OKLAHOMA MONTHLY CLIMATE SUMMARY
JUNE 2003

Oklahoma Climatological Survey

Overview

Northwesterly flow in the upper-levels of the atmosphere and a series of strong cold fronts helped stave off the start of Oklahoma's summer heat by at least a month, bringing much-needed relief to the state's parched landscape. While the preceding five-month period was exceedingly dry for most of Oklahoma, the predominant signal during June was wetter than normal, with cooler-than-normal temperatures. The month ended as the 8th-coolest and 25th-wettest June in the state's 112-year climate record.

The state received another welcome break after the extraordinary tornado outbreaks of May – no tornadoes were reported in the state during June. And although the prevailing upper-level winds were not favorable for tornadic weather, the thunderstorms that did occur were accompanied by numerous instances of damaging straight-line winds and flooding rainfall.

Precipitation

More than five inches of rain fell across the state on average during June, putting a halt to the state's burgeoning rainfall deficit for the year at 4.22 inches. The statewide-averaged total for the month, more than an inch above normal, was boosted by a soggy 7.54-inch average for the southwestern corner of the state, the 5th-wettest June for that area since 1895. Most of southern Oklahoma was under the influence of a mild to moderate drought during May, so the abundant moisture that fell in that region of the state curtailed those conditions. Unfortunately, the east-central region was the only area which was not near or above normal during June. Nearly an inch below normal, the rainfall deficit for the year in that area reached nearly seven inches below normal. Despite rainfall surpluses, south central and southeastern Oklahoma experienced the 19th and 14th driest Junes, respectively, in the last 109 years. In a month with a plethora of bountiful rainfall amounts, Hobart led the pack with 10.3 inches.

Temperature

With numerous frontal passages and often-cloudy conditions, the state's temperatures nosedived during June. The statewide-averaged temperature finished over three degrees below normal. Nearly all areas of the state were similarly cool, with the exception of southwestern and south-central Oklahoma, which were between two and three degrees below normal. The cool conditions dropped the year-to-date statewide-averaged temperature back below normal by 0.2 degrees, and gave the start of the climatological summer a very auspicious beginning. The highest temperature of the month was 101 degrees, which was recorded at Hollis on the 11th. The lowest temperature of 44 degrees occurred on the 6th at Boise City.

June 2003 Statewide Extremes

Description	Extreme	Station	Date
High Temperature	101ºF	Hollis	June 11
Low Temperature	44ºF	Boise City	June 6
High Precipitation	10.3 in.	Hobart	
Low Precipitation	2.21 in.	Breckinridge	

June 2003 Daily Highlights

June 1-5: The precipitation began quickly during June as the first of several upper-level disturbances generated a large complex of showers and thunderstorms on the High Plains of Kansas and Nebraska. Caught in the predominant northwesterly flow, this thunderstorm complex moved across Oklahoma, bringing beneficial rainfall. The same scenario played out for the next four days, as thunderstorms formed northwest of the state and roared in during the nighttime hours. The cold fronts associated with the disturbances helped to tame temperatures and keep the state unseasonably cool. Severe weather struck the state on the 5th, complete with hail, damaging winds, and flooding rainfall. The Mesonet station at Medford recorded 3.68 inches of rain on that day.

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June 6-9: The rain trickled to a temporary halt as a surface high pressure system built into the state from the northwest. Northerly winds dominated this period, and were reinforced by another strong cold front on the 8th. Rain did fall in southern Oklahoma, but amounts were generally less than an inch. The activity in that area allowed temperatures in the southern regions to remain below normal, while the rest of the state enjoyed fair skies and seasonable temperatures.

June 10-14: Another stormy pattern developed over the state as a front stalled over Oklahoma, and several upper-level disturbances passed over from the west. Severe weather occurred each day, with flash flooding prevalent in central and southwestern Oklahoma. Street flooding occurred in Moore on the 10th, and roads were reported flooded near Cordell on the 14th. The heaviest rain of this period fell on the 14th as a significant part of western Oklahoma received greater than one inch amounts – Arnett led the pack with over three inches on the 14th. Widespread heat erupted over the state on the 11th on the south side of the stalled front. The state's high temperature for the month of 101 degrees occurred on this day at Hollis. Numerous other reports of upper-90s occurred throughout southern Oklahoma.

June 15-17: Fair weather dominated this period, although the sunny weather heated the ground enough to generate a few isolated thunderstorms. In the weak upper-level environment, these slow-moving storms dropped excessive amounts of rain before dissipating. Most of the state, however, experienced fair skies and temperatures in the 80s – a welcome respite from the soggy conditions of the first half of the month.

June 18-21: A weak surface front lingered in the area and combined with several disturbances from the west to once again bring showers and thunderstorms to the state. The heat began to show up in southern sections, although the areas that received rain remained cool. Most of the heavy rainfall amounts were on the 21st, with Newport receiving over two inches. No widespread severe weather was reported with the thunderstorms, other than a few scattered reports of high winds on the 21st.

June 22-24: The rain fled once again and the state welcomed another brief glimpse of summer, all courtesy of an upper-level ridge of high pressure over the western U.S. Strong southerly winds of up to 30 mph elevated the temperatures into the upper-90s across the state, with Cherokee reaching 100 degrees on the 23rd. The winds increased to over 40 mph. on the 24th in response to an approaching low pressure system.

June 25-26: An unusually strong cold front entered the state early on the 25th, triggering widespread showers and thunderstorms. Winds swung around to the north at 10-20 mph behind the front in the rain-cooled air. Both days saw generous rainfall amounts, with Perkins, Newkirk, Antlers, Marena, and Durant all totaling over three inches for the period. Lows dropped from the 70s before the frontal passage to the mid-50s afterwards. Highs behind the front were in the 70s and 80s, below normal for this period.

June 27-30: Oklahoma experienced one last day of tranquil weather on the 27th under the influence of a surface high pressure system before northwesterly flow dominated once again. Just as with the month's first week, the northwesterly flow carried thunderstorm complexes from the lee of the central Rockies into the state. Northeast Oklahoma endured more heavy rainfall amounts and rivers overflowing their banks on the 29th and 30th. Once again, no widespread severe weather was reported, although strong to severe winds of over 70 mph developed in Woods and Woodward Counties on the 29th. Not directly attributed to thunderstorms, the winds were associated with a strong mesoscale low pressure system which formed in the wake of a line of storms. The month ended on a peaceful note with a warm, humid day with light southerly winds.

June 2003 Statewide Statistics

Temperature

	Average	Depart.	Rank (1892-2003)
Month (June)	73.4ºF	-3.1ºF	8th Coolest
Year-to-Date (Jan-Jun)	55.2ºF	-0.2ºF	39th Warmest

Precipitation

	Total	Depart.	Rank (1892-2003)
Month (June)	5.27 in.	1.01 in.	25th Wettest
Year-to-Date (Jan-Jun)	14.93 in.	-4.22 in.	29th Driest

Depart. = Departure from 30-year normal

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June 2003 Severe Weather

Significant Tornadoes (F2 or greater)

No significant tornadoes reported in the state

Hail (2 inches in diameter or greater)

Size (inches)	Location	County	Date
2.00	Roosevelt	Kiowa	June 11
2.85	Blair	Jackson	June 11
2.75	10 NE Keyes	Cimarron	June 23

Wind Gusts (70 mph or greater)

Speed (mph)	Location	County	Date
73	4 S Tipton	Tillman	June 1
76	4 SE Frederick	Tillman	June 1
76	4 NW Bessie	Washita	June 1
78	4 WNW Bessie	Washita	June 1
70	Newcastle	McClain	June 1
70	1 E Hucmac	Dewey	June 5
80	Cashion	Kingfisher	June 5
71	Friendship	Jackson	June 11
70	5 E Snyder	Kiowa	June 11
80	Cache	Comanche	June 11
71	Medicine Park	Comanche	June 11
81	3 W Medicine Park	Comanche	June 11
71	2 NNW Ninnekah	Grady	June 11
70	Oklahoma City	Oklahoma	June 11
73	2 S Ada	Pontotoc	June 11
72	4 NNE Sulphur	Murray	June 11
75	Tyrone	Texas	June 28

Flooding

Location	County	Date
Claremore	Rogers	June 2
6 N Bunch	Adair	June 2
1 N Owasso	Tulsa	June 2
Elmore City	Garvin	June 5
5 N Hennepin	Garvin	June 5
S Shidler	Osage	June 5
Moore	Cleveland	June 10
3 SW Moore	Cleveland	June 10
4 SE Cordell	Washita	June 14
Arpelar	Pittsburg	June 14
Catoosa	Rogers	June 29
8 E Tulsa	Tulsa	June 29
Lenapah	Nowata	June 30

