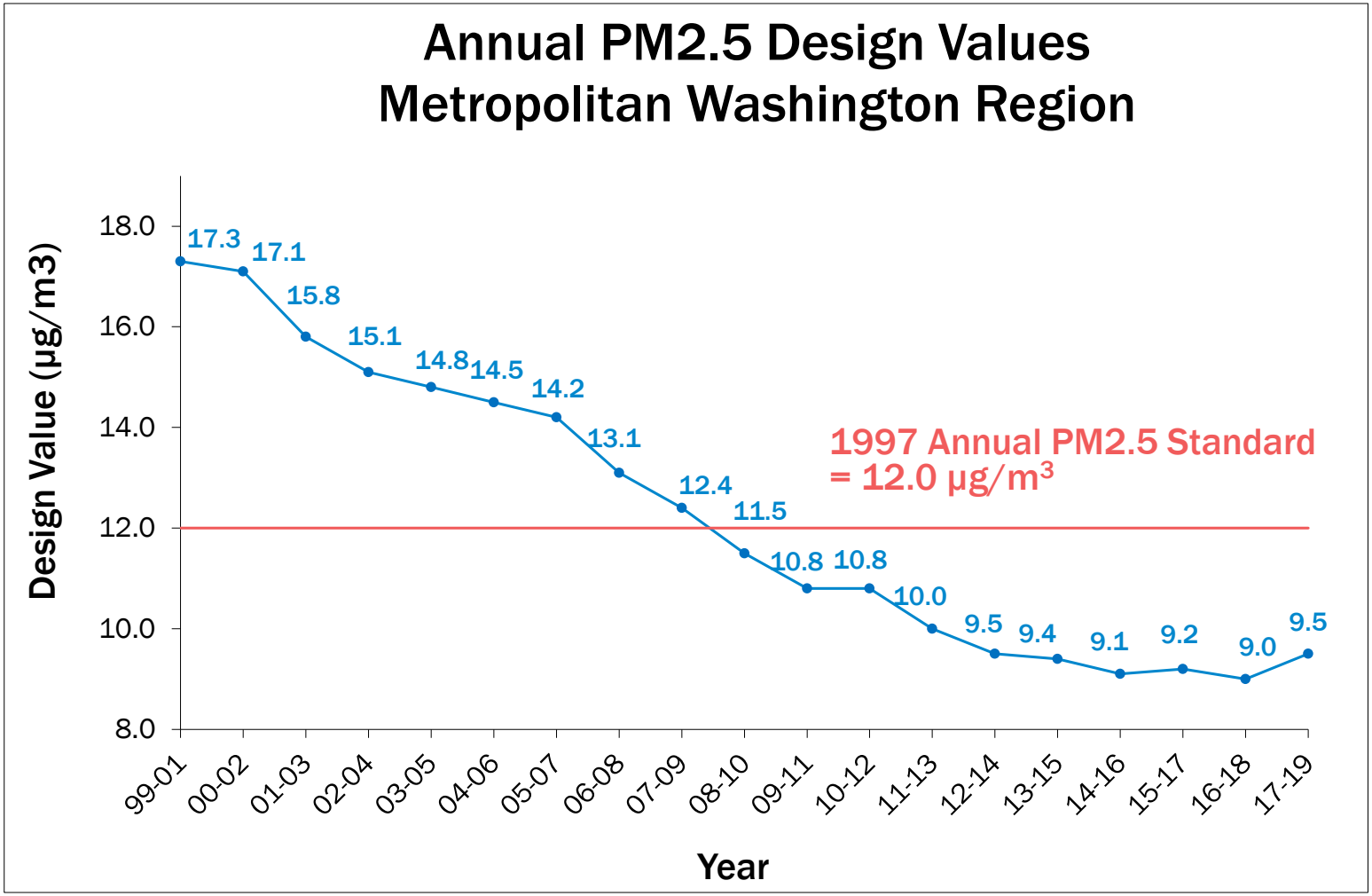
Analysis is based on draft data as of July 7, 2020.

