

# Grand Planning Region

## Summary

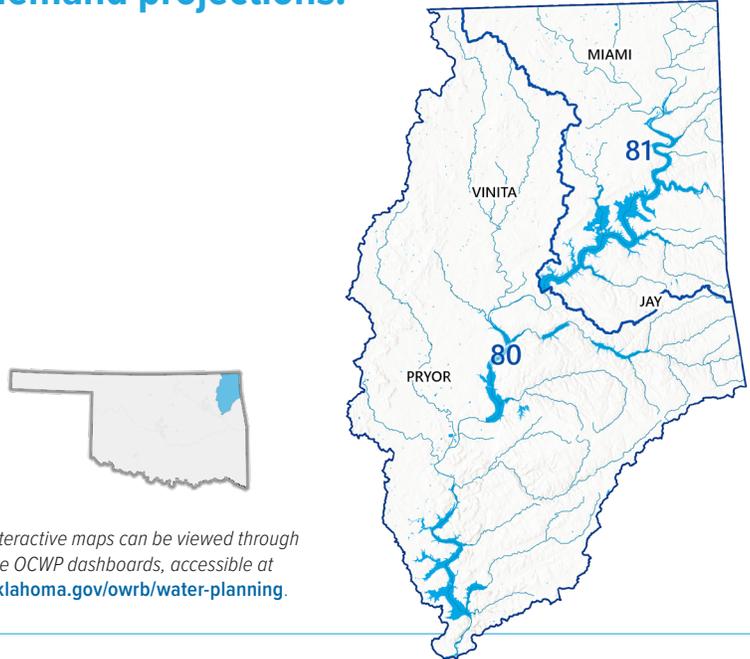
- Grand Region demands are supplied by a combination of surface water, groundwater, and out-of-basin supplies.
- Water demand (withdrawal) is projected to increase by 1,570 acre-feet per year (7%) between 2020 and 2075.
- Physical water shortages are projected for surface water and bedrock groundwater 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 Grand Region basins. Surface water throughout the region is administered by the Grand River Dam Authority, while groundwater is administered by OWRB.
- In addition to the Statewide Recommendations, Grand 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](http://oklahoma.gov/owrb/water-planning)

The Grand Region represents 3% of the state's 2075 projected population and 1% 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](http://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 Grand 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). **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



OKLAHOMA  
Water Resources Board

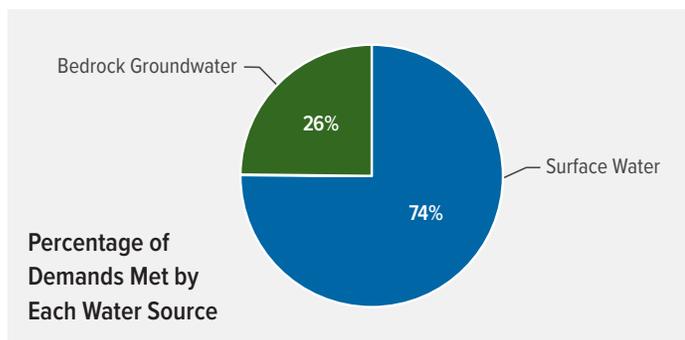
## Population

2020	2030	2035	2045	2060	2075
160,961	167,411	165,982	164,118	162,912	161,846

## Water Demand Projections

**Water demands (withdrawals) are projected to increase by 7% between 2020 and 2075.**

The Grand Region’s largest demand sector is Public Supply, representing 33% of the region’s 2075 water demands. The second largest demand sector is Thermoelectric Power, representing 25% of the region’s 2075 water demands.



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

### Total Demand by Sector (AFY)

	2020	2030	2035	2045	2060	2075
<b>Self-supplied Domestic</b>	2,257	2,343	2,317	2,292	2,292	2,280
<b>Self-supplied Industrial</b>	-	-	-	-	-	-
<b>Crop Irrigation</b>	1,458	1,788	1,897	2,116	2,379	2,379
<b>Livestock</b>	5,990	6,006	6,045	5,951	5,800	5,684
<b>Oil &amp; Gas</b>	254	254	254	254	254	254
<b>Public Supply</b>	9,008	9,139	8,984	8,769	8,561	8,303
<b>Thermoelectric Power</b>	4,652	3,955	4,003	4,716	5,511	6,290
<b>Total</b>	<b>23,618</b>	<b>23,484</b>	<b>23,499</b>	<b>24,098</b>	<b>24,797</b>	<b>25,188</b>

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 Grand Region is projected to experience surface water gaps (where demand exceeds supplies) and bedrock groundwater depletions (where water use exceeds the rate of recharge), as detailed in the table and text below. No alluvial groundwater depletion is projected.

SURFACE WATER GAP	2030	2035	2045	2060	2075	2075
	Maximum Magnitude (AFY)					Frequency
<b>Basin</b>						
<b>80</b>	-	184	396	1,159	1,745	82%
<b>81</b>	-	-	-	-	-	0%