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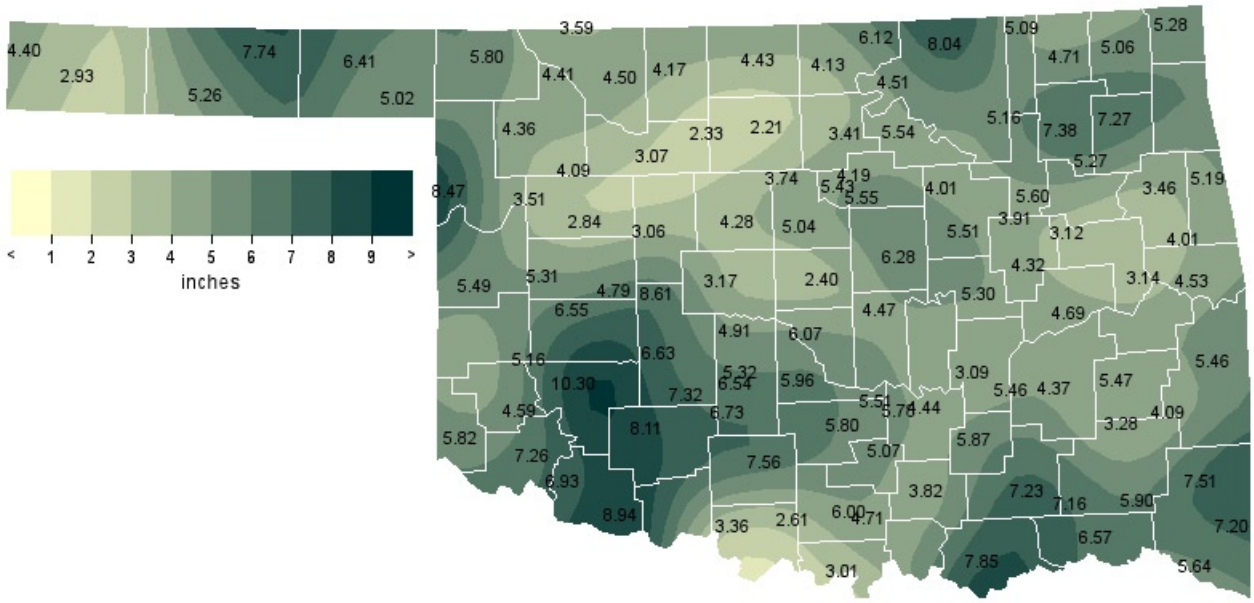
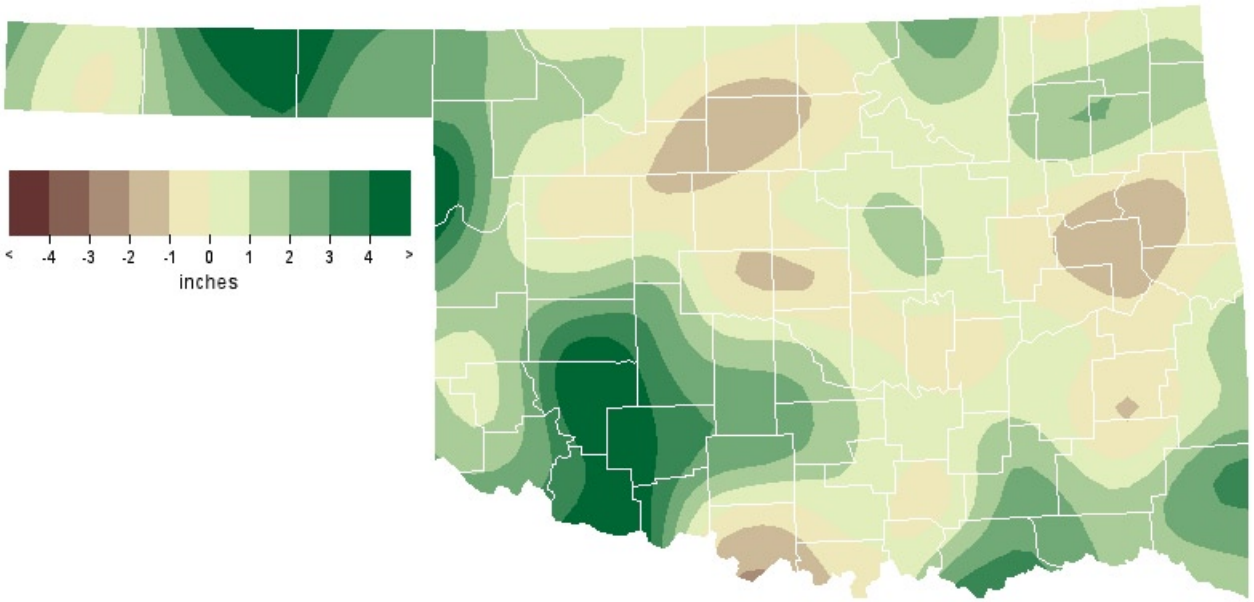
June 2003 Observed Precipitation



June 2003 Departure from Normal Precipitation



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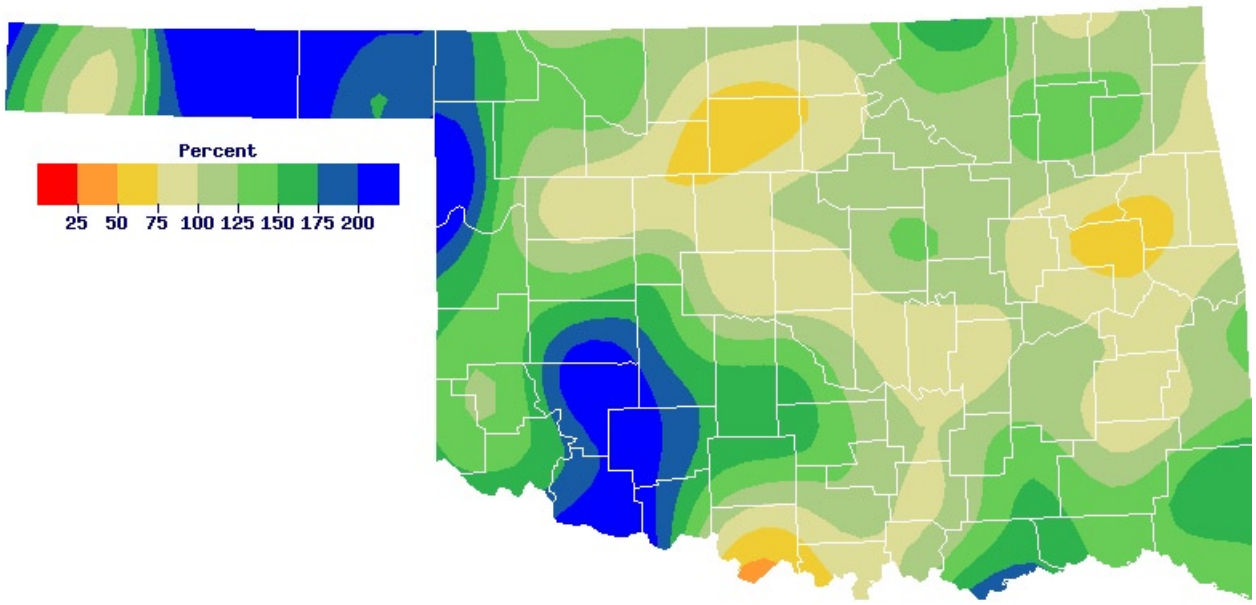
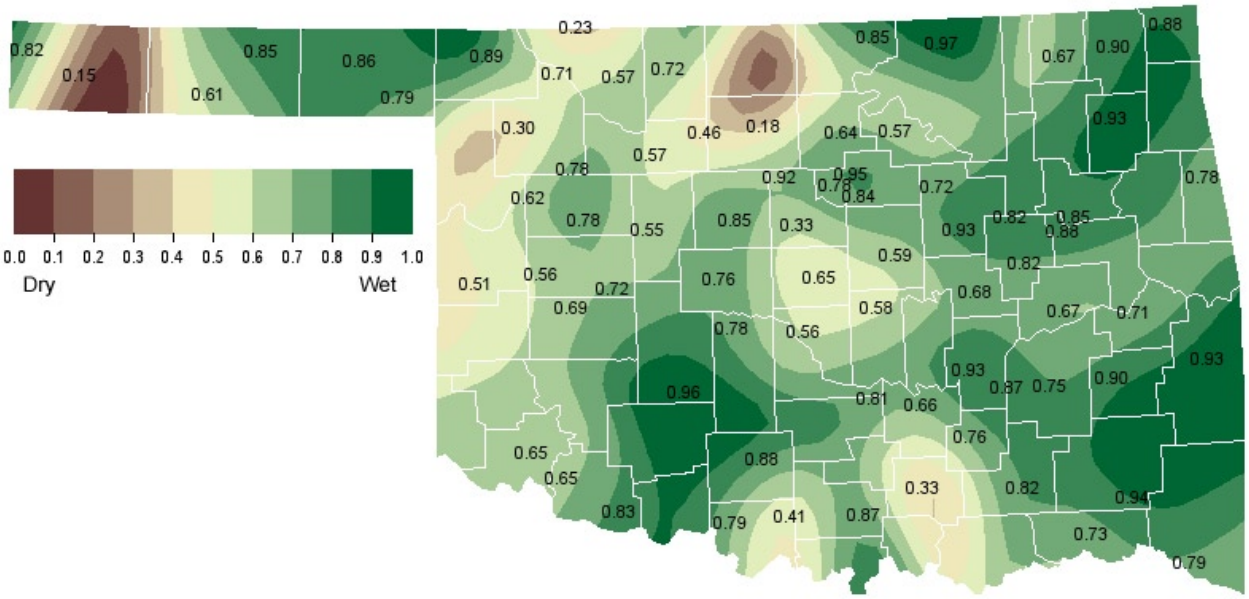
June 2003 Percent of Normal Precipitation