PM2.5 Exceedance Trend

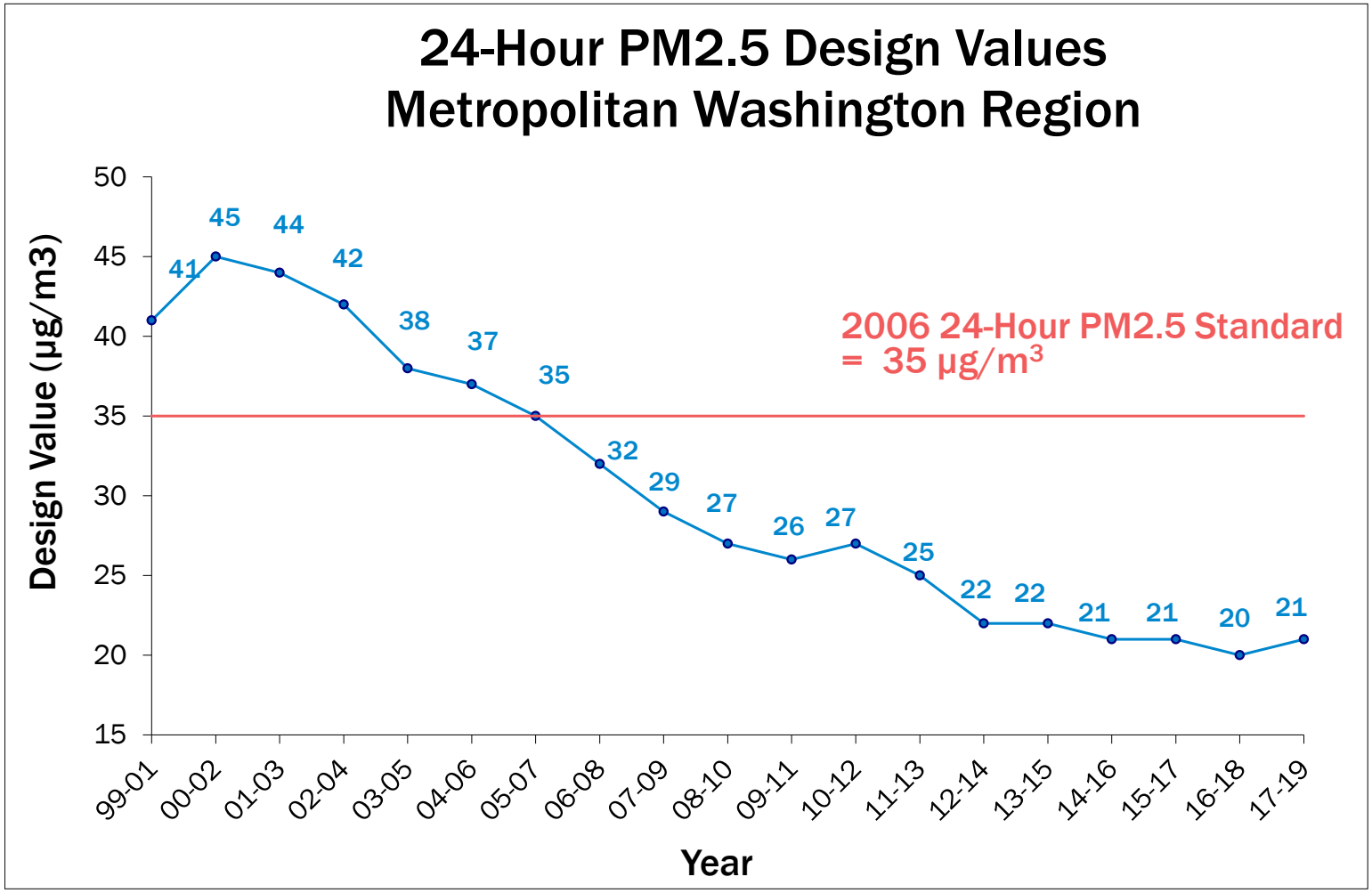


Analysis is based on draft and incomplete data as of July 7, 2020. 2019 & 2020 code red days recorded on July 4th.

