

DFW Modeling Review

New Episode Considerations and Screening

SIP Steering Committee

Pete Breitenbach

November 19, 2004



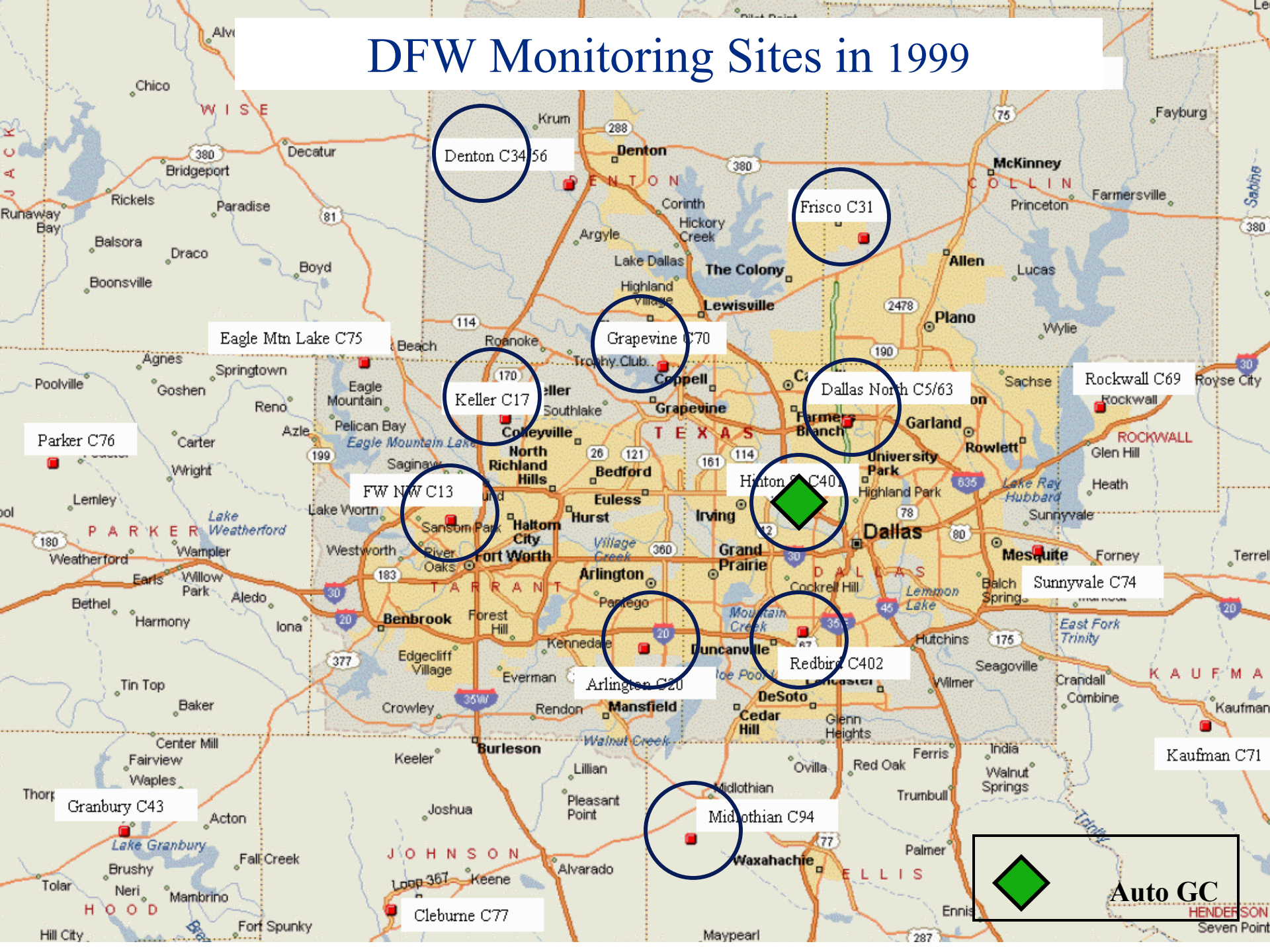
New Episode Considerations

- 1999 Episode has performance issues
 - 6 days satisfactory out of 8 in episode
 - EPA wants to see 10 days in future SIPs
- 1999 Episode is becoming outdated
 - Emissions Inventory continues to evolve
- Emissions Inventory Improvements
 - Include Houston imputed emissions
 - Include New Offshore Data from MMS
 - HARC Emissions Inventory Project
 - CAIR program (when it becomes final)

