

# 2020 OZONE SEASON SUMMARY & COVID-19 IMPACTS ON AIR QUALITY

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# Ozone Monitor Map

Metropolitan Washington Ozone Monitors  
Washington, DC, MD, VA



Note: State air agencies in the District of Columbia, Maryland, and Virginia monitor and provide air pollutant data for the Washington region. EPA also operates a monitor in Beltsville, MD.

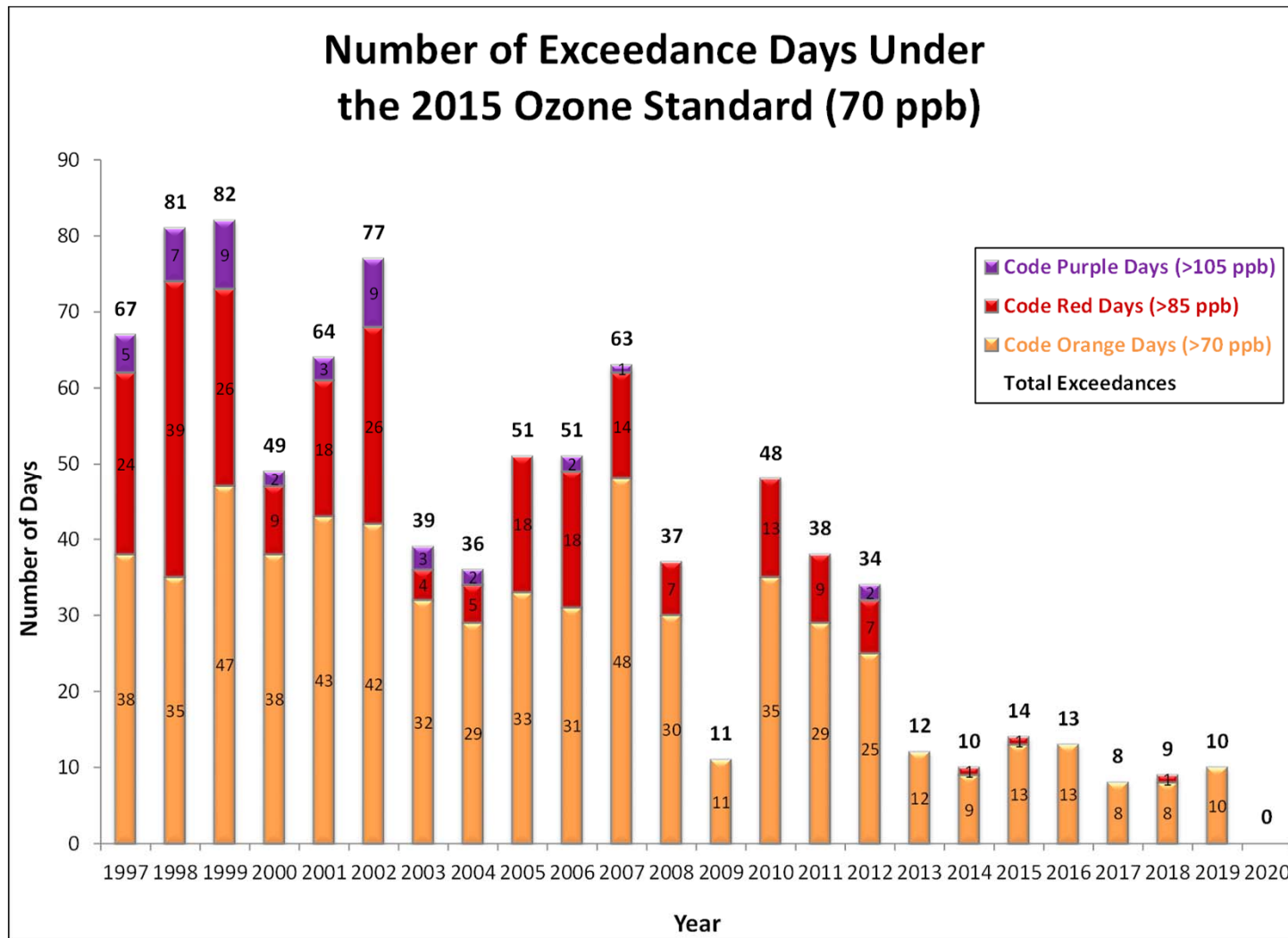
# Peak 8-Hour Average Ozone Levels (ppb)

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
01	02	03	04	05	06	07	29	30	31	01	02	03	04	26	27	28	29	30	01	02
44	52	40	44	42	39	43				40	48	50	36						39	49
08	09	10	11	12	13	14	05	06	07	08	09	10	11	03	04	05	06	07	08	09
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	15	16	17	18	10	11	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	22	23	24	25	17	18	19	20	21	22	23
44	38	39	38	41	48	43	50	45	48	49	41	34	47	42						
29	30	31					26	27	28	29	30			24	25	26	27	28	29	30
38	49	40					38	40	40	51	46									
														31						

2 Code Yellow Days, Rest all Code Green Days

Analysis is based on draft and incomplete data as of May 19, 2020.

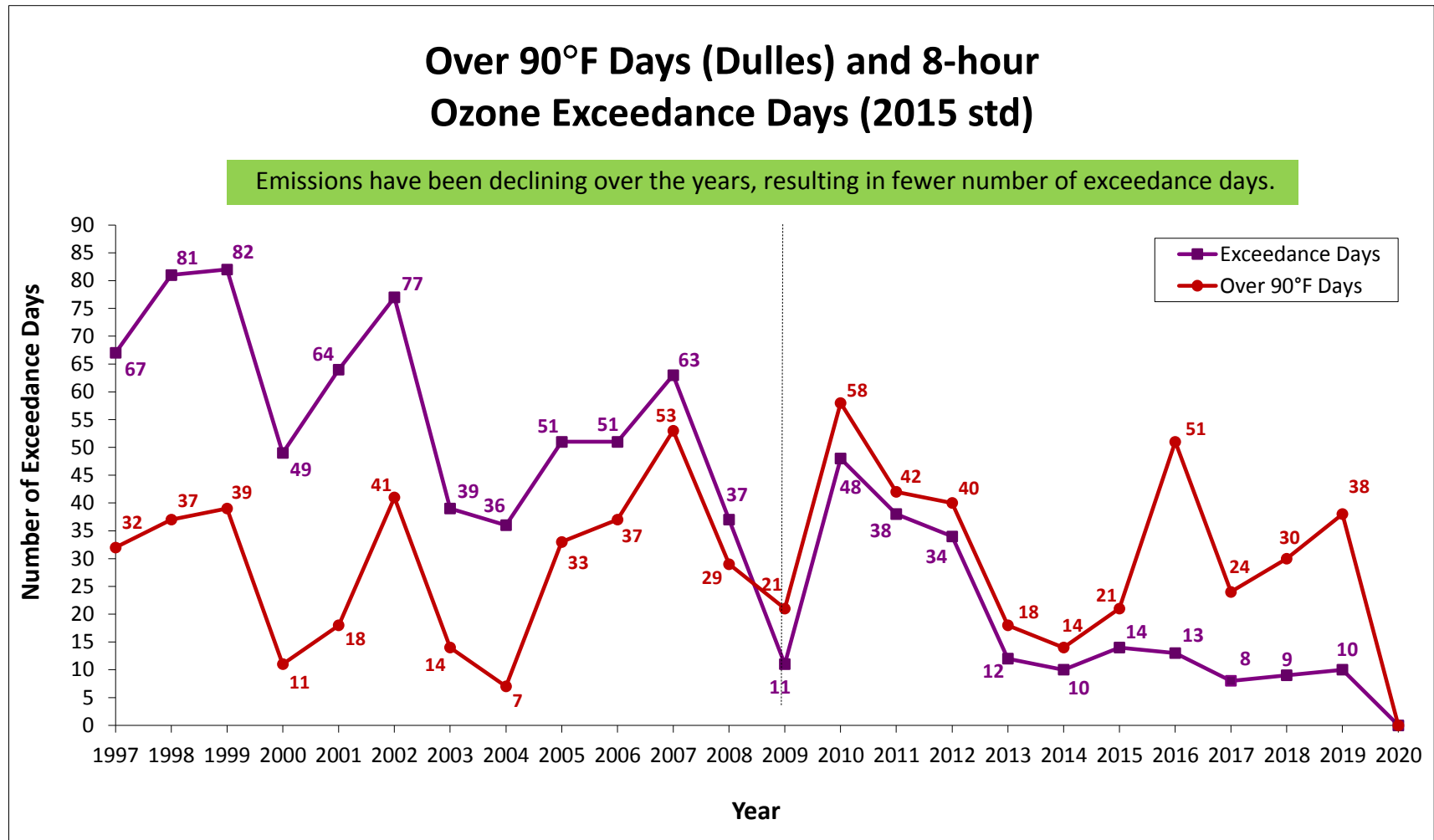
# Ozone Exceedance Trend



Analysis is based on draft and incomplete data as of May 19, 2020.