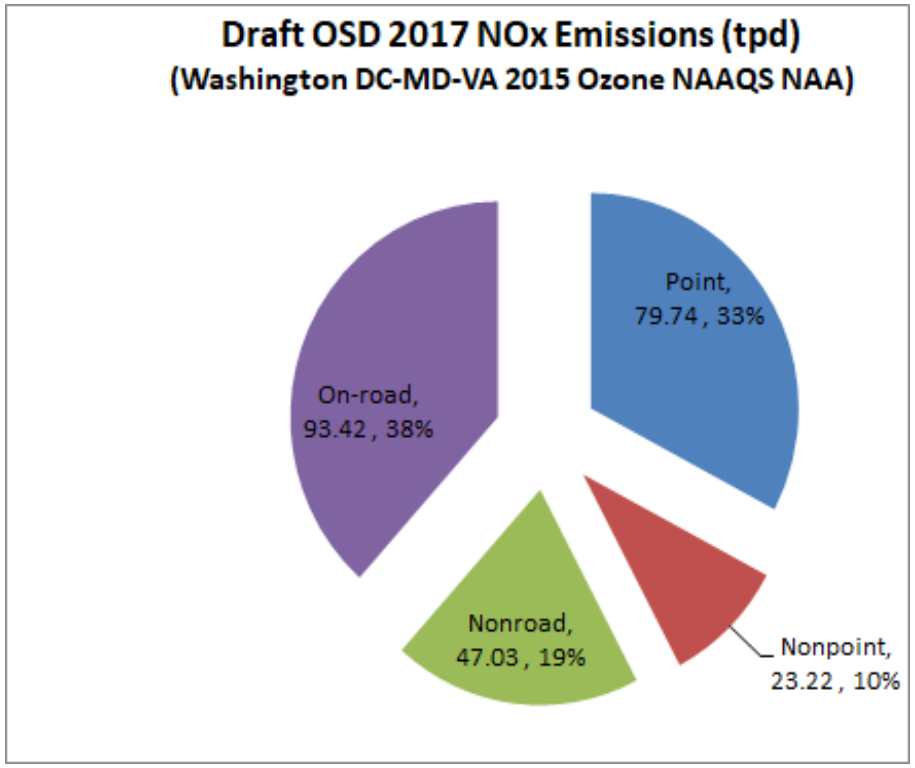
Annual PM2.5 Design Value Trend



24-Hour PM2.5 Design Value Trend

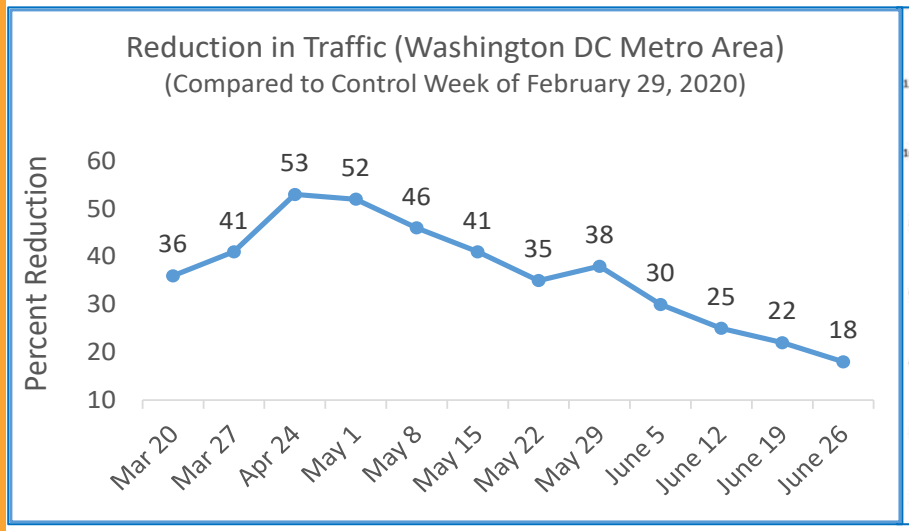


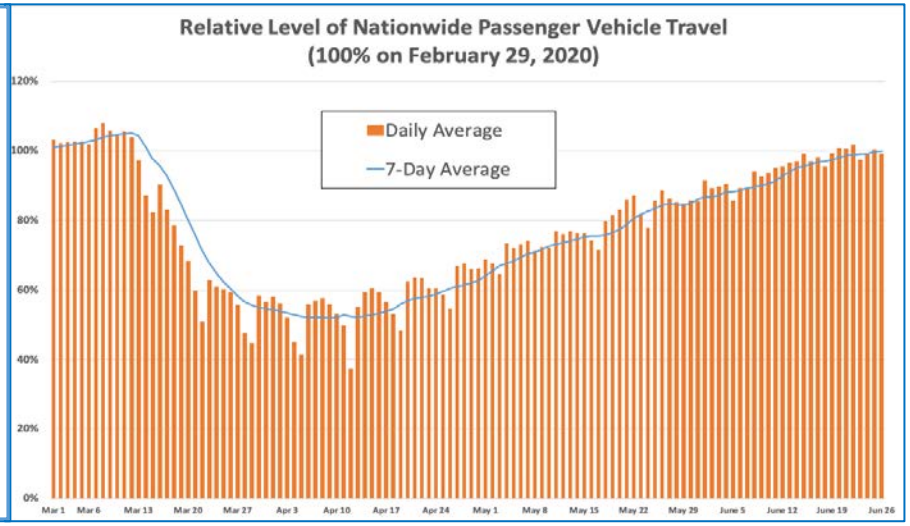
Emission by Source



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

IMPACT ON ON-ROAD SECTOR

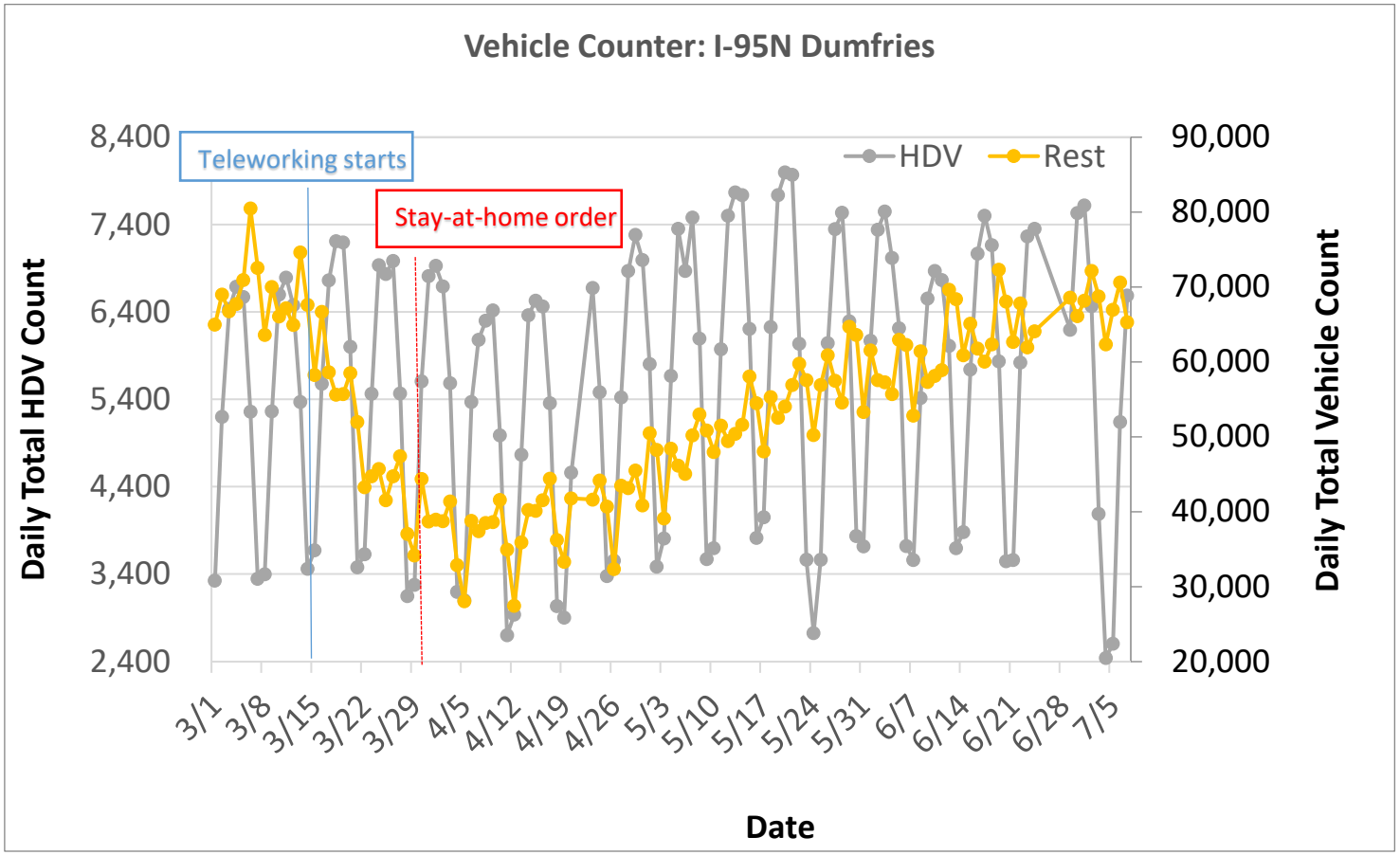




Sources:

