Middle Arkansas Planning Region

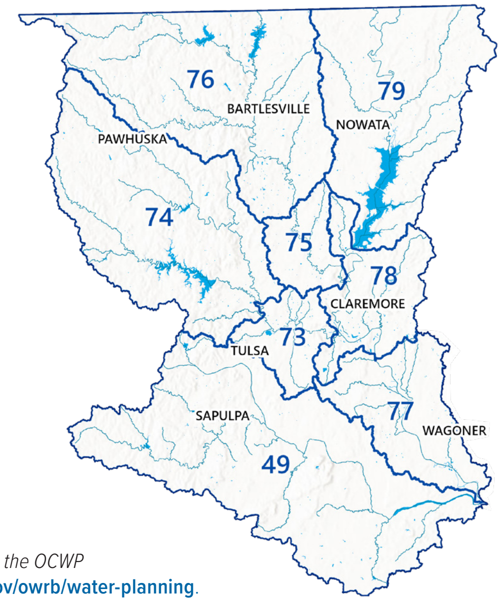
Summary

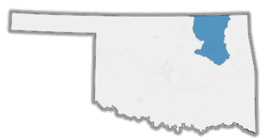
- Middle Arkansas Region demands are supplied by a combination of surface water, groundwater, and out-of-basin supplies.
- Water demand (withdrawal) is projected to increase by 40,035 acre-feet per year (18%) between 2020 and 2075.
- Physical water shortages are projected for surface water and bedrock groundwater as early as 2030 and will continue through 2075.
- Surface water and groundwater are projected to remain legally available for permitting through 2075 in all Middle Arkansas Region basins.
- In addition to the Statewide Recommendations, Middle Arkansas Region stakeholders expressed the need to invest in regionalization, instream (or nonconsumptive) flow, non-point source mitigation (source water protection), new technology to improve water quality, and the need to meter all uses.

OWRB Water Planning Page

oklahoma.gov/owrb/water-planning

The Middle Arkansas Region represents 24% of the state's 2075 projected population and 12% of the state's total 2075 water demand projections.





Interactive maps can be viewed through the OCWP dashboards, accessible at **oklahoma.gov/owrb/water-planning**.

Reliable water supplies must be physically available (wet water available at the time and place it's needed), legally available (having a permit to use the water), of suitable quality for its intended purpose, and have the necessary infrastructure to divert, convey, and treat the water if necessary. For the Middle Arkansas Region, to mitigate projected water supply shortages, the following strategies will typically be most effective:

- Reduce water demand through conservation, water loss reduction, and other activities (PS, SSI, OG, TE). WSS
- Reduce water demand through agricultural water saving options (CI, LS). WSS
- Continue/increase reliance on in-basin surface water (all sectors) in some basins. WSS WDI
- Continue/increase reliance on in-basin groundwater (all sectors). WSS WDI

Options to address water quality concerns include expanding source water protection programs and expanding water quality studies. WSS WDI

Infrastructure limitations can be addressed through additional water funding. Possible sources of new funding include providers setting appropriate water rates, public-private partnerships, state programs, and federal programs. WIW

Water Demand Sectors: PS = Public Supply, SSI = Self-supplied Industrial, OG = Oil & Gas, TE = Thermoelectric Power, CI = Crop Irrigation, LS = Livestock, SSD = Self-supplied Domestic

OCWP Statewide Recommendations: The recommendations are designed to address current and anticipated water supply challenges. Areas where the OCWP Statewide Recommendations specifically address this region's challenges are noted throughout this fact sheet with the following icons: WIW Water Infrastructure & Workforce, WM Water Management, WSS Water Supplies & Storage, and WDI Water Data & Information

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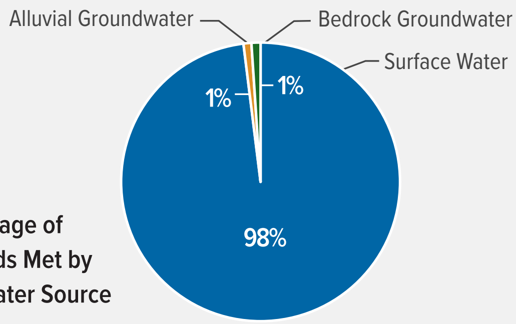
Population

2020	2030	2035	2045	2060	2075
958,031	977,711	991,818	1,023,012	1,079,442	1,127,580

Water Demand Projections

Water demands (withdrawals) are projected to increase by 18% between 2020 and 2075.