June 2003 Average Soil Moisture at 25cm



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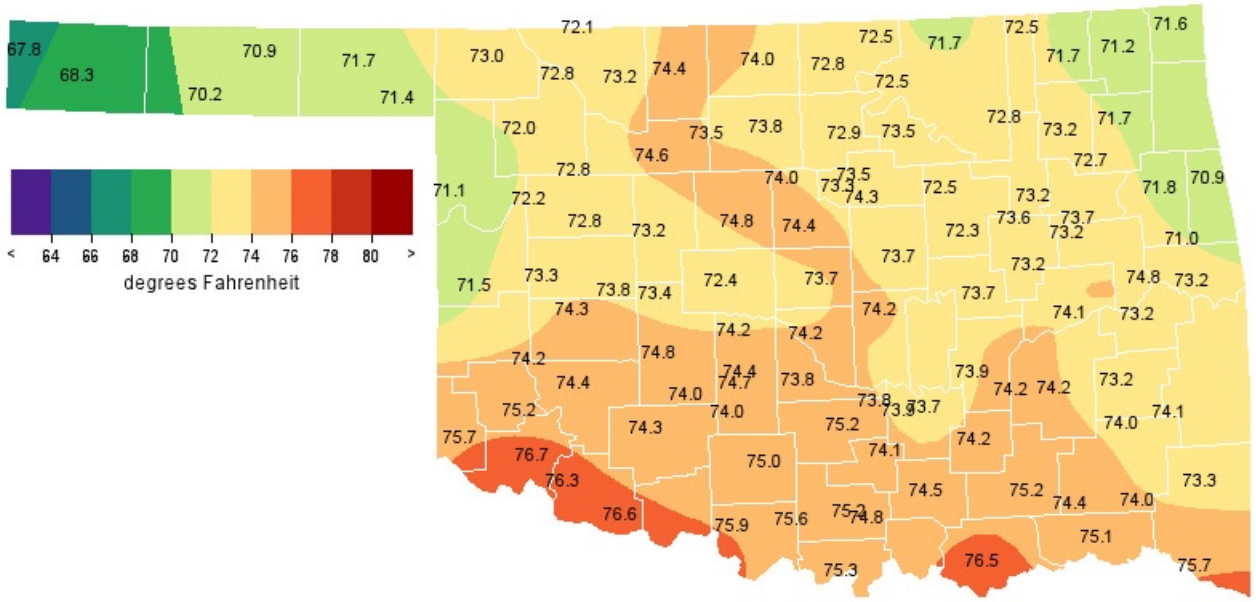
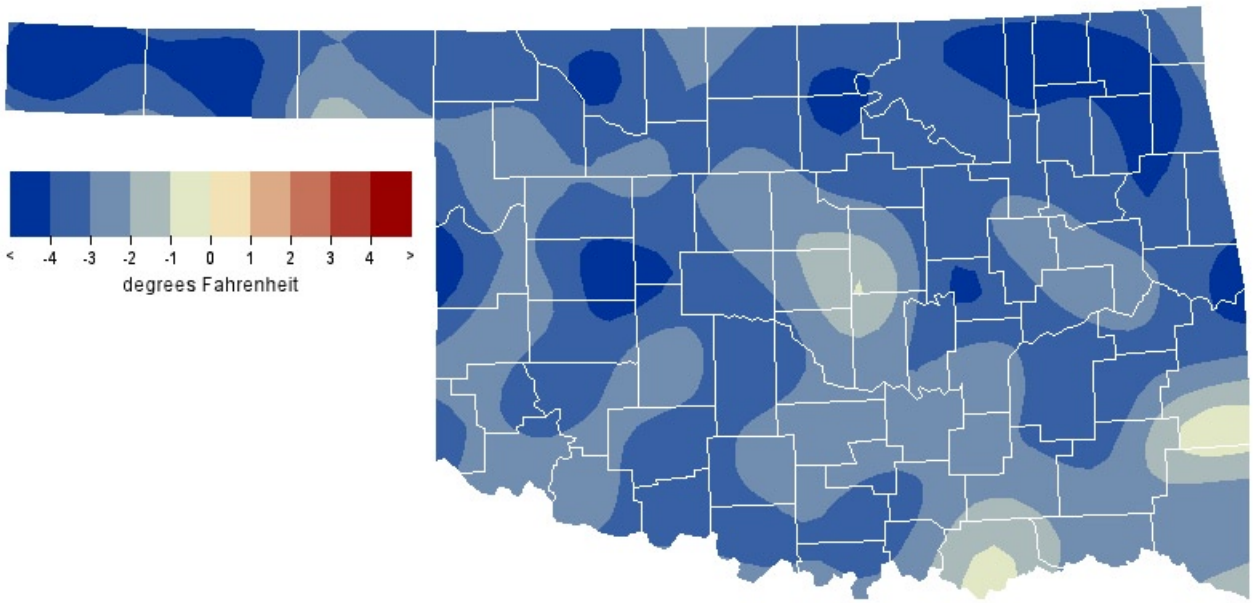
June 2003 Average Temperature



June 2003 Departure from Normal Temperature



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Mesonet Monthly Summary for June 2003

NAME	MEAN TEMP	MAX TEMP	MAX DAY	MIN TEMP	MIN DAY	HDD	CDD	TOT PPT	MAX 24-HR	MAX DAY
PANHANDLE										
Arnett	71.1	91	23	47	8	15	199	8.47	3.17	14
Beaver	71.6	95	22	47	8	16	215	6.41	1.26	5
Boise City	68.3	95	23	44	6	38	138	2.93	.87	5
Buffalo	73.0	97	23	49	8	7	245	5.80	1.31	14
NORTH CENTRAL										
Blackwell	72.8	95	23	49	8	4	239	4.13	1.52	5
Breckenridge	73.9	96	23	50	8	2	268	2.21	.92	5
Cherokee	74.4	100	23	48	8	3	284	4.17	2.36	5
Fairview	74.6	98	23	51	8	5	293	3.07	1.02	5
Freedom	72.8	97	23	47	8	8	241	4.41	1.39	5
Lahoma	73.5	97	23	50	8	4	259	2.33	.59	21
May Ranch	72.1	96	23	47	8	14	226	3.59	1.29	28
NORTHEAST										
Bixby	73.0	92	23	54	7	****	****	5.60	1.63	25
Burbank	72.5	93	23	51	8	6	231	4.51	1.68	25
Copan	72.5	93	23	50	4	7	233	5.09	1.26	30
Foraker	71.6	91	24	52	4	9	207	8.04	2.12	25
Jay	*****	***	***	***	***	****	****	*****	*****	***
Miami	71.5	91	24	49	4	14	209	5.28	1.43	19
Nowata	71.7	93	24	50	8	10	210	4.71	1.44	25
Pawnee	73.4	94	23	52	7	3	256	5.54	1.89	25
WEST CENTRAL										
Bessie	74.3	94	23	53	8	0	278	6.55	1.33	14
Butler	73.3	94	23	50	8	0	249	5.31	.97	4
Camargo	72.2	94	23	47	8	8	224	3.51	.66	4
Cheyenne	71.5	91	23	52	8	8	204	5.49	1.84	13
Erick	*****	***	***	***	***	****	****	*****	*****	***
CENTRAL										
Bowlegs	*****	***	***	***	***	****	****	*****	*****	***
Bristow	72.4	92	24	51	7	2	223	5.51	1.62	25
Chandler	73.6	92	23	53	7	1	259	6.28	2.29	25
Chickasha	74.4	93	23	52	27	0	281	5.32	1.02	5
El Reno	72.4	93	23	48	7	2	225	3.17	1.39	10
Guthrie	74.4	95	23	53	7	0	283	5.04	2.37	25
Kingfisher	74.9	96	23	51	8	****	****	4.28	1.40	5
Marena	73.3	93	23	51	8	2	251	5.43	3.15	25
Marshall	73.9	95	23	49	8	0	268	3.74	1.15	10
Minco	74.2	92	23	54	8	0	277	4.91	1.14	4
EAST CENTRAL										
Calvin	73.9	92	24	54	7	0	267	3.09	.71	14
Cookson	71.0	92	24	50	27	7	187	4.01	1.18	2
Eufaula	74.1	93	24	56	7	0	273	4.69	1.27	25
Haskell	73.2	93	23	54	7	2	248	3.12	1.59	25
McAlester	74.1	93	23	54	7	0	274	4.37	.97	11
Okmulgee	73.2	94	23	52	7	1	246	4.32	1.54	25
Sallisaw	73.2	93	24	55	7	0	247	4.53	.75	2
SOUTHWEST										
Altus	76.6	98	11	57	8	0	349	7.26	1.60	1
Fort Cobb	74.8	94	23	56	8	0	294	6.63	2.15	14
Hinton	73.4	93	23	52	27	****	****	8.61	3.14	14
Hobart	74.3	94	22	55	27	****	****	10.00	2.42	13
Hollis	75.7	101	11	55	7	0	321	5.82	1.18	29
Mangum	75.1	99	23	53	7	0	304	4.59	.99	13
SOUTH CENTRAL										
Ada	73.8	92	23	54	27	0	264	4.44	.73	14
Ardmore	74.9	92	22	55	7	0	297	4.71	1.46	21
Burneyville	75.2	94	24	53	7	0	307	3.01	1.32	12
Byars	73.8	90	23	55	8	1	264	5.51	1.13	12
Centrahoma	74.1	92	23	53	27	0	274	5.87	1.64	26
Durant	*****	***	***	***	***	****	****	*****	*****	***
Ketchum Ranch	75.0	92	23	55	8	0	299	7.56	2.42	5
Lane	75.1	93	23	55	7	0	303	7.23	2.87	26
Madill	75.3	92	22	56	27	****	****	3.31	1.00	26
SOUTHEAST										
Antlers	74.4	95	23	52	7	0	281	7.16	3.26	26
Clayton	74.1	94	23	54	27	0	272	3.28	.93	11
Cloudy	74.0	92	23	55	9	0	270	5.90	1.54	5
Hugo	75.2	93	24	58	7	0	305	6.57	3.11	5
Idabel	75.6	94	23	57	3	****	****	5.64	2.03	26

