

Ozone Season Summary

2015

Sunil Kumar

MWAQC-TAC Meeting

October 13, 2015

Ozone Season Summary

Peak 8-Hour Ozone Concentrations (ppb)

APRIL 2015						
MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
		1 51	2 62	3 46	4 46	5 53
6 57	7 45	8 39	9 37	10 42	11 58	12 60
13 60	14 43	15 53	16 58	17 51	18 65	19 58
20 48	21 52	22 54	23 50	24 55	25 48	26 52
27 47	28 50	29 61	30 60			

MAY 2015						
MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
				1 43	2 52	3 68
4 67	5 71	6 67	7 70	8 72	9 45	10 41
11 48	12 59	13 46	14 59	15 60	16 61	17 40
18 52	19 52	20 47	21 38	22 59	23 60	24 68
25 60	26 65	27 48	28 69	29 66	30 52	31 43

JUNE 2015						
MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
1 51	2 32	3 28	4 32	5 33	6 54	7 49
8 56	9 60	10 67	11 88	12 60	13 59	14 57
15 45	16 42	17 55	18 46	19 47	20 52	21 46
22 68	23 52	24 63	25 64	26 60	27 43	28 42
29 53	30 58					

JULY 2015						
MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
		1 60	2 46	3 62	4 54	5 54
6 39	7 62	8 41	9 39	10 60	11 57	12 71
13 50	14 54	15 56	16 60	17 48	18 48	19 62
20 68	21 54	22 56	23 67	24 68	25 63	26 62
27 58	28 70	29 49	30 51	31 67		

AUGUST 2015						
MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
					1 57	2 54
3 62	4 64	5 73	6 55	7 53	8 55	9 55
10 37	11 52	12 48	13 55	14 75	15 71	16 67
17 68	18 59	19 44	20 39	21 63	22 60	23 69
24 62	25 64	26 57	27 53	28 62	29 63	30 61
31 62						

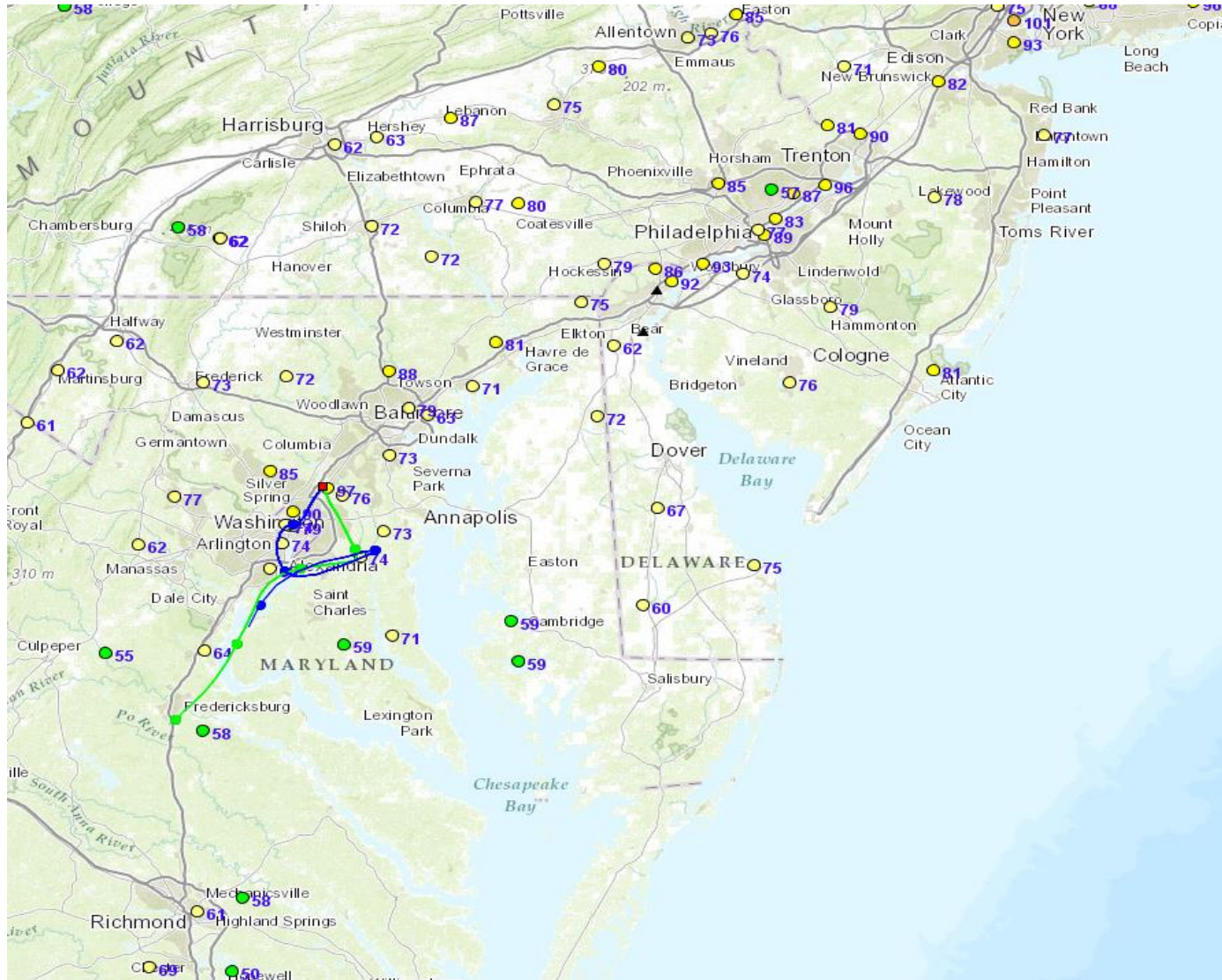
SEPTEMBER 2015						
MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
	1 72	2 77	3 68	4 72	5 45	6 57
7 58	8 57	9 54	10 39	11 58	12 33	13 35
14 51	15 73	16 81	17 82	18 78	19 57	20 40
21 32	22 35	23 54	24 57	25 40	26 36	27 37
28 37	29 27	30 37				

