

OZONE SEASON SUMMARY 2021

Sunil Kumar
Principal Environmental Engineer

MWAQC-Technical Advisory Committee
September 21, 2021

Peak 8-Hour Average Ozone Levels (ppb)

March 2021							April 2021							May 2021						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	39	45	44	46	45	47					37	48	47							49
07	08	09	10	11	12	13	04	05	06	07	08	09	10	02	03	04	05	06	07	08
48	48	59	63	61	47	52	61	58	63	67	50	36	49	57	38	46	44	43	41	44
14	15	16	17	18	19	20	11	12	13	14	15	16	17	09	10	11	12	13	14	15
52	48	44	38	34	47	48	53	36	39	38	46	42	41	44	49	51	41	50	49	60
21	22	23	24	25	26	27	18	19	20	21	22	23	24	16	17	18	19	20	21	22
55	52	47	26	33	51	50	45	48	55	45	46	58	58	53	59	66	71	82	74	66
28	29	30	31				25	26	27	28	29	30		23	24	25	26	27	28	29
39	47	55	41				51	55	60	61	49	48		59	30	47	63	62	45	33
														30	31					
														27	45					

June 2021							July 2021							August 2021						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30	31	01	02	03	04	05	27	28	29	30	01	02	03	01	02	03	04	05	06	07
		50	52	38	54	73					44	40	37	47	54	55	61	71	67	58
06	07	08	09	10	11	12	04	05	06	07	08	09	10	08	09	10	11	12	13	14
64	48	53	51	52	30	48	50	50	64	63	37	45	44	61	62	55	50	60	58	49
13	14	15	16	17	18	19	11	12	13	14	15	16	17	15	16	17	18	19	20	21
38	58	48	55	60	64	53	43	46	50	52	64	64	54	51	37	31	23	42	42	49
20	21	22	23	24	25	26	18	19	20	21	22	23	24	22	23	24	25	26	27	28
50	46	31	51	59	53	33	45	54	61	63	46	49	56	43	53	67	80	63	59	61
27	28	29	30				25	26	27	28	29	30	31	29	30	31				
29	39	42	53				52	68	74	74	61	62	49	52	51	50				

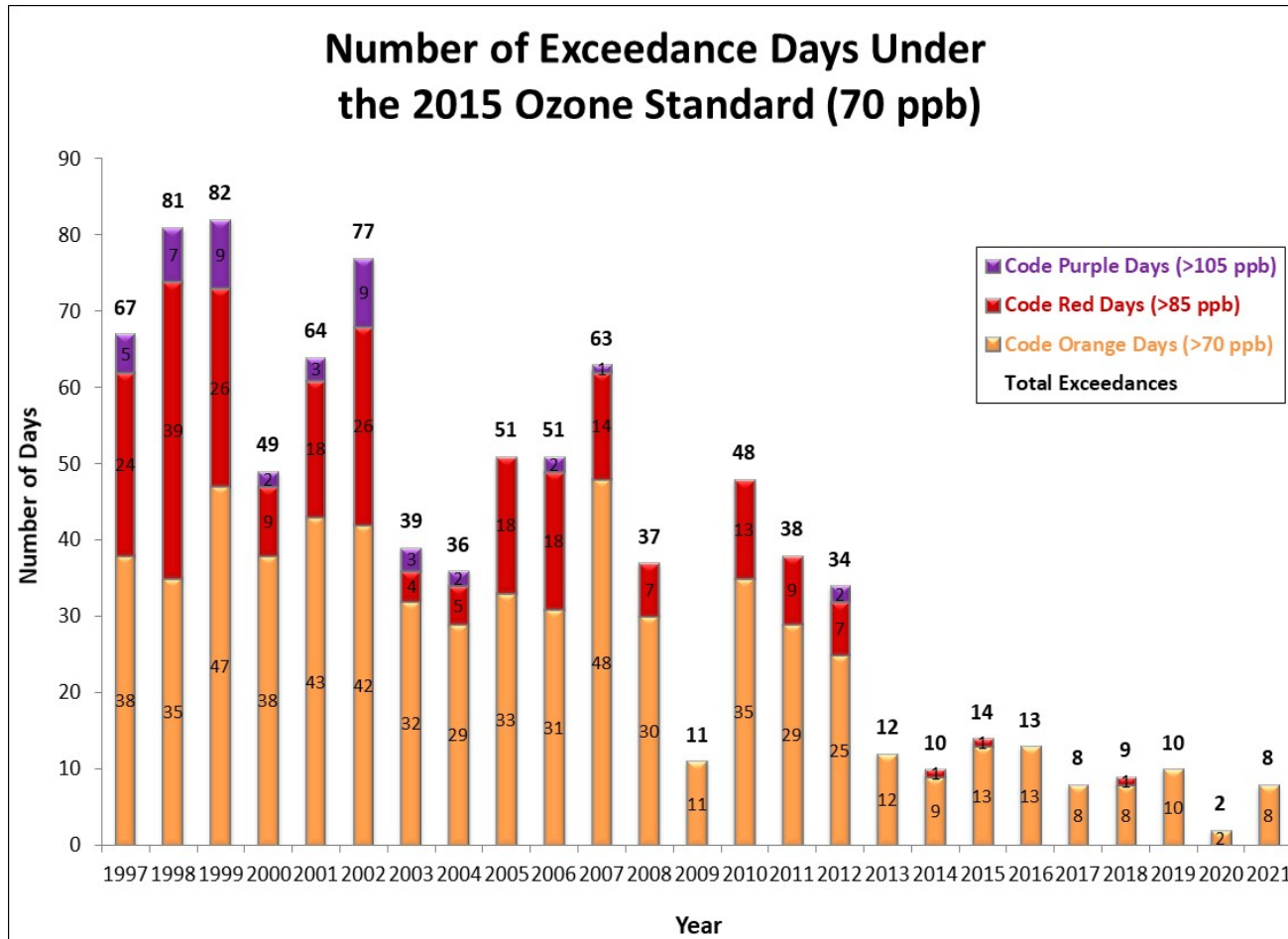
September 2021						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
29	30	31	01	02	03	04
			40	40	50	47
05	06	07	08	09	10	11
39	49	60	52	43	39	46
12	13	14	15	16	17	18
47	52	59	55			
19	20	21	22	23	24	25
26	27	28	29	30		

8 Code Orange Days, 55 Code Yellow Days, rest all Code Green Days

Analysis is based on draft data as of September 15, 2021.



