2025 OCWP
Oklahoma Comprehensive Water Plan

# Round 3 Regional Meeting Summary
# Spring 2024



OKLAHOMA Water Resources Board

US Army Corps of Engineers

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SECTION 1

# ROUND 3 REGIONAL MEETING EXECUTIVE SUMMARY

In April and May 2024, the Oklahoma Water Resources Board (OWRB) hosted a third series of Oklahoma Comprehensive Water Plan (OCWP) regional meetings across the state to engage with local officials, water utility suppliers, regulated industry, commercial agricultural producers, economic development entities, and other organizations to converse on local water challenges share opportunities and identify ways the OCWP can inform and support local water planning and management.

The meetings began with a welcome and team introduction by Owen Mills, OWRB's Planning Director, and a local success story. The OCWP team extends its appreciation to Oklahoma State University, Oka' Institute, Oklahoma Rural Water Association, Bio X Designs, and the Oklahoma Municipal Assurance Group for sharing their stories. The meeting proceeded with a general OCWP update and a recap of the first two rounds of regional meetings (August 2023 and December 2023). In the first round of regional meetings, permitting / policy / regulations, funding / financing and infrastructure improvements, and collaboration / partnership emerged as key topical categories to frame breakout group discussions at the second round.

During the Round 3 regional meetings, the OCWP Team presented draft baseline scenario data. These data illustrated the degree to which demands in each of the state's 82 planning Basins are projected to change from 2020 to 2075. Physical water supply gaps and depletions are defined as conditions where, respectively, surface water and groundwater supplies are insufficient to satisfy projected demands. These gaps/depletions vary geographically across the state. However, if water is physically available, it may not be legally available for use. The amount of groundwater predicted to be available for permitting under future demand conditions has been estimated. Development of surface water legal availability estimates are in progress by the OCWP Team. Information was also presented regarding surface water quality. Key water quality trends were presented for total dissolved solids, water clarity, and nutrients. Because the State's groundwater quality monitoring program has a shorter period of record than surface water quality, groundwater quality trending analyses could not be prepared. The draft figures presented at RM3 have been updated; the updated figures are included in this summary document.

To meet physical water supply gaps/depletions, water management strategies can be implemented throughout Oklahoma. Discussion of the effectiveness of strategies specific to each OCWP Planning Region was held in breakout groups. Participants were asked to provide input on the strategies that would be most effective in their area to address water supply challenges. Participants also suggested other strategies, expressed reasons for their positions, and listed potential methods of implementing the strategies. Among the five regional meetings, the following key takeaways were established:

- Effective water management strategies should align locally and focus on the Region's and/or Basin's predominant demand.
- Demand Management was identified by participants as the most applicable water management strategy in each of the Regions.
- There is a lack of concurrence among Oklahomans regarding the future role of large-scale water transfers in the state. However, one or more meeting participants expressed support for intra-basin transfers between public supply water systems for the purpose of infrastructure cost-sharing and water supply redundancy/resiliency.

- Watershed Management (e.g., source water protection, eradication of invasive species, etc.) was independently suggested by participants in each regional meeting as an additional water management strategy. Suggested means of implementation varied.

# SECTION 2 ROUND 3 REGIONAL MEETINGS

In April 2024, OWRB hosted in-person meetings in Lone Wolf, Antlers, Woodward, and Tulsa, plus a statewide virtual meeting, as part of the ongoing 2025 OCWP update. In May 2024, an in-person meeting was held in Oklahoma City. This was the third in a series of regional meetings designed to engage with local officials, water utility suppliers, regulated industry, commercial agricultural producers, economic development entities, and other organizations to converse on local water challenges, opportunities, and information the OCWP can provide to support their needs and efforts.

## 2.1 Welcome

Owen Mills, OWRB's Planning Director, welcomed guests by reminding them of the goals for the regional meetings, reviewing the agenda, and introducing key OCWP team members as well as legislators, local officials, and OWRB Board Members.

In each meeting, a local success story was told.

- Paul Weckler, Oklahoma State University (OSU), Professor of Biosystems & Agricultural Engineering, discussed OSU's various well monitoring and soil health efforts. OSU has implemented real-time well monitoring in Caddo County, Blaine County, the Panhandle, and a few other areas but are working towards widespread monitoring via an app across the state. In collaboration with OWRB, US Geological Survey (USGS), and more.
- Amy Hays, Oka' Institute, Assistant Director of Development and Outreach, shared a success story regarding the restoration efforts of the Lake of the Arbuckles Watershed in collaboration with the Chickasaw Nation and the Lake of the Arbuckles Watershed Association. Discussed restoration efforts include training on soil health practices, riparian zone improvements, and best water management practices.
- Brandon Bowman, Oklahoma Rural Water Association (ORWA), ORWA State Program Director, shared information regarding the services and funding available through the ORWA. Examples include their Water Loss and Leak Detection Program and Technical Assistance Program. Water and wastewater systems are essential to rural Oklahoma because they help protect public health and promote economic growth.
- Steve Patterson, Bio X Design, shared a success story regarding the transformation of a local park near Lake Eufaula to a wetland that treats urban stormwater runoff, provides wildlife habitat, and provides visitors with educational and relaxing environment. OWRB funded the project through a State Revolving Fund (SRF) loan. Construction was completed in 2020.
- William Sheppard, Oklahoma Municipal Assurance Group (OMAG), Risk Management Director, shared information regarding various grants that OMAG provides. SL-RAT Assessment is free to AG members. It provides a sewer system map with blockage assessment. Additional sanitary sewer system services they provide through their grants are root control and the purchase of used or refurbished equipment.

## 2.2 OCWP Overview

The 2025 OCWP Update is a multi-year project that seeks to define and address water supply challenges and solutions. In recognition of variability in hydrology and water uses across the state, analysis is completed on the Basin or Regional level. The OCWP Team seeks input from stakeholders across all water sectors to support technical and policy work.

The OCWP seeks to provide consistent information across the state to assess reliable water supply, which depends on physical supply *(is wet water available)*, legal/permit availability (*do I have the water right to use the water*), and water quality. All of this depends on infrastructure *(do I have the necessary infrastructure in place to divert, treat, distribute, and use the water?)*.

## 2.3 Round 1 and 2 Regional Meeting Recap

In August 2023, OWRB held five in-person and two virtual Round 1 regional meetings around the state. Figure 1 summarizes the relative prominence of topics that came up during these discussions. Summaries from Round 1 regional meetings were presented in each of the Round 3 meetings. Larger boxes indicate topics that were more frequently brought up by meeting participants. Across the state, the three most commonly identified topics were funding/financing and infrastructure improvements, permitting/regulations/policy, and collaboration/partnership.

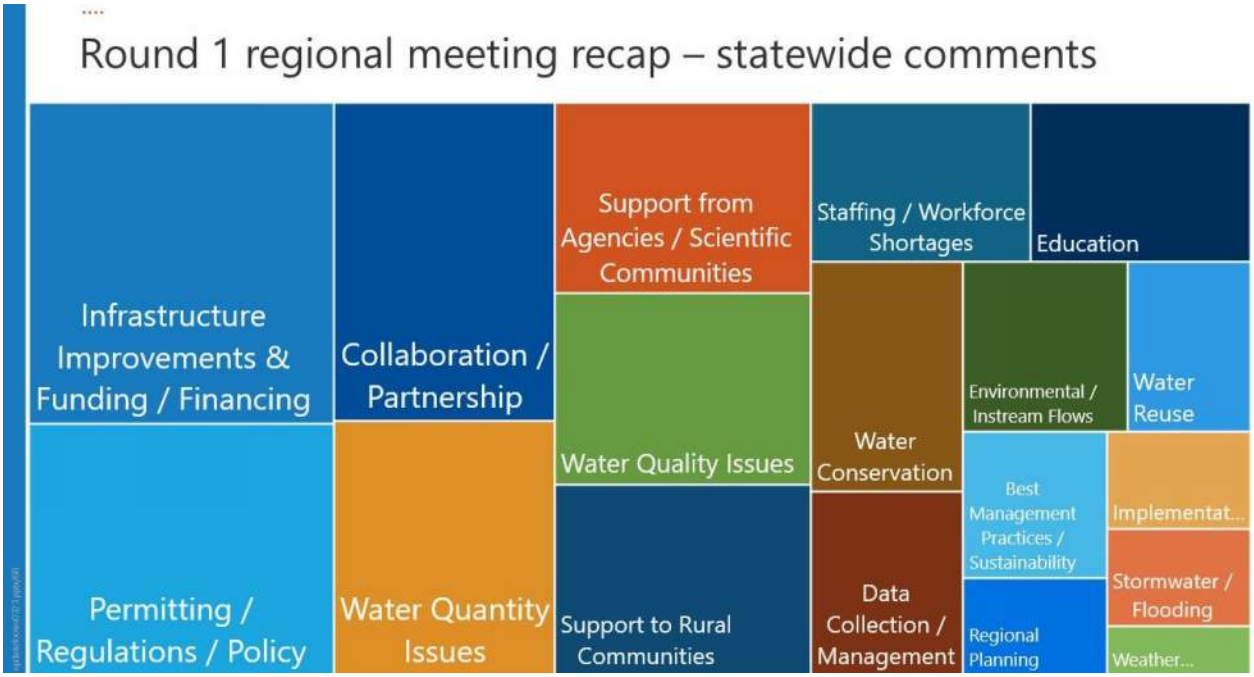



Figure 1 Round 1 Regional Meeting Recap

In the series of Regional Meeting 2 meetings around the state in December 2023, these three topics identified were discussed in breakout groups. Throughout the five distinct areas of the state, different feedback was given with regards to the three topics and was shared. However, there was some degree of consensus, which is captured below.

**Permitting / Policy / Regulations**. Many participants expressed support for increasing timely enforcement of existing rules and use limits. Ideas for achieving this included establishing regional OWRB

offices or representatives, local management authorities, or modifying enforcement rules. Nearly all participants expressed views that some form of local control or management of water resources would be beneficial, although there was no consensus on what management structures should be implemented or what kinds of authorities, if any, should be established.

**Funding / Financing** and Infrastructure Improvements. There was broad support regarding the development of a more robust education program for system management and board training, expanded planning and technical assistance programs, and providing significant and permanent state funding for water and wastewater management. Many participants agreed that these could be accomplished within existing program authorities if these programs were provided additional funding and/or staff.

**Collaboration / Partnership**. Many participants expressed support for developing regional water plans, and for the role coordination can play to leverage and improve individual local planning efforts within a Region. Participants noted that regional water plans can be useful tools in identifying capital project needs for water supply, and that the state could help incentivize regional planning through financial programs to assist with funding regional plan development and by either requiring, or providing bonus points for, inclusion of a capital project in a regional water plan as a condition for approving or prioritizing state funding for that capital project.

Participants identified several best management practices (BMP) for managing water and mechanisms through which the state can encourage or incentivize these voluntary BMPs. Examples include providing training and/or technical assistance for utilities to implement effective utility management and sustainable utilities practices (e.g., appropriate rate structures, regular rate increases, long-term planning, etc.).

## 2.4 Draft Baseline Scenario Data

Technical studies are an important component of the OCWP because they help guide recommendations and provide 50-year basin-scale water resources projections for local entities' use in planning and managing their supplies. Draft baseline scenario data – *water demand projections, physical supply, physical gaps/depletions, legal supply, and water quality* - developed by the OCWP Team were presented at the Round 3 meetings for participant awareness and feedback.

### 2.4.1 Water Demand Projections

The OCWP Team started this portion of the meeting with a presentation of population projections provided by the Oklahoma Department of Commerce. According to the 2020 Census, Oklahoma has a population of just under 4 million people and by 2075 is predicted to have approximately 4.8 million people.

For each water demand sector, water withdrawal projections (also referred to as water demand) were presented. Total withdrawals represent the amount of water pumped or diverted from the source to meet the needs of the use sector. In nearly all instances, some proportion of water is returned to the surface water or released back into the ground. The difference between withdrawals and return flows is referred to as consumptive use in the OCWP.

The demand sectors are defined as the following:

- Public Supply – Water users receive supply from municipal or public water systems, community, or rural water district.
- Self-Supplied Domestic – Water use from households that are not connected to a public water system. This does not include well water used for crop irrigation.
- Crop Irrigation – Water use for agricultural crop production to supplement natural rainfall.

- Thermoelectric Power - Water use associated with power plants to cool equipment and condense steam to drive generators. OCWP estimates are prepared both for withdrawals and consumptive use for this sector, as a large proportion of withdrawals are typically returned to the source water body.
- Self-Supplied Industrial – Water needed by large industrial users who do not receive water from a public water supplier.
- Livestock – Water required for animal nutrition, cooling, sanitation, and waste removal.
- Oil & Gas – Water use associated with oil and gas production. Examples include enhanced recovery of petroleum, drilling or completion of a well, and rig wash.

Excluding Thermoelectric Power, statewide demands increase by 14% through 2075, but trends vary between planning Regions and Basins (Appendix A). Figure 2 captures the demand trends by sector. Public supply, self-supplied domestic, and self-supplied industrial demands are expected to increase statewide as population and employment grow through the planning period. Additionally, crop irrigation demand is projected to slightly increase with the expansion of irrigated acreage. Livestock and Oil & Gas demand is predicted to remain relatively constant. Excluding Thermoelectric Power demands, the statewide 2075 total demand is predicted to be 2.2-million acre-feet.

Thermoelectric Power demands are projected to decrease through 2045 and slightly rebound through 2075. However, most (approximately 97%) of these withdrawals are returned and not consumed. These demands are based on Energy Information Administration's (EIA) projections, which show a decrease in natural gas-powered generation through the next 10 years and then a rebound through 2050 and a decrease in coal-powered generation from the mid-2030s through 2050. The statewide 2075 total demand is predicted to be 3.4-million acre-feet.

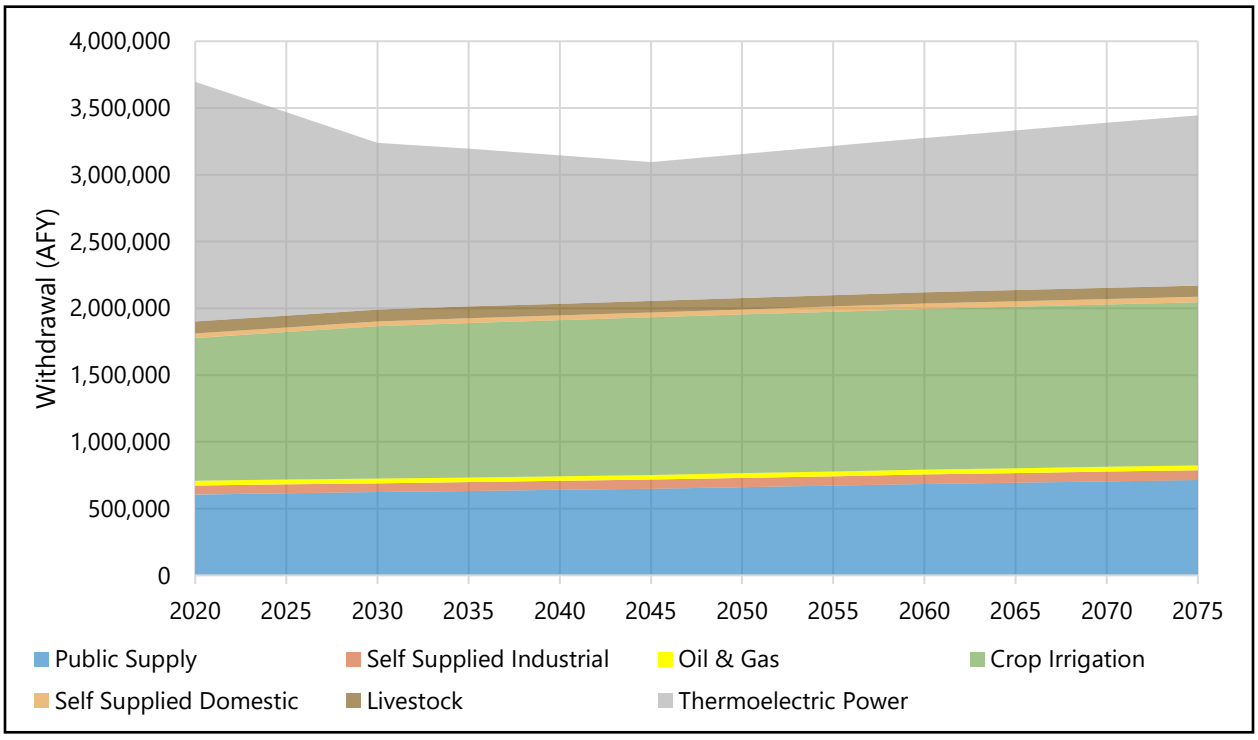



Figure 2 Statewide Water Withdrawal (Demand) Forecast by Sector

### 2.4.2 Physical Supply and Physical Gaps/Depletions

The OCWP Team then discussed physical supply availability and potential "wet water" gaps/depletions. Physical supply is the volume of surface water (i.e., streamflow, lakes, reservoirs) and groundwater (in either alluvial or bedrock aquifers) physically present as wet water. Basins across the state rely on these three water sources, but to varying degrees as their availability and water quality varies geographically.

Streamflow can be defined as the physical water measured at the downstream point of a planning basin. As shown in Appendix A, streamflow can vary dramatically from wet to average to the driest (drought) conditions. Historical streamflow records account for reservoir operations. Minimum interstate inflows required by upstream interstate Compacts have been conservatively excluded from these analyses (e.g., Oklahoma has access to 40 percent of historical streamflow entering the State). The H2O Tool calculates the outflow from the planning basin after removal of planning decade incremental demands (the projected increase in demands for each decade), inclusion of inter basin transfers, and inclusion of return flows from each water use sector analyzed. Return flow rates (calculated as a percentage of withdrawal) are generated based on the volume of demand satisfied and vary by basin for Public Supply. These flow rates are assumed to be constant across the state for Crop Irrigation and Thermoelectric Power but vary by Basin for the other sectors based on certain local conditions.

When surface water demand exceeds the available surface water supply, a surface water "gap" occurs (see Figure 3). A statistical analysis of the historical variation in streamflow is used to determine the magnitude and frequency of physical surface water gaps and alluvial groundwater depletions. The OCWP physical water calculations recognize that surface water and alluvial groundwater are physically connected. This connection indicates that a diversion from an alluvial groundwater source results in a comparable reduction in streamflow of the surface water source that is connected to the alluvial aquifer. All alluvial groundwater is supplied by surface water. The volume of alluvial groundwater (streamflow) in a basin is determined by subtracting the surface water demand from the total surface water supply. An alluvial groundwater depletion occurs when alluvial groundwater demand exceeds the streamflow that remains in the basin. Depletions are identified in bedrock groundwater aquifers when the bedrock groundwater demand exceeds the recharge rate. A groundwater depletion does not necessarily imply an inability to meet demand, as groundwater storage can typically be tapped to meet the demand. However, a depletion is indicative of a long-term water supply reliability concern.




Figure 3 Fundamental Planning Equation

Surface water physical availability gaps and groundwater physical availability depletions are tabulated by Planning Region in Appendix A.

### 2.4.3 Legal Supply

Legal Supply is the volume of available water for appropriation (or permitting). To estimate groundwater legal supply, the Equal Proportionate Share (EPS) is multiplied by the area of the aquifers underlying the planning basin. The permitted amount is subtracted to determine the amount of water remaining to be permitted. All basins have some groundwater available for permitting (as summarized in Appendix A).

The OCWP Team is currently working to develop a similar estimate for surface water legal availability. OWRB uses the average annual runoff for surface water permitting calculations. This model, with a few minor changes to make it suitable for statewide planning, will be used to estimate the amount of surface water available for appropriation and will present those results in subsequent phases of OCWP development.

### 2.4.4 Water Quality

The OCWP Team is currently working to develop a water quality dashboard. Surface water quality includes rivers/streams and lakes/reservoirs. Specific nutrients that are anticipated to be evaluated are total phosphorus, total nitrogen, and relative level of eutrophication. Eutrophication occurs when nutrients cause algal overgrowth and subsequently start to impair a water body. Both nutrients, while present naturally in ecosystems, may have significant contributions from both point and nonpoint source anthropogenic (or people) sources. Turbidity, or water clarity, provides insight into treatment needs for water suppliers, affects aquatic life in a variety of ways, and impacts the aesthetics and recreational value of a waterbody. While not a direct surrogate for total suspended solids (total mass), turbidity is a good indicator of the prevalence of suspended solids. Groundwater quality data are less widely available statewide, and thus were not trended. However, the state's database of groundwater quality is expanding because of new programs enacted in response to recommendations in the 2012 OCWP.

## 2.5 Round 3 Breakout Groups

In this round of meetings, breakout groups were used as a platform to discuss water management strategies (WMS). WMS are methods that can be used to minimize and/or prevent gaps/depletions now and/or in the future. Categories of WMS (also referred to as "Tier 1 WMS") are defined in Appendix B and listed below in Table 1. Participants were separated into breakout groups by Planning Region, then given time to indicate (or "vote on") which WMS they viewed as being most effective for meeting water needs in their Region. Each participant was given three "dots" that could be placed in any combination on the WMS categories (e.g., three dots on one category, one apiece on three categories, etc.). The groups discussed the strategies to explore why certain strategies were or were not prioritized for their Region. Table 1 provides a summary by meeting region of participants' input. Participant commentary is summarized in the following sections.

Table 1 Summary of Water Management Strategy Votes

| | NW | NE | SW | SE | Central | Total |
|---|---|---|---|---|---|---|
| Demand Management | 33% | 38% | 21% | 30% | 21% | 27% |
| Agricultural Options | 37% | 7% | 26% | 4% | 11% | 16% |
| Water Transfers | 9% | 11% | 8% | 4% | 9% | 8% |
| Increase Reliance on Surface Water | 0% | 2% | 18% | 5% | 9% | 8% |
| Increase Reliance on Ground Water | 2% | 2% | 8% | 9% | 5% | 5% |
| Stormwater Capture and Use | 0% | 13% | 6% | 13% | 20% | 12% |
| Reuse | 17% | 16% | 8% | 7% | 20% | 14% |
| Other | 2% | 13% | 5% | 29% | 4% | 10% |

(1) Northwest meeting covered the Panhandle Planning Region.
(2) Northeast meeting covered the Eufaula, Grand, Lower Arkansas, and Middle Arkansas Regions.
(3) Southwest meeting covered the Beaver-Cache, Lower Washita, Southwest, and West Central Planning Regions.
(4) Southeast meeting covered the Blue-Boggy and Southeast Planning Regions.
(5) Central meeting covered the Central and Upper Arkansas Planning Regions.

### 2.5.1 Northwest

Generally, Northwest Round 3 meeting participants showed strong support for Agricultural Options and Demand Management as the WMS categories that would be most effective for their Region.

**Agricultural Options:** Many expressed that working towards more water savings in the agricultural sector is important because it has the highest demand in the area, indicating the potential for the most water savings. Some participants suggested that using more efficient irrigation methods and related technologies (e.g., soil moisture probes, crop choice) are effective paths forward for this strategy, especially when there are financial incentives available for implementation. Participants indicated that there are incentives in place now, but there could be increased interest if additional incentives were established. Some participants disagreed and suggested that there are limitations towards water efficiency. Potential limitations cited include the cost of new irrigation technology, limited resources for the repair of "old" technology, and some expressed a position that existing technology cannot be substantially improved.

Another consideration for the Agricultural Options WMS expressed by participants was permitting/policy changes. Some expressed that OWRB needs to better enforce current water use and reporting polices but understand that OWRB's resources are limited. Others thought that policy changes are vital and expressed that all demand sectors need to meter water use, or, more generally, promote requirements to improve accuracy of reported water use. One participant stressed that OWRB should consider changing

the permitting process. For example, since the Ogallala Aquifer is substantially declining, should OWRB continue to issue new groundwater permits? Demands for the public supply sector should be prioritized over those for agriculture or oil & gas, especially when supplies are limited. Another participant voiced concerns about well-spacing limits both in terms of enforcement well-spacing requirements as well as impacts of older wells that were grandfathered in and do not meet existing spacing requirements. Among these suggestions, group consensus was not achieved for potential changes to permitting/policy.

**Demand Management:** Participants expressed that Demand Management is a WMS that the Region should pursue. Methods suggested to support this strategy include tiered water rates, low water use grass for golf courses, water use restrictions for landscape irrigation, and the implementation of water efficient plumbing fixtures community wide. Implementation would have to occur on a community basis, but agencies such as OWRB could provide information about best practices or sample ordinances as a path forward.

**Reuse:** Many comments regarding Demand Management were made in relation to the Reuse WMS. Some participants suggested that potable water should not be utilized for all uses, and instead, reclaimed municipal water could be treated to an appropriate level for its use to save on resources. Generally, support for reuse was reached among participants; however, some remained skeptical of its feasibility due to limited return flows from community wastewater systems in rural areas. Additionally, water reuse technology is relatively new and even with public support, the potential cost may continue to prohibit its widespread use in the near future.

**Water Transfers, Increase Reliance on Surface Water, and Increase Reliance on Groundwater:** Limited votes were given to Water Transfers, Increase Reliance on Surface or Groundwater, and Stormwater Capture/Use WMS. The few participants who voted for Water Transfers believe that it will have to be used, no matter the cost, on a large-scale to maintain regional vitality. Opponents thought that transferring water from another portion of the state is not feasible due to cost. However, participants generally expressed support for connecting small water systems to provide redundancy/resiliency but recognized that some financial assistance is needed to move forward. Increasing Reliance on Surface Water and Stormwater Capture/Use were not favored due to the Region's lack of rainfall and lack of urbanized areas that generate stormwater runoff, and the expectation that this will not change over time. Participants expressed that Increasing Reliance on Groundwater is an inevitability rather than preferred strategy, because nearly all the Region's supply currently comes from this source.

### 2.5.2 Northeast

The WMS that had the most support from meeting participants in this Region was Demand Management and Reuse.

**Demand Management:** Participants expressed that since the largest demand sector in the Region is public supply; this strategy would have the greatest impact upon implementation. Rather than looking for new water supplies, managing local demand was suggested to be less expensive for the Region.

**Reuse:** Some participants related Reuse to Demand Management because it is viewed as a conservation tool (i.e., a way to reduce or offset demands on traditional sources). Furthermore, participants viewed Reuse, both potable and indirect potable, as a feasible strategy in the area because of return flow availability from regional municipalities. Concerns expressed by participants regarding this strategy include the potential negative impact on low-flow streams and effects on natural water quality.

**Stormwater Capture/Use:** Stormwater Capture/Use was another WMS that some participants supported through their votes. One participant had the opinion that this is a large source of water that the Region is not adequately utilizing. Barriers hindering the utilization of this water source were identified as local infrastructure and stormwater quality. Current systems in the area do not have sufficient storage capacity

for this supply. Limited treatment of this supply is ideal to keep treatment costs low, but it is difficult when contamination is immediate upon contact with the ground.

**Water Transfers:** Participants expressed mixed opinions on Water Transfers. Most voted favorably of this WMS when viewed as a method to supporting rural communities through small, intra/inter-basin system connections. These transfers provide them with redundancy and the availability to cost-share vital infrastructure. A few other participants had positive opinions for a different reason – for example, substantial water transfers have allowed economic development for various communities in the Region. Conversely, others noted this practice as irresponsible because of the potential negative impacts on local ecosystems and source basin's supply.

**Agriculture Options:** Limited votes were given to the Agriculture Options WMS, mainly due to the sector's limited presence in the area. It was noted by one participant that municipalities plan based on metering their demand and suggest that the irrigators do the same because "you cannot manage what you do not measure." Other participant comments regarding this WMS were tailoring crop selection to water naturally available and the implementation of maximum efficiency in irrigation practices. Multiple comments were made regarding climate variability and the potential need to change irrigation practices regionally if there is less rainfall in the future.

**Increase Reliance on Surface or Groundwater:** Increase Reliance on Surface or Groundwater were the two WMS given the least support in this Region with one vote each. One participant suggested raising reservoir flood pool levels to increase surface water capacity in the region. Another expressed interest in evaluating the potential for aquifer storage and recovery (ASR) to increase groundwater storage capacity in the Region.

**Other Strategies:** Generally, participants in this Region expressed support for Watershed Management as a new category of WMS. This strategy stresses the importance of maintaining non-consumptive flows in local surface water bodies and the preservation of natural water quality to maintain ecosystem services. Some participants suggested that implementation of this strategy would include policy changes to enforce non-consumptive flows, add non-consumptive flows to demand modeling, and increased water quality monitoring to better understand the impacts of non-point source pollution.

### 2.5.3 Southwest

Southwest meeting participants shared the greatest support for the Agricultural Options, Demand Management, and Increase Reliance on Surface Water WMS.

**Agricultural Options:** Consensus was met regarding the need for improved education on efficient irrigation practices to explain their importance towards water savings, how these practices work, and the funding available to support these practices. One participant suggested that similar educational materials have become more widely available for soil moisture probes. Participants expressed that new techniques and technologies are not the only path towards improved water management in the agricultural sector. For instance, technical and financial assistance to maintain and potentially update older equipment was viewed positively as these services could provide water and cost savings to individual producers. Additionally, most participants supported an increase in funding towards groundwater monitoring wells and a program to share this data on a real-time basis. This data could potentially be used as a tool for producers when they are making crop decisions.

Like participants at the Northwest meeting, changes to metering policy were suggested but a consensus was not reached. Some participants agreed that financial incentives for the implementation of metering technology is a better way to get producers to meter instead of requiring it. This technology was said to benefit producers as it helps them move towards lower maintenance systems with improved accuracy, further encouraging participation. Additionally, these improvements could potentially decrease water

consumption, which over time, decreases pumping costs. One producer noted at the meeting that lower pumping costs alone are a driver for producers to use less water.

**Demand Management:** Generally, participants also favored Demand Management as a WMS for the Southwest Region. Various participants suggested different methods of pursuit but, overall, participants were in support of those mentioned. Regional municipalities were said to be experiencing water loss with their current infrastructure. Identification of where and why this loss is occurring is key because it allows for the determination of a path to control and future mitigation. Small systems have had success with ORWA's Water Loss and Leak Detection Program. Additionally, participants expressed that municipalities could work towards waste elimination through educational programs. OWRB can provide tools to municipalities to share individual-scale conservation measures (e.g., best way to water lawns, taking shorter showers) with their customers. These methods can be applied region-wide but overall participants believed that there is not a specific pathway to achieve success with this WMS. Rather, localities need to have the control to implement what they think will work for their communities as they understand what is needed to minimize demands.

**Increase in Reliance on Surface Water:** Increase in Reliance on Surface Water was another supported WMS. One participant who voiced their opinion on this strategy thought that the construction of new reservoirs, even with limited potential sites, or at least raising dams in the area could help increase storage. Another participant noted that limiting influent sediment would, in the short term, help maintain reservoir storage capacity but is unsure of a path forward to do so.

**Increase in Reliance on Groundwater:** Participants who supported an Increase in Reliance on Groundwater generally expressed that the Region is too reliant on surface water. Two systems that are primarily reliant on surface water said that they are in the process of diversifying their supply with groundwater wells. One cited concern was that evaporation is influencing their surface water yield.

**Reuse and Stormwater Capture/Use:** Reuse and Stormwater Capture/Use were connected to an Increase in Reliance on Groundwater WMS. Participants noted that excess agricultural tail water and stormwater could be captured and stored as groundwater, then targeted for non-potable uses to minimize treatment. However, the concerns expressed were that limited agricultural tail water is produced due to the emergence of more efficient irrigation practices and technologies, as well as limited rainfall in the area. Additionally, participants did not favor potable or indirect potable reuse due to limited municipal return flows available in the area. Limited support of foreseen pathways forward with Reuse and Stormwater Capture/Use is reflected in the number of votes they received.

**Other Strategies:** Watershed Management was the strategy identified by the participants who voted placed their vote in the "Other" strategy category, citing the need for brush control programs and/or funding to eliminate invasive species (e.g., Red Cedar) that have high water demands.

### 2.5.4 Southeast

Participants at the Southeast meeting expressed the greatest support for Demand Management and Watershed Management (Other or not listed strategy) WMS.

**Demand Management:** Tools, such as smart meters, have been shown to help some municipalities manage their demand because they can quickly identify leaks and thus minimize water loss. Participants supported education rather than enforcement of water conservation measures in their Region. For instance, one regional municipality enforced conservation measures during a period of drought and believes that it caused users to increase water use. Overall, participants reached a consensus with the idea that Demand Management should be considered with regards to quality of life (*How do we save water but maintain or improve the public's quality of life?*).

**Reuse and Stormwater Capture/Use:** Like the Southwest meeting, Southeast meeting participants thought that Reuse and Stormwater Capture/Use coincide with Demand Management because water taken from an alternative source is a conservation measure. Generally, it was shared that excess water, stormwater or otherwise, should be captured and made available for future use, including to meet instream flow needs (environment, recreation, or cultural).

**Agricultural Options:** Irrigation was suggested as one of the best ways to use stormwater since it could be captured in on-site ponds and reused without centralized infrastructure. Beyond this, the group saw limited potential savings in the agricultural sector as there are few irrigated acres in this Region. Other measures related to the Agricultural Options WMS were not discussed. Participants did not specifically suggest any other mechanisms to capture stormwater, but one did stress that capture is increasingly becoming more important as the climate becomes more variable. They also suggested that this flow should be metered so that the volume captured is understood.

**Reuse:** Direct or indirect potable reuse would be difficult according to participants since the Region's infrastructure is primarily decentralized. Furthermore, they expressed that basins seeking water transfers from Southeast Oklahoma seriously explore Reuse. Another identified barrier to reuse was public support. One municipality in the Region cited that their constituents are not in favor of non-potable reuse but believe education through sharing success stories will be the path forward in overcoming this hurdle.

**Water Transfers:** The WMS with the most significant feedback from participants in Southeast Oklahoma was Water Transfers. Generally, participants were in consensus on all views associated with this strategy and tended to focus more on minimizing or eliminating transfers by others out of Southeast Oklahoma, rather than viewing transfers into Southeast Oklahoma as a WMS to address local needs. Most participants stressed that it should be an emergency measure, not a default approach to responsible water management. Participants expressed that the area is perceived by others as having an endless supply of surface water due to its rainfall patterns. They believe this is not true because water is being permitted then transferred to other areas of the state.

**Increase Reliance in Groundwater:** One system that uses local surface water has had to direct potential customers to groundwater because they do not have any more legal supply available to treat and sell. Groundwater was reported as the Region's primary supply for rural customers, but overall, regional reliance increased because of less surface water availability. This aligns with the Region's minor preference for the Increase Reliance in Groundwater WMS over Increase Reliance in Surface Water. Regional barriers identified for this strategy include limited drilling potential in some areas due to the nature of the landscape, and deep well water quality.

**Other Strategies:** Participants correlated their least preferred WMS, Water Transfers, to one of their preferred Other (not listed) strategies, Watershed Management. The group expressed that limiting water transfers out of the Region helps the watershed maintain its integrity and could both be addressed by implementing change to permitting/policy. Suggested changes include the requirement of conservation measures by out-of-basin permit holders; Implementation of Non-Consumptive Flow requirements in all streams; and cease the issuance of out-of-basin permits when local demands currently do not meet or are projected to exceed supply. Beyond changes to policy, one participant suggested Increased Education Programs regarding water and its ecosystem services to encourage the public to value natural resources more greatly. Another participant expressed that the area could benefit from zoning and economic growth management to manage demand, preserve natural recharge features, and limit non-point source pollution in stormwater runoff.