* Since April 1, 2015, there have been 5 Code Orange Days, 61 Code Yellow Days, and 117 Code Green Days

Meteorology Factors on Exceedance Days

- June 11 & September 2 (Local & Transported Emissions)
 - High Temperatures: 92°F/93°F, Clear skies
 - Light westerly winds brought ozone from Ohio River Valley
 - Ozone build up on previous days
 - Recirculation (September 2) & Canadian wildfire smoke (June 11)
- September 16-18 (Mostly Recirculation of Local Emissions)
 - High Temperatures: Mid-80°F, Clear skies
 - Extremely light winds & Recirculation
 - Ozone build up on previous days

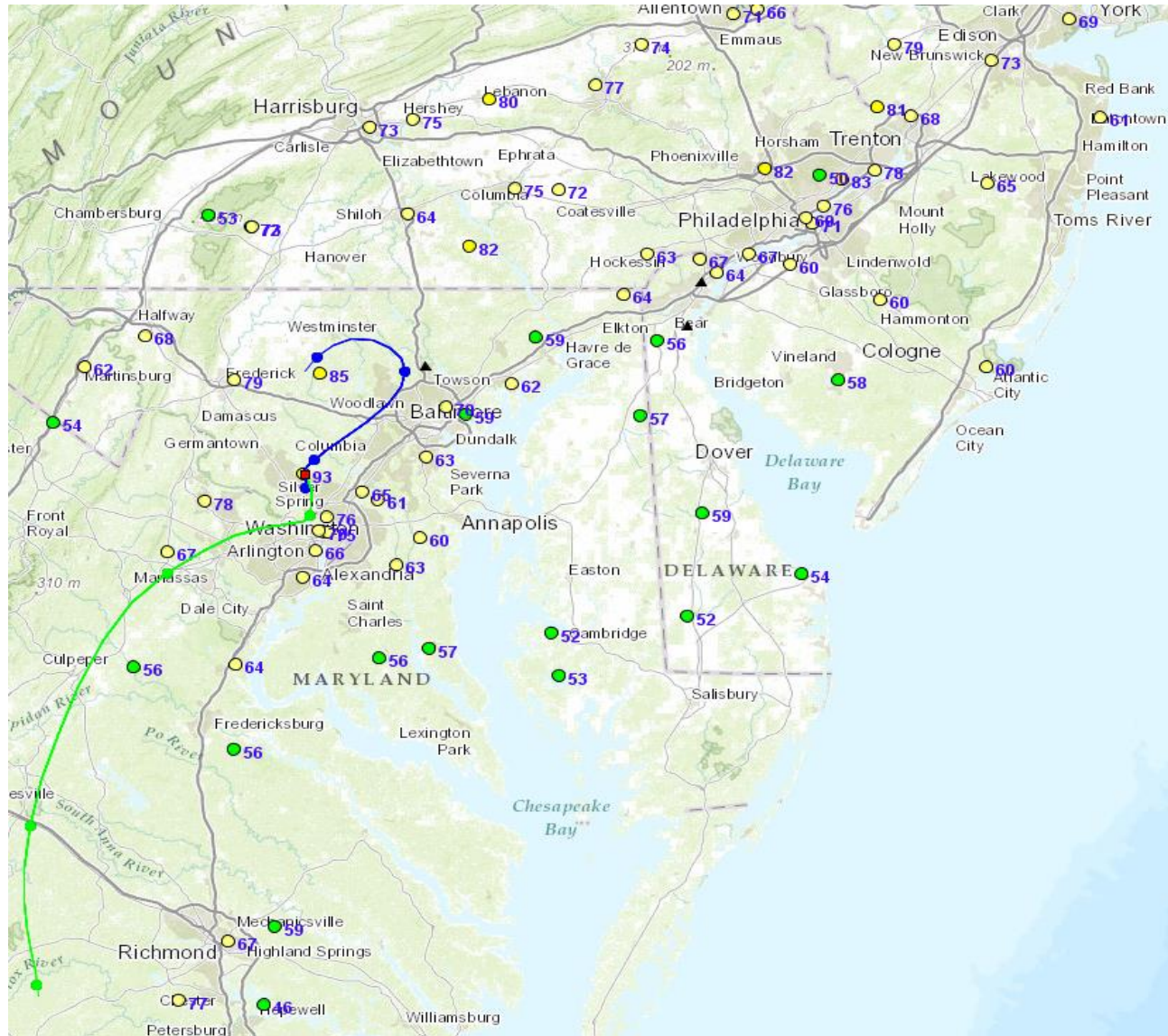
Wind Trajectories (September 17)



500 m

1500 m

Wind Trajectories (September 18)



