

OZONE SEASON SUMMARY 2016

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MWAQC-Technical Advisory Committee
October 11, 2016

Peak 8-Hour Average Ozone Levels (ppb)

APRIL 2016

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
				1	2	3
				48	46	45
4	5	6	7	8	9	10
51	45	52	42	46	41	47
11	12	13	14	15	16	17
55	49	48	57	57	65	64
18	19	20	21	22	23	24
73	75	55	61	51	46	54
25	26	27	28	29	30	
59	62	35	38	36	36	

MAY 2016

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
						1
						37
2	3	4	5	6	7	8
38	40	29	27	34	39	48
9	10	11	12	13	14	15
39	43	29	40	52	48	48
16	17	18	19	20	21	22
50	43	47	56	60	48	45
23	24	25	26	27	28	29
46	62	76	75	69	65	56
30	31					
49	68					

JUNE 2016

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
		1	2	3	4	5
		77	44	46	44	37
6	7	8	9	10	11	12
55	68	47	59	63	66	63
13	14	15	16	17	18	19
53	66	64	66	55	58	62
20	21	22	23	24	25	26
79	52	59	49	60	66	63
27	28	29	30			
56	58	57	59			

JULY 2016

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
				1	2	3
				57	48	41
4	5	6	7	8	9	10
34	47	69	68	62	58	45
11	12	13	14	15	16	17
63	56	49	51	60	63	60
18	19	20	21	22	23	24
57	62	68	79	76	64	61
25	26	27	28	29	30	31
70	74	80	62	67	54	53

AUGUST 2016

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
1	2	3	4	5	6	7
59	63	52	52	36	52	50
8	9	10	11	12	13	14
49	41	37	42	49	47	40
15	16	17	18	19	20	21
62	56	51	55	65	67	36
22	23	24	25	26	27	28
45	55	54	59	63	61	59
29	30	31				
79	68	65				

SEPTEMBER 2016

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
			1	2	3	4
			53	37	42	46
5	6	7	8	9	10	11
49	65	66	64	60	55	46
12	13	14	15	16	17	18
55	55	68	38	48	45	37
19	20	21	22	23	24	25
25	42	56	72	80	39	43
26	27	28	29	30		
35	46	37	28	28		

13 Code Orange Days, 77 Code Yellow Days, 93 Code Green Days

Analysis is based on draft data as of October 7, 2016. Data is subject to change.

2016 Ozone Exceedances

Date	Monitors Exceeding	Highest Monitor	8-Hr Max (ppb)
4/18	1	Southern Maryland	73
4/19	6	Southern Maryland	75
5/25	6	Beltsville	76
5/26	6	Calvert	75
6/1	3	Frederick Airport	77
6/20	1	PG Equestrian	79
7/21	8	McMillan	79
7/22	1	PG Equestrian	76
7/26	2	Southern Maryland	74
7/27	6	Southern Maryland	80
8/29	1	Franconia	79
9/22	1	Prince William	72
9/23	7	Arlington	80

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Meteorology on Exceedance Days

Two distinct meteorological conditions during ozone exceedances

1. Combination of Local & Transported Emissions (April 18/19 & May 25/26, July 26/27, August 29, September 23)

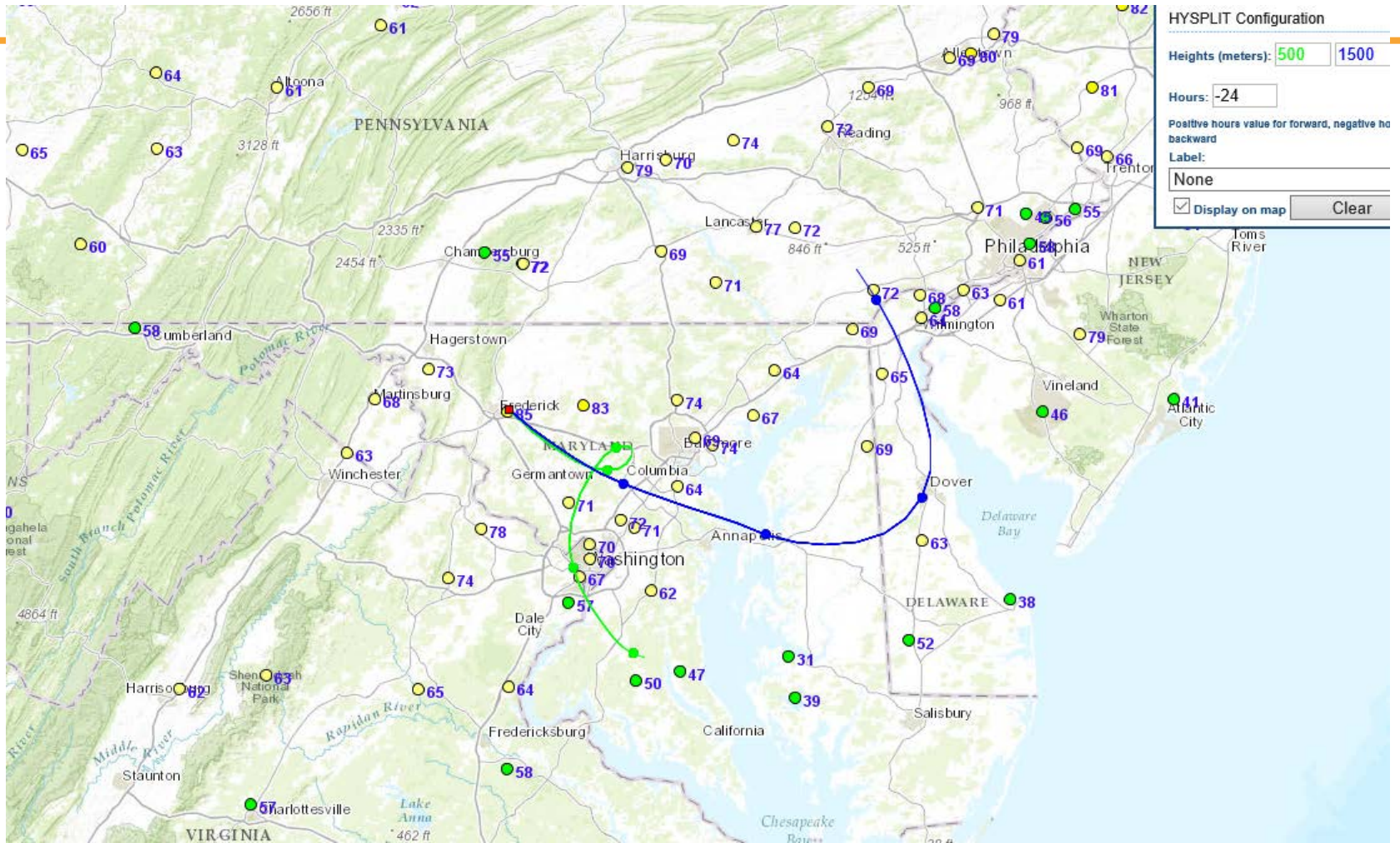
1. High Temperatures: 82-95 °F, Clear skies
2. Light westerly winds brought additional ozone from Ohio River Valley into the region
3. Ozone build up on previous days

