



Connecticut Department of Energy and Environmental Protection



May 12, 2016 Ozone Event

Analyzed by
Michael Geigert



Connecticut Department of Energy and Environmental Protection

OTC Ozone Monitors

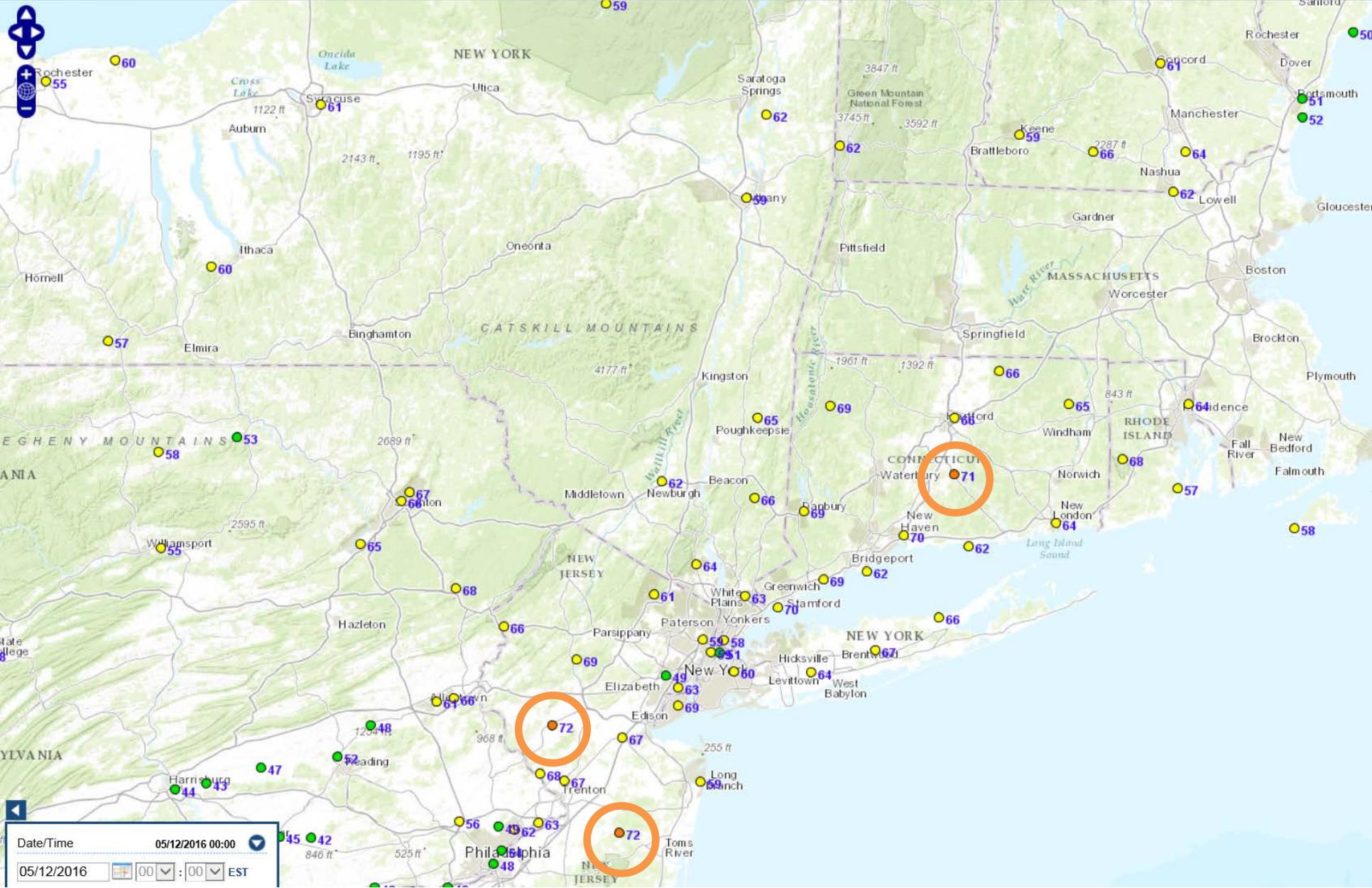
- 1 CT Exceedance
- 1 NJ Exceedance

Site	Site AQS	Param	Date (LST)	Max 8-hr
Colliers Mills	340290006	O3	5/12/2016	72
Middletown	090070007	O3	5/12/2016	71
Flemington	340190001	O3	5/12/2016	70
Greenwich	090010017	O3	5/12/2016	70
New Haven - Cri	090090027	O3	5/12/2016	70
Chester	340273001	O3	5/12/2016	69
Cornwall	090050005	O3	5/12/2016	69
Danbury	090011123	O3	5/12/2016	69
Susan Wagner	360850067	O3	5/12/2016	69
Westport	090019003	O3	5/12/2016	69
Pocono	420890002	O3	5/12/2016	68
W Greenwich	440030002	O3	5/12/2016	68
Holtsville	361030009	O3	5/12/2016	67
PECK	420690101	O3	5/12/2016	67
Rider Universit	340210005	O3	5/12/2016	67
Rutgers Univers	340230011	O3	5/12/2016	67
Columbia	340410007	O3	5/12/2016	66
East Hartford	090031003	O3	5/12/2016	66
FREE	420950025	O3	5/12/2016	66
Miller State Pa	330115001	O3	5/12/2016	66
