

# **OKLAHOMA ANNUAL SUMMARY 1990**

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## 1990 IN REVIEW

An active spring storm season, flooding in southern Oklahoma, dry conditions in the north, summer heat waves, and a December cold snap were all prominent features of 1990. Heavy precipitation during the first five months of 1990, pushed the statewide annual average to 43.52 inches. The total was 11.06 inches above the 30-year mean, and the 7th wettest since records began in 1892. The average annual temperature of 61.5 degrees came in tied for the 19th warmest on record, 0.9 degree above normal.

Precipitation during 1990 was anything but uniform. All regions of the state except the Panhandle recorded above-normal precipitation, but the greatest departures from normal were recorded in the south and east. Overall, most of the precipitation fell from mid-January to mid-May. January through April all ranked among the top five monthly precipitation totals on record statewide, and the period January through April was the wettest on record. It took quite some time for waters to move downstream, as flooding persisted into late May after the rains had ceased.

The year began with the fifth warmest January on record, and above-normal temperatures persisted through mid-March. The warmth of January also helped to dry grasslands, resulting in numerous grass fires in eastern and central Oklahoma. Despite some heavy precipitation in mid-January, the threat of grass fires did not end until precipitation became more frequent and widespread in February. The warm, wet conditions during the first three months created abundant soil moisture, which helped to increase wheat yields statewide.

A ready access to moisture from the Gulf of Mexico not only contributed to heavy rains, but also added to an active spring storm season. The 30 tornadoes recorded during 1990 were the most since 1986. An outbreak of ten tornadoes ripped across central Oklahoma on March 13 in advance of an approaching cold front. Among the more damaging tornadoes was one which hit downtown Shattuck on April 25, injuring four people and causing \$2 million in damages. The only tornado fatality of the year occurred on May 15, when a tornado hit Stillwater. The storm also left 11 injured and caused nearly \$5 million in damages.

Continued heavy rains throughout the spring caused millions of dollars in damages through floods. South central and southeast Oklahoma were especially hard-hit, as heavy rains filled creeks and rivers across central, southern and eastern Oklahoma. As the water moved downstream, widespread flooding occurred along many rivers, and reservoirs were pushed beyond capacity. Record lake levels were recorded at Lakes Eufaula, Texoma, Sardis, Wister, McGee, Hugo and Arbuckle, according to the United States Geological Survey (USGS). Waters in Lake Texoma topped the spillway for the first time since 1957. The heavy rains also kept farmers out of the field for much of the spring, hampering harvesting of winter wheat, planting of spring crops, and application of fertilizer and pesticides to crops. A lack of sunshine also made conditions favorable for the spread of plant diseases, which caused damage to much of the wheat crop before it could be harvested.

A ridge of high pressure began building over the western United States at the end of May. By the middle of June, the ridge was firmly in place, diverting rains away from Oklahoma, and making June 1990 the tenth driest on record. This was good news to residents of southeast Oklahoma, who found cleaning up from the spring floods a difficult enough task without added rain. The dry conditions were not as good news to residents of north central Oklahoma however, where precipitation had been below normal since March. The prolonged dry spell across northern and western Oklahoma remained unbroken until mid-September.

Along with the drier conditions of June came the summer's first heat wave. 25 days with temperatures above the century mark during June made the month the sixth warmest on record. The heat wave lasted into early July when a shift in the upper-air patterns brought a welcome change in the weather. Maximum temperatures were held to the 80's or low 90's for much of the time from mid-July to mid-August. The heat returned in the latter half of August and continued into early September, forcing cancellation or rescheduling of classes at many schools during early September. The highest temperature of the year, 110 degrees, was observed at Buffalo on August 25. Temperatures remained over 100 degrees through the first ten days of September.

A series of cold fronts in mid-September brought much needed rain to northern Oklahoma, and also brought relief from the heat. Cool, dry air, which persisted through early November, brought the first freeze to many parts of the state on October 10. The dry air warmed quickly with the afternoon sun, as maximum temperatures frequently climbed to the 70's and 80's during much of the

period. Record heat near Thanksgiving pushed November to the fifth warmest on record. The warm weather through much of the fall contributed to a record cotton harvest.

Warm temperatures continued into the first few weeks of December, until a cold arctic air mass heralded the beginning of winter on the 20th. Sub-zero temperatures were recorded in many locations from December 21-24, including -8 degrees at Goodwell on the 22nd and Waynoka on the 24th. Another arctic front at the end of the month brought ice storms to large sections of Oklahoma, as winter once again tightened its grip on the state.

### 1990 STATE SUMMARY BY CLIMATE DIVISION

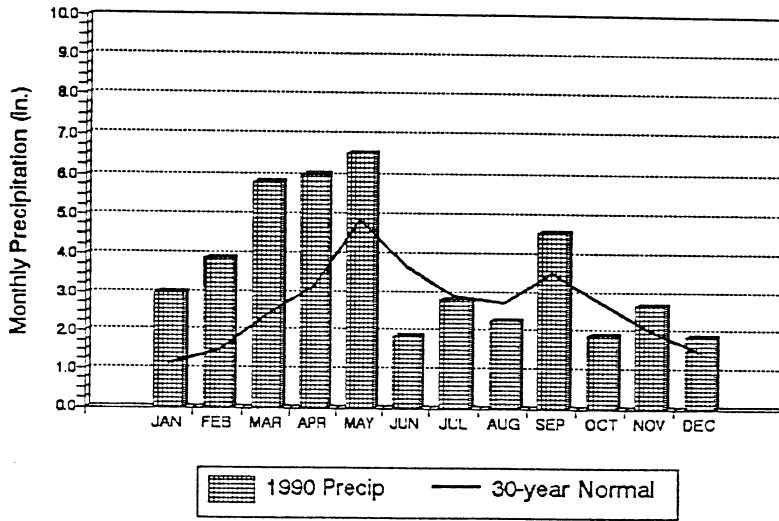
CD	TEMPERATURE	PRECIPITATION	CDD	HDD
1	57.5	18.1	1651.7	4379.6
2	60.4	25.6	2103.1	3738.4
3	61.7	43.2	2079.0	3269.4
4	60.7	29.1	2050.4	3604.2
5	62.3	44.2	2170.1	3120.5
6	62.5	66.4	2031.6	2928.5
7	62.1	35.1	2161.2	3184.4
8	63.3	56.8	2210.0	2819.0
9	63.8	73.4	2151.0	2561.6

