Northwest Planning Region

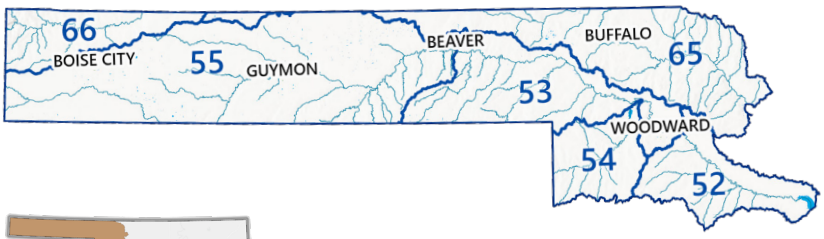
Summary

- Northwest Region demands are supplied predominantly by bedrock groundwater supplies.
- Water demand (withdrawal) is projected to increase by 44,057 acre-feet per year (7%) between 2020 and 2075.
- Physical water shortages are projected for surface water and groundwater as early as 2030 and will continue through 2075.
- Surface water is projected to remain legally available for permitting through 2075 only in Basins 54 and 65 of the Northwest Region. Groundwater is legally available for permitting in all Northwest Region basins.
- In addition to the Statewide Recommendations, Northwest Region stakeholders expressed interest in developing a regional economic plan, investing in technology and research, creating interconnections between systems, supporting irrigation districts, reforming federal crop insurance, metering of all water uses, expanding the Master Irrigators program and developing broader education program about best production/irrigation practices.

OWRB Water Planning Page

oklahoma.gov/owrb/water-planning

The Northwest Region represents 1% of the state's 2075 projected population and 30% 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 Northwest 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
- For some basins where existing and traditional strategies are unable to meet future demands, water transfers (all sectors) may be effective. WM WSS

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

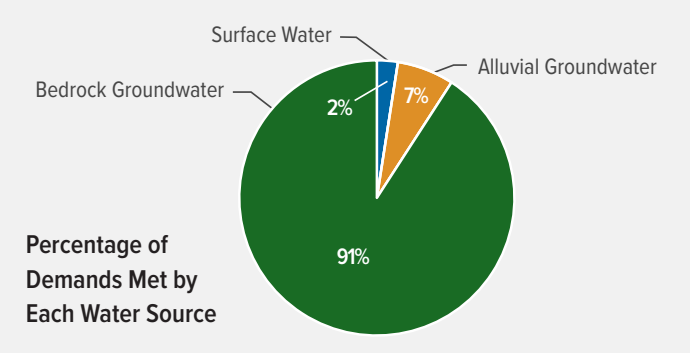
Population

2020	2030	2035	2045	2060	2075
58,718	58,879	58,749	59,136	61,036	61,553

Water Demand Projections

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

The Northwest Region's largest demand sector is Crop Irrigation, representing 94% of the region's 2075 water demands. The second largest demand sector is Livestock, representing 3% 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 Northwest Region, Self-supplied Domestic, Crop Irrigation, Livestock, Public Supply, and Thermoelectric Power demands will increase while Self-supplied Industrial 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	623	639	634	633	663	670
Self-supplied Industrial	2,946	2,872	2,866	2,853	2,787	2,718
Crop Irrigation	573,272	592,484	596,533	603,750	611,703	615,324
Livestock	17,306	17,430	17,615	17,797	18,115	18,550
Oil & Gas	1,697	1,697	1,697	1,697	1,697	1,697
Public Supply	12,814	12,910	12,894	13,025	13,555	13,741
Thermoelectric Power	164	111	106	136	159	179
Total	**608,824**	**628,144**	**632,345**	**639,891**	**648,679**	**652,880**

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 or projected demands, whichever is less.

The Northwest Region is projected to experience surface water gaps (where demand exceeds supplies) and groundwater depletions (where water use exceeds the 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
52	8	8	6	6	6	7%
53	-	-	-	-	-	0%
54	1	1	1	1	1	4%
55	4	5	9	12	14	58%
65	1,033	1,034	1,039	1,044	1,047	52%
66	95	95	95	95	95	76%

AFY = acre-feet per year

ALLUVIAL GROUNDWATER DEPLETION	2030	2035	2045	2060	2075	2075
Basin	Magnitude (AFY)					Frequency
52	784	823	699	665	733	42%
53	497	761	1,236	1,867	2,146	59%
54	2	2	2	2	2	4%
55	-	-	-	-	-	No AGW Demand
65	558	757	1,120	1,536	1,721	66%
66	-	-	-	-	-	No AGW Demand