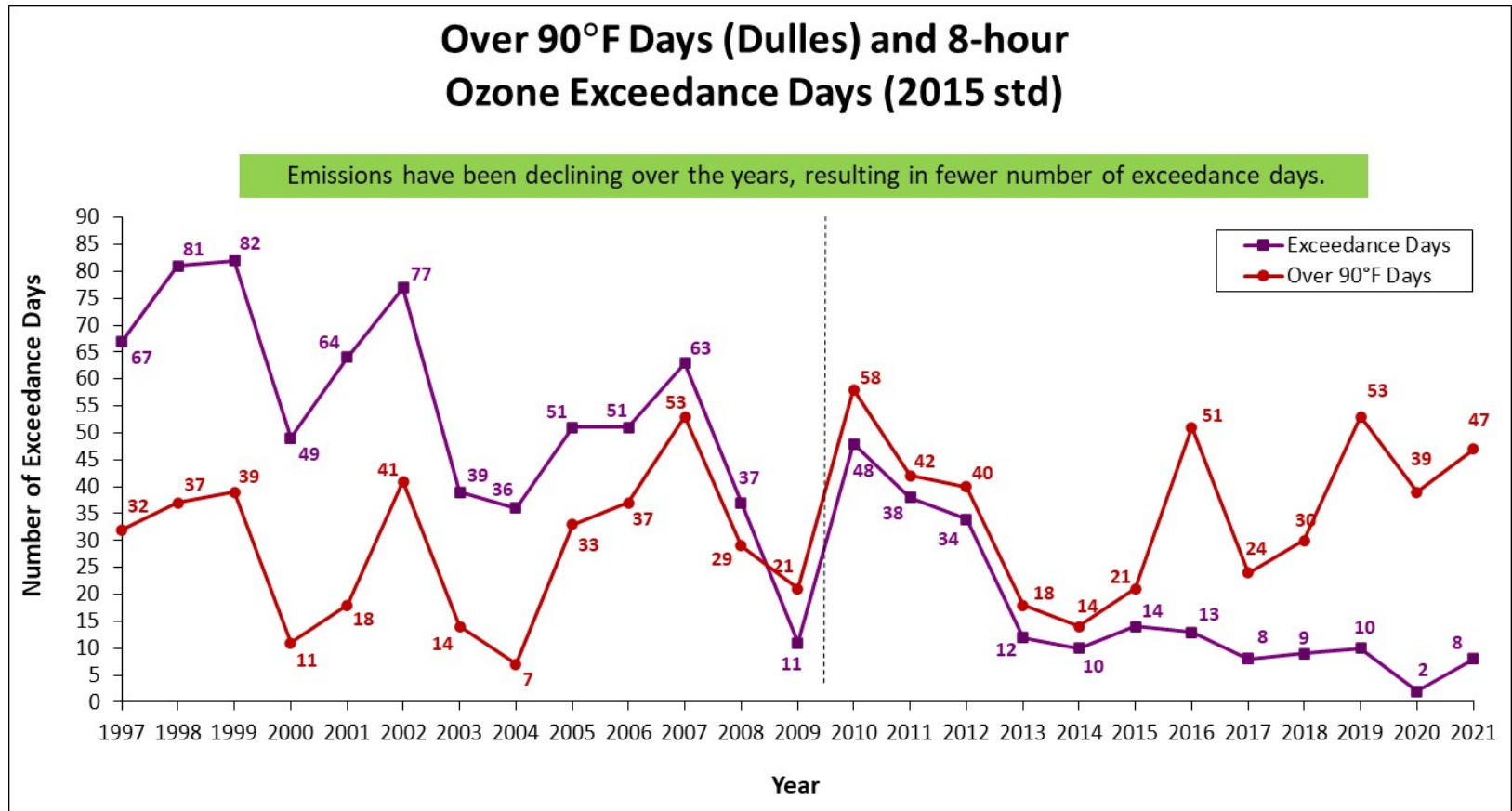
Ozone Exceedance Trend



2021 data is draft and incomplete as of September 15, 2021.