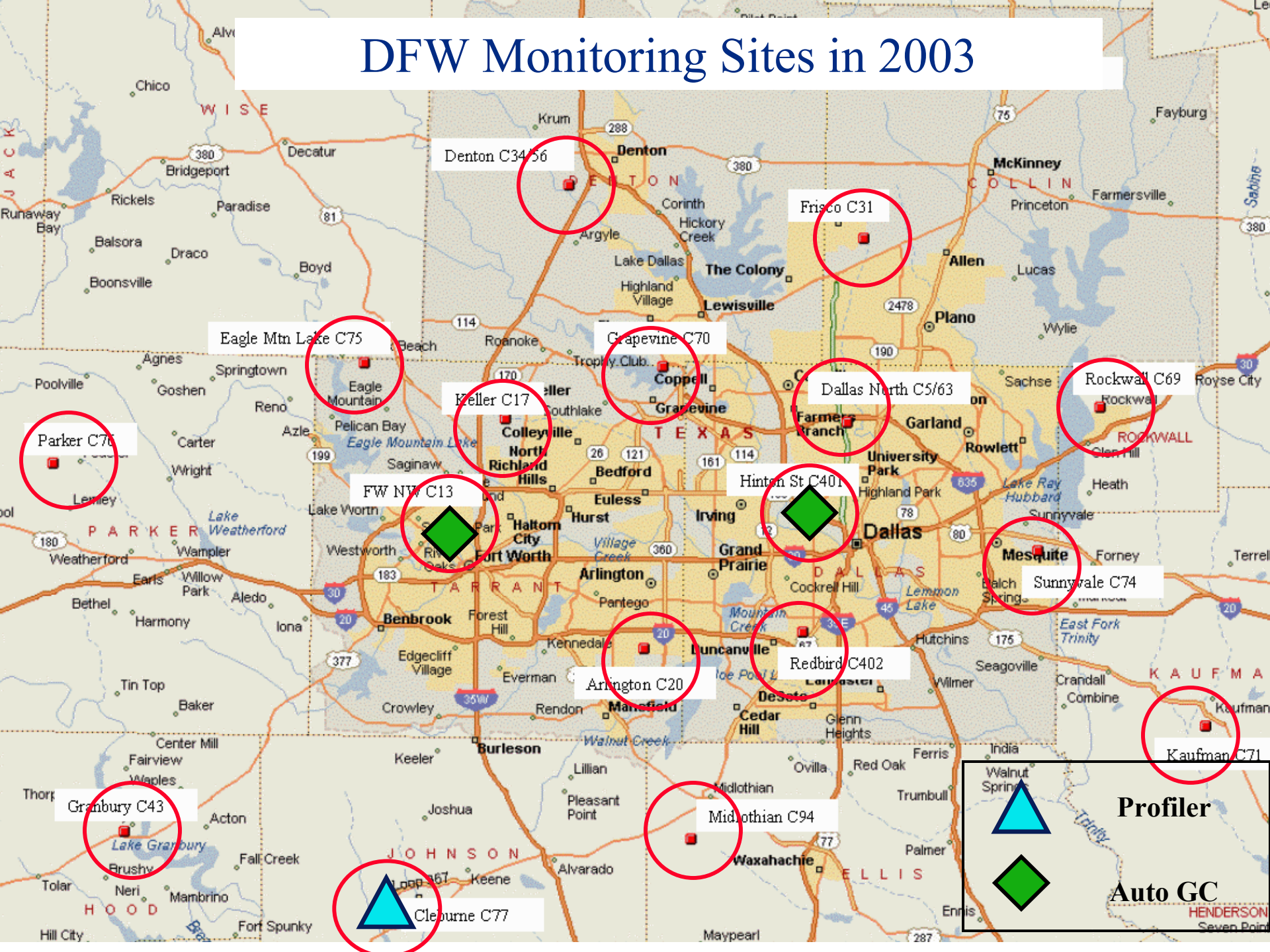
Reasons for Newer Episode

- Enhanced Surface Monitoring network
 - 19 CAMs sites instead of 10
- VOC Measurements at two sites (2003?)
 - AGC @ Hinton and Meacham
- Upper Air Profiler at Cleburne (June 2003)
 - Mixing Height and Winds through the layer
- More recent Emissions Inventory
 - Changes have occurred since 1999