The Middle Arkansas Region's largest demand sector is Public Supply, representing 88% of the region's 2075 water demands. The second largest demand sector is Thermoelectric Power, representing 6% of the region's 2075 water demands.



Percentage of Demands Met by Each Water Source

Water demand refers to the amount of water that needs to be withdrawn from surface waters and/or groundwater to meet the needs of people, communities, industry, agriculture, and other users. Changes in water demands correspond to growth or decline in population, agriculture, industry, or related economic activity. Demands were projected through 2075 for seven distinct consumptive water demand sectors.

In the Middle Arkansas Region, Self-supplied Domestic, Self-supplied Industrial, Crop Irrigation, Public Supply, and Thermoelectric Power demands will increase while Livestock demands will decrease between 2020 and 2075. There is no change in Oil & Gas demands.

Total Demand by Sector (AFY)

	2020	2030	2035	2045	2060	2075
Self-supplied Domestic	2,999	3,041	3,052	3,072	3,128	3,174
Self-supplied Industrial	590	575	582	595	617	638
Crop Irrigation	7,640	8,101	8,183	8,350	8,550	8,550
Livestock	5,396	5,247	5,239	5,109	4,923	4,773
Oil & Gas	401	401	401	401	401	401
Public Supply	190,150	194,107	197,198	204,079	216,354	226,800
Thermoelectric Power	11,825	9,206	9,103	11,087	12,949	14,698
Total	**219,000**	**220,678**	**223,759**	**232,694**	**246,922**	**259,035**

AFY = acre-feet per year; Small differences may result due to rounding.

Physical Water Shortages WIW WM WSS

To quantify physical surface water gaps and groundwater storage depletions through 2075, use of existing surface water and groundwater supplies was assumed to continue in current proportions while out-of-basin supplies will be used up to permit amounts or projected demands, whichever is less.

The Middle Arkansas Region is projected to experience surface water gaps (where demand exceeds supplies) and bedrock groundwater depletions (where water use exceeds rate of recharge), as detailed in the tables below. The magnitude of shortages is projected for all planning years, and the frequency (probability) of a shortage occurring is estimated for 2075 demand conditions. Bedrock groundwater frequencies are constant because of the lack of direct connection to surface water hydrology. Frequent shortages with large magnitudes are indicative of the greatest need to implement alternative water management strategies.

SURFACE WATER GAP	2030	2035	2045	2060	2075	2075
Basin	**Magnitude (AFY)**					**Frequency**
49	204	645	2,647	6,013	9,628	93%
73	89	398	1,727	3,629	5,362	80%
74	125	132	141	173	219	6%
75	2	10	26	84	126	13%
76	-	2	15	47	117	97%
77	18	32	132	266	547	86%
78	8	12	13	222	546	21%
79	10	3	1	-	-	0%

AFY = acre-feet per year

ALLUVIAL GROUNDWATER DEPLETION	2030	2035	2045	2060	2075	2075
Basin	**Magnitude (AFY)**					**Frequency**
49	-	-	-	-	-	0%
73	-	-	-	-	-	No AGW Demand
74	-	-	-	-	-	No AGW Demand
75	-	-	-	-	-	No AGW Demand
76	-	-	-	-	-	No AGW Demand
77	-	-	-	-	-	0%
78	-	-	-	-	-	No AGW Demand
79	-	-	-	-	-	No AGW Demand

AFY = acre-feet per year

Physical Water Shortages Cont.