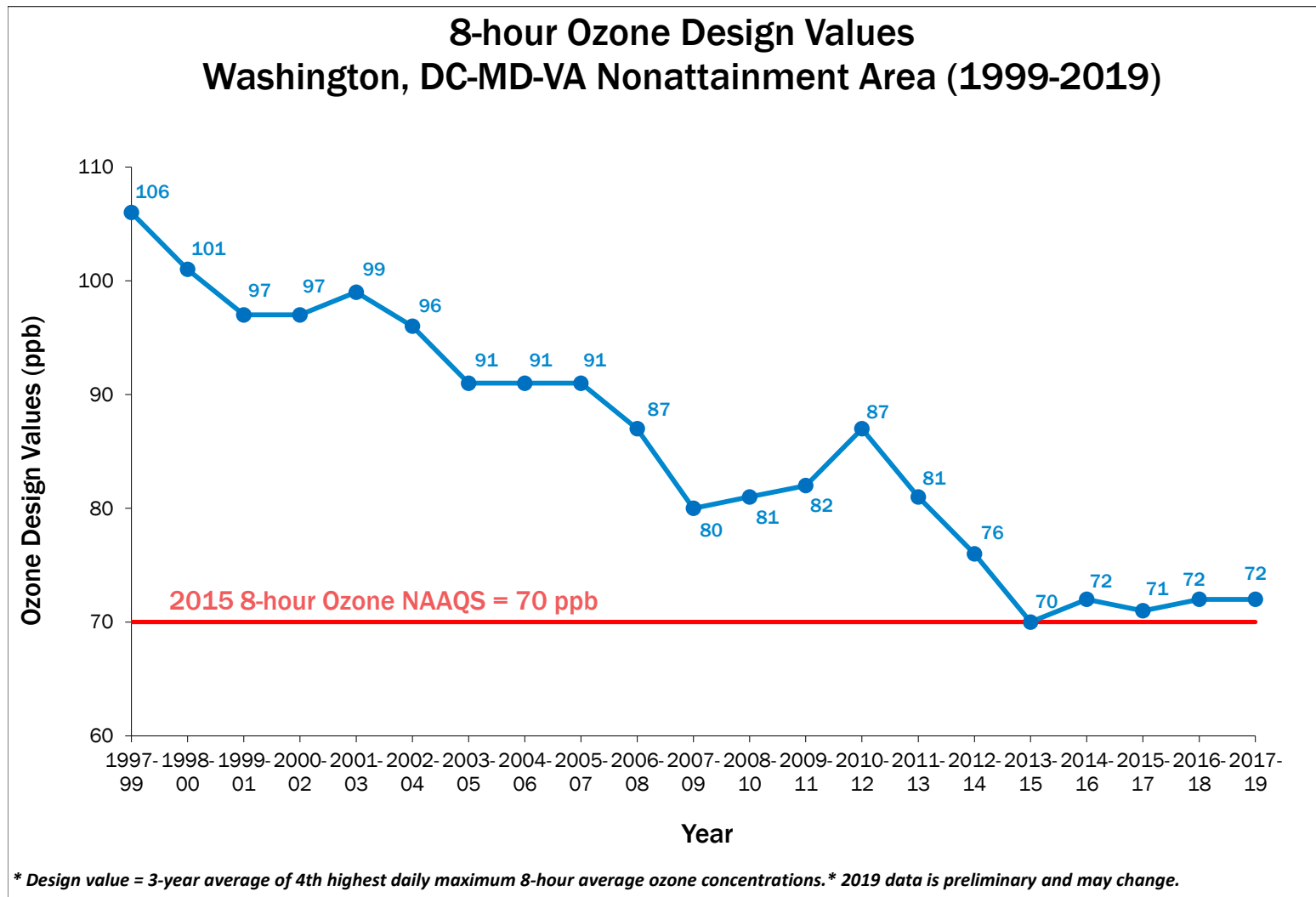


# Ozone & Temperature Trend



Analysis is based on draft and incomplete data as of May 19, 2020.

# 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/m<sup>3</sup>)

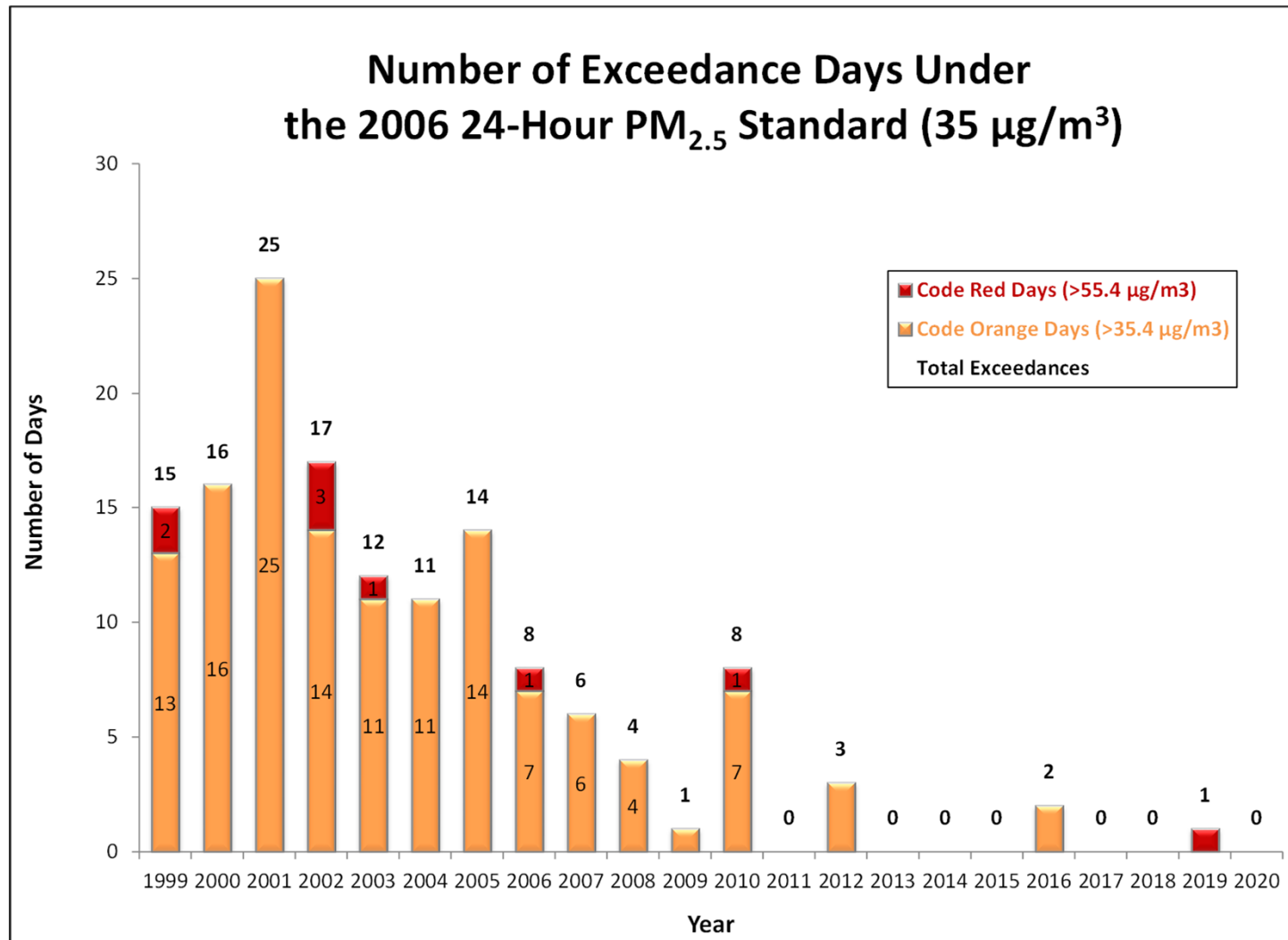
March 2020							April 2020							May 2020						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01	02	03	04	05	06	07	29	30	31	01	02	03	04	26	27	28	29	30	01	02
6.2	10.9	9.4	3.4	7.7	9.3	4.0				6.6	4.2	3.1	3.1						3.5	5.6
08	09	10	11	12	13	14	05	06	07	08	09	10	11	03	04	05	06	07	08	09
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	16	17	18	10	11	12	13	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	22	23	24	25	17	18	19	20	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						
29	30	31					26	27	28	29	30			24	25	26	27	28	29	30
9.4	6.5	4.3					4.0	3.1	6.0	8.3	5.1									
														31						

1 Code Yellow Day, rest all Code Green Days

Analysis is based on draft and incomplete data as of May 19, 2020.