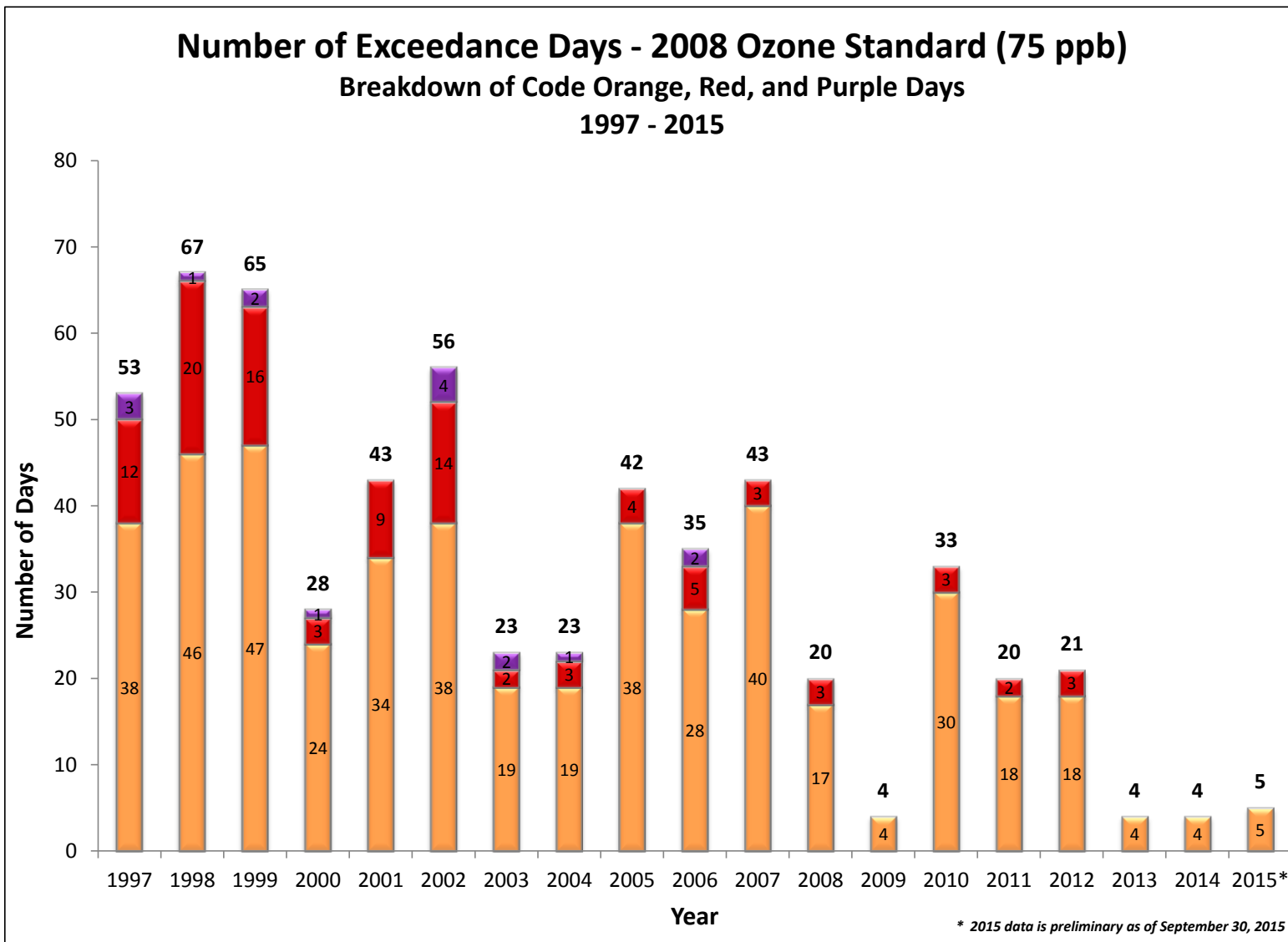
500 m
1500 m

2015 Ozone Exceedances

Date	Monitors Exceeding	Highest Monitor	8-Hr Max (ppb)
6/11	6	HU-Beltsville	88
9/2	1	Southern Maryland	77
9/16	7	Beltsville	81
9/17	4	Beltsville	82
9/18	2	Rockville	78


*Analysis is based on draft data as of October 13, 2015 and is subject to change.

Exceedance Trend (2008 Ozone NAAQS)