NAME	MEAN TEMP	MAX TEMP	MAX DAY	MIN TEMP	MIN DAY	HDD	CDD	TOT PPT	MAX 24-HR	MAX DAY
Goodwell	70.2	95	9	47	8	27	184	5.26	1.04	4
Hooker	70.9	96	22	47	8	23	200	7.74	3.06	28
Kenton	67.8	93	9	45	6	35	118	4.40	1.38	4
Slapout	71.4	94	23	49	8	13	205	5.02	.86	11
Medford	74.1	99	23	51	8	3	275	4.43	3.68	5
Newkirk	72.4	92	23	53	8	8	231	6.12	3.29	25
Red Rock	72.9	94	23	50	8	6	242	3.41	2.10	25
Seiling	72.7	95	23	48	8	6	239	4.09	1.74	5
Woodward	72.0	93	23	48	8	12	221	4.36	.94	14
Alva	73.1	98	23	48	8	7	251	4.50	2.08	5
Pryor	71.8	92	24	51	9	8	212	7.27	2.40	2
Skiatook	72.8	92	23	54	8	6	241	5.16	2.42	30
Vinita	71.1	91	24	49	8	15	199	5.06	1.50	25
Wynona	*****	***	***	***	***	****	****	*****	*****	***
Porter	73.7	94	23	55	4	1	264	*****	*****	***
Inola	72.6	92	24	53	7	4	233	5.27	1.31	2
Claremore	73.2	92	23	53	4	4	249	7.38	2.69	2
Putnam	72.8	94	23	48	8	6	239	2.84	.73	1
Retrop	74.2	95	23	55	7	0	276	5.16	.95	11
Watonga	73.2	95	23	51	8	5	250	3.06	1.50	5
Weatherford	73.8	95	23	51	8	0	264	4.79	1.50	4
Oilton	72.5	94	23	50	7	4	228	4.01	1.78	25
Okemah	73.7	94	23	54	7	1	263	5.30	1.77	25
Perkins	74.3	94	24	52	7	1	280	5.55	3.55	25
Shawnee	74.1	92	23	55	7	1	275	4.47	1.30	14
Spencer	73.6	92	23	52	7	2	260	2.40	.88	4
Stillwater	73.5	93	23	50	8	1	258	4.19	2.15	25
Washington	73.8	90	23	54	8	0	263	5.96	.94	4
Ninnekah	74.7	95	23	53	27	0	291	6.54	2.27	5
Acme	74.0	92	22	52	7	0	270	6.73	1.90	5
Norman	74.2	92	23	54	27	0	276	6.07	2.16	10
Stigler	73.3	93	23	55	27	****	****	3.78	1.00	11
Stuart	74.1	92	23	55	27	0	273	5.46	1.10	14
Tahlequah	71.8	92	24	52	9	5	208	3.46	.92	25
Webbers Falls	74.8	97	24	55	7	0	294	3.14	.63	11
Westville	71.0	89	24	51	27	8	187	5.19	2.43	2
Hectorville	73.6	93	23	56	4	2	259	3.91	.95	25
Medicine Park	74.3	91	23	55	7	0	279	8.11	1.46	26
Tipton	76.4	96	11	57	7	0	342	6.93	1.92	29
Walters	*****	***	***	***	***	****	****	*****	*****	***
Apache	74.1	92	22	54	8	0	272	7.32	1.51	11
Grandfield	76.6	96	22	57	8	0	348	8.94	1.97	5
Pauls Valley	75.2	92	23	56	8	0	306	5.80	1.65	5
Ringling	75.6	95	22	57	7	0	319	2.61	.79	26
Sulphur	74.1	91	23	54	7	0	273	5.07	1.26	26
Tishomingo	74.5	92	24	55	7	0	284	3.82	1.31	26
Waurika	75.9	94	23	56	7	0	328	3.36	.72	10
Vanoss	73.9	92	23	53	27	0	267	5.00	1.30	21
Bee	*****	***	***	***	***	****	****	*****	*****	***
Newport	75.3	91	23	57	27	0	308	6.00	2.22	21
Mt Herman	73.4	91	23	55	7	1	253	7.51	1.94	5
Talihina	73.4	93	24	53	9	****	****	4.09	.99	18
Wilburton	73.1	92	24	52	7	0	244	5.47	1.46	11
Wister	*****	***	***	***	***	****	****	5.46	1.08	14
Broken Bow	*****	***	***	***	***	****	****	7.20	1.55	5

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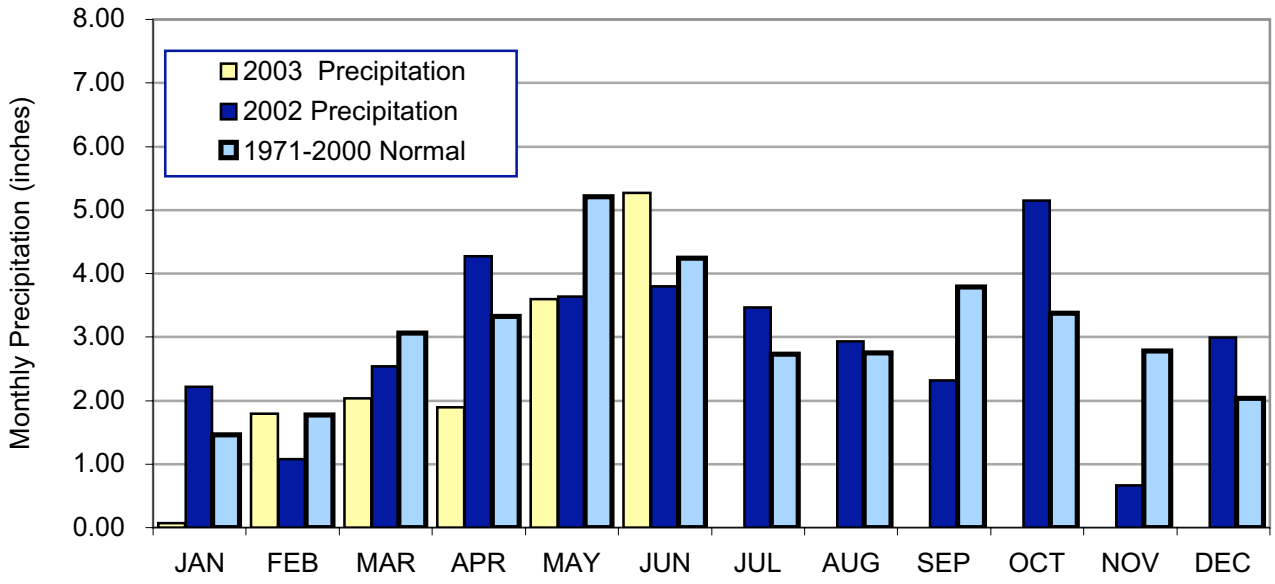
June 2003 Mesonet Precipitation Comparison