2. Mostly Local Emissions & Recirculation (June 1 /20 & July 21/22, September 23)

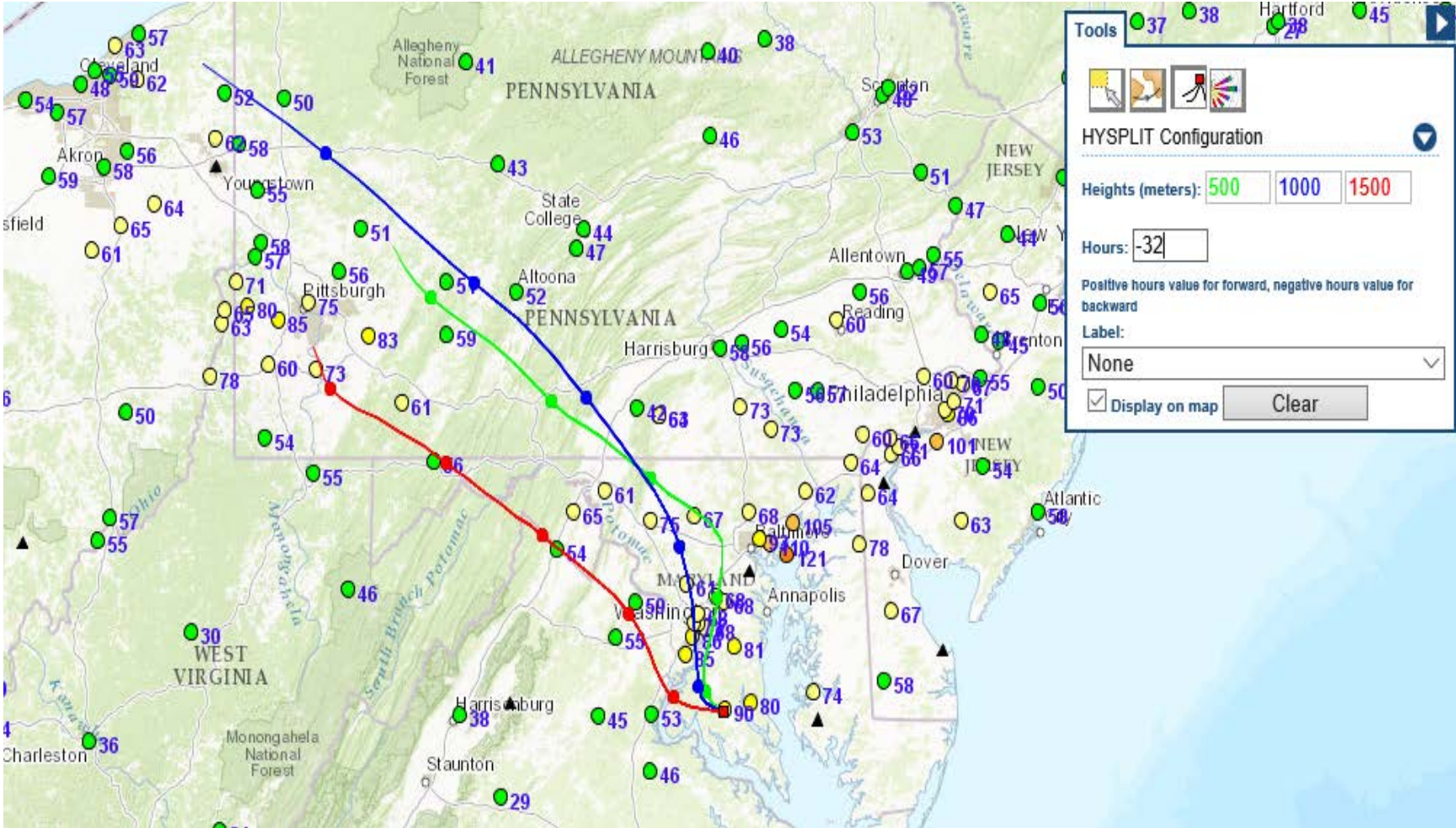
1. High Temperature: 87-95 °F, Clear skies
2. Light winds recirculating local emissions, keeping ozone within the region
3. Ozone build up on previous days