#### WARMEST AND COOLEST OBSERVED TEMPERATURE FOR EACH CLIMATE DIVISION

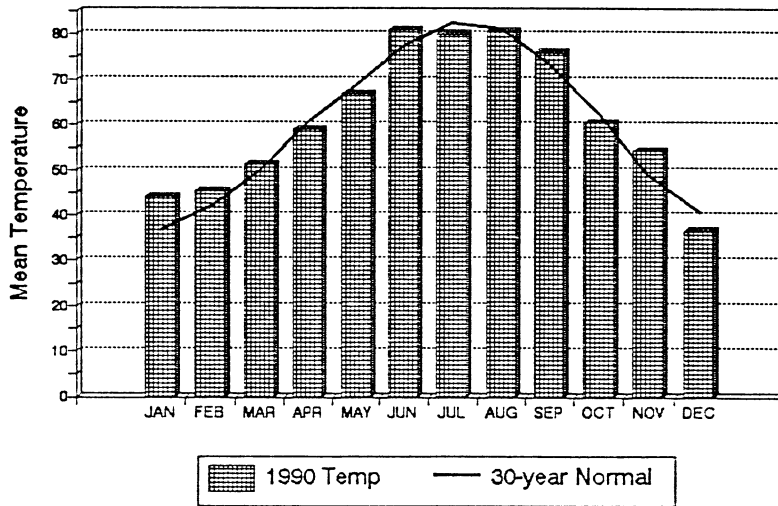
#### GREATEST MONTHLY AND 24-HOUR PRECIPITATION TOTAL FOR EACH CLIMATE DIVISION

CD	MAX			MIN			MONTHLY			24-HOUR		
	TEMP	DATE	LOCATION	TEMP	DATE	LOCATION	PRECIP	MONTH	LOCATION	PRECIP	DATE	LOCATION
1	110	0825	BUFFALO	-16	1223	KENTON	6.29	JUL	BOISE CITY	3.65	0425	OPTIMA LAKE
2	109	0902	GREAT SALT PLNS	-8	1230	ENID	7.37	SEP	NEWKIRK	4.08	0311	MORRISON
	*	*	*	-8	1224	WAYNOKA	*	*	*	*	*	*
3	108	0831	RALSTON	-2	1231	PAWUSKA	9.78	MAR	ONETA	5.61	0921	WAGONER
4	109	0902	WEATHERFORD	-4	1222	CLINTON	10.83	APR	CHEYENNE	8.68	0423	CHEYENNE
5	107	0831	GUTHRIE	-3	1223	STILLWATER	12.48	MAR	GUTHRIE	6.04	0921	PRAGUE
	107	0901	GUTHRIE	*	*	*	*	*	*	*	*	*
6	105	0703	MCCURTAIN	2	1231	TAHLEQUAH	16.17	MAY	HANNA	8.04	0503	HANNA
7	108	0627	CHATTANOOGA	0	1231	ANADARKO	10.60	APR	RANDLETT	4.85	0819	ALTUS AFB
8	108	0908	MCGEE CREEK DAM	3	1231	MARLOW	16.28	MAY	DAISY	7.30	0503	ALLEN
9	106	0830	ANTLERS	4	1223	BATTIEST	22.00	MAY	SMITHVILLE	7.38	0503	BENGAL
	106	0829	BOSWELL	4	1224	SMITHVILLE	*	*	*	*	*	*
	*	*	*	4	1224	TUSKAHOMA	*	*	*	*	*	*

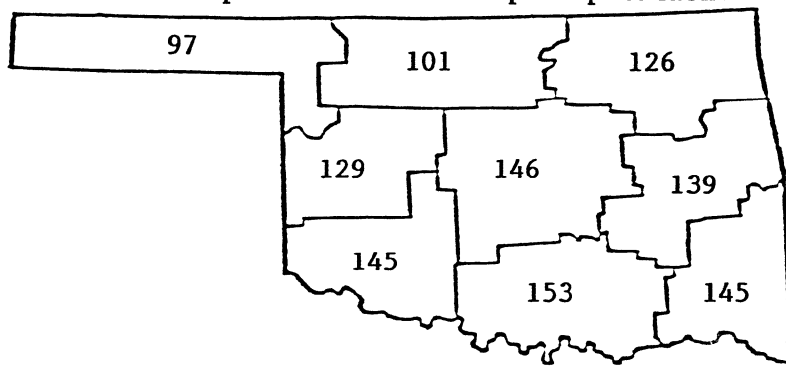
### 1990 Monthly Precipitation Statewide Average for Oklahoma



### 1990 Monthly Temperatures Statewide Average for Oklahoma



### 1990 annual percent of normal precipitation.



### THE FLOODS OF 1990

Heavy rains during the first four months of 1990 pushed rivers and lakes beyond capacity, resulting in heavy flooding across central, southern and eastern regions of Oklahoma. A series of slow-moving low pressure systems passed over Oklahoma throughout February and early March, saturating many portions of the state. With rivers still catching up to the heavy runoff from the early spring storms, two heavy rainfall events hit the state in April and early May.

During the third week of April, a very strong low pressure system entrenched itself over the Western United States. For several days, upper level disturbances along and ahead of the low center spawned thunderstorms in the state. On April 18 and 19 storms delivered 2-4 inches of rain to much of the southern one-half of the state. Additional rain followed over the next several days. As the system finally moved through the state on April 25 and 26, southeastern Oklahoma received another 3 to 3.5 inches of rain. During the period April 16-26, the reporting stations of Climate Division 8 (comprising most of south central Oklahoma) received an average of 8.63 inches of precipitation. This represented over twice the normal divisional average for the entire month.

The second major storm system moved slowly through the state during the period of May 1 through 3, producing 2-day rainfall amounts of over 10 inches at Hanna and at Bengal. Rainfall in excess of 8 inches fell at Ashland, Daisy, Hartshorne and Lehigh. A number of other locations received over 7 inches during the passage of this system.

Twelve counties in central, southern and eastern Oklahoma were declared disaster areas on May 18 - Atoka, Bryan, Carter, Johnston, Lincoln, Love, Marshall, McIntosh, Murray, Pittsburgh, Pottawatomie and Sequoyah. Much of the flooding occurred in areas near Lakes Texoma and Eufaula and along streams which feed into the lakes. Many lakes in the area reached new record levels, including Lakes Eufaula, Texoma, Sardis, Wister, McGee, Hugo and Arbuckle.

Roger Mills County in western Oklahoma was also declared a disaster area on May 18, in the wake of localized flash flooding. On April 22, an area of heavy thunderstorms moved from the Texas panhandle into Roger Mills county. Rainfall in excess of 8 inches fell on Cheyenne during the afternoon and evening, causing flash floods which damaged over half the homes and business in the town, and swept away at least three county bridges.