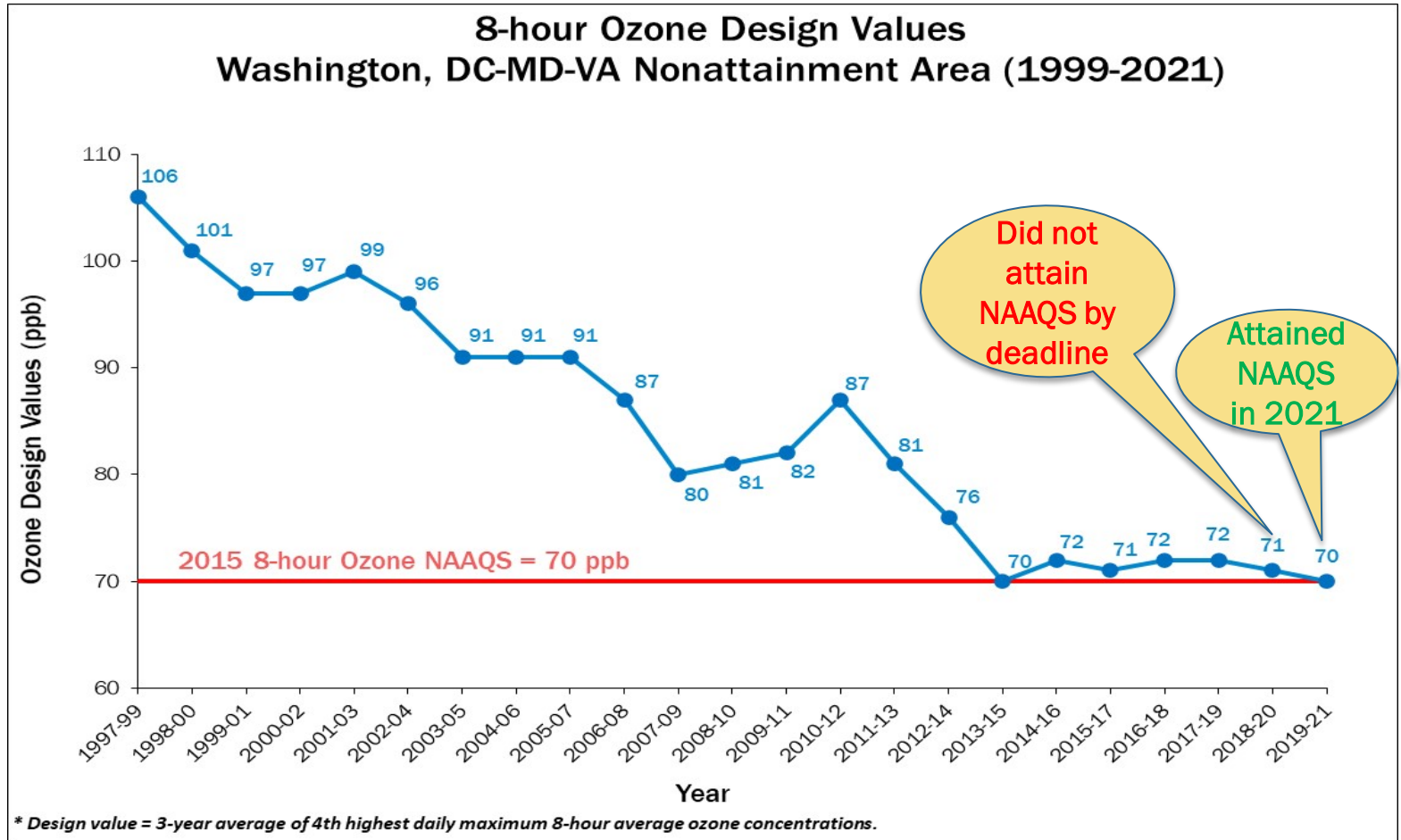


Ozone & Temperature Trend



2021 data is draft and incomplete as of September 15, 2021.

Ozone Design Value Trend



2019-21 data is draft as of September 15, 2021.



Ozone Design Values (Individual Monitors)

Monitor	County, State	Draft 2019-2021 Design Value (ppb)
Beltsville	Prince George's, MD	70
McMillian	District of Columbia	69
HU- Beltsville	Prince George's, MD	67
Takoma	District of Columbia	66
Arlington	Arlington, VA	66
PG Equestrian	Prince George's, MD	65
Franconia	Fairfax, VA	65
Frederick	Fredrick, MD	65
Rockville	Montgomery, MD	63
Ashburn	Loudoun, VA	62
River Terrace	District of Columbia	60
S. Maryland	Charles, MD	59
Long Park	Prince William, VA	59
Calvert	Calvert, MD	58

2021 data is draft and incomplete as of September 15, 2021.

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/Revised CSAPR Update (2009/2015/2017/2021)		Gas Can Replacement



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

March 2021							April 2021							May 2021						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	6.6	5.3	9.5	8.6	5.1	5.5					5.3	4.0	5.8							4.3
07	08	09	10	11	12	13	04	05	06	07	08	09	10	02	03	04	05	06	07	08
8.6	14.0	15.2	20.0	17.7	8.6	4.8	9.2	12.0	12.7	13.5	5.3	6.6	9.7	8.9	11.0	8.6	8.0	5.9	8.0	4.5
14	15	16	17	18	19	20	11	12	13	14	15	16	17	09	10	11	12	13	14	15
5.5	5.0	8.0	9.3	5.8	5.0	7.5	5.9	6.3	7.7	10.5	6.7	4.2	6.5	6.8	4.2	6.8	5.0	7.3	10.6	9.7
21	22	23	24	25	26	27	18	19	20	21	22	23	24	16	17	18	19	20	21	22
14.7	11.3	9.2	8.1	11.4	6.7	5.0	7.2	8.5	8.4	6.7	6.3	9.4	11.6	8.2	10.9	11.3	12.7	12.3	9.9	12.5
28	29	30	31				25	26	27	28	29	30		23	24	25	26	27	28	29
6.5	4.9	9.4	7.7				9.2	6.0	12.4	14.4	12.4	3.9		12.3	7.3	10.4	15.4	9.6	10.1	2.5
														30	31					
														4.1	7.8					