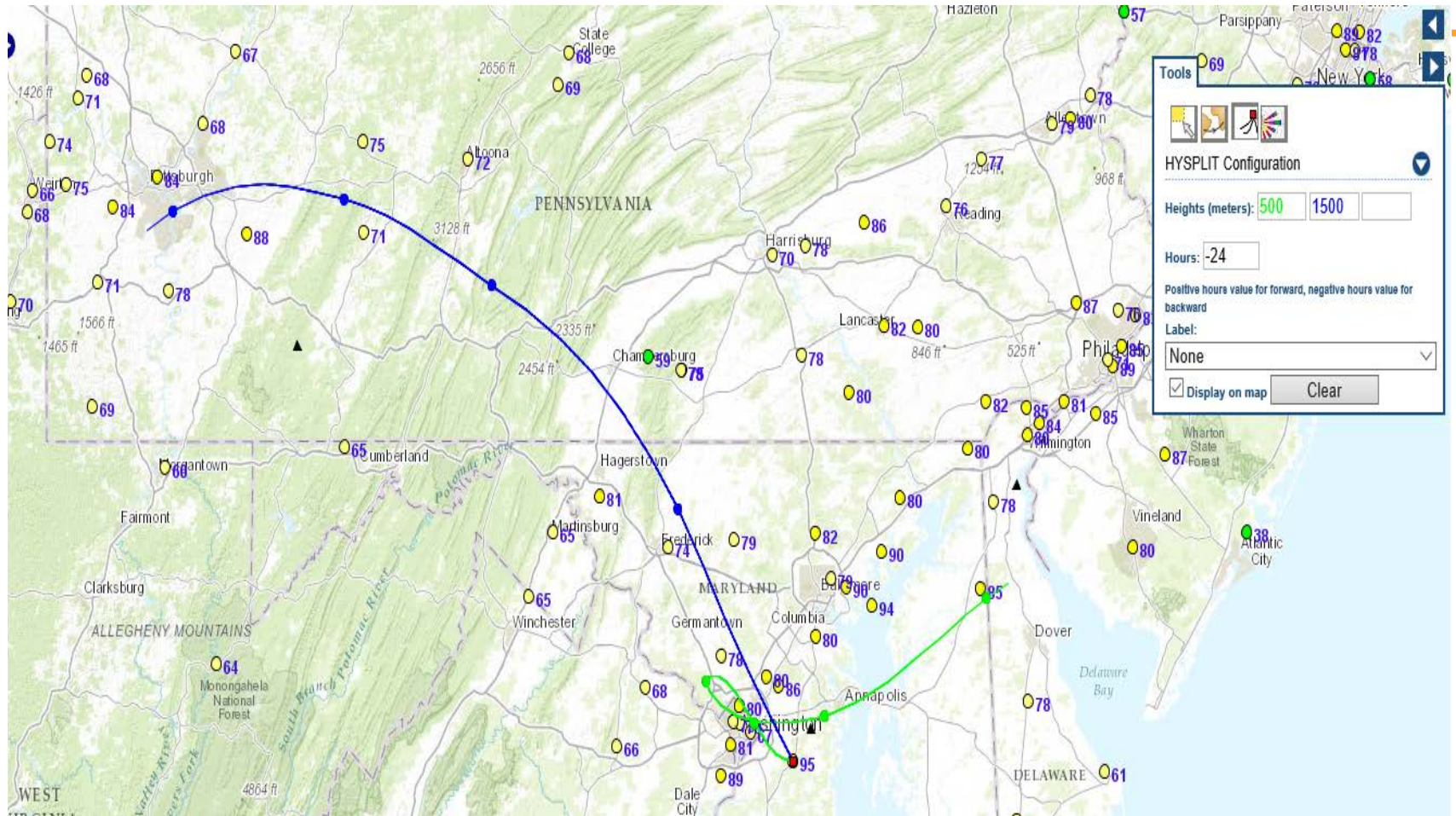
Wind Trajectories (June 1) – Local Emissions & Recirculation



