

# East Central Planning Region

## REGIONAL DESCRIPTION

Covering approximately 11.2 percent of the state (7,829 square miles), Haskell, Hughes, Latimer, LeFlore, McIntosh, Okfuskee, Pittsburg, Seminole and Sequoyah Counties comprise the East Central Planning Region (Figure 24). The region's terrain varies from the forested Kiamichi Mountains to the rolling river basin plains of the Arkansas River, to the foothills of the Ozark Mountains. Stream and surface water sources are abundant within the region.

The East Central Region has one of the lowest projected M&I water demands for the year 2050. The region is lightly populated with McAlester as the largest city. Projected 2050 agricultural demands are the lowest of any planning region.

The region's climate is mild, with annual mean temperatures varying from 51 to 62 degrees. Annual evaporation ranges from 56 inches per year in the western portion of the region to 48 inches per year in the east. Rainfall averages closely approximate evaporation rates, making the region well-suited for reservoirs.

## WATER RESOURCES

### *Stream Water*

Table 12 summarizes the stream water sources of the East Central Planning Region. Major streams include the North Canadian and Canadian Rivers, Little River, Deep Fork River, Poteau River and the headwaters of the Kiamichi River. Some of the streams in the middle and lower eastern portions of the region contain good quality water. However, some streams in the west contain water of poor quality and restrict M&I uses.

The Canadian River upstream of Lake Eufaula experiences unacceptable chloride and TDS levels. Upstream wastewater return flows contribute to high nutrient loadings in the river which joins the Arkansas River at Robert S. Kerr Reservoir. The overall water quality improves at this point due to dilution with higher quality waters of the Arkansas River.

The Arkansas River, the principal waterway of the region, collects flows of the Illinois, Poteau and the Canadian Rivers. The river water has a generally low min-

eral content in this region. Overall, the water tends to be hard but is acceptable for most M&I uses.

The North Canadian River within the region experiences many of the same water quality problems noted in the Central Region. Levels of TDS and chlorides remain high and quality is the poorest of the region's available stream water sources.

The Poteau River is located in the southeastern portion of the East Central Planning Region in LeFlore County. The water is of good quality with low mineral content.

### **MAJOR RESERVOIRS**

There are four major impoundments within the East Central Planning Region. The largest of these is Eufaula Lake in McIntosh, Pittsburg and Haskell Counties. This Corps of Engineers project was constructed in 1964 for flood control, water supply, navigation and hydropower purposes. The flood control storage of 1,510,800 ac-ft is credited with preventing more than \$107 million dollars of flood-related damages since becoming operational. The lake, located on the Canadian River about 12 miles east of Eufaula, is the fifteenth largest man-made impoundment in the United States, with a surface area of 105,500 acres at normal pool. The lake has a dependable water supply yield of 56,000 af/yr (50 mgd). Power pool storage of 1,407,000 ac-ft is available for reallocation to water supply, should it be needed. The water is of fair quality and suitable for most municipal and industrial uses.

Robert S. Kerr Reservoir, on the Arkansas River in LeFlore County, is a key component in the McClellan-Kerr Arkansas River Navigation System. The reservoir was constructed in 1970 for navigation, hydroelectric power and recreational purposes. The powerhouse is equipped with four 27,500 kW turbines having a total capacity of 110,000 kW and an average annual potential energy output of 459 M kWh. The navigational lock is 110 feet wide by 600 feet long and can provide 48 feet of lift to vessels. The reservoir has a power pool capacity of 525,700 ac-ft which extends to Webbers Falls Lock & Dam. The power pondage is 84,700 ac-ft. The reservoir has no dedicated water supply storage; however, 33,734 af/yr has been allocated from the power pool to the Sequoyah

Water Distribution Authority for municipal water supply.

Tenkiller Ferry Lake is located on the Illinois River in Cherokee and Sequoyah Counties. The reservoir straddles the East Central and Northeast Planning Regions. Completed in 1953 by the Corps of Engineers, the lake's authorized purposes are flood control and hydroelectric power. Water supply is not an authorized purpose of the reservoir even though the conservation pool is comprised of 25,400 ac-ft (29,792 af/yr yield) of water supply storage, 345,600 ac-ft (392,050 af/yr yield) of power drawdown storage and 283,100 ac-ft of dead storage. The lake also provides 576,700 ac-ft of flood control storage.

Wister Lake is the fourth major impoundment in the East Central Region. The lake was built by the Corps of Engineers in 1948 to provide flood control, water supply and low flow augmentation on the Poteau River in LeFlore County. The lake contains 388,399 ac-ft of flood control and conservation pool storage, varying between 39,082 and 61,423 ac-ft, depending upon the time of year. Of the varying conservation pool, 14,000 ac-ft is set aside for water supply which yields 31,400 af/yr (27.9 mgd). The water is of good quality and suitable for all uses.