DFW Monitoring Sites in 1999



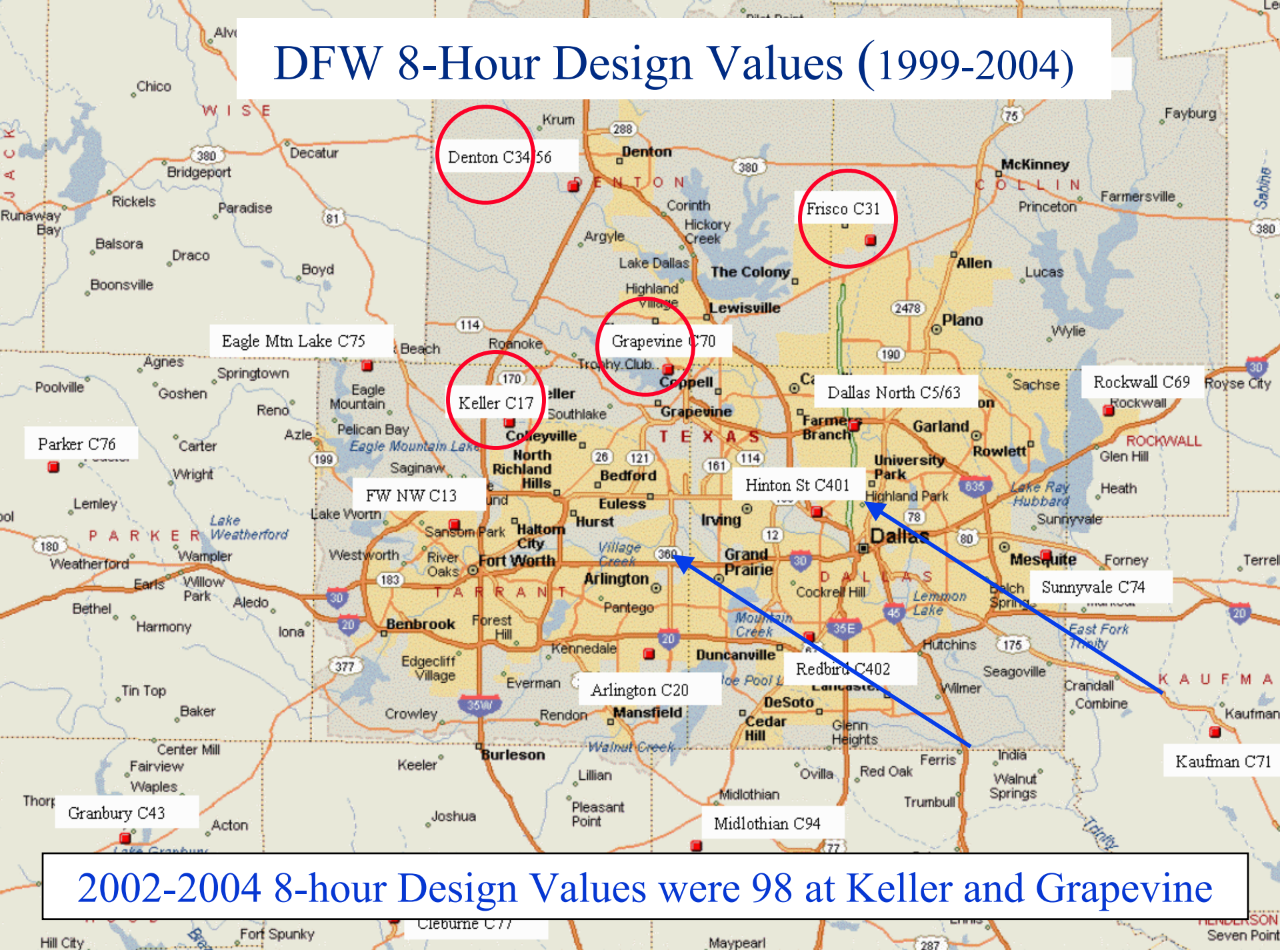
DFW Monitoring Sites in 2003



Selection Criteria

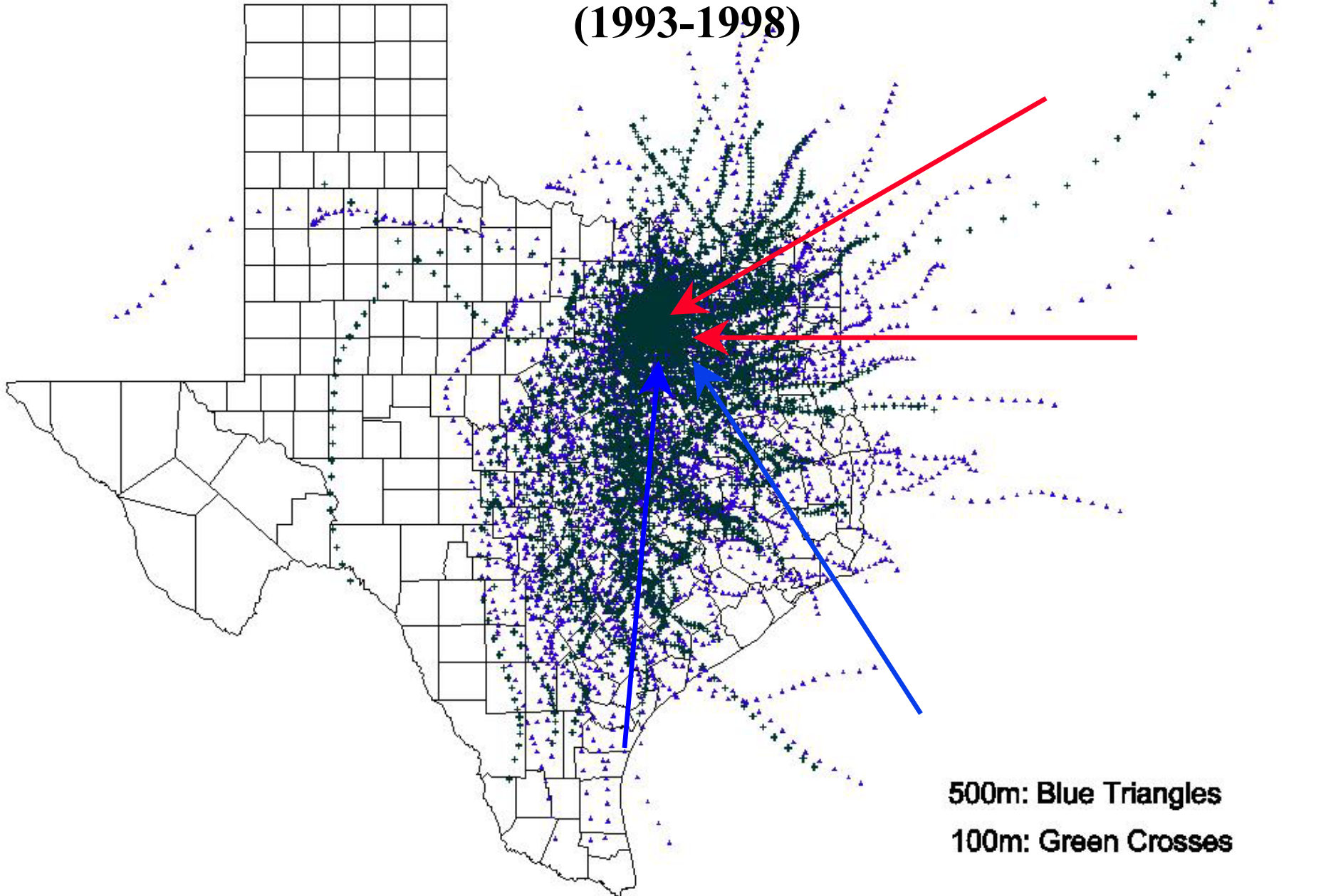
- Episode should be Typical and Representative
 - Peak Ozone Season is August-September
- Normal Range of Ozone Concentrations
 - Close to Current Design value (98 ppb in 2004)
- Typical Wind Speeds and directions
 - Should include calm (local) and windy (transport) days
- Should be recent,
 - Representative emissions and growth patterns
- Include Weekdays and Weekends for 8-hour

DFW 8-Hour Design Values (1999-2004)



2002-2004 8-hour Design Values were 98 at Keller and Grapevine

DFW Back Trajectories for 8-Hour Ozone (1993-1998)



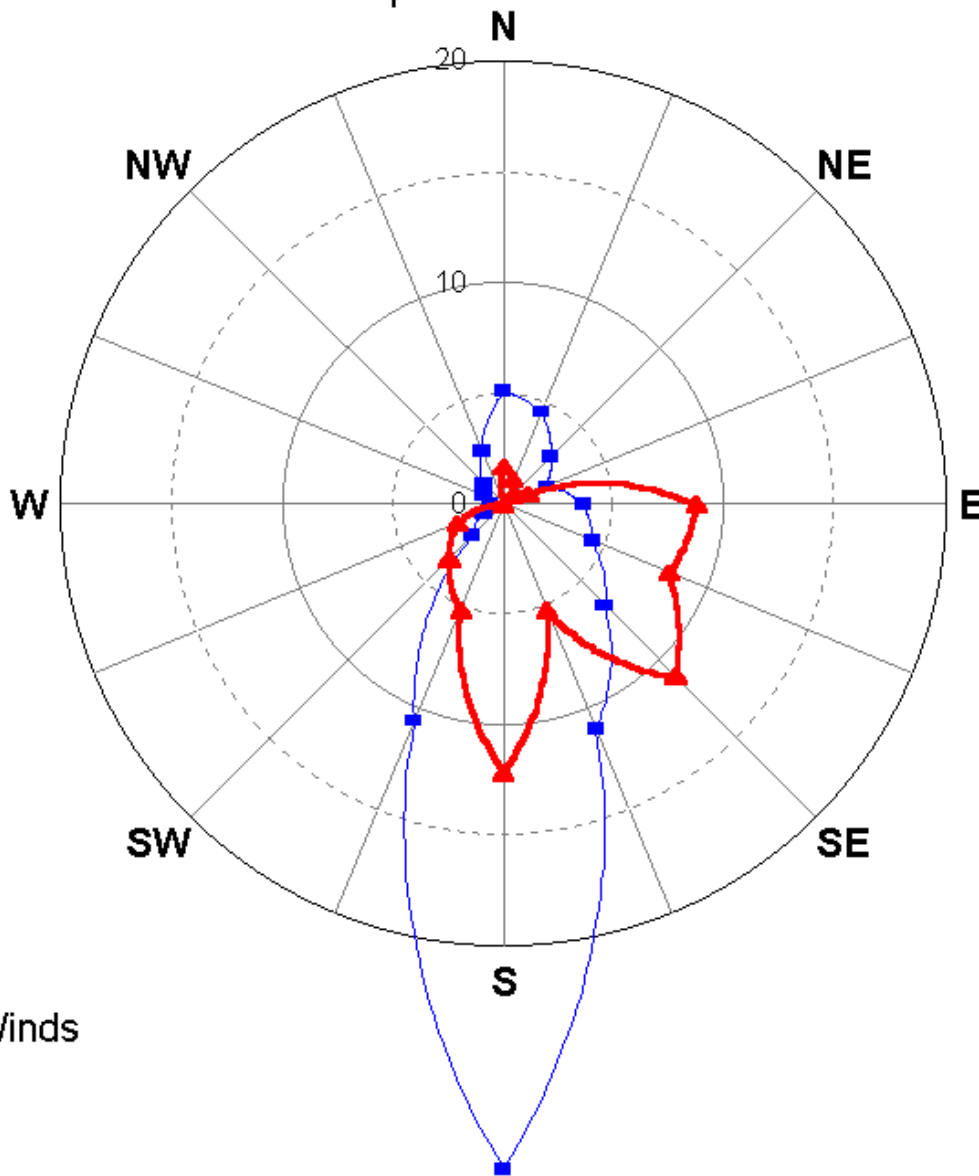
Normal Winds vs Ozone Winds

Dallas/Fort Worth Airport

Calm Conditions (Winds < 3 knots)

