OZONE SEASON SUMMARY 2021

Sunil Kumar Principal Environmental Engineer

MWAQC October 27, 2021



Peak 8-Hour Average Ozone Levels (ppb)

Ma	irch	2021	,				Ар	ril	2021					M	ay	2021				
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
28	01	02	03	04	05	06	28	29	30	31	01	02	03	25	26	27	28	29	30	01
	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								
	IIC	2021					Ju	ly	2021					Aug	ust	2021				
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	JU	Monday	2021 Tuesday	Wednesday	Thursday	Friday	Saturday	Aug	Monday	2021 Tuesday	Wednesday	Thursday	Friday	Saturday
		Tuesday 01	Wednesday 02	03	04	05	Sunday	,		Wednesday	01	02	03	Sunday 01	Monday 02	Tuesday 03	Wednesday 04	05	06	07
	Monday		Wednesday 02 52	03 38	Friday 04 54	05 73	Sunday	Monday			Thursday 01 44	Friday 02 40	Saturday 03 37		Monday 02 54	Tuesday 03 55	Wednesday 04 61	05 71	o6 67	07 58
Sunday 30	Monday 31 07	Tuesday 01 50 08	Wednesday 02 52 09	03 38	04 54	05 73	Sunday 27 04	Monday 28	Tuesday 29 06	07	01 44 08	02 40 09	03 37	Sunday 01 47	Monday 02 54 09	Tuesday 03 55	04 61	05 71	06 67	58 14
	Monday	Tuesday 01	Wednesday 02 52 09 51	38 10 52	04	05 73 12 48	Sunday 27 04 50	Monday 28 05 50	Tuesday 29 06 64	07 63	44	40 09 45	37 10 44	Sunday 01	Monday 02 54	Tuesday 03 55 10 55	Wednesday 04 61 11 50	71 12 60	o6 67	07 58
Sunday 30 06 64	Monday 31 07 48	Tuesday 01 50 08 53	Wednesday 02 52 09 51	03 38 10 52	54 11 30	73 12 48	Sunday 27 04 50	Monday 28 05 50	Tuesday 29 06 64	07 63	01 44 08 37	40 09 45	37 10 44	Sunday 01 47 08 61	Monday 02 54 09 62	Tuesday 03 55 10 55	Wednesday 04 61 11 50	05 71 12 60	06 67 13 58	58 14 49
Sunday 30	Monday 31 07 48 14 58	Tuesday 01 50 08 53 15 48	Wednesday 02 52 09 51 16 55	03 38 10 52 17 60	04 54 11 30 18	73 12 48 19 53	Sunday 27 04 50 11 43	Monday 28 05 50 12 46	Tuesday 29 06 64 13 50	30 07 63 14 52	01 44 08 37 15 64	40 09 45 16 64	37 10 44 17 54	Sunday 01 47 08 61 15 51	Monday 02 54 09 62 16 37	Tuesday 03 55 10 55 17 31	Wednesday 04 61 11 50 18 23	05 71 12 60 19 42	06 67 13 58 20 42	58 14 49 21 49
Sunday 30 06 64 13 38	Monday 31 07 48 14 58	Tuesday 01 50 08 53 15 48	Wednesday 02 52 09 51 16 55 23	38 10 52 17 60	04 54 11 30 18 64 25	73 12 48 19 53	Sunday 27 04 50 11 43	Monday 28 05 50 12 46	Tuesday 29 06 64 13 50	07 63 14 52	01 44 08 37 15 64	40 09 45 16 64	37 10 44 17 54	Sunday 01 47 08 61 15 51	Monday 02 54 09 62 16 37	Tuesday 03 55 10 55 17 31	04 61 11 50 18 23 25	71 12 60 19 42	67 13 58 20 42	58 14 49 21 49 28
Sunday 30 06 64 13 38 20 50	Monday 31 07 48 14 58	Tuesday 01 50 08 53 15 48 22 31	Wednesday 02 52 09 51 16 55	03 38 10 52 17 60	04 54 11 30 18	73 12 48 19 53	Sunday 27 04 50 11 43 18	Monday 28 05 50 12 46 19 54	Tuesday 29 06 64 13 50 20 61	30 07 63 14 52 21	01 44 08 37 15 64 22 46	40 09 45 16 64 23 49	37 10 44 17 54 24	Sunday 01 47 08 61 15 51	Monday 02 54 09 62 16 37	Tuesday 03 55 10 55 17 31 24 67	Wednesday 04 61 11 50 18 23	05 71 12 60 19 42	06 67 13 58 20 42	58 14 49 21 49
Sunday 30 06 64 13 38 20 50	Monday 31 07 48 14 58 21 46	Tuesday 01 50 08 53 15 48 22 31	Wednesday 02 52 09 51 16 55 23 51 30	38 10 52 17 60	04 54 11 30 18 64 25	73 12 48 19 53	Sunday 27 04 50 11 43 18 45 25	Monday 28 05 50 12 46 19 54 26	Tuesday 29 06 64 13 50 20 61	07 63 14 52 21 63 28	01 44 08 37 15 64 22 46	40 09 45 16 64 23 49	37 10 44 17 54 24	Sunday 01 47 08 61 15 51 22 43	Monday 02 54 09 62 16 37 23 53 30	Tuesday 03 55 10 55 17 31 24 67	04 61 11 50 18 23 25	71 12 60 19 42	67 13 58 20 42	58 14 49 21 49 28
Sunday 30 06 64 13 38 20 50	Monday 31 07 48 14 58	Tuesday 01 50 08 53 15 48 22 31	Wednesday 02 52 09 51 16 55 23	38 10 52 17 60	04 54 11 30 18 64 25	73 12 48 19 53	Sunday 27 04 50 11 43 18	Monday 28 05 50 12 46 19 54	Tuesday 29 06 64 13 50 20 61	30 07 63 14 52 21	01 44 08 37 15 64 22 46	40 09 45 16 64 23 49	37 10 44 17 54 24	Sunday 01 47 08 61 15 51 22 43 29 52	Monday 02 54 09 62 16 37 23 53 30 51	Tuesday 03 55 10 55 17 31 24 67 31	Wednesday 04 61 111 50 18 23 25 80	71 12 60 19 42	67 13 58 20 42	58 14 49 21 49 28
Sunday 30 06 64 13 38 20 50	Monday 31 07 48 14 58 21 46	Tuesday 01 50 08 53 15 48 22 31	Wednesday 02 52 09 51 16 55 23 51 30	38 10 52 17 60	04 54 11 30 18 64 25	73 12 48 19 53	Sunday 27 04 50 11 43 18 45 25	Monday 28 05 50 12 46 19 54 26	Tuesday 29 06 64 13 50 20 61	07 63 14 52 21 63 28	01 44 08 37 15 64 22 46	40 09 45 16 64 23 49	37 10 44 17 54 24	Sunday 01 47 08 61 15 51 22 43	Monday 02 54 09 62 16 37 23 53 30 51	Tuesday 03 55 10 55 17 31 24 67 31	Wednesday 04 61 111 50 18 23 25 80	71 12 60 19 42	67 13 58 20 42	58 14 49 21 49 28