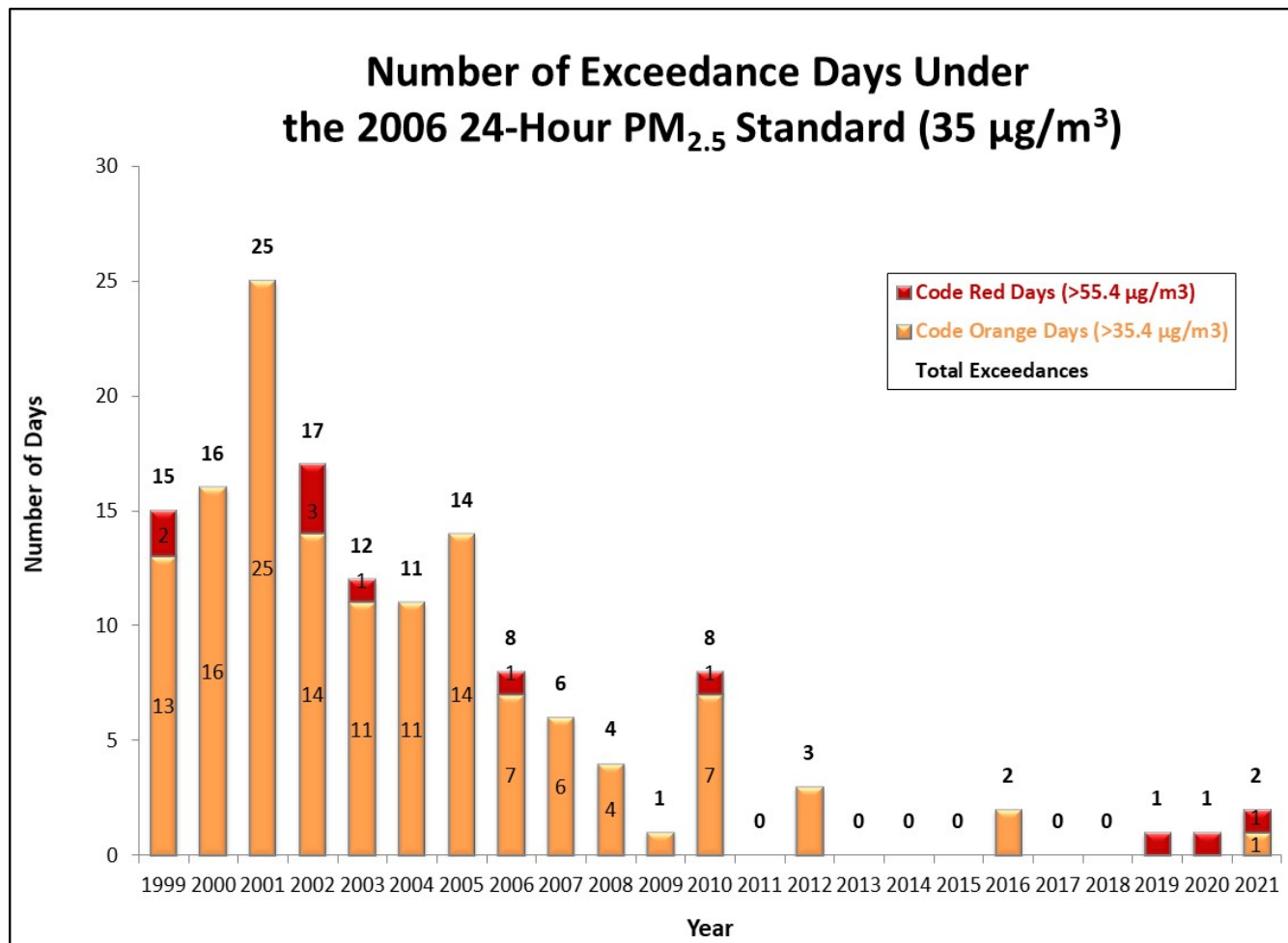
June 2021							July 2021							August 2021						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30	31	01	02	03	04	05	27	28	29	30	01	02	03	01	02	03	04	05	06	07
		13.6	10.3	8.0	8.3	12.7					7.9	7.6	5.4	17.3	15.2	12.3	11.5	13.6	13.4	10.7
06	07	08	09	10	11	12	04	05	06	07	08	09	10	08	09	10	11	12	13	14
15.5	13.6	12.3	10.6	10.0	6.6	8.8	58.9	42.7	21.0	23.3	15.1	8.5	8.3	9.2	14.0	17.0	11.6	11.3	12.0	10.5
13	14	15	16	17	18	19	11	12	13	14	15	16	17	15	16	17	18	19	20	21
7.7	10.1	7.9	6.0	6.7	10.6	15.9	12.4	12.1	12.3	9.6	11.0	13.5	15.1	8.5	10.5	8.3	7.7	6.8	6.4	8.7
20	21	22	23	24	25	26	18	19	20	21	22	23	24	22	23	24	25	26	27	28
15.2	10.9	7.0	6.2	9.5	6.5	8.5	7.1	24.0	32.4	33.4	15.1	11.5	13.2	10.0	14.7	15.1	18.5	16.0	14.2	13.3
27	28	29	30				25	26	27	28	29	30	31	29	30	31				
10.2	10.4	10.2	9.5				17.9	15.3	16.7	17.8	20.7	17.3	8.8	13.1	11.1	11.4				

September 2021						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
29	30	01	02	03	04	05
			9.7	6.1	6.2	8.2
06	07	08	09	10	11	12
11.0	8.6	9.3	12.2	8.0	6.5	9.0
13	14	15	16	17	18	19
10.0	15.7	20.7	13.7			
20	21	22	23	24	25	26
28	29	30				

1 Code Red, 1 Code Orange, 60 Code Yellow Days, rest all Code Green Days

Analysis is based on draft data as of September 15, 2021.