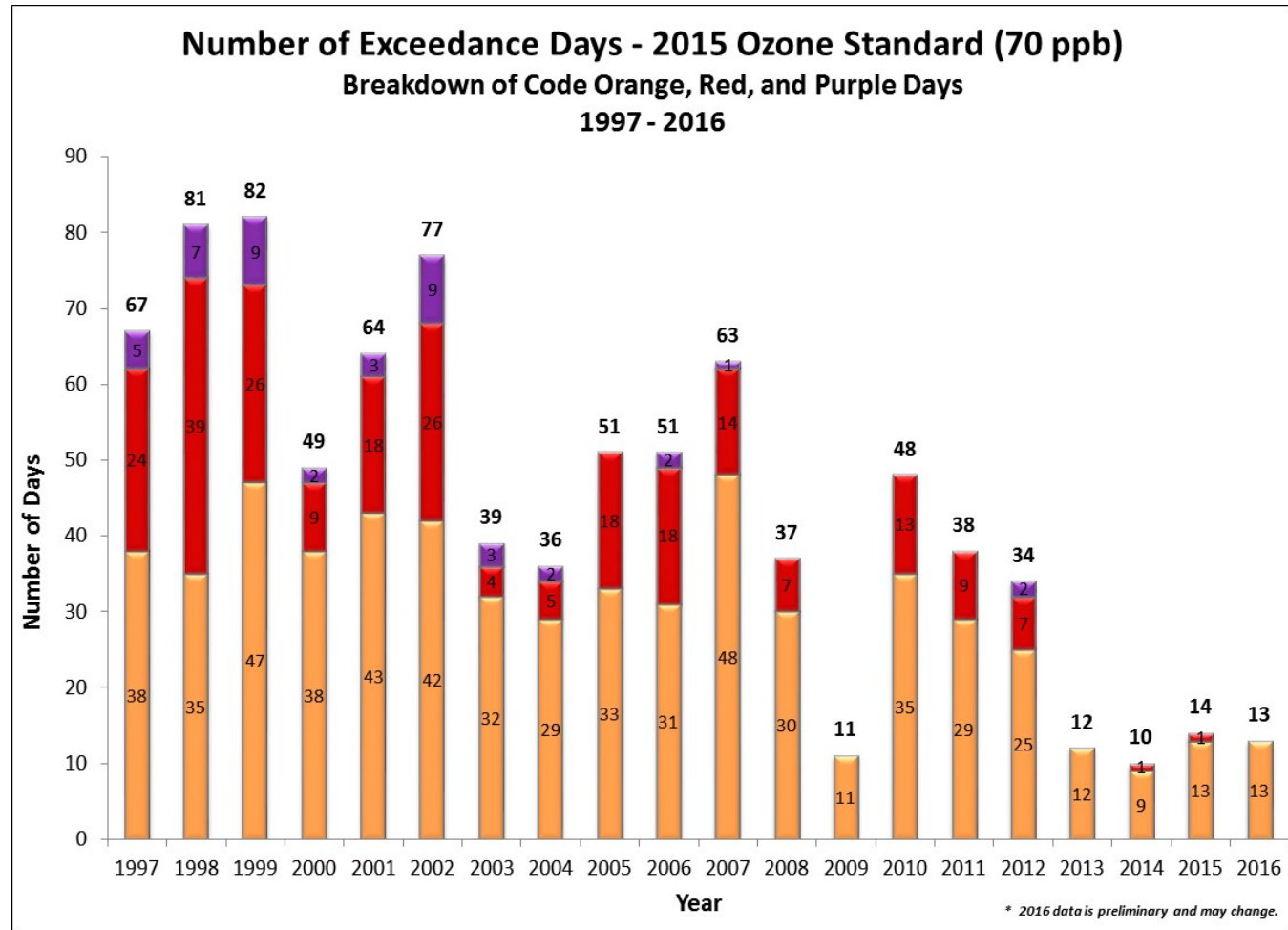
Wind Trajectories (July 27) – Long Range Transport