Mt Ninham	360790005	O3	5/12/2016	66
Riverhead	361030004	O3	5/12/2016	66
SCRA	420692006	O3	5/12/2016	66
SUMMIT	330074001	O3	5/12/2016	66
Stafford	090131001	O3	5/12/2016	66
Abington	090159991	O3	5/12/2016	65
Millbrook	360270007	O3	5/12/2016	65
WILK	420791101	O3	5/12/2016	65
Babylon	361030002	O3	5/12/2016	64
E Providence	440071010	O3	5/12/2016	64
Groton Fort Gri	090110124	O3	5/12/2016	64
Londonderry - M	330150018	O3	5/12/2016	64
Rockland Cty	360870005	O3	5/12/2016	64
Whiteface Mtn	360310003	O3	5/12/2016	64
BRIS	420170012	O3	5/12/2016	63
Bar Harbor - Ca	230090102	O3	5/12/2016	63
Bayonne	340170006	O3	5/12/2016	63
White Plains	361192004	O3	5/12/2016	63
Ancora State Ho	340071001	O3	5/12/2016	62
Bennington	500030004	O3	5/12/2016	62
Madison-Beach R	090099002	O3	5/12/2016	62
NEA	421010024	O3	5/12/2016	62
Nashua - Gilson	330111011	O3	5/12/2016	62
Stillwater	360910004	O3	5/12/2016	62
Stratford	090013007	O3	5/12/2016	62

May 12, 2016



Map of May 12, 2016, Maximum 8-hr Ozone (ppb)



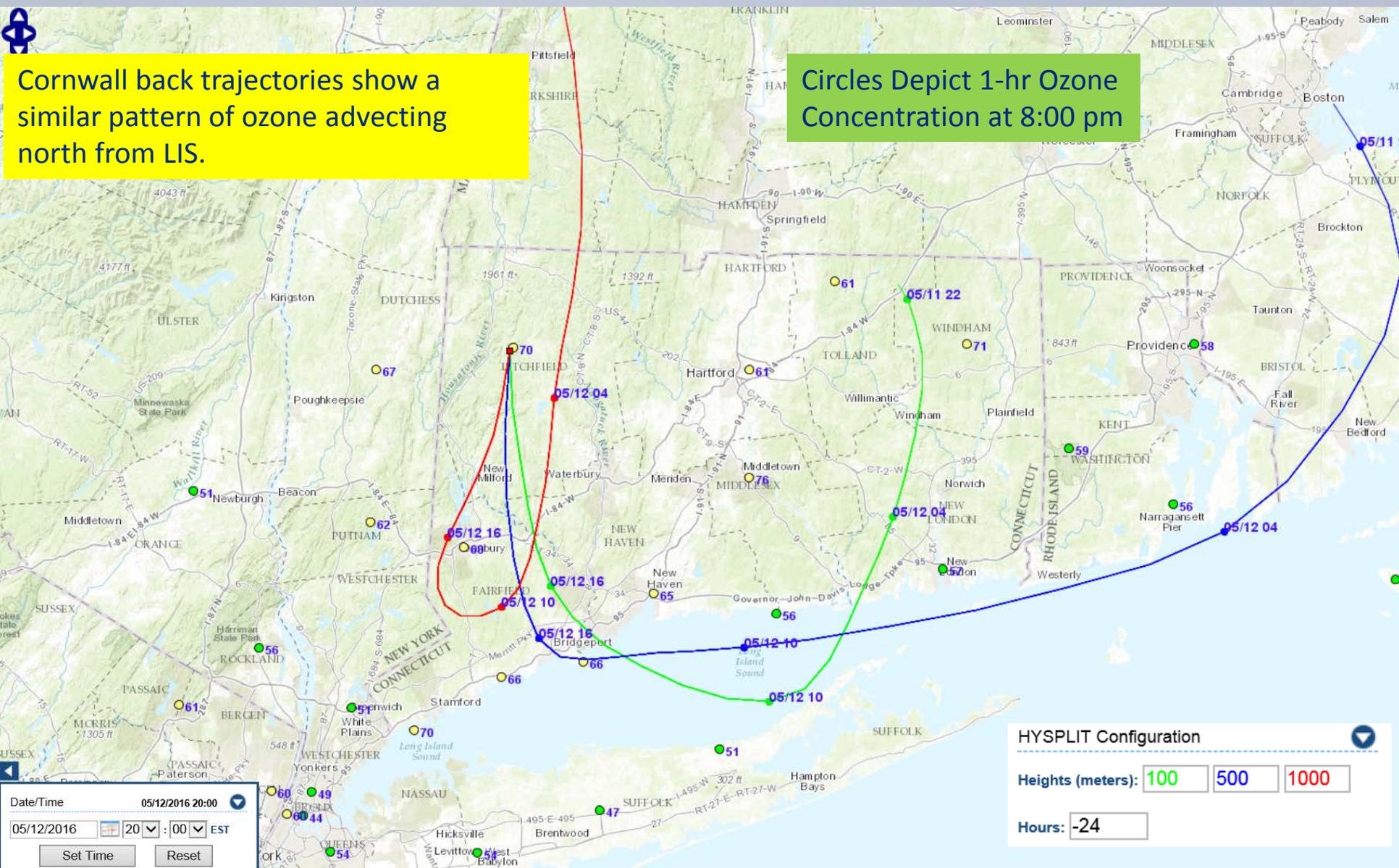
Date/Time 05/12/2016 00:00
05/12/2016 00:00 EST