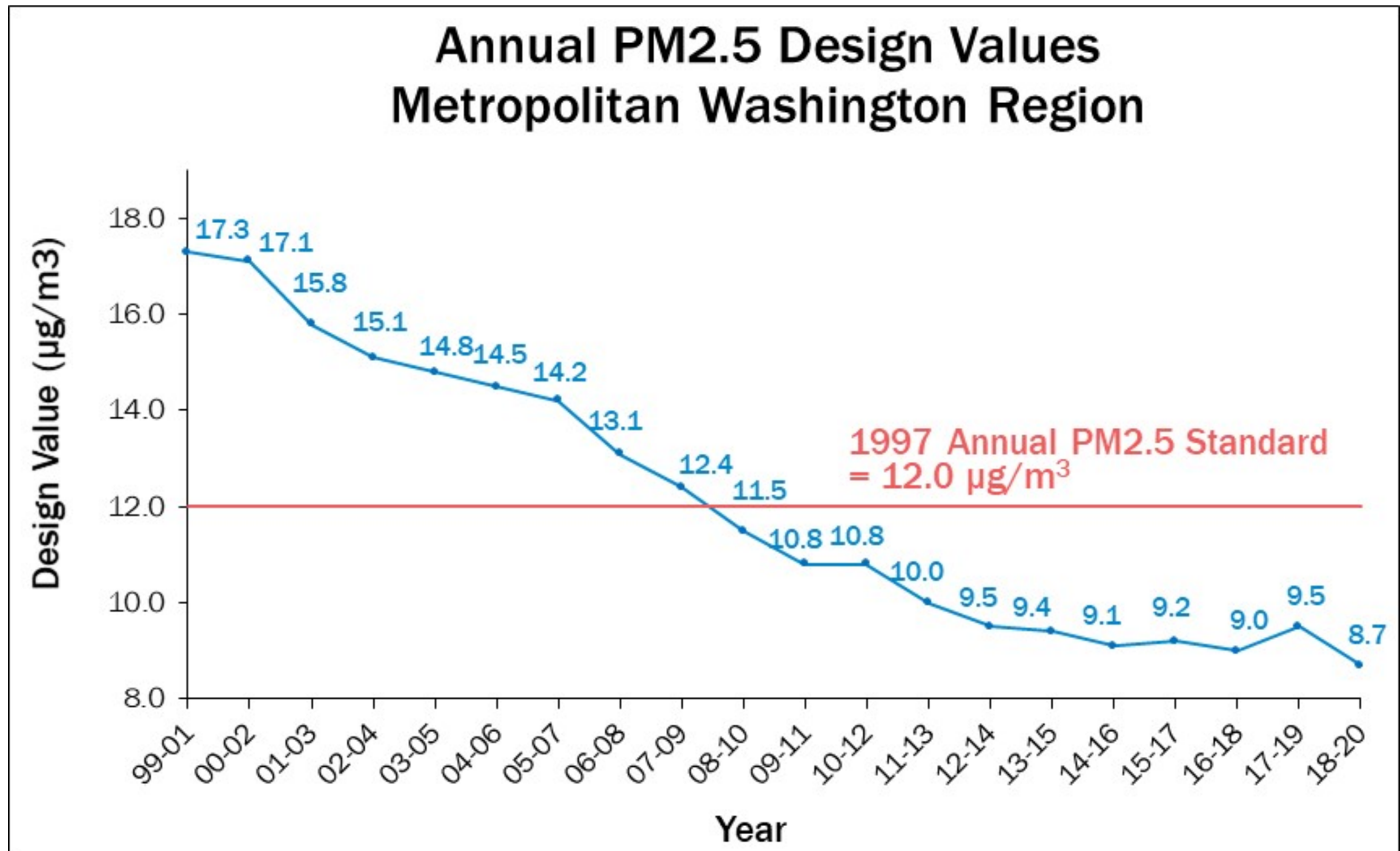
PM2.5 Exceedance Trend



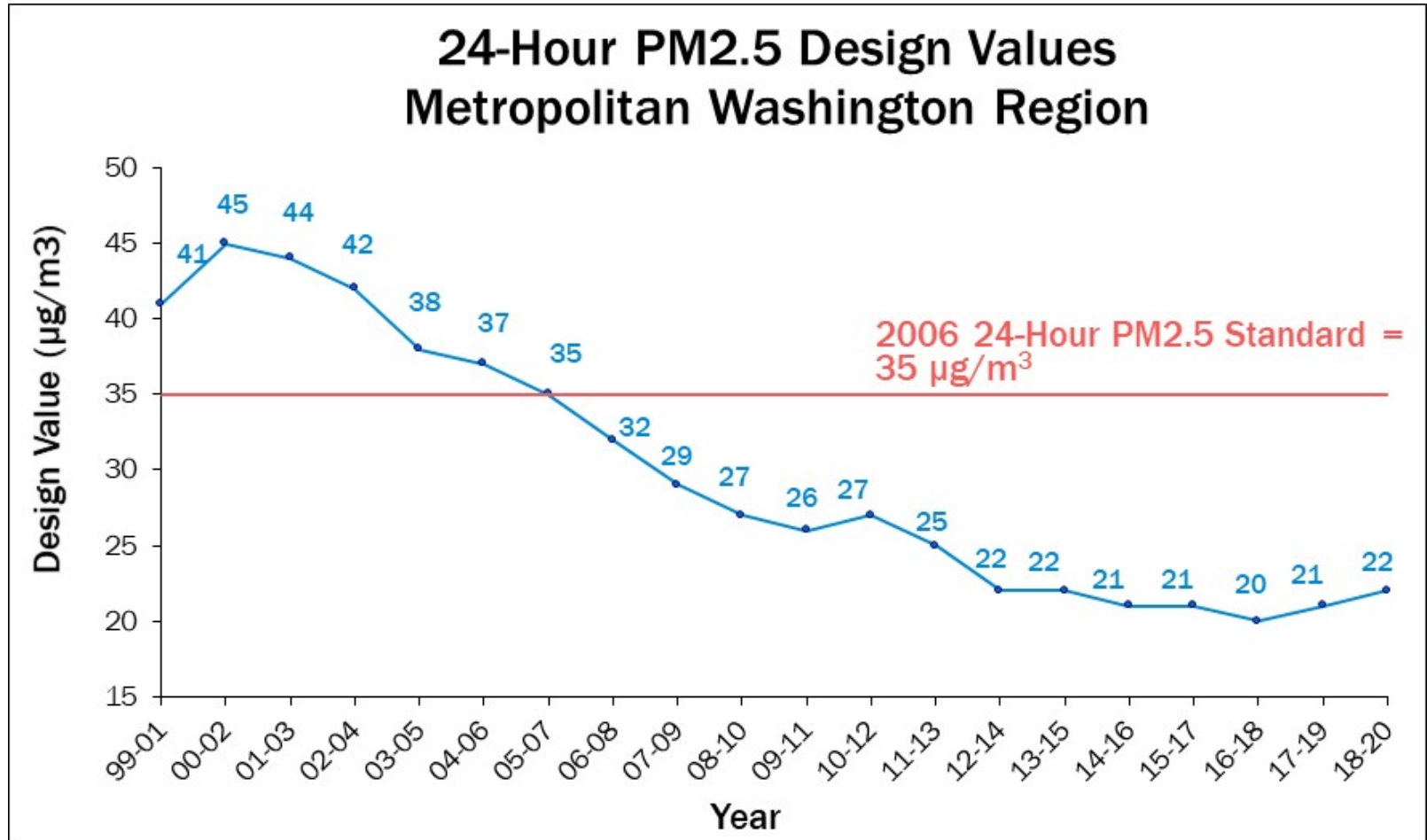
2021 data is draft and incomplete as of September 15, 2021.