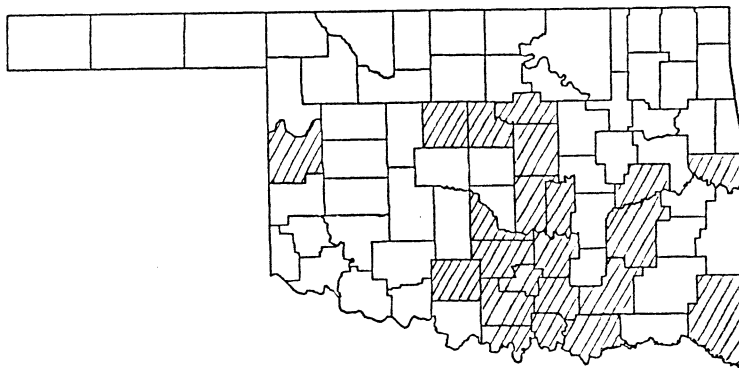
The list of disaster areas was expanded on May 22 to include Payne county, following a damaging tornado on May 18 in Stillwater. Along with the Stillwater storm, heavy rains fell on Kingfisher and Logan counties. Water moved downstream from these rains, pushing rivers out of their banks farther upstream than previously recorded. Kingfisher, Logan, Garvin, McClain, Pontotoc, Seminole and Stephens counties were also declared disaster areas on May 25.

Water flowing over the spillway of Lake Texoma, for the first time since 1957, moved down the Red River, causing flooding in low-lying regions of southeastern Oklahoma late in the month. McCurtain County became the final county added to the list of disaster areas on May 25.

Overall, 22 counties across central, southern, eastern and western Oklahoma were declared disaster areas as a result of the spring rains and storms. It took a long time for waters to drain from swollen reservoirs, and southeastern Oklahoma continued to suffer into June as the lakes dropped toward normal levels.

Mark Shafer

Counties declared disaster areas, May 18-25, 1990



## THE TORNADOES OF MARCH 13, 1990

Early March of 1990, an unusually stormy period for Oklahoma and nearby states, culminated in a powerful outbreak of severe thunderstorms and tornadoes on March 13. For three days prior to the outbreak, warm, humid air streamed north across the plains states while a deep upper-level trough of low pressure over the western states periodically ejected small disturbances across Oklahoma. Although thunderstorms erupted on March 11th and 12th in central and eastern Oklahoma, they were small in scale compared to the severe weather outbreak produced by the main body of the western trough as it moved eastward and interacted with the moist unstable airmass on the 13th. A total of 59 tornadoes were spawned across seven states; 10 of these were in Oklahoma.

The potential for severe weather was readily apparent the morning of the 13th when thunderstorms erupted in northwestern Oklahoma along a dryline (a boundary between dry air of the southwestern United States and moist air from the Gulf of Mexico). These storms produced high winds and hail, destroying a mobile home at 8:30 a.m. in May, Oklahoma. The morning storms raced northeastward across Kansas and eventually produced several strong tornadoes in eastern Iowa. By late morning, no further thunderstorms were active in Oklahoma. However, southeasterly winds continued to strengthen across the eastern two thirds of the state, continuing the supply of moisture. At the same time, the dryline began moving eastward toward the region of enhanced moisture, raising dust across western sections of the state in its wake.

Early afternoon sunshine heated the air, producing thunderstorms along the dryline near a Lawton-to-Yukon line and in northwest Oklahoma west of Enid. The first storms to become severe were those in southwest Oklahoma, with the first reports of large hail at 2:38 p.m. in Tillman County. Two hours later, the first tornado touched down west of Bradley and moved northeast 28 miles before dissipating five miles northeast of Noble. The tornado produced F2 damage (on a scale from 0 to 5) in Noble and Washington, including extensive damage to the Noble High School football stadium. A second F2 tornado developed from the same cluster of storms, touching down west of Criner and lifting southeast of Noble. As the storms continued northeastward, a third tornado (F1) touched down in the Little River State Park in east Norman at 5:50 p.m. The last tornado (F1) produced by this group of storms touched down northwest of Stella and lifted west of Meeker by 6:45 p.m. One serious injury occurred from this tornado when a mobile home was destroyed.

Meanwhile, storms in northwest Oklahoma produced two strong tornadoes in Grant County. The first tornado (F3) developed five miles northeast of Nash at 5:15 p.m. and traveled 19 miles, before dissipating northeast of Wakita. Another tornado (F2) formed east of Wakita while the first tornado was still in progress. The second tornado crossed into Kansas before it dissipated. Both tornadoes remained over lightly populated regions and no injuries were reported.

A third cluster of storms developed in northwest Texas and moved into Jefferson County. Three tornadoes were spawned by these thunderstorms. The first tornado (F1) was reported at Waurika at 6 p.m. The strongest of the tornadoes occurred one hour later near Loco, causing damage rated at F3. One person was injured by this tornado. The third tornado (F2) formed near Elmore City and moved northeastward toward Byars before lifting at 8:45 p.m. Damage was considerable in Ratliff City and Pauls Valley. One final tornado (F2) for the day touched down at 8:10 p.m. in Creek County, destroying several barns.

The March 1990 episode was the most significant tornado outbreak for Oklahoma since April 26, 1984, in terms of numbers and intensity of tornadoes. Amazingly, considering the size of the outbreak, very few injuries were reported, largely due to long warning lead times provided by the National Weather Service. Doppler radar proved to be an invaluable tool in the warning process.