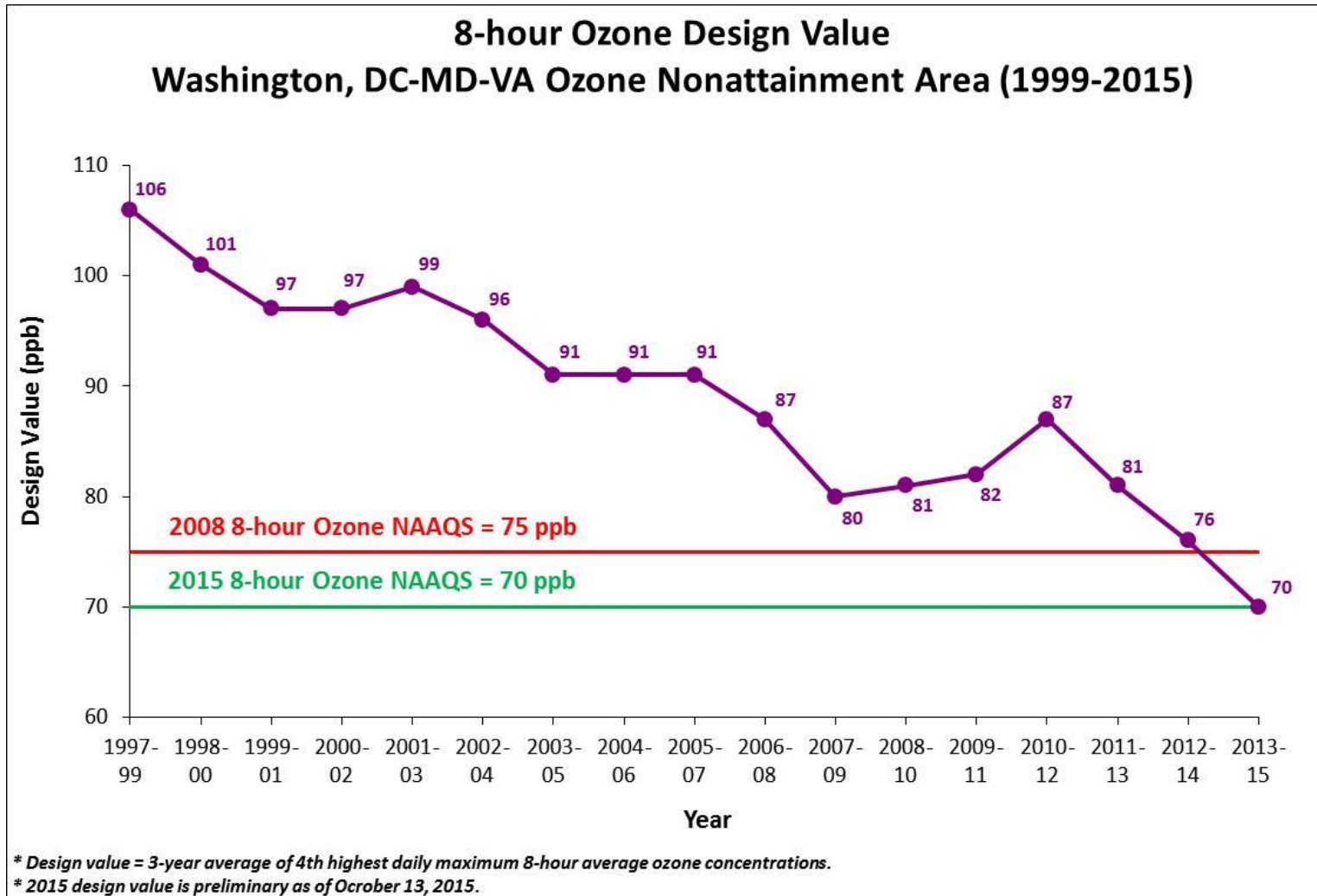


Why Fewer Exceedance Days Now ?

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

Ozone Design Value Trend



Fine Particle Summary

24-hour PM_{2.5} Concentrations (µg/m³)