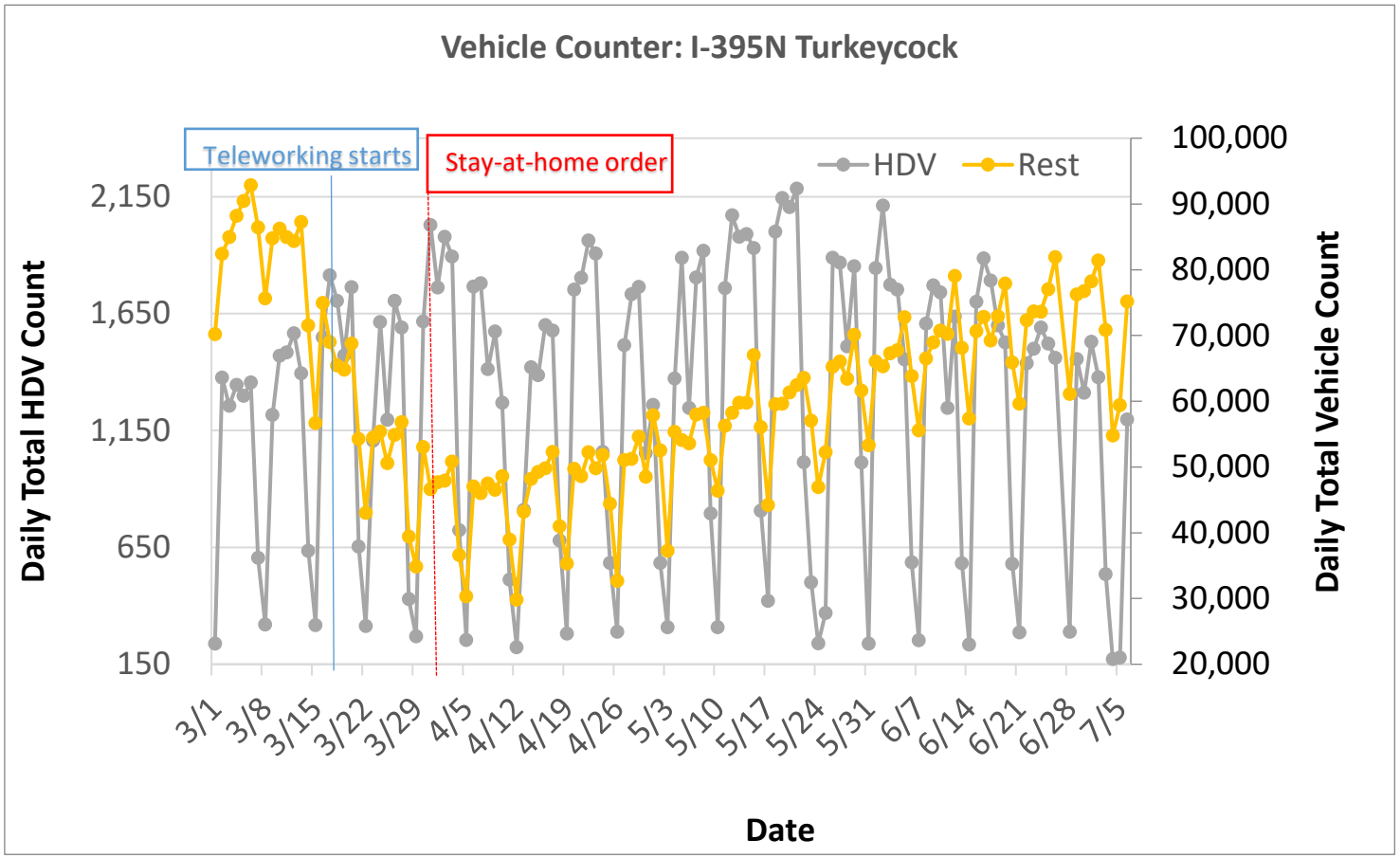
- A. Washington metro area chart is based on data extracted from INRIX U.S. National Traffic Volume Synopsis Issues #1(Table 1), #2(Table3), #6-#15
- B. Nationwide travel chart - INRIX U.S. National Traffic Volume Synopsis Issue #15 (June 20 – June 26, 2020)

IMPACT ON ON-ROAD SECTOR



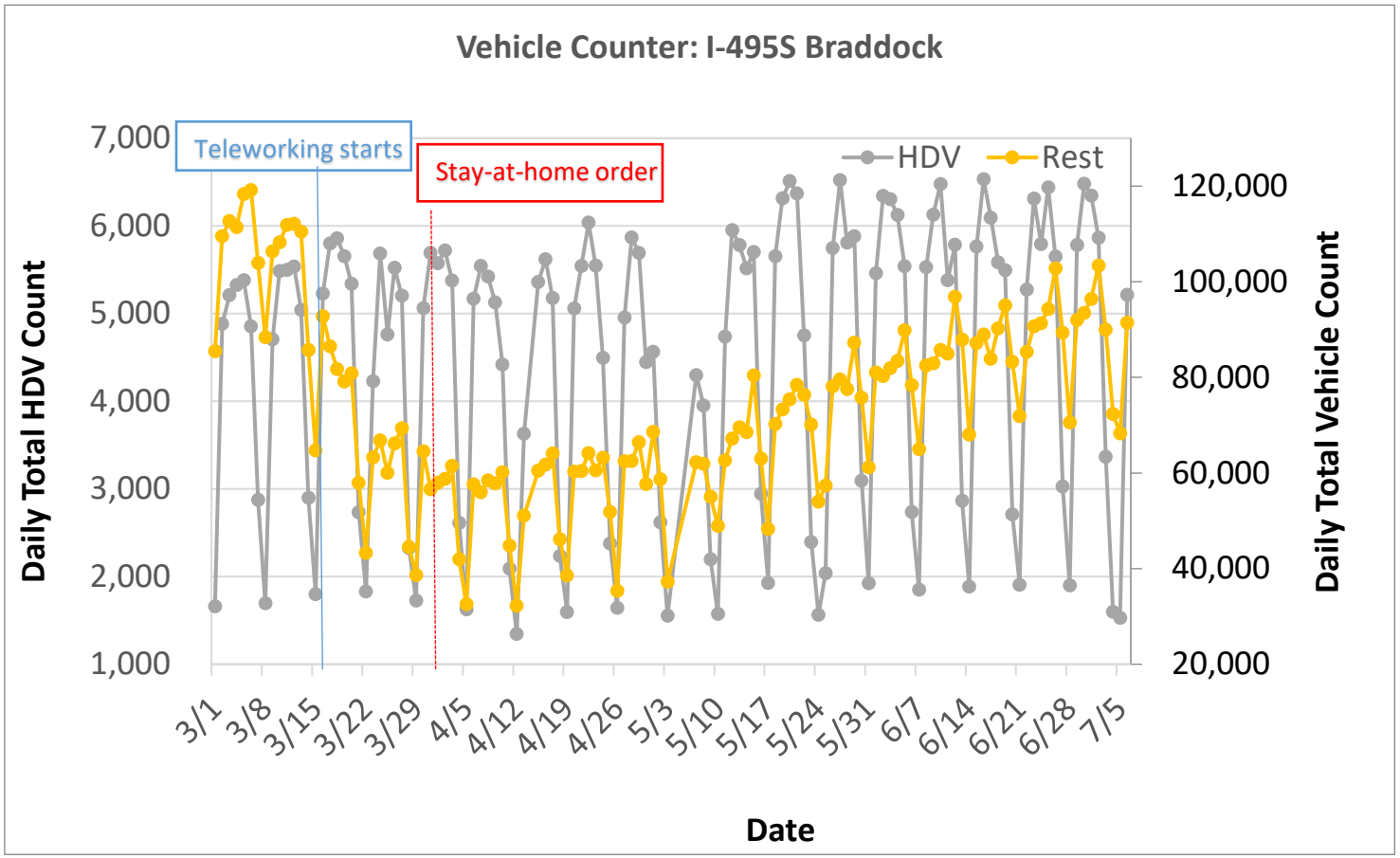
- Heavy-duty vehicle traffic became slightly higher than normal after mid-April. Rest of the vehicle traffic continues to increase after a decrease during mid-March to mid April. Source: VDOT