Cornwall 24-hr back Trajectory (8:00pm)



Cornwall back trajectories show a similar pattern of ozone advecting north from LIS.

Circles Depict 1-hr Ozone Concentration at 8:00 pm



Date/Time: 05/12/2016 20:00
05/12/2016 20:00 EST
Set Time Reset

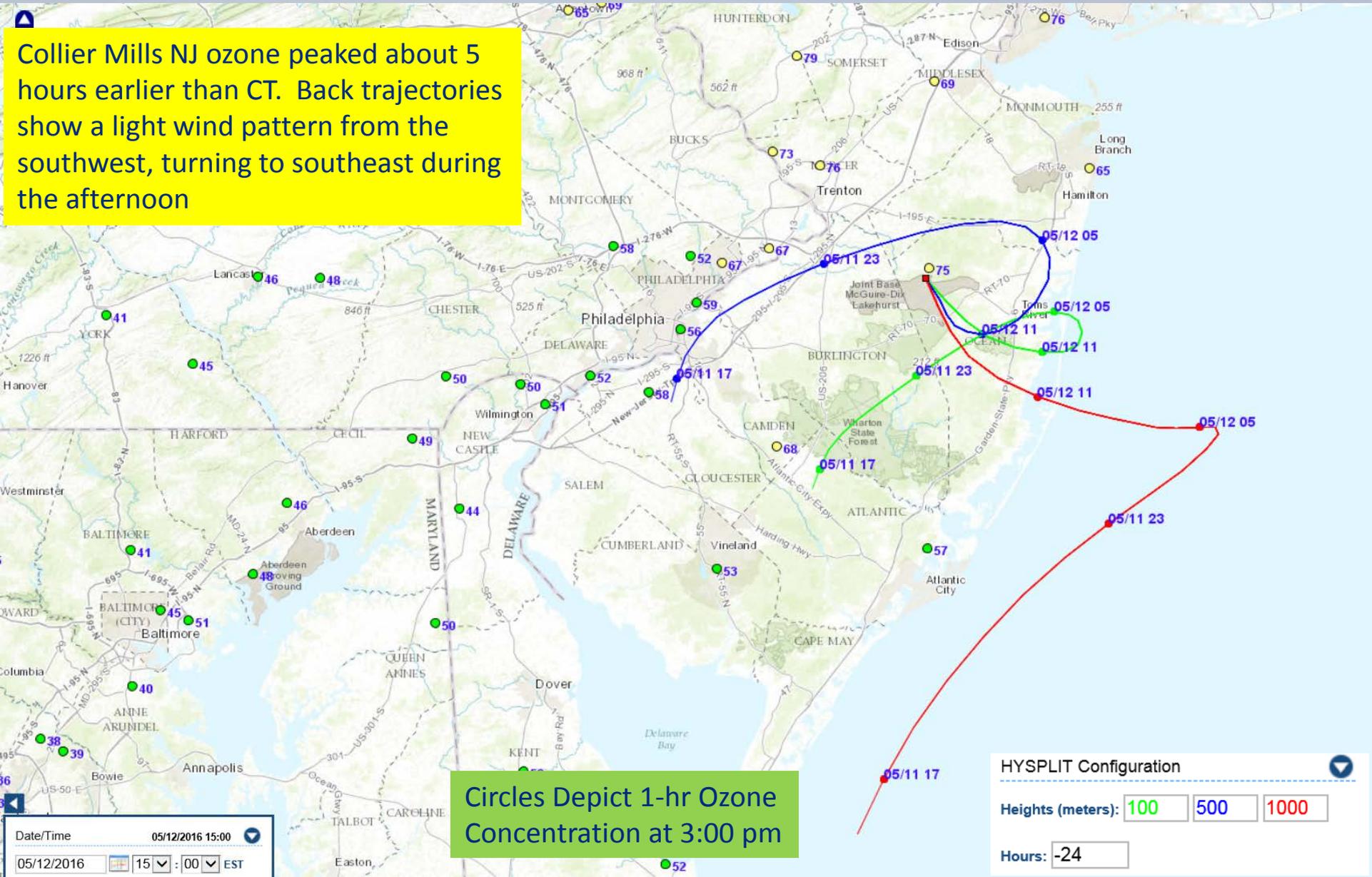
HYSPLIT Configuration
Heights (meters): 100 500 1000
Hours: -24