Annual PM2.5 Design Value Trend



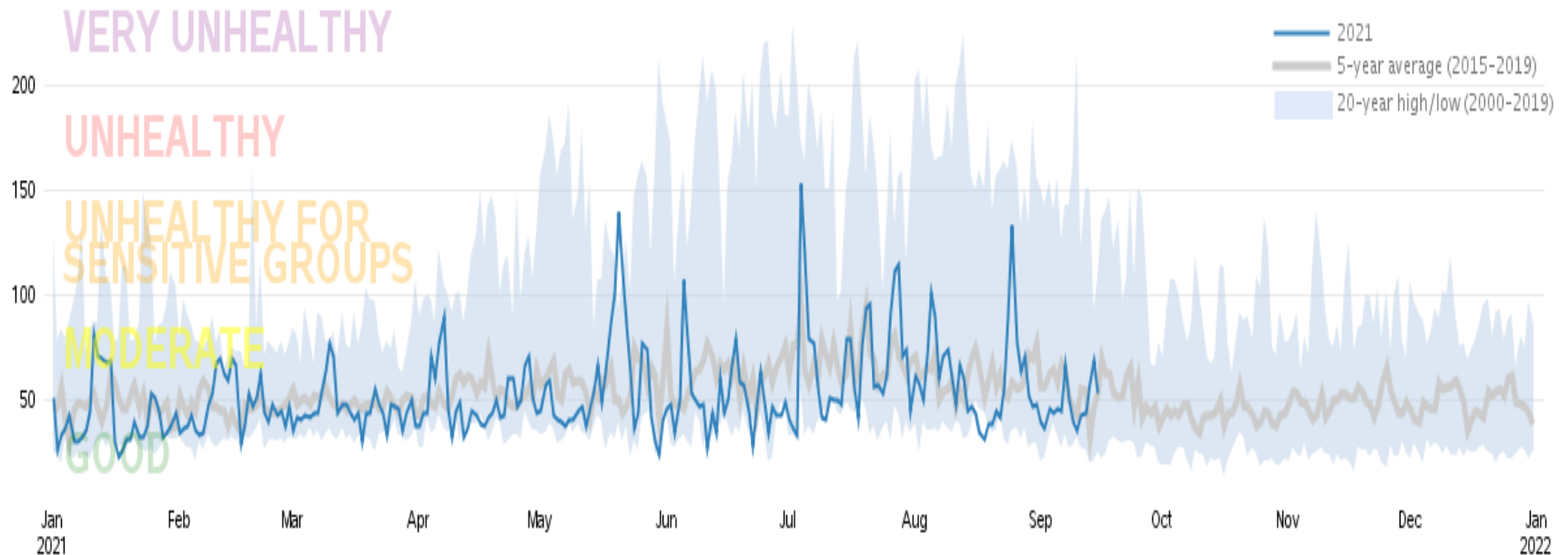
24-Hour PM2.5 Design Value Trend



AQI Value Trends

Combined Ozone and PM2.5 Daily AQI Values

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



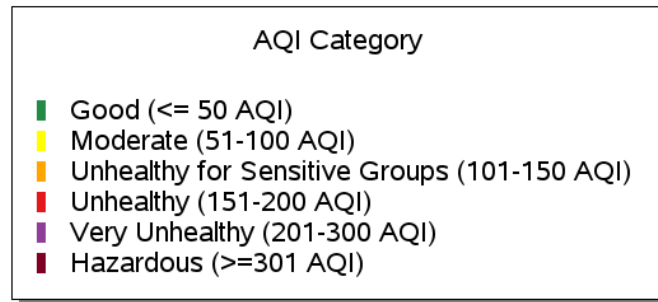
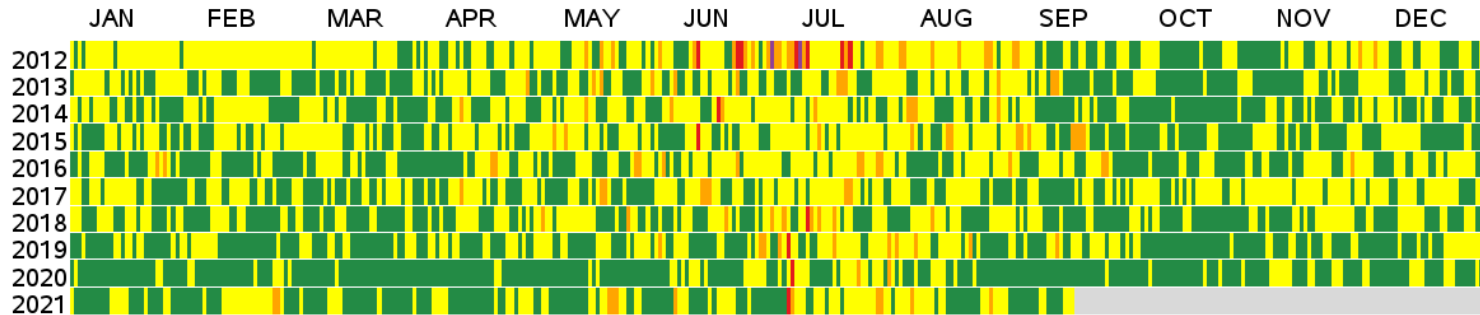
Source: U.S. EPA AirData <<https://www.epa.gov/air-data>>