### **MUNICIPAL LAKES**

There are four large municipal lakes and one large private lake within the East Central Planning Region. The largest is Konawa Reservoir on Jumper Creek in Seminole County. Built in 1968 by Oklahoma Gas and Electric Company, the impoundment is utilized as cooling water for its Seminole Power Plant. The lake has 23,000 ac-ft of storage and provides recreational opportunities for the region.

McAlester Lake, in Pittsburg County, is an impoundment owned and operated by the City of McAlester. The lake, built on Bull Creek in 1930 for water supply and recreation, has a yield of 9,200 af/yr (8.2 mgd). Water is of good quality and suitable for all uses.

Okemah Lake is a City of Okemah impoundment in Okfuskee County. Located on Buckeye Creek, it was built for water supply and recreational purposes. The lake has conservation storage of 13,100 ac-ft and an estimated yield of 6,550 af/yr (5.8 mgd), based on recharge factors for the county. Water in the lake is of fair quality.

Holdenville Lake, on a tributary to Little River in Hughes County, is owned and operated by the City of Holdenville for water supply and recreational purposes. The lake was built in 1931 with a surface area of 550 acres and conservation storage of 11,000 ac-ft. Based on the recharge factor for the county, the lake has an estimated yield of 5,500 af/yr (4.9 mgd).

Lloyd Church Lake (SCS #7) is an NRCS project on Bandy Creek in Latimer County. Owned by the City of Wilburton, the lake has conservation storage of 3,060 ac-ft and a dependable yield of 1,523 af/yr (1.36 mgd). The lake's pur-

poses include water supply, flood control and recreation.

#### OTHER IMPOUNDMENTS

There are numerous other NRCS projects, small municipal lakes and private reservoirs within the East Central Planning Region. These lakes provide municipal supply, irrigation water and recreational opportunities. Cohee Lake (1,500 ac-ft of conservation storage), Wetumka Lake (1,839 ac-ft), Sportsman Lake (5,349 ac-ft), Wewoka Lake (3,301 ac-ft), Brown Lake (4,525 ac-ft), Wayne Wallace Lake (1,746 ac-ft), New Spiro Lake (2,160

ac-ft) and Brushy Creek Reservoir (3,258 ac-ft) are some of the larger impoundments in this category.

#### AUTHORIZED DEVELOPMENT

There are no major authorized water supply projects within the East Central Planning Region.

#### POTENTIAL DEVELOPMENT

There are numerous sites within the East Central Planning Region with potential for development of new water supply projects. The abundance of rainfall within the region could also aid in

Table 12  
STREAM WATER DEVELOPMENT  
East Central Planning Region

PROJECT	STREAM	PURPOSE*	FLOOD CONTROL STORAGE (acre-feet)	WATER SUPPLY STORAGE (acre-feet)	WATER SUPPLY YIELD (ac-ft/year)
<b>EXISTING OR UNDER CONSTRUCTION</b>					
Eufaula	Canadian River	ws, fc, p, n	1,510,800	56,000	56,000
Holdenville	Tributary to Little River	ws, r	0	11,000	5,500
Konawa	Jumper Creek	p, r	---	23,000	---
Lloyd Church (SCS #7)	Bandy Creek	ws	---	3,060	1,523
McAlester	Bull Creek	ws, fc, r	---	13,398 <sup>1</sup>	9,200 <sup>1</sup>
Okemah	Buckeye Creek	ws, r	---	13,100	6,550
Robert S. Kerr	Mainstem Arkansas	p, r, n	---	---	33,606 <sup>2</sup>
Sardis	Jackfork Creek	ws, fc, r, fw	---	---	1,000 <sup>3</sup>
Tenkiller (Water Supply Pool Allocations)	Illinois River	fc, p	576,700	25,400 <sup>4</sup>	10,992 <sup>4</sup>
Wister	Poteau River	ws, fc, flow	388,399	39,082	31,400
<b>TOTAL</b>			<b>2,475,899</b>	<b>184,040</b>	<b>155,771</b>
<b>POTENTIAL</b>					
Atwood	Canadian	ws, r	---	---	44,800
Brazil	Brazil Creek	ws, fc, r	108,000	190,000	87,400
Higgins	Gaines Creek	ws, r	---	195,000	68,400
Holson Creek	Holson Creek	ws, r	---	30,000	22,400
Peaceable	Peaceable Creek	ws, r	---	---	33,600
Sasakwa	Little River	ws, fc, r	209,000	325,000	79,900
Tate Mountain	Little River	ws, r	---	134,600	49,800
Tenkiller (Power Pool Allocations)	Illinois River	fc, p	---	345,600 <sup>5</sup>	392,050 <sup>5</sup>
Vian Creek <sup>6</sup>	Vian Creek	ws, fc, r	10,400	17,500	10,100
Weleetka <sup>7</sup>	North Canadian River	ws, r	---	---	35,800
Wetumka	Wewoka Creek	ws, fc, r	110,000	210,000	67,200
<b>TOTAL</b>			<b>437,400</b>	<b>1,447,700</b>	<b>891,450</b>
<b>TOTAL YIELD</b>					<b>1,047,221</b>