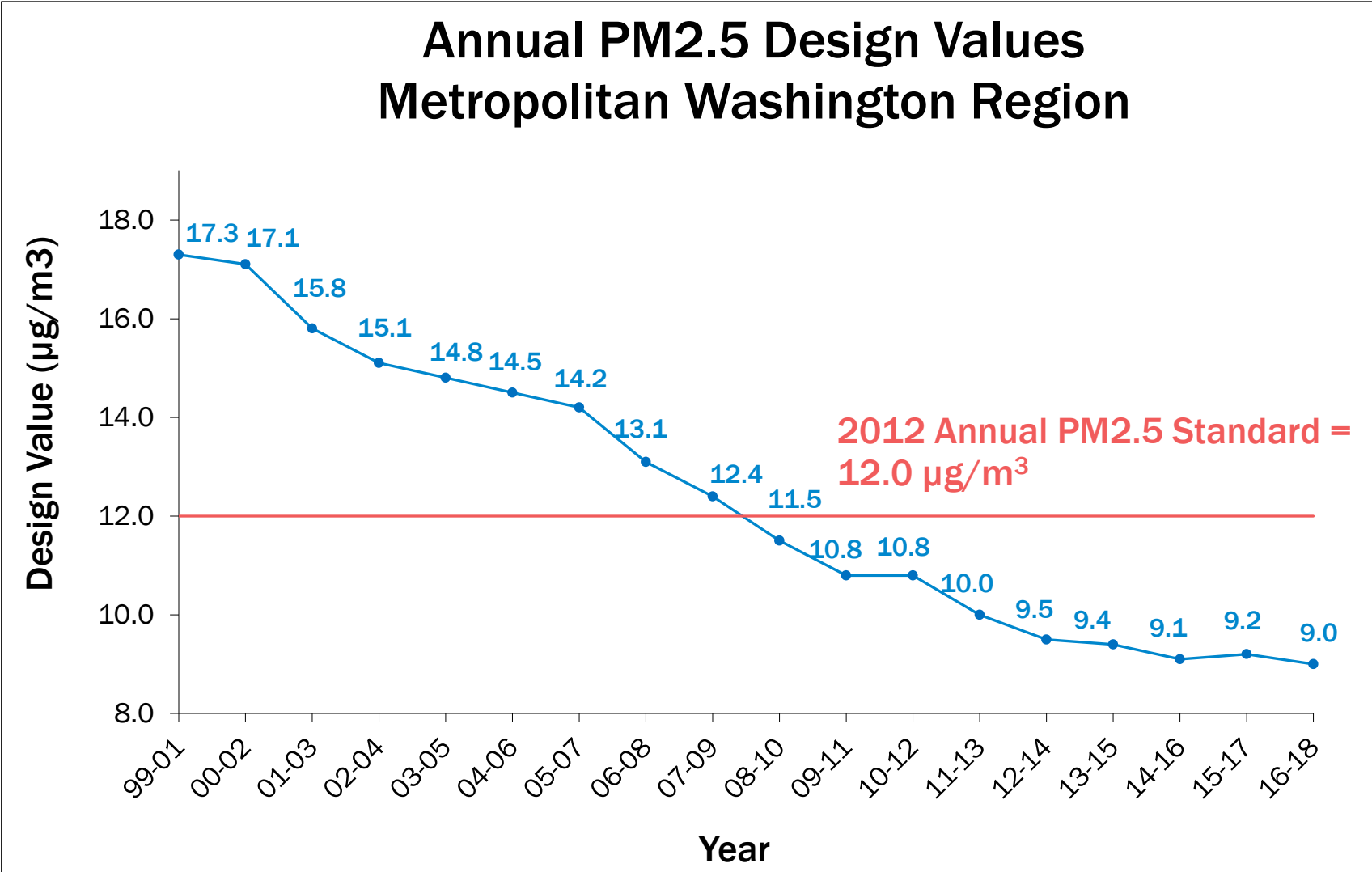


# PM2.5 Exceedance Trend

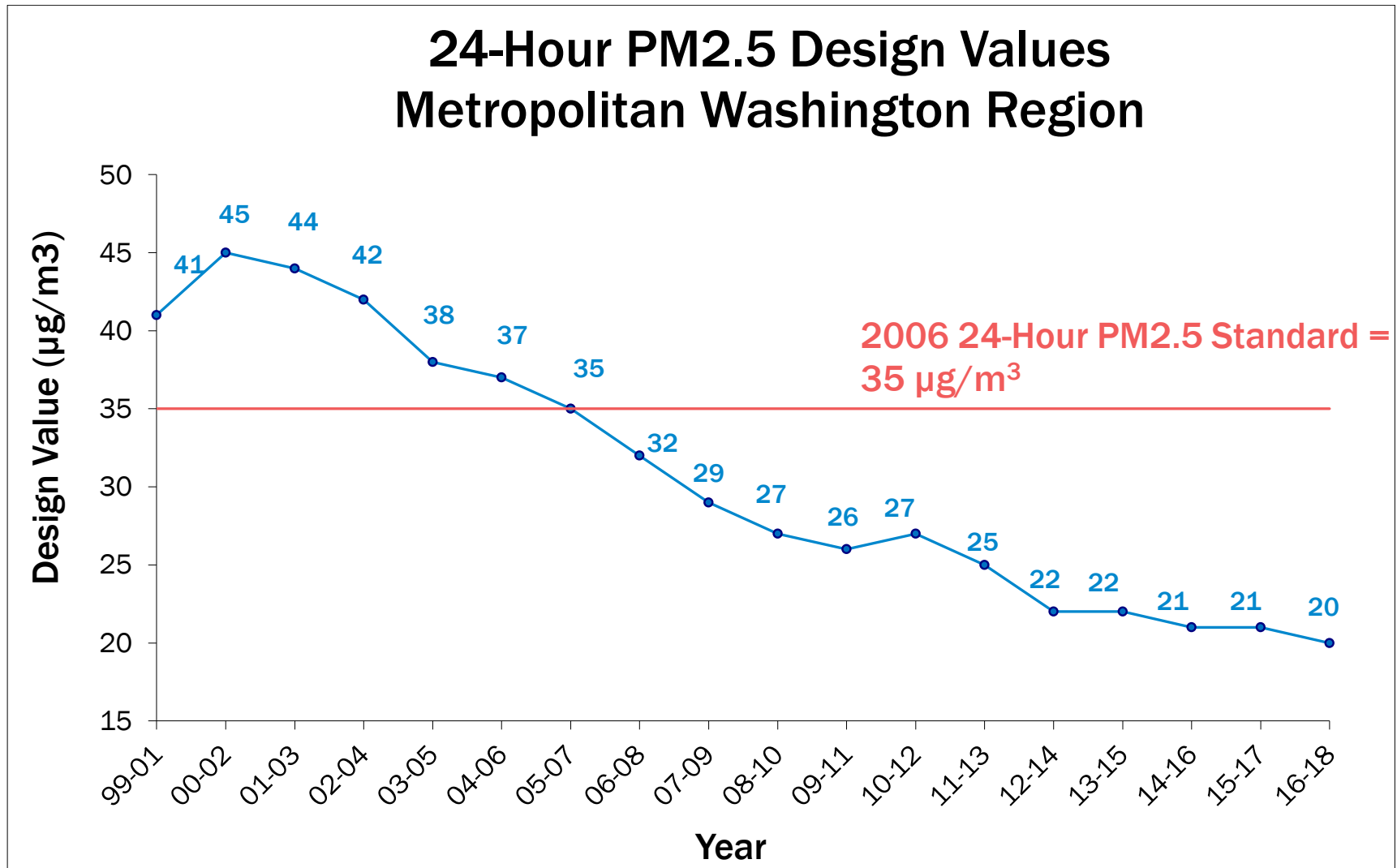


Analysis is based on draft and incomplete data as of May 11, 2020.