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



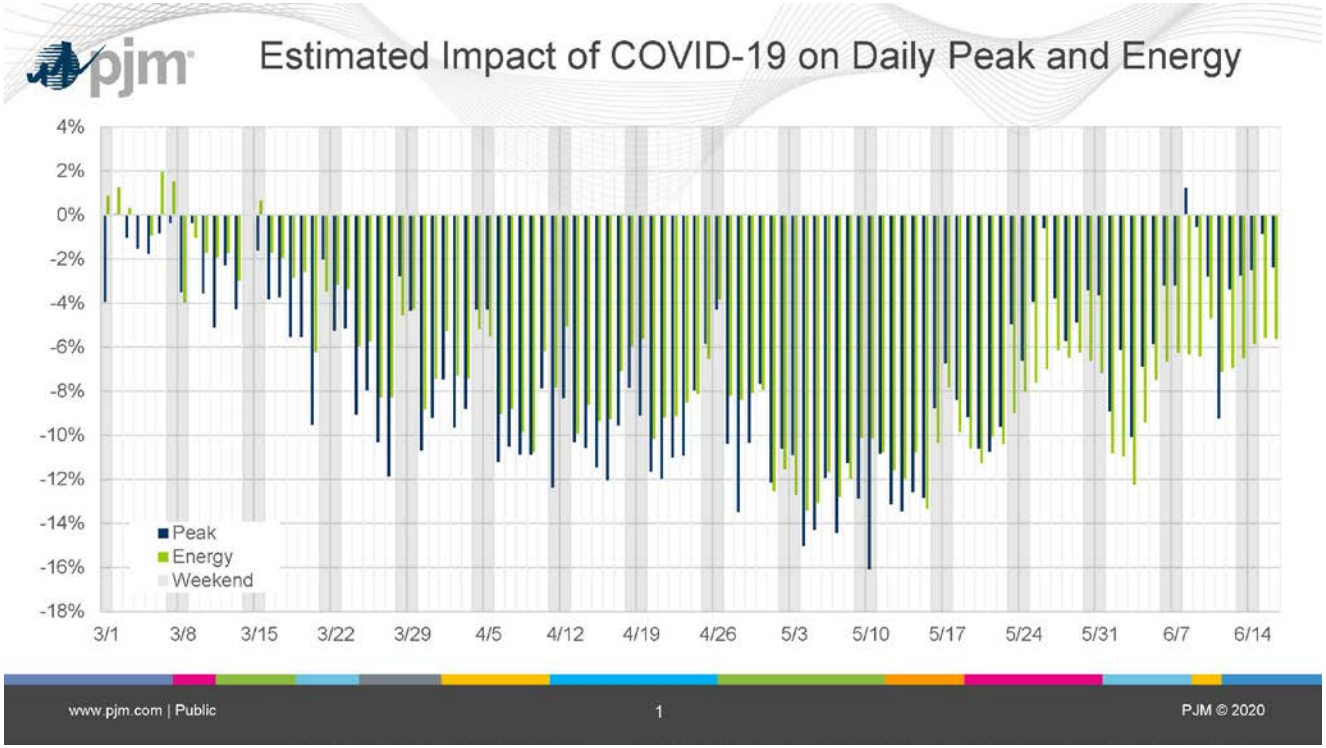
- Heavy-duty vehicle traffic became slightly higher than normal after mid-April. Rest of the vehicle traffic continues to increase after a decrease during mid-March to mid-April. Source: VDOT