10% of All Winds are calm

39% of Ozone Winds are calm



•Nobis, TAMU, 1998

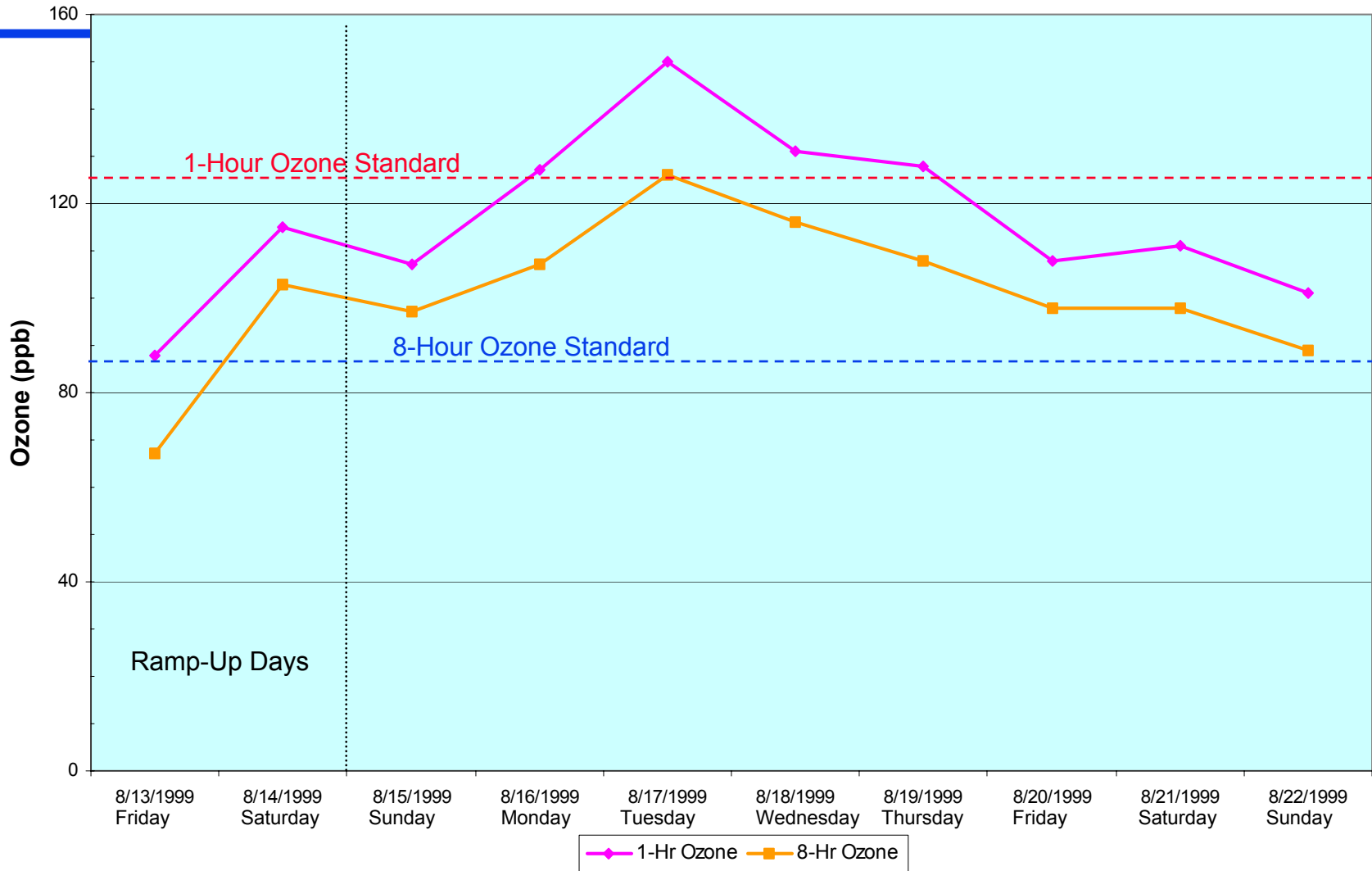
DFW 8-Hour Episode Data

- August 13 - August 22, 1999 Episode

Day	Date	Max O3	Site Name	# Sites	Remarks	Source
Fri	Aug 13	67	Frisco	0	Ramp Up	---
Sat	Aug 14	103	Arlington	4	2 nd Ramp	---
Sun	Aug 15	97	Keller	6	Transport	Ark, La
Mon	Aug 16	107	Keller	6	Winds<3m/s	E Tx
Tues	Aug 17	<u>126</u>	Frisco, Denton	7	Winds<2m/s	Local
Wed	Aug 18	116	Frisco	4	Wind< 2m/s	Local
Th	Aug 19	108	Midlothian	2	Front	Local
Fri	Aug 20	98	Midlothian	1	Transport	Ok, Ark
Sat	Aug 21	98	Arlington	5	Transport	La, Ark
Sun	Aug 22	108	Denton	2	Transport	SE Tx
Mon	Aug 23	59	Denton	0		---