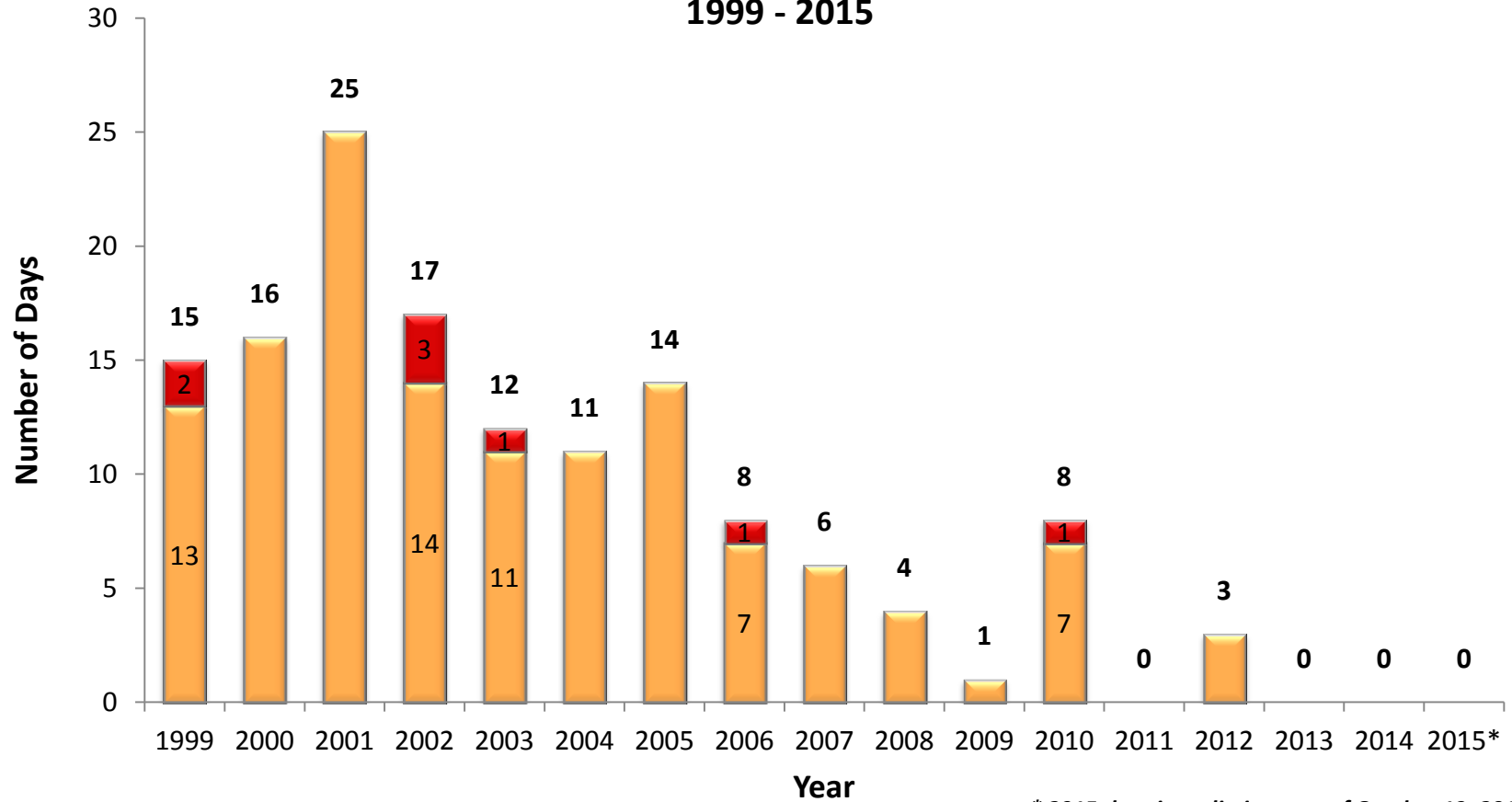
APRIL 2015							MAY 2015							JUNE 2015						
MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
		1 10.5	2 11.4	3 16.6	4 7.5	5 6.8					1 13.1	2 14.3	3 19.2	1 9.7	2 4.9	3 6.8	4 7.7	5 6.5	6 9.9	7 9.6
6 10.1	7 16.7	8 9.6	9 12.1	10 12.7	11 8.2	12 9.1	4 21.2	5 24.4	6 21.5	7 16.7	8 18.7	9 12.7	10 17.4	8 10.0	9 11.5	10 24.6	11 32.5	12 17.2	13 14.2	14 13.9
13 11.6	14 13.4	15 8.9	16 10.0	17 13.5	18 17.2	19 13.9	11 20.5	12 9.7	13 6.6	14 5.7	15 8.5	16 14.8	17 11.3	15 10.5	16 8.8	17 10.5	18 8.8	19 12.4	20 11.7	21 8.1
20 12.7	21 11.3	22 12.5	23 9.0	24 7.6	25 11.0	26 10.9	18 12.2	19 10.6	20 8.4	21 8.5	22 8.4	23 6.6	24 11.5	22 10.3	23 15.0	24 6.0	25 11.4	26 13.6	27 5.7	28 5.1
27 10.9	28 11.0	29 13.2	30 16.3				25 14.1	26 13.5	27 11.2	28 12.7	29 13.5	30 8.7	31 12.2	29 8.2	30 10.9					