8 Code Orange Days, 55 Code Yellow Days, rest all Code Green Days Analysis is based on draft data as of September 30, 2021.



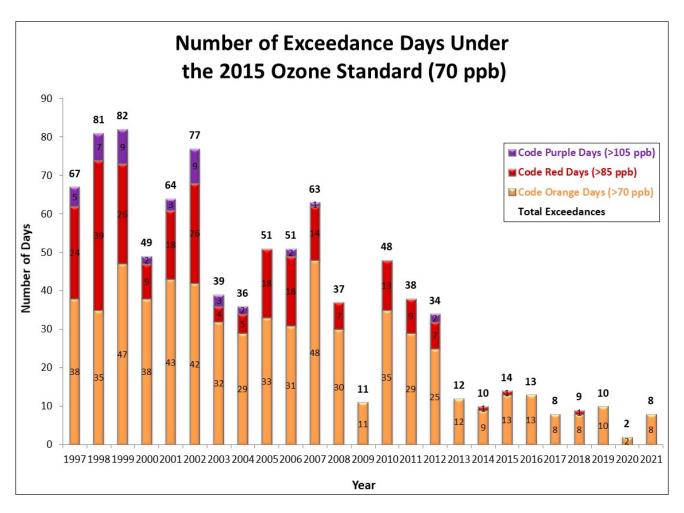
Agenda Item 5: Ozone Season Summary October 27, 2021