### 2.5.5 Central

Demand Management, Reuse, and Stormwater Capture/Use were the favored WMS of the Central meeting participants. The “Other” category had the least support given by meeting participants, but overall, represented those who favored Watershed Management as a strategy.

**Demand Management:** Suggested methods included expansion of the Red Cedar removal programs and increased land management (zoning). Overall, participants expressed that efficiency could improve by increasing conservation measures and reducing the amount of water wasted. Controlling demand was identified to be easier than increasing an area’s physical supply. In times of drought, a Region’s physical supply is especially limited. Many participants agreed that water systems need to have a drought management plan and drought education for their customers. One system expressed the need for regulated demand management measures over voluntary because they have maximized system savings with existing voluntary measures.

**Reuse:** Most attendees were in support of non-potable and potable reuse but acknowledged that there are barriers regarding implementation. For instance, a local power company uses treated wastewater effluent as cooling water. Other users have contacted the power company regarding reusing this water further. However, the company representative stated that they are unable because current regulations require a discharge permit. Besides regulations, participants shared the perspective that public acceptance of reuse is the greatest barrier to implementation. Potable and non-potable supply scarcity is predicted to drive acceptance of this WMS, especially as both have the capacity to expand throughout the state.

**Stormwater:** Participants expressed that stormwater can be a good source of wet water. Like other Regions, treatment and storage were identified as barriers to this WMS. Participants shared that they view surface water reservoirs and aquifers potential storage for this water but understand the cost prohibitive nature of both.

**Agricultural Options:** Participants who voted in favor of the Agricultural Options WMS identified that there is continued innovation in the industry to improve water efficiency measures. Since economic growth is tied to the human need for food, innovation in this field is noted to be a necessity.

**Water Transfers, Increase Reliance on Surface Water, and Increase Reliance on Groundwater:** Meeting comments regarding the Water Transfers, Increase Reliance on Surface Water, and Increase Reliance on Groundwater correlated to one another. Participants viewed that Water Transfers between systems offer resiliency and redundancy, no matter the size. Some participants expressed concerns about sediment accumulation, which makes treatment difficult, and water losses due to evaporation with water transfers. Some water transfers could be used to increase groundwater reliance with ASR with appropriate aquifers. For both groundwater and surface water, treatment cost is a concern as upcoming and future regulations to address the treatment of constituents of emerging concern (CECs) and PFAS emerge.

## 2.6 Look Ahead

Owen Mills, Planning Director at OWRB, gave a short overview of the Local Projects and Programs (or capital improvement projects) data collected thus far. This data will be used as the foundation of estimating costs to meet future water needs across the state. The data compiled to date is in the OWRB Infrastructure Dashboard. The needs are several times the total amount of water infrastructure loans done by OWRB since the inception of its loan programs. Drinking water treatment is a public health issue above all else, and this finding of such large deficits in water infrastructure is an enormous hurdle for *all* Oklahomans to overcome, especially for small rural systems and will be a substantial focus of the 2025 OCWP. Stay on the lookout for more on this topic. Public water system participants were encouraged to

submit their projects and needs on OWRB's website. Systems can still submit their infrastructure needs to LPP Data Collection Form. Additionally, all participants were encouraged to complete and invite their friends and colleagues to complete the Public Outreach Survey, which allows you to share your priorities, concerns, and how the OCWP can provide value to you. Submissions are now closed for this survey.

Lastly, Owen thanked participants for their participation in these meetings. Over the coming year, the OCWP Team will follow up on the discussion items of from meeting, explore other priority topics, present data and findings from other technical studies, and discuss recommendations to include in the OCWP. The next round of regional meetings is tentatively scheduled to be in Fall 2024 and will focus on WMS feasibility. Reach out to Owen with any questions or to discuss the OCWP.



Owen.Mills@owrb.ok.gov

Oklahoma.gov/OWRB/Water-Planning

Oklahoma Comprehensive Water Plan

APPENDIX A

# MEETING PRESENTATION

## Round 3 | Presentation

# 2025 OCWP Regional Meetings

| | | |
|---|---|---|
| Southwest | Lone Wolf | April 15 |
| Southeast | Antlers | April 16 |
| Northwest | Woodward | April 18 |
| Northeast | Tulsa | April 19 |
| Central | Oklahoma City | May 3 |
| Virtual | | April 22 |



OKLAHOMA Water Resources Board

US Army Corps of Engineers®

Website: Oklahoma.gov/OWRB/Water-Planning

Facebook: Oklahoma Comprehensive Water Plan

01

# Welcome

20 minutes

2025 OCWP

# Agenda

01 Welcome and Share Success Story

02 OCWP Update and Data Presentation

03 Networking Break

04 Concurrent Breakout Sessions

05 Networking Break

06 Breakout Session Summary

07 Look Ahead

# Goals for the OCWP Regional Meetings

*Why and how we want you to participate!*



**Identify local water issues** and policy needs.



**Identify and frame solutions** to those issues and needs.



**Chart a course toward reliable water management** locally and statewide.

Round 1: Listening sessions

Round 2: Breakout on what we heard

Round 3: Present regional projections for supply/demand/water quality

Round 4: Feasibility of water management strategies

Round 5: Review draft recommendations

2025 OCWP
Oklahoma Comprehensive Water Plan

# OCWP Team Leaders



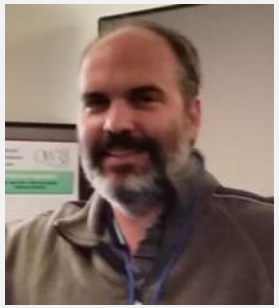
**Julie Cunningham**

*Executive Director, OWRB*



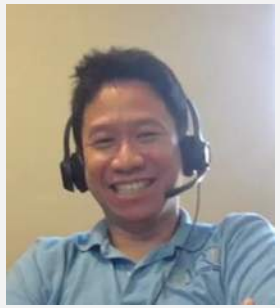
**Owen Mills**

*Director of Planning, OWRB*



**Matt Cogburn**

*Water Resources Planner, OWRB*



**Yohanes Sugeng**

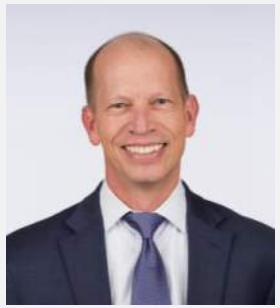
*Engineering and Planning Division Chief, OWRB*

US Army Corps of Engineers.



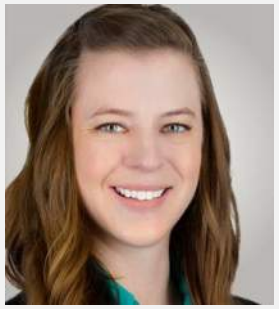
**Amber Wooten**

*Project Manager, Carollo Engineers*



**John Rehring**

*Senior Water Resource Engineer, Carollo Engineers*



**Rachel Duncan**

*Senior Water Resources and Resilience Engineer, Carollo Engineers*



**Jessica Fritsche**

*Senior Water Resource Planner, Carollo Engineers*



**Sarah Jones**

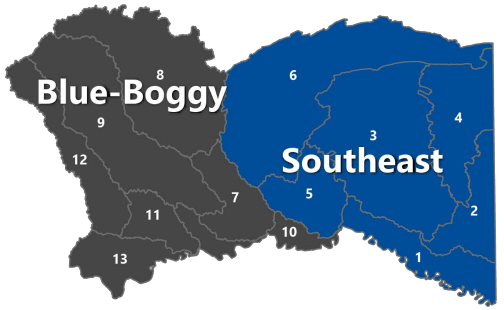
*Project Engineer, Carollo Engineers*

# Welcome



Federal Legislators
State Legislators
Local Government Officials
OWRB Board Members

# Local success story





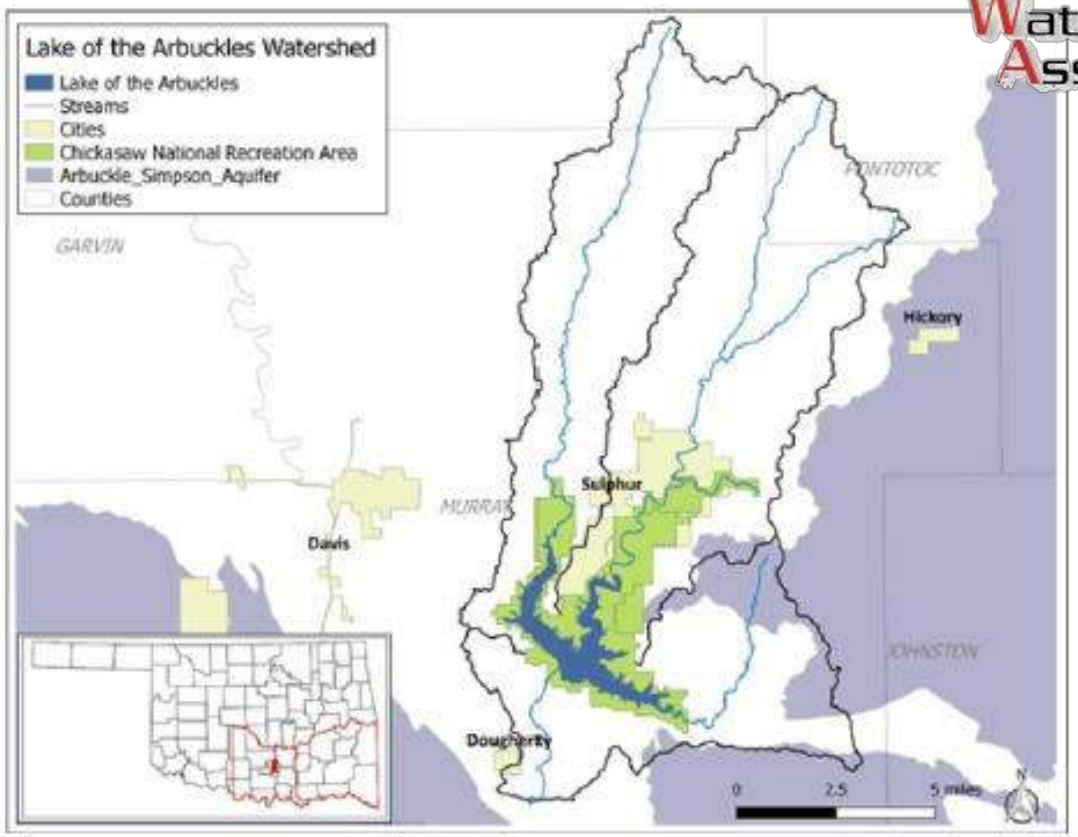
Amy Hays

Oka' Institute

Assistant Director of Development and Outreach

# Improving Water Quality and Quantity through Soil Health Improvements in the Lake of the Arbuckles Watershed






U.S. Bureau of Reclamation – WaterSMART
Award Number: R22AP00135-00
April 2022 – December 2023

## Board of Directors

### Lake of the Arbuckles Watershed Association

Larry Keenan, President

Marilyn Bearden, Vice President

Ronald Trett, Secretary

Wes Hilliard, Treasurer

Ty Albright

Don Brown

Kent Cornell

David Earsom

Roger Kite

Edd McNeil

Gary Mobly

Charles Rohla

Roy Oliver



The Lake of the Arbuckles watershed, covering approximately 138.4 square miles across Murray, Garvin, and Pontotoc Counties in Oklahoma, is at the center of an intensive watershed restoration project spearheaded by the Chickasaw Nation in collaboration with the Oka' Institute at East Central University and the **Lake of the Arbuckles Watershed Association (LAWA).**

The project's efforts focus on improving soil health and water management through targeted activities. Grant activities include engaging landowners with training on soil health best management practices, identifying and enhancing riparian areas requiring improvements, and implementing field-scale soil health BMPs such as no-till drilling, managing riparian buffer strips, riparian zone revegetation, riparian buffer fencing, and alternative water installation.









# Outreach and Education: No-till Drill Use and Demonstration

# Soil Health testing, analysis, and management plan development



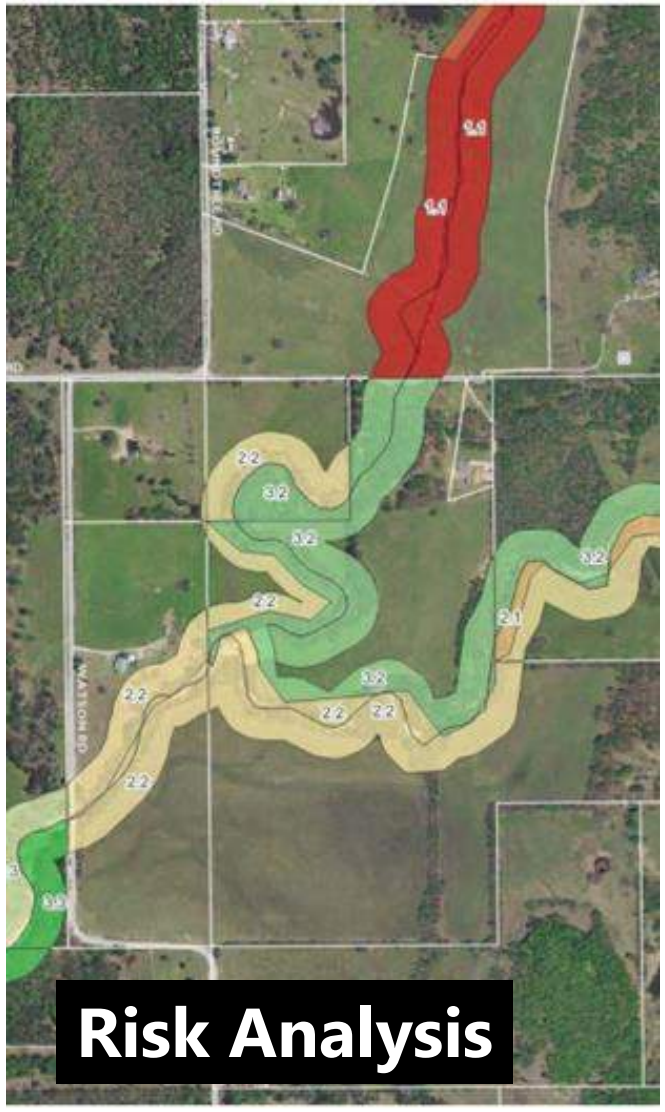


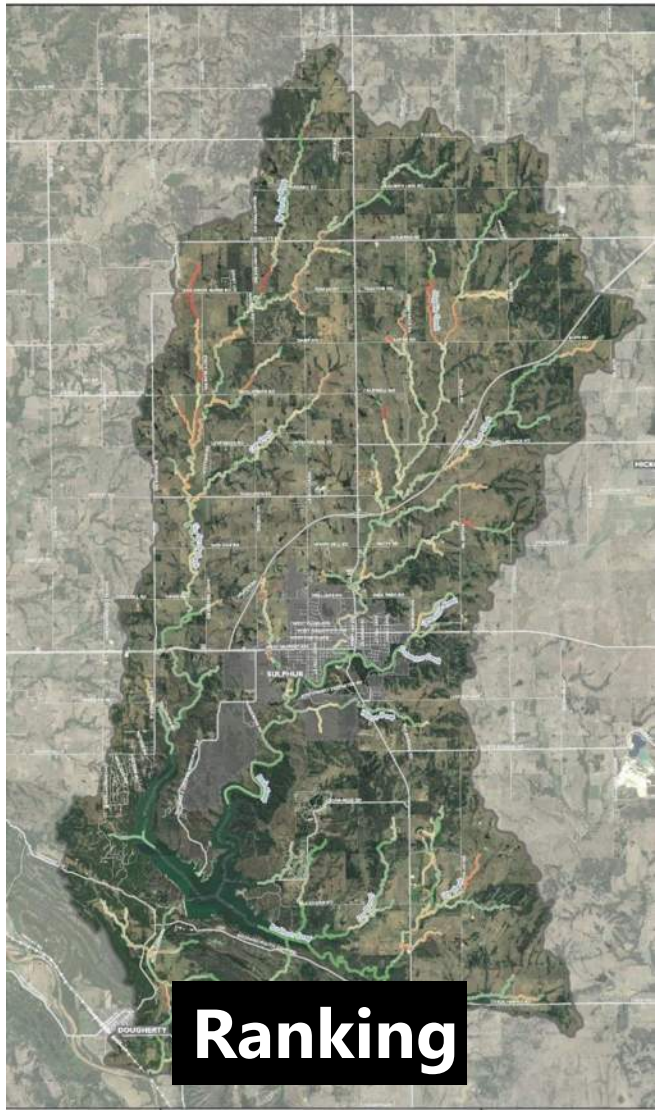


25 locations for analyzed and provided management plans

# Watershed Analysis – AquaStrategies Riparian Zone Prioritization



# Riparian Fencing

Fencing to enhance riparian zone




**Installation of fencing to increase riparian buffer, reduce grazing impacts, protect edge zone**

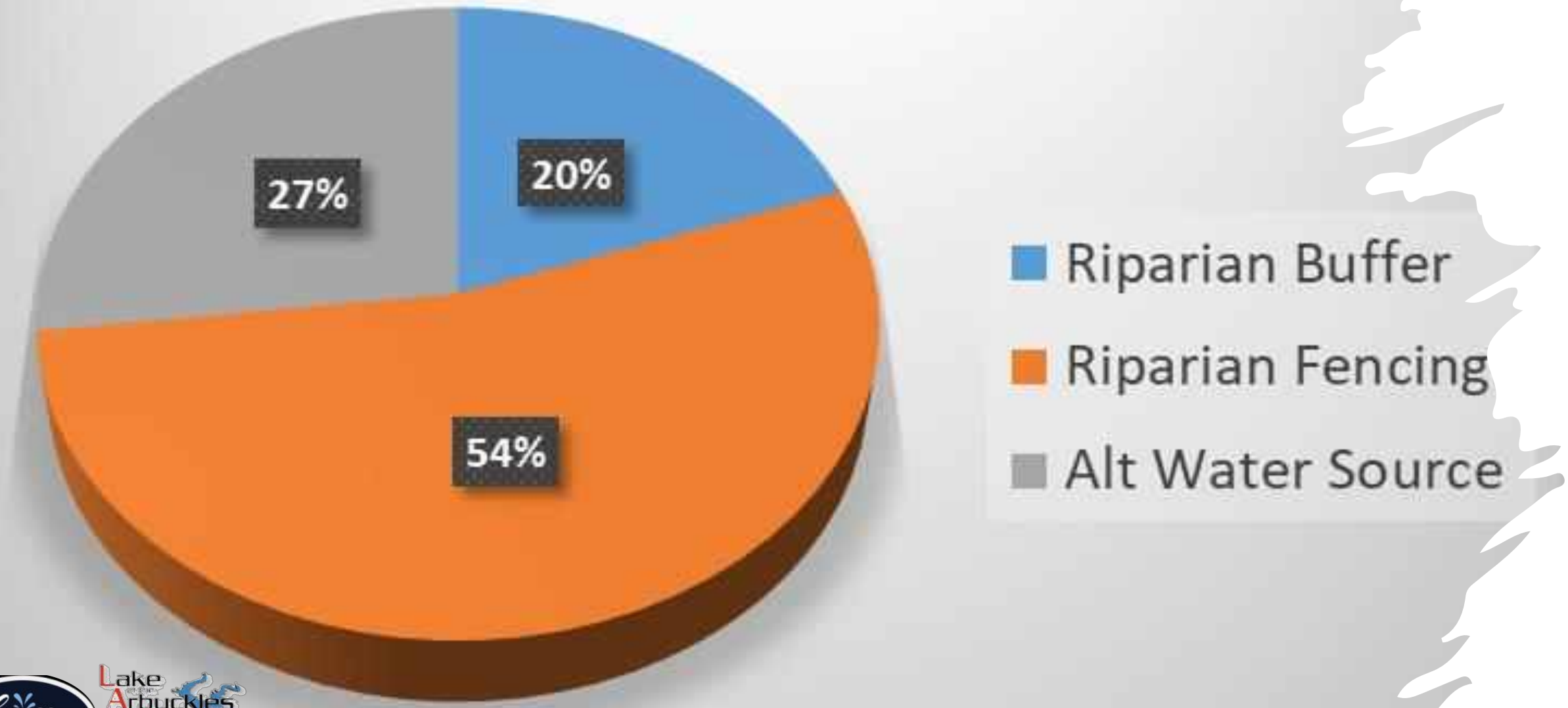




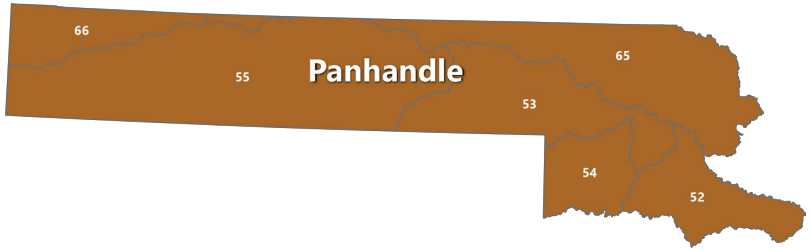




# Funds expended on practices



# Local success story




Brandon Bowman

ORWA State Program Director

Oklahoma Rural Water Association



# Services and Funding Available from the ORWA

*Brandon Bowman*
*ORWA State Program Director*
*Oklahoma Rural Water Association*

OKLAHOMA RURAL WATER ASSOCIATION
ORWA

# ORWA - Who We Are

- Provides Resources, Training & Technical Assistance
- Target Water & Wastewater Systems
- Rural & Small Community System Specialists
- Statewide Coverage



# Rural Oklahoma Depends on Small Water and Wastewater Systems

- Protect Public Health and the Environment
  - Provides tested/treated drinking water of high quality.
  - Provides environmentally sound treatment of wastewater.

    *...both at an affordable cost.*

- Promote Economic Growth
  - Housing, industry, agriculture, communities can flourish.
  - Economic growth depends on a robust water and wastewater infrastructure.

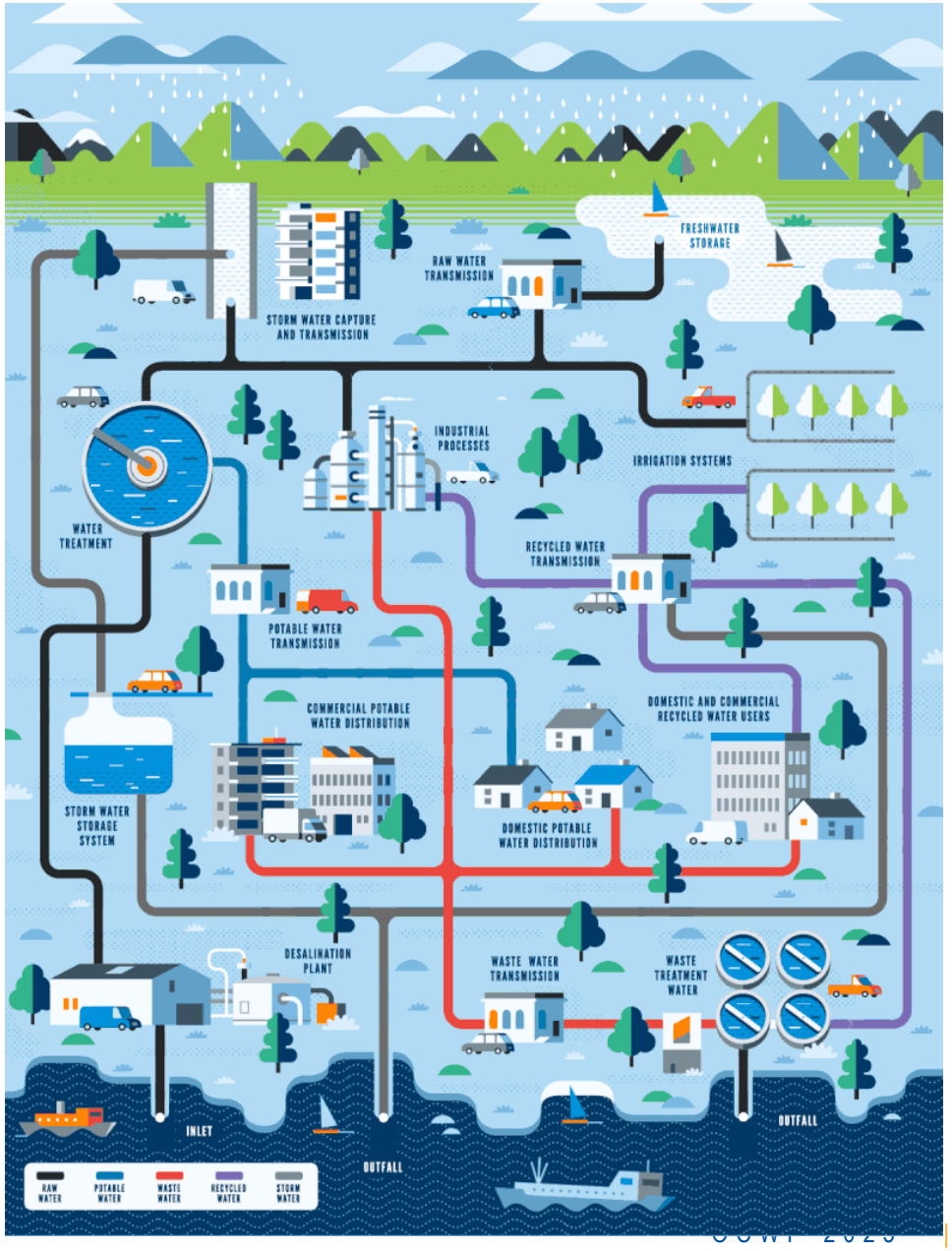


# Demand Doesn't Stop

The need continues 24/7/365.

Demand tends to increase when everyone else gets a day off.

Sustainability is critical to ensure perpetual operations.



# Water Loss and Leak Detection

- Water loss auditing – method and software
- Leak detection help: acute and comprehensive
- Meter analysis test benches







**Leak Detection - Summary Statistics**

| Leak Detection Events | Leaks Identified | Leaks Repaired | Real Loss Identified | Value of Real Loss Identified | Real Loss Repaired | Value of Real Loss Repaired |
|---|---|---|---|---|---|---|
| 9 | 61 | 36 | 163.2 MG/Yr | $888,881 / Yr | 115.1 MG/Yr | $601,087 / Yr |

SFY 2023

# Northwest Oklahoma – Success Stories

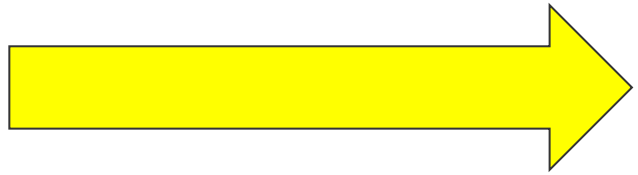
| System | Date Completed | Leaks Identified | Leaks Repaired | Real Loss Repaired, MG/Yr | Value of Real Loss Repaired, MG/ Yr |
|---|---|---|---|---|---|
| Harper 1 | March 2021 | 8 | 1 | 7.884 | $15,768 |
| Okeene | April 2022 | 2 | 2 | 2.102 | $4,305 |
| Wanette | March 2023 | 16 | 7 | 26.280 | $183,960 |

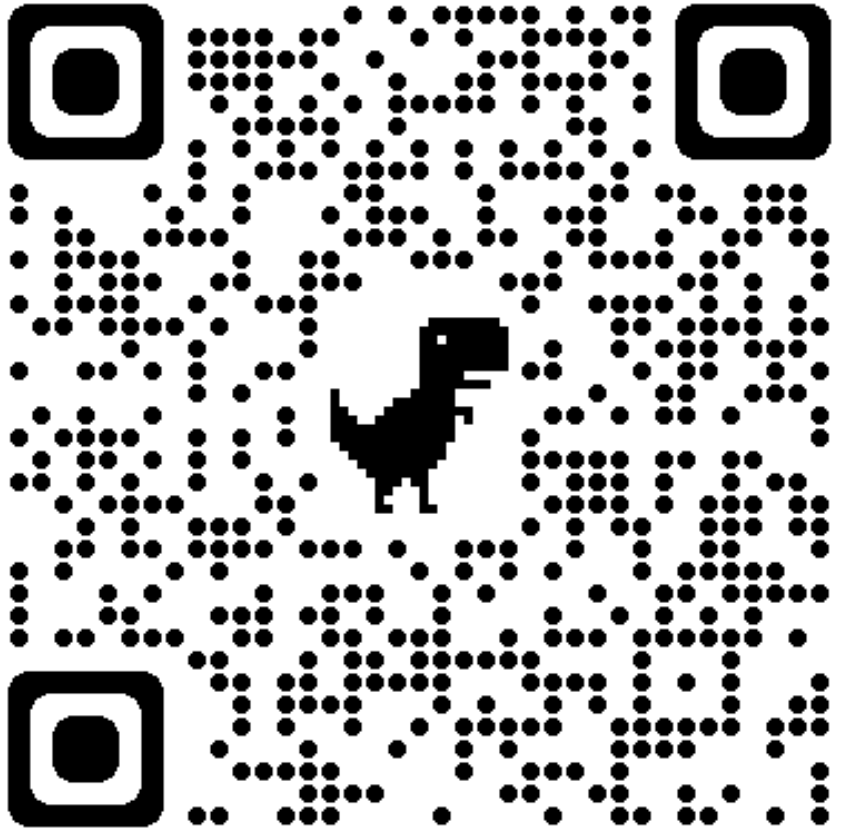




# To request technical assistance from ORWA:

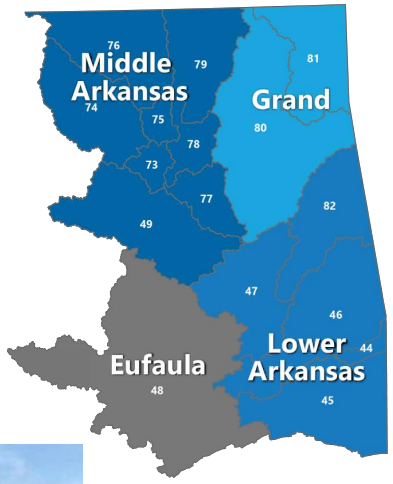
Complete a request here:





OKLAHOMA RURAL WATER ASSOCIATION
ORWA

# Local success story




Steve Patterson

Bio X Design



*Eufaula Wetland Visitors. Photo: Megan McBride, 2022*

# Eufaula Wetland Park:

## Success in SRF &

## Community-Based Ecological Design



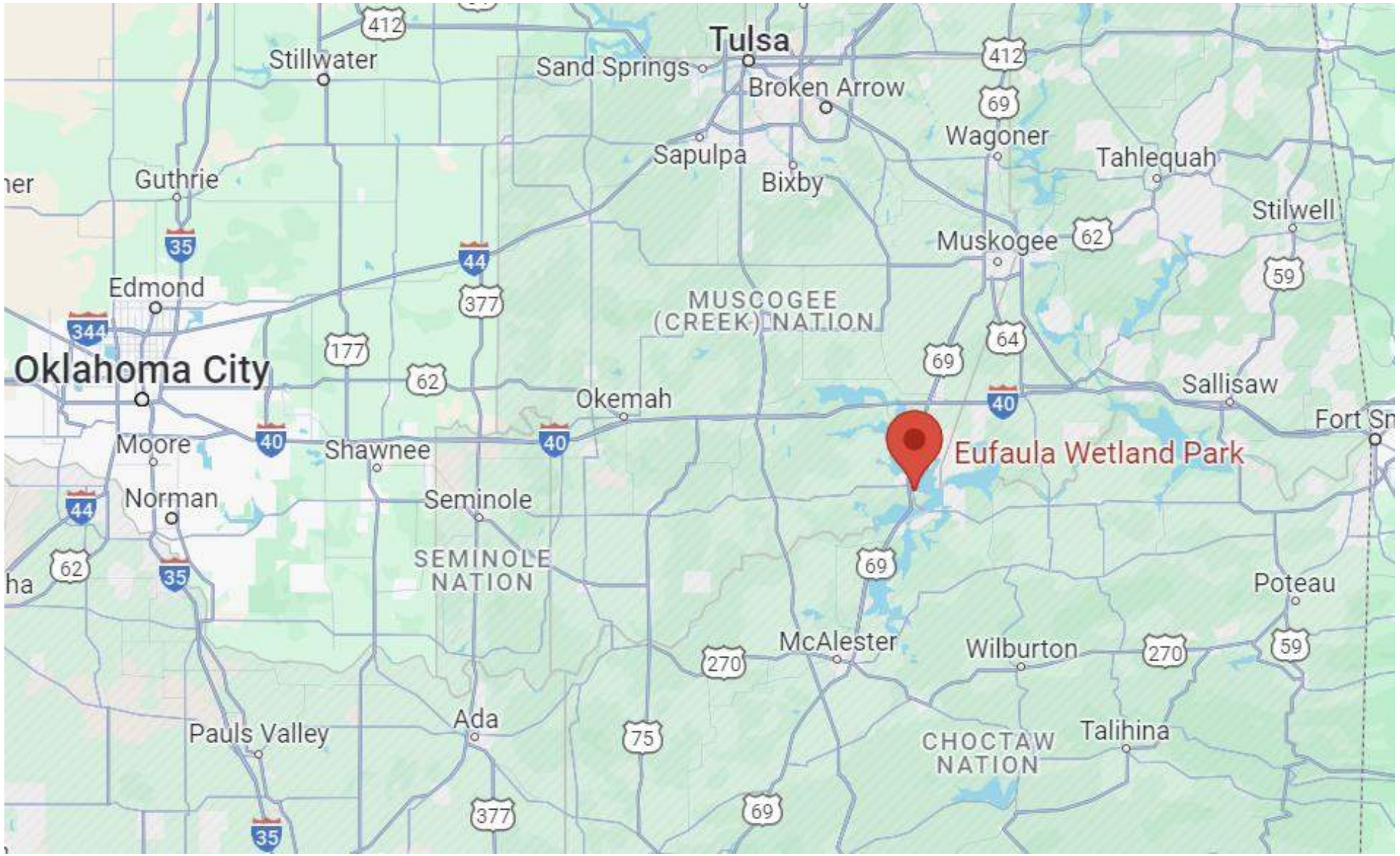


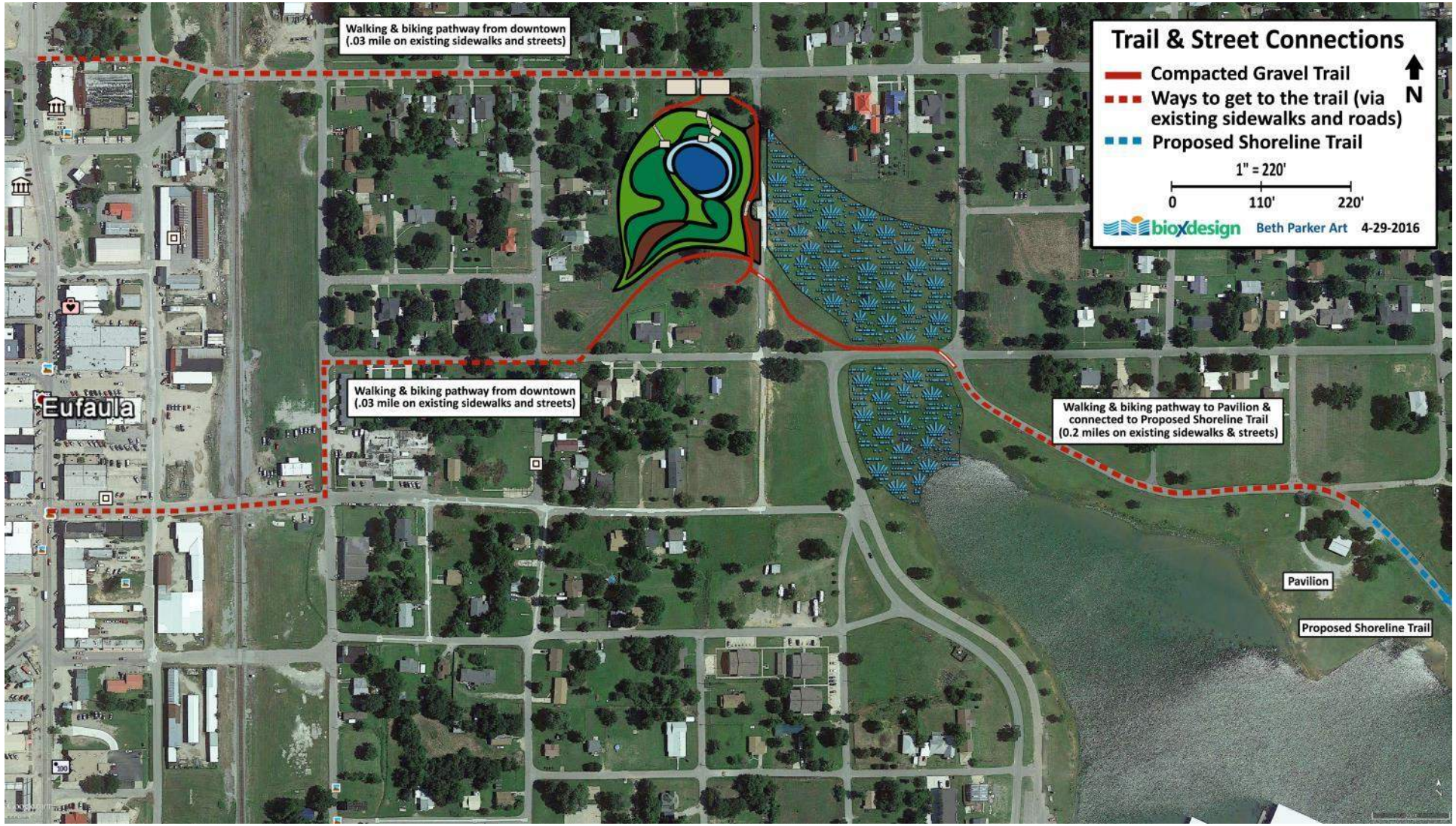









Tulsa
Stillwater
Sand Springs
Broken Arrow
Wagoner
Tahlequah
Sapulpa
Bixby
Guthrie
Stilwell
Muskogee
Edmond
MUSCOGEE (CREEK) NATION
Oklahoma City
Okemah
Sallisaw
Eufaula Wetland Park
Moore
Shawnee
Norman
Seminole
SEMINOLE NATION
Poteau
McAlester
Wilburton
Ada
Pauls Valley
Talihina
CHOCTAW NATION


Walking & biking pathway from downtown
(.03 mile on existing sidewalks and streets)
Walking & biking pathway from downtown
(.03 mile on existing sidewalks and streets)
Eufaula
Walking & biking pathway to Pavilion &
connected to Proposed Shoreline Trail
(0.2 miles on existing sidewalks & streets)
Pavilion
Proposed Shoreline Trail
Trail & Street Connections
Compacted Gravel Trail
Ways to get to the trail (via existing sidewalks and roads)
Proposed Shoreline Trail
N
1" = 220'
0
110'
220'
bioxdesign
Beth Parker Art
4-29-2016

# OWRB awards $100,000 towards wetlands project

## Community hears three wetlands presentations

3/23/2017



Sam Sylvester and wetlands project coordinator Jerry McCormick look over a proposed design presented by University of Oklahoma students last Thursday. (Staff photo by Shauna Belyeu)

**By Shauna Belyeu**
*General Manager*

University of Oklahoma students from India, New York, China, Vietnam, Iran and Oklahoma presented three different proposals on wetland ideas Thursday, March 23 at the Eufaula Community Center.