JULY 2015							AUGUST 2015							SEPTEMBER 2015						
MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
		1 14.1	2 21.4	3 16.2	4 24.1	5 17.8						1 11.4	2 12.4		1 18.1	2 26.7	3 21.7	4 27.7	5 15.8	6 8.2
6 7.9	7 14.5	8 14.7	9 6.8	10 9.7	11 14.0	12 14.8	3 10.7	4 11.3	5 10.9	6 10.7	7 10.8	8 9.0	9 10.2	7 9.7	8 9.7	9 8.8	10 8.2	11 7.0	12 9.5	13 5.7
13 12.9	14 8.8	15 4.6	16 4.9	17 10.4	18 9.3	19 15.2	10 9.3	11 10.9	12 6.8	13 5.9	14 9.3	15 12.5	16 15.8	14 7.2	15 8.9	16 12.7	17 14.6	18 12.6	19 11.4	20 5.9
20 12.1	21 10.9	22 6.0	23 8.0	24 7.8	25 10.7	26 15.0	17 14.1	18 17.1	19 12.4	20 9.2	21 7.4	22 8.7	23 8.7	21 6.8	22 7.2	23 7.6	24 7.8	25 8.1	26 7.0	27 5.2
27 10.9	28 9.3	29 10.8	30 9.7	31 8.6			24 12.7	25 9.7	26 10.0	27 8.8	28 11.4	29 12.6	30 15.7	28 8.2	29 6.3	30 4.2				
							31 17.2													