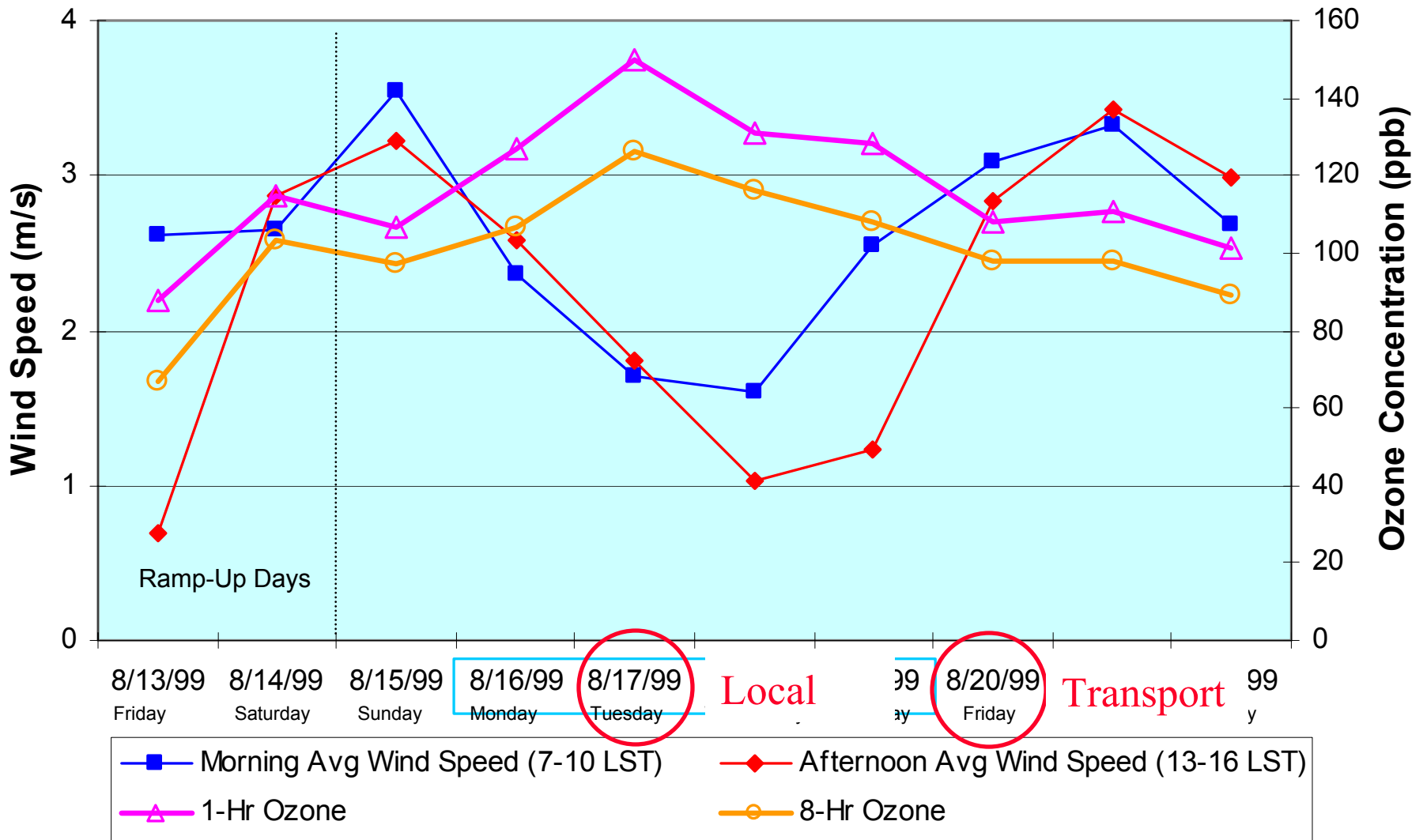
DFW 1-hour and 8-Hour Ozone Measurements

August 13-22, 1999 Episode



DFW Domain Average Wind Speeds vs Ozone Concentrations

Aug 13-22, 1999 Ozone episode



Candidate Episodes

Episode Dates	# Days	# Exc	Max O ₃	Site Name	Type
June 28-July 3 2003	5 out of 6	16	97	Keller	Transport +Texas
Aug 6-11 2003	5 out of 6	32	119	Dallas North	Texas NE-East
July 15-21 2004	5 out of 7	31	104	Denton	Texas E -S
July 31-Aug 5 2004	6 out of 6	16	108	Grapevine	Texas E-S
Sept 10-12 2004	3 out of 3	14	108	Eagle Mtn	Transport NE

Preliminary Assessment

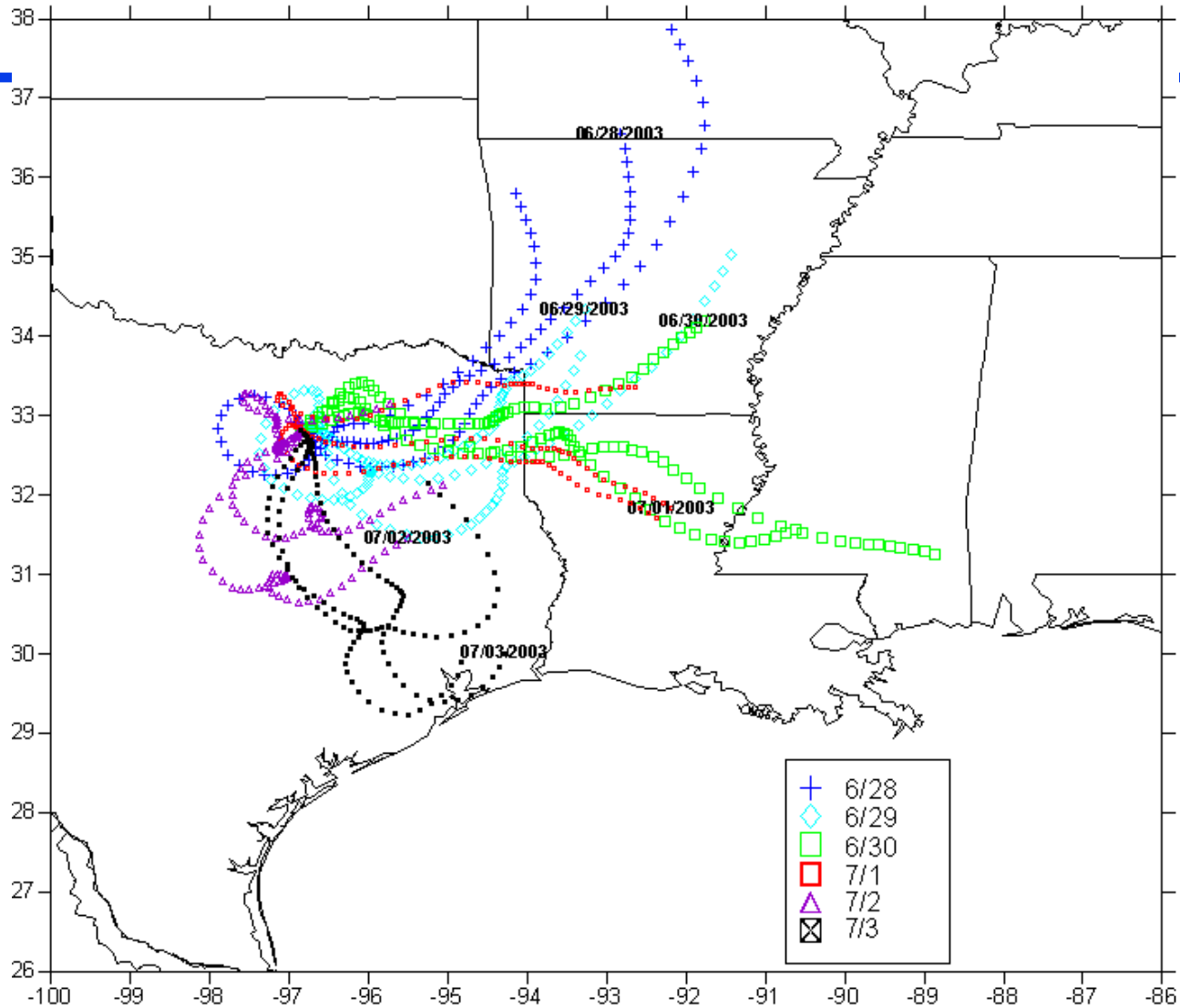
- Evaluate Daily Ozone Data
- Evaluate Back Trajectories