AFY = acre-feet per year

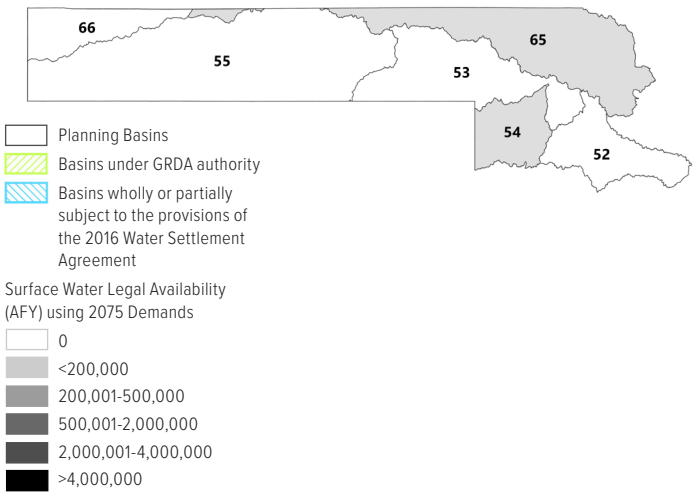
BEDROCK GROUNDWATER DEPLETION	2030	2035	2045	2060	2075
Basin	Magnitude (AFY)				
52	2,836	2,865	2,938	3,058	3,180
53	37,067	38,367	40,722	43,399	44,620
54	10,596	10,596	10,591	10,597	10,608
55	422,506	423,804	426,071	428,548	429,749
65	41,611	42,355	43,673	45,195	45,878
66	18,500	18,499	18,483	18,461	18,445

AFY = acre-feet per year

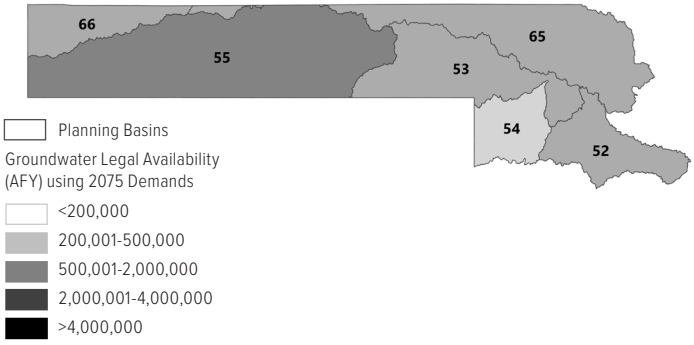
Legal Water Availability WM WSS

Surface water is projected to remain legally available for permitting through 2075 only in Basins 54 and 65 within the Northwest Region. Groundwater is legally available for permitting in all of the Northwest Region basins.

Surface Water Legal Availability



Groundwater Legal Availability



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)
Canton	0
Optima	No Yield

--- 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)
Cimarron River	Alluvial	Major	temporary 2.0
El Reno	Bedrock	Minor	temporary 2.0
North Canadian River	Alluvial	Major	1.0
Ogallala Northwest	Bedrock	Major	1.4
Ogallala Panhandle	Bedrock	Major	2.0
Ogallala-Whitehorse	Bedrock	Major	temporary 2.0
Rush Springs	Bedrock	Major	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: Since groundwater is the primary source of drinking water in the region, water quality concerns such as elevated nitrate and fluoride levels in the Ogallala are important to monitor, as they can adversely affect human health.

Lakes: Impacts affecting lakes in this region include nutrients, chlorophyll- a, and turbidity, all of which affect recreation and water supply uses. Consistent with high levels of nutrients and productivity, lakes in this region are classified as eutrophic and hypereutrophic. High levels of nutrients and chlorophyll can lead to increased treatment cost, taste & odor issues for water supply, and reduced recreation.

Streams: Rivers and streams are impacted by drought-flood cycling and scarcity. These factors contribute to water insecurity.

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)
$362M	**$302M**	**$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)[1]	Future Drinking Water Costs through 2045 (2025 dollars)[2]
Small	$16M	$850M	$653M
Small-Medium	N/A	N/A	N/A
Medium-Large	$58M	$461M	$88M
Large	N/A	N/A	N/A
Non-Public suppliers	$288M	N/A	N/A
Total	**$362M**	**$1.31B**	**$741M**

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)](https://oklahoma.gov/owrb/water-planning.html) for more information on region water quality and trend analysis.