IMPACT ON NONPOINT & NONROAD SECTORS

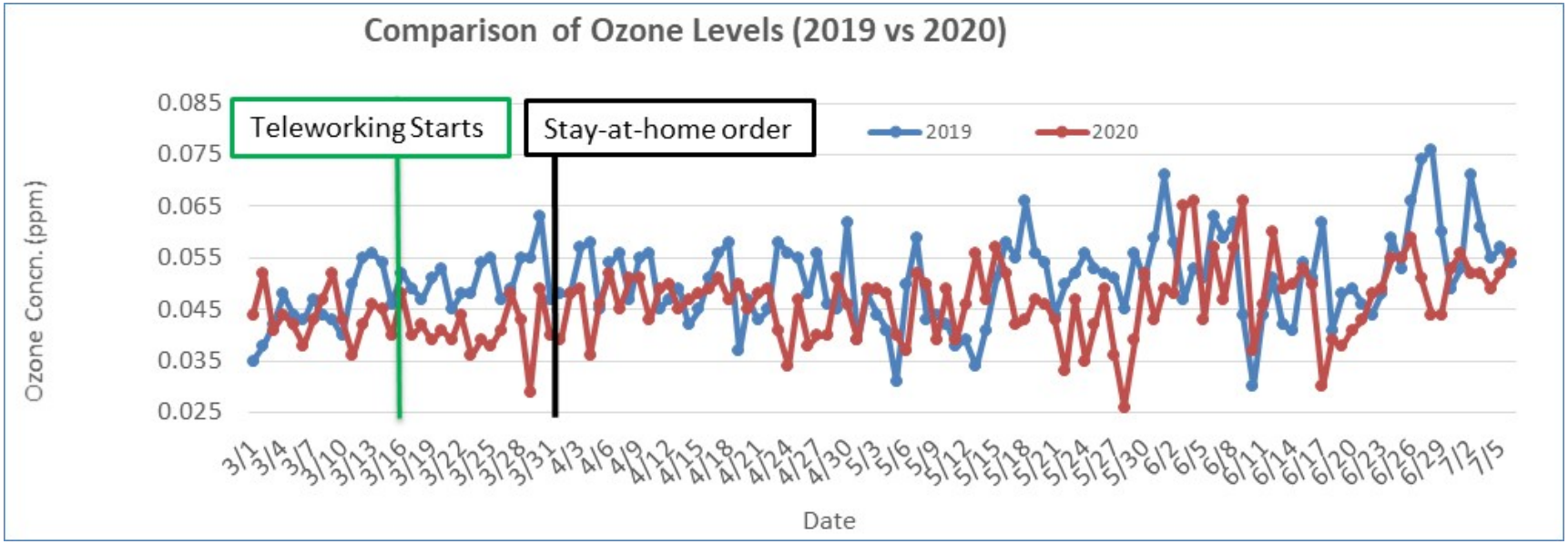
- Emissions are still expected to be lower as activities related to nonroad sources (e.g., construction, commercial, industrial, aircraft, railroad, etc) and nonpoint sources (dry cleaners, restaurants, portable fuel containers, auto repair facilities, etc) have still not resumed to pre-COVID-19 levels.

IMPACT ON POINT SECTOR

- Energy consumption in the region is still below the pre-COVID-19 level as most offices, businesses, schools, etc. remain closed and people are still teleworking/staying at home.
- Electricity consumption data is still lower compared to the pre-COVID-19 level.