Wind Trajectories (September 23) – Recirculation & Long Range Transport



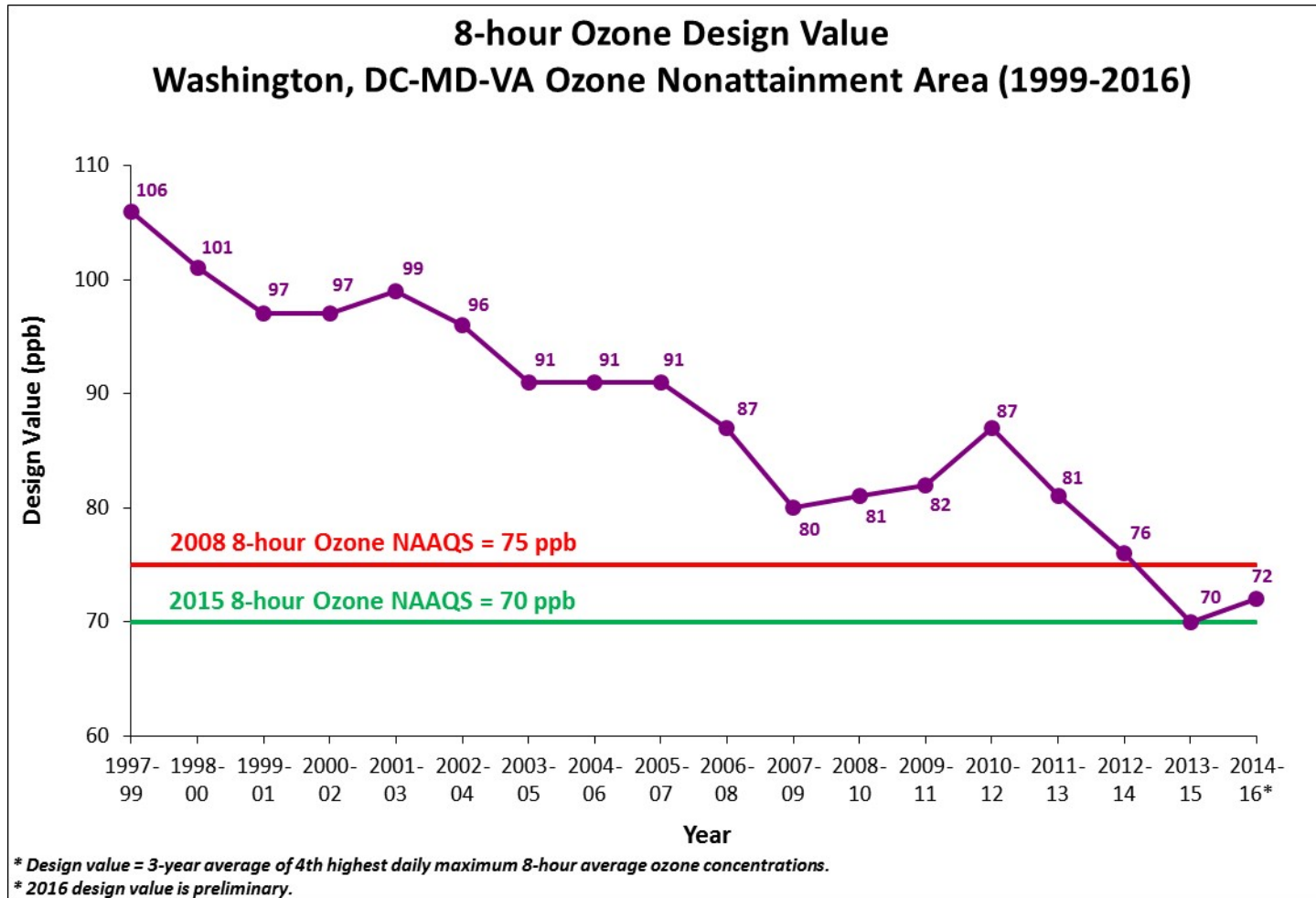
Ozone Exceedance Trend



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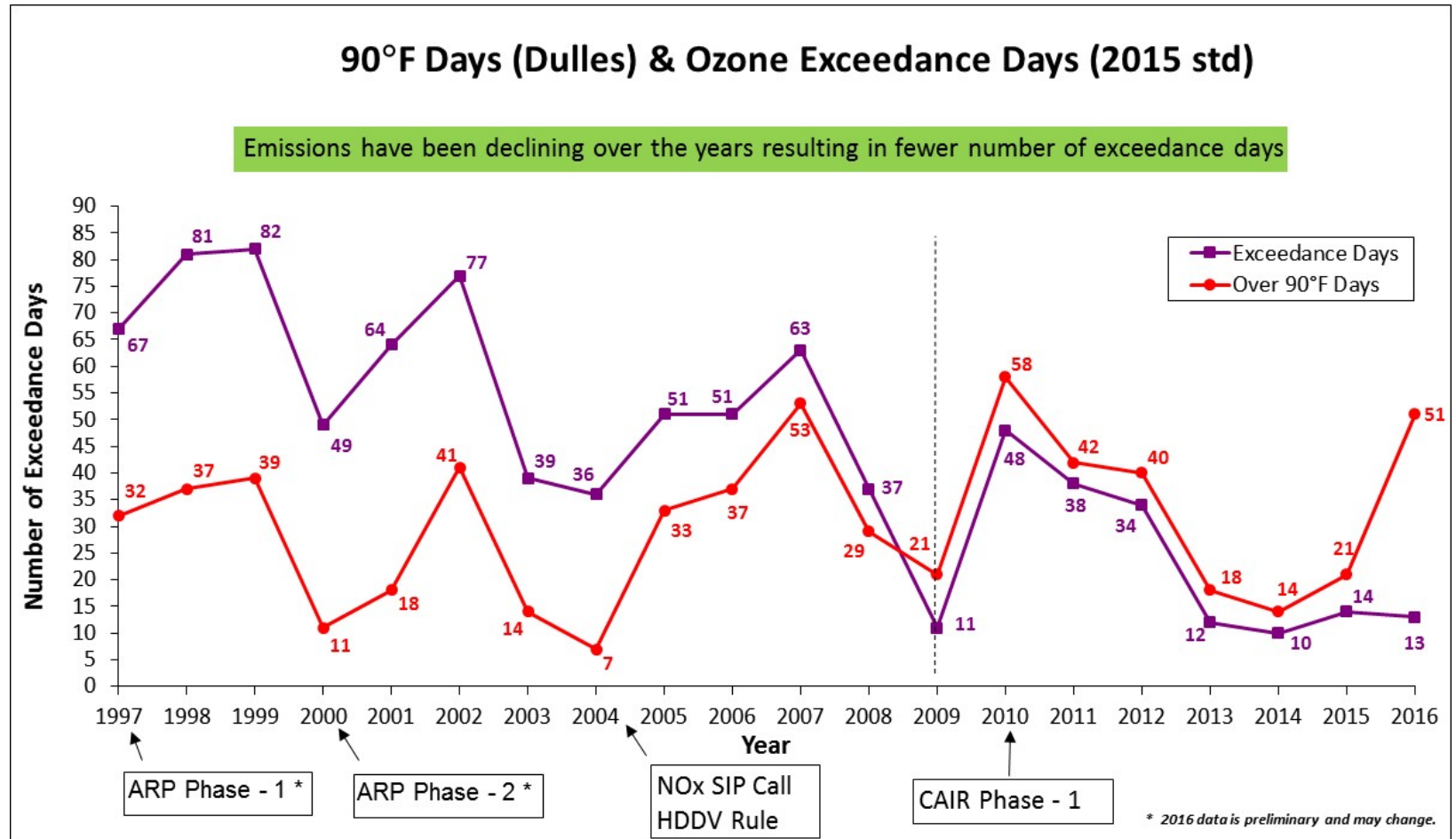
Ozone Design Value Trend



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Ozone & Temperature Trend



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Why Fewer Exceedance Days Now ?