Climate Division	Precipitation (inches)	Departure from Normal (inches)	Rank since 1895	Wettest on Record (Year)	Driest on Record (Year)	June 2002 (inches)
Panhandle	5.75	2.82	4th Wettest	7.70 (1962)	0.01 (1924)	2.62
North Central	3.91	-0.03	42nd Wettest	9.91 (1908)	0.43 (1933)	4.84
Northeast	5.74	1.12	31st Wettest	11.34 (1948)	0.08 (1933)	4.14
West Central	4.59	0.73	29th Wettest	9.25 (1989)	0.32 (1910)	3.03
Central	4.99	0.42	32nd Wettest	11.34 (1908)	0.00 (1914)	4.52
East Central	4.11	-0.75	46th Driest	12.69 (1935)	0.00 (1914)	4.18
Southwest	7.45	3.29	5th Wettest	8.79 (1962)	0.56 (1933)	3.12
South Central	5.24	0.60	29th Wettest	9.35 (1945)	0.00 (1914)	3.72
Southeast	5.83	1.13	29th Wettest	11.00 (1945)	0.00 (1914)	4.13
Statewide	5.27	1.01	25th Wettest	8.73 (1908)	0.46 (1933)	3.86

2002 and 2003 Statewide Precipitation Monthly Totals vs. Normal



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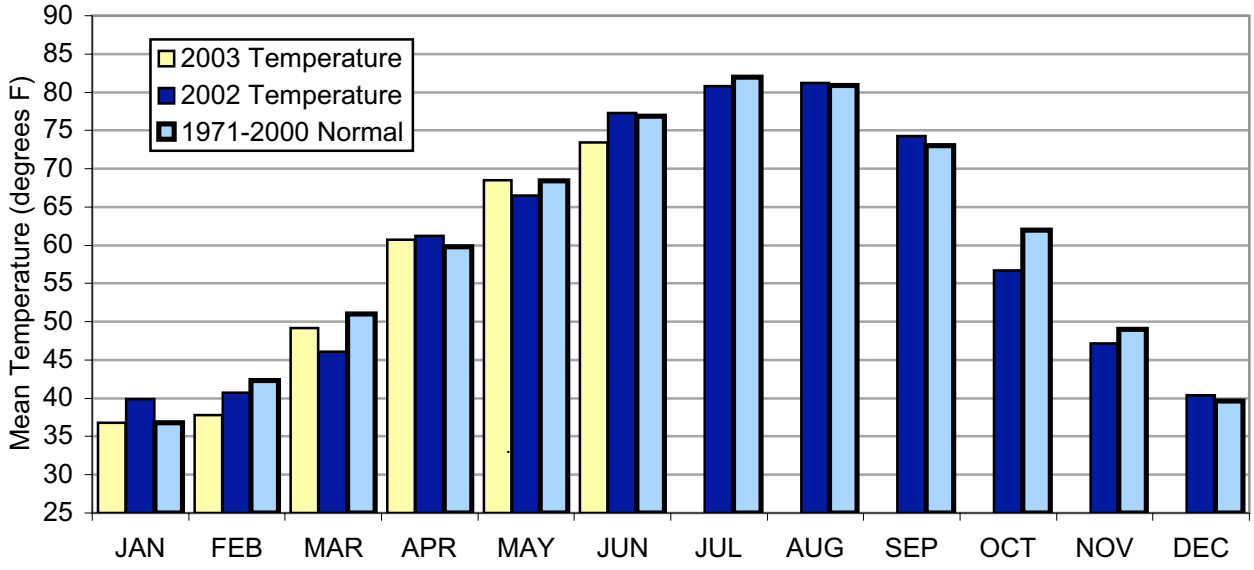
June 2003 Mesonet Temperature Comparison

Climate Division	Average Temp (ºF)	Departure from Normal (ºF)	Rank since 1895	Hottest on Record (Year)	Coldest on Record (Year)	June 2002 (ºF)
Panhandle	70.5	-3.9	14th Coolest	82.0 (1953)	67.7 (1903)	78.0
North Central	73.2	-3.6	9th Coolest	85.7 (1953)	69.7 (1903)	77.9
Northeast	72.5	-3.2	7th Coolest	83.7 (1953)	68.9 (1903)	76.1
West Central	73.2	-3.2	11th Coolest	85.6 (1953)	69.1 (1903)	77.2
Central	73.8	-3.0	9th Coolest	84.4 (1953)	69.9 (1903)	76.6
East Central	73.2	-3.0	5th Coolest	84.4 (1953)	69.8 (1903)	76.7
Southwest	75.1	-3.3	10th Coolest	86.7 (1953)	71.5 (1903)	78.4
South Central	74.9	-2.8	10th Coolest	85.2 (1953)	71.1 (1903)	77.2
Southeast	74.2	-2.2	11th Coolest	83.9 (1953)	70.3 (1903)	76.3
Statewide	73.4	-3.1	8th Coolest	84.6 (1953)	69.8 (1903)	77.1

2002 and 2003 Statewide Temperature Monthly Averages vs. Normal



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Mesonet Extremes for June 2003

Climate Division	High Temp (°F)	Day	Station	Low Temp (°F)	Day	Station	High Monthly Rainfall (in.)	Station	High Daily Rainfall (in.)	Day	Station
Panhandle	97	23rd	Buffalo	44	6th	Boise City	8.47	Arnett	3.17	14th	Arnett
North Central	100	23rd	Cherokee	47	8th	May Ranch	6.12	Newkirk	3.68	5th	Medford
Northeast	94	23rd	Pawnee	49	8th	Vinita	8.04	Foraker	2.69	2nd	Claremore
West Central	95	23rd	Watonga	47	8th	Camargo	6.55	Bessie	1.84	13th	Cheyenne
Central	96	23rd	Kingfisher	48	7th	El Reno	6.73	Acme	3.55	25th	Perkins
East Central	97	24th	Webbers Falls	50	27th	Cookson	5.46	Stuart	2.43	2nd	Westville
Southwest	101	11th	Hollis	52	27th	Hinton	10.3	Hobart	3.14	14th	Hinton
South Central	95	22nd	Ringling	53	7th	Burneyville	7.85	Durant	3.09	26th	Durant
Southeast	95	23rd	Antlers	52	7th	Antlers	7.51	Mt Herman	3.26	26th	Antlers
Statewide	101	11th	Hollis	44	6th	Boise City	10.3	Hobart	3.68	5th	Medford

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July Climatological Outlook

July in Oklahoma means summer. By the beginning of the month, the jet stream and its accompanying weather systems have retreated to the U.S.-Canadian border. The western arm of a broad area of high pressure at the earth's surface, centered in the central Atlantic Ocean, has migrated northward and spreads across the state. Winds are persistently from the south, but not as strong as during preceding months. As a result, the seventh month of the year is the Oklahoma's warmest with an average temperature of 82 degrees and is the 4th driest month with a statewide-averaged precipitation of 2.73 inches.

Temperature
Mean: 82.0 degrees
Hottest June: 1954, 88.6 degrees
Coolest June: 1906, 76.4 degrees
Hottest location: Waurika, 85.1 degrees
Coolest location: Boise City, 77.2 degrees
Hottest recorded: 120 degrees, Alva, July 18, 1936
Altus, July 19, 1936
Tishomingo, July 26, 1943
Coldest recorded: 41 degrees, Goodwell, July 15, 1915

Oklahoma's hottest July, at least since record keeping began in 1892, occurred in 1954. That month produced the highest statewide-averaged temperature (88.6 degrees) of any month during the 110-year period of record. The thermometer indicated 120 degrees at Alva July 18, 1936, at Altus July 19, 1936, and at Tishomingo July 26, 1943. The lowest July statewide-averaged monthly temperature on record was 76.4 degrees in 1906. The lowest temperature ever reported in Oklahoma during July is 41 degrees at Goodwell, July 15, 1915. Humidity, vegetation, and elevation contribute to the variations in temperature across the state. The higher elevation and somewhat drier air in the panhandle lead to cooler nights and a greater range in daily temperatures than in other parts of the state. The more humid air in the southeast typically warms less in the daytime, but also retains more heat through the night. Southwestern Oklahoma suffers the most from the heat.

Precipitation
Mean: 2.73 inches
Wettest year: 1950, 9.26 inches
Driest year: 1980, 0.41 inches
Wettest location: Carnasaw Fire Tower (McCurtain County), 4.50 inches
Driest location: Altus and Reydon, 1.77 inches
Most recorded: 18.83 inches, Wewoka, 1950

July precipitation, all rainfall unless you count an occasional hailstorm, is primarily a result of localized events. While the panhandle enjoys its summer rainy season and rain certainly doesn't disappear from north central Oklahoma, the forested southeast, though drier than it is in other months, still receives more precipitation than other parts of the state. The wettest July, based on a statewide average of rainfall, was 1950 (9.26 inches). The driest July occurred in 1980 (0.41 inches).