# Annual PM2.5 Design Value Trend



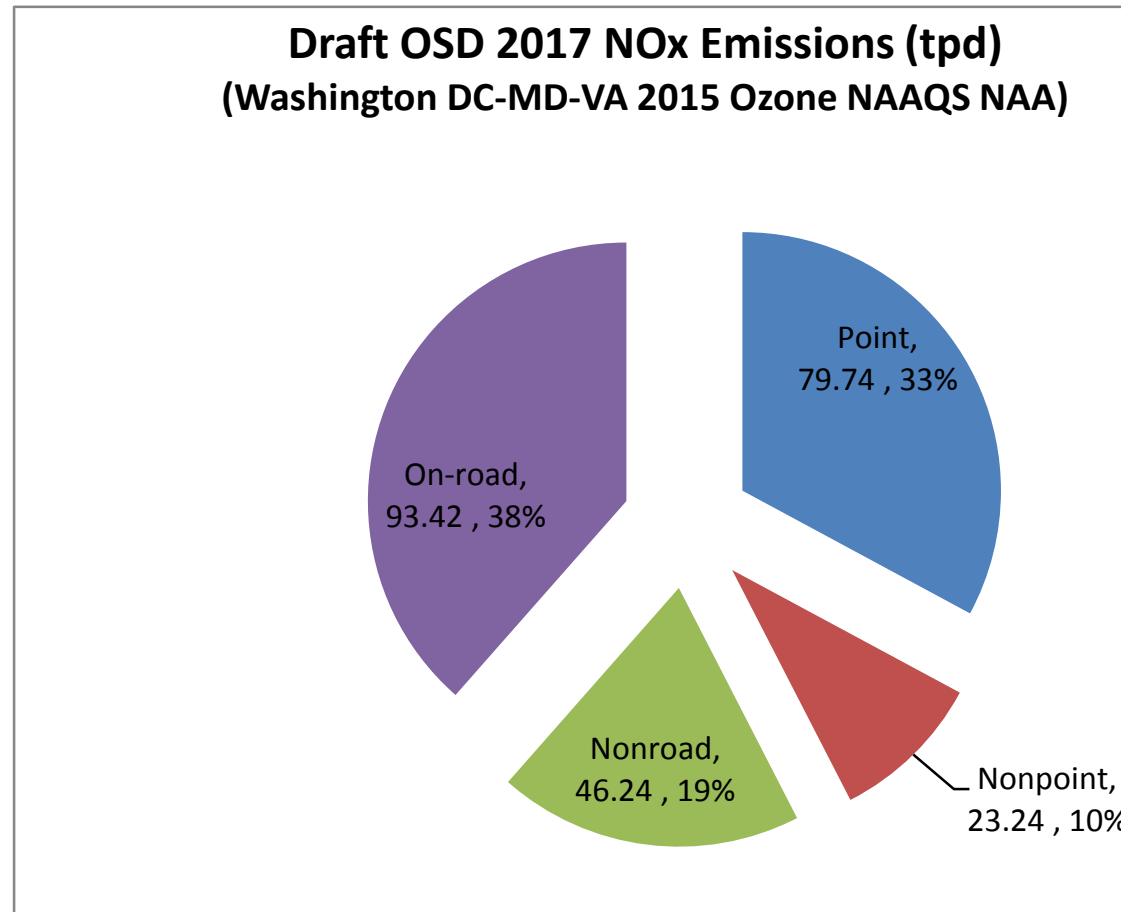
# 24-Hour PM2.5 Design Value Trend



# COVID-19 & AIR QUALITY

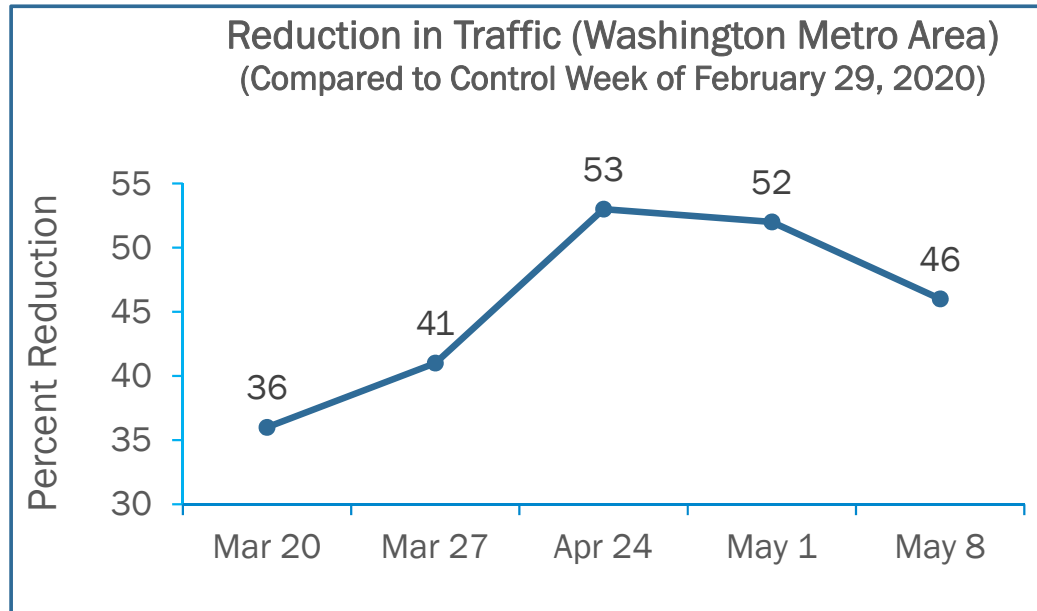
- COVID-19 virus has affected how educational institutions, offices, businesses, and governments operate across the country and in the Washington region since early March.
- Students are being taught online.
- A significant number of employees are teleworking.
- Public and private transportation has been affected quite significantly. This has resulted in significant reduction in traffic in the region.
- There has also been impact on the energy and fuel consumption in the region due to office and business closures and people teleworking/staying at home.