Emission Control Programs

Federal	State	Local
Acid Rain Program (1996/2000)	Vehicle Inspection and Maintenance Programs	Renewable Energy Programs Regional Wind Power Purchase Program Clean Energy Rewards Program Renewable Portfolio Standards
Tier 2 (LD Vehicle) Rule (2004)	MD Healthy Air Act (2009/2012)	Energy Efficiency Programs LED Traffic Signal Retrofit Program Building Energy Efficiency Programs
HD Diesel Vehicle Rule (2004/2007)	VA CSAPR Rule	VRE Idling Reduction
NOx SIP Call (2004)		Low VOC Paint
Clean Air Interstate Rule/CSAPR (2009/2015)	Ozone Transport Commission Rules	Gas Can Replacement



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

APRIL 2016

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
				1	2	3
				7.9	7.0	4.7
4	5	6	7	8	9	10
5.9	7.7	10.6	6.9	4.7	6.0	7.1
11	12	13	14	15	16	17
7.6	9.3	8.0	13.7	9.1	13.6	9.7
18	19	20	21	22	23	24
10.1	11.4	5.4	12.5	13.0	9.0	4.3
25	26	27	28	29	30	
10.3	10.2	12.7	13.6	11.2	13.3	

MAY 2016

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
						1
						5.1
2	3	4	5	6	7	8
6.8	12.8	10.7	7.9	3.9	5.3	5.5
9	10	11	12	13	14	15
9.6	11.6	13.6	14.6	14.4	9.0	5.2
16	17	18	19	20	21	22
5.6	8.1	12.5	13.0	11.6	7.1	6.5
23	24	25	26	27	28	29
10.9	10.4	15.7	19.1	20.0	15.7	9.8
30	31					
16.1	11.3					

JUNE 2016

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
		1	2	3	4	5
		13.5	6.9	8.0	9.7	7.5
6	7	8	9	10	11	12
7.4	10.5	8.5	5.7	7.7	11.5	7.6
13	14	15	16	17	18	19
5.5	6.3	10.5	12.9	6.0	6.4	6.9
20	21	22	23	24	25	26
8.2	8.3	8.4	6.6	9.8	9.7	8.4
27	28	29	30			
11.3	12.3	8.3	9.9			

JULY 2016

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
				1	2	3
				10.7	6.0	7.5
4	5	6	7	8	9	10
12.8	6.4	9.1	10.9	10.3	8.5	6.7
11	12	13	14	15	16	17
7.5	10.8	11.0	11.3	8.0	7.2	7.2
18	19	20	21	22	23	24
9.0	8.1	12.5	15.8	17.7	15.5	12.0
25	26	27	28	29	30	31
16.0	13.5	17.4	13.8	9.4	12.1	6.6

AUGUST 2016

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
1	2	3	4	5	6	7
8.8	10.8	7.7	8.0	8.7	12.0	6.9
8	9	10	11	12	13	14
10.8	9.9	8.3	12.6	11.9	11.0	10.0
15	16	17	18	19	20	21
6.2	8.1	6.5	12.2	15.4	17.0	16.0
22	23	24	25	26	27	28
12.4	13.5	12.0	12.6	11.7	12.5	12.1
29	30	31				
13.2	14.4	18.1				