\*ws-municipal water supply, fc-flood control, p-power, r-recreation, fw-fish and wildlife, n-navigation, flow-low flow augmentation.

<sup>1</sup> City of McAlester no longer uses Lake Talawanda No. 1 & 2 for water supply. Values reflect only McAlester Lake.

<sup>2</sup> Robert S. Kerr has no water supply storage or yield. However, 33,606 af/yr of hydropower pool is allocated to water supply.

<sup>3</sup> Located in Southeast Planning Region. Total water supply yield is 156,800 af/yr, of which 1,000 af/yr is allocated to East Central Planning Region.

<sup>4</sup> Total water supply yield is 29,792 af/yr, of which 18,800 af/yr is allocated to Northeast Planning Region.

<sup>5</sup> Reallocation of 345,600 ac-ft of hydropower storage yielding 392,050 af/yr for water supply. Also listed as potential source for Northeast Planning Region.

<sup>6</sup> Regulating storage reservoir to regulate excess flows from Arkansas River.

<sup>7</sup> Storage requirements have not been developed. Yields are based on 60% of average annual streamflow in drainage area.

**Figure 24  
EAST CENTRAL  
PLANNING REGION**

this development. Of the 11 sites identified in Table 12, several have been extensively studied.

Holson Reservoir is a proposed multi-purpose impoundment on Holson Creek in the Poteau River Basin of LeFlore County. The potential yield of the reservoir is 22,400 af/yr (20 mgd) from the 30,000 ac-ft of conservation storage.

Sasakwa Lake, proposed for development on the Little River in Seminole County, is another potential multipurpose site under consideration. The recommended configuration calls for 209,000 ac-ft of flood control storage and 325,000 ac-ft of conservation storage yielding 79,900 af/yr (71.3 mgd) of marginal quality water supply. Chloride and high iron concentrations could cause objectionable taste.

Tate Mountain Reservoir is proposed on the Little River, approximately 6.5 miles northwest of Sasakwa, in Seminole County. The potential reservoir, recommended in an April 1989 Bureau of Reclamation study, includes 134,600 ac-ft of conservation storage yielding 49,800 af/yr (44.5 mgd) of water supply. No flood control storage is proposed. The dam site is situated to avoid inflows from Salt Creek, thus making the water of acceptable quality for most uses.

Wetumka Creek is another potential multipurpose project in the East Central Region. Located on Wewoka Creek in Hughes County, the reservoir is planned to have 110,000 ac-ft of flood control storage and 103,600 ac-ft of conservation storage yielding 67,200 af/yr (60 mgd) of

water supply. Stream water in the area contains large quantities of oilfield brines. Without prior clean-up and containment of these inflows, the water would be questionable for M&I use.

Modifications to Wister Lake were proposed in the 1980 Oklahoma Comprehensive Water Plan. However, potential dam safety issues and downstream channelization problems identified with the project resulted in its removal from consideration by the Corps of Engineers.

### **STREAM WATER RIGHTS**

As of June 1994, the OWRB had issued stream water allocation permits totaling 257,290 ac-ft per year from lakes, rivers and streams in the East Central Planning Region (Table 13).

Table 13  
WATER RIGHTS  
East Central Planning Region

<b>STREAM WATER ALLOCATIONS</b> (acre-feet)								
COUNTY	Municipal	Industrial	Agricultural	Commercial	Rec, F&W	Power	Other	TOTAL
Haskell	2,540	5	404	55	---	---	---	3,004
Hughes	5,400	20	10,270	3	816	---	---	16,509
Latimer	4,405	60	911	30	483	---	---	5,889
LeFlore	6,788	15,357	8,510	169	615	---	---	31,439
McIntosh	7,311	5	297	176	473	---	---	8,262
Okfuskee	1,582	15	3,733	---	428	---	---	5,758
Pittsburg	35,406	21,309	5,652	30	1	---	---	62,398
Seminole	3,957	142	1,289	---	367	35,000	---	40,755
Sequoyah	76,246	3,308	2,639	42	1,041	---	---	83,276
<b>TOTAL</b>	<b>143,635</b>	<b>40,221</b>	<b>33,705</b>	<b>505</b>	<b>4,224</b>	<b>35,000</b>	<b>---</b>	<b>257,290</b>