James G. LaDue

### STORM SUMMARY REPORT

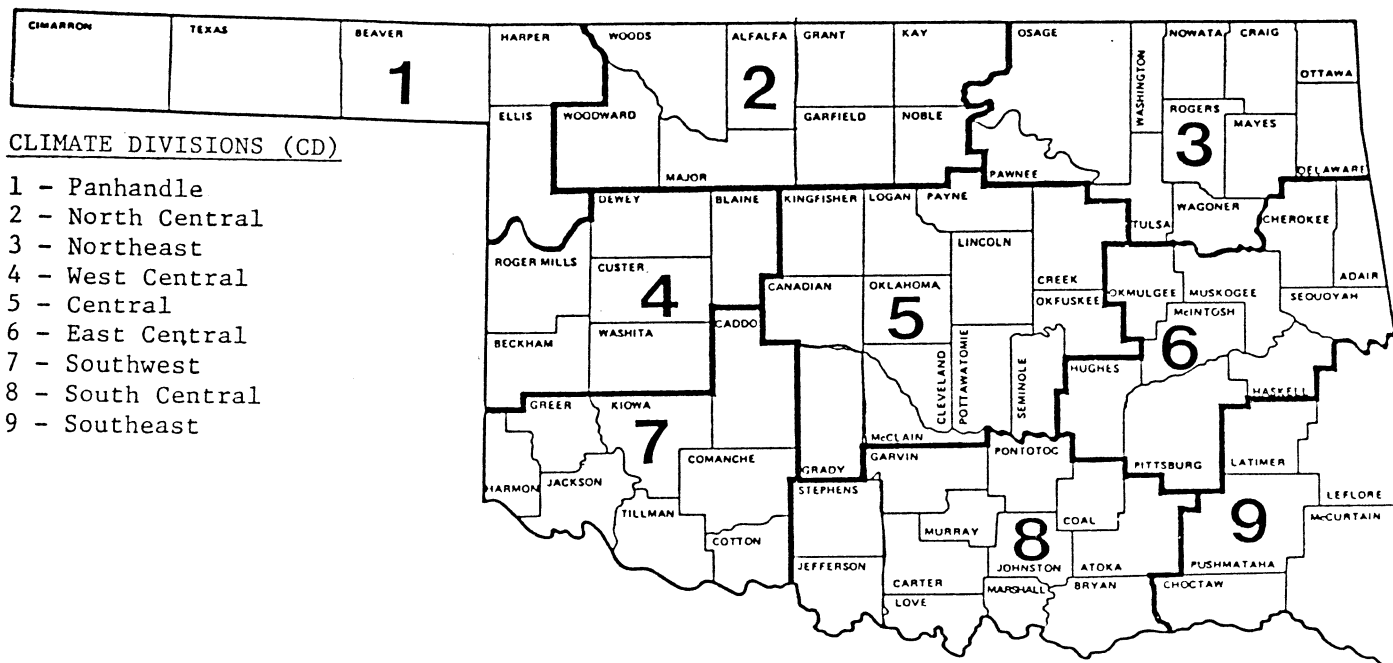
STATE Oklahoma MONTH \_\_\_\_\_ YEAR 1990

TYPE OF STORM	NUMBER	DAYS	DEATHS	INJURIES	DAMAGE*	
					PROPERTY	CROPS
TORNADOES	30	7	1	31	1.5 - 15.0 Million Dollars	No Estimate
HAIL	<del> </del>	<del> </del>	0	0	5.0 - 50.0 Million Dollars	.5 - 5.0 Million Dollars
THUNDERSTORM WINDS	<del> </del>	<del> </del>	0	0	.05 - 2.5 Million Dollars	.05 - .5 Million Dollars
HIGH WINDS	<del> </del>	<del> </del>	0	0	No Estimate	No Estimate
LIGHTNING	<del> </del>	<del> </del>	4	4	.05 - 3.0 Million Dollars	No Estimate
FLASH FLOODS	89	<del> </del>	1	0	5.0 - 50.0 Million Dollars	No Estimate
FLOODS	72	<del> </del>	0	0	5.0 - 50.0 Million Dollars	No Estimate
HEAVY SNOWSTORMS AND BLIZZARDS	<del> </del>	<del> </del>	0	0	No Estimate	No Estimate
ICE STORMS #	<del> </del>	<del> </del>	12	16	No Estimate	No Estimate
HURRICANES & TROPICAL STORMS	<del> </del>	<del> </del>	0	0	0	0
ALL OTHERS (Heat)	1	<del> </del>	1	0	No Estimate	No Estimate

\* Total damage for month, by categories.  
# Freezing drizzle and freezing rain, commonly known as glaze.

SUPERSEDES WS FORM F-2 WHICH SHOULD BE DESTROYED

O K L A H O M A



1990 STATION SUMMARY

The following tables contain summaries of the cooperative data received at the OCS during 1990. They represent a preliminary description of climate conditions across the state and have been initially quality controlled for accuracy. Even so, they may not always agree precisely with those final values published by the National Climatic Data Center. Asterisks indicate data are missing within the month or that 30-year "normals" were unavailable. A station is included in the table only if six or more months of complete data are available. Annual averages and totals are computed only if all twelve monthly values are present. Climate division averages and totals are based on complete monthly records.