Plans are moving right along for a new wetlands project, thanks to the foresight and determination of Save Our Water and Team Up to Clean Up (TUCU) member, Jerry McCormick.

"The project is two years in the making," McCormick said. "I attended a wetlands meeting and listened to Restoration Ecologist, Steve Patterson speak, and I was so impressed."

McCormick contacted Patterson and together they scoped out potential wetland areas around Lake Eufaula. They narrowed the potential location down to the area at Broadway and Belt.

"The 2.5 acre area that we were looking at was already wet," said Patterson. "We could create an educational opportunity for a school. Wetlands improve water quality, create wildlife habitats and develop recreational locations."

Patterson did the preliminary work, reviewing the logistics and hydrology aspects. He then brought in the architectural landscape class from the University of Oklahoma.

Students visited and walked the area for a site analysis. They spent two weeks working on their conceptual ideas then spent another two weeks working on their designs and presentations.

Ideas posed during the presentations included raised boardwalks, accessible terraces, water ring gardens, fountains, docks, interactive signage and viewing decks.

See **WETLANDS**, Page A2

## Wetlands

*Continued from Page A1*

Spectators and neighbors were impressed by the presentations.

"This is a great project for our community. As with anything, it all comes down to fundamental budget," said City Manager Greg Buckley.

Enter Shannon Phillips with the Oklahoma Conservation Commission.

"Our department works with the Oklahoma Water Resources Board (OWRB) to offer low interest and principal forgiveness loans and water-quality funding.

Phillips made the announcement that her agency was offering a principal forgiveness loan of $100,000 toward construction. The principal will be forgiven when the project is completed.

OCC officials attending the OWRB's monthly meeting in support of the loan application included Shannon Phillips, Water Quality Director and Jeri Fleming, Environmental Programs Manager.

"We will work with Save Our Water, TUCU and the city to find contractors who meet state guidelines. Then we will work with and reimburse contractors," Phillips said.

### What's next:

- Review team designs to create best approach
- List of professional engineers
- Get the professional engineered plans
- Develop a construction budget

The group will have to secure permits from the Corp of Engineers for earth movements.

"I am confident we can get this project completed and the community involved. This loan is great. It will get us started. This will be great for the community, McCormick said."

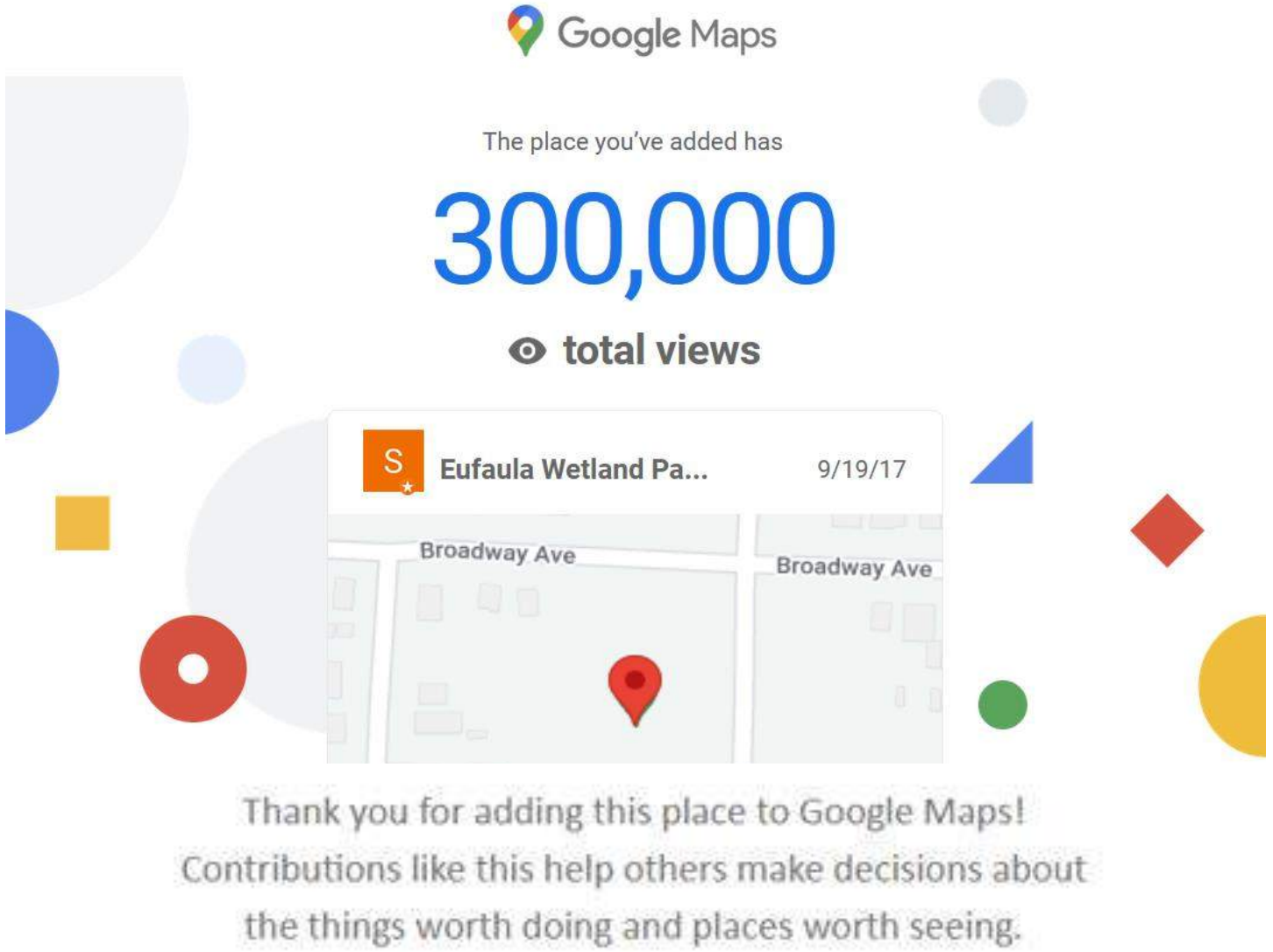







Choctaw Nation Visitors






# Questions?

April 10, 2024

# Local success story




## William Sheppard

## Oklahoma Municipal Assurance Group (OMAG)

Risk Management Director

# WATER/WASTEWATER SUCCESS – OMAG VAS PROGRAMS

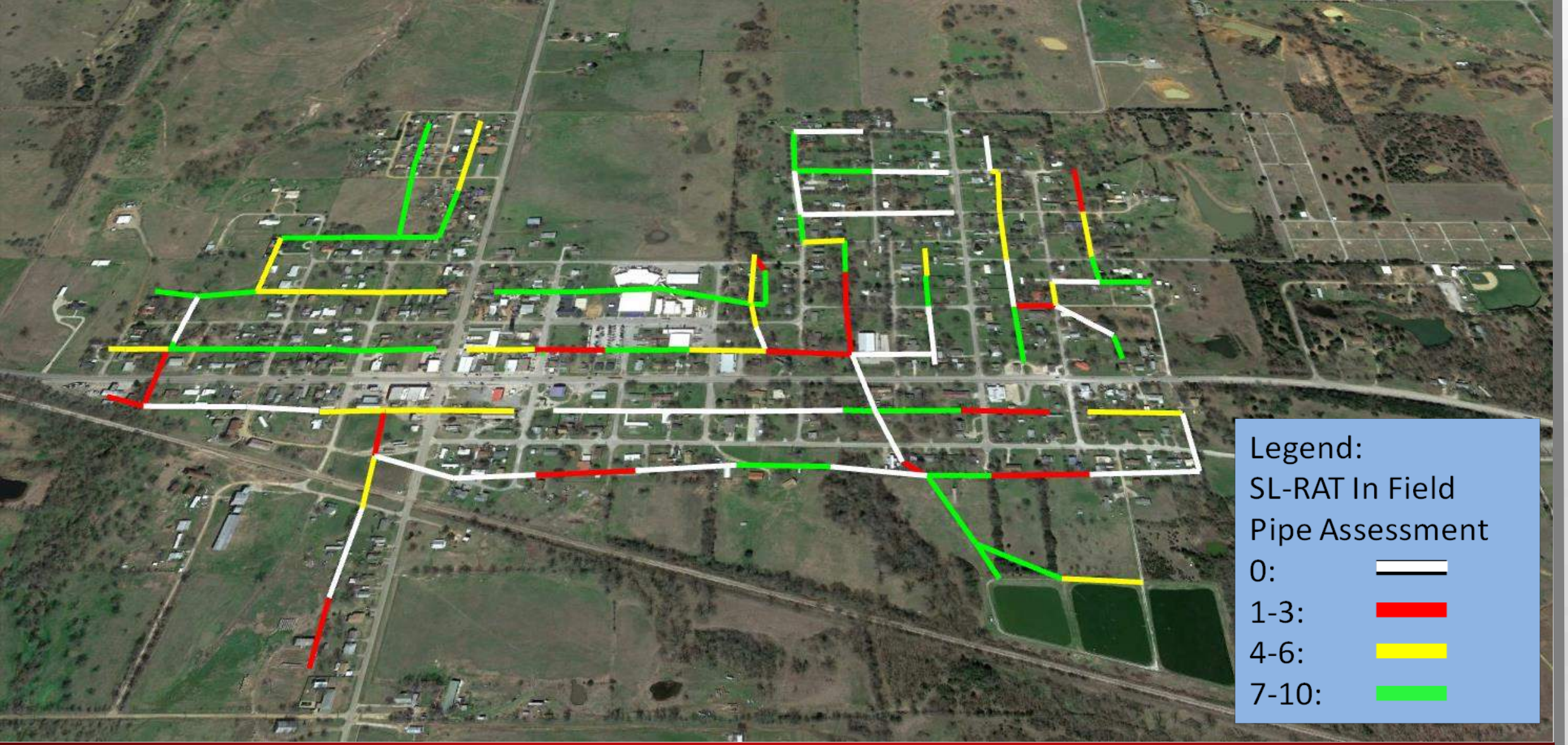
OWRB – PUBLIC MEETING – MAY 3, 2024


THE GOOD
THE BAD
THE UGLY


THE GOOD
OMAG

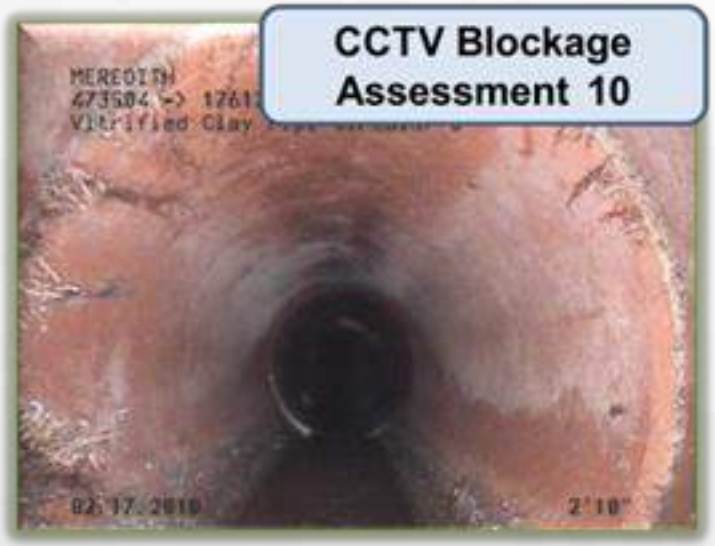



OMAG




OMAG

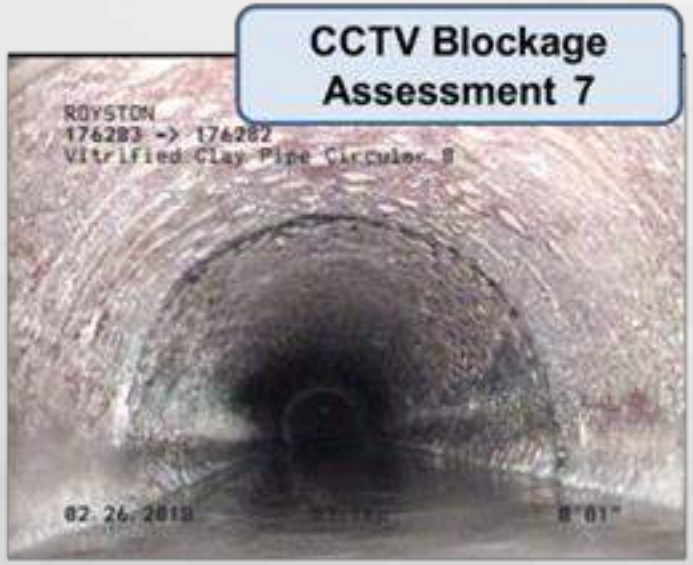
# SL-RAT INSPECTION SCORING





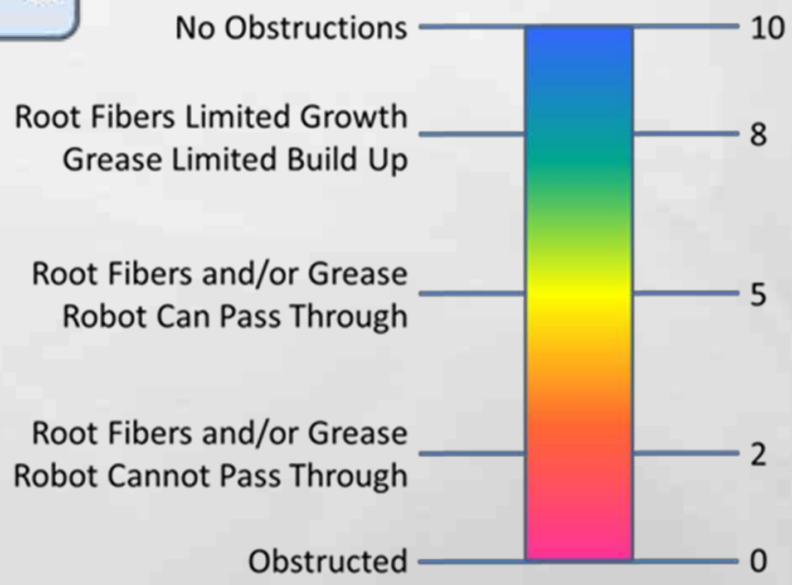


CCTV Robot was Able to Pass Through Root Fibers










OMAG

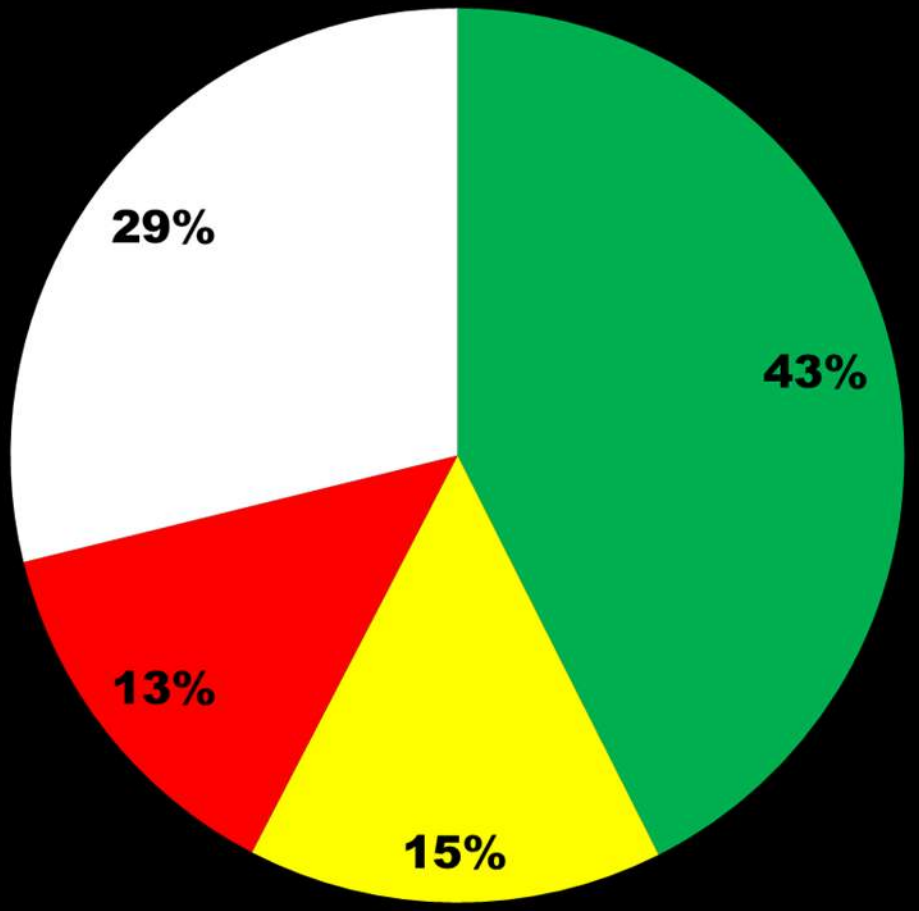
Export to Google Earth | Export to CSV | Enhanced Export | Export SHP | Enhanced Export

Size: 50 58 measurements found

| RX Oper. ID | RX Hw ID | TX Oper. ID | TX Hw ID | Date/Time * = estimated | Meas. Dur. (sec) | Oper. Pipe Lng (ft) | Eval. Pipe Lng (ft) | Meas. Status | Pipe Status | Field Assess | GPS Assess | Notes | Rx Lat/Lon | Tx Lat/Lon |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 28 | 1 | 29 | 9/12/2012 9:12:48 AM | 79 | 50 | 51 | Valid | Good | 8 GOOD | 8 GOOD | | Lat: 32.807091 Lon: -79.958845 ID: MH-06 | Lat: 32.806953 Lon: -79.958858 ID: MH-07 |
| 1 | 28 | 1 | 29 | 9/12/2012 9:08:22 AM | 80 | 150 | 123 | Valid | Good | 8 GOOD | 7 GOOD | | Lat: 32.807091 Lon: -79.958845 ID: MH-04 | Lat: 32.807428 Lon: -79.958868 ID: MH-05 |
| 1 | 28 | 1 | 29 | 9/12/2012 9:04:10 | 9 | 5 | | Val | OD | 3 GO | | | ID: MH-04 | Lat: 32.807428 Lon: -79.958868 ID: MH-05 |
| 1 | 28 | 1 | 29 | 9/12/2012 8:57:58 AM | 80 | 150 | 235 | Valid | Fair | 4 FAIR | 5 FAIR | | Lat: 32.807805 Lon: -79.958673 ID: MH-04 | Lat: 32.80844 Lon: -79.958546 ID: MH-03 |
| 1 | 28 | 1 | 29 | 9/12/2012 8:54:09 AM | 79 | 150 | 143 | Valid | Good | 7 GOOD | 7 GOOD | | Lat: 32.808825 Lon: -79.958463 ID: MH-02 | Lat: 32.80844 Lon: -79.958546 ID: MH-03 |
| 1 | 28 | 1 | 29 | 9/12/2012 8:49:17 AM | 112 | 150 | 314 | Late | Block | 0 BLOCK | 1 POOR | ☑ | Lat: 32.808825 Lon: -79.9 ID: MH-02 | Lat: 32.809641 L 145 ID: MH-01 |

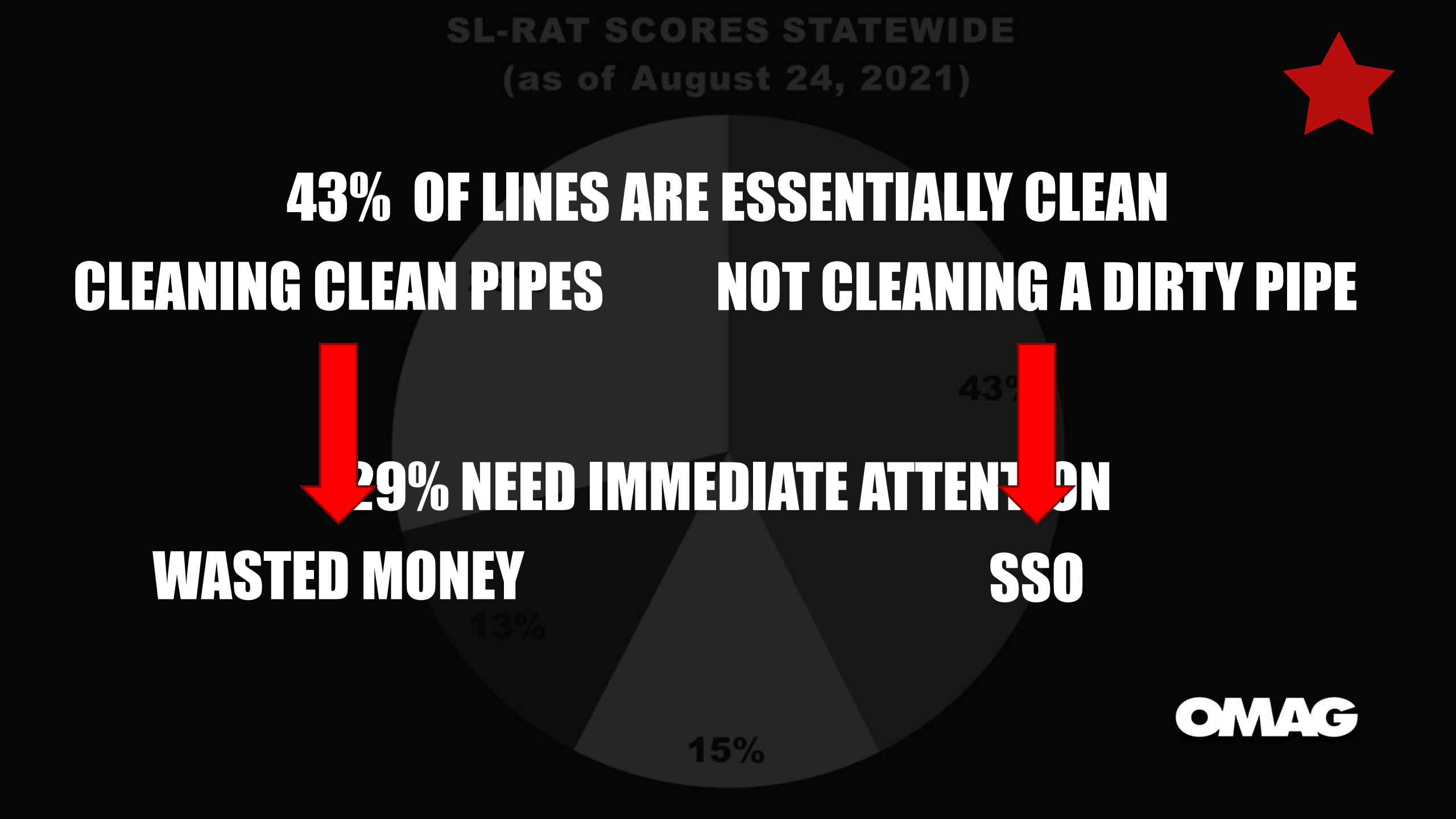
SL-DOG WEB PORTAL

## SL-RAT SCORES STATEWIDE
(as of August 24, 2021)




Field
ssment

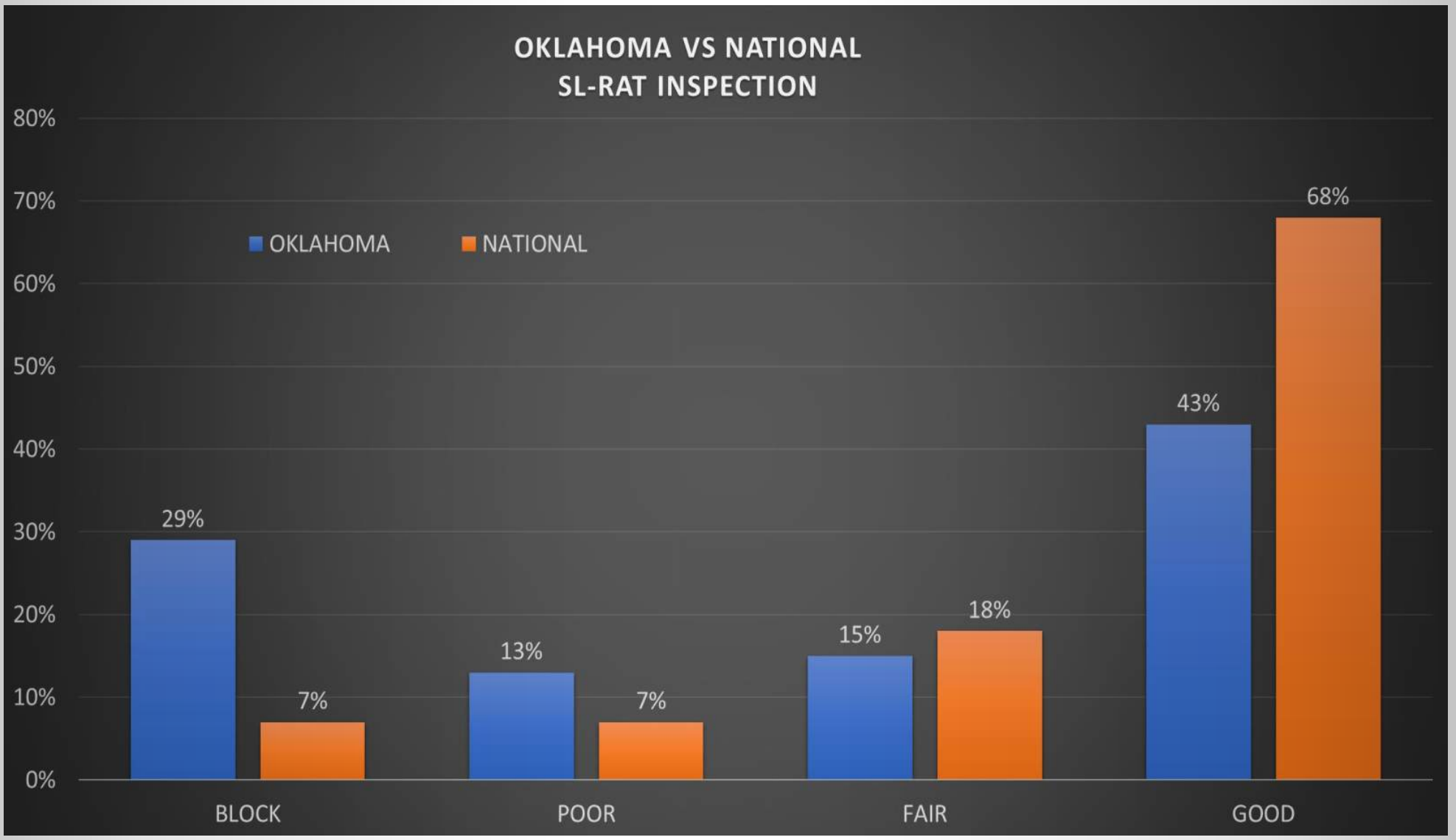
OMAG


SL-RAT SCORES STATEWIDE
(as of August 24, 2021)
43% OF LINES ARE ESSENTIALLY CLEAN
CLEANING CLEAN PIPES
NOT CLEANING A DIRTY PIPE
29% NEED IMMEDIATE ATTENTION
WASTED MONEY
SSO
43%
13%
15%
OMAG

# FINANCIAL IMPACT

- JETTING = $1/FT
- CCTV INSPECTION = $2/FT
- SL-RAT INSPECTION IS 15¢/FT
- REDUCE COST BY 50%




OKLAHOMA VS NATIONAL
SL-RAT INSPECTION
80%
70%
60%
50%
40%
30%
20%
10%
0%
OKLAHOMA
NATIONAL
29%
7%
13%
7%
15%
18%
43%
68%
BLOCK
POOR
FAIR
GOOD

# MAINTENANCE ACTIVITIES

**TABLE 2 FREQUENCY OF MAINTENANCE ACTIVITIES**

| Activity | Average (% of system/year) |
|---|---|
| Cleaning | 29.9 |
| Root removal | 2.9 |
| Manhole inspection | 19.8 |
| CCTV inspection | 6.8 |
| Smoke testing | 7.8 |

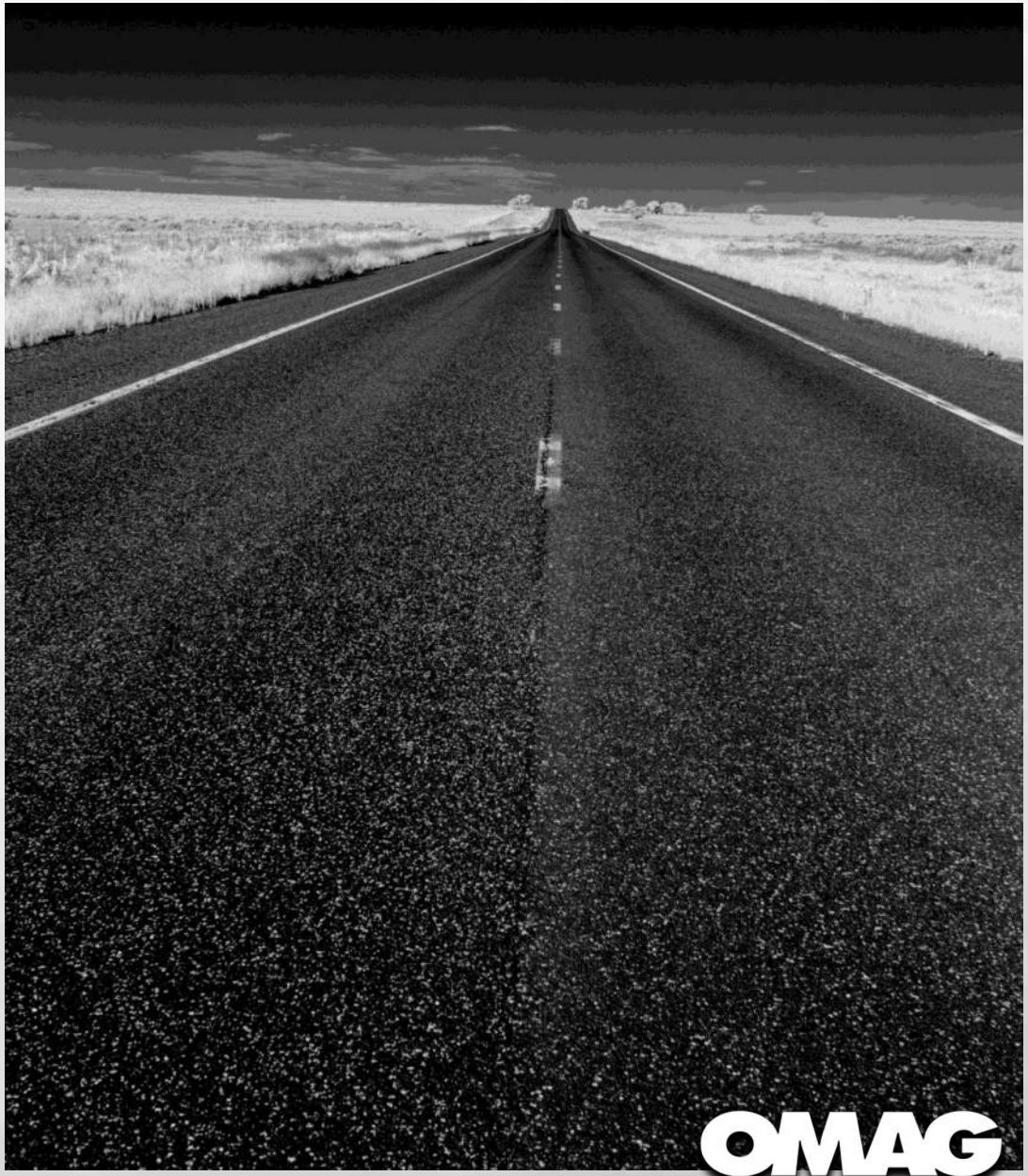
Source: ASCE, 1998.