BEDROCK GROUNDWATER DEPLETION	2030	2035	2045	2060	2075
Basin	**Magnitude (AFY)**				
49	-	-	-	-	-
73	177	180	186	197	206
74	31	12	20	9	-
75	142	143	145	148	151
76	35	33	21	13	2
77	No BGW Demand				
78	321	324	328	334	341
79	1	1	2	2	3

AFY = acre-feet per year

Arkansas River near Tulsa

Legal Water Availability WM WSS

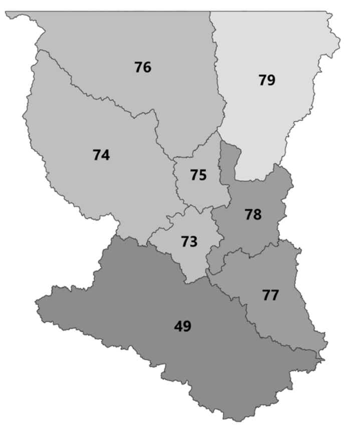
Surface water and groundwater are projected to remain legally available for permitting through 2075 in all of the basins within the Middle Arkansas Region.

Surface Water Legal Availability

- Planning Basins
- Basins under GRDA authority
- Basins wholly or partially subject to the provisions of the 2016 Water Settlement Agreement

Surface Water Legal Availability (AFY) using 2075 Demands

- 0
- <200,000
- 200,001-500,000
- 500,001-2,000,000
- 2,000,001-4,000,000
- >4,000,000

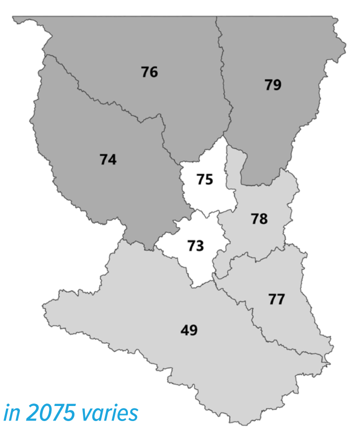


Groundwater Legal Availability

- Planning Basins

Groundwater Legal Availability (AFY) using 2075 Demands

- <200,000
- 200,001-500,000
- 500,001-2,000,000
- 2,000,001-4,000,000
- >4,000,000



Legal water availability projected in 2075 varies across the region, with darker shading indicating more water available for appropriation.

Surface Water Resources

WIW WM WSS WDI

The OCWP uses historical monthly streamflow data (1950-2021), which reflects current natural and human-created conditions (runoff, diversions and use of water, and impoundments and reservoirs) to represent the water that may be physically available to meet projected demand. The maximum amount of water a reservoir can dependably supply during a critical drought period is referred to as its yield. The table below provides information about remaining water supply yield that is available for permitting from existing reservoirs in the region.

Reservoir	Estimated Remaining Water Supply Yield to be Permitted (AFY)
Bixhoma	---
Heyburn	0
Sahoma	---
Sand Springs Lake	0
Shell	---
Birch	560
Bluestem	---
Hominy Municipal	---
Pawhuska	---
Skiatook	0
Waxhoma	---
Copan	20
Hudson	---
Hulah	2
Claremore	---
Oologah	0

--- Indicates no information is available.
AFY = acre-feet per year
Estimated remaining water supply yield as of July 2025.

Groundwater Resources

WIW WM WSS WDI

For the OCWP physical water availability analyses, alluvial aquifers are defined as aquifers comprised of river alluvium and terrace deposits, occurring along rivers and streams and consisting of unconsolidated deposits of sand, silt, and clay. Alluvial aquifers are more hydrologically connected with surface water features (streams, rivers, lakes) than bedrock aquifers. Bedrock aquifers consist of consolidated (solid) or partially consolidated rocks, such as sandstone, limestone, dolomite, and gypsum. Bedrock aquifers are typically replenished slowly by recharge from surface infiltration (precipitation) and from adjacent aquifers.