June 28- July 3, 2003

2003 TCEQ Daily Maximum 8-Hour Ozone Average (ppb)

Area	Dallas-Fort Worth																		
Site	Parker County C76	Granbury C73	Cleburne C77	Midlothian Tower C94	Redbird C402	Arlington Airport C61	Fort Worth NW C13	Eagle Mountain C75	Keller C17	Denton Airport C56	Grapevine C70	Hinton C401	Dallas North C63	Frisco C31	Anna C68	Greenville C1006	Rockwall C69	Sunnyvale C74	Kaufman C71
4th High	87	79	85	86	89	85	96	96	97	94	95	91	88	87	79	77	83	86	71
Max	99	86	87	89	112	98	108	104	107	99	99	130	119	106	82	80	86	111	92
Days 85+	7	1	4	5	5	4	16	11	17	11	16	7	6	5	0	0	2	4	2
Days 105+	0	0	0	0	2	0	1	0	1	0	0	2	1	1	0	0	0	1	0
Days 125+	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
06/28 Sat	59	56	62	70	78	74	87	87	97	88	97	91		83	65	64	72	78	65
06/29 Sun	85	66	68	65	71	77	93	81	85	68	76	77		66	63	61	66	70	59
06/30 Mon	69	84	85	54	54	64	71	67	65	57	59	55		51	48	39	42	48	47
07/01 Tue	72	65	74	68	68	76	82	75	78	62	79	69		68	54	56	55	62	49
07/02 Wed	63	60	65	65	64	68	77	73	85	79	88	70	82	79	76	65	63	67	55
07/03 Thu	68	55	60	64	62	64	77	88	86	90	88	68	76	75	68	63	63	67	56

June 28- July 3, 2003

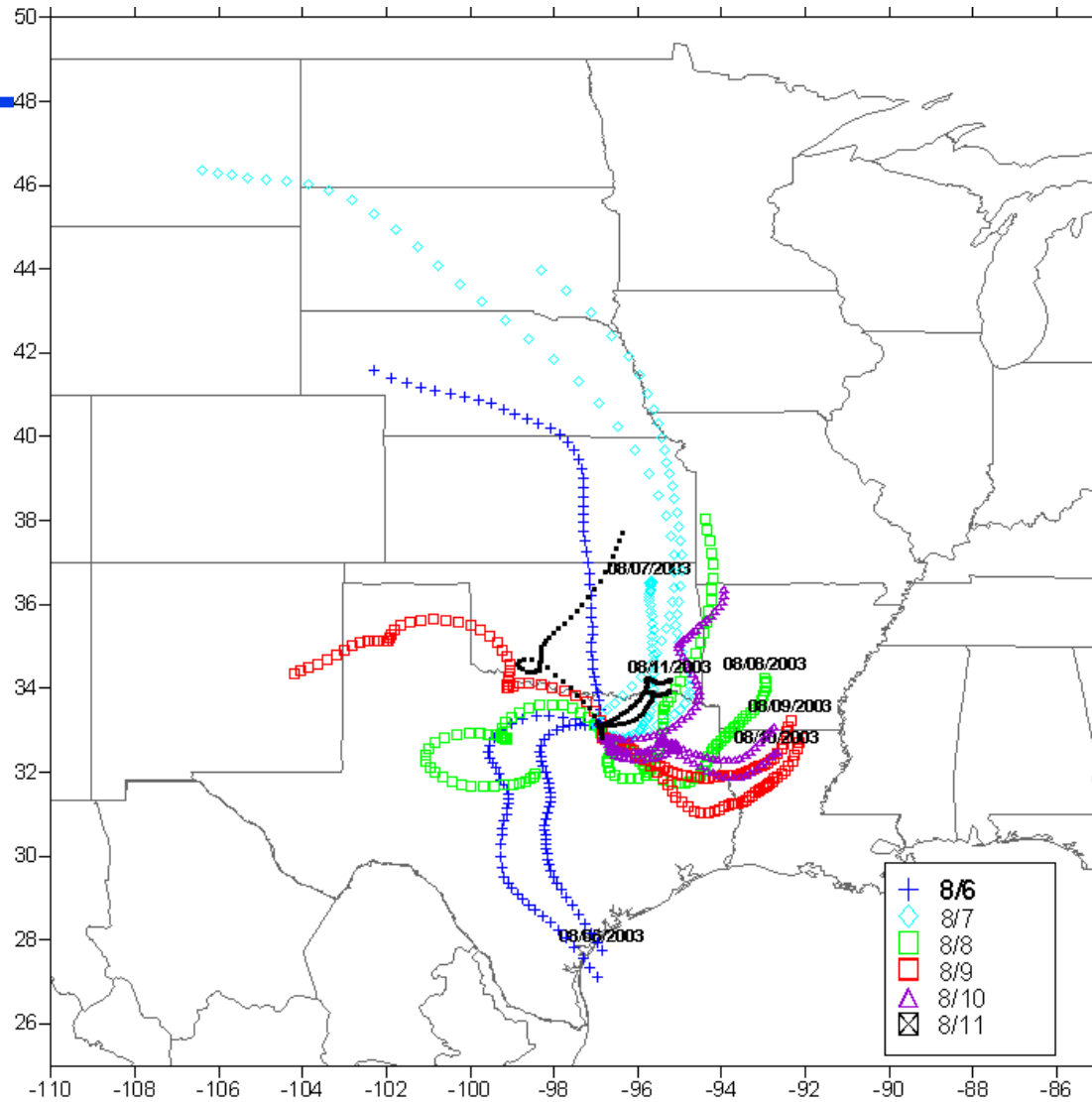


August 6 - 11th, 2003

2003 TCEQ Daily Maximum 8-Hour Ozone Average (ppb)

Area	Dallas-Fort Worth																		
	Parker County C76	Granbury C73	Cleburne C77	Midlothian Tower C94	Redbird C402	Arlington Airport C61	Fort Worth NW C13	Eagle Mountain C75	Keller C17	Denton Airport C56	Grapevine C70	Hinton C401	Dallas North C63	Frisco C31	Anna C68	Greenville C1006	Rockwall C69	Sunnyvale C74	Kaufman C71
4th High	87	79	85	86	89	85	96	96	97	94	95	91	88	87	79	77	83	86	71
Max	99	86	87	89	112	98	108	104	107	99	99	130	119	106	82	80	86	111	92
Days 85+	7	1	4	5	5	4	16	11	17	11	16	7	6	5	0	0	2	4	2
Days 105+	0	0	0	0	2	0	1	0	1	0	0	2	1	1	0	0	0	1	0
Days 125+	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
08/04 Mon	41	40	43	43	43	42	43	45	49	51	51	42	47	52	55	45		41	39
08/05 Tue	39	35	39	41	43	42	41	42	37	42	51	45	55	56	59	50	50	46	40
08/06 Wed	65	70	86	89	93	83	75	69	73	65	73	81	75	68	71	73	74	82	
08/07 Thu	76	67	78	86	112	98	104	89	107	94	99	117	119	106	82	77	85	86	
08/08 Fri	86	74	79	76	82	76	92	96	95	83	88	85	83	77	71	76	78	79	
08/09 Sat		46	47	47	40	46	40	45	50	49	45	47	44	46	49	54	40	42	
08/10 Sun		72	75	74	89	83	98	88	99	78	97	92	88	78	67	68	70	79	
08/11 Mon		73	87	88		83	86	79	83	78	82	75	74	70	72	65	73	77	
08/12 Tue		67	72	62	52	61	65	60	62	57	60	62	53	56	56	58	61	60	