Greenwich 24-hr back Trajectory (8:00pm)



Collier Mills, NJ 24-hr back Trajectory (3:00pm)

Collier Mills NJ ozone peaked about 5 hours earlier than CT. Back trajectories show a light wind pattern from the southwest, turning to southeast during the afternoon

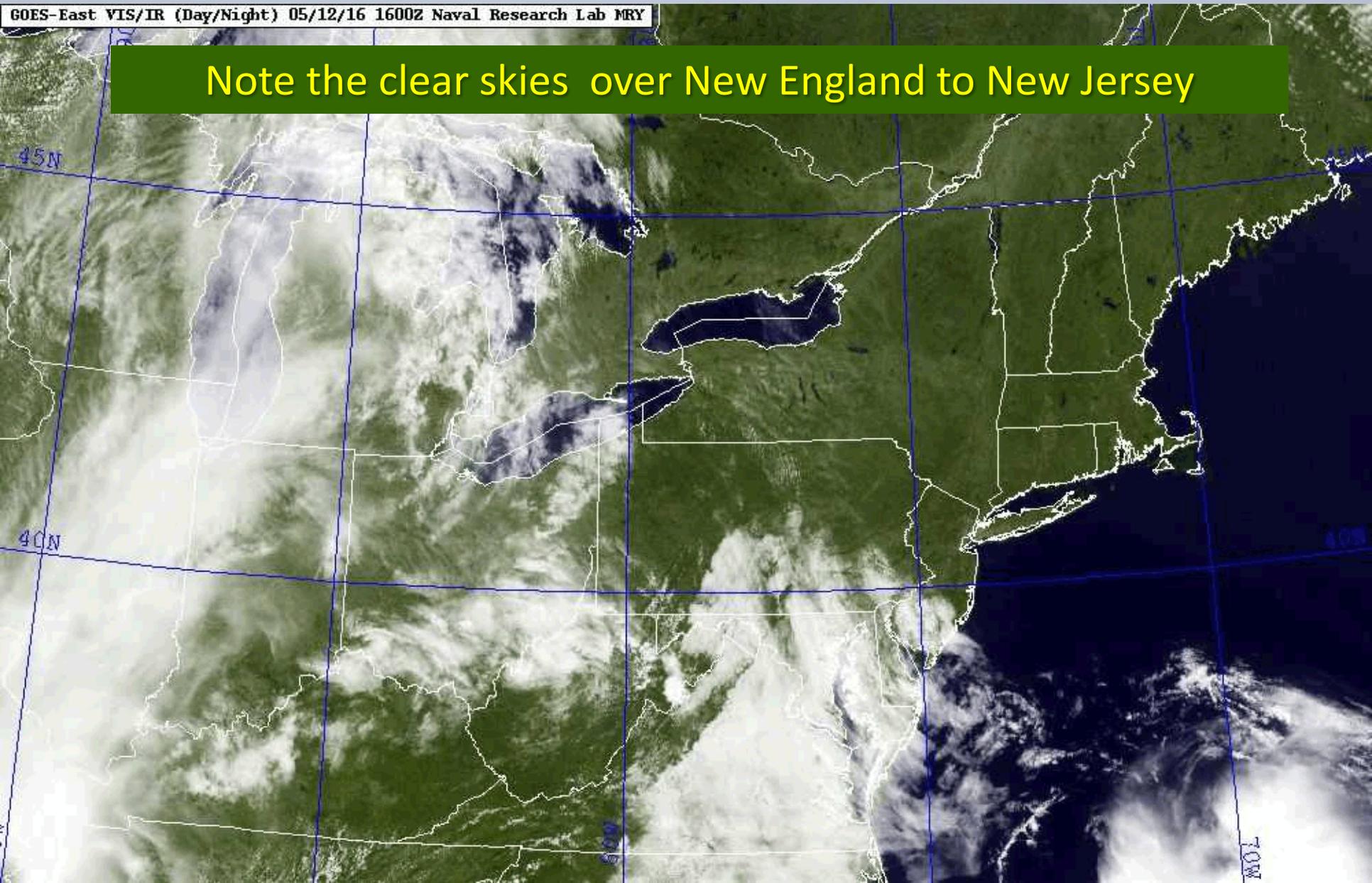


Circles Depict 1-hr Ozone Concentration at 3:00 pm