**ACOUSTIC TECHNOLOGY 100%**

OMAG

# ROAD TO PROGRESS

- 171 C/T
- 1063 Miles
- 200+ Deployments
- 6.5 MILES PER C/T

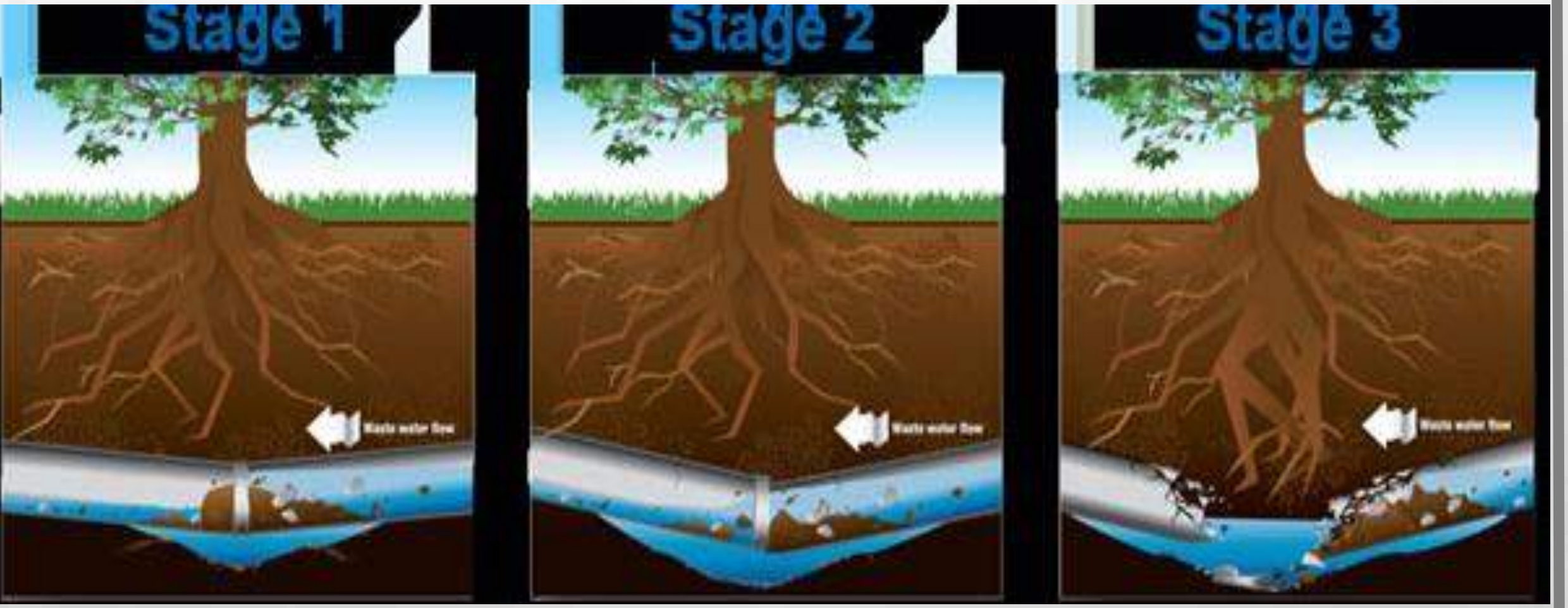


# OMAG SEWER GRANTS




OMAG

# STAGES OF ROOT INFILTRATION



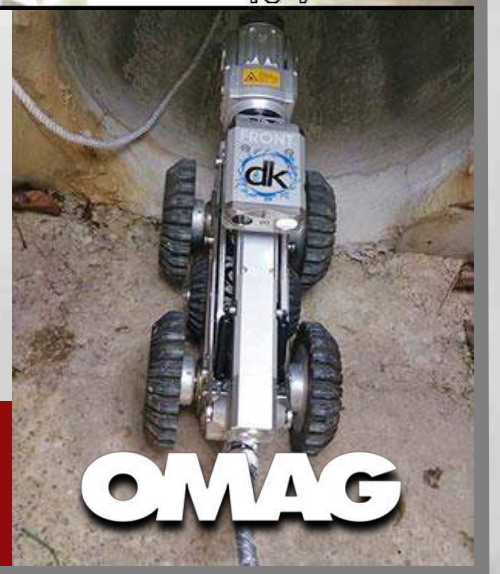

OMAG

# SEWER CAMERA

- AFTER SL-RAT
- AFTER SSO EVENT
- SCHEDULED MAINTENANCE
- BEFORE DESTRUCTIVE MEASURES






USMH: Brooke
DSMH: City Maine
Tap Factory Made Defectiv
13.0 ft.
850
12.99 ft
12.99 ft


USMH: Between 5th & 6th
DSMH: West of 6th
Inspection Abandoned
Debris
50.3 ft.
467
50.31 ft
50.31 ft


08:00:46 AM / 2018-06-14
[22' 7"]





OMAG

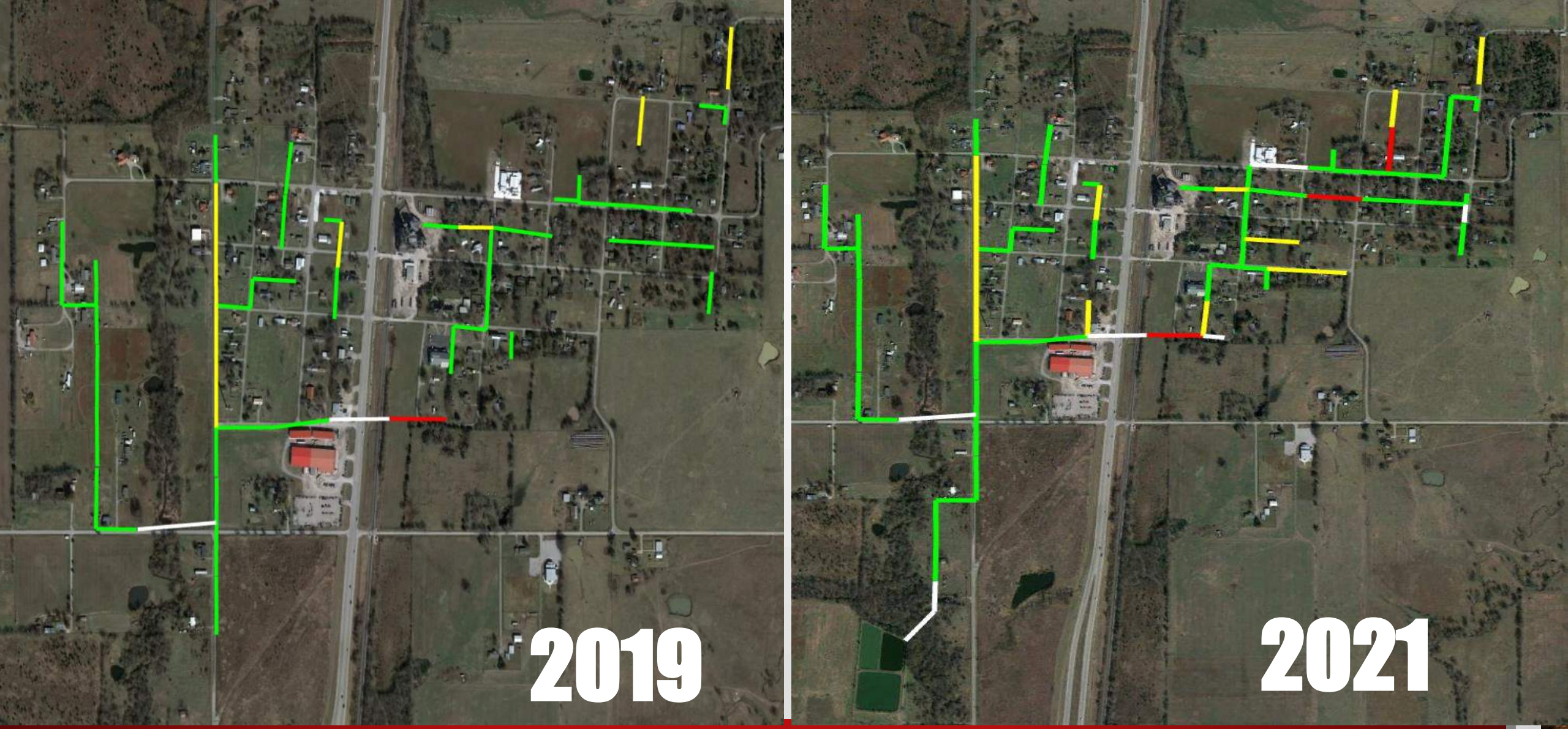


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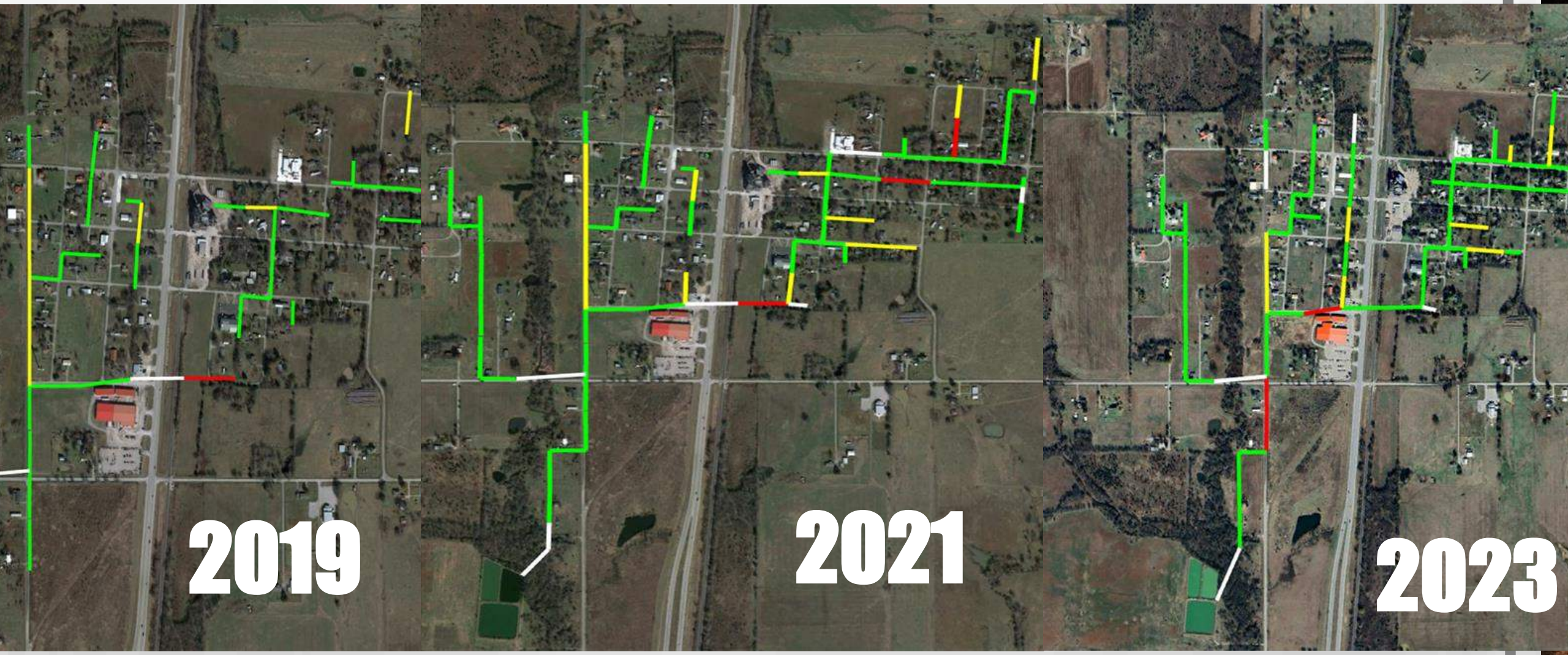





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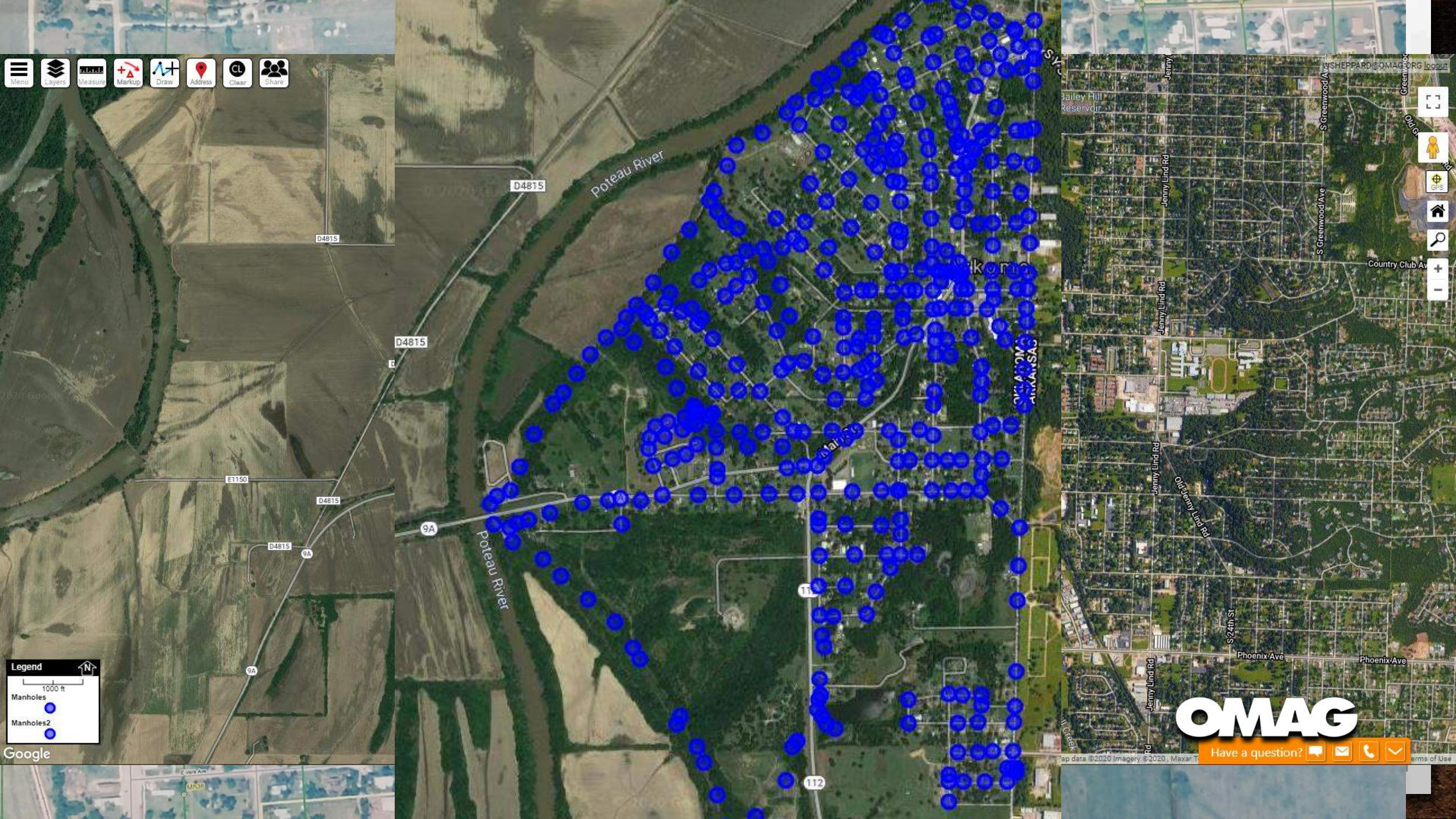


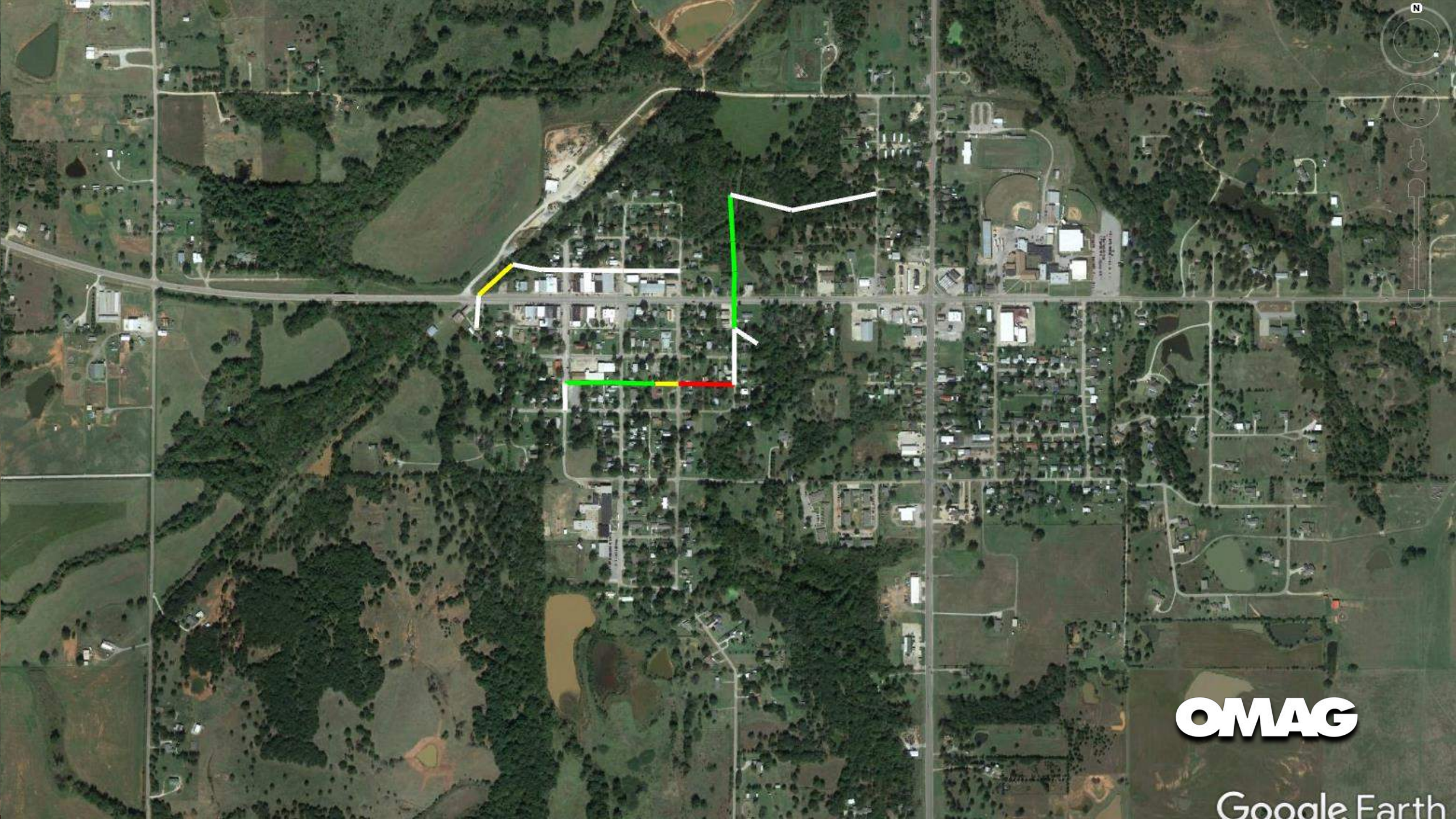

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THE BAD
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Menu
Layers
Measure
Markup
Draw
Address
Clear
Share
D4815
Poteau River
E1150
9A
Legend
1000 ft
Manholes
Manholes2
Google
Bailey Hill Reservoir
S Greenwood Ave
Jenny Lind Rd
Old Jenny Lind Rd
Country Club Ave
S 24th St
Phoenix Ave
112
OMAG
Have a question?


OMAG
Google Earth

# TROUBLE ALONG THE WAY




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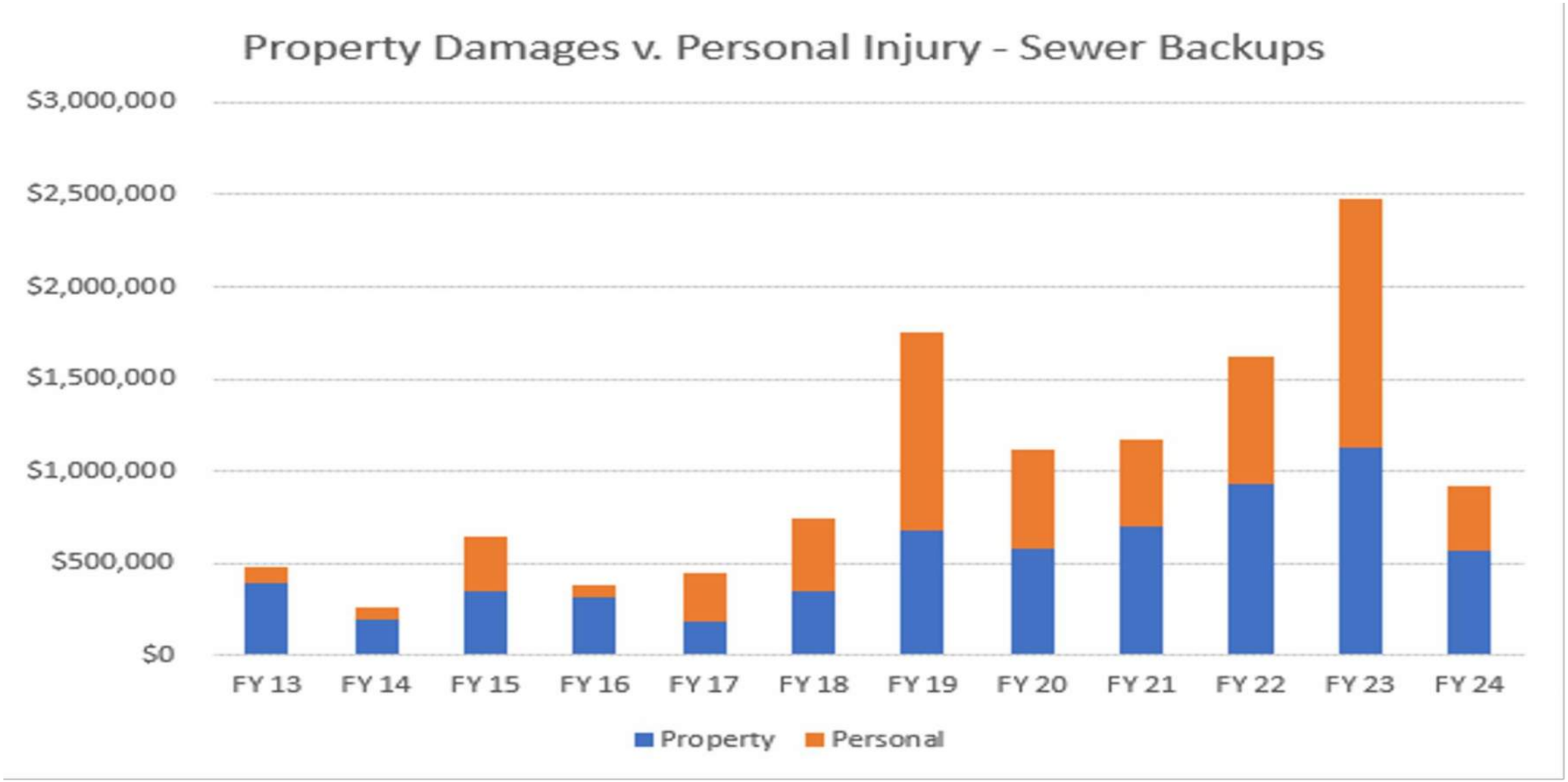

THE UGLY
OMAG


OMAG






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Property Damages v. Personal Injury - Sewer Backups
$3,000,000
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$0
FY 13
FY 14
FY 15
FY 16
FY 17
FY 18
FY 19
FY 20
FY 21
FY 22
FY 23
FY 24
Property
Personal



# THE END OF THE LINE

## OWRB – PUBLIC MTG. – MAY 3, 2024
## THE GOOD, THE BAD, THE UGLY


OKLAHOMA

02

# OCWP Update and Data Presentation

55 minutes

# Supply Issues and Solutions Vary Across the State

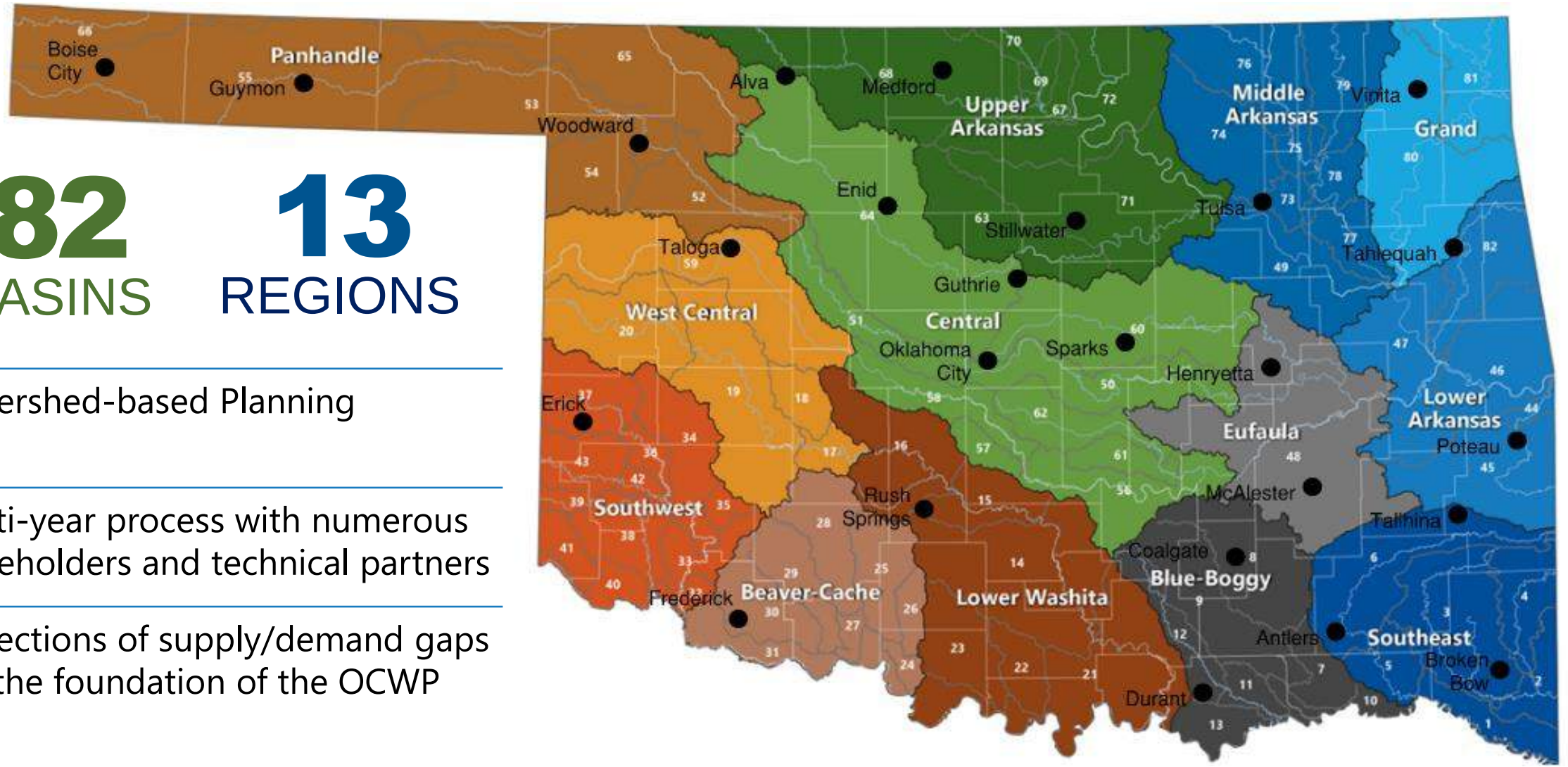
**82** BASINS

**13** REGIONS

Watershed-based Planning

Multi-year process with numerous stakeholders and technical partners

Projections of supply/demand gaps are the foundation of the OCWP



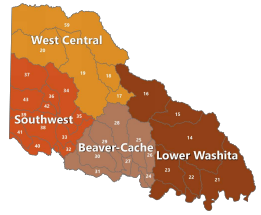



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# Technical Studies Support All OCWP 2025 Focus Areas

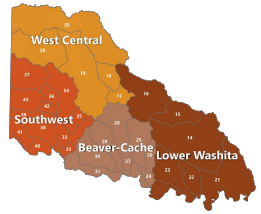
- **Identify** basins with projected water challenges or opportunities
- Identify and **recommend** water management strategies
- Identify **infrastructure investment needs** & financial solutions
- **Advance** 2012 OCWP Policy Recommendations
- Integrate Oklahoma's first statewide **Flood Plan**
- Conduct **focused engagement** throughout the process
- Provide **greater access** to OCWP deliverables

# Round 1 regional meeting recap – Southwest




- Water Conservation
- Permitting / Regulations / Policy
- Infrastructure Improvements & Funding / Financing
- Collaboration / Partnership
- Regional Planning
- Water Quantity Issues
- Support from Agencies / Scientific…
- Data Collection / Management
- Water Quality Issues
- Support to Rural Communities
- Implementation
- Staffing / Workforce Shortages
- Environment… Instream Flows
- Water Reuse
- Weather Extremes

# Round 2 regional meeting highlights - Southwest




**Infrastructure Improvements / Funding / Financing**

- Encourage more robust system management through training and technical support
- Expand planning and technical assistance programs
- Provide permanent state funding for water and wastewater projects

**Permitting / Regulations / Policy**

- Improve enforcement of existing rules and use limits
- Expand water quality monitoring for surface and groundwater
- Discussed Metering, Setback buffers for wells, Local control/management of water resources, Instream flow considerations

**Collaboration / Partnership / Regional Planning**

- Provide support for and/or incentivize regional water planning
- Identify, encourage, and/or incentivize voluntary best water management practices

**Water Conservation**

- Education on the need for and how to conserve water
- Provide funding to entities to implement conservation
- Price water to encourage conservation
- Select crops and work with producers and insurance companies to come to more sensible agreement (ex, when yields are predicted to be low, is it more sensible to conserve water then “do all you can” to produce crops?)

# Round 1 regional meeting recap – Southeast




Support to Rural Communities

Support from Agencies / Scientific Communities

Permitting / Regulations / Policy

Infrastructure Improvements & Funding / Financing

Water Quantity Issues

Collaborati… Partnership

Environme… Instream Flows

Data Collection / Management

Water Quality Issues

Water Reuse

Staffing / Workforce Shortages

Best Manage… Practices / Sustaina…

Regional Planning

Implementation

# Round 2 regional meeting highlights - Southeast




| | |
|---|---|
| Infrastructure Improvements / Funding / Financing | • Encourage more robust system management through training and technical support<br>• Expand planning and technical assistance programs<br>• Provide permanent state funding for water and wastewater projects |
| Permitting / Regulations / Policy | • Improve enforcement of existing rules and use limits<br>• Expand water quality monitoring for surface and groundwater<br>• Discussed Metering, Setback buffers for wells, Local control/management of water resources, Instream flow considerations |
| Collaboration / Partnership / Regional Planning | • Provide support for and/or incentivize regional water planning<br>• Identify, encourage, and/or incentivize voluntary best water management practices |
| Support to rural communities – Support from agencies / scientific community | • Provide tech support even if entity is not using corresponding program<br>• Education about best management practices, workforce, rates, succession planning, and more |
| Environmental / Instream Flow | • Recognize the (economic) benefits of keeping water in the streams and lakes<br>• Discussed changing the hearing process for contested permits<br>• Discussed having other agencies (like USFWS/ODWC) to review controversial permits |

# Round 1 regional meeting recap – Northwest




Permitting / Regulations / Policy

Infrastructure Improvements & Funding / Financing

Collaboration / Partnership

Support from Agencies / Scientific Communities

Support to Rural Communities

Water Quantity Issues

Implementation

Water Conservation

Education

Environm... Instream Flows

Best Management Practices / Sustainability

Water Quality Issues

Staffing / Workfo... Shorta...

Regional Planning

# Round 2 regional meeting highlights - Northwest




**Infrastructure Improvements / Funding / Financing**

- Encourage more robust system management through training and technical support
- Expand planning and technical assistance programs
- Provide permanent state funding for water and wastewater projects

**Permitting / Regulations / Policy**

- Improve enforcement of existing rules and use limits
- Expand water quality monitoring for surface and groundwater
- Discussed Metering, Setback buffers for wells, Local control/management of water resources, Instream flow considerations

**Collaboration / Partnership / Regional Planning**

- Provide support for and/or incentivize regional water planning
- Identify, encourage, and/or incentivize voluntary best water management practices

# Round 1 regional meeting recap – Northeast




- Infrastructure Improvements & Funding / Financing
- Collaboration / Partnership
- Permitting / Regulation… Policy
- Water Quality Issues
- Support to Rural Communities
- Environmental / Instream Flows
- Water Quantity Issues
- Support from Agencies / Scientific Communit…
- Staffing / Workforce Shortages
- Data Collection / Management
- Regional Planning
- Education
- Imple…
- Weather Extremes
- Best Mana… Practic… Sustai…
- Stormwater /…

# Round 2 regional meeting highlights - Northeast




**Infrastructure Improvements / Funding / Financing**

- Increase funding to expand existing workforce, technical assistance, leak detection, and long-range planning
- Support education for operators, district board members, and managers, and staff training
- Several success stories from RWDs and communities; lack funding for water loss and aging infrastructure

**Permitting / Regulations / Policy**

- General support for requiring metering; if mandatory, consider state subsidies to support costs/acceptance
- Expand and modernize water quality monitoring network for surface water and groundwater
- Consider a "Regional Water Governance Committee" to review/comment on permit applications

**Collaboration / Partnership / Regional Planning**

- Support for developing a transparent and consistent approach to regional planning (watershed basis)
- Regionalization via infrastructure sharing is more appealing than consolidation of utilities
- Best practices to incentivize (link to grant funding, communicate success stories, share templates): effective utility management; sustainable utilities practices; conservation plans; drought mgt. plans.