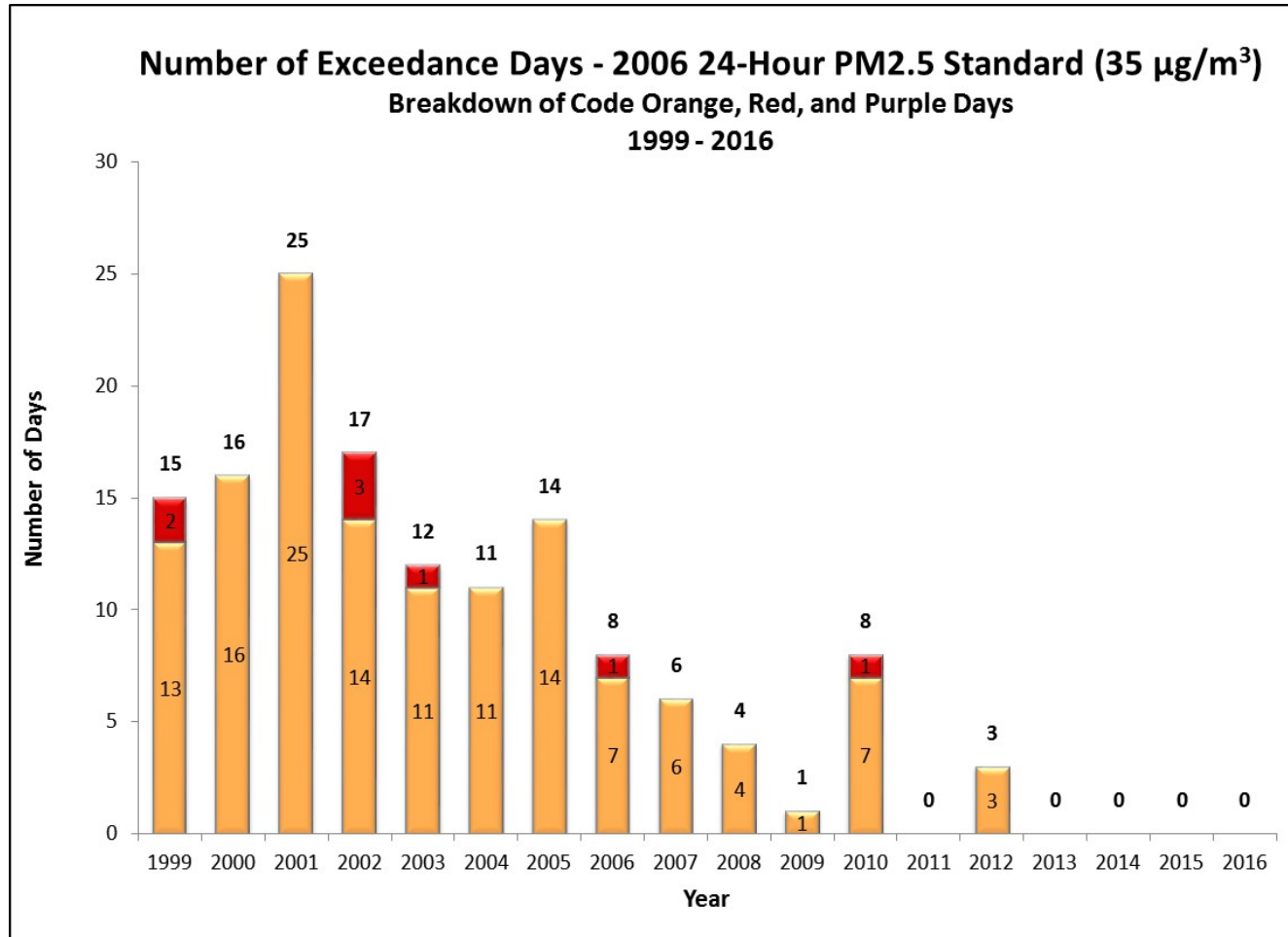
SEPTEMBER 2016

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
			1	2	3	4
			16.8	8.0	6.2	7.9
5	6	7	8	9	10	11
7.6	10.4	9.0	11.9	12.1	13.9	7.9
12	13	14	15	16	17	18
5.1	6.5	8.5	6.5	5.1	6.1	5.7
19	20	21	22	23	24	25
4.4	9.2	11.9	12.1	12.6	12.3	7.0
26	27	28	29	30		
8.3	8.2	9.0	2.1	4.8		

50 Code Yellow Days, 133 Code Green Days

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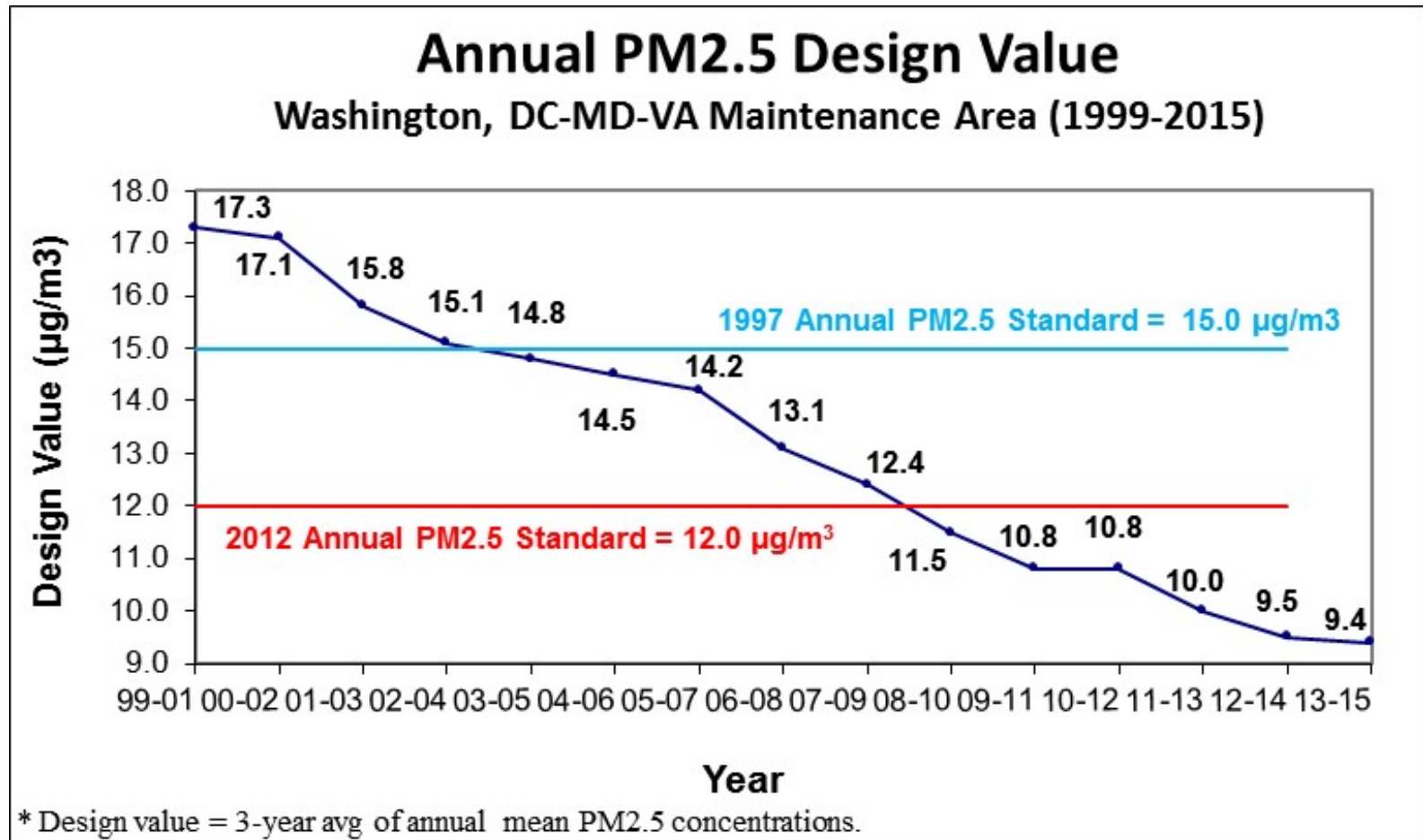
PM2.5 Exceedance Trend