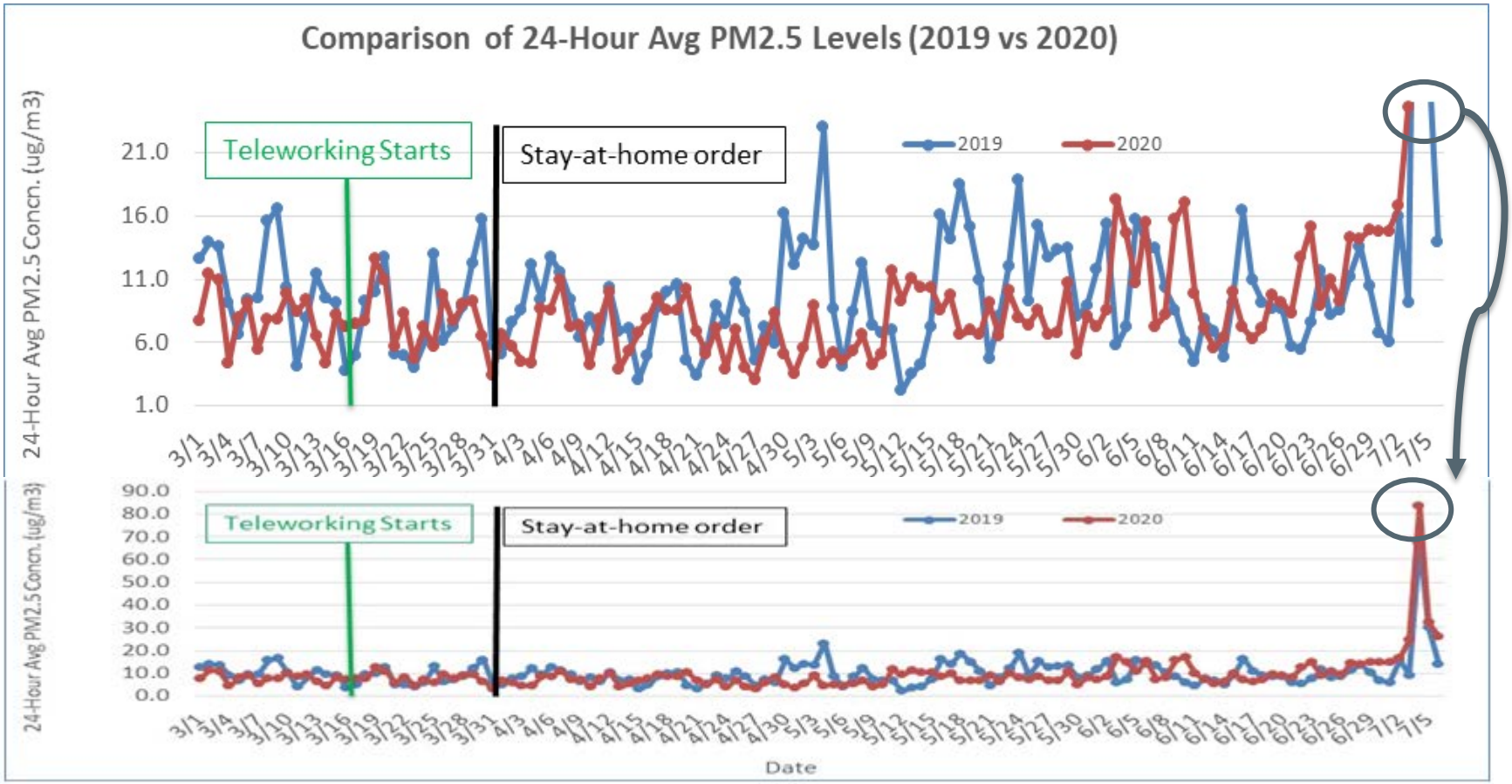


Comparison of Ozone Levels – 2019 vs 2020



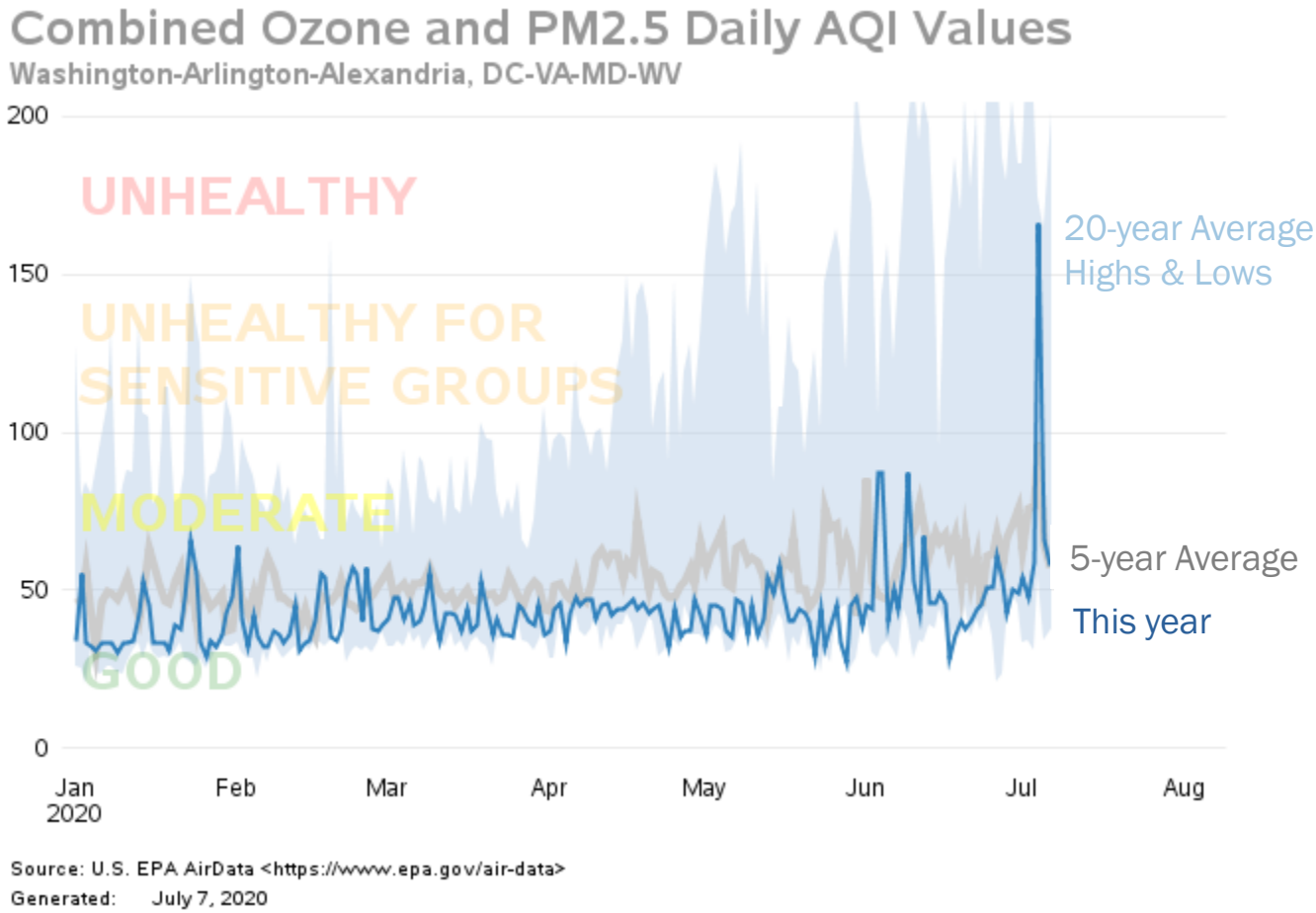
Note: Draft data valid as of July 7, 2020.