<b>GROUNDWATER ALLOCATIONS</b> (acre-feet)								
COUNTY	Municipal	Industrial	Agricultural	Commercial	Rec, F&W	Power	Other	TOTAL
Haskell	242	---	90	---	1,542	---	---	1,874
Hughes	1,556	10	11,117	---	20	---	---	12,703
Latimer	34	---	134	34	---	---	---	202
LeFlore	31	---	7,321	170	---	---	---	7,522
McIntosh	556	---	240	---	---	---	5	801
Okfuskee	300	7,043	1,730	783	---	---	---	9,856
Pittsburg	380	8	1,407	---	---	---	---	1,795
Seminole	4,815	784	1,522	18	57	90	---	7,285
Sequoyah	169	---	7,839	5	---	---	---	8,013
<b>TOTAL</b>	<b>8,083</b>	<b>7,845</b>	<b>31,400</b>	<b>1,010</b>	<b>1,619</b>	<b>90</b>	<b>5</b>	<b>50,051</b>

Note: Agricultural allocations include Irrigation. Mining included in Industrial.  
Source of Data: Oklahoma Water Resource Board printout, June 23, 1994.

## Groundwater

East Central Oklahoma overlies the Ada-Vamoosa Formation and alluvium and terrace deposits of the Canadian and Arkansas Rivers. The Ada-Vamoosa Aquifer is a fine- to very fine-grained sandstone with siltstone and interbedded limestone. It has a maximum thickness of approximately 550 feet and saturated thickness of 100 to 200 feet. Wells are generally 100 to 500 feet deep and commonly yield 100 to 300 gpm from the formation but may exceed 500 gpm in some locations. Water from the Vamoosa Formation is generally of a sodium bicarbonate or sodium calcium bicarbonate type while dissolved solids are usually less than 500 mg/L.

Wells in the two major alluvial and terrace deposit aquifers of the region yield from 200 to 800 gpm. Formation deposits average 42 feet in thickness, with satu-

rated thickness averaging 25 feet, and consist of clays, sand, silt and gravels. Hardness is the major water quality problem; TDS values are usually less than 500 mg/L in the Arkansas River Basin and less than 1,000 mg/L in the Canadian River Basin. However, these waters are generally suitable for most M&I uses.

### GROUNDWATER DEVELOPMENT

Extensive development of groundwater supplies has not occurred in the East Central Planning Region due to the abundance of stream water. Some communities in Seminole and Okfuskee Counties utilize the Vamoosa Formation while smaller communities along the Canadian and Arkansas Rivers utilize the alluvial and terrace deposits.

### GROUNDWATER RIGHTS

As of June 1994, the OWRB had issued groundwater allocation permits totaling

50,051 ac-ft per year from aquifers in the East Central Planning Region (Table 13).

## SUPPLY AND DEMAND ANALYSIS

The East Central Planning Region is well-prepared for anticipated future growth. Existing reservoirs within the region currently have surplus and/or unallocated water available. Table 14 displays the availability of water from existing sources. The long-range projection for M&I water demand in the year 2050 is 63,000 af/yr (56.2 mgd). The power demand of 75,600 af/yr (67.5 mgd) is projected to be the largest component of future water demands within the region. As shown in Table 15, current supplies indicate that anticipated demands should be satisfied without deficits.

Table 14  
SURPLUS WATER AVAILABILITY  
East Central Planning Region  
(1,000 ACRE-FEET/YEAR)