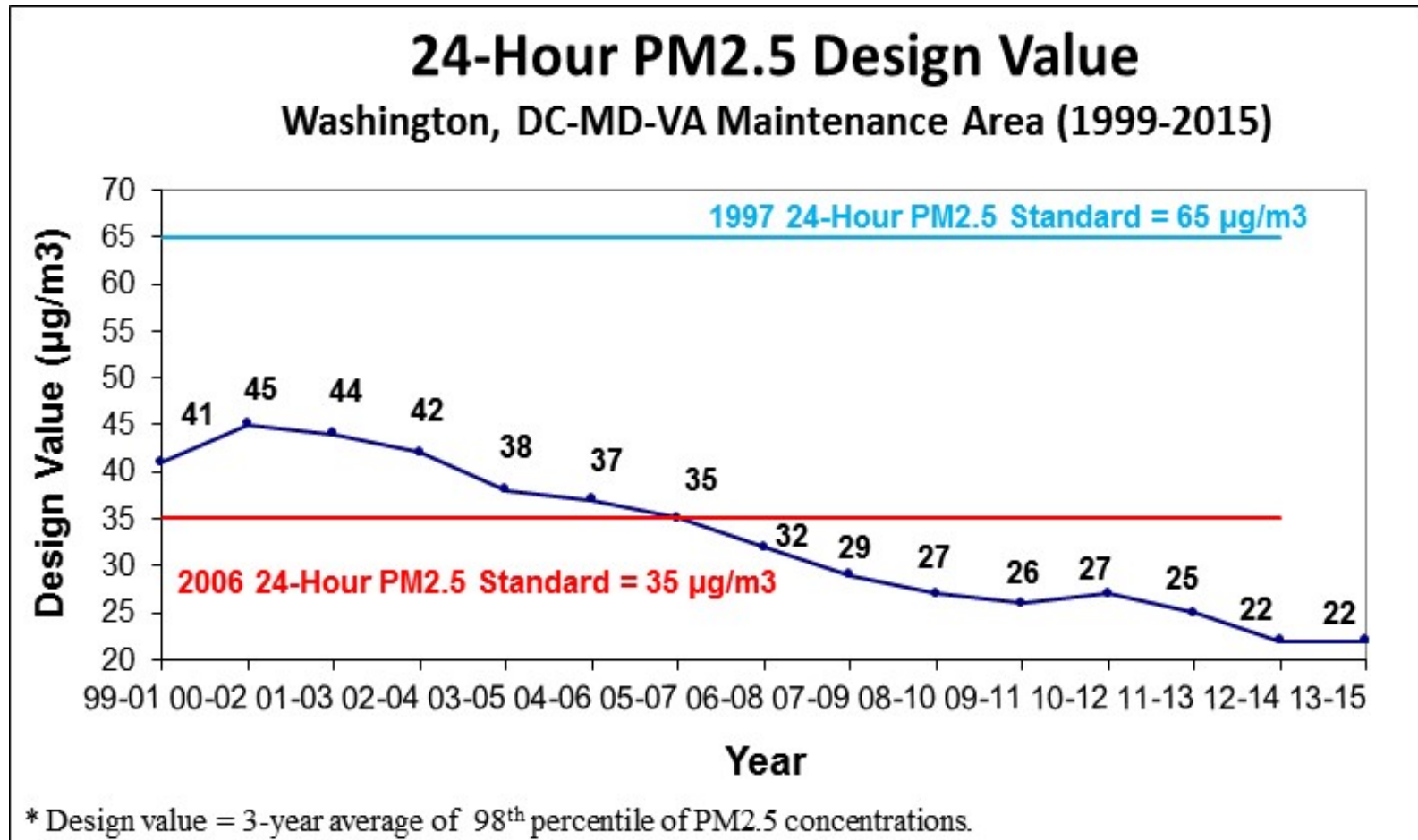
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Annual PM2.5 Design Value Trend



24-Hour PM2.5 Design Value Trend



What are the ozone levels that would keep us in nonattainment in 2017 (2015 Ozone NAAQS)

Monitor	Draft 2014-2016 Design Value (ppm)	4 th Highest 8-hour Max Ozone Concentration in 2016 (ppm)	4 th Highest 8-hour Max Ozone Concentration in 2017 That Would Keep Us in Nonattainment (ppm)
Arlington	0.072	0.072	0.068
Takoma	0.070	0.071	0.070
PG Equestrian	0.071	0.076	0.068
McMillan NCORE	0.070	0.072	0.069
Calvert	0.069	0.070	0.076
Franconia	0.070	0.073	0.068
S. Maryland	0.069	0.073	0.072
HU- Beltsville	0.069	0.070	0.071
Rockville	0.068	0.068	0.073
Beltsville	0.068	0.070	0.076
Ashburn	0.067	0.068	0.074
Frederick	0.067	0.070	0.073
Long Park	0.065	0.067	0.079

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