Aquifer	Type	Class	Equal Proportionate Share (AFY/Acre)
Arkansas River	Alluvial	Major	temporary 2.0
Cherokee Group	Bedrock	Minor	temporary 2.0
North-Central Oklahoma	Bedrock	Minor	temporary 2.0
Northeastern Oklahoma Pennsylvanian	Bedrock	Minor	temporary 2.0
Roubidoux	Bedrock	Major	temporary 2.0
Vamoosa-Ada	Bedrock	Major	2.0
Verdigris River Groundwater Basin	Alluvial	Minor	temporary 2.0

AFY = acre-feet per year

Bedrock aquifers with typical yields greater than 50 gallons per minute (gpm) and alluvial aquifers with typical yields greater than 150 gpm are considered major aquifers.

Water Quality WIW WDI

Groundwater: Groundwater from the major aquifers of the Vamossa-Ada and Arkansas River experiences elevated concentrations of nitrate, total dissolved solids, and salinity.

Lakes: Water quality in this region is impacted by elevated levels of nutrients and chlorophyll-a—factors that directly affect both recreational and water supply uses. Lakes in this area are classified as eutrophic to hypereutrophic, reflecting their moderate to high nutrient concentrations and biological productivity.

Streams: Rivers and streams are impacted by urbanization, modification/impoundment, flow alteration, and agricultural runoff, leading to riparian loss, increased sedimentation, and increased nutrient concentrations. These factors contribute to increased dredging, treatment costs, and flooding risk, as well as habitat degradation or loss.

General: These water bodies are impacted by excess nutrients, sedimentation, and harmful algal blooms (HABs), which reduce water quality and reservoir health. Municipal and industrial demands continue to place pressure on the region's water systems, while silt accumulation further limits storage capacity. Strategic nutrient management, erosion control, and watershed protection are essential to sustaining water availability and quality in the long term.

Water Infrastructure Needs WIW

OWRB compiled near-term wastewater project needs, water supply project needs, and state flood plan project needs as part of developing the 2025 OCWP. Near-term costs include drinking water and wastewater projects by public utilities (various system sizes) and other entities (such as conservancy districts, department of wildlife, regional councils, and tourism). All flood mitigation projects in the database were identified by public water suppliers in the State Flood Plan.

Near-term Drinking Water Cost (2024 dollars)	Near-term Wastewater Cost (2024 dollars)	Near-term Stormwater Cost (2024 dollars)
$4.07B	**$1.40B**	**$463M**

M = million

For drinking water, costs were projected for the next 20 years for public suppliers. While it is difficult to anticipate all the changes that may occur within this extended timeframe, it is beneficial to evaluate the order of magnitude of the long-range potential costs of meeting demands. Estimated costs include rehabilitation of existing water infrastructure and construction of new water infrastructure for growth and regulatory compliance. The costs are categorized according to system sizes:

- Small systems serve less than 3,300 people;
- Small-medium systems serve 3,301 to 10,000 people;
- Medium-large systems serve 10,001-100,000 people; and
- Large systems serve more than 100,000 people.

System Size	Near-term Drinking Water Cost (2024 dollars)	Future Drinking Water Costs through 2035 (2025 dollars)[1]	Future Drinking Water Costs through 2045 (2025 dollars)[2]
Small	$42M	$2.11B	$307M
Small-Medium	$129M	$533M	$1.79B
Medium-Large	$136M	$1.24B	$3.72B
Large	$3.38B	$1.48B	$487M
Non-Public suppliers	$384M	N/A	N/A
Total	**$4.07B**	**$5.36B**	**$6.31B**

M = million; B = billion; N/A = not applicable

1. Not inclusive of near-term costs.
2. Not inclusive of near-term or future drinking water costs through 2035.

Visit OWRB Water Planning page **(https://oklahoma.gov/owrb/water-planning.html)** for more information on region water quality and trend analysis.