Satellite Animation: May 12, 2016, 12:00- 5:30 pm

GOES-East VIS/IR (Day/Night) 05/12/16 1600Z Naval Research Lab MRY

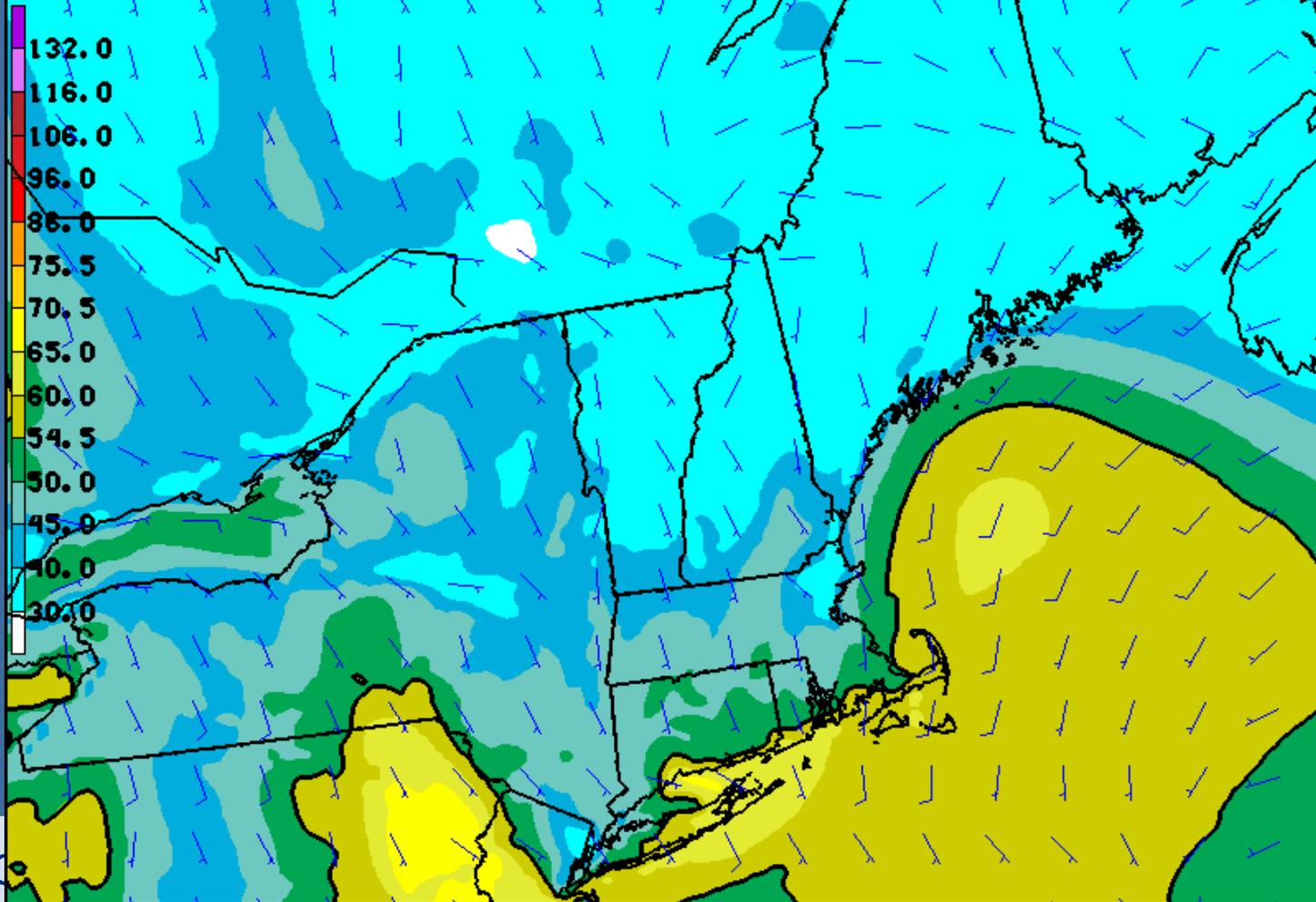
Note the clear skies over New England to New Jersey



May 12nd: NOAA Model Under-Predicted

NOAA 06z Model

Forecasters need to add 10 ppb model output.