**Environmental / Instream Flow**

- Recognize the (economic) benefits of keeping water in the streams and lakes
- Discussed changing the hearing process for contested permits
- Discussed having other agencies (like USFWS/ODWC) to review controversial permits

# Round 1 regional meeting recap – Central




- Infrastructure Improvements & Funding / Financing
- Collaboration / Partnership
- Staffing / Workforce Shortages
- Water Reuse
- Data Collection / Management
- Water Quality Issues
- Water Quantity Issues
- Education
- Best Management Practices / Sustainability
- Support from Agencies / Scientific Communities
- Water Conservation
- Permitting / Regulations / Policy
- Stormwate… Flooding
- Support to Rural Comm…
- Weather Extremes
- Environm… Instream…
- Regional Planning

# Round 2 regional meeting highlights – Central




**Infrastructure Improvements / Funding / Financing**

- Improve access to technical assistance
- Create permanent funding programs
- Include funding support for local planning assistance

**Permitting / Regulations / Policy**

- Support for metering water use, esp. in areas where groundwater / surface water is more fully allocated
- Local management and planning would require minimum standards set by the State
- Consider modifying "use it or lose it" policy to a more balanced approach, like in Oregon
- Low support for ODWC proposal to review permit apps; how would ODWC comments be addressed?
- Mixed reactions to whether and how to implement an instream flow program; consistent approach is key

**Collaboration / Partnership / Regional Planning**

- Expand regional planning so all parts of the state have a regional plan; provide state funding support
- Encourage/facilitate regionalization via regional planning, coordinate reservoir operations, ASR science
- Encourage water metering, water loss prevention programs and training, conservation, reuse/recycling
- Support these best practices through a combination of funding, education, and policy mechanisms

# OCWP Recommendations

Public input through regional meetings, surveys, written comments, etc.

Feedback from related agencies, tribes, workgroups, and organizations

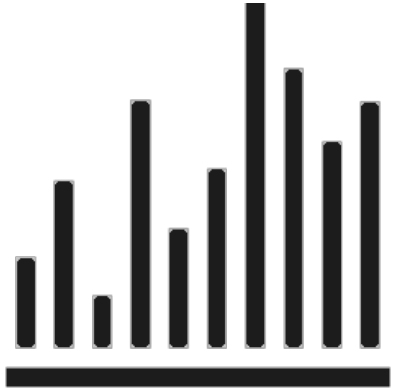
Water demand, physical supply, legal analysis, water quality, etc.



Other technical and supplemental studies

Policy assessment

# Draft Baseline Scenario Data



Demands



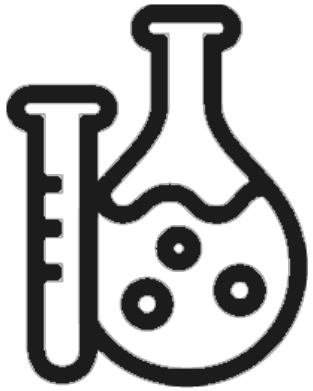
Physical Supply



Physical Gaps / Depletions



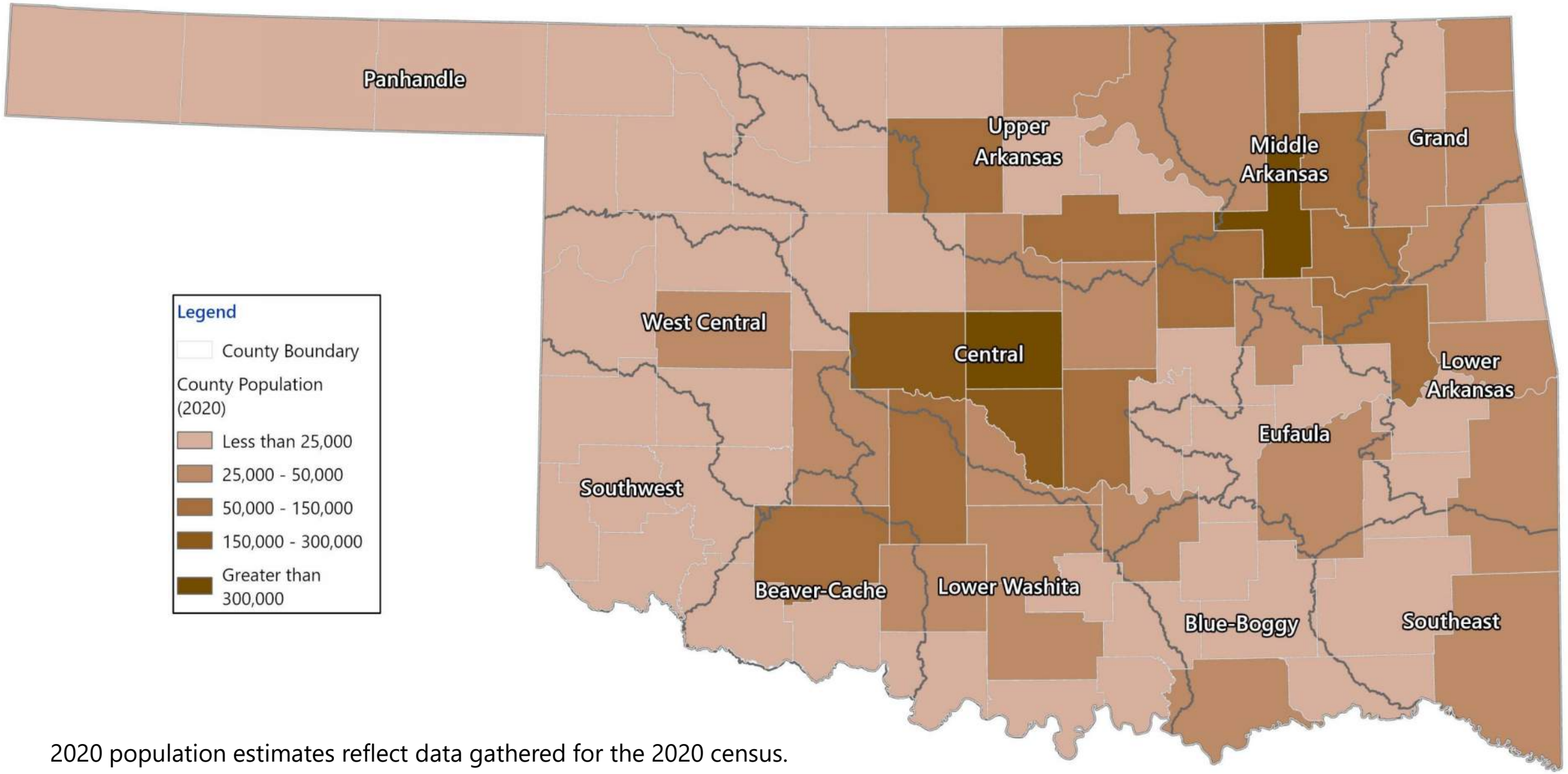
Legal supply



Water Quality

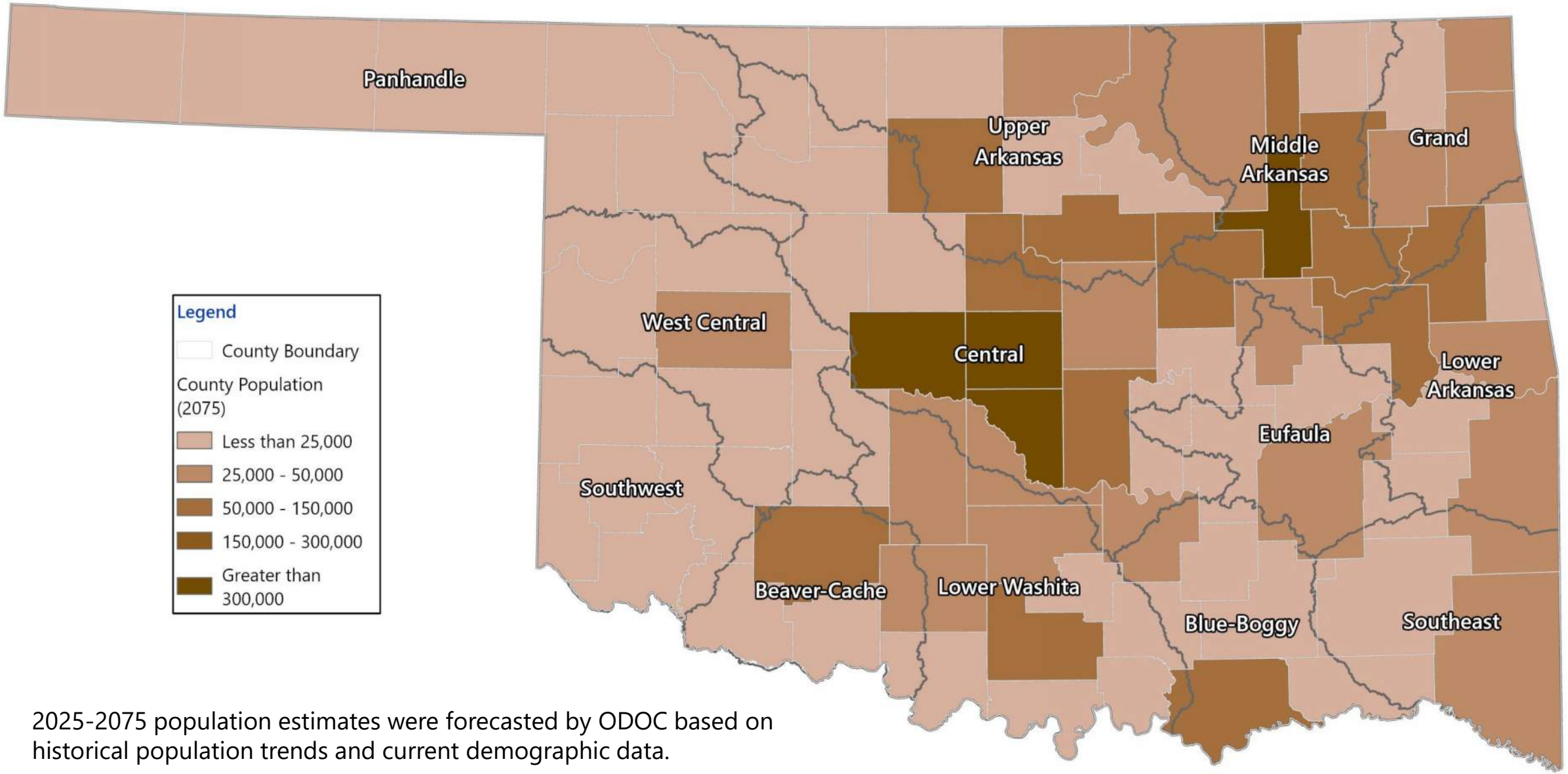
All data presented today is in DRAFT form and subject to change.
We will work over the coming months to refine and finalize it.

# 2020 Population – just under 4 million people




2020 population estimates reflect data gathered for the 2020 census.

# Projected 2075 Population – approximately 4.8 million people




2025-2075 population estimates were forecasted by ODOC based on historical population trends and current demographic data.

# Water Demand Forecasts for These Sectors

- **Projections of water use through 2075**

*Public Supply*



*Self-Supplied Domestic*



*Crop Irrigation*



*Thermoelectric Power*



*Self-Supplied Industrial*



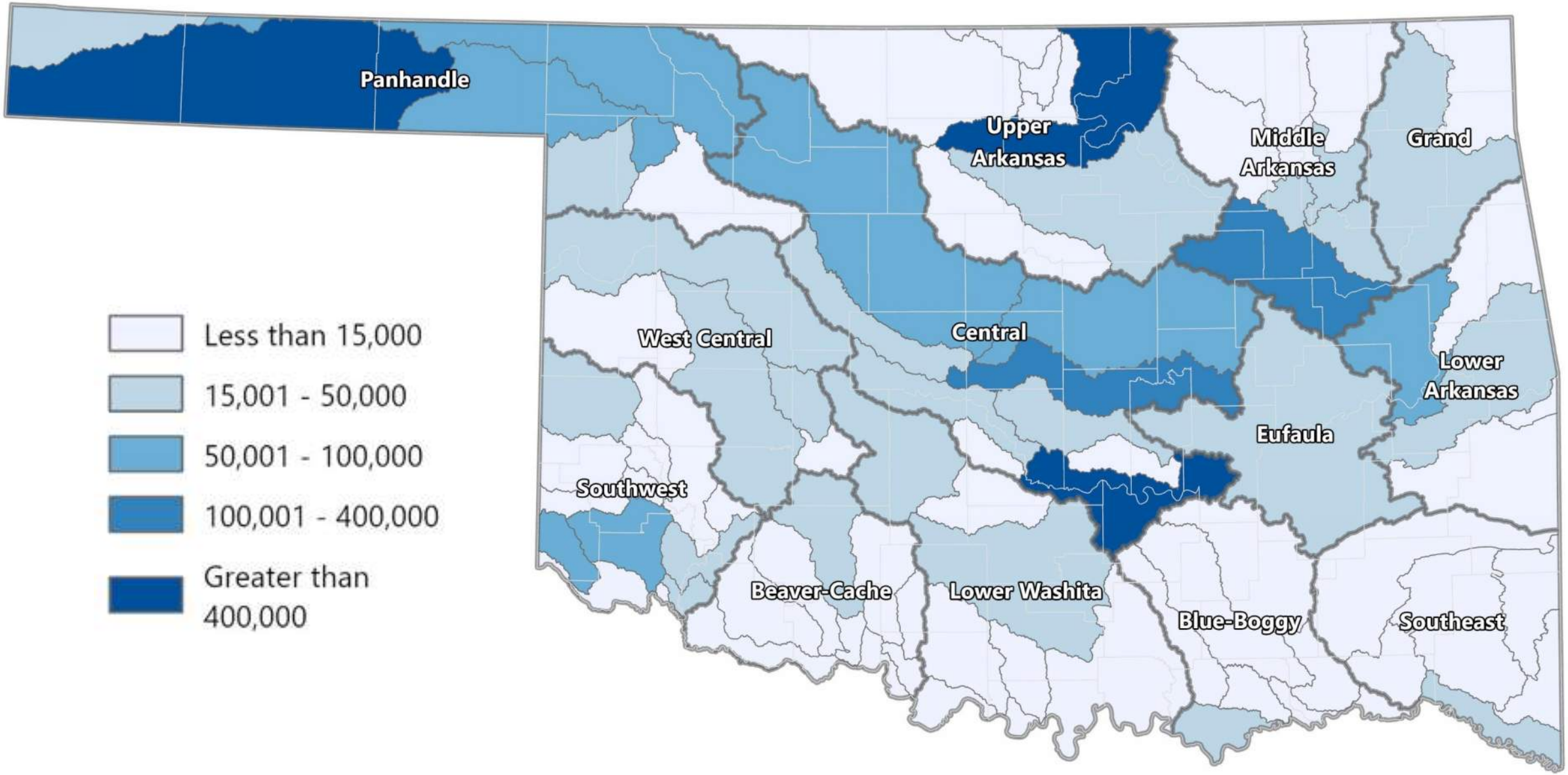
*Livestock*



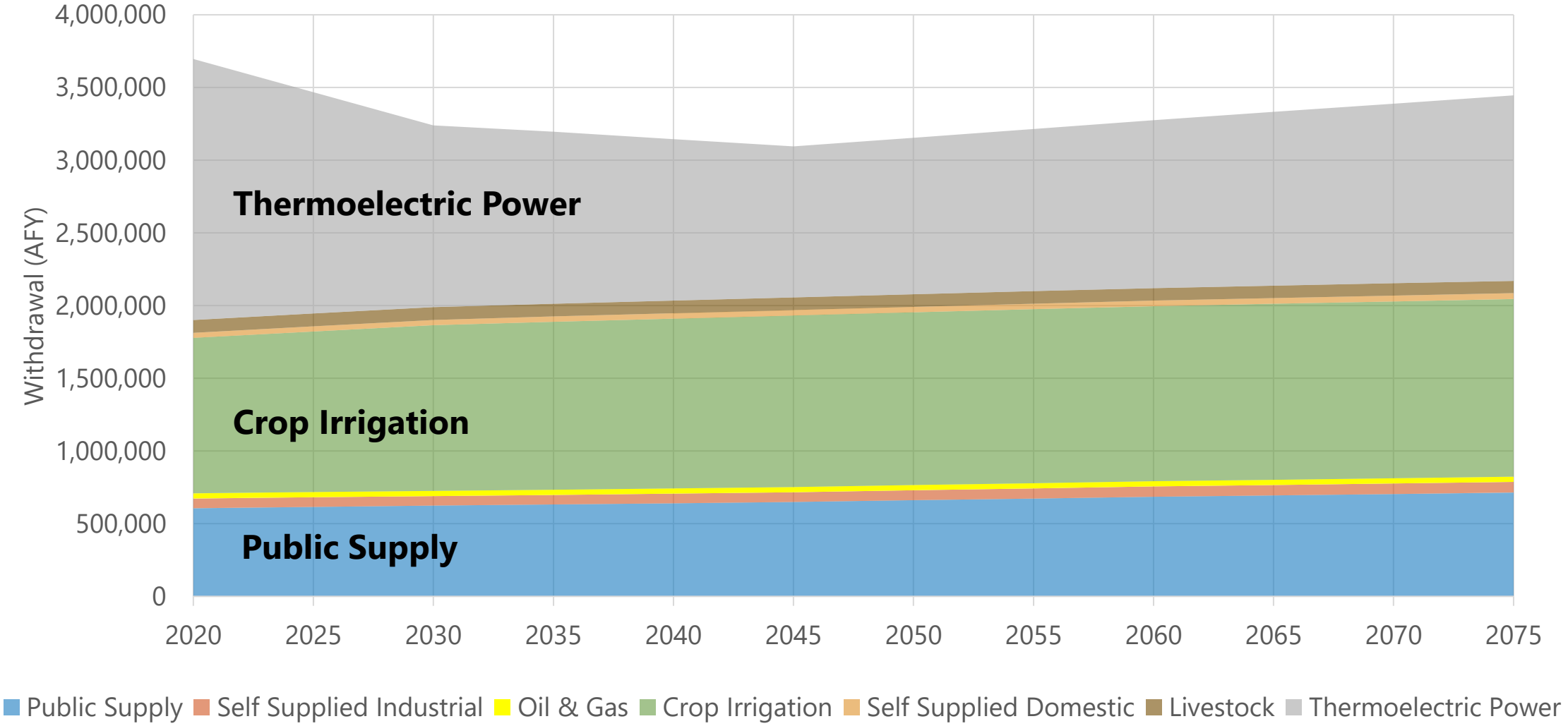
*Oil & Gas*



# Current Water Demands (AFY)



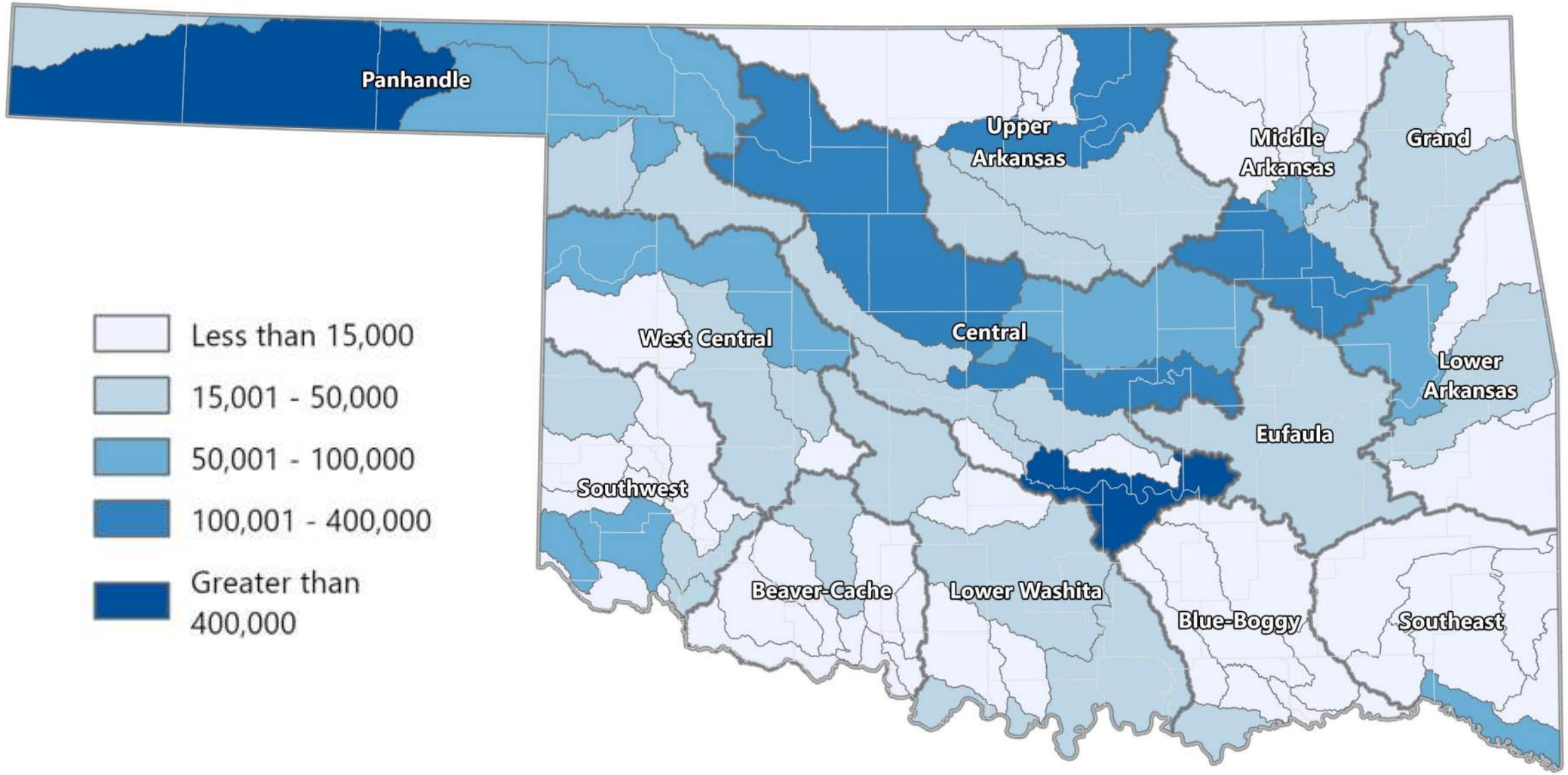
# Water Demand Forecast by Sector




Note that most (97%) of Thermoelectric Power withdrawals are returned and not consumed.

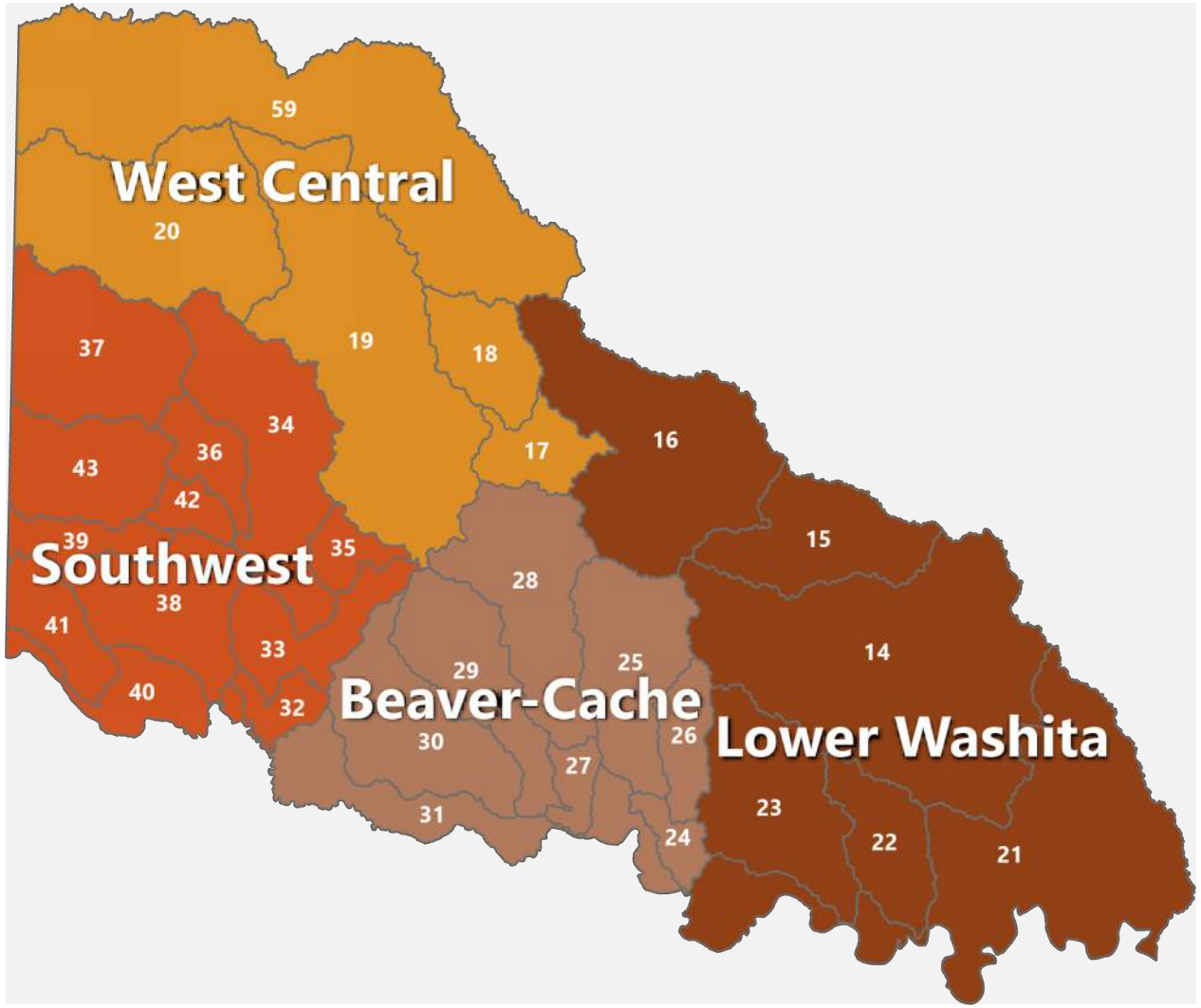
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# Projected 2075 Water Demands (AFY)

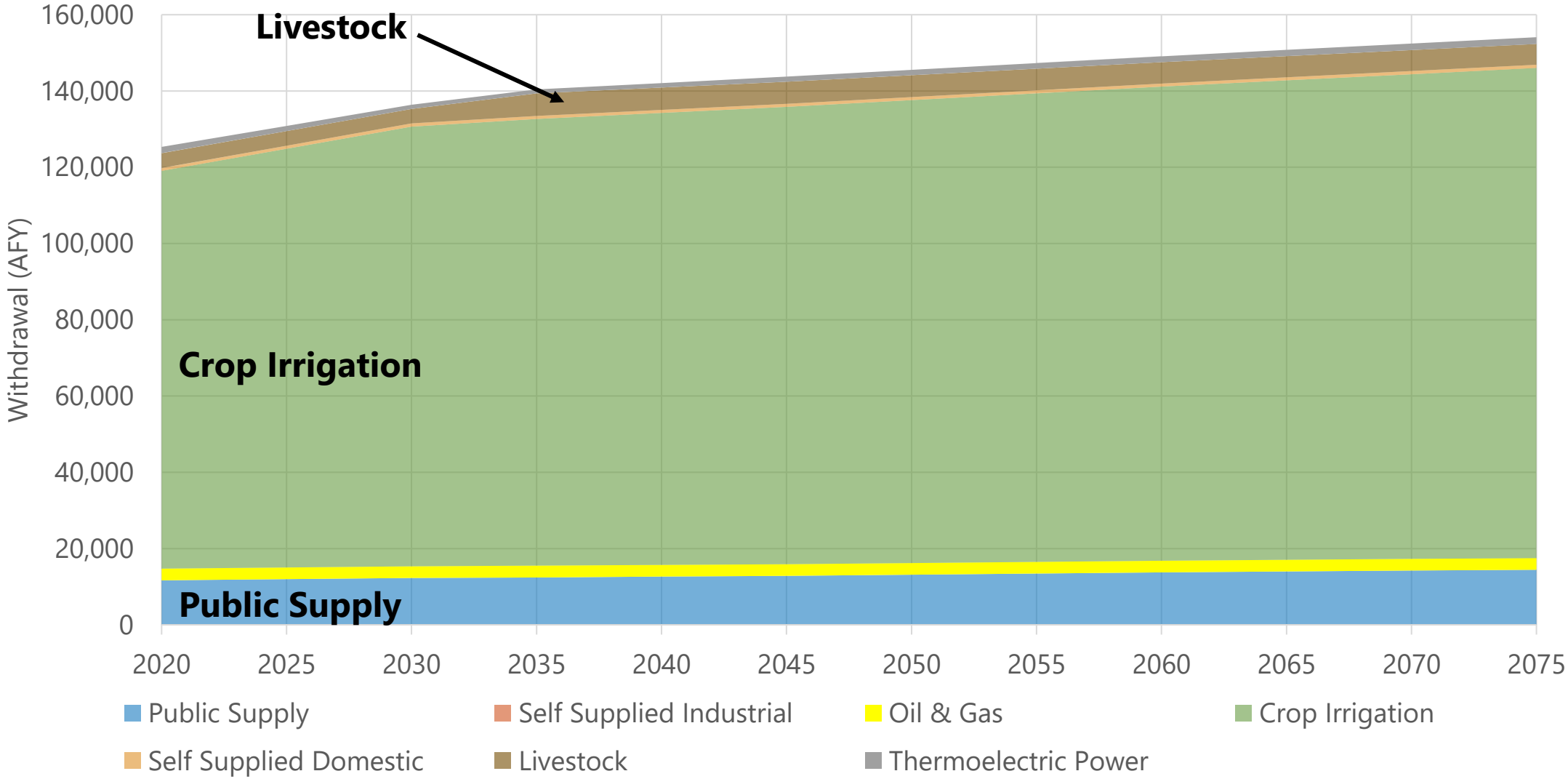



All data presented today is in DRAFT form and subject to change.

# Southwest Region Data – Water Demand Forecasts

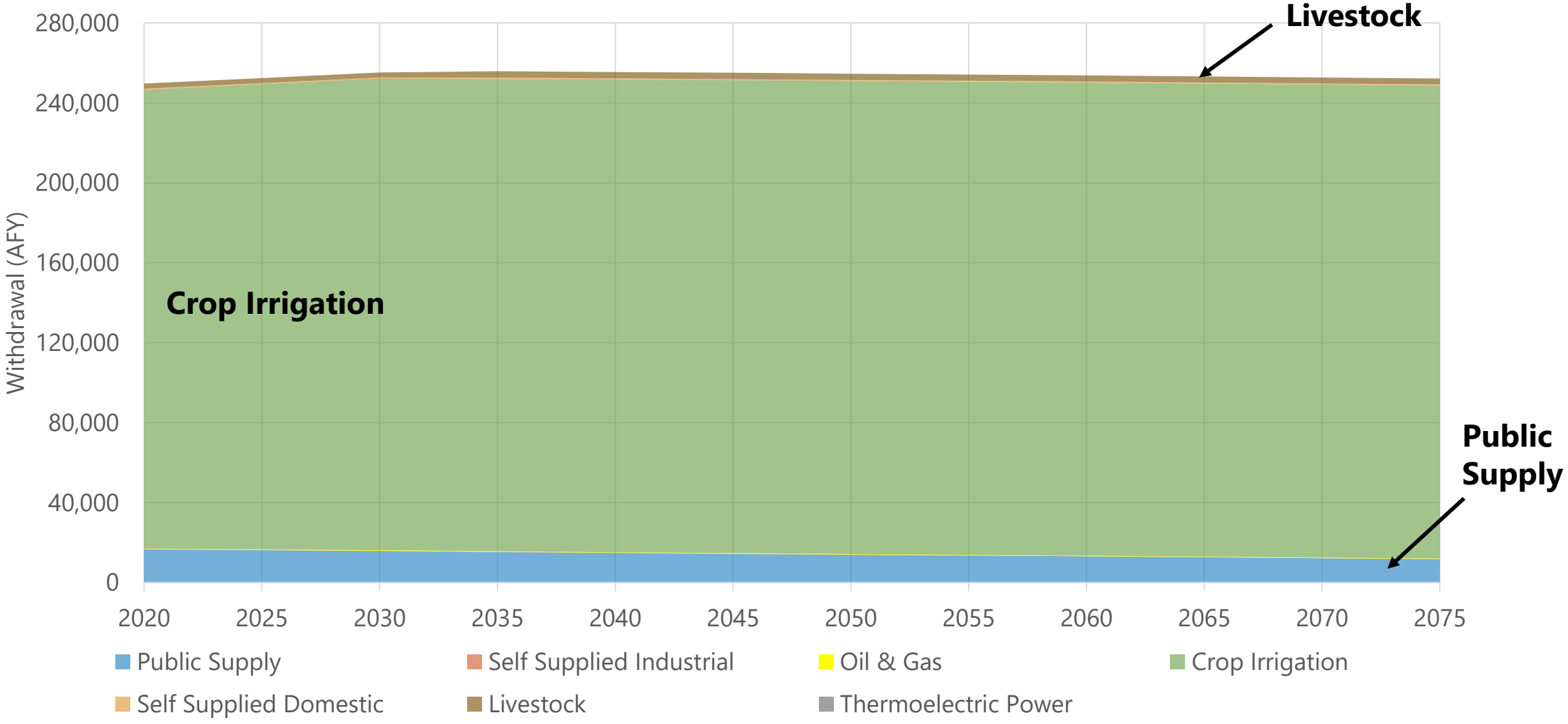


# Water Demand Forecast by Sector - West Central




All data presented today is in DRAFT form and subject to change.