1990 PRECIPITATION (INCHES) AND DEPARTURES FROM NORMAL

CD	ID	STATION	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV		DEC		ANNUAL	
			PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP
1	332	ARNETT	0.82	0.39	2.65	1.98	1.43	0.13	2.96	1.18	2.59	-1.55	0.68	-2.61	2.83	0.74	3.53	1.12	4.03	2.12	0.86	-0.95	2.12	1.03	0.25	-0.38	24.77	3.20
1	593	BEAVER	0.95	0.57	2.12	1.54	0.74	-0.43	2.59	1.34	1.95	-1.31	0.92	-1.92	3.82	0.95	0.00	-2.81	2.26	0.74	0.52	-0.70	0.74	-0.15	0.30	-0.15	16.92	-2.33
1	908	BOISE CITY	0.66	0.30	1.63	1.14	0.40	-0.41	0.42	-0.93	2.65	0.22	1.20	-0.79	6.29	3.69	0.99	-1.39	1.73	0.17	0.25	-0.58	1.72	1.09	0.36	-0.04	18.32	2.47
1	1243	BUFFALO	0.43	-0.10	1.48	0.56	1.01	-0.70	2.44	0.37	1.49	-2.90	1.82	-1.78	2.07	-1.25	1.07	-2.27	2.07	-0.73	0.30	-1.65	0.73	-0.60	0.61	-0.08	15.52	-11.13
1	3070	FARGO	0.72	0.26	2.59	1.74	1.64	0.35	3.65	1.82	2.29	-1.67	0.75	-2.46	3.23	1.04	1.14	-1.33	4.58	2.76	0.63	-1.04	1.46	0.44	0.38	-0.27	23.07	1.64
1	3407	GAGE	0.49	0.04	1.89	1.08	3.59	2.41	2.47	0.62	2.68	-0.98	1.16	-1.61	0.70	-1.41	1.47	-0.95	2.51	0.91	0.57	-1.02	1.62	0.78	0.25	-0.39	19.43	-0.52
1	3489	GATE	0.85	*	2.14	*	1.44	*	2.61	*	1.81	*	0.96	*	2.65	*	0.88	*	1.44	*	0.63	*	0.44	*	0.60	*	16.47	*
1	3628	GOODWELL	0.94	0.69	0.93	0.62	0.64	-0.14	1.41	0.30	2.61	-0.26	0.55	-1.75	2.46	-0.42	0.26	-2.11	2.78	1.51	0.43	-0.52	1.04	0.40	0.14	-0.13	14.19	-1.81
1	4298	HOOKER	1.73	1.32	2.21	1.75	0.74	-0.49	1.85	0.66	2.83	-0.60	0.29	-2.66	2.67	-0.26	0.56	-2.22	4.36	2.74	0.18	-0.93	0.86	0.10	0.22	-0.17	18.51	-0.76
1	4766	KENTON	0.99	0.69	1.46	1.18	0.65	-0.11	0.56	-0.73	2.92	0.43	0.74	-1.08	4.59	1.70	0.89	-1.61	2.32	0.81	0.17	-0.73	1.11	0.58	0.35	0.05	16.76	1.18
1	5045	LAVERNE	0.73	0.10	2.08	1.20	1.31	-0.23	3.13	1.60	1.32	-2.07	1.17	-1.80	2.67	0.18	1.56	-1.41	1.51	-0.50	0.32	-1.19	0.99	0.00	0.78	0.11	17.59	-4.01
1	7412	RANGE	*	*	*	*	0.87	*	1.97	*	3.81	*	0.65	*	1.39	*	0.77	*	*	*	0.25	*	0.49	*	0.41	*	*	*
1	7534	REGNIER	1.12	0.85	1.36	1.09	0.35	-0.33	0.74	-0.37	2.53	0.61	1.01	-0.79	4.19	1.69	1.98	0.07	1.35	-0.06	0.20	-0.56	0.99	0.48	0.14	-0.14	15.97	2.54
1	9017	TURPIN	1.13	*	1.58	*	0.61	*	3.41	*	2.69	*	0.58	*	3.10	*	0.09	*	2.71	*	*	*	0.44	*	*	*	*	*
2	193	ALVA	1.44	*	2.57	*	*	*	*	*	*	*	*	3.65	*	2.37	*	2.07	*	0.74	*	1.43	*	0.47	*	*	*	
2	302	VANCE AFB	*	*	1.82	*	3.22	*	2.48	*	3.49	*	0.72	*	2.01	*	1.32	*	2.36	*	1.18	*	1.65	*	0.63	*	*	*
2	755	BILLINGS	1.77	0.86	3.44	2.22	4.95	2.88	1.58	-1.34	3.60	-1.00	0.79	-3.32	0.49	-3.03	2.05	-0.84	5.25	1.03	1.61	-0.86	1.90	0.01	0.52	-0.70	27.96	-4.09
2	818	BLACKWELL	1.80	*	2.77	*	4.60	*	1.41	*	2.90	*	0.90	*	0.55	*	3.06	*	5.21	*	1.03	*	1.85	*	0.88	*	26.97	*