# Emission by Source



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

# IMPACT ON ON-ROAD SECTOR

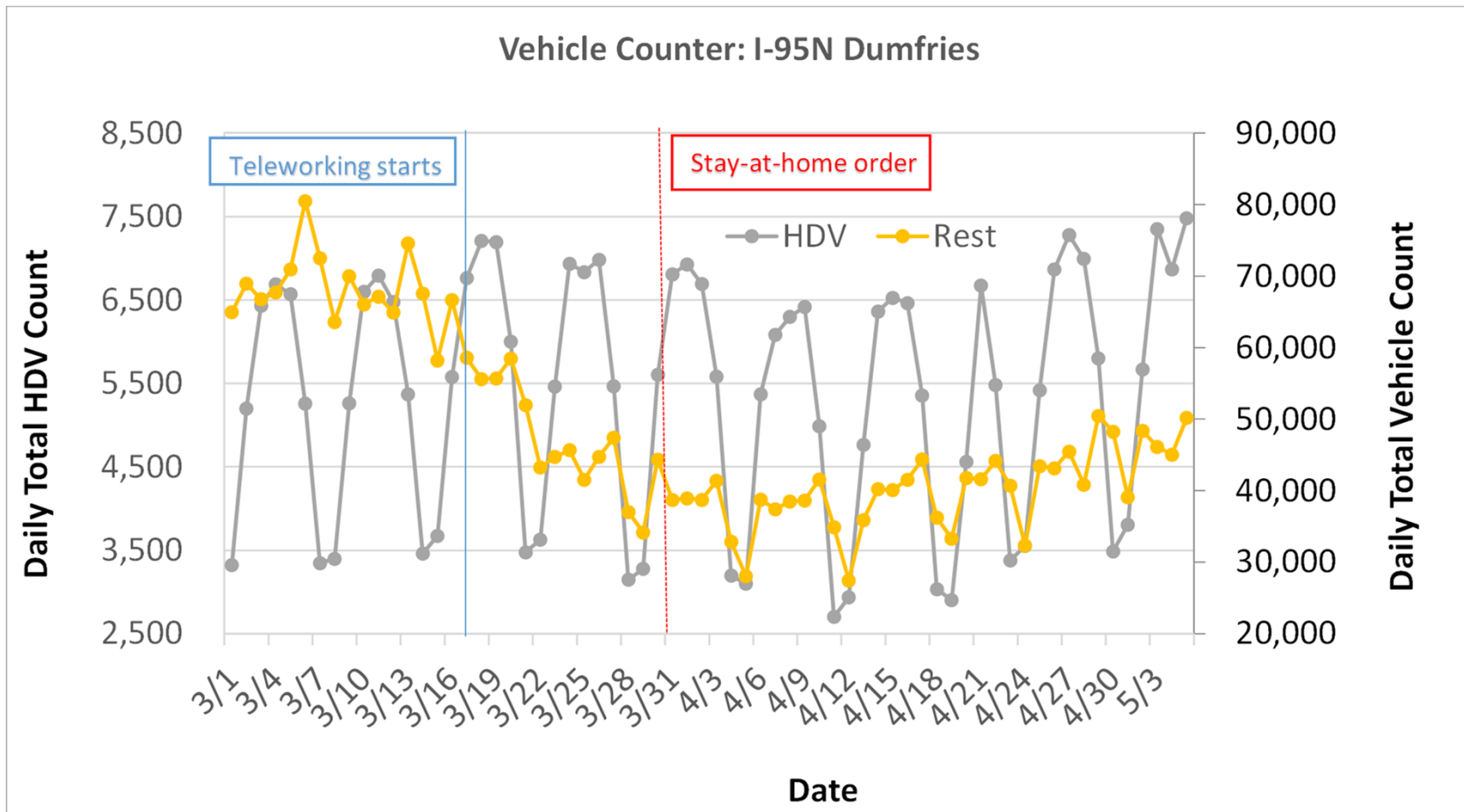


Source: Washington metro area chart is based on data extracted from INRIX U.S. National Traffic Volume Synopsis Issues #1(Table 1), #2(Table3), #6, #7, and #8

	03/18/20	03/25/20	04/01/20	04/08/20	04/15/20	04/22/20	04/29/20	05/06/20
Observed Volume	1,249K	926K	883K	888K	870K	949K	1,004K	931K
% Change from 2019	-29.0%	-47.4%	-50.9%	-50.7%	-48.6%	-44.8%	-42.5%	-43.7%

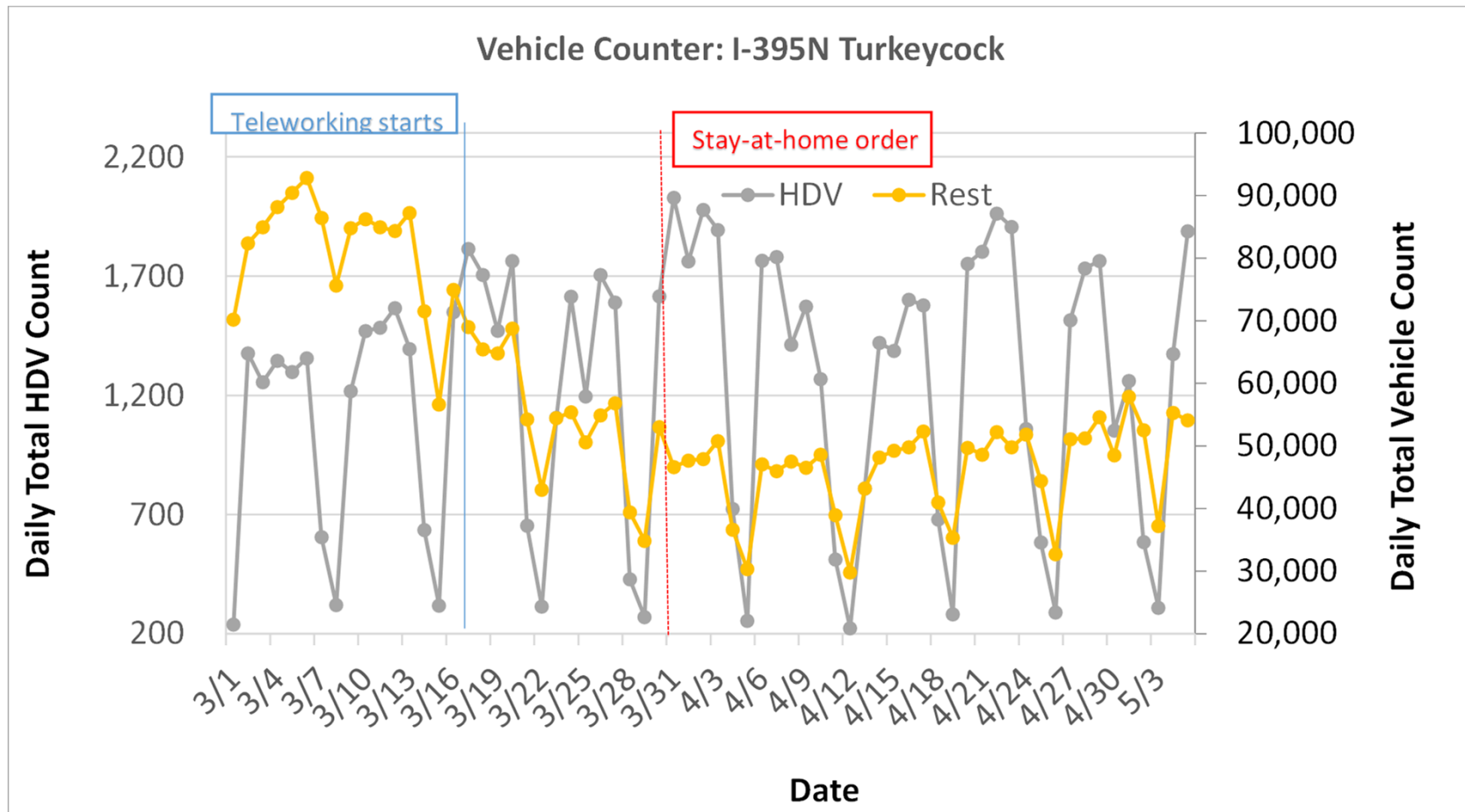
Source: VDOT

# IMPACT ON ON-ROAD SECTOR



- Both heavy-duty and other vehicle traffic seem to be increasing after a decrease during the early to mid April. Source: VDOT

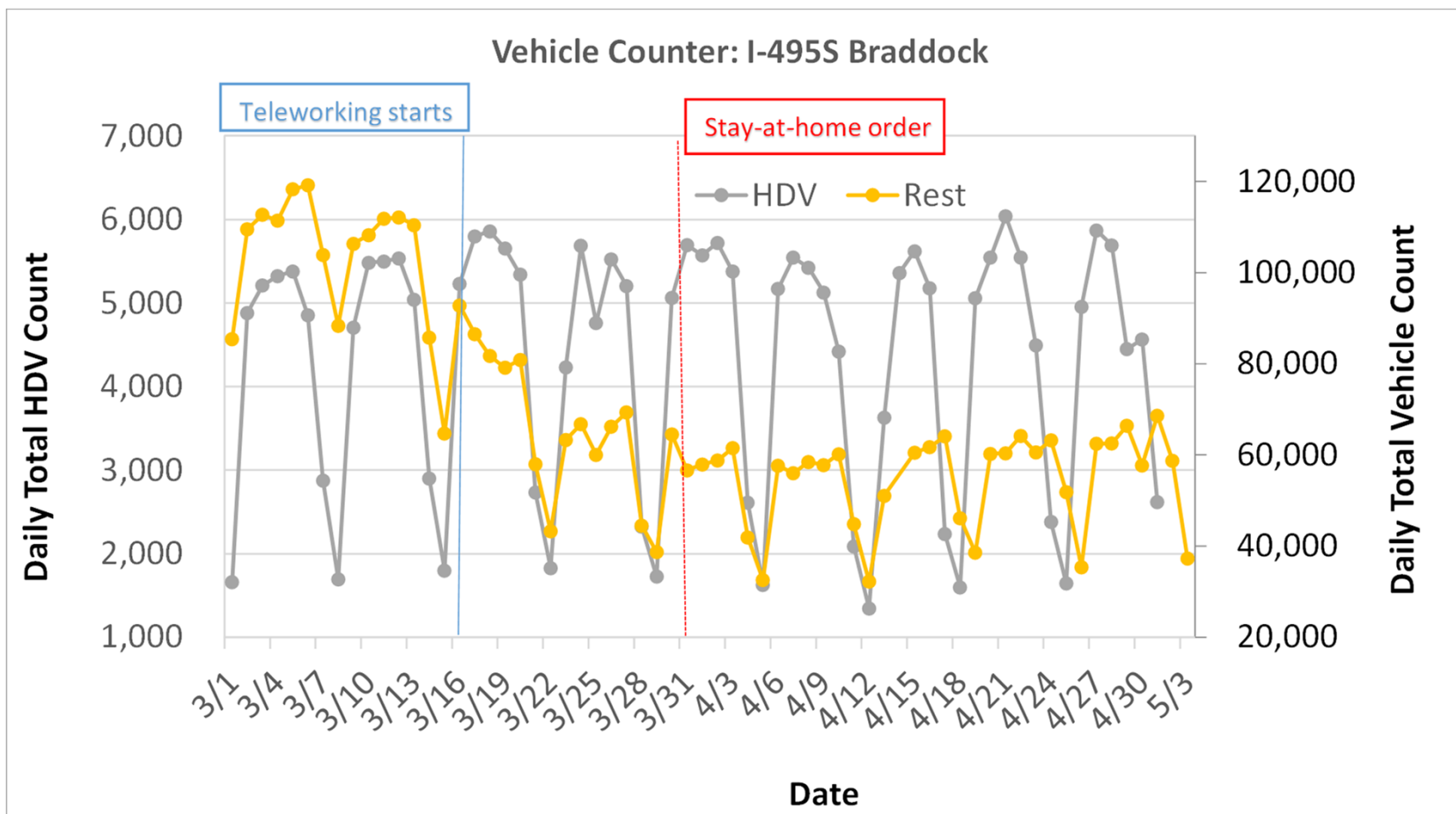
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# IMPACT ON ON-ROAD SECTOR