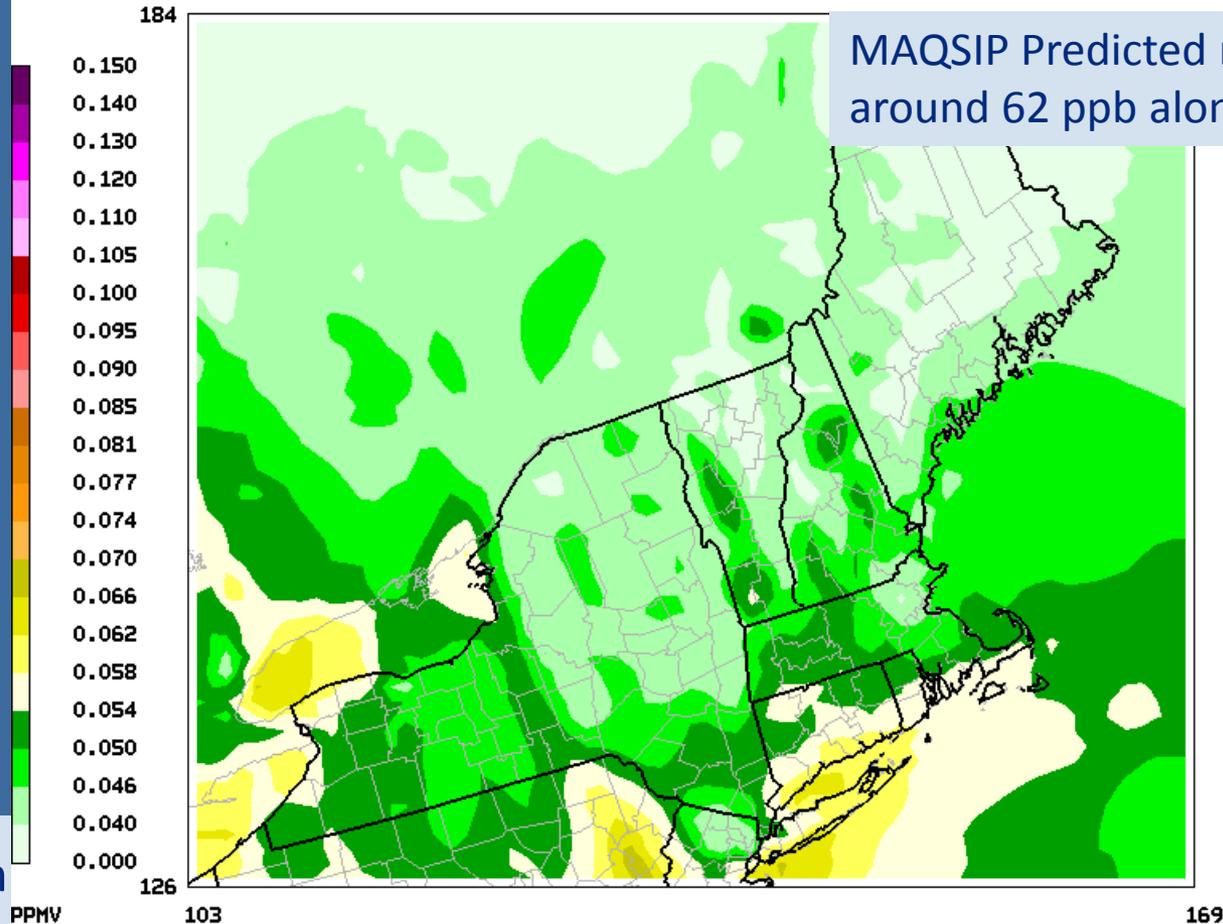
May 12nd: MAQSIP Model Under-Predicted

MAQSIP 06z
Model

24HR Peak 8HR-AVG Ozone -- 15km NES wndw

(c) 2013 BAMS Environmental Modeling Center

15km MAQSIP Domain Initialized 20160512 at 06Z



MAQSIP Predicted maximums of around 62 ppb along the CT coast.

Min= 0.033 at (105,184), Max= 0.068 at (133,126)