Oklahoma averages only 2.1 tornadoes in July each year. Since 1950, the July record for tornadoes is seven in 1956. Fifteen of those 52 months have been free of confirmed tornadoes. In the absence of well-organized systems, the vast majority of recorded July tornadoes have been of the weaker variety, and multiple occurrences on the same day are extremely rare. Only one fatality has been attributable to a tornado since 1950, that occurring in Murray County in 1955. Lightning, thunderstorm-induced winds, locally heavy rain, and, of course, heat are more likely to provide Oklahoma with its "weather misery" during the month.

Tornadoes
Average July Tornadoes: 2
Most: 7 (1956)

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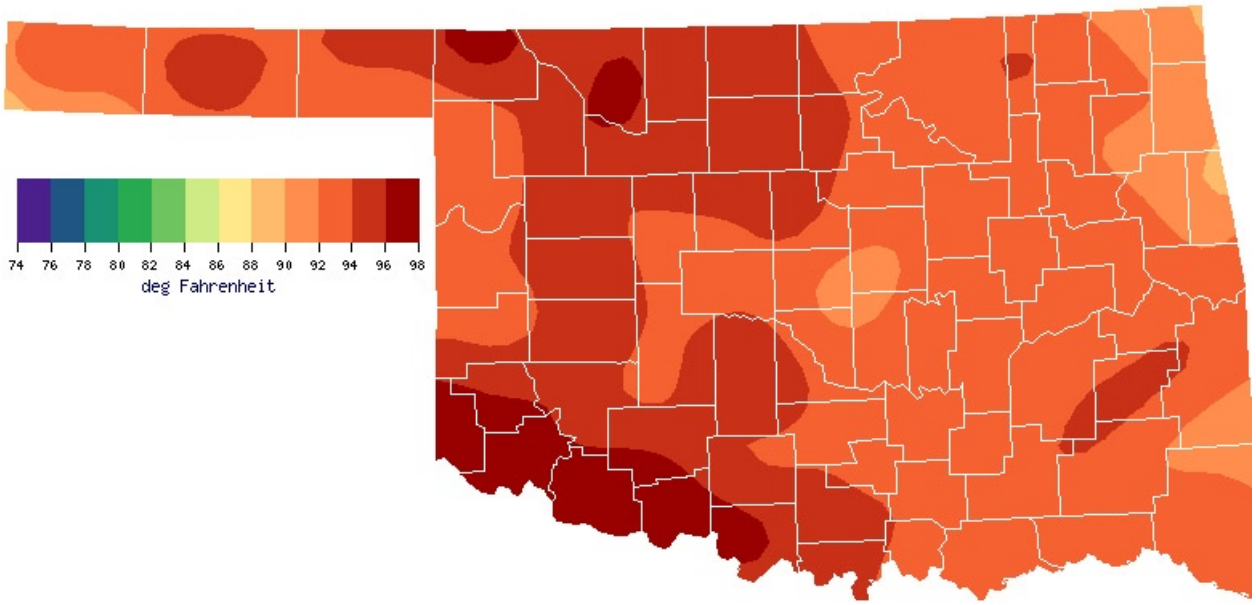
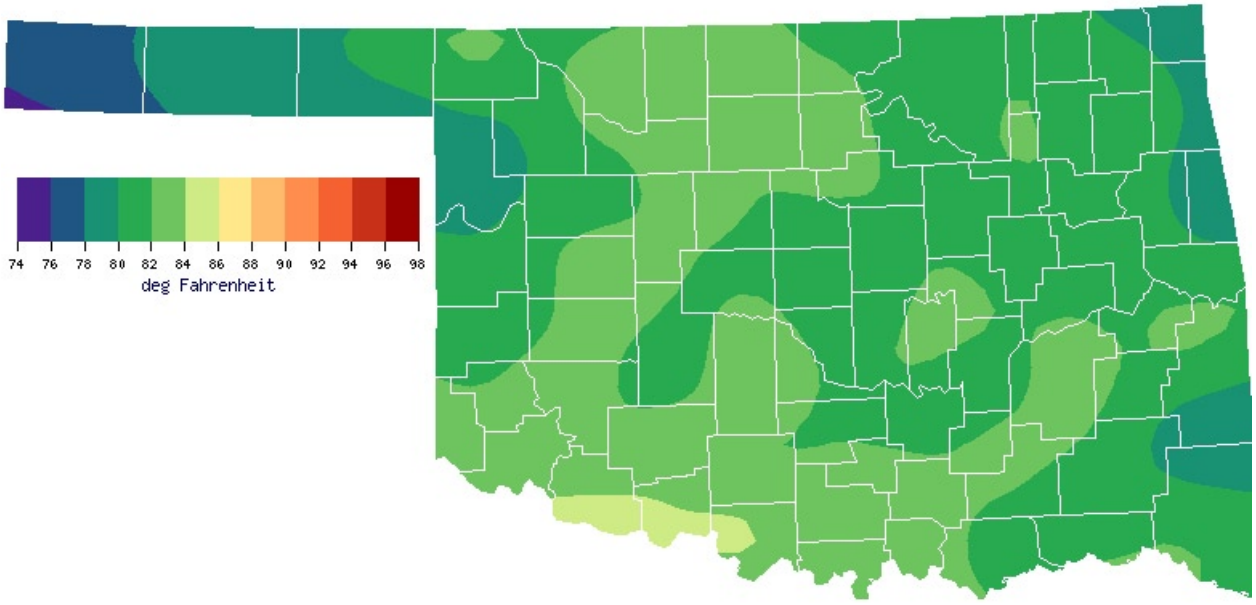
July Normal Monthly Maximum Temperature (1971-2000)



July Normal Monthly Minimum Temperature (1971-2000)



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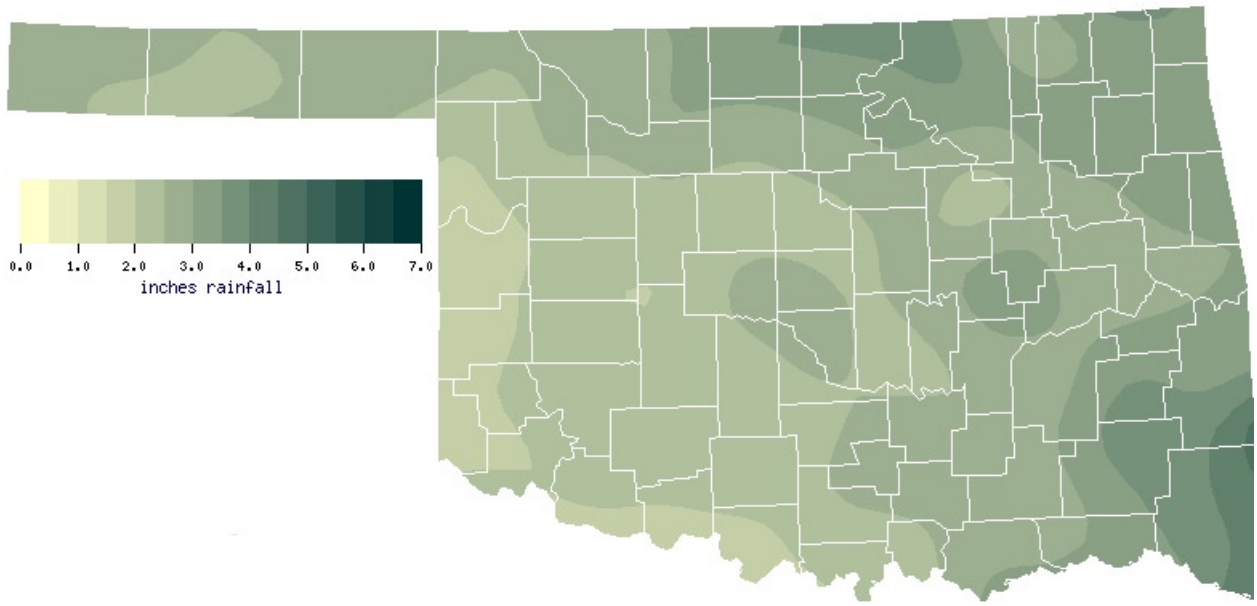
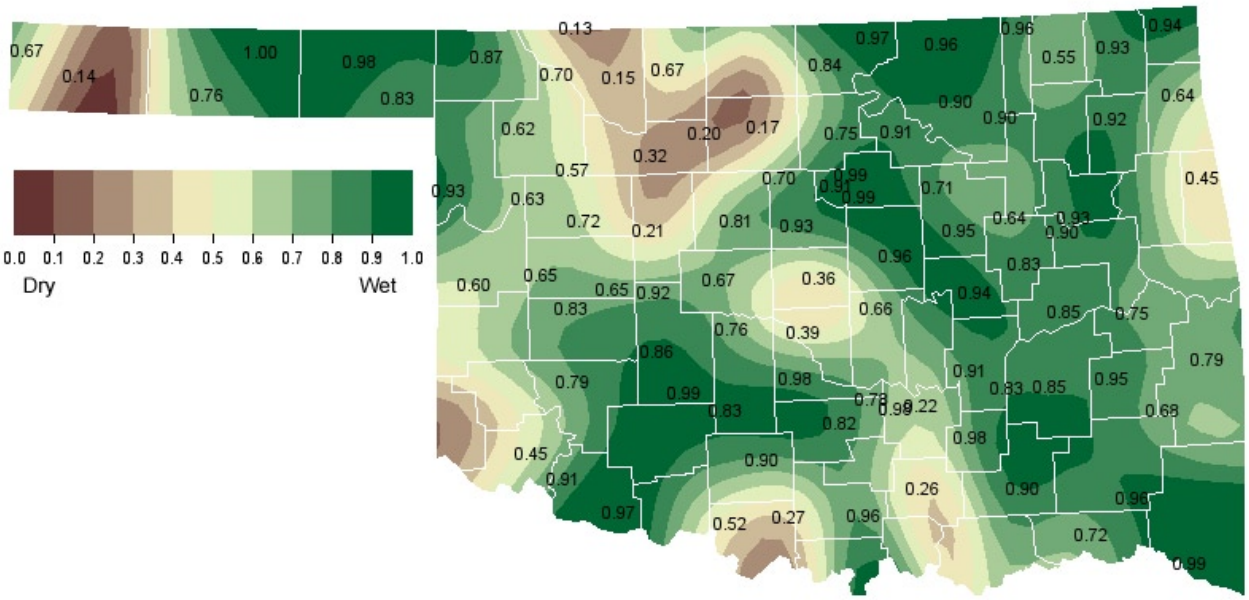
July Normal Precipitation (1971-2000)