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# IMPACT ON ON-ROAD SECTOR

Select District

Day of Week

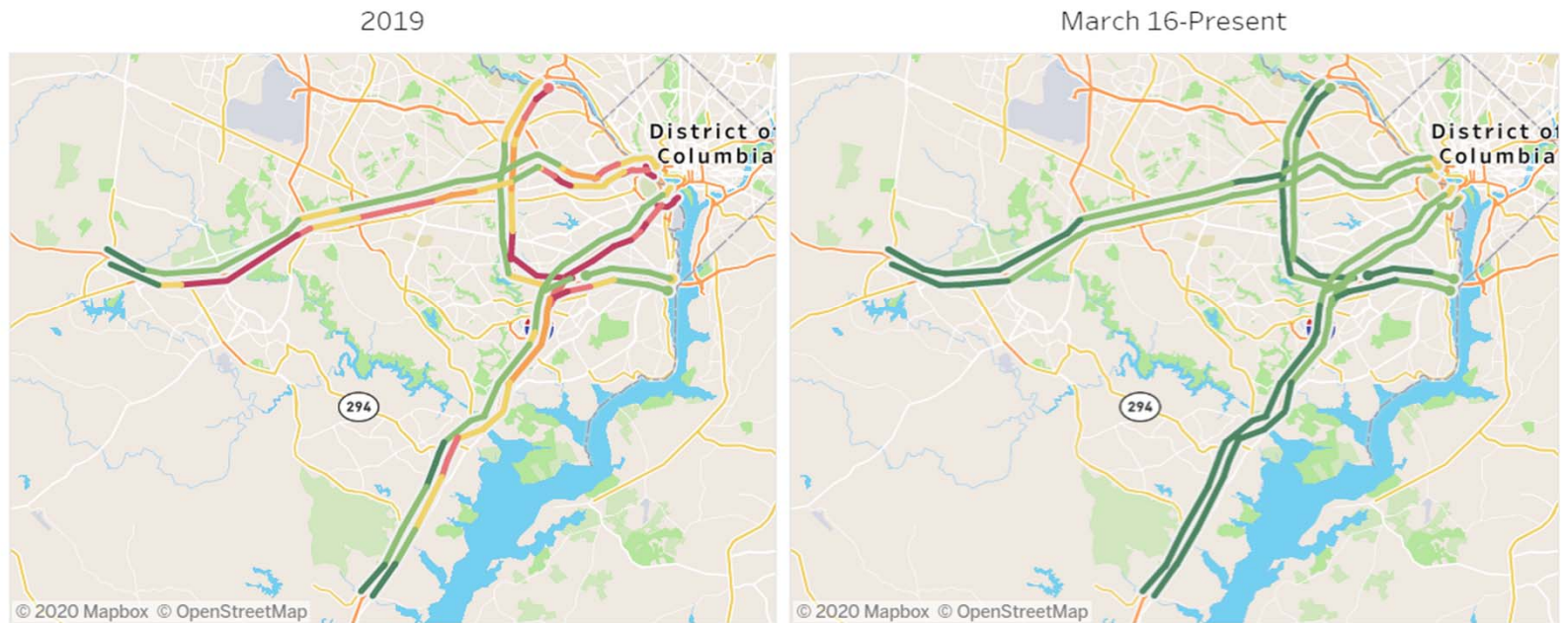
Select Hour

Average Daily Vehicle Hours of Delay - Wednesday

	2019	3/18/2020	3/25/2020	4/1/2020	4/8/2020	4/15/2020	4/22/2020
I-66	12,300	200	100	0	0	0	100
I-95	11,500	1,300	200	0	0	600	1,200
I-395	2,100	0	0	0	0	0	100
I-495	8,000	0	0	0	0	0	0
<b>Grand Total</b>	<b>33,900</b>	<b>1,500</b>	<b>300</b>	<b>0</b>	<b>100</b>	<b>600</b>	<b>1,300</b>

- <25 mph
- 25-35 mph
- 35-45 mph
- 45-55 mph
- 55-65 mph
- >65 mph

Speed Comparison on Wednesdays at 8:00



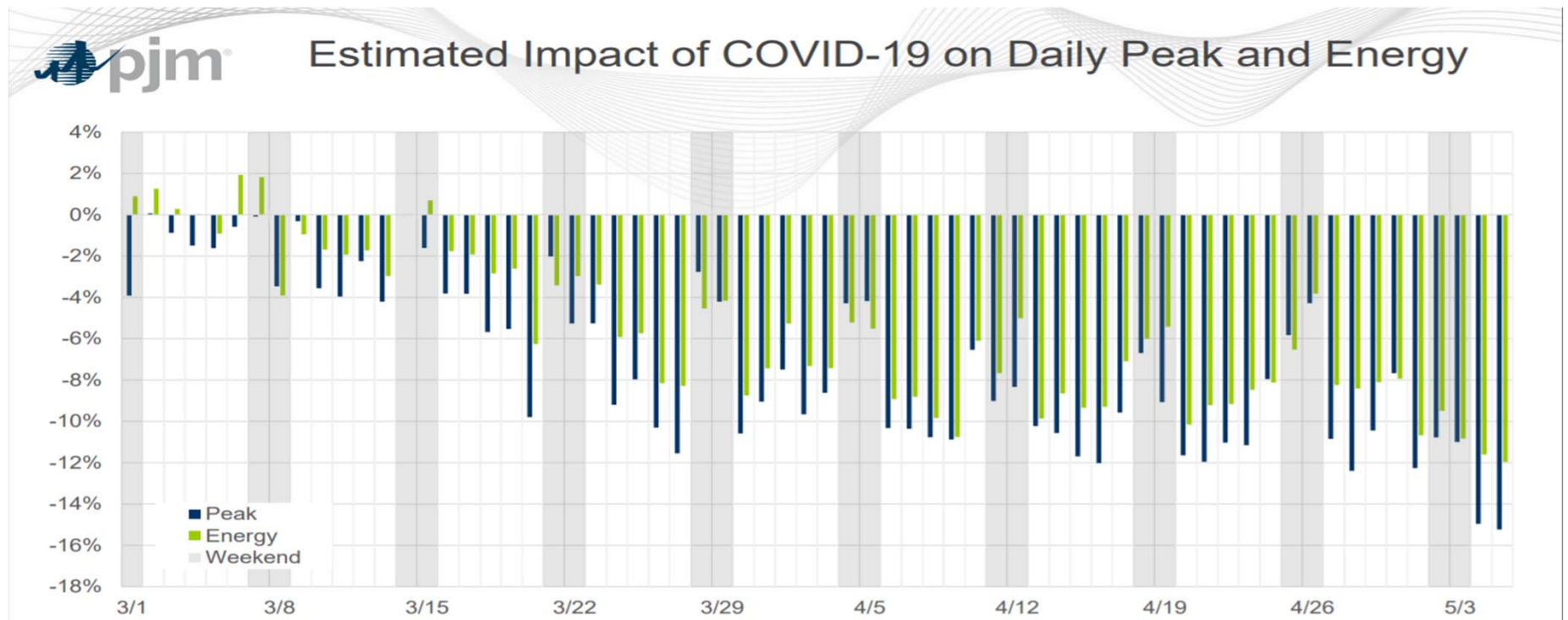
- Northern Virginia traffic shows much less congestion.
- Source: VDOT

# IMPACT ON NONPOINT & NONROAD SECTORS

- Emissions can be expected to decline similar to other sectors 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 also declined.