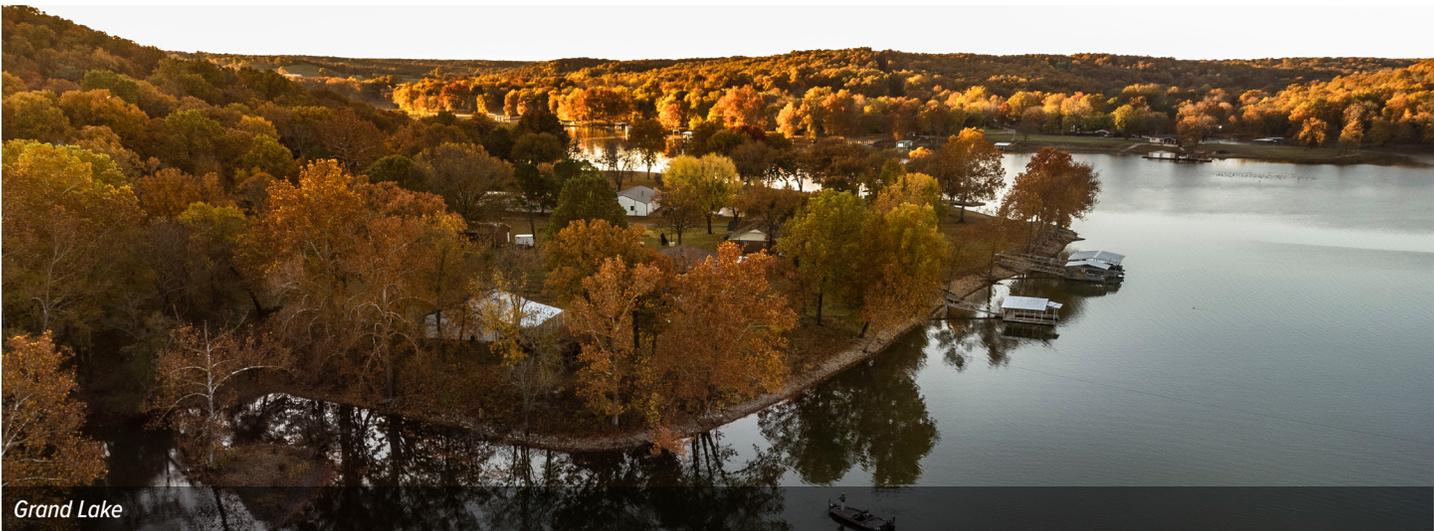
AFY = acre-feet per year

ALLUVIAL GROUNDWATER DEPLETION	2030	2035	2045	2060	2075	2075
	Maximum Magnitude (AFY)					Frequency
<b>Basin</b>						
<b>80</b>	-	-	-	-	-	0%
<b>81</b>	-	-	-	-	-	No AGW Demand

AFY = acre-feet per year

BEDROCK GROUNDWATER DEPLETION	2030	2035	2045	2060	2075
	Average Magnitude (AFY)				
<b>Basin</b>					
<b>80</b>	24	21	14	10	8
<b>81</b>	52	51	38	29	18

AFY = acre-feet per year



Grand Lake

## Legal Water Availability WM WSS

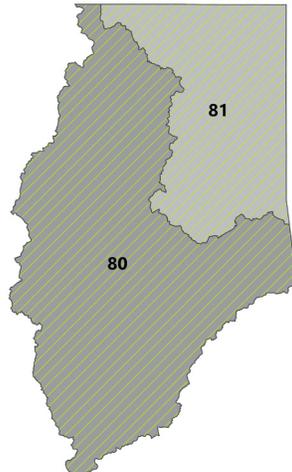
Surface water and groundwater are projected to remain legally available for permitting through 2075 in all of the basins within the Grand Region. Surface water in this Region is administered by the Grand River Dam Authority, while groundwater is administered by OWRB.

### Surface Water Legal Availability

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

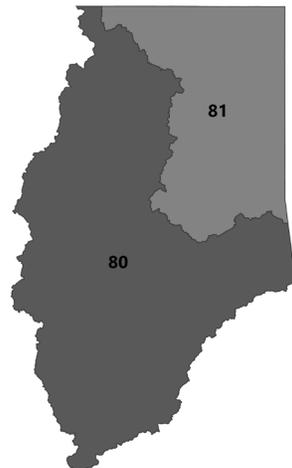
Surface Water Legal Availability (AFY) using 2075 Demands

- 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)
Eucha/Spavinaw Lakes	0
Fort Gibson	---
Hudson (Markham Ferry)	---
W.R. Holway	0
Grand	---

--- 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
Boone	Bedrock	Minor	temporary 2.0
Cherokee Group	Bedrock	Minor	temporary 2.0
Middle Neosho River	Alluvial	Minor	temporary 2.0
Northeastern Oklahoma Pennsylvanian	Bedrock	Minor	temporary 2.0
Northern Neosho River	Alluvial	Minor	temporary 2.0
Roubidoux	Bedrock	Major	temporary 2.0
Southern Neosho River	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:** The Roubidoux aquifer, the main groundwater source for the Grand region, has elevated total dissolved solids and salinity, while the Arkansas River alluvial aquifer shows some manganese concerns.



**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, approaching hypereutrophic, reflecting their moderate to high nutrient concentrations and biological productivity.



**Streams:** Water quality of Grand Lake is heavily influenced by heavy metals, sedimentation, runoff, and riparian loss concerns in its watershed. These factors contribute to poor aesthetics, habitat degradation, increased nutrients, health concerns, tourism concerns, and increased treatment costs.

## 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)
\$436M	\$392M	\$0M

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) <sup>1</sup>	Future Drinking Water Costs through 2045 (2025 dollars) <sup>2</sup>
Small	\$49M	\$750M	\$7.26B
Small-Medium	\$91M	\$1.10B	\$1.42B
Medium-Large	\$60M	\$0M	\$0M
Large	N/A	N/A	N/A
Non-Public suppliers	\$96M	N/A	N/A
<b>Total</b>	<b>\$295M</b>	<b>\$1.85B</b>	<b>\$8.68B</b>

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.