43

46

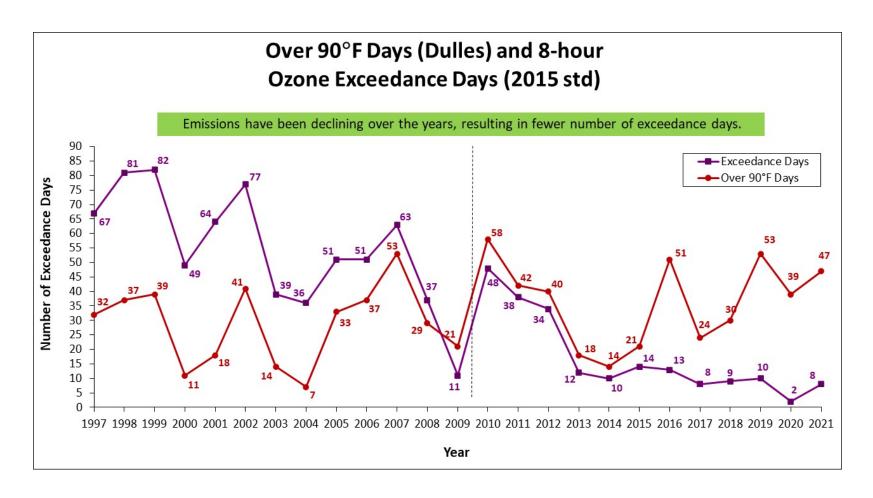
47

Ozone Exceedance Trend



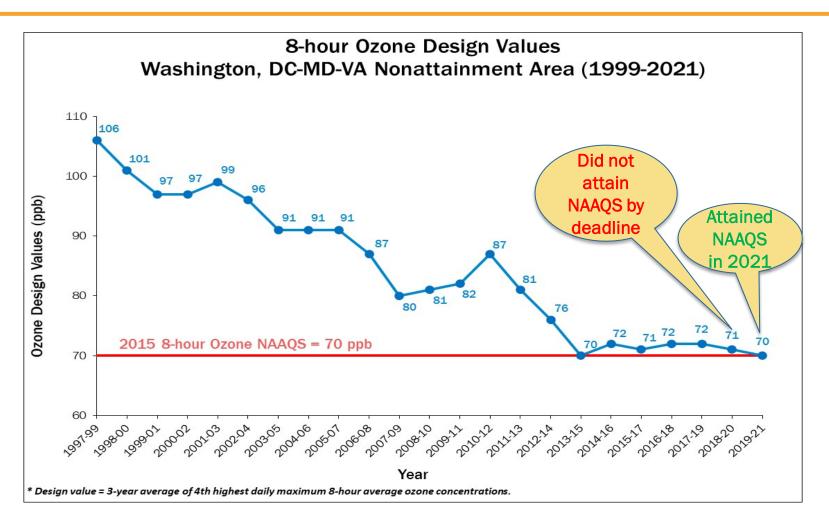


Ozone & Temperature Trend





Ozone Design Value Trend



2019-21 data is draft as of September 30, 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					



24-Hour Average PM2.5 Levels (µg/m³)

Mar	ch	2021					Ap	ril	2021					Ma	ay	2021				
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
28 0	01	02	03	04	05	06	28	29	30	31	01	02	03	25	26	27	28	29	30	01
	6.6	5.3	9.5	8.6	5.1	5.5					5.9	4.3	5.8							4.3
07 0	08	09	10	11	12	13	04	05	06	07	08	09	10	02	03	04	05	06	07	08
8.7	14.0	15.2	20.0	18.9	8.6	5.1	9.9	12.0	13.0	14.8	6.1	7.4	9.7	8.9	16.4	8.6	8.0	5.9	8.0	4.7
14 1	15	16	17	18	19	20	11	12	13	14	15	16	17	09	10	11	12	13	14	15
5.5	5.0	8.5	10.6	6.1	5.0	8.3	5.9	7.1	7.7	10.8	6.7	4.3	6.8	8.8	4.2	7.3	5.0	7.3	13.8	11.1
21 2	22	23	24	25	26	27	18	19	20	21	22	23	24	16	17	18		20	21	22
14.7	11.3	10.2	8.1	11.4	6.7	5.0	8.1	10.0	9.5	6.7	6.3	10.0	11.6	10.3	10.9	11.3	12.7	12.3	9.9	12.5
28 2	29	30	31				25	26	27	28	29	30		23	24	25	26	27	28	29
5.9	4.9	9.4	9.1				9.2	6.0	12.4	14.4	12.4	3.9		12.3	8.9	10.4	15.4	9.6	10.1	2.9
														30	31					
														5.1	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 3	31	01	02	03	04	05	27	28	29	30	01	02	03	01	02	03	04	05	06	07
		10.5	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 0		08	09	10	11	12	04	05	06	07	08	09	10	08	09	10		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
7 7	101	0.1	6.0	6.7	10.6		11	12	13	0.6	11 0	16	17	15	16	17	18	19	20	21
7.7	10.1	8.1	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
15.2	10.9	7.0	6.2	9.5	6.5	8.5	7.1	24.0	20		1 - 1		12.2	22	23	24	25	26	27	28
27 2	10.5	7.0	30	3.3	0.5	0.5	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
11.3	10.4	10.2	9.5				17.9	15.3	16.7	17.8	20.7	17.3	8.8	29	30	31				
11.5	10.7	10.2	J.J				17.3	13.3	10.7	17.0	20.7	17.3	0.0	13.1	11.1	11.4				
					I															