Comparison of PM2.5 Levels – 2019 vs 2020



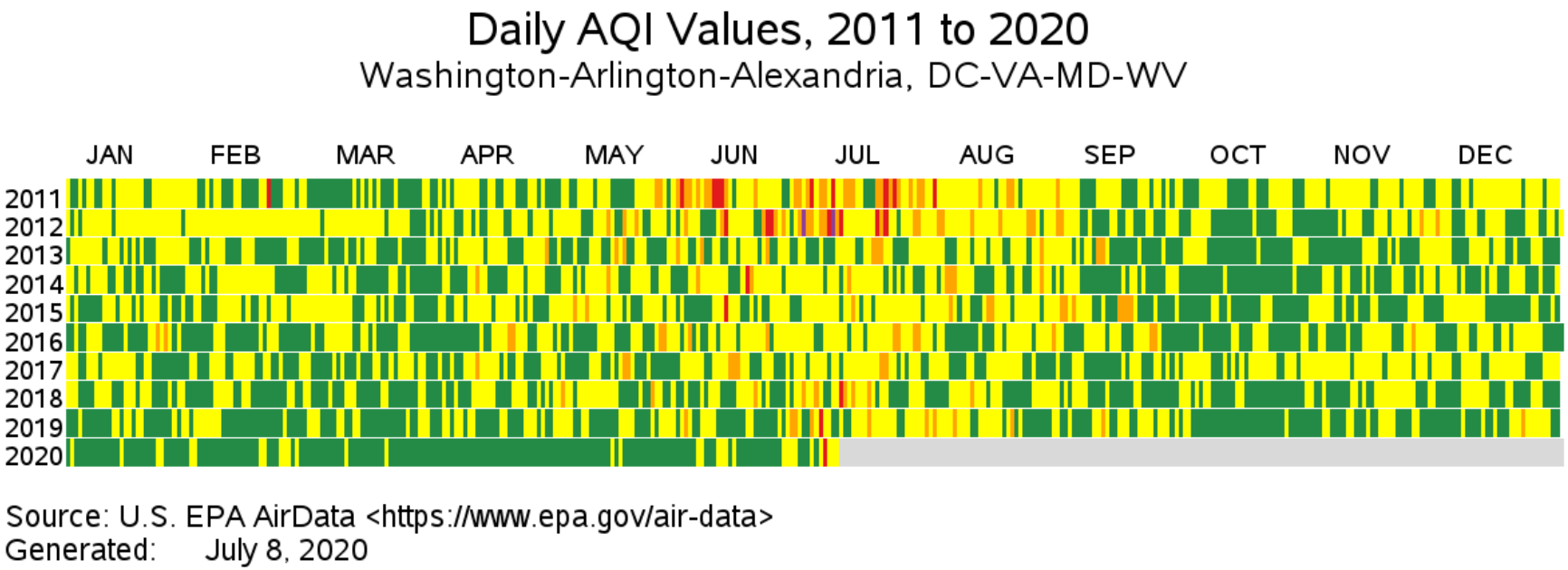
Note: Draft data valid as of July 7, 2020.

AQI Value Trends



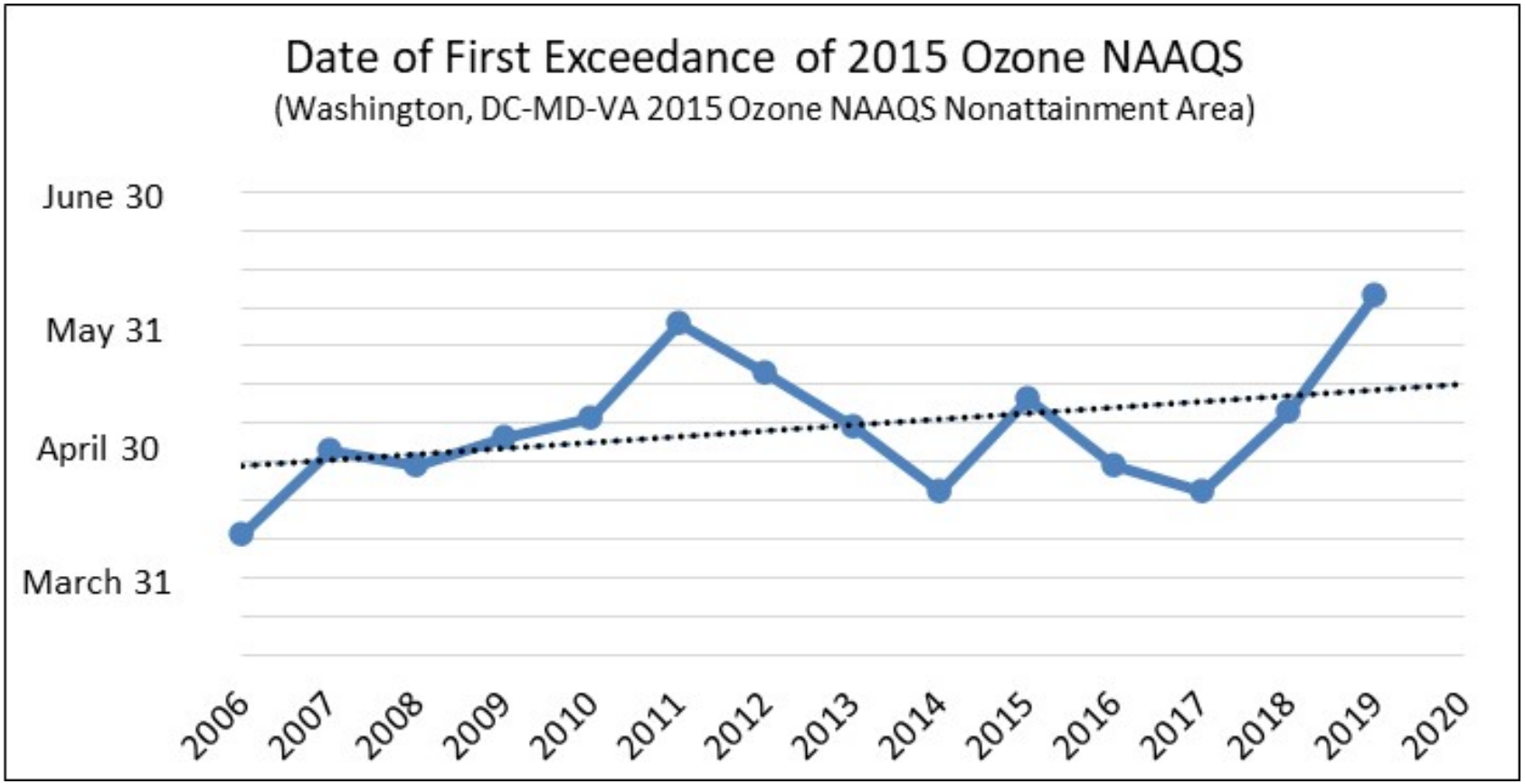
Note: Data shown above is for the Washington-Arlington-Alexandria CBSA.

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 July 7, 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.

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

CONCLUSIONS

- Ozone levels overall still seem to be lower after COVID-19 related restrictions were implemented in the Washington region. PM2.5 levels also overall still seem to be lower though they seem to be higher starting June end onwards.
- Reduction in emissions due to lower traffic and fuel/ electricity consumption coupled with weather contributed towards lower pollutant levels.
- If traffic, fuel, and energy consumption levels slowly go back to pre-COVID-19 levels, the air quality impact of COVID-19 restrictions is expected be lower in rest of the Summer months.