Generated: September 16, 2021

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

AQI Value Trends

Daily AQI Values, 2012 to 2021 Washington-Arlington-Alexandria, DC-VA-MD-WV

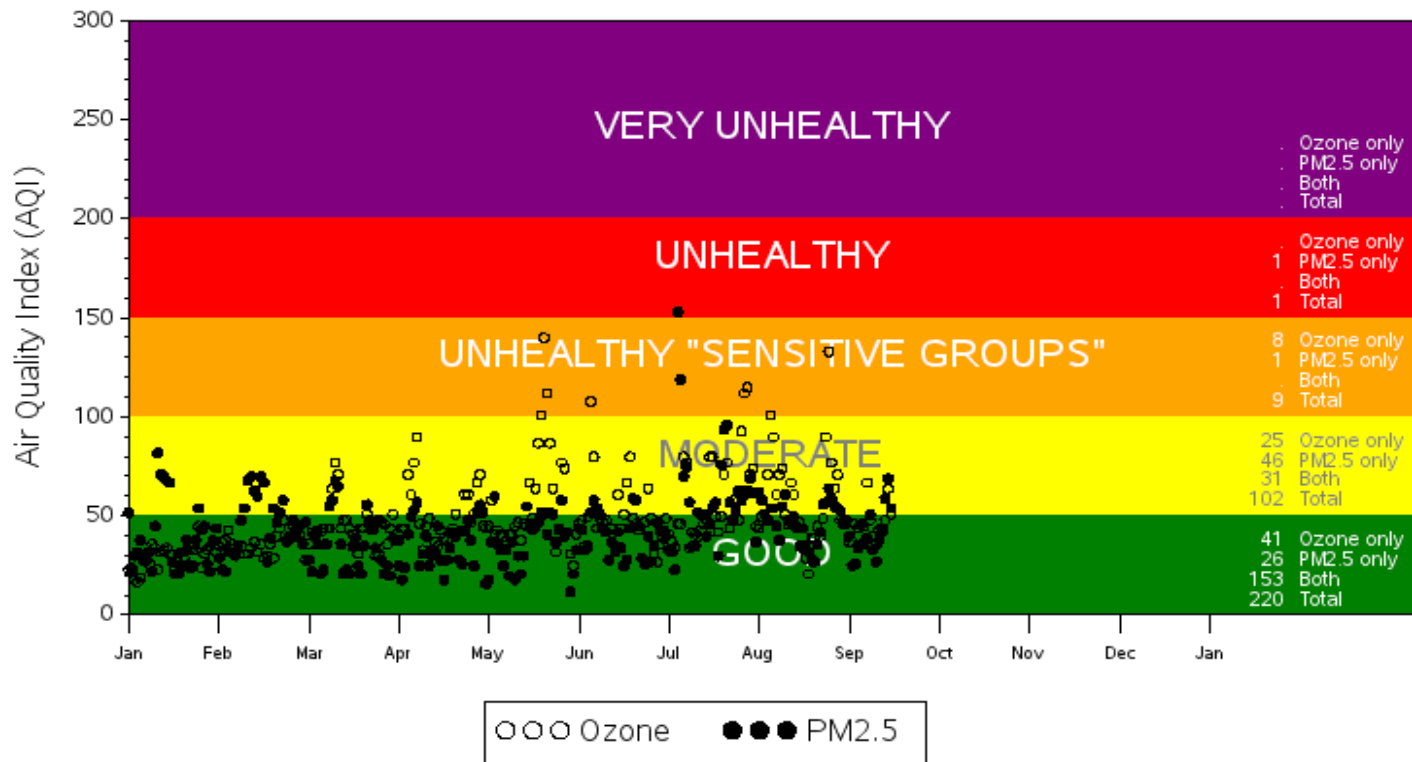


Source: U.S. EPA AirData <<https://www.epa.gov/air-data>>
Generated: September 16, 2021

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

AQI Values - 2021

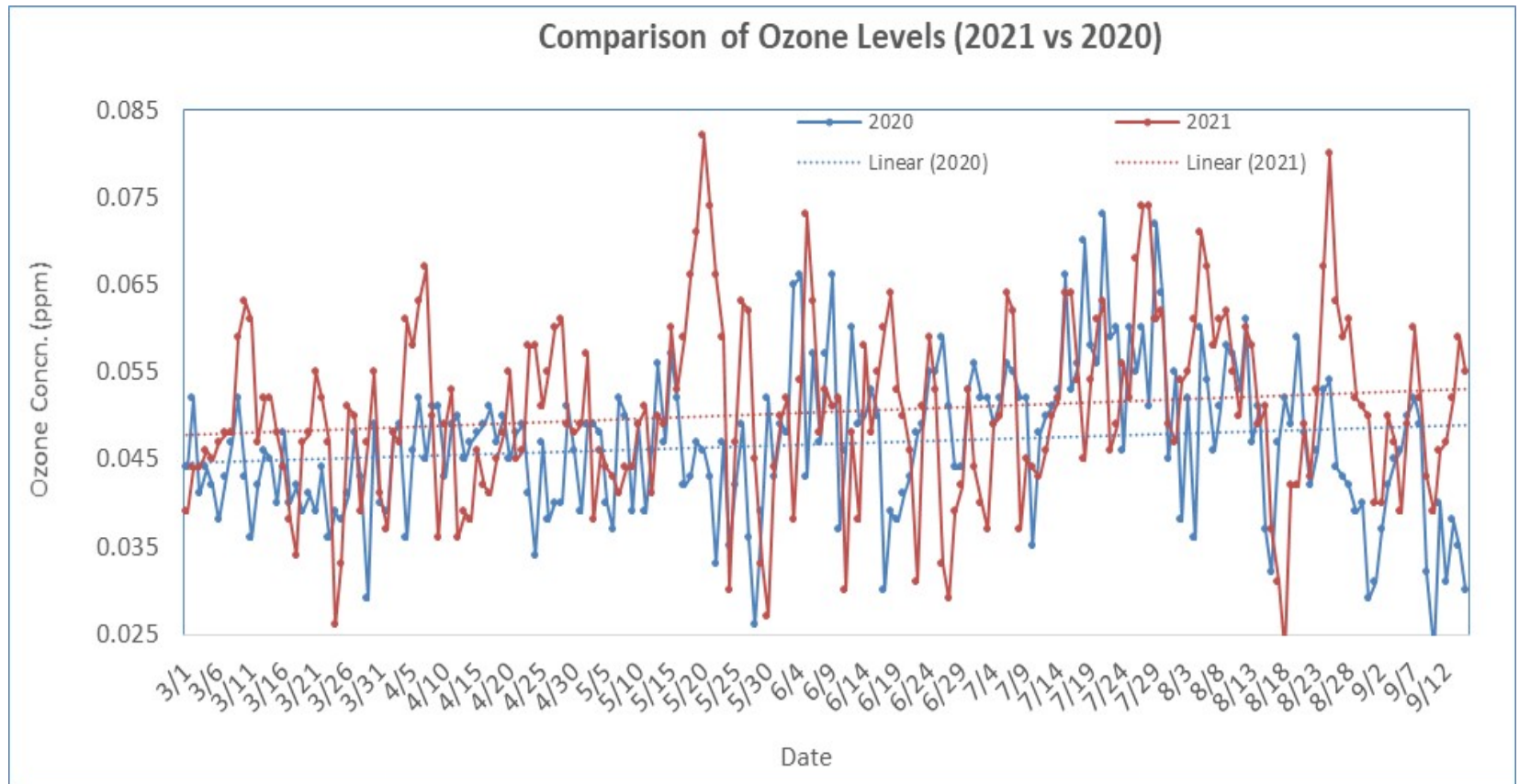
Daily Ozone and PM2.5 AQI Values in 2021 Washington-Arlington-Alexandria, DC-VA-MD-WV