2	1075	BRAMAN	1.91	*	2.70	*	3.91	*	1.12	*	2.85	*	0.45	*	*	*	2.05	*	*	*	1.35	*	2.01	*	0.25	*	*	*
2	1724	CHEROKEE	2.45	1.76	*	*	1.92	-0.01	3.35	0.80	5.80	1.95	1.71	-2.28	5.58	2.82	1.03	-1.55	3.33	0.66	0.78	-1.04	1.73	0.45	0.10	-0.77	*	*
2	2912	ENID	1.99	1.08	3.60	2.44	4.07	2.18	2.45	-0.33	3.60	-1.41	0.15	-3.97	2.03	-1.15	*	*	2.71	-0.50	1.65	-1.16	2.54	0.76	0.43	-0.60	*	*
2	3304	FT SUPPLY	0.63	0.13	1.70	0.85	*	*	*	*	1.82	-1.89	0.81	-2.13	*	*	*	*	1.83	-0.14	0.48	-0.95	2.22	1.30	0.30	-0.32	*	*
2	3358	FREEDOM	1.04	*	2.02	*	1.16	*	1.89	*	2.71	*	0.81	*	2.78	*	0.97	*	4.22	*	0.64	*	1.26	*	0.46	*	19.97	*
2	3909	HARDY	1.29	*	3.20	*	5.17	*	*	*	2.32	*	1.52	*	3.60	*	1.86	*	5.99	*	1.66	*	1.76	*	0.74	*	*	*
2	4019	HELENA	1.97	1.26	3.51	2.51	3.37	1.45	2.41	-0.16	*	*	0.72	-3.23	2.03	-1.05	1.22	-1.39	2.25	-0.62	0.98	-1.14	1.93	0.39	0.46	-0.48	*	*
2	4573	JEFFERSON	1.90	1.20	3.52	2.55	3.46	1.53	1.87	-0.90	2.20	-1.72	0.60	-3.38	1.81	-2.11	2.66	-0.59	3.00	-0.13	0.73	-1.82	1.99	0.07	0.45	-0.58	24.20	-5.88
2	5013	LAMONT	1.48	*	3.05	*	3.94	*	1.57	*	2.86	*	0.34	*	1.54	*	1.03	*	3.16	*	1.62	*	1.56	*	0.64	*	22.80	*
2	5768	MEDFORD	2.97	*	3.93	*	3.67	*	1.67	*	2.14	*	0.64	*	1.39	*	1.24	*	4.52	*	0.95	*	1.77	*	0.47	*	25.37	*
2	6065	MORRISON	1.31	*	3.57	*	6.73	*	3.95	*	3.81	*	2.28	*	1.45	*	5.15	*	5.65	*	1.16	*	1.48	*	0.89	*	37.43	*
2	6139	MUTUAL	2.61	2.11	2.22	1.29	1.87	0.29	3.60	1.15	3.71	-0.61	0.48	-2.69	1.54	-1.02	1.79	-0.41	1.97	-0.51	0.77	-0.75	1.39	0.24	0.30	-0.36	22.26	-1.27
2	6278	NEWKIRK	0.62	-0.24	0.99	-0.11	4.18	2.20	2.10	-0.85	2.87	-1.85	1.00	-3.59	1.91	-1.64	1.41	-2.09	7.37	3.83	0.99	-1.78	1.46	-0.48	0.17	-1.05	25.08	-7.65
2	6751	ORIENTA	1.49	*	2.72	*	1.85	*	2.68	*	3.23	*	1.04	*	0.99	*	3.22	*	3.11	*	0.83	*	2.02	*	0.52	*	23.70	*
2	7012	PERRY	1.57	0.70	3.38	2.06	6.04	3.68	4.11	1.41	3.12	-2.16	*	*	*	*	2.12	-1.21	5.25	1.51	1.83	-0.80	1.34	-0.46	*	*	*	*
2	7201	PONCA CITY	2.38	1.47	3.61	2.39	6.52	4.42	1.98	-0.92	2.02	-2.47	1.73	-2.44	2.10	-2.00	4.30	0.94	6.03	2.19	1.25	-1.35	1.96	-0.09	0.93	-0.34	34.84	1.80
2	7505	RED ROCK	1.62	0.75	3.30	1.91	5.58	3.33	2.73	-0.06	3.60	-1.03	2.70	-1.33	0.88	-2.84	1.99	-0.95	3.43	-0.29	1.97	-0.50	1.53	-0.19	0.70	-0.59	30.03	-1.79
2	7556	RENFROW	3.03	2.32	2.66	1.65	3.39	1.48	1.65	-0.91	*	*	*	*	*	*	*	*	*	*	1.39	-0.93	0.43	-1.27	0.51	-0.48	*	*
2	9404	WAYNOKA	1.47	0.87	2.66	1.68	1.32	-0.31	1.86	-0.32	2.97	-1.47	0.43	-3.32	4.54	1.99	1.14	-1.56	1.74	-0.76	0.84	-0.87	1.53	0.25	0.30	-0.47	20.80	-4.29
2	9760	WOODWARD	0.83	*	2.19	*	1.34	*	2.16	*	2.14	*	0.66	*	1.60	*	1.07	*	2.80	*	0.48	*	1.40	*	0.36	*	17.05	*