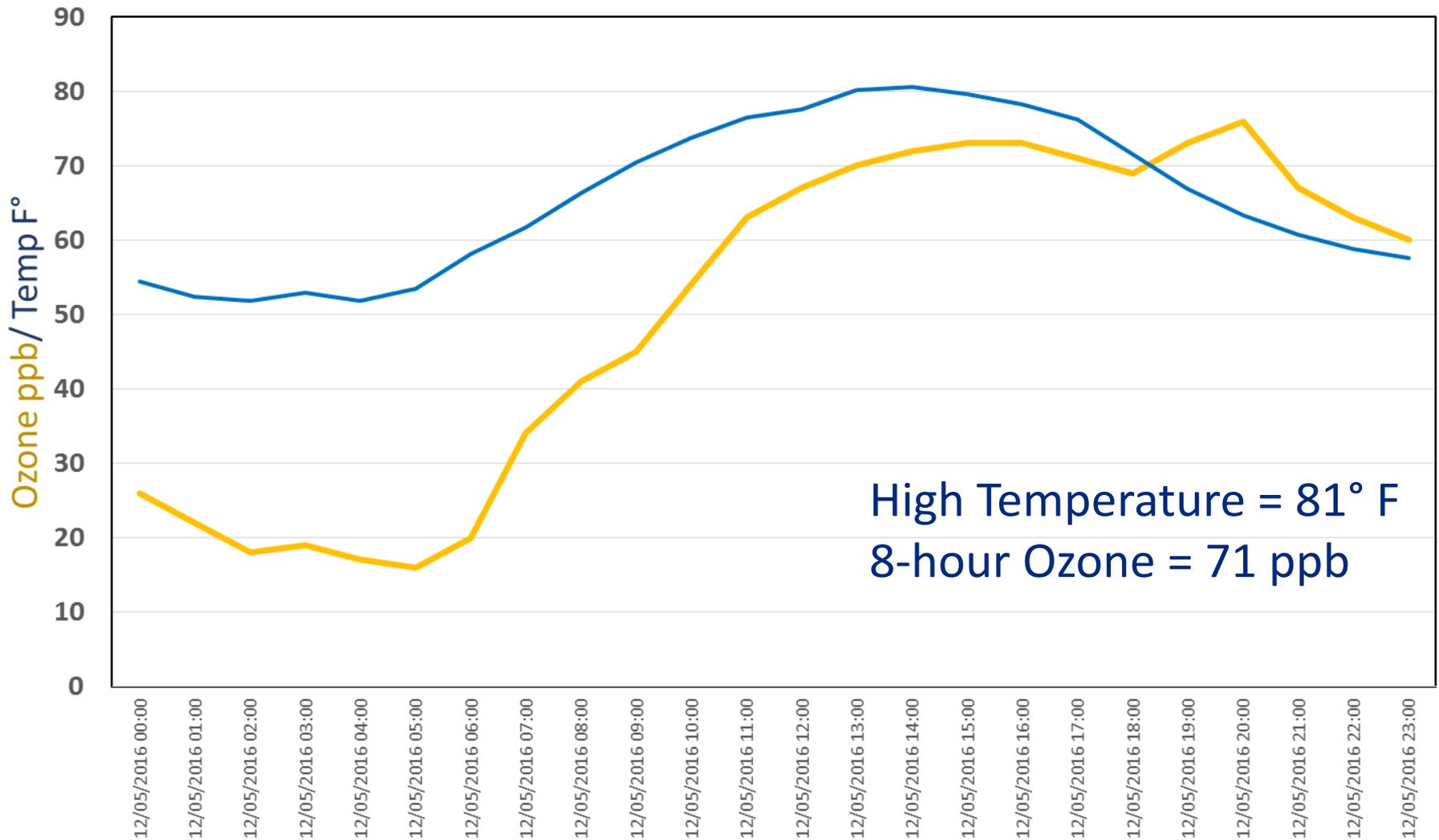


Con

ction

Temperature vs. Ozone

Middletown Ozone vs Temperature, May 12, 2016



Conclusions

- Weak high pressure produced a weak wind pattern;
- Transport was very localized, south winds during the afternoon transported pollutants from the coast inland;
- High temperatures barely exceeded 80 °F, but full sunshine allowed ozone formation and a 'marginal' exceedance to occur;
- Both NOAA and MAQSIP model under-predicted by about 10 ppb, which is common this time of year.



So far this Season...

Connecticut Department of Energy & Environmental Protection 8-Hour Ozone Daily Maximums* April 2016

Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Abington	38	38	42	37	44	48	48	40	M	43	51	40	43	43	48	M	51	60	47	50	60	64	45	51	51	37	48	49	M	50
Cornwall	45	43	45	39	48	52	M	43	47	45	49	42	46	49	51	54	58	61	52	55	66	72	44	M	52	37	49	52	53	54
Danbury	39	41	44	36	45	51	49	42	44	45	49	40	44	48	50	53	60	65	53	49	60	67	42	49	52	32	50	48	54	58
East Hartford	37	35	43	39	47	51	47	40	47	44	51	40	45	47	51	52	56	65	54	M	58	68	46	55	49	37	47	50	50	56
Greenwich	36	44	48	40	51	53	53	46	46	47	54	46	44	49	52	58	55	68	61	59	60	59	46	57	M	44	42	52	50	57
Groton	38	M	43	38	47	49	51	41	48	47	55	46	40	44	50	53	49	60	54	52	57	52	48	54	50	38	47	M	43	44
Madison	31	40	43	35	45	53	51	41	M	46	54	42	39	42	48	52	48	58	54	51	51	51	45	51	51	37	48	49	43	45
Middletown	37	40	43	37	46	54	52	42	48	46	56	42	46	47	53	55	58	68	58	57	63	73	50	57	57	36	49	48	49	57
New Haven	31	39	43	36	46	49	47	38	44	40	45	39	35	44	49	51	49	59	54	50	46	56	44	51	50	33	45	46	44	48
Stafford	39	37	43	38	45	51	49	40	46	44	52	39	43	44	48	50	51	61	49	51	61	67	45	52	49	38	48	51	51	53
Stratford	34	42	44	39	47	55	52	41	46	46	55	41	41	45	50	54	52	59	53	56	56	51	43	52	53	41	48	50	48	51
Westport	33	40	43	35	46	52	49	41	44	45	52	42	43	46	49	54	55	64	55	54	57	59	44	53	53	34	46	49	46	51
# days > Federal Standard																							1							



Compare to Last Season...