July 1, 2003 Soil Moisture Conditions at 25cm



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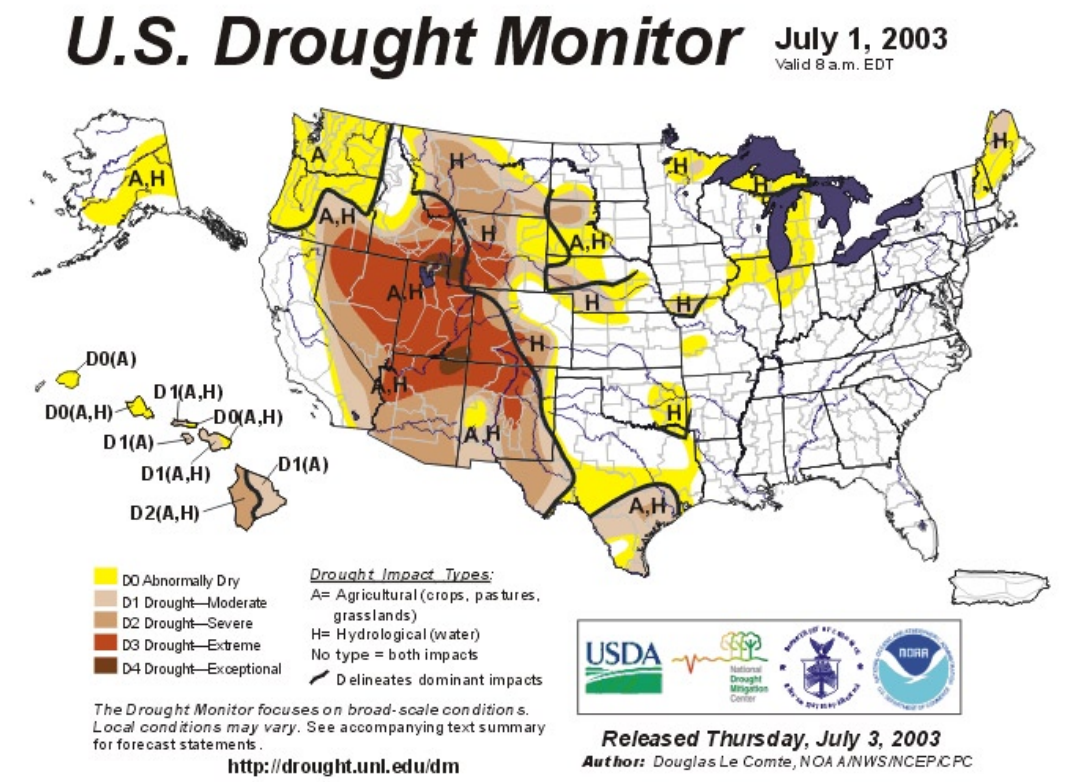
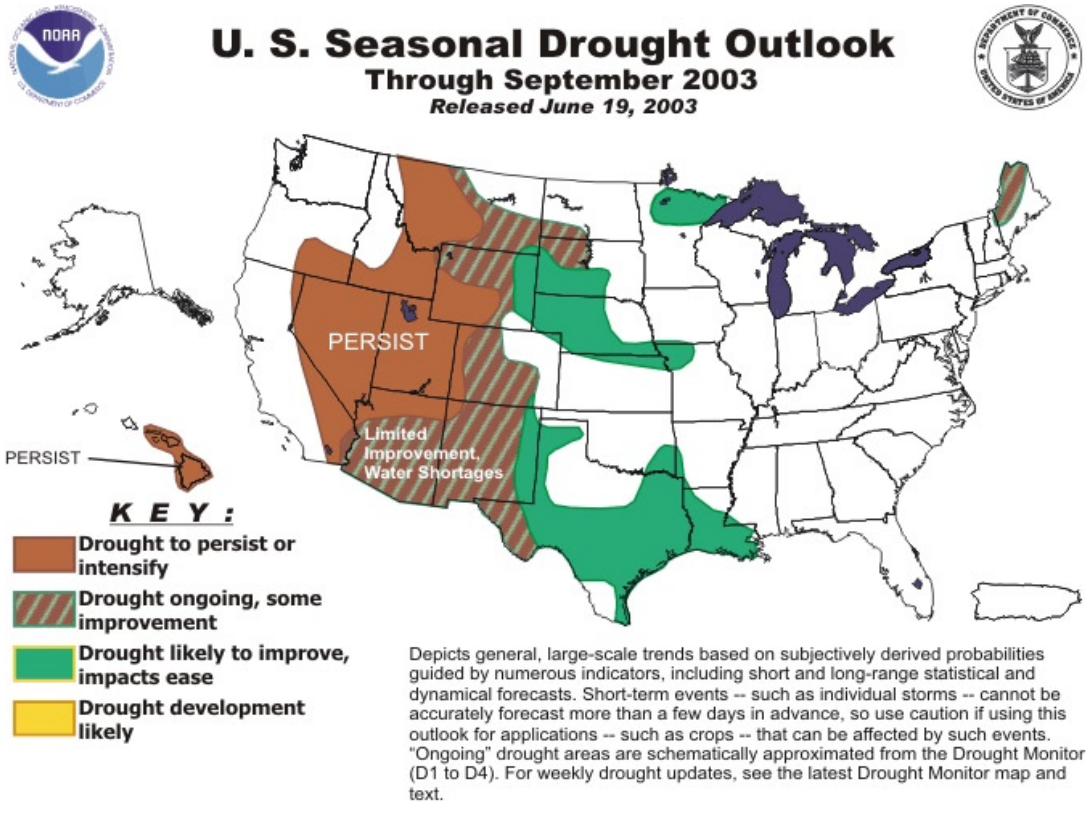
July 2003 Drought Indices





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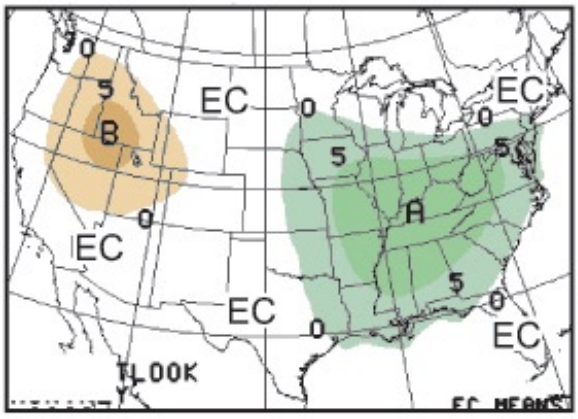
July 2003 U.S. Precipitation Forecast



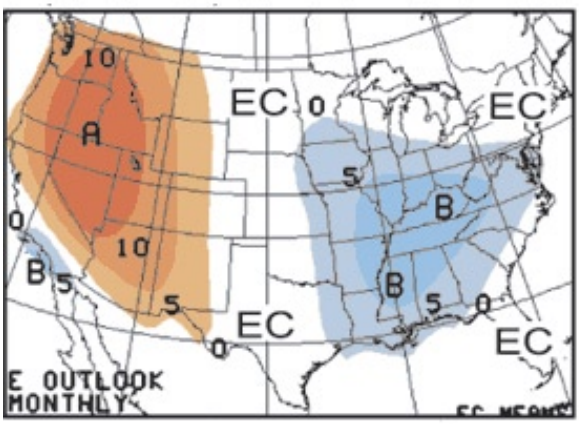
Percent Likelihood
of Above or Below
Average Precipitation*

5% - 10%
0% - 5%
A = Above

0% - 5%
5% - 10%
B = Below

*EC indicates no forecasted anomalies due to lack of model skill.