# Water Demand Forecast by Sector - Southwest

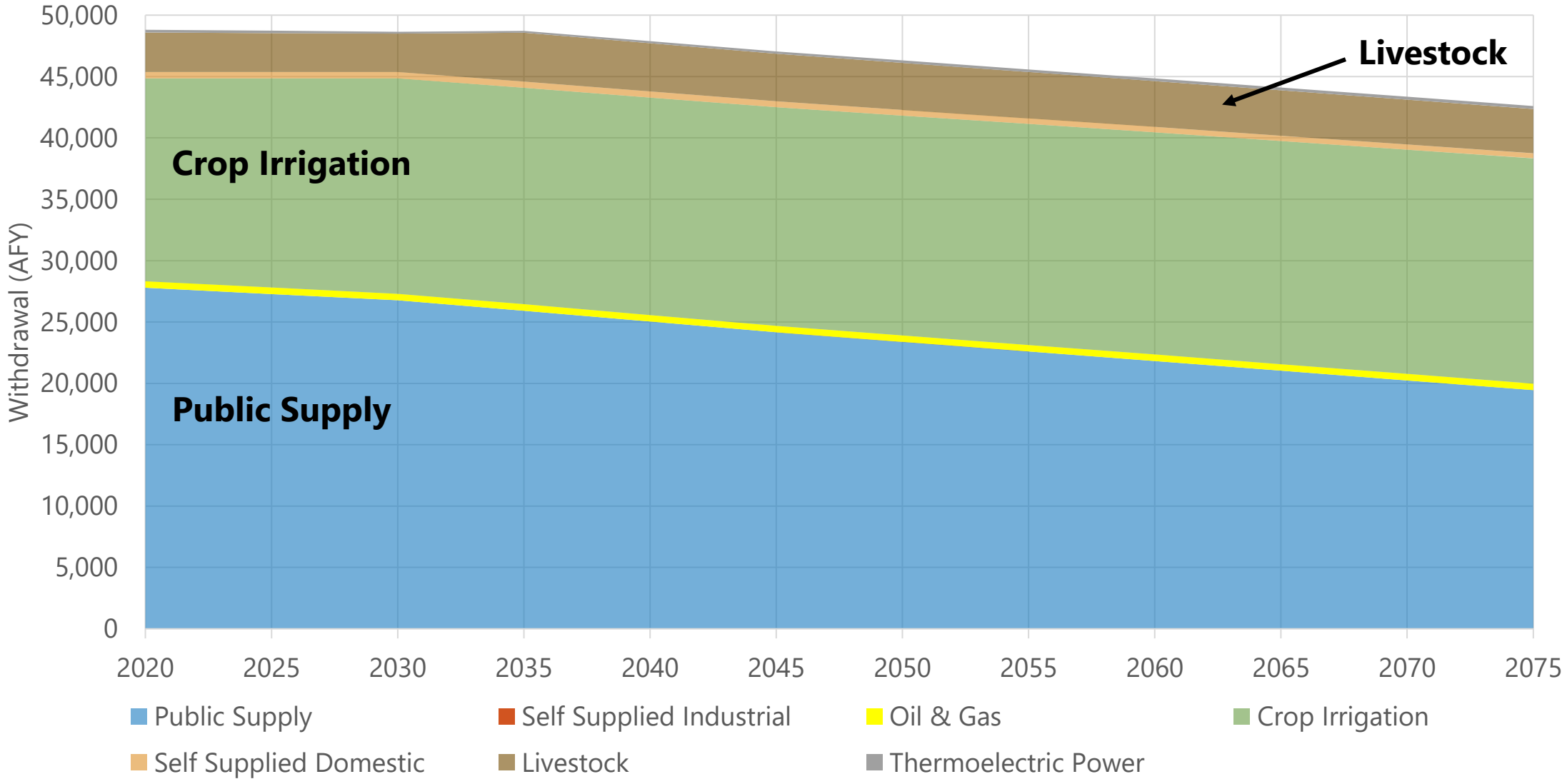



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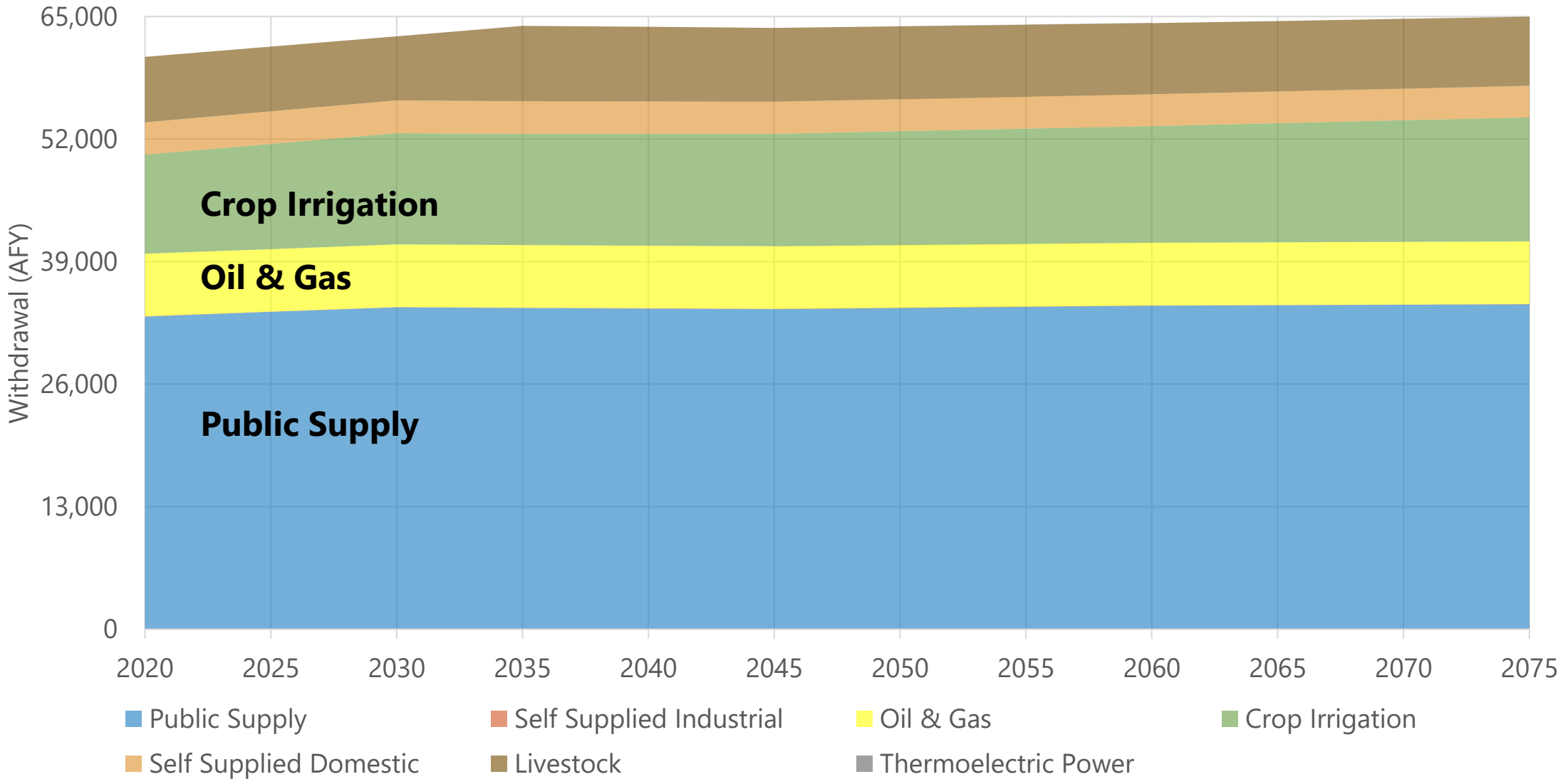
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# Water Demand Forecast by Sector - Beaver-Cache



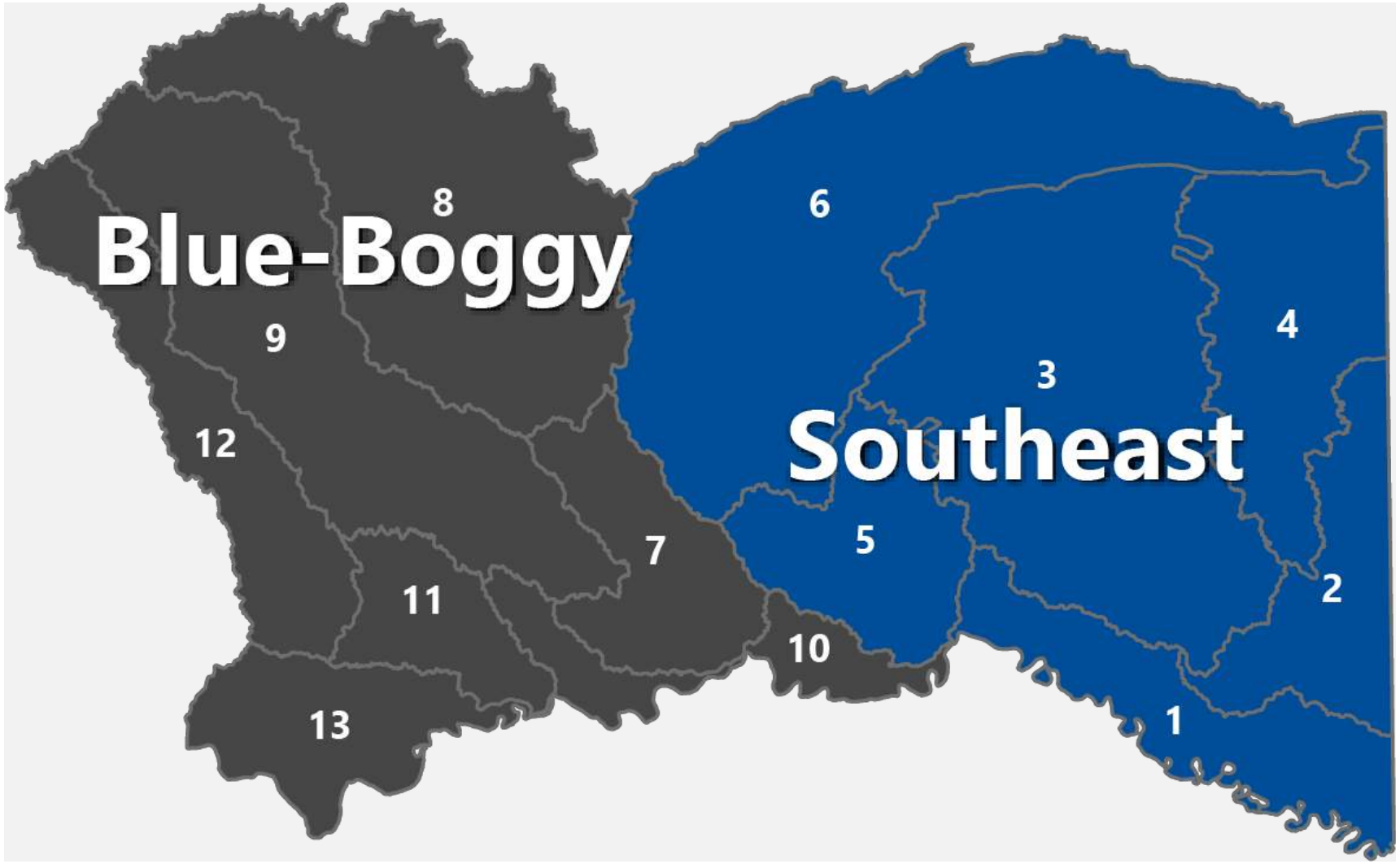

All data presented today is in DRAFT form and subject to change.

# Water Demand Forecasts by Sector - Lower Washita

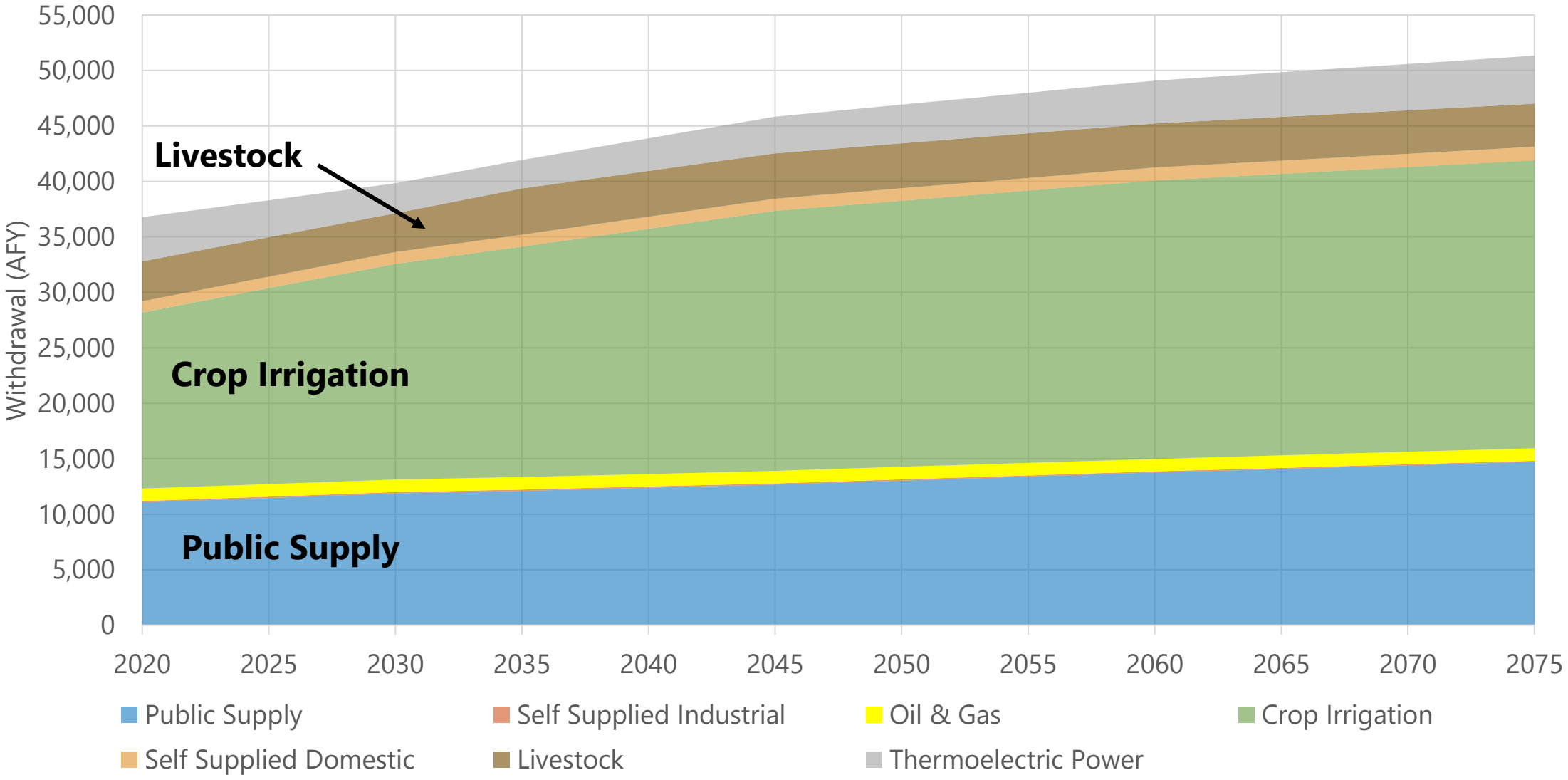



All data presented today is in DRAFT form and subject to change.

# Southeast Region Data – Water Demand Forecasts



# Water Demand Forecast by Sector - Blue-Boggy

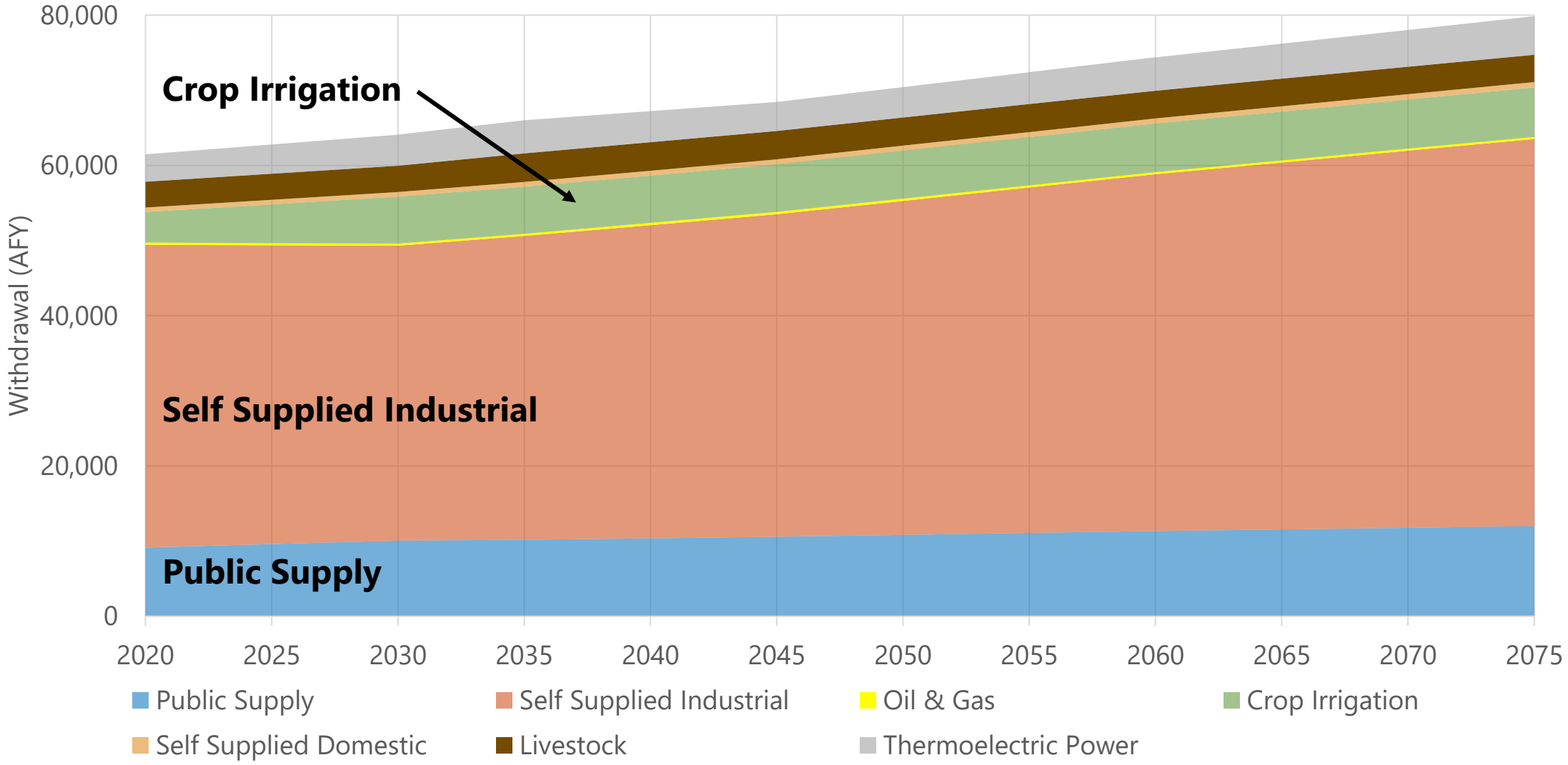





All data presented today is in DRAFT form and subject to change.

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# Water Demand Forecast by Sector - Southeast

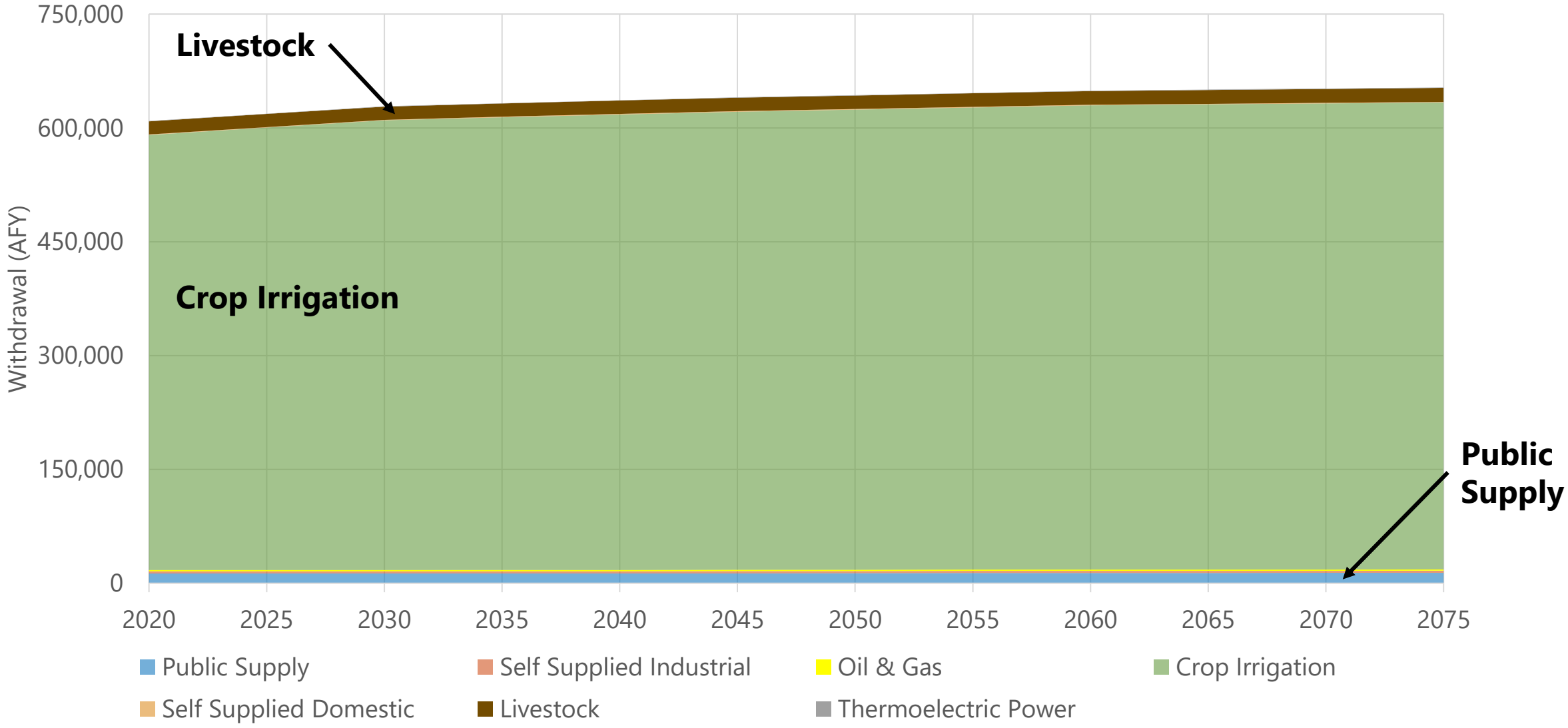



All data presented today is in DRAFT form and subject to change.

# Northwest Region Data – Water Demand Forecasts



# Water Demand Forecast by Sector - Panhandle

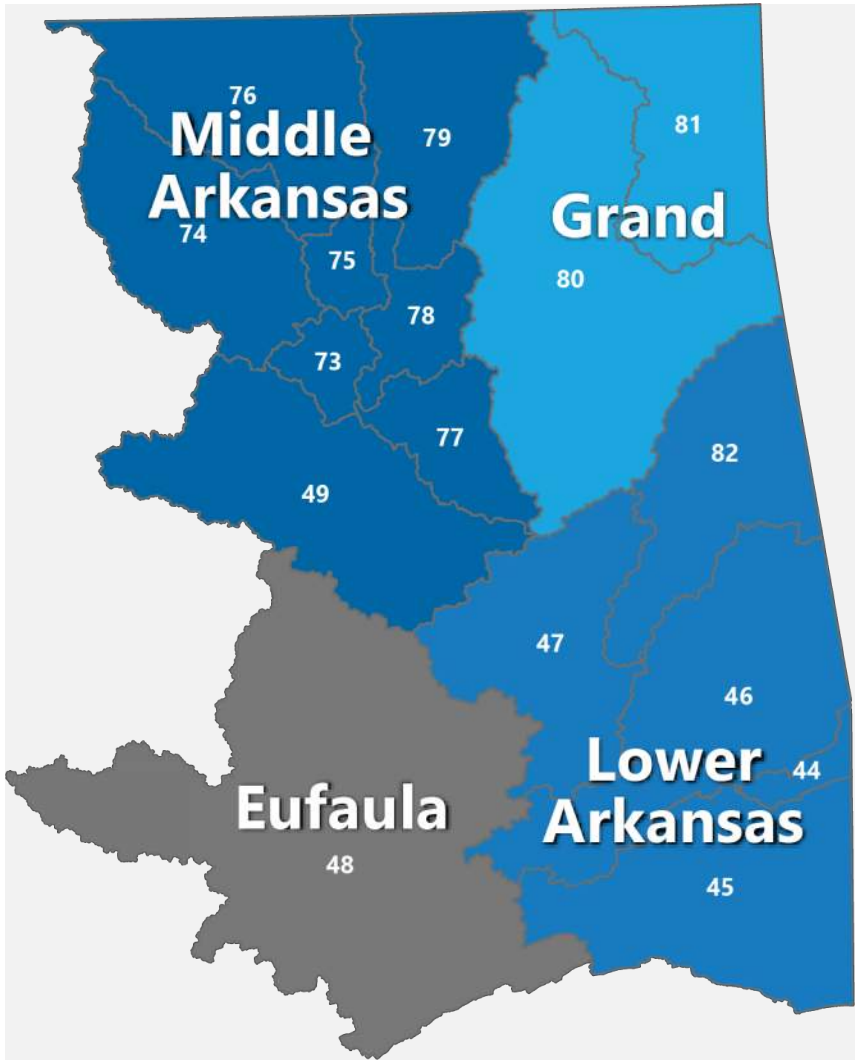




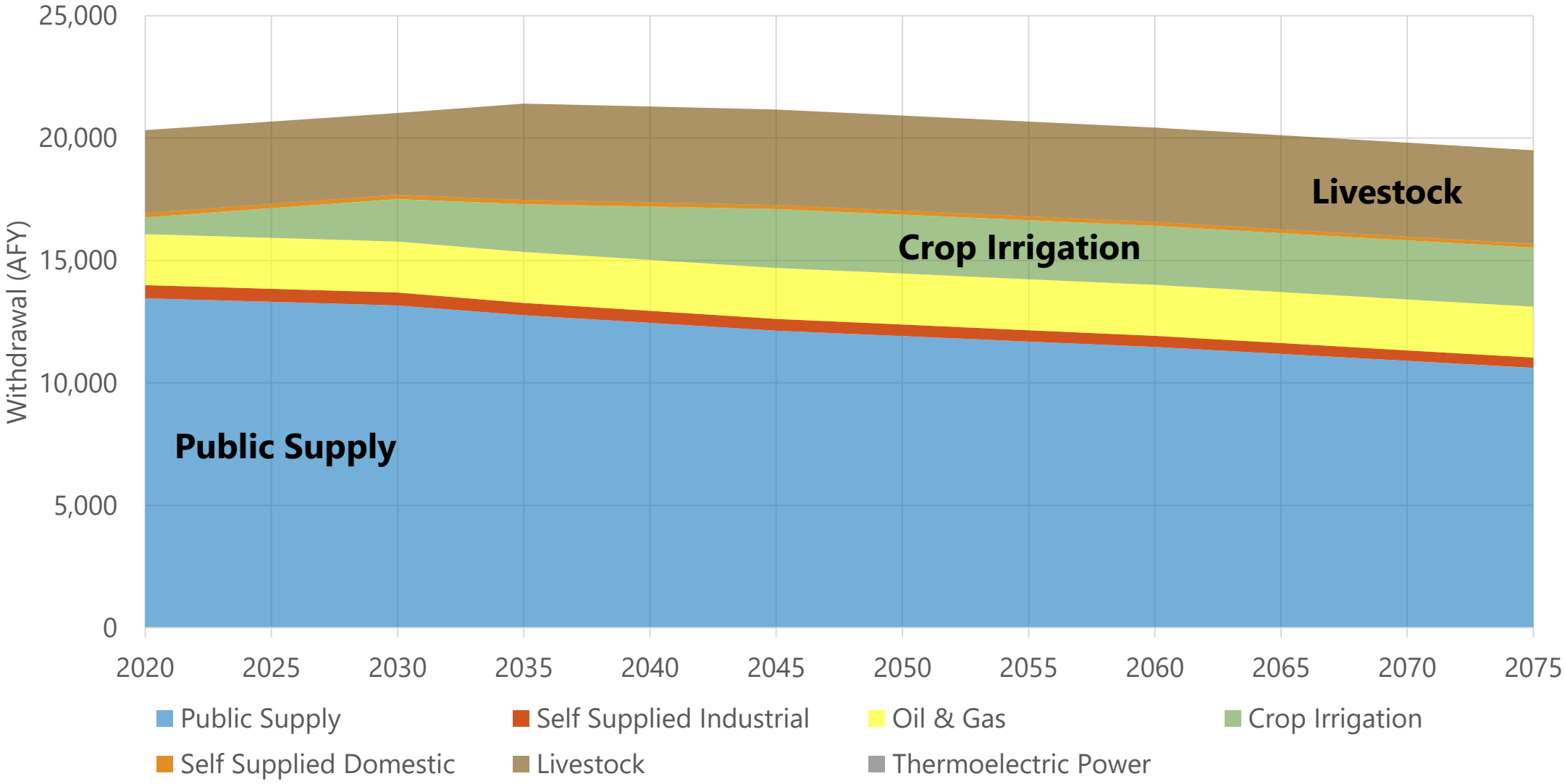

All data presented today is in DRAFT form and subject to change.

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# Northeast Region Data – Water Demand Forecasts



# Water Demand Forecast by Sector - Eufaula

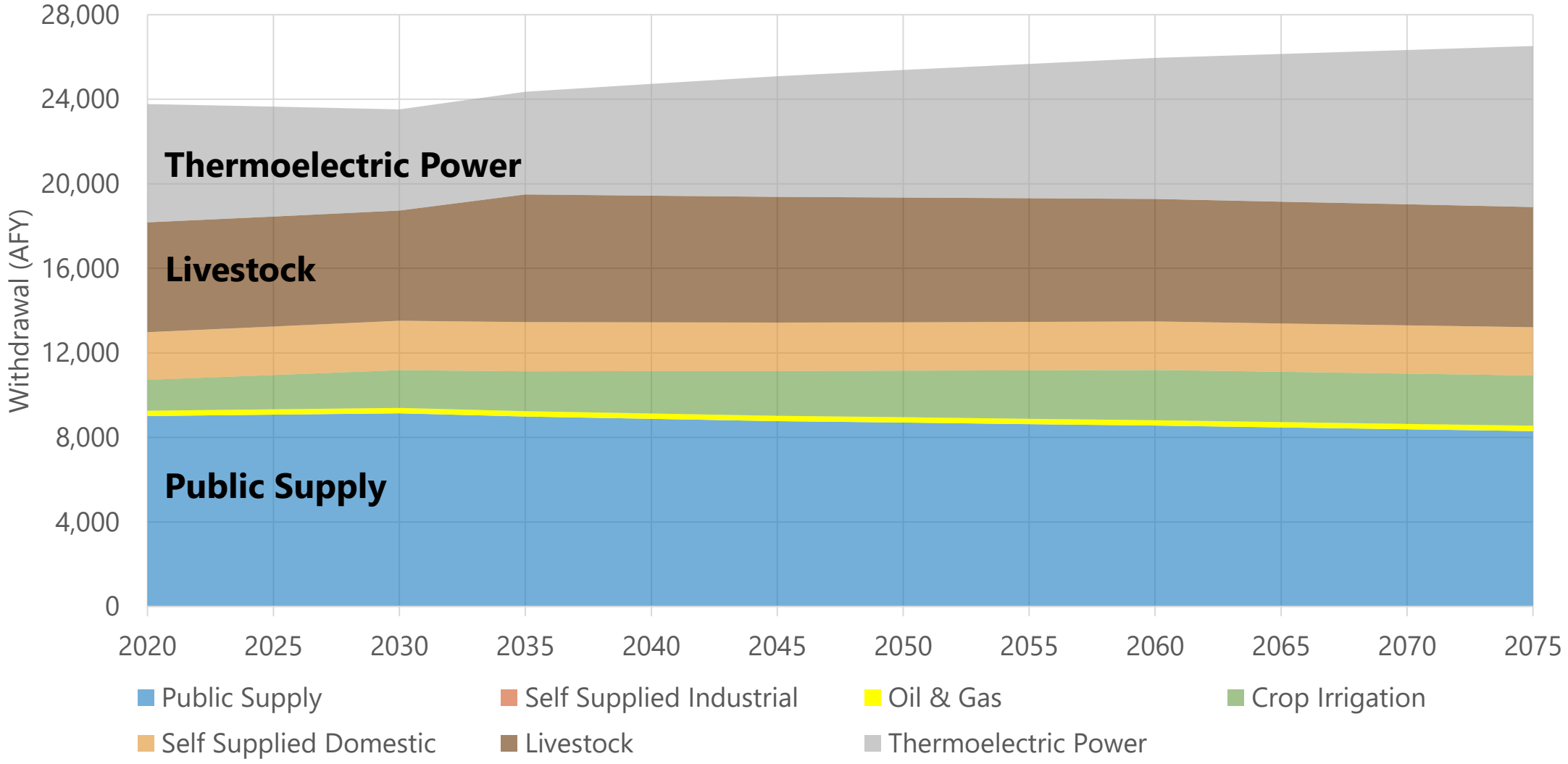



All data presented today is in DRAFT form and subject to change.



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# Water Demand Forecast by Sector - Grand

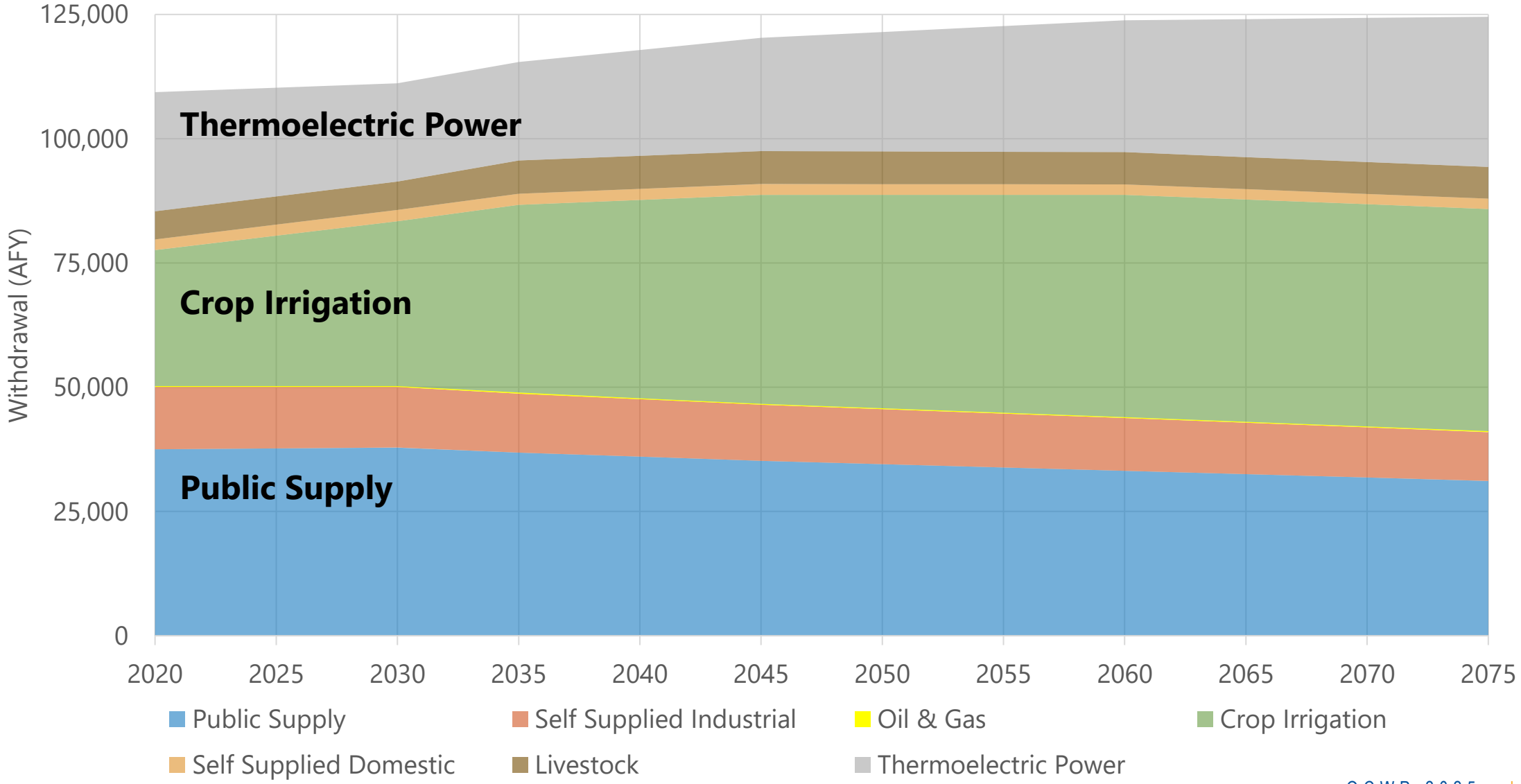



All data presented today is in DRAFT form and subject to change.