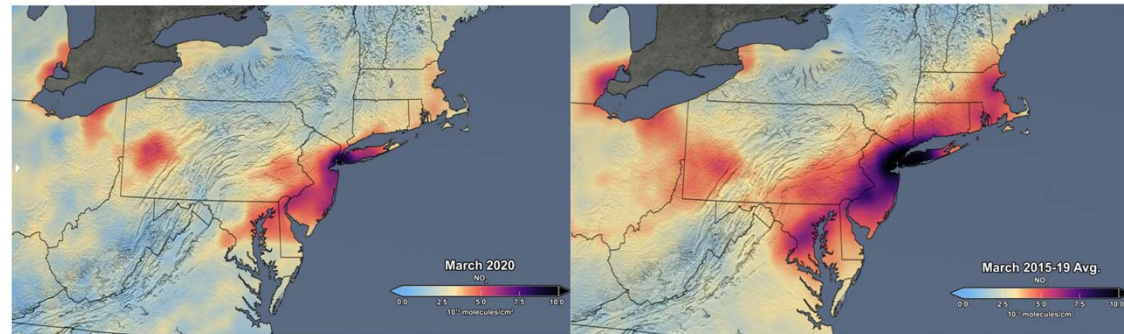
# IMPACT ON POINT SECTOR

- There has also been impact on the energy consumption in the region due to office and business closures and people teleworking/staying at home.
- Electricity consumption data, in general shows downward trend (lower emissions).

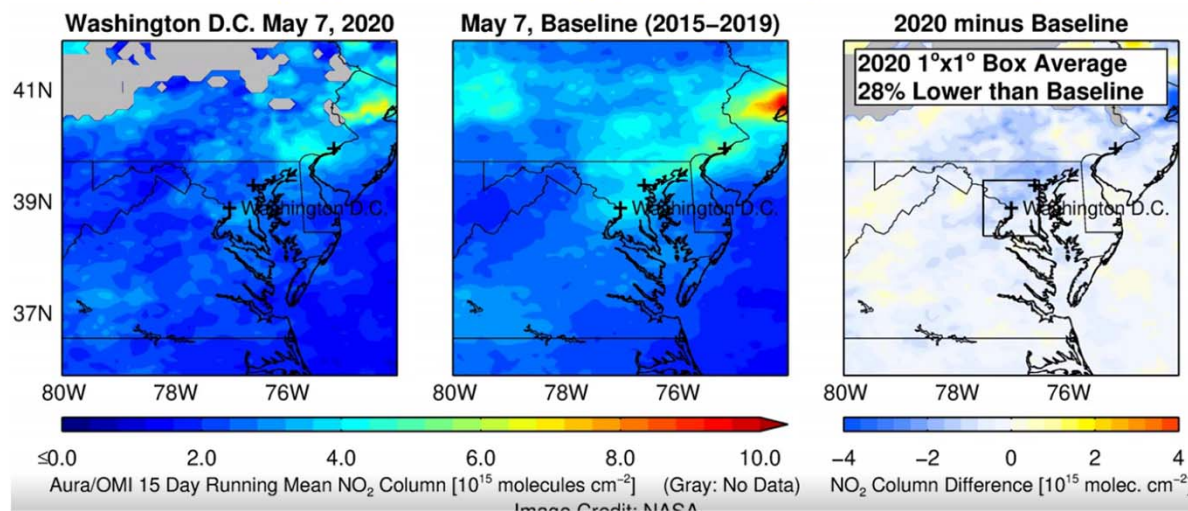


- Source: PJM Report “Update of COVID-19 Load Impacts”, May 12, 2020

# SATELLITE NO2 DATA TREND



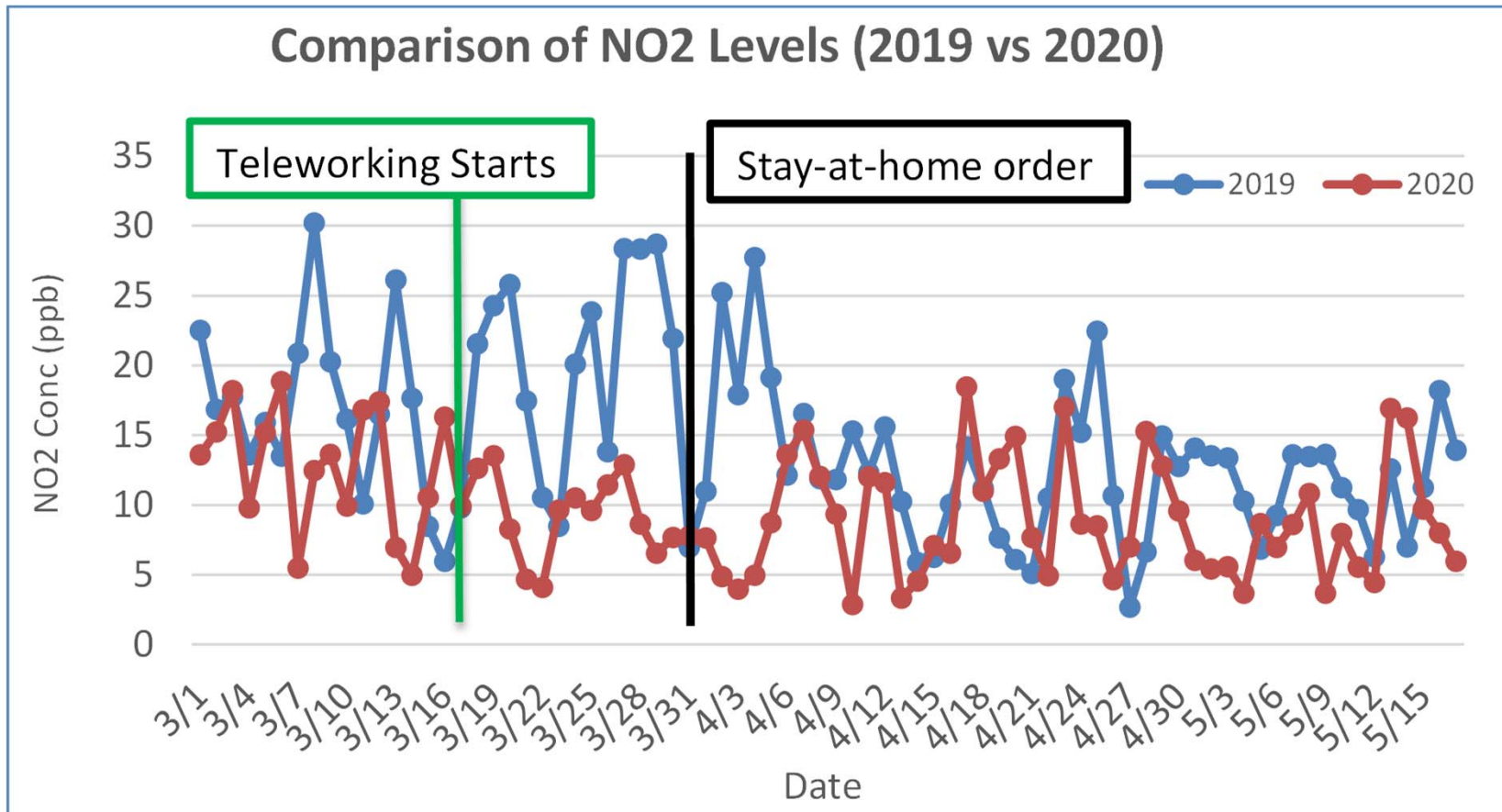
Source: NASA - <https://earthdata.nasa.gov/learn/articles/feature-articles/health-and-air-quality-articles/find-no2-data>



[https://so2.gsfc.nasa.gov/no2/pix/mp4s/Washington\\_DC.html](https://so2.gsfc.nasa.gov/no2/pix/mp4s/Washington_DC.html)