July 2003 U.S. Temperature Forecast



Percent Likelihood
of Above and Below
Average Temperatures*

10% - 20%
5% - 10%
0% - 5%
A = Above

0% - 5%
5% - 10%
B = Below

*EC indicates no forecasted anomalies due to lack of model skill.

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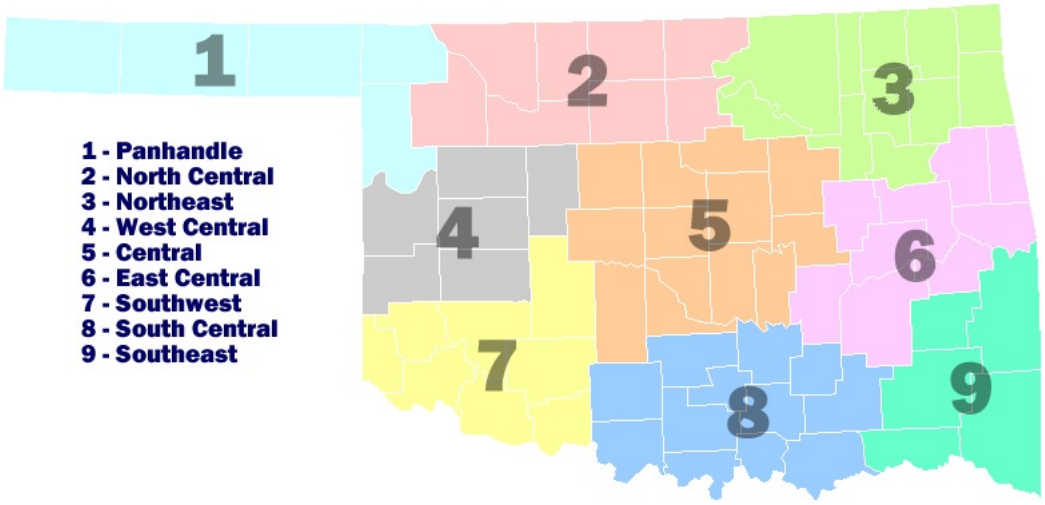
July Climate Normals

Climate Division	Max. Temperature (°F)	Min. Temperature (°F)	Avg. Temperature (°F)	Precipitation (inches)
1	94.2	65.6	79.9	2.5
2	94.9	69.4	82.2	2.98
3	92.8	69.9	81.4	3.14
4	94.4	69.2	81.8	2.1
5	93.7	70.5	82.1	2.53
6	92.7	70.1	81.5	2.97
7	96	70.1	83.1	2.12
8	94.3	71.1	82.7	2.53
9	93.4	69	81.2	3.59
Statewide	94	69.6	81.8	2.73

Oklahoma Climate Divisions



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Interpretation Information

Mean Daily Temperature: Calculated from an average of the daily maximum and minimum temperatures. Daily averages are summed for each day, and then divided by the number of valid data points – typically the number of days in the month. Although this may differ from the "true" daily average, it is consistent with historical methods of observation and comparable to the normals and extremes for stations and regions of the state.

Degree Days: Degree Days are calculated each day of the month for which there is a temperature report and the mean temperature for the day is less than (Heating Degree Days) or greater than (Cooling Degree Days) 65 degrees. Daily values are summed to arrive at a monthly total. HDD/CDD are qualitative measures of how much heating/cooling was required to maintain a comfortable indoor temperature. Missing observations may result in an artificially high or low value.

Severe Weather Reports: Only the most significant events are listed. Tornadoes of F2 or greater strength (on the 0-5 Fujita scale), hail of two inches diameter or greater, and wind speeds of 70 miles per hour or above are listed. National Weather Service defines storms as severe when they produce a tornado, hail of three-quarters inch or greater, or wind speeds above 57 miles per hour (50 knots). For additional reports, contact the Oklahoma Climatological Survey, Storm Prediction Center, or your local National Weather Service forecast office.

Soil Moisture: The soil moisture variable displayed is the Fractional Water Index (FWI), measured at a depth of 25 cm. This unitless value ranges from very dry soil having a value of 0, to saturated soils having a value of 1.

Additional Resources

Sunrise / Sunset tables
U.S. Naval Observatory**:** http://aa.usno.navy.mil/data

Severe Storm Reports
Storm Prediction Center: http://spc.noaa.gov/climo/

National Climatic Data Center (more than about 4-5 months old):
http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms

Seasonal Outlooks
Climate Prediction Center:
http://www.cpc.ncep.noaa.gov/products/OUTLOOKS_index.html

Climate Calendars and other local weather and climate information
Oklahoma Climatological Survey: http://climate.ocs.ou.edu or
http://www.ocs.ou.edu/
E-mail (ocs@ou.edu) or telephone (405/325-2541)

Oklahoma Climatological Survey

Oklahoma Climatological Survey is the State Climate Office for Oklahoma

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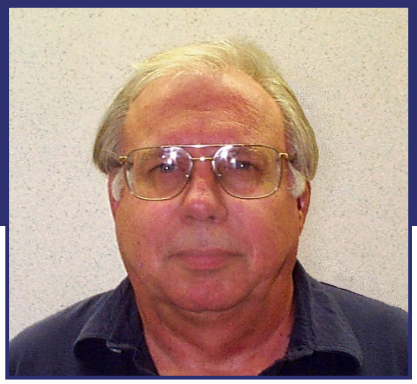
Howard Johnson Retires



Howard Johnson is looking forward to his "extended vacation." After twenty-one years with the Oklahoma Climatological Survey (OCS), Associate State Climatologist Howard Johnson has retired. To many, "Howy" is the voice they spoke to on the phone when they had a question about Oklahoma's weather or climate. He answered questions ranging from "How many cloud droplets can fit in a teaspoon?" to "How severe is the drought?" In fact, during the 1995-96 drought, Johnson appeared on *NBC's Today Show* standing up to his ankles in a muddy field, talking about how dry it was in Oklahoma.

Johnson was born in January 1941 in Duncan, Oklahoma as the second of three boys. During the summer of 1944, his father, who was a high school principal, moved the family to Kingfisher, where Howard graduated high school in 1959.

After a short stint at Northern Oklahoma Junior College in Tonkawa, Johnson graduated in 1964 with a Bachelor's degree in mathematics from Oklahoma State University in Stillwater. He was commissioned as an Air Force Lieutenant that summer, then spent a year at the University of Oklahoma in the USAF basic weather program. Thereafter, he was stationed at Eglin AFB before being reassigned to a one-year tour with the 1st Weather Group in Saigon, Vietnam. In Vietnam, he provided climate input to intelligence summaries. Upon his return home, Johnson spent his remaining years in the Air Force as a Minuteman missile launch officer stationed at Whiteman AFB, Missouri.

After Captain Johnson's separation from the Air Force in December 1970, he returned to the University of Oklahoma and graduated in 1974 with a Master's degree in meteorology. His graduate advisor was Eugene Wilkens.

Johnson's aviation forecasting experience landed him a job with a state-operated weather modification project in North Dakota. After a few Dakota winters, Johnson decided it was time to return home. In May 1982, Johnson started as a research associate at OCS, where he would spend the remainder of his career. Johnson took charge of the OCS's climate services group in the late 1980s, and helped it become one of the top climate services programs in the nation.

As one of six founding members of the Oklahoma Mesonet's Steering Committee, Johnson brought his service expertise to the world's first permanent statewide mesoscale network of automated weather stations. Johnson helped shape products that allow decision-makers to monitor weather conditions on a real-time basis. One of his most notable accomplishments was the development of ways to provide daily assessments of precipitation deficits during the 1995-1996 drought. The product has since become a nationally recognized tool for drought monitoring and is a vital component of the state's drought plan, which Johnson helped re-shape in the mid 1990s.

Even more than watching weather, Johnson loves talking about climate. He blends Oklahoma's history seamlessly with its climate, demonstrating the impacts of major climate features, including the Dust Bowl years, the heat and drought of the 1950s (including the July 1954 week he spent at Boy Scout camp near Helena, OK – the hottest week in Oklahoma history), and how irrigation changed the face of Oklahoma's landscape. Johnson also loves probing deeper into history, studying the pre-statehood days of Oklahoma. His ability to recall details of Oklahoma's climate from memory is unmatched. He did distill some of his memory in his book, *The Atlas of Oklahoma Climate,* and a monthly series of articles that highlight significant weather and climate events.

Now that Johnson has retired, he plans to spend some time traveling and listening to his extensive collection of jazz records. An avid baseball fan, Johnson will re-visit some of his original work on statistically faithful recreations of baseball's first century. This summer, he plans to spend time with his son Kevin, who lives in Duncan, British Columbia. He also looks forward to spending more time at his true alma mater – Oklahoma State University in Stillwater.

The people at OCS wish Howy the very best in his retirement.

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