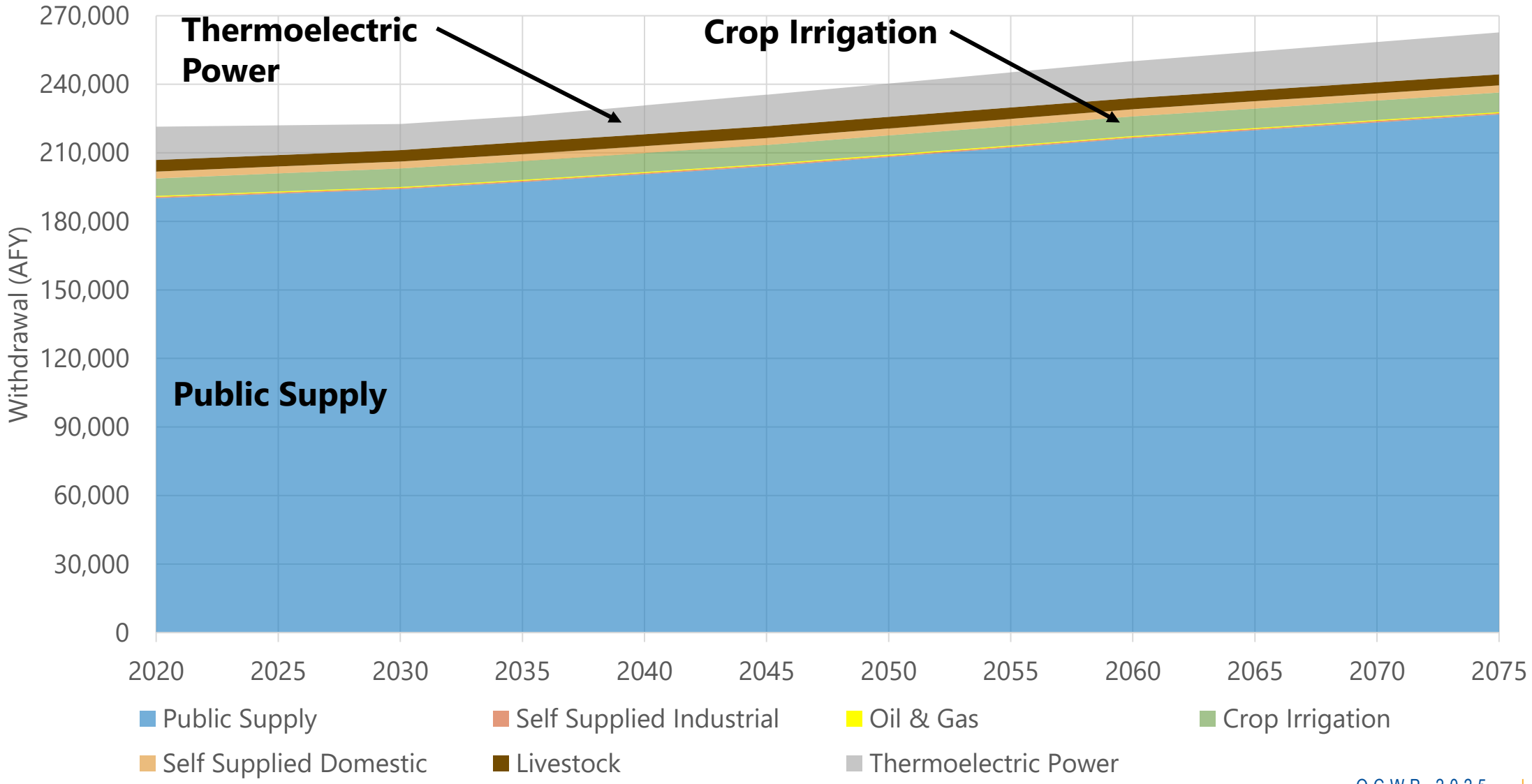
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# Water Demand Forecast by Sector - Lower Arkansas



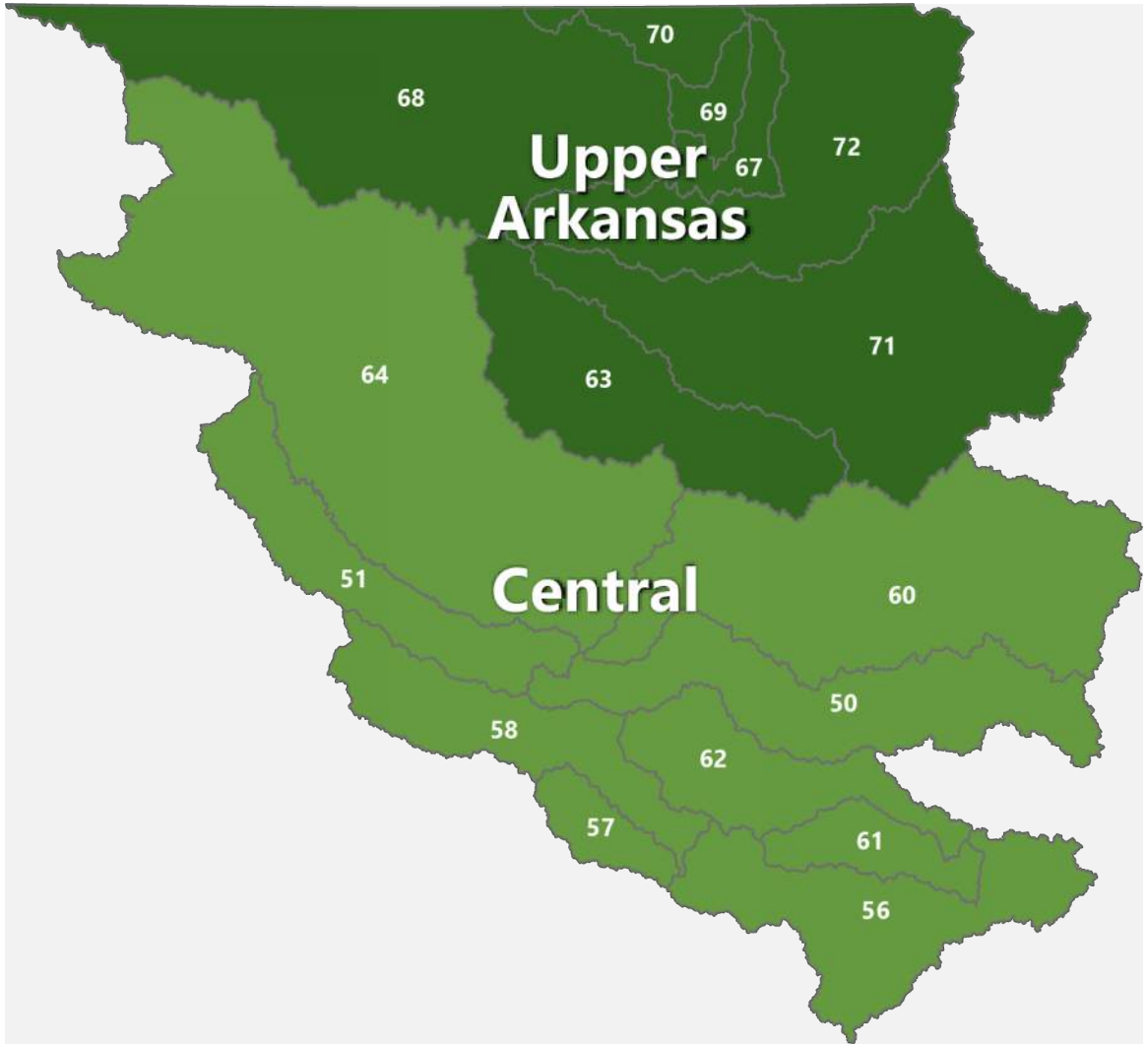

All data presented today is in DRAFT form and subject to change.

# Water Demand Forecast by Sector - Middle Arkansas

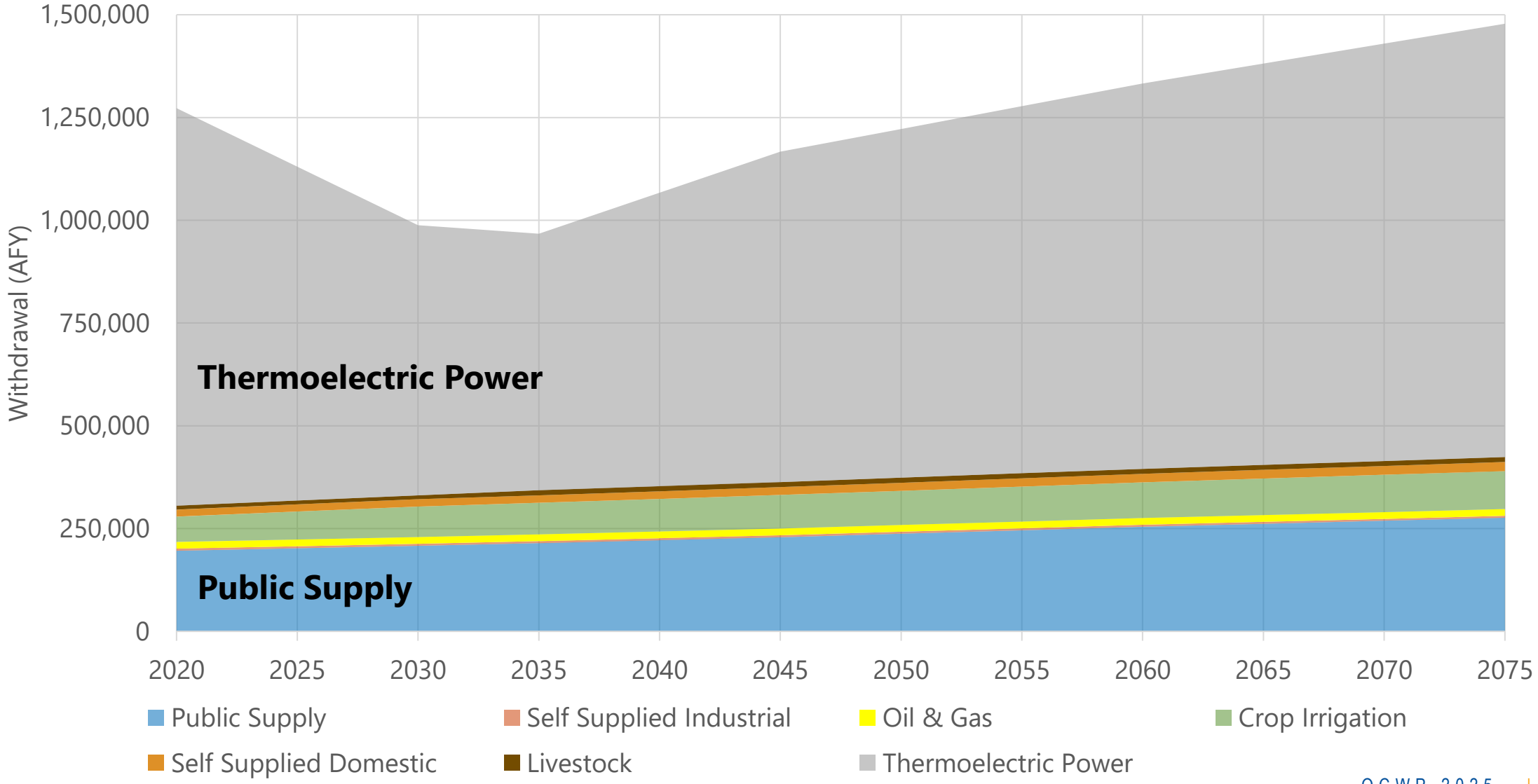



All data presented today is in DRAFT form and subject to change.

# Central Region Data – Water Demand Forecasts



# Water Demand Forecast by Sector - Central

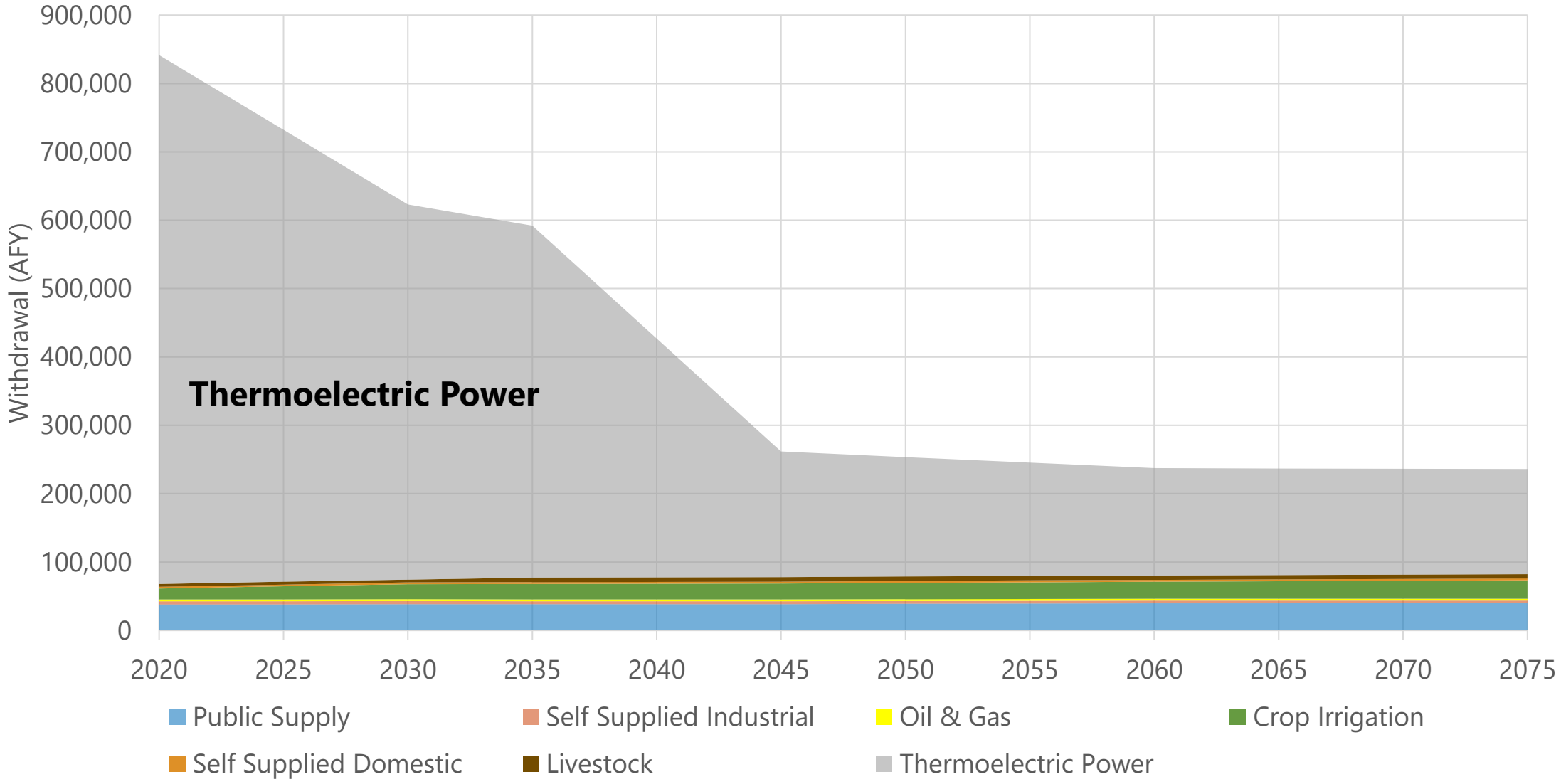



All data presented today is in DRAFT form and subject to change.



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# Water Demand Forecast by Sector - Upper Arkansas

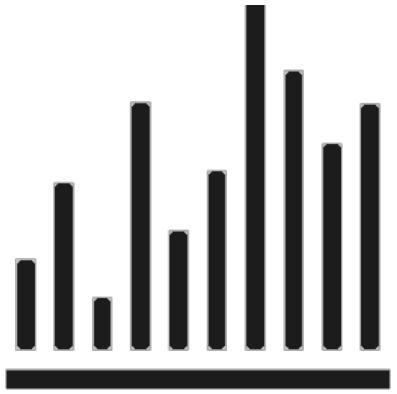





All data presented today is in DRAFT form and subject to change.

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# Draft Baseline Scenario Data



✓Demands



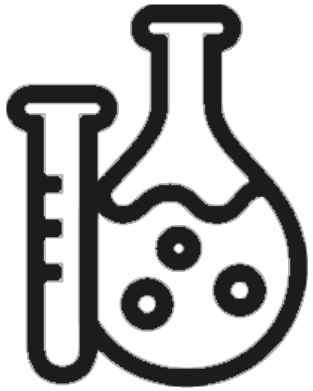
Physical Supply



Physical Gaps / Depletions



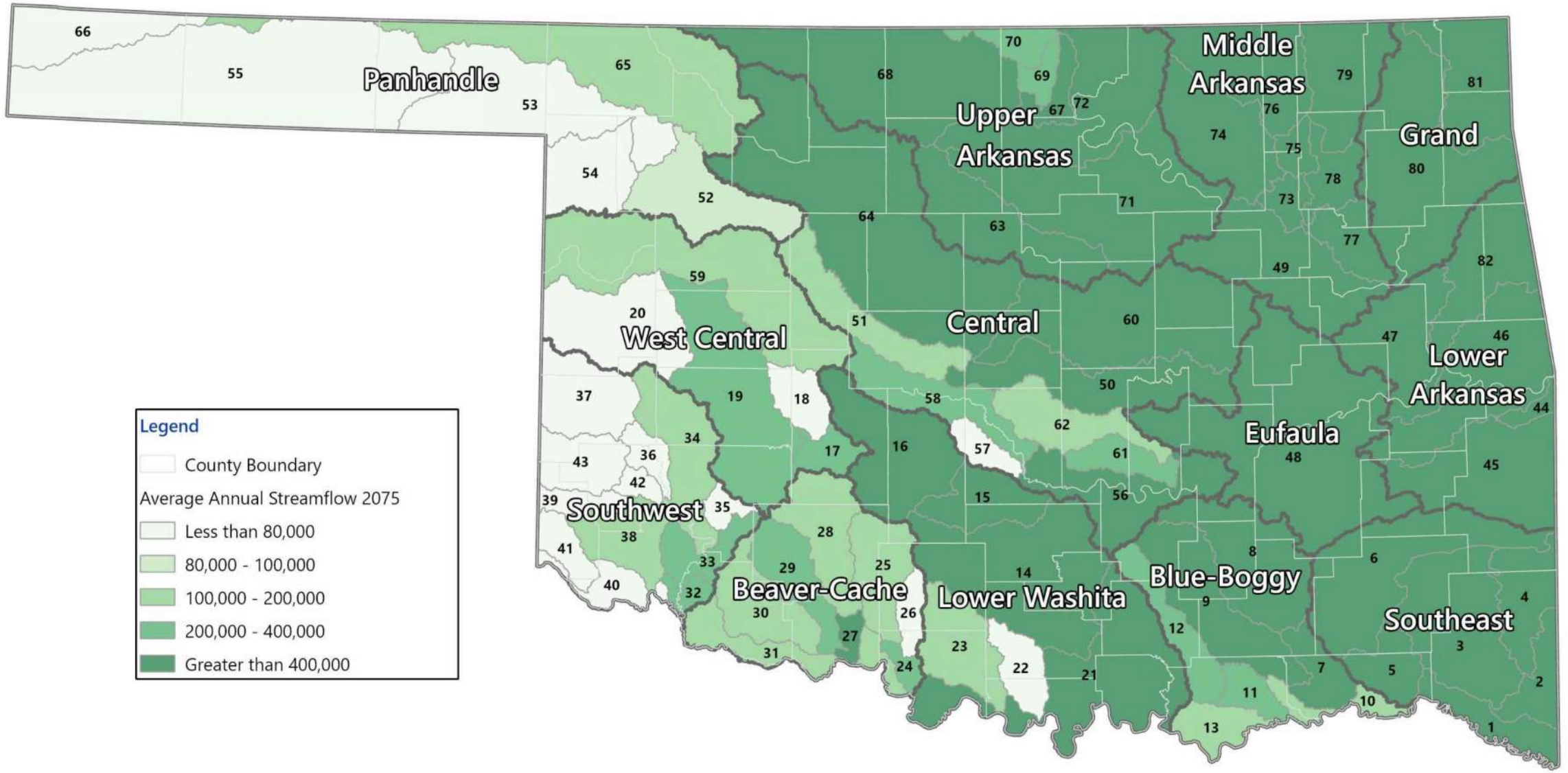
Legal supply



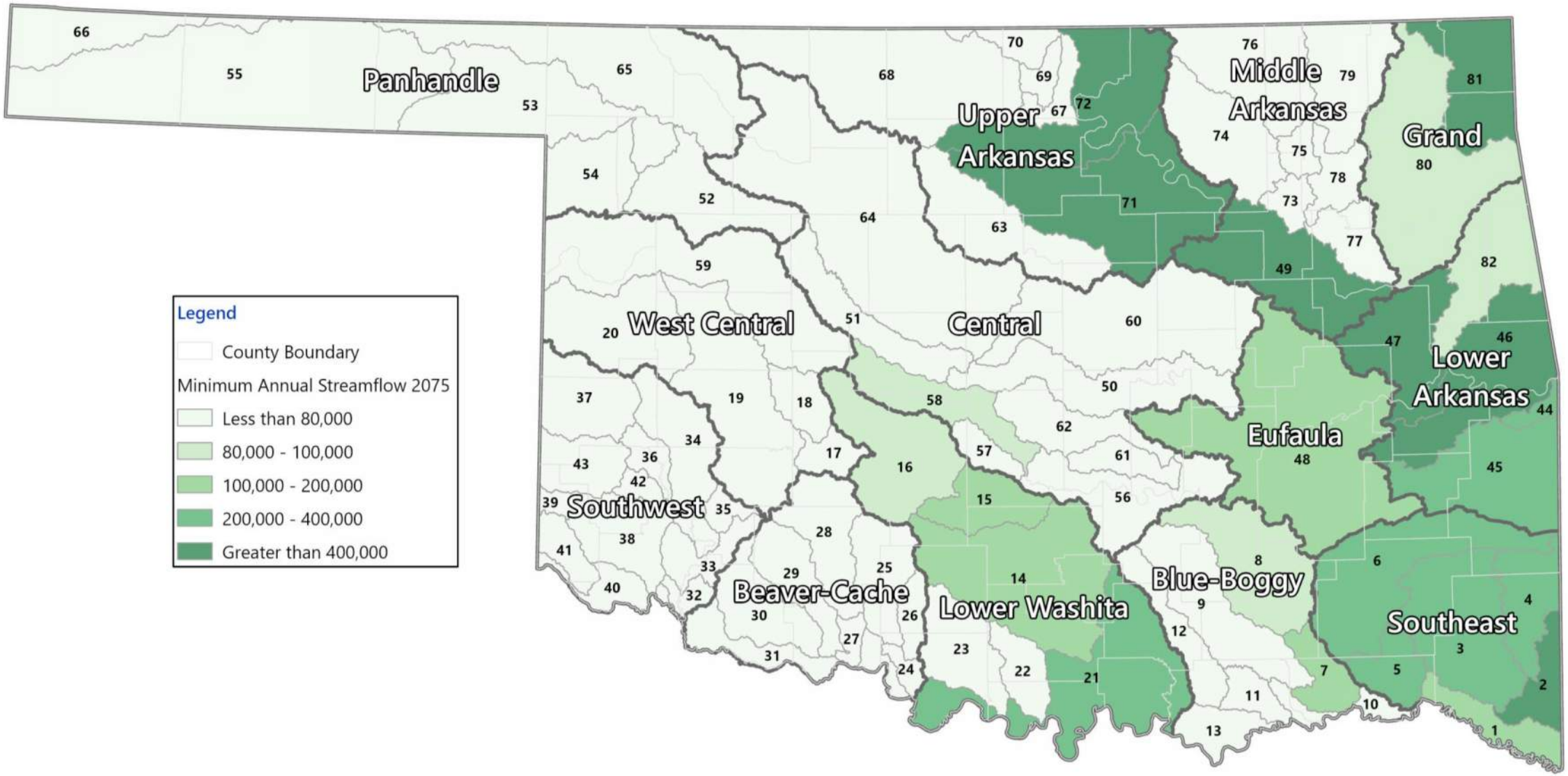
Water Quality

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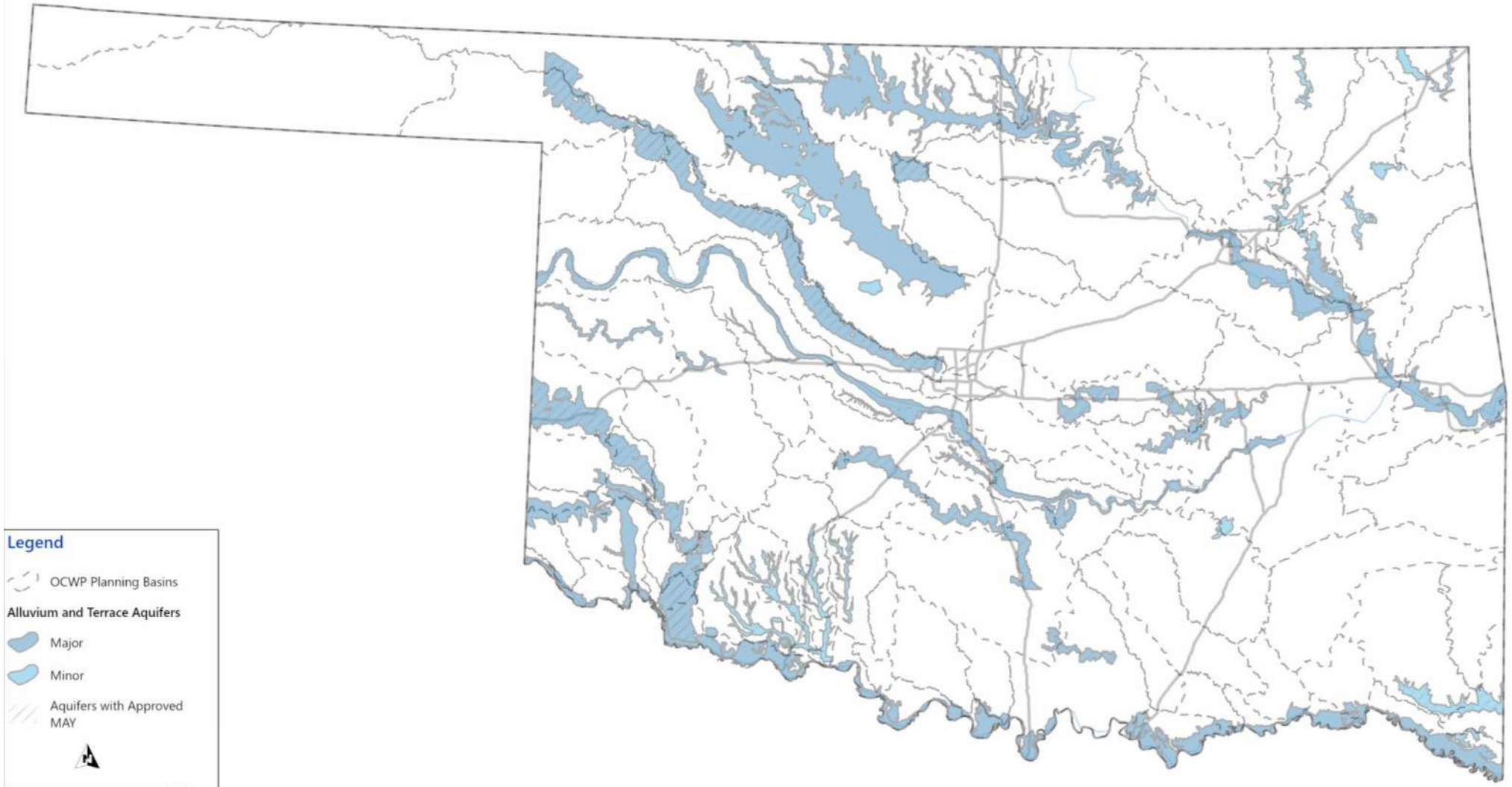
# Streamflow under Average Conditions (AFY)



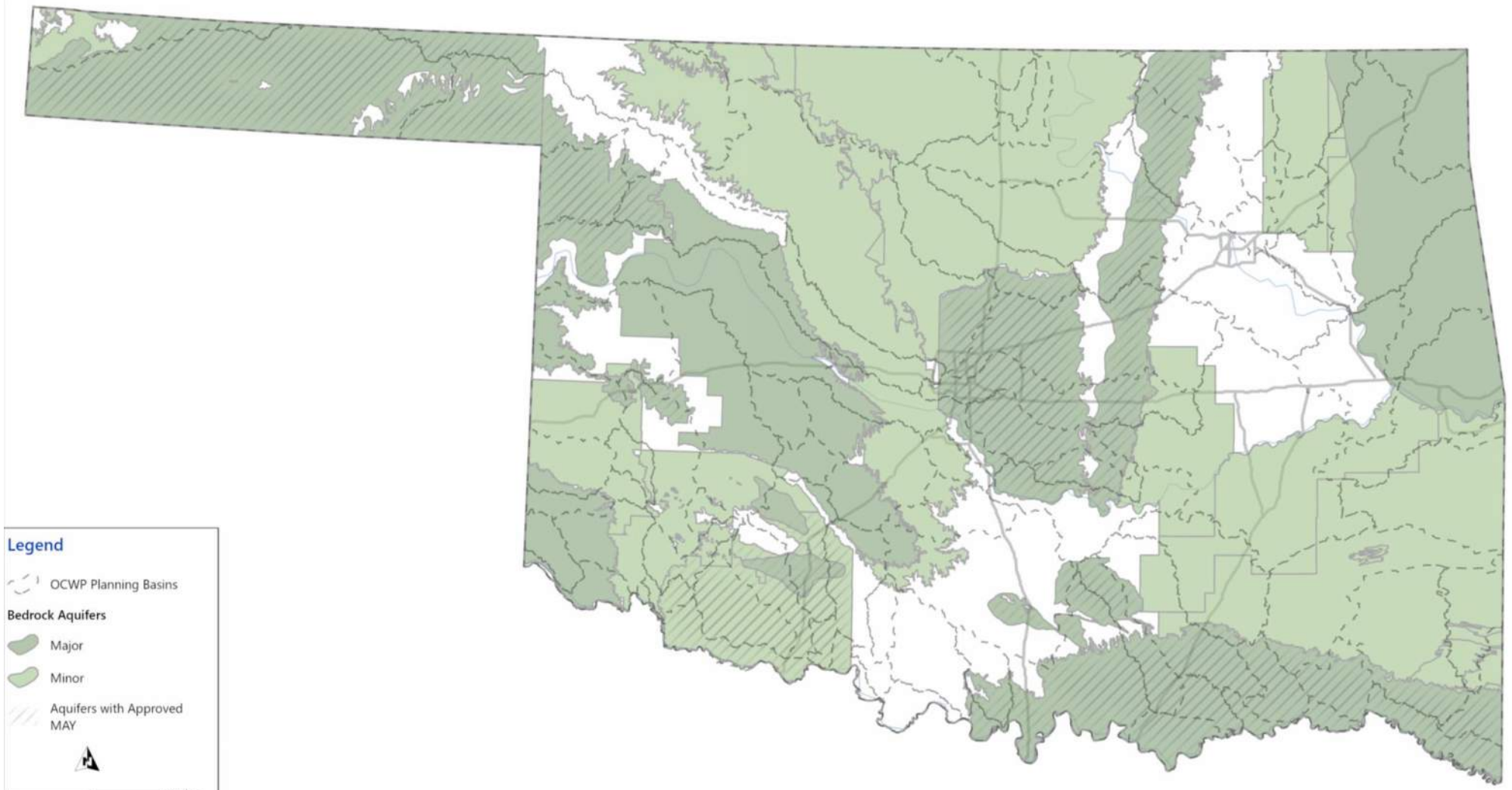
# Streamflow under Driest Conditions (AFY)