1990 PRECIPITATION (INCHES) AND DEPARTURES FROM NORMAL

CD	ID	STATION	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV		DEC		ANNUAL	
			PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP
3	535	BARNSDALL	1.89	0.69	4.63	3.20	*	*	4.50	1.22	5.78	0.51	3.32	-1.22	1.78	-1.42	2.65	-0.52	3.50	-1.22	1.65	-1.42	1.94	-0.38	*	*	*	*
3	548	BARTLESVILLE	*	*	3.57	2.12	7.72	5.00	3.39	0.07	7.11	2.44	3.85	-0.24	2.49	-0.50	1.14	-1.88	3.67	-0.46	1.47	-1.74	2.07	-0.18	1.50	0.02	*	*
3	782	BIXBY	3.08	1.63	*	*	9.26	6.57	7.62	3.71	5.62	0.97	1.93	-2.81	0.89	-2.32	1.83	-0.96	5.13	0.78	2.07	-1.09	2.27	-0.46	3.06	1.23	*	*
3	1256	BURBANK	1.87	*	3.79	*	6.60	*	3.89	*	3.48	*	4.05	*	2.63	*	0.84	*	6.01	*	1.68	*	2.10	*	0.60	*	37.55	*
3	1717	CHELSEA	3.37	*	3.36	*	8.91	*	5.35	*	5.25	*	4.37	*	1.25	*	1.31	*	4.87	*	3.31	*	1.77	*	3.59	*	46.71	*
3	1828	CLAREMORE	3.85	2.47	4.55	2.93	8.47	5.31	6.03	2.27	4.52	-0.15	2.92	-1.71	1.96	-1.12	2.34	-0.57	3.56	-0.32	2.58	-0.84	*	*	3.77	1.92	*	*
3	1902	CLEVELAND	*	*	4.48	*	*	*	8.08	*	4.03	*	1.45	*	1.92	*	4.41	*	4.61	*	*	*	2.75	*	1.24	*	*	*
3	3250	FORAKER	1.00	-0.02	1.77	0.55	6.10	3.71	3.38	0.25	2.72	-2.10	2.91	-1.28	4.86	1.39	2.38	-1.13	7.33	3.25	1.37	-1.73	1.87	-0.50	0.69	-0.65	36.39	1.74
3	4258	HOLLOW	2.83	1.48	3.52	1.97	7.31	4.17	3.88	0.16	9.58	4.72	6.05	1.47	1.68	-2.07	1.67	-1.63	*	*	*	*	*	*	*	*	*	*
3	4289	HOMINY	1.69	0.62	4.12	2.73	8.30	5.48	4.46	1.34	5.11	0.47	2.75	-1.40	2.04	-1.38	6.18	3.15	4.69	0.21	1.94	-1.01	2.77	0.71	1.60	0.33	45.67	11.25
3	4393	HULAH	*	*	3.47	2.30	*	*	4.51	1.35	*	*	1.16	-3.20	1.61	-1.33	2.16	-0.87	3.16	-0.67	*	*	*	*	*	*	*	*
3	4567	JAY	*	*	*	*	*	*	7.19	*	7.93	*	4.39	*	0.88	*	1.80	*	7.58	*	*	*	2.64	*	*	*	*	*
3	4672	KANSAS	6.88	*	4.02	*	8.12	*	7.50	*	8.74	*	*	*	0.65	*	2.35	*	*	*	5.19	*	3.96	*	6.26	*	*	*
3	4812	KEYSTONE	*	*	4.55	*	*	*	5.94	*	8.51	*	1.57	*	0.37	*	1.65	*	6.52	*	*	*	*	*	*	*	*	*
3	5118	LENAPAH	2.62	*	4.27	*	*	*	5.23	*	9.10	*	6.29	*	1.96	*	1.32	*	6.25	*	1.32	*	*	*	*	*	*	*
3	5522	MANNFORD	1.87	0.75	4.47	3.00	*	*	6.04	2.75	*	*	1.21	-2.67	*	*	4.30	1.22	8.93	4.70	*	*	2.50	0.30	2.14	0.72	*	*
3	5540	MARAMEC	1.63	0.58	4.54	3.14	8.11	5.66	5.91	2.92	4.84	-0.17	2.11	-1.79	2.24	-0.88	2.71	-0.21	6.86	2.94	2.58	-0.58	2.63	0.62	*	*	*	*
3	5855	MIAMI	3.37	1.84	4.08	2.20	8.63	5.19	5.43	1.71	9.77	4.74	4.51	-0.37	1.17	-2.76	3.84	0.33	4.35	-0.25	*	*	1.55	-1.40	3.02	0.87	*	*
3	6485	NOWATA	2.38	1.10	3.56	1.92	7.46	4.19	3.97	0.47	9.08	4.46	5.22	0.44	2.24	-0.70	3.41	0.02	6.92	2.61	2.01	-1.29	*	*	*	*	*	*
3	6713	ONETA	2.88	*	3.47	*	9.78	*	7.95	*	4.72	*	0.75	*	0.76	*	2.33	*	5.29	*	3.12	*	2.39	*	3.62	*	47.07	*
3	6935	PAWUSKA	1.91	0.80	5.68	4.37	8.90	6.22	4.79	1.72	6.10	1.34	5.81	1.50	1.89	-1.56	2.39	-0.95	3.10	-1.01	2.79	-0.14	3.31	1.28	1.03	-0.32	47.71	13.25
3	6940	PAWNEE	1.54	0.53	3.17	1.86	7.02	4.54	5.15	2.18	4.73	-0.11	1.38	-2.64	3.71	0.58	2.52	-0.49	5.14	0.77	1.78	-0.94	1.98	0.10	1.02	-0.23	39.15	6.15
3	7309	PRYOR	*	*	3.98	2.20	8.66	5.55	6.68	2.78	6.00	1.12	4.31	-0.36	*	*	1.63	-1.77	5.03	0.87	3.28	-0.49	2.25	-0.65	4.51	2.47	*	*
3	7390	RALSTON	2.00	1.00	3.56	2.26	7.66	5.14	4.40	1.43	7.66	2.94	3.12	-1.27	2.09	-1.40	3.85	0.93	3.13	-0.73	1.33	-1.36	2.02	0.07	0.99	-0.37	41.83	8.64
3	7394	RAMONA	1.83	*	4.02	*	7.69	*	4.73	*	5.91	*	3.21	*	0.78	*	0.91	*	4.85	*	1.51	*	3.19	*	2.62	*	41.25	*
3	8258	SKIATOOK	2.40	1.21	3.41	1.78	7.55	4.72	5.87	2.40	4.73	0.06	2.15	-2.16	0.41	-3.00	3.03	0.17	4.74	0.41	1.86	-1.33	3.20	0.85	2.19	0.74	41.54	5.85
3	8380	SPAVINAW	3.93	2.40	4.35	2.56	7.96	4.83	7.66	3.58	8.79	3.73	3.92	-0.86	0.77	-2.96	3.04	-0.56	7.88	3.50	2.66	-0.99	*	*	*	*	*	*
3	8992	TULSA	2.93	1.58	3.33	1.59	7.21	4.07	5.31	1.16	5.21	0.07	1.08	-3.49	0.25	-3.26	1.83	-1.18	4.29	-0.08	2.15	-1.26	2.41	-0.15	3.72	1.90	39.75	0.95
3	9101	UPPR SPAV	5.51	*	4.64	*	8.54	*	6.43	*	7.61	*	*	*	1.27	*	1.95	*	6.79	*	3.15	*	2.67	*	7.08	*	*	*
3	9203	VINITA	2.93	1.40	4.06	2.25	8.68	5.14	4.51	0.44	5.39	0.04	6.32	1.45	2.47	-0.91	1.32	-2.29	7.05	2.30	3.63	-0.09	*	*	3.73	1.59	*	*
3	9247	WAGONER	5.80	4.08	4.46	2.57	7.33	3.94	8.77	4.10	4.94	0.11	0.57	-4.52	0.85	-2.65	2.67	-0.18	7.05	2.96	2.00	-1.10	3.60	0.40	3.83	1.77	51.88	11.48
3	9298	WANN	2.32	*	3.35	*	8.15	*	5.01	*	8.58	*	*	*	*	*	2.40	*	2.27	*	*	*	2.60	*	1.47	*	*	*
3	9792	WYNONA	2.00	*	4.47	*	7.72	*	4.32	*	6.13	*	4.38	*	1.97	*	2.50	*	3.72	*	1.99	*	2.85	*	2.81	*	44.90	*