Source: U.S. EPA AirData <<https://www.epa.gov/air-data>>
Generated: September 16, 2021



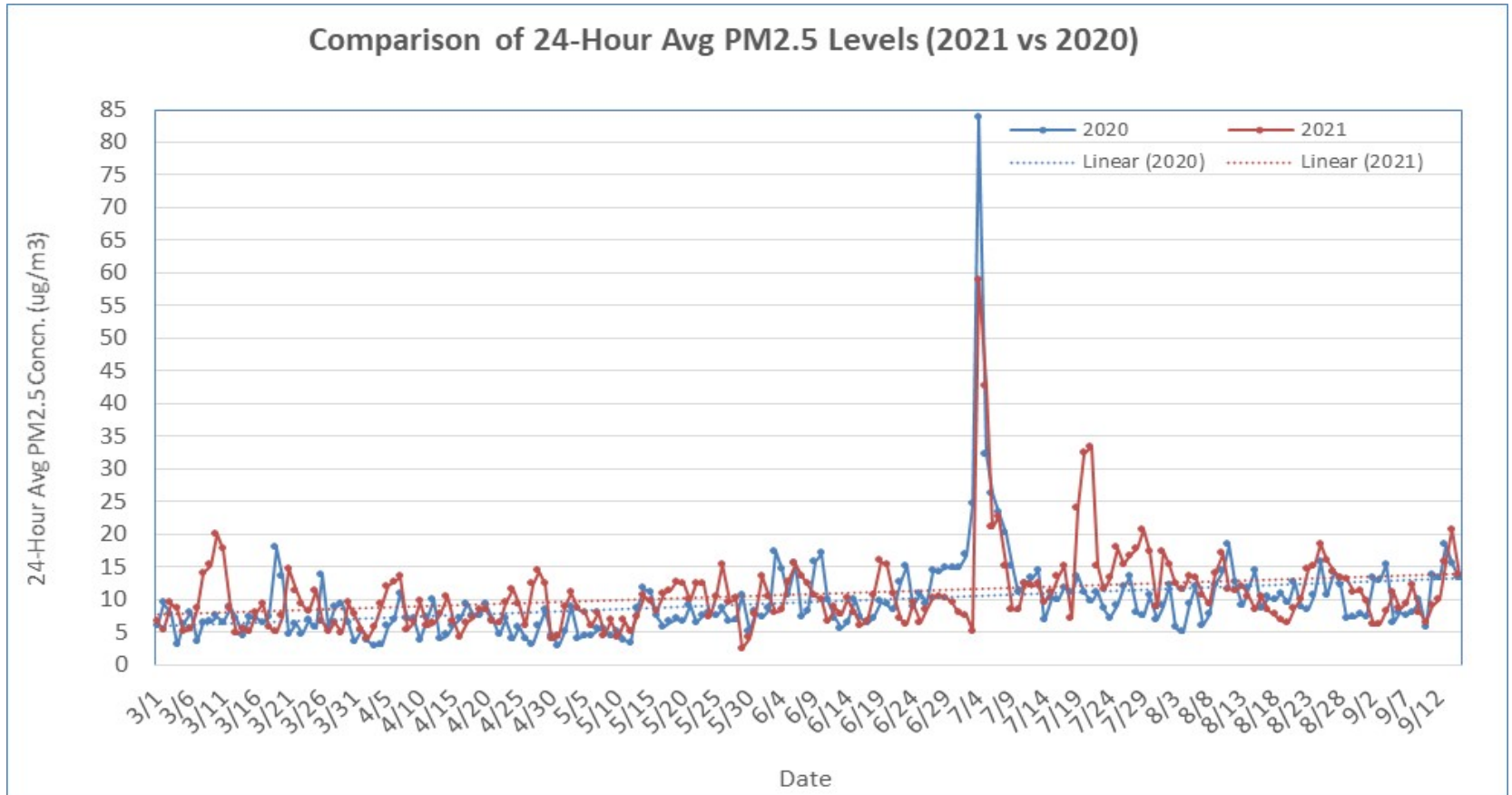
OZONE LEVELS – 2020 Vs 2021



- Draft 2021 ozone levels mostly higher. Warmer and drier than normal weather might be partly responsible.



PM2.5 LEVELS – 2020 Vs 2021



- Draft 2021 PM2.5 levels mostly higher. Warmer and drier than normal weather might be partly responsible.



CONCLUSIONS

- Ozone and PM2.5 levels are overall higher in 2021 compared to 2020, but still a bit lower compared to 2019 suggesting air quality is getting back closer to "normal" levels.
- Weather also contributed towards higher pollutant levels this year.
- As post-pandemic recovery took place, expected increase in emissions also contributed.
- Though the Washington region attained the 2015 ozone standard this year, a lot can be attributed to the 2020 data. There is a chance the region can go back to nonattainment as post-pandemic recovery continues next year and beyond leading to increased emissions.
- Therefore, there is a need to continue efforts to lower ozone levels.