* Since April 1, 2015, there have been 69 Code Yellow Days and 114 Code Green Days

PM_{2.5} Exceedance Trend

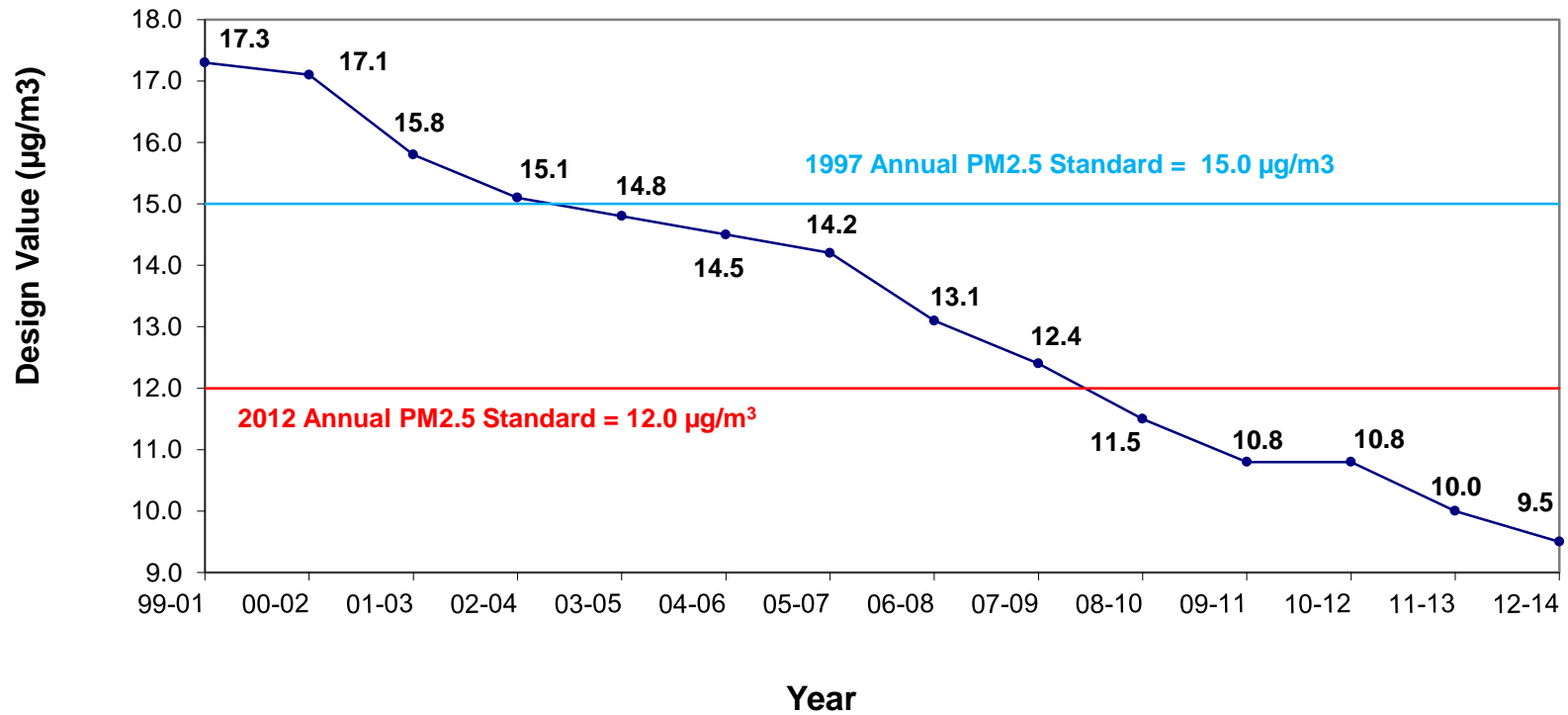
Number of Exceedance Days - 2006 24-Hour PM_{2.5} Standard (35 µg/m³)
Breakdown of Code Orange, Red, and Purple Days
1999 - 2015



* 2015 data is preliminary as of October 13, 2015

Annual PM_{2.5} Design Value Trend

Annual PM_{2.5} Design Value
Washington, DC-MD-VA Maintenance Area (1999-2014)



* Design value = 3-year avg of annual mean PM_{2.5} concentrations.

24-Hour PM_{2.5} Design Value Trend