1990 PRECIPITATION (INCHES) AND DEPARTURES FROM NORMAL

CD	ID	STATION	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV		DEC		ANANNUAL	
			PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP	PCP	DEP
4	1445	CANTON DAM	*	*	*	*	*	*	5.32	3.03	3.07	-1.88	1.65	-2.05	1.30	-1.11	2.18	-0.07	4.78	1.65	*	*	*	*	*	*	*	*
4	1738	CHEYENNE	0.39	*	2.00	*	2.38	*	10.83	*	4.22	*	2.25	*	0.80	*	3.67	*	3.71	*	0.36	*	2.29	*	0.00	*	32.90	*
4	1909	CLINTON	1.59	0.88	2.85	1.81	1.75	0.05	3.55	1.16	6.77	1.77	2.18	-1.17	1.85	-0.67	2.37	-0.42	3.52	0.52	0.81	-1.89	2.82	1.35	0.24	-0.67	30.31	2.72
4	2039	COLONY	*	*	3.68	*	4.73	*	3.34	*	6.41	*	1.41	*	3.21	*	3.73	*	2.85	*	0.71	*	2.71	*	0.49	*	*	*
4	2125	CORDELL	1.48	0.78	3.18	2.15	3.07	1.44	2.80	0.61	5.34	0.66	1.71	-1.36	1.00	-1.52	3.21	0.58	5.13	2.33	0.50	-2.08	2.69	1.30	0.40	-0.51	30.54	4.38
4	2849	ELK CITY	1.90	1.35	2.73	1.78	1.73	0.21	1.62	-0.59	5.30	0.37	1.70	-1.62	2.11	-0.30	4.39	2.06	3.88	1.30	1.08	-0.91	2.06	0.70	*	*	*	*
4	2944	ERICK	1.45	0.97	1.56	0.70	1.99	0.58	2.79	0.59	7.15	2.74	2.19	-0.78	2.10	-0.03	2.86	0.74	3.24	0.43	1.09	-1.11	2.22	1.23	0.52	-0.16	29.17	5.90
4	3497	GEARY	1.50	0.84	3.10	1.98	*	*	1.85	-0.61	5.60	0.80	1.20	-2.61	1.08	-1.39	2.21	0.02	1.87	-1.35	0.60	-1.83	*	*	0.33	-0.69	*	*
4	3871	HAMMON	1.54	1.03	2.21	1.30	2.65	1.09	2.99	0.77	4.52	-0.04	3.93	0.97	1.20	-0.95	5.70	3.26	4.33	1.62	0.90	-1.00	2.20	0.81	0.14	-0.57	32.32	8.29
4	5090	LEEDEY	1.21	0.75	3.41	2.51	2.02	0.68	2.99	0.49	5.19	0.41	1.39	-1.85	0.67	-1.30	4.11	1.53	4.43	2.20	0.88	-0.88	1.81	0.48	0.10	-0.59	28.21	4.43
4	5463	MACKIE	*	*	1.12	*	1.39	*	2.51	*	4.44	*	2.69	*	0.29	*	1.76	*	4.00	*	0.45	*	1.60	*	0.31	*	*	*
4	6035	MORAVIA	2.16	1.66	2.56	1.60	2.13	0.60	3.37	1.28	5.52	0.77	1.57	-1.42	1.12	-1.17	1.25	-0.81	3.51	0.74	0.94	-1.48	2.35	1.30	0.42	-0.38	26.91	2.69
4	6629	OKEENE	1.14	0.55	3.60	2.66	2.86	1.04	4.97	2.64	3.43	-1.56	1.40	-2.57	2.30	-0.04	1.44	-1.13	2.94	0.01	0.85	-1.27	2.07	0.47	0.50	-0.36	27.50	0.44
4	7565	RETROP	1.84	*	2.76	*	2.43	*	3.22	*	5.97	*	1.84	*	2.43	*	2.23	*	3.52	*	0.72	*	2.73	*	0.41	*	30.10	*
4	7579	REYDON	1.13	0.74	2.41	1.62	1.37	-0.03	2.25	-0.02	4.35	0.06	3.24	-0.07	*	*	3.13	0.90	4.62	2.28	0.69	-0.99	1.97	1.01	0.17	-0.44	*	*
4	7952	SAYRE	1.14	0.72	2.09	1.37	1.77	0.49	2.07	0.02	6.48	2.07	0.93	-2.24	0.68	-1.39	2.75	0.70	3.61	1.17	0.99	-1.14	1.85	0.76	0.53	-0.07	24.89	2.46
4	8652	SWEETWATER	1.26	*	2.31	*	1.45	*	1.36	*	5.23	*	1.74	*	3.29	*	5.86	*	5.42	*	0.70	*	2.20	*	*	*	*	*
4	8708	TALOGA	2.00	1.45	2.84	1.90	2.13	0.51	5.13	2.69	3.10	-2.03	0.55	-2.72	3.20	0.58	2.72	0.28	4.15	1.52	1.01	-0.85	2.08	0.61	0.25	-0.38	29.17	3.56
4	8815	THOMAS	1.44	*	3.48	*	4.09	*	3.99	*	3.18	*	3.50	*	2.20	*	3.52	*	2.88	*	0.38	*	2.48	*	0.20	*	31.34	*
4	9172	VICI	1.05	*	2.19	*	2.32	*	4.15	*	5.00	*	0.77	*	0.66	*	1.80	*	3.21	*	0.87	*	1.52	*	0.25	*	23.81	*
4	9364	WATONGA	1.73	0.96	4.18	3.13	3.22	1.44	5.42	3.00	1.45	-3.53	2.15	-1.62	2.31	0.07	1.78	-0.27	3.56	0.61	0.50	-1.72	2.18	0.76	0.22	-0.78	28.71	2.05
4	9422	WEATHERFORD	1.34	0.70	4.19	3.20	3.17	1.58	4.48	2.25	4.24	-0.48	1.65	-1.98	0.91	-1.58	2.97	0.28	4.34	1.06	0.52	-2.21	2.55	1.19	0.31	-0.55	30.69	3.46
5	200	AMBER	1.81	*	4.13	*	5.59	*	4.94	*	4.59	*	1.26	*	3.89	*	2.76	*	4.36	*	1.25	*	1.77	*	1.36	*	37.71	*
5	288	ARCADIA L.	1.71	*	*	*	4.69	*	5.25	*	5.90	*	2.14	*	1.26	*	1.61	*	4.80	*	1.26	*	1.80	*	1.36	*	*	*
5	830	BLANCHARD	1.60	*	3.99	*	6.10	*	6.37	*	5.74	*	0.96	*	2.59	*	4.03	*	3.78	*	2.40	*	2.25	*	1.68	*	41.51	*
5	1144	BRISTOW	3.88	2.73	3.11	1.50	9.73	7.18	*	*	4.69	-1.04	0.60	-3.76	1.02	-2.53	2.22	-0.40	7.71	3.71	2.75	0.21	2.31	-0.02	2.93	1.34	*	*
5	1684	CHANDLER	2.49	1.34	*	*	10.04	7.75	9.73	6.51	4.19	-1.22	0.78	-3.02	1.20	-2.14	2.49	0.24	5.25	1.46	1.89	-0.54	2.75	0.66	1.81	0.42	*	*
5	1750	CHICKASHA	1.92	1.02	4.93	3.72	6.42	4.48	5.21	2.37	5.59	0.47	1.92	-1.17	2.47	-0.05	3.48	0.96	2.76	-0.72	1.90	-0.81	2.50	0.95	1.58	0.50	40.68	11.72
5	2196	COX CITY	*	*	3.25	*	7.35	*	8.00	*	8.20	*	2.85	*	3.96	*	2.80	*	4.40	*	*	*	2.87	*	1.19	*	*	*
5	2242	CRESCENT	*	*	*	*	7.23	*	4.01	*	4.38	*	1.12	*	3.83	*	2.86	*	3.36	*	0.55	*	1.53	*	0.83	*	*	*
5	2318	CUSHING	0.38	-0.66	5.04	3.73	*	*	*	*	5.53	0.18	2.16	-2.13	1.93	-1.79	1.69	-1.00	4.17	0.28	*	*	3.21	1.20	*	*	*	*
5	2818	EL RENO	1.00	0.17	3.79	2.70	8.09	6.24	3.44	0.86	5.36	0.19	0.92	-2.71	0.87	-1.90	2.74	0.44	5.39	1.78	0.68	-2.20	1.86	0.22	0.82	-0.21	34.96	5.58
5	3821	GUTHRIE	2.15	1.24	4.67	3.41	12.48	10.47	*	*	*	*	0.76	-3.20	0.82	-2.02	2.50	0.12	1.69	-2.29	0.83	-1.83	2.25	0.45	2.10	0.90	*	*
5	4055	HENNESSEY	1.56	0.85	3.78	2.62	4.80	2.94	4.13	1.75	4.11	-1.21	1.31	-2.59	2.01	-0.50	2.64	-0.05	2.91	-0.48	*	*	1.55	-0.08	0.56	-0.43	*	*
5	4489	INGALLS	0.72	*	4.36	*	7.17	*	*	*	5.19	*	2.35	*	1.28	*	2.28	*	6.79	*	2.88	*	2.27	*	0.42	*	*	*
5	4861	KINGFISHER	1.71	0.88	4.48	3.35	5.99	4.23	3.99	1.57	5.66	0.72	0.80	-2.96	2.08	-0.49	1.29	-1.10	2.58	-1.02	0.81	-1.63	1.71	0.18	0.53	-0.60	31.63	3.13
5	4915	KONAWA	4.17	2.84	2.93	1.28	6.98	4.09	11.69	7.57	8.58	2.48	2.88	-0.84	4.98	2.45	1.31	-1.15	5.57	1.45	2.14	-1.45	4.29	2.15	2.34	0.48	57.87	21.35
5	5589	MARSHALL	1.52	0.76	3.25	2.09	*	*	3.55	1.17	5.39	0.14	1.05	-2.95	1.84	-0.75	1.19	-1.56	2.18	-1.33	0.98	-1.62	1.50	-0.13	0.65	-0.49	*	*