August 6 -11th, 2003

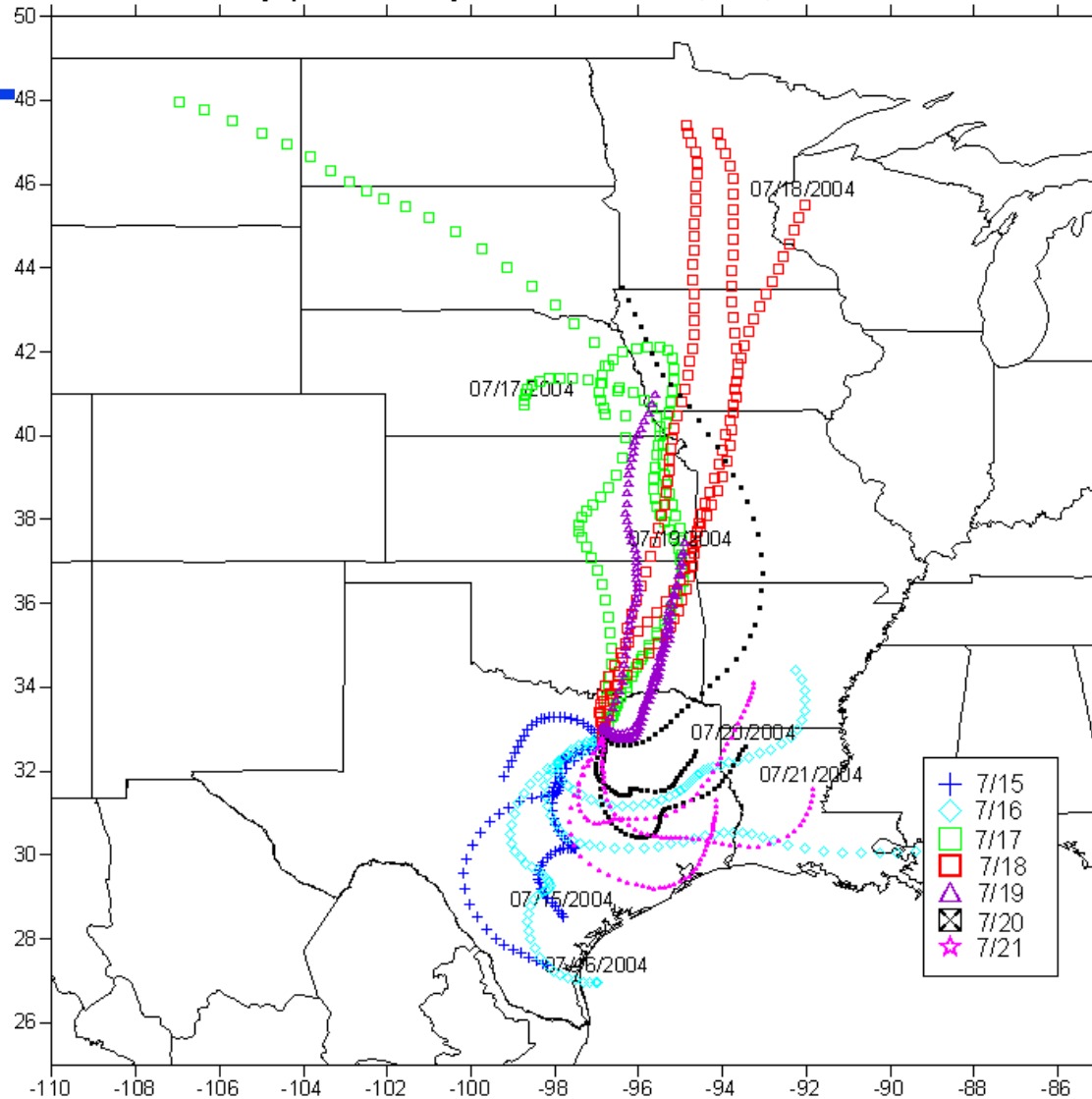


July 15- 21, 2004

2004 TCEQ Daily Maximum 8-Hour Ozone Average (ppb)

Area	Dallas-Fort Worth																		
	Site	Parker County C76	Granbury C73	Cleburne C77	Midlothian Tower C94	Executive Airport C402	Arlington Airport C61	Fort Worth NW C13	Eagle Mountain C75	Keller C17	Denton Airport C56	Grapevine C70	Hinton C401	Dallas North C63	Frisco C31	Anna C68	Greenville C1006	Rockwall C69	Sunnyvale C74
4th High	79	80	93	87	88	84	90	87	92	92	92	86	87	94	85	80	81	80	73
Max	83	85	101	108	103	105	94	108	103	105	108	95	98	97	100	100	93	83	81
Days 85+	0	1	6	5	4	3	10	6	6	11	5	5	6	9	4	1	3	0	0
Days 105+	0	0	0	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0
Days 125+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/13 Tue	31	27	30	31	39	39	37	36	42	46	53	49	59	63	54	60	69	54	36
07/14 Wed	35	32	36	37	46	43	49	44	59	59	64	58	70	71	57	55	62	57	48
07/15 Thu	51		59	54	60	59	58	59	69	75	75	66	76	88	81	70	69	63	58
07/16 Fri	59	57	62	61	65	65	68	69	71	76	85	76	91	90	85	100	93	83	69
07/17 Sat	57	62	81	69	68	65	66	57	60	56	57	64	59	54	55	56	57	62	57
07/18 Sun	54	57	69	60	60	65	65	58	59	60	60	58	55	53	55	56	60	62	58
07/19 Mon	76	84	97	86	90	98	94	81	85	76	83	85	83	70	58	62	66	73	64
07/20 Tue	71	68	76	73	71	74	82	89	91	104	94	77	82	94	80	67	77	70	65
07/21 Wed	82	85	93	87	82	84	90	85	92	92	92	82	87	97	88	80	85	83	81
07/22 Thu	39	39	44	38	38	36	42	44	46	51	48	40	45	53	49	38	38	37	39