SOURCE	TOTAL YIELD	LOCAL ALLOCATION	OUT OF REGION ALLOCATION	POTENTIAL SURPLUS
Eufaula	56.0	48.5	---	7.5
Holdenville	5.5	5.5	---	---
Lloyd Church	1.5	1.5	---	---
McAlester	9.2	9.2	---	---
Okemah	6.6	6.6	---	---
Robert S. Kerr (Power Pool Allocations)	33.6	33.6	---	---
Tenkiller (Water Supply Pool Allocations)	29.8	11.0	18.8	---
Wister	31.4	23.0	---	8.4
SCS & Municipal Lakes	103.7	103.7	---	---
Groundwater	50.1	50.1	---	---
<b>TOTAL</b>	<b>327.3</b>	<b>292.7</b>	<b>18.8</b>	<b>15.9</b>
<b>Other Potential Sources</b>				
Atwood	44.8	---	---	44.8
Brazil	87.4	---	---	87.4
Higgins	68.4	---	---	68.4
Holson Creek	22.4	---	---	22.4
Peaceable	33.6	---	---	33.6
Sasakwa	79.9	---	---	79.9
Tate Mountain	49.8	---	---	49.8
Tenkiller (Power Pool Allocations) <sup>1</sup>	392.1	---	---	392.1
Vian	10.1	---	---	10.1
Weleetka	35.8	---	---	35.8
Wetumka	67.2	---	---	67.2
<b>TOTAL</b>	<b>891.5</b>	<b>---</b>	<b>---</b>	<b>891.5</b>
<b>TOTAL SURPLUS WATER AVAILABILITY</b>	<b>1,218.8</b>	<b>292.7</b>	<b>18.8</b>	<b>907.4</b>

<sup>1</sup> Also considered as potential source for Northeast Planning Region.

Table 15  
SUPPLY AND DEMAND ANALYSIS  
East Central Planning Region  
(1,000 ACRE- FEET/YEAR)

SOURCE	COUNTY									TOTAL
	Haskell	Hughes	Latimer	LeFlore	McIntosh	Okfuskee	Pittsburg	Seminole	Sequoyah	
MUNICIPAL AND INDUSTRIAL COMPONENT										
Eufaula	2.9	---	---	---	5.8	---	38.3	---	---	47.1
Holdenville	---	5.5	---	---	---	---	---	---	---	5.5
Lloyd Church	---	---	1.5	---	---	---	---	---	---	1.5
McAlester	---	---	---	---	---	---	9.2	---	---	9.2
Okemah	---	---	---	---	---	6.6	---	---	---	6.6
Robert S. Kerr	---	---	---	---	---	---	---	---	33.6	33.6
Sardis <sup>1</sup>	---	---	1.0	---	---	---	---	---	---	1.0
Tenkiller (Water Supply Pool Allocations)	---	---	---	---	---	---	---	---	11.0	11.0
Wister	---	---	---	23.0	---	---	---	---	---	23.0
SCS & Municipal Lakes	---	1.3	1.8	2.3	1.7	5.5	7.7	4.3	4.9	29.7
Groundwater	1.8	1.6	0.1	0.2	0.6	8.1	0.4	5.7	0.2	18.6
M & I Supply	4.7	8.4	4.4	25.5	8.1	20.2	55.7	10.0	49.7	186.6
2050 M&I Demand	2.6	4.1	3.0	14.9	5.5	3.1	11.2	7.3	11.3	63.0
M&I Surplus/(Deficit)	2.1	4.3	1.4	10.6	2.6	17.1	44.5	2.7	38.4	123.6
AGRICULTURAL COMPONENT										
Eufaula	---	---	---	---	1.4	---	---	---	---	1.4
Robert S. Kerr	---	---	---	---	---	---	---	---	0.1	0.1
SCS & Municipal Lakes	5.1	21.2	7.5	6.8	0.3	10.2	8.1	11.5	3.7	74.2
Groundwater	0.1	11.1	0.1	7.3	0.2	1.7	1.4	1.5	7.8	31.4
Agricultural Supply	5.2	32.3	7.6	14.1	1.9	11.9	9.5	13.1	11.6	107.1
2050 Agricultural Demand	1.9	14.6	0.9	6.6	1.9	2.3	3.0	4.1	4.7	40.0
Agricultural Surplus/(Deficit)	3.3	17.7	6.7	7.5	---	9.6	6.5	9.0	6.9	67.1
POWER COMPONENT										
Konawa	---	---	---	---	---	---	---	41.4	---	41.4
Canadian River	---	---	---	---	---	---	---	35.0	---	35.0
Groundwater	---	---	---	---	---	---	---	0.1	---	0.1
Power Supply	---	---	---	---	---	---	---	76.5	---	76.5
2050 Power Demand	---	---	---	---	---	---	---	75.6	---	75.6
Power Surplus/(Deficit)	---	---	---	---	---	---	---	0.9	---	0.9
TOTALS										
Total Local Supply	9.8	40.7	12.0	39.6	10.0	32.1	65.2	99.6	61.3	370.3
2050 Demand	4.5	18.7	3.9	21.5	7.4	5.4	14.2	87.0	16.0	178.6
Net Surplus/(Deficit)	5.3	22.0	8.1	18.1	2.6	26.7	51.0	12.6	45.3	191.7

<sup>1</sup>From Southeast Planning Region.