Connecticut Department of Energy & Environmental Protection 8-Hour Ozone Daily Maximums* April 2015

Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Abington	M	53	M	M	42	50	35	43	42	35	46	52	58	48	47	52	42	59	42	46	44	54	38	M	M	43	39	M	47	42
Cornwall	54	54	48	43	45	54	42	45	45	40	46	53	60	50	51	56	49	63	46	45	49	55	41	38	41	48	M	50	54	49
Danbury	48	50	31	42	42	49	30	37	37	34	46	51	56	43	48	53	39	62	45	40	45	52	38	36	40	45	35	48	50	46
East Hartford	50	50	36	41	44	50	35	40	40	25	46	51	59	47	49	54	38	61	45	37	42	54	38	34	41	45	38	49	53	46
Greenwich	52	52	32	44	46	47	M	45	39	38	47	45	55	45	M	50	35	64	42	44	M	49	40	38	41	46	40	52	50	43
Groton	50	51	43	41	42	46	37	44	42	38	47	49	52	45	49	49	44	65	42	50	48	51	39	35	41	42	40	46	48	42
Madison	50	53	43	43	39	45	37	M	42	40	48	51	53	45	51	50	41	65	42	50	47	53	42	36	43	42	40	49	46	44
Middletown	51	53	41	41	43	51	34	42	41	33	46	51	58	44	46	53	42	61	42	49	44	54	38	34	41	44	38	47	50	45
New Haven	M	M	28	42	39	49	30	40	36	36	47	46	49	40	49	M	25	65	43	47	38	45	35	35	40	41	37	47	50	45
Stafford	49	53	41	39	43	M	38	43	42	36	44	52	61	46	46	54	42	58	42	44	42	54	38	31	38	42	40	M	50	42
Stratford	49	51	39	41	38	43	31	45	39	39	46	48	51	41	48	46	37	64	41	44	44	50	38	35	39	42	M	M	M	43
Westport	49	51	31	42	40	44	26	41	36	36	47	48	55	M	47	49	34	64	40	37	46	48	38	35	39	43	37	48	49	42
# days > Federal Standard																														



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Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Abington	41	24	28	32	M	M	27	38	45	50	57	65	50	54	34	46															
Cornwall	46	34	26	33	33	34	29	41	47	50	66	69	54	56	37	M															
Danbury	41	22	19	29	31	27	23	40	M	50	53	69	48	57	38	46															
East Hartford	43	18	25	33	30	35	23	39	47	50	57	66	46	55	34	46															
Greenwich	48	31	34	38	34	36	28	46	61	40	54	70	49	59	38	51															
Groton	41	33	29	35	30	33	41	41	54	49	54	64	44	54	36	49															
Madison	41	32	32	34	28	32	34	38	52	43	49	62	46	53	38	49															
Middletown	46	21	29	35	30	35	30	42	52	53	60	71	M	56	36	38															
New Haven	42	21	27	30	26	31	23	38	49	35	43	70	47	49	37	45															
Stafford	42	25	27	32	29	34	29	38	44	50	56	66	51	57	34	47															
Stratford	46	30	35	37	30	35	28	41	53	42	47	62	48	55	37	47															
Westport	40	28	26	32	30	32	24	41	56	40	53	69	48	57	36	47															
# days > Federal Standard												2																			



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Connecticut Department of Energy & Environmental Protection 8-Hour Ozone Daily Maximums* May 2015

Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Abington	M	M	52	67	M	48	61	70	40	48	40	57	50	54	34	46															
Cornwall	42	49	55	76	M	54	66	84	42	44	50	59	54	56	37	M															
Danbury	39	49	55	71	66	47	60	84	41	39	41	56	48	57	38	46															
East Hartford	40	47	57	70	64	45	67	79	40	50	42	54	46	55	34	46															
Greenwich	42	44	51	61	68	49	56	62	43	30	30	61	49	59	38	51															
Groton	40	40	46	64	67	49	61	57	43	39	26	57	44	54	36	49															
Madison	42	40	45	63	M	44	57	58	44	33	27	66	46	53	38	49															
Middletown	42	46	56	69	70	47	65	78	40	47	39	60	M	56	36	38															
New Haven	43	44	49	56	47	48	35	58	42	33	20	53	47	49	37	45															
Stafford	39	45	54	72	61	50	67	74	41	52	47	51	51	57	34	47															
Stratford	43	44	49	63	69	46	54	55	46	35	27	63	48	55	37	47															
Westport	42	44	48	61	M	44	60	64	40	35	28	58	48	57	36	47															
# days > Federal Standard				1				2																							



What to Expect for 2016