July 15- 21, 2004

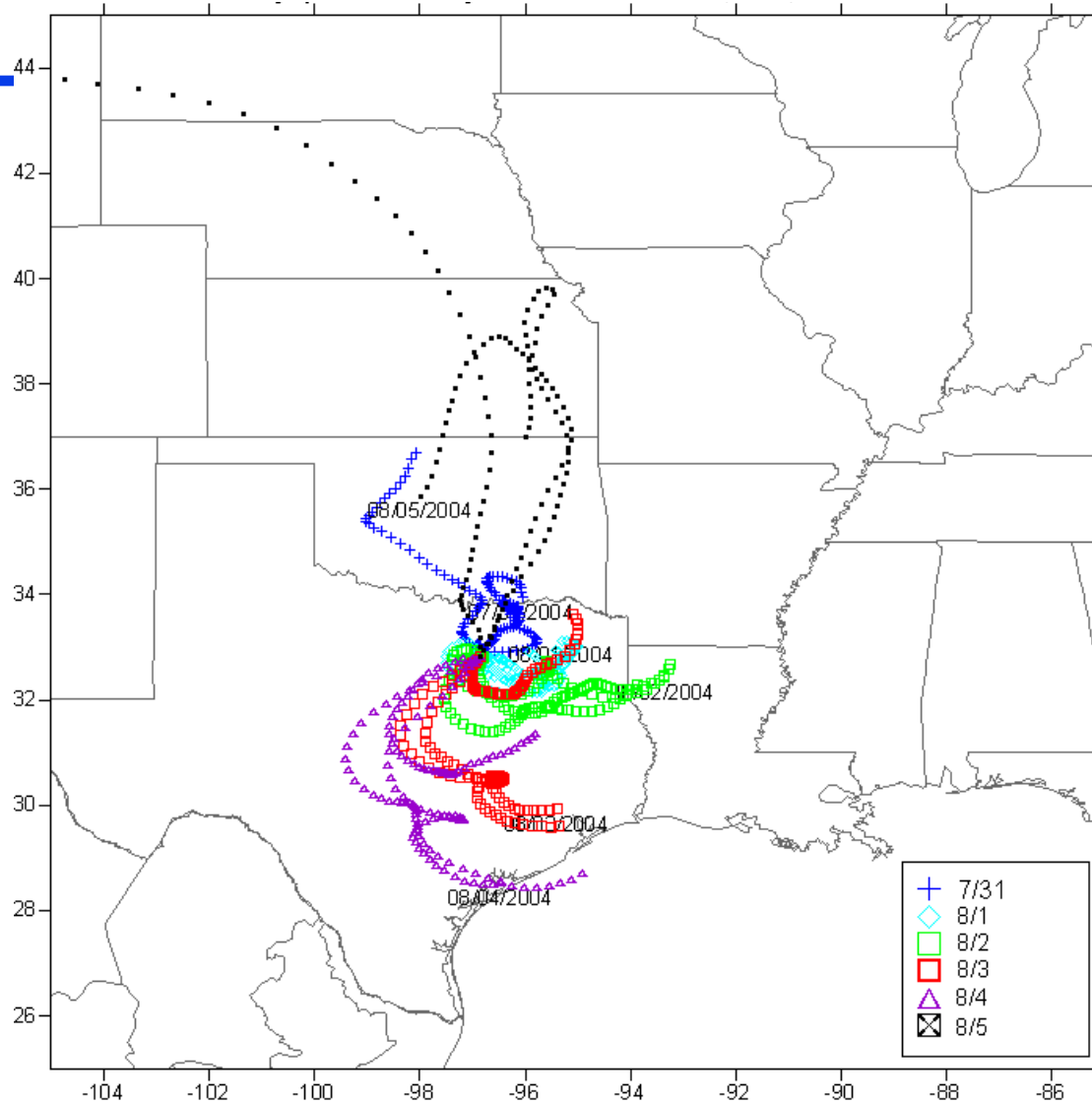


July 31 – August 5, 2004

2004 TCEQ Daily Maximum 8-Hour Ozone Average (ppb)

Area	Dallas-Fort Worth																		
	Site	Parker County C76	Granbury C73	Cleburne C77	Midlothian Tower C94	Executive Airport C402	Arlington Airport C61	Fort Worth NW C13	Eagle Mountain C75	Keller C17	Denton Airport C56	Grapevine C70	Hinton C401	Dallas North C63	Frisco C31	Anna C68	Greenville C1006	Rockwall C69	Sunnyvale C74
4th High	79	80	93	87	88	84	90	87	92	92	92	86	87	94	85	80	81	80	73
Max	83	85	101	108	103	105	94	108	103	105	108	95	98	97	100	100	93	83	81
Days 85+	0	1	6	5	4	3	10	6	6	11	5	5	6	9	4	1	3	0	0
Days 105+	0	0	0	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0
Days 125+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/29 Thu	39	40	39	38	29	38	46	43	42	41	49	39		47	49	39	40	42	35
07/30 Fri	59	60	80	71	79	73	71	64	59	52	58	63	57		49	49	56	67	66
07/31 Sat	69	57	63	60	88	83	87	71	72	68	73	83	73	64	57	56	62	67	58
08/01 Sun	55	53	63	62	73	73	85	64	76	72	77	77	72	69	59	62	65	61	58
08/02 Mon	60	58	64	64	78	72	89	87	100	92	108	89	98	97	72	69	81	74	62
08/03 Tue	55	49	54	55	66	55	60	60	72	79	76	71	60	95	100	65	73	64	58
08/04 Wed	63	57	59	55	69	64	69	66	77	73	79	81	90	80	77	84	91	78	57
08/05 Thu	60	67	93	77	78	62	65	56	61	51	54	67	61	59	54	54	52	58	62
08/06 Fri	76	70	72	57	65	67	76	67	72	57	64	62	59	57	51	56	62	60	58

July 31 – August 5, 2004



September 10-12, 2004

2004 TCEQ Daily Maximum 8-Hour Ozone Average (ppb)

Area	Dallas-Fort Worth																		
Site	Parker County C76	Granbury C73	Cleburne C77	Midlothian Tower C94	Executive Airport C402	Arlington Airport C61	Fort Worth NW C13	Eagle Mountain C75	Keller C17	Denton Airport C56	Grapevine C70	Hinton C401	Dallas North C63	Frisco C31	Anna C68	Greenville C1006	Rockwall C69	Sunnyvale C74	Kaufman C71
4th High	79	80	93	87	88	84	90	87	92	92	92	86	87	94	85	80	81	80	73
Max	83	85	101	108	103	105	94	108	103	105	108	95	98	97	100	100	93	83	81
Days 85+	0	1	6	5	4	3	10	6	6	11	5	5	6	9	4	1	3	0	0
Days 105+	0	0	0	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0
Days 125+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/08 Wed	52	57	64	55	53	52	53	50	51	49	51	48	50	45	47	49	50	56	54
09/09 Thu	75	71	79	72	69	69	77	73	83	75	80	68	70	64	59	73	60	67	67
09/10 Fri	82	79	85	78	83	80	94	108	103	105	101	95	86	82	66		73	75	73
09/11 Sat	66	64	68	67	74	69	80	80	83	86	82	82	86	86	72		73	73	68
09/12 Sun	73	66	70	67	69	71	89	91	95	83	83	74	75	73	66		71	68	62
09/13 Mon	65	64	65	60	57	58	67	72	70	74	65	57	61	65	58		57	55	49

September 10-12, 2004