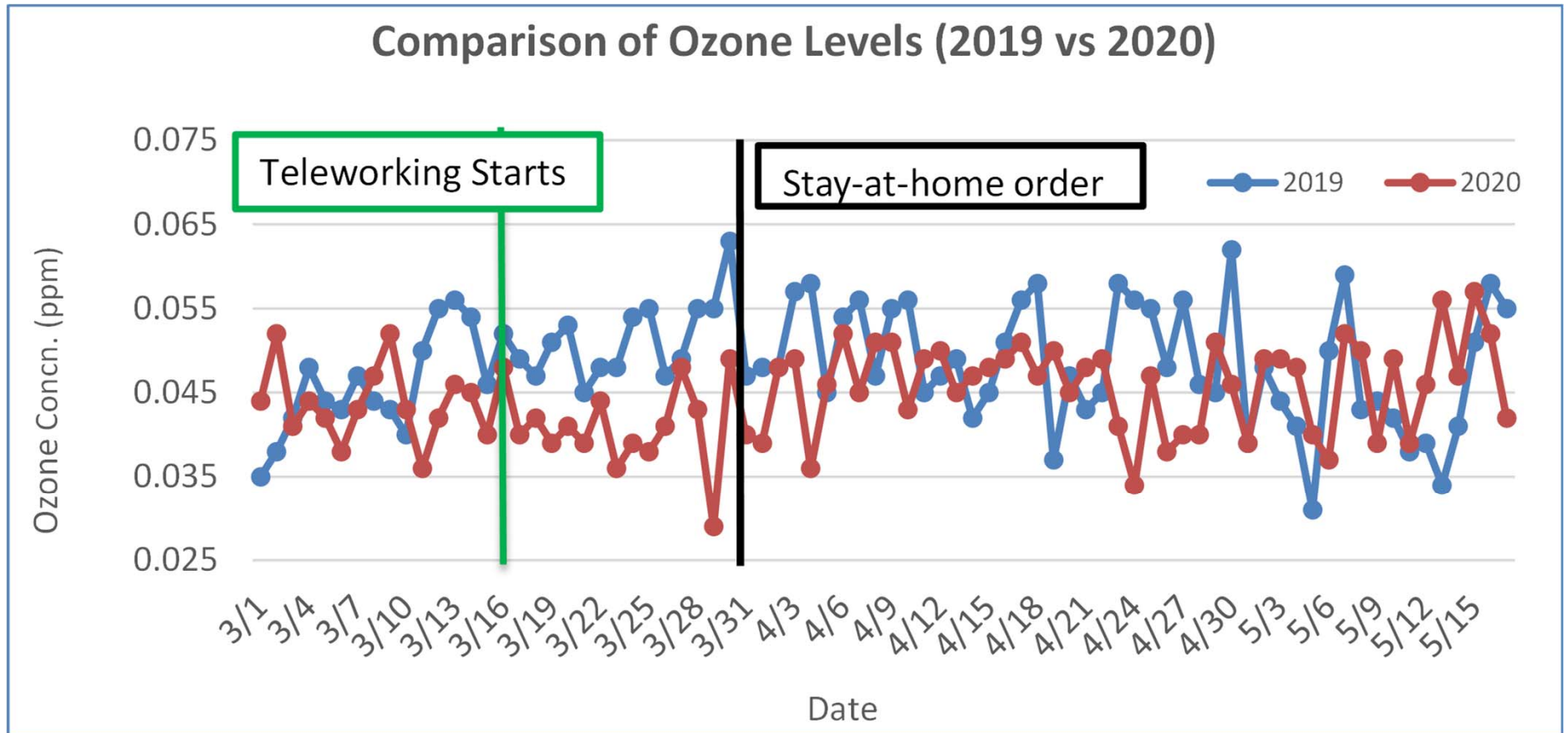
- Lower NO<sub>2</sub> levels in March/May 2020 compared to March/May 2015-2019 averages.
- NASA cautions that “Further analysis is required to rigorously quantify the amount of the change in NO<sub>2</sub> levels associated with changes in pollutant emissions versus natural variations in weather.”

# COVID-19 & NO2 LEVELS



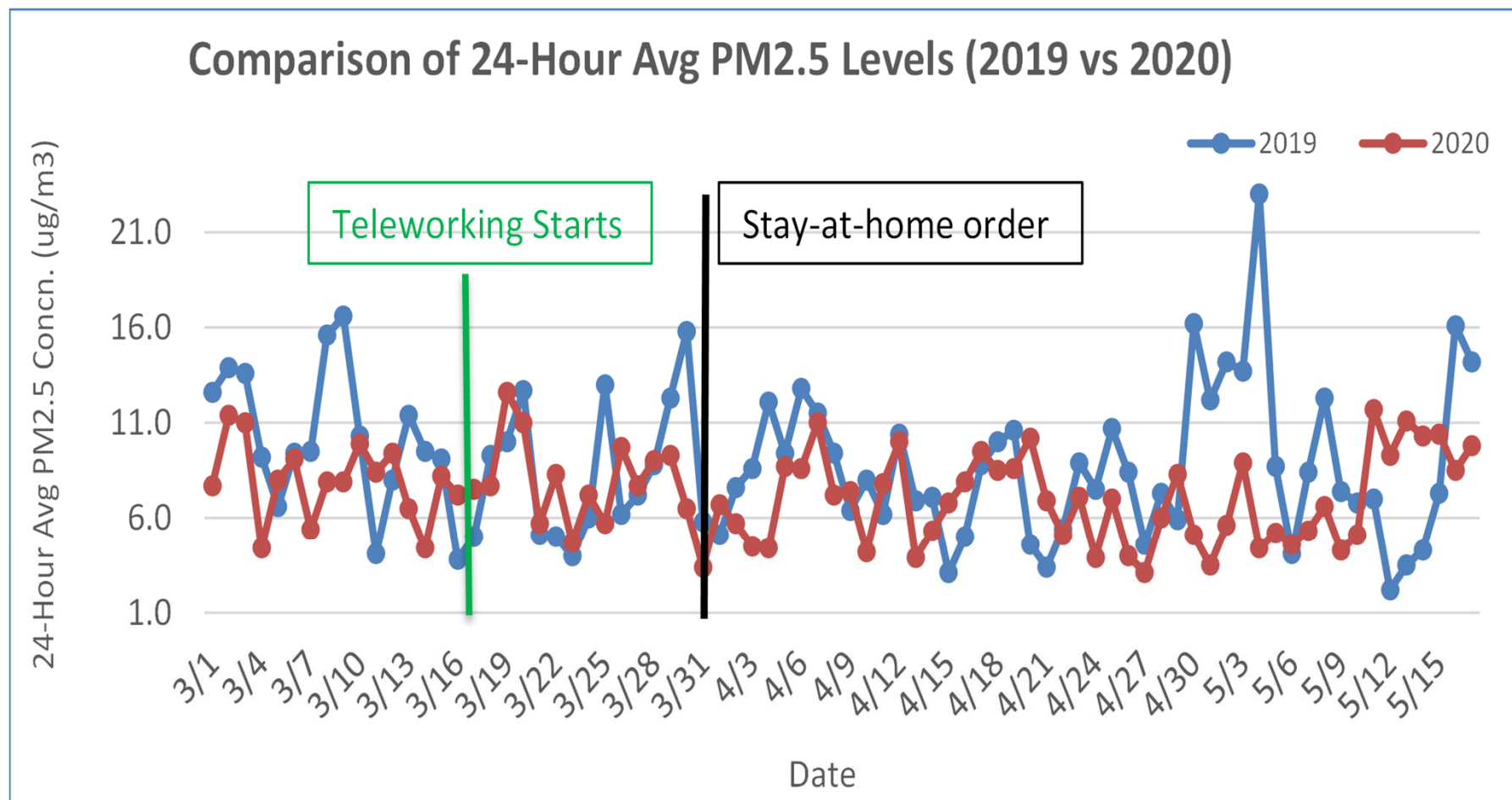
- Draft 2020 ozone levels mostly lower compared to 2019 both before and after lockdown. Role of weather needs to be studied.

# COVID-19 & OZONE LEVELS



- Draft 2020 ozone levels mostly lower compared to 2019 both before and after lockdown. Role of weather needs to be studied.

# COVID-19 & PM2.5 LEVELS



- Draft 2020 PM2.5 levels generally lower. Role of weather needs to be studied.



# CONCLUSIONS

- NO<sub>2</sub>, ozone and PM<sub>2.5</sub> levels generally seemed lower after COVID-19 lockdown though it is too early to tell if all of that happened due to lower emissions. Role of weather needs to be investigated to determine how much that contributed towards lower pollutant levels.
- Ozone is usually low in March and April as weather is generally not very conducive for ozone formation in those months.
- Ozone and PM<sub>2.5</sub> levels generally seem higher from 2<sup>nd</sup> week of May onwards. Favorable weather, increased traffic, activities ?
- Air quality impact of lockdown is expected to be more visible in summer, if it gets extended to those months.