1 Code Red, 1 Code Orange, 63 Code Yellow Days, rest all Code Green Days Analysis is based on draft data as of September 30, 2021.



Wednesday

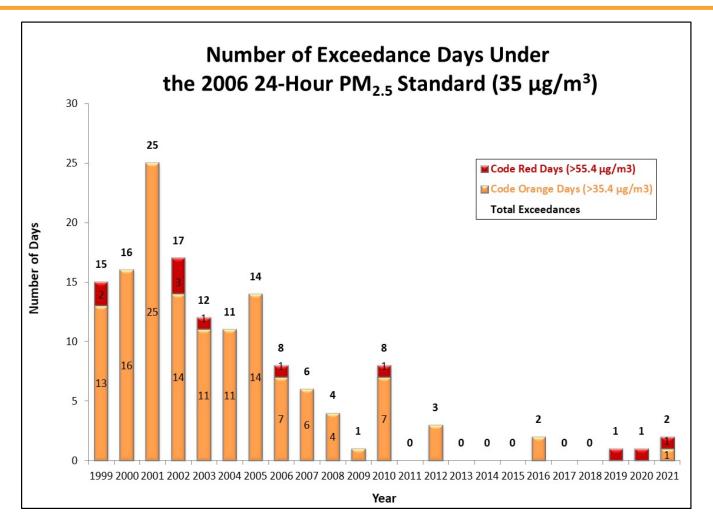
Thursday

10.3

5.3

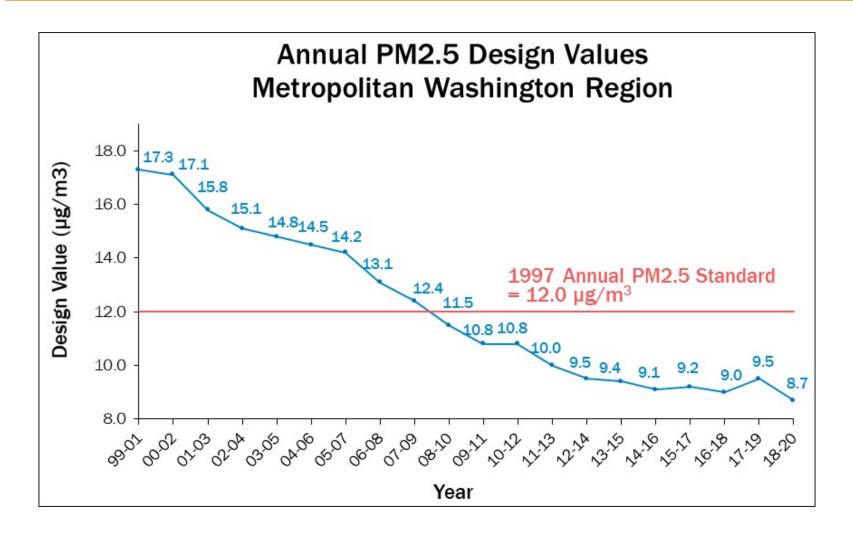
10.3

PM2.5 Exceedance Trend



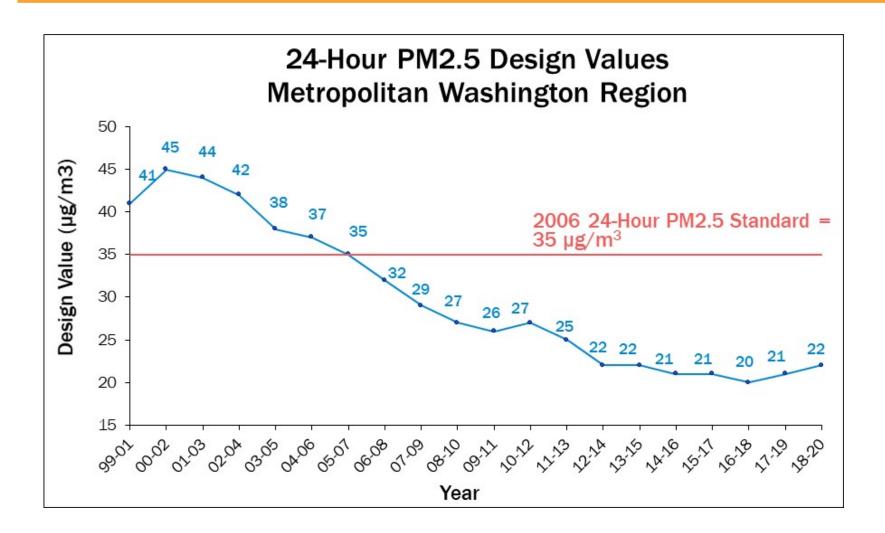


Annual PM2.5 Design Value Trend



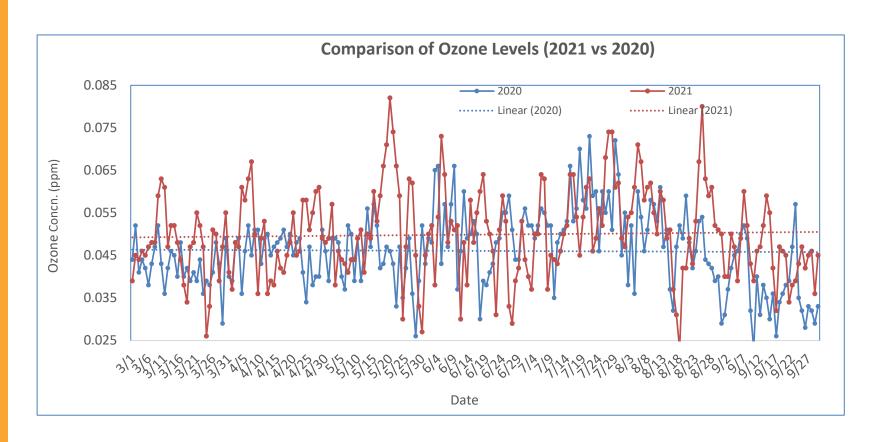


24-Hour PM2.5 Design Value Trend





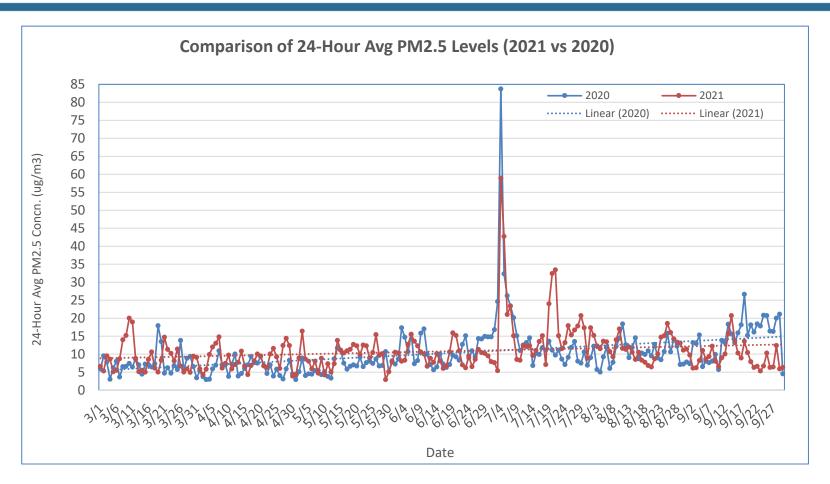
OZONE LEVELS - 2020 Vs 2021



• 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.
- Relatively warmer Weather and higher emissions this year contributed towards higher pollutant levels this year compared to 2020.
- Though the Washington region attained the 2015 ozone standard this year,
 a lot can be attributed to abnormally low ozone data observed in 2020.
- There is a chance the region can go back to nonattainment in future 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.