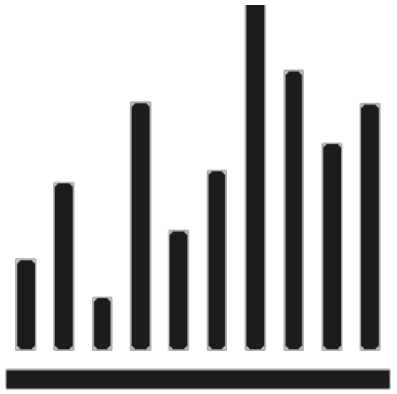
# Major and Minor Alluvial Aquifers



# Major and Minor Bedrock Aquifers



# Draft Baseline Scenario Data



✓Demands



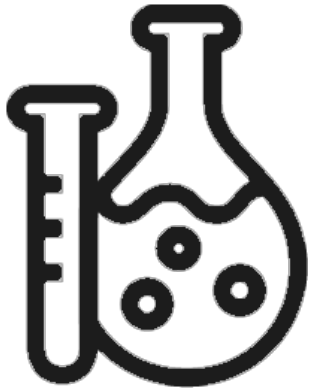
✓Physical Supply



Physical Gaps / Depletions



Legal supply



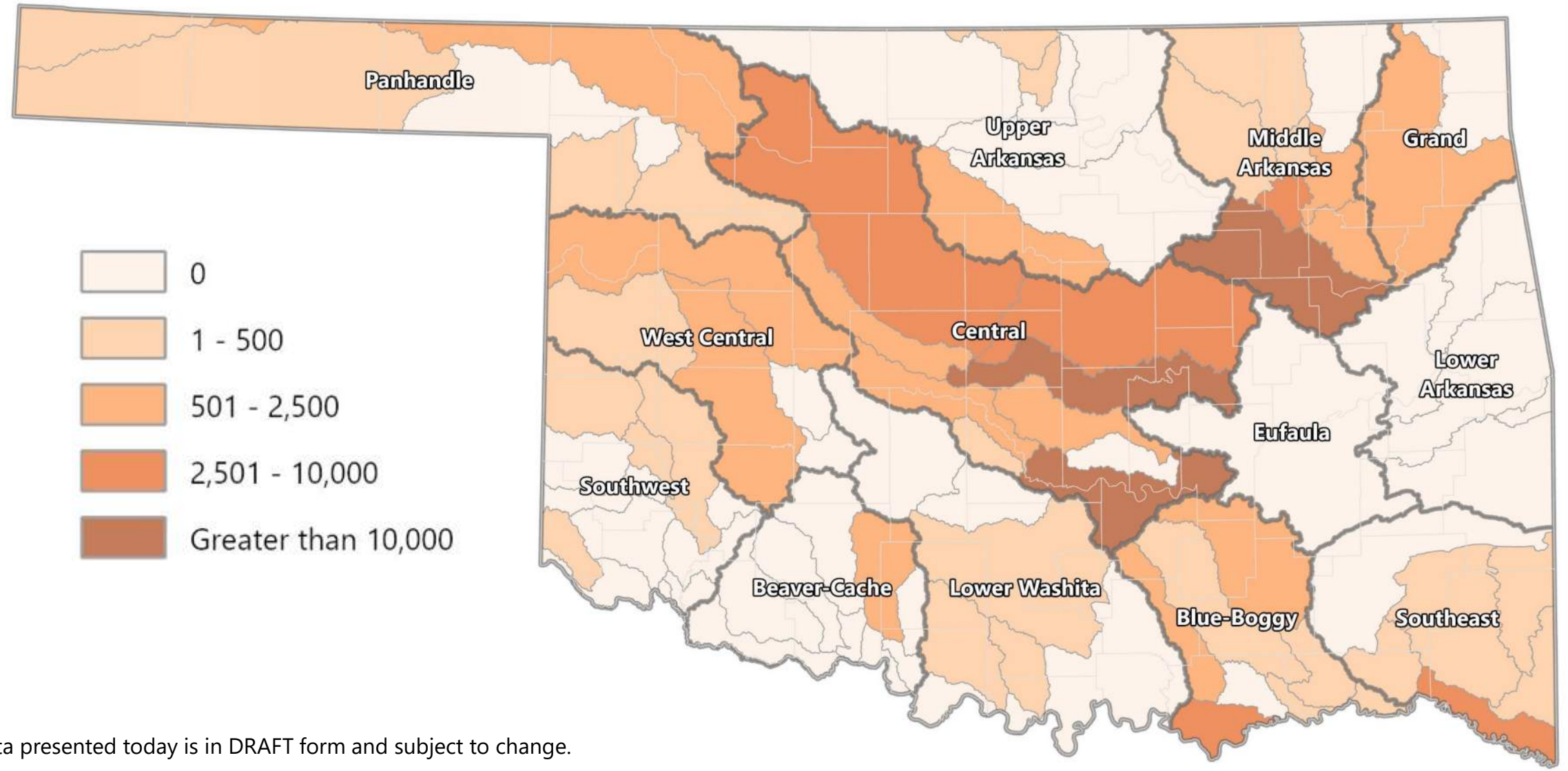
Water Quality

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# Fundamental Planning Equation

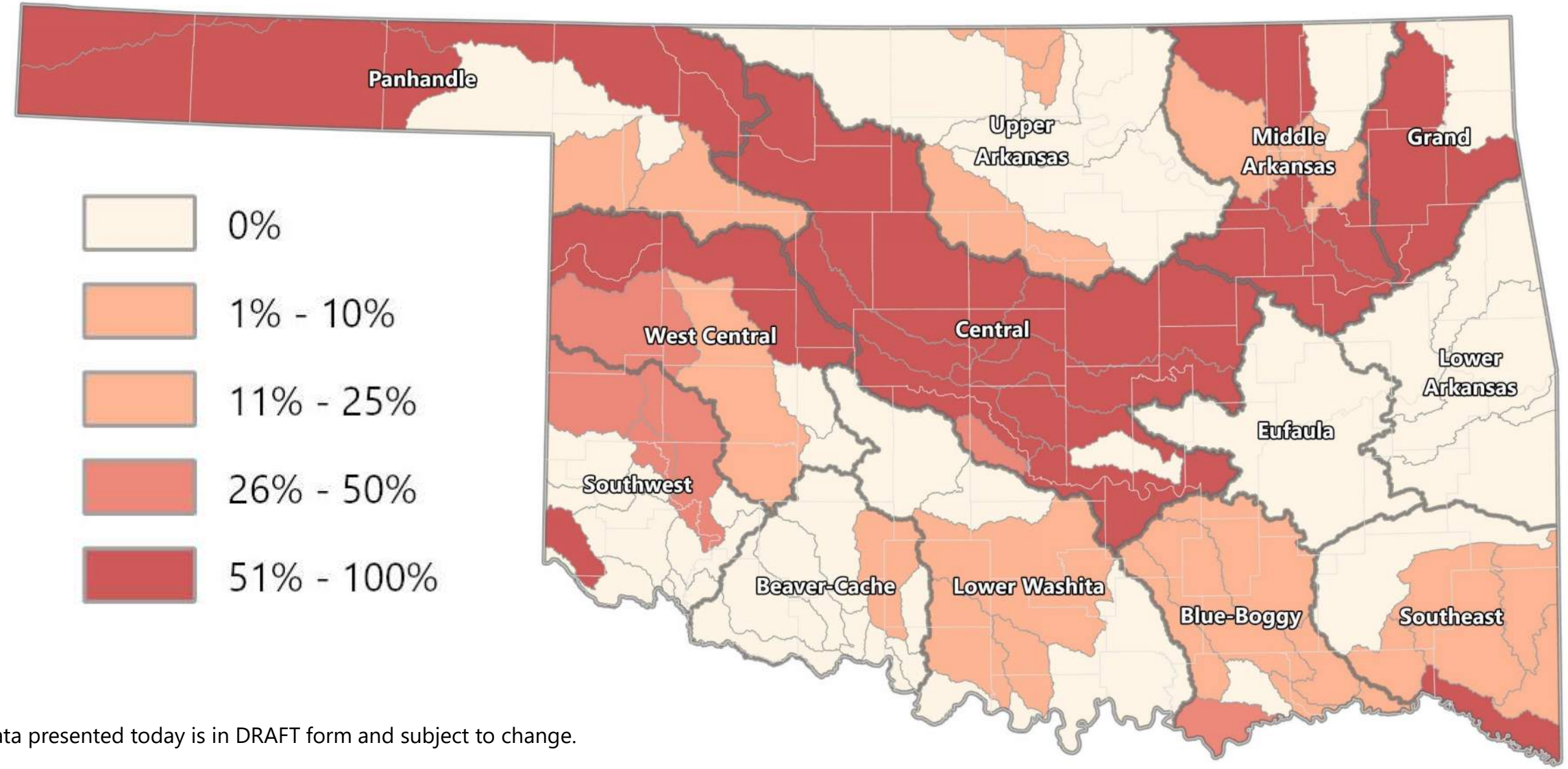


# Projected **Surface Water** Gap Magnitude (AFY) under Historical Driest Conditions for 2075 Demands



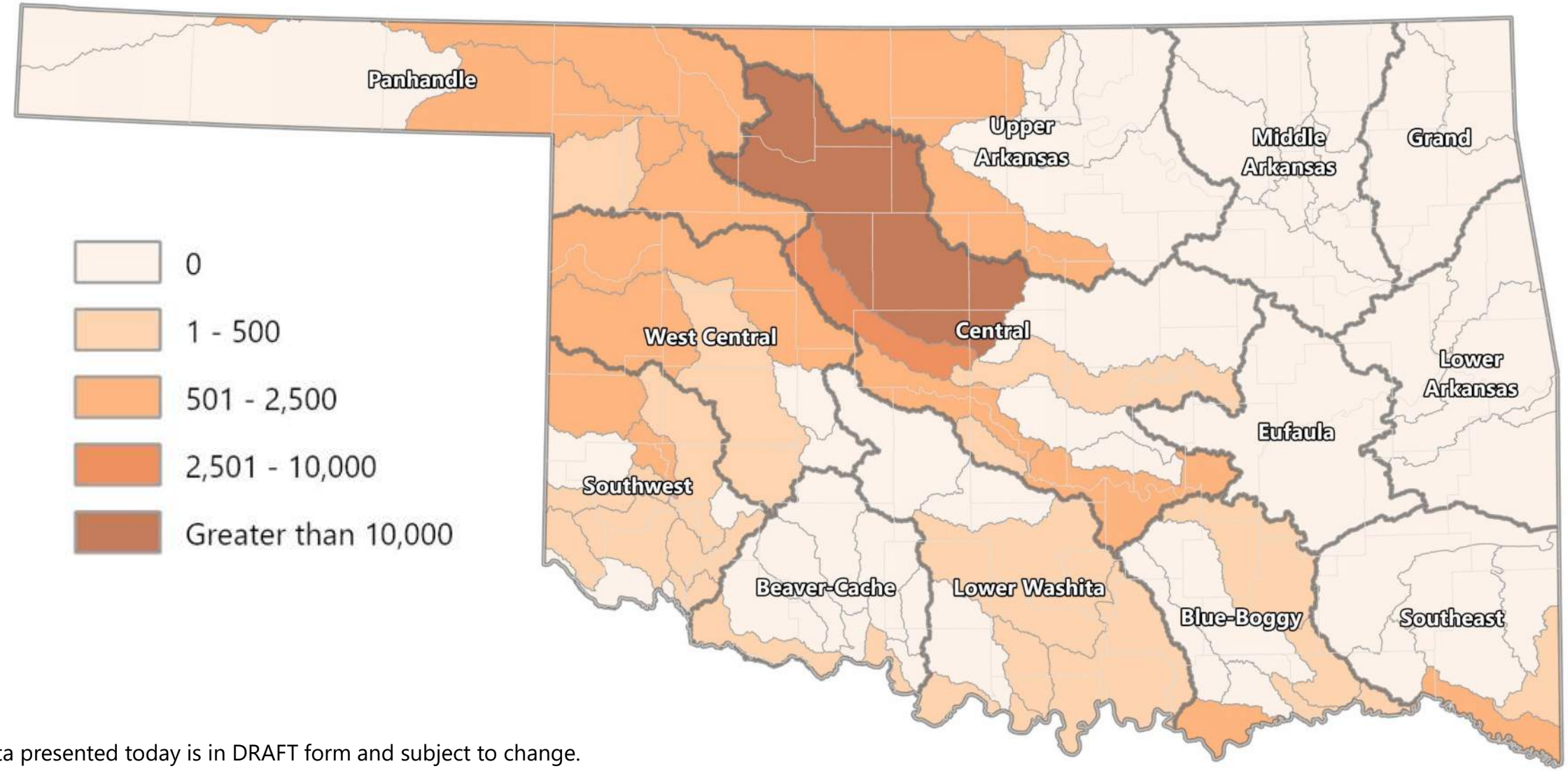

All data presented today is in DRAFT form and subject to change.

# Projected Probability of a **Surface Water** Gap of Any Magnitude under 2075 Demands



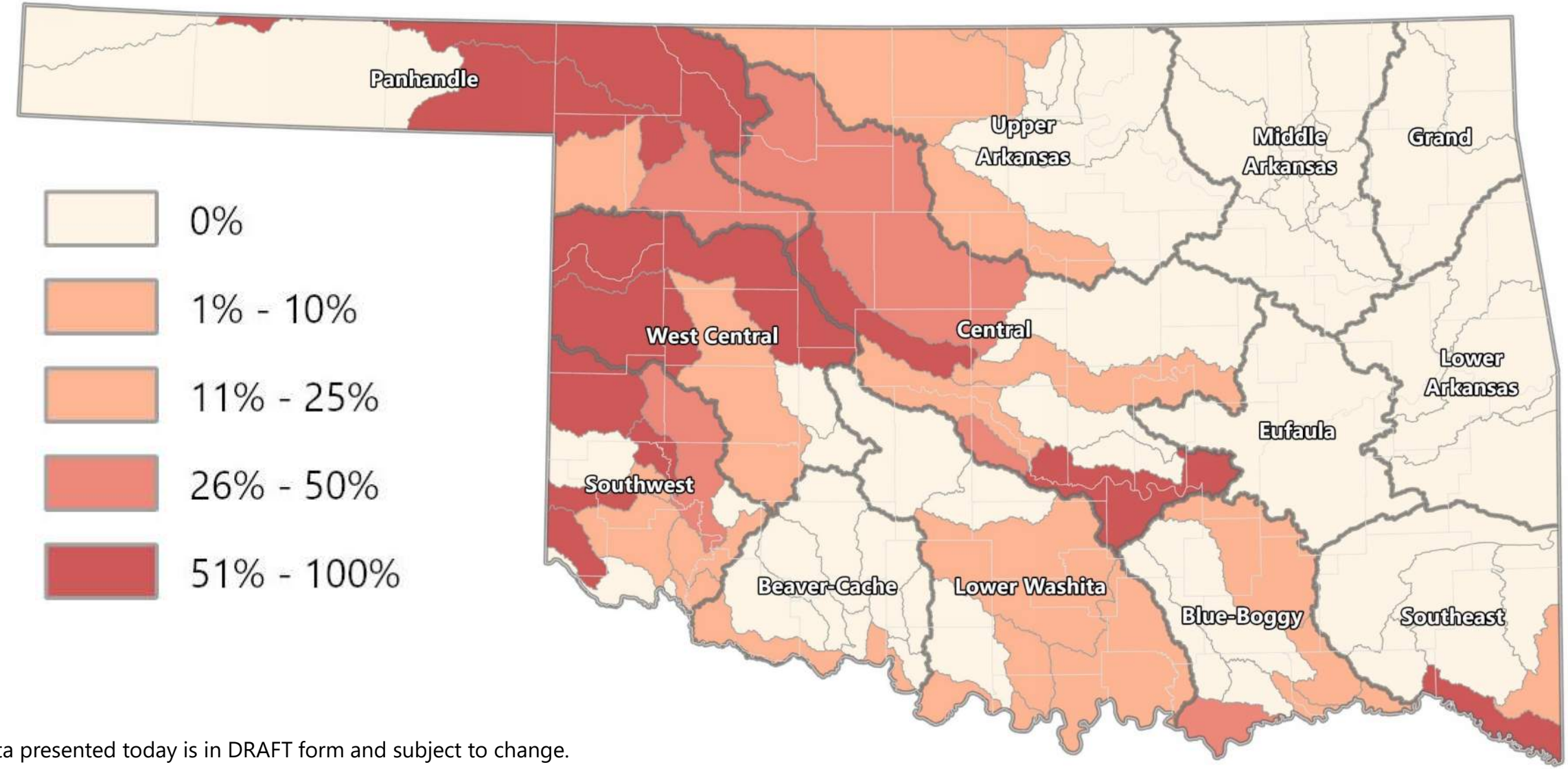

All data presented today is in DRAFT form and subject to change.

# Projected **Alluvial Groundwater** Depletion (AFY) Magnitude under Historical Driest Conditions for 2075 Demands



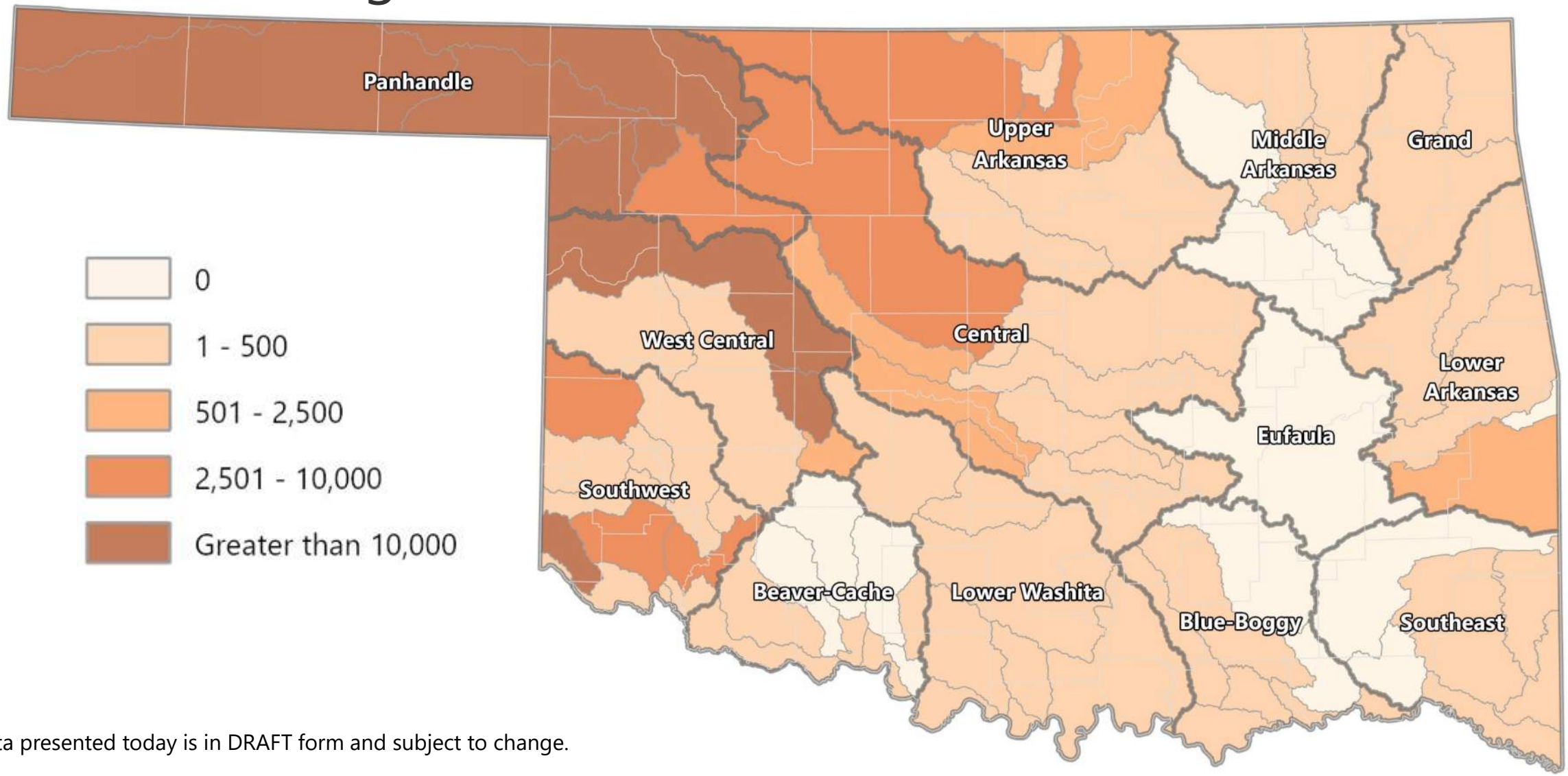

All data presented today is in DRAFT form and subject to change.

# Projected Probability of an **Alluvial Groundwater** Depletion of Any Magnitude under 2075 Demands



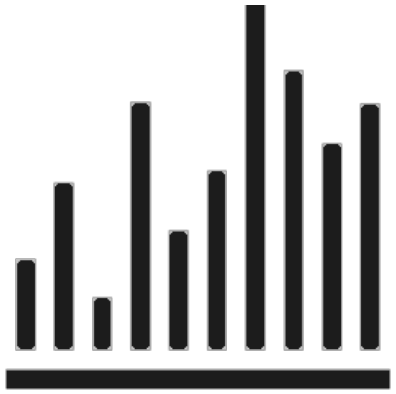

All data presented today is in DRAFT form and subject to change.

# Projected **Bedrock Groundwater** Depletion (AFY) in Excess of Annual Recharge for 2075 Demand




All data presented today is in DRAFT form and subject to change.

# Draft Baseline Scenario Data



✓Demands



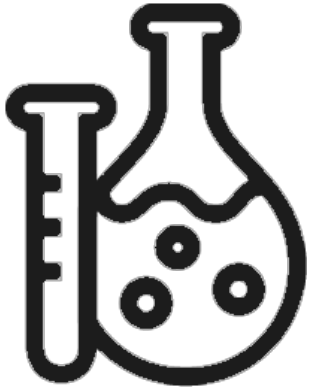
✓Physical Supply



✓Physical Gaps / Depletions



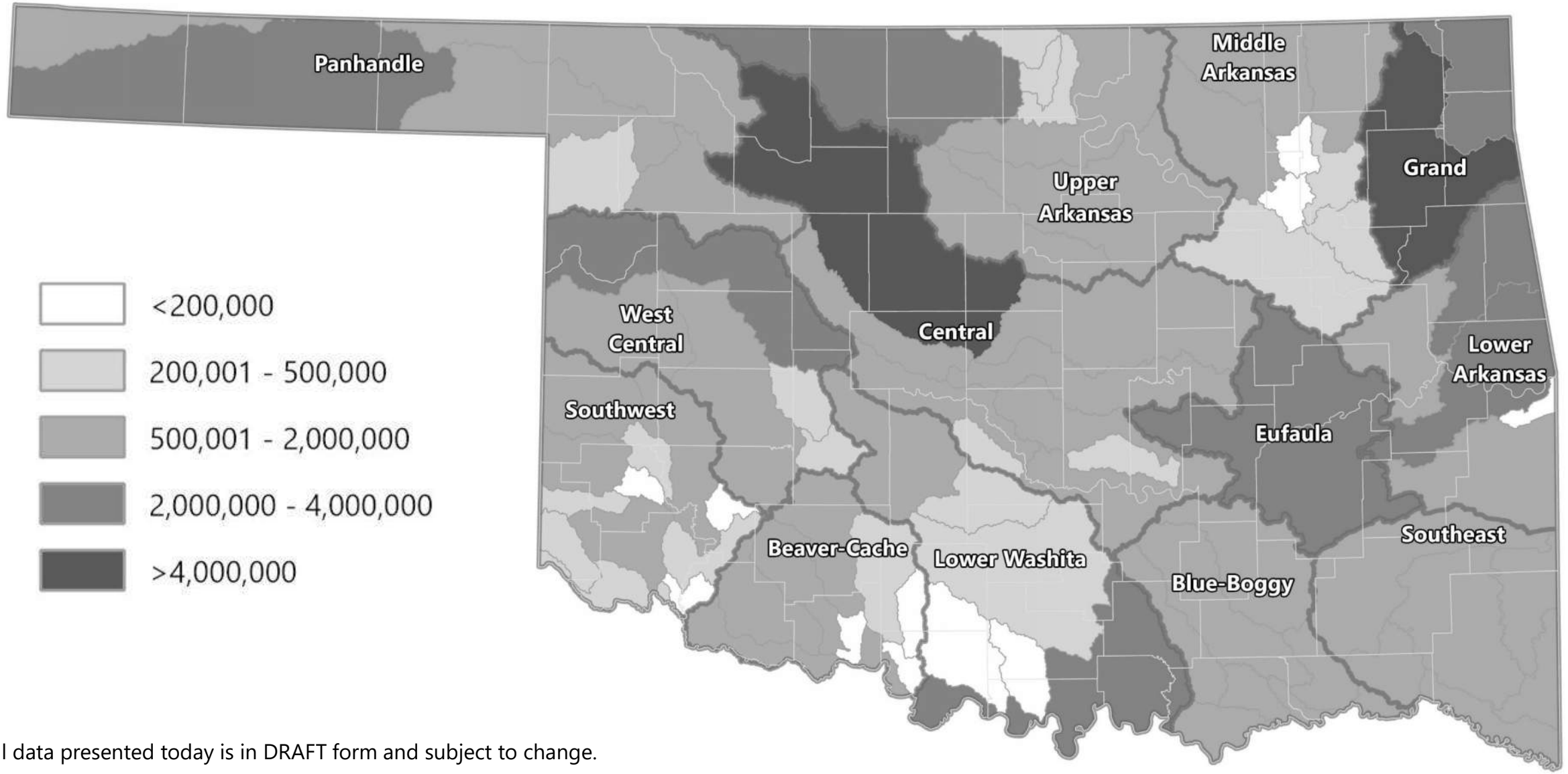
Legal supply



Water Quality

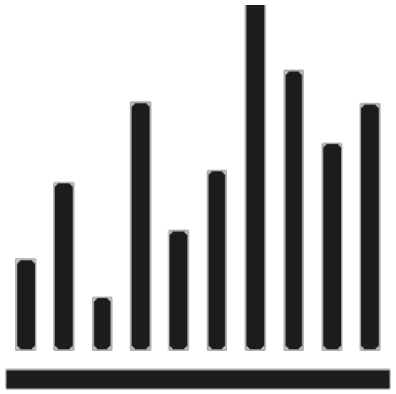
All data presented today is in DRAFT form and subject to change.
We will work over the coming months to refine and finalize it.

# Groundwater Legal Availability (AFY) using 2075 Demands




All data presented today is in DRAFT form and subject to change.

# Draft Baseline Scenario Data



✓Demands



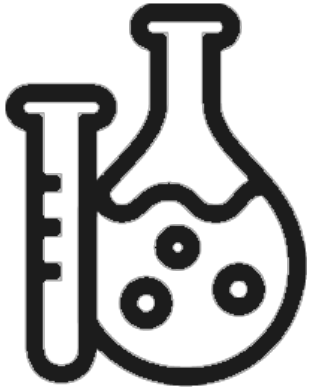
✓Physical Supply



✓Physical Gaps / Depletions



✓Legal supply



Water Quality

All data presented today is in DRAFT form and subject to change.
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# Water Quality

- Surface Water
  - Lakes and Reservoirs
  - Rivers and Streams
- Groundwater

# Southwest: Key Water Quality Trends for Lakes

## Nutrient Enrichment

- Nutrients generally loading more to lakes, specifically nitrogen
- Increased eutrophication in several waterbodies

## Water Clarity

- Decreased loading of suspended solids (turbidity) in many lakes
- Clarity improving in some lakes

## Dissolved Solids

- Greatly increasing in nearly all lakes

# Northwest: Key Water Quality Trends for Lakes

## Nutrient Enrichment

- Nitrogen increasing in both Fort Supply and Canton.
- Phosphorus decreasing in Canton with no trend in Fort Supply.
- Increased eutrophication in both lakes.

## Water Clarity

- No trend for loading of suspended solids (turbidity) or water clarity in both lakes.

## Dissolved Solids

- Dissolved solids greatly increasing in both lakes.

# Northeast: Key Water Quality Trends for Lakes

## Nutrient Enrichment

- Nitrogen: Mostly no trend; increasing in 7 of 32 lakes.
- Phosphorus:  Increasing in 17 of 32 lakes, no trend elsewhere.
- Eutrophication: Increasing (15 of 32 lakes, no trend elsewhere.

## Water Clarity

- For  suspended solids (turbidity), increasing in 15 of the 32 lakes, decreasing in 8 of 32.
- For clarity, increasing in 5 of the 32 lakes, decreasing in 8 of the 32 lakes.

## Dissolved Solids

- 7 of the 32 lakes show an increasing trend, decreasing in 9 of 32.

# Central: Key Water Quality Trends for Lakes

## Nutrient Enrichment

- Nitrogen: Mostly no trend.
- Phosphorus:  Mostly no trend; increasing in 5 of 23 lakes.
- Eutrophication: Increasing in 17 of 23 lakes.

## Water Clarity

- For  suspended solids (turbidity), 11 of the 23 lakes show a decreasing trend while only 2 show an increasing trend.
- For clarity, 3 of the 23 lakes show increased clarity, while 6 of the show a decreasing trend.

## Dissolved Solids

- If dissolved solids shows a trend, it is always increasing (20 of 23 Lakes).

# Southwest: Key Water Quality Trends for Streams

## Nutrient Enrichment

- Nitrogen increasing
- Phosphorus decreasing
- Eutrophication occurring in parts of the Red and Washita

## Turbidity/Temperature

- Decreased loading of suspended solids (turbidity) in many rivers
- Water temperature increasing in some rivers

## Dissolved Solids

- Greatly increasing in nearly all lakes
- Hardness increasing

# Northwest: Key Water Quality Trends for Streams

## Nutrient Enrichment

- Nitrogen increasing in lower Beaver River and the North Canadian.
- Nitrogen decreasing in upper Beaver River and the Cimarron River.
- Phosphorus generally decreasing in all rivers.
- Eutrophication increasing in Wolf Creek and the North Canadian but decreasing in the Cimarron.

## Turbidity/Temperature

- Decreased loading of suspended solids (turbidity) throughout the region except the upper Beaver River.
- Water temperature increasing in the upper Beaver River and North Canadian River.
- Water Temperature decreasing in lower Beaver River and Cimarron River.

## Dissolved Solids

- Dissolved solids and hardness  greatly increasing in all rivers.

# Northeast: Key Water Quality Trends for Streams

## Nutrient Enrichment

- Nitrogen: Many show no trend; increasing  in 13 of 31 streams, decreasing in 6 streams.
- Phosphorus: Many show no trend; decreasing in 17 of 31 streams, increasing in 6 streams.
- Eutrophication: increasing in 14 of 31 streams, decreasing in 6.
- Illinois River watershed nutrients continue to trend downward in the watershed, but concentrations and loading continue to be very high—well above the 37 ug/L phosphorus criterion.  As this persists, eutrophication will continue to be an issue.

## Turbidity/Temperature

- For suspended solids (turbidity), 25 of the 31 streams show an decreasing; only 1 is increasing.

## Dissolved Solids

- For dissolved solids, 19 of the 31 streams show increasing trend; 1 shows a decreasing trend.
- For hardness, 15 of the 31 streams show increasing trend, while 4 show a decreasing trend.

# Central: Key Water Quality Trends for Streams

## Nutrient Enrichment

- Nitrogen increasing  in 18 of 22 Streams.
- Phosphorus: mostly no trend. Increasing in 9 of 22 streams.
- Eutrophication increasing in 12 of 22 streams.

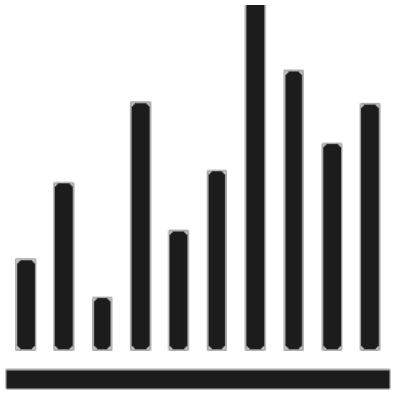
## Turbidity/Temperature

- For  suspended solids (turbidity), 20 streams show a decreasing trend.
- For water temperature, 5 sites show an increasing trend, 4 sites a decreasing trend, with remainder demonstrating no significant trend.

## Dissolved Solids

- For Dissolved solids, 13 of the 22 streams show increasing trend, while 2 show a decreasing trend.
- For hardness, 12 of the 22 streams show increasing trend, while 3 show a decreasing trend.

# Draft Baseline Scenario Data



✓Demands



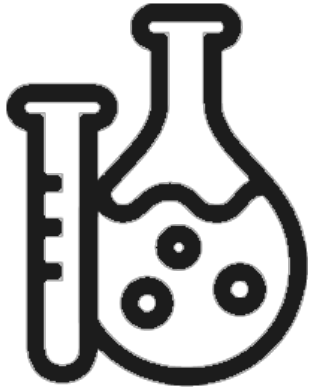
✓Physical Supply



✓Physical Gaps / Depletions



✓Legal supply



✓Water Quality

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# Meeting Physical Gaps

## Which Water Management Strategies are Preferred?

Demand Management



Agriculture Options



Water Transfers



Increase Reliance on Surface Water



Increase Reliance on Groundwater



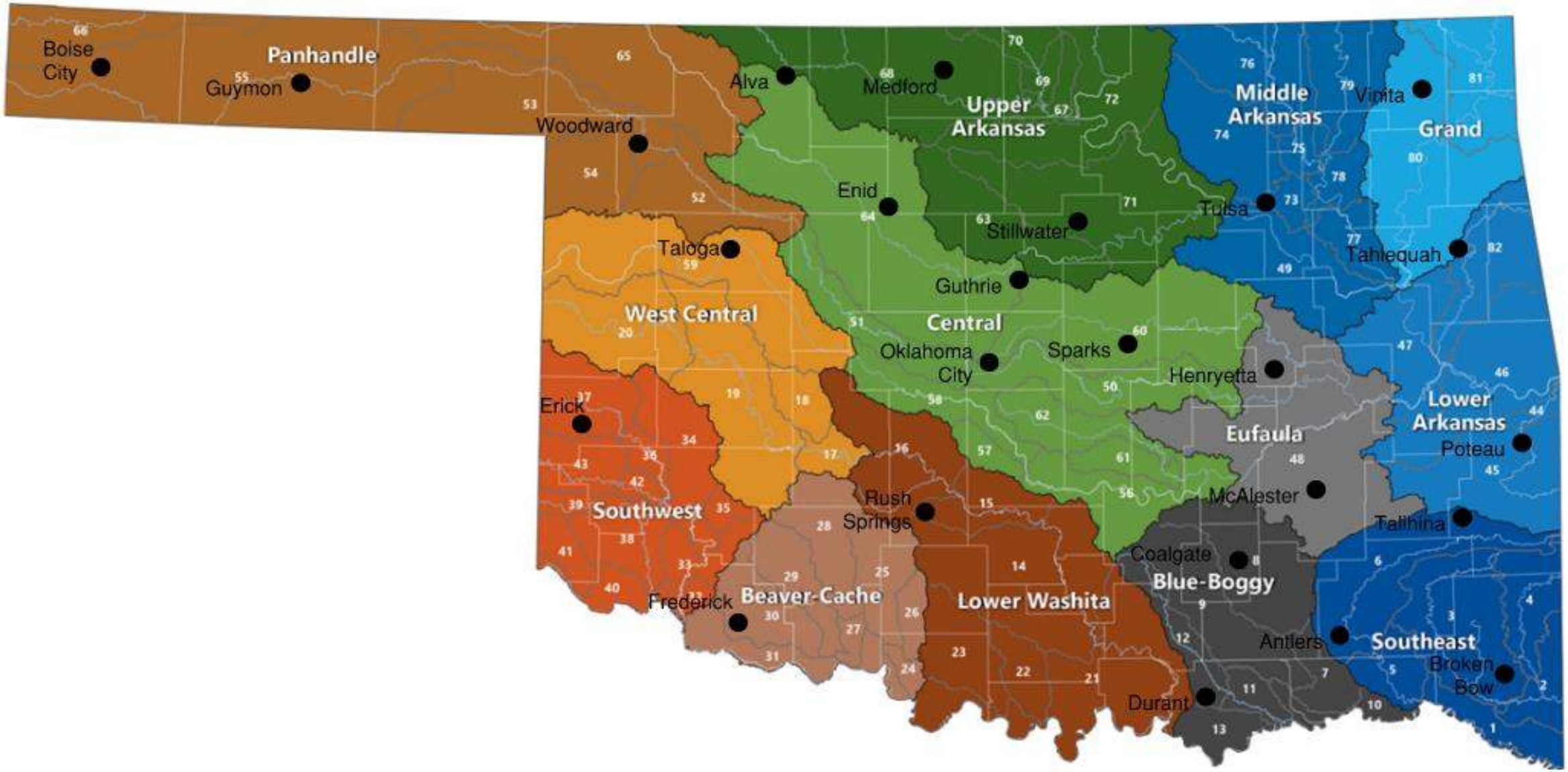
Stormwater Capture and Use



Reuse



# Breakout by Planning Region



03

# Networking Break, Move to Breakout Groups

15 minutes

2025 OCWP

04

# Concurrent Breakout Sessions

45 minutes

2025 OCWP

05

# Networking Break, Move to Large Group

15 minutes

2025 OCWP

06

# Summary of each breakout session

20 minutes

07

# Look Ahead

10 minutes

2025 OCWP

# Tell us about your system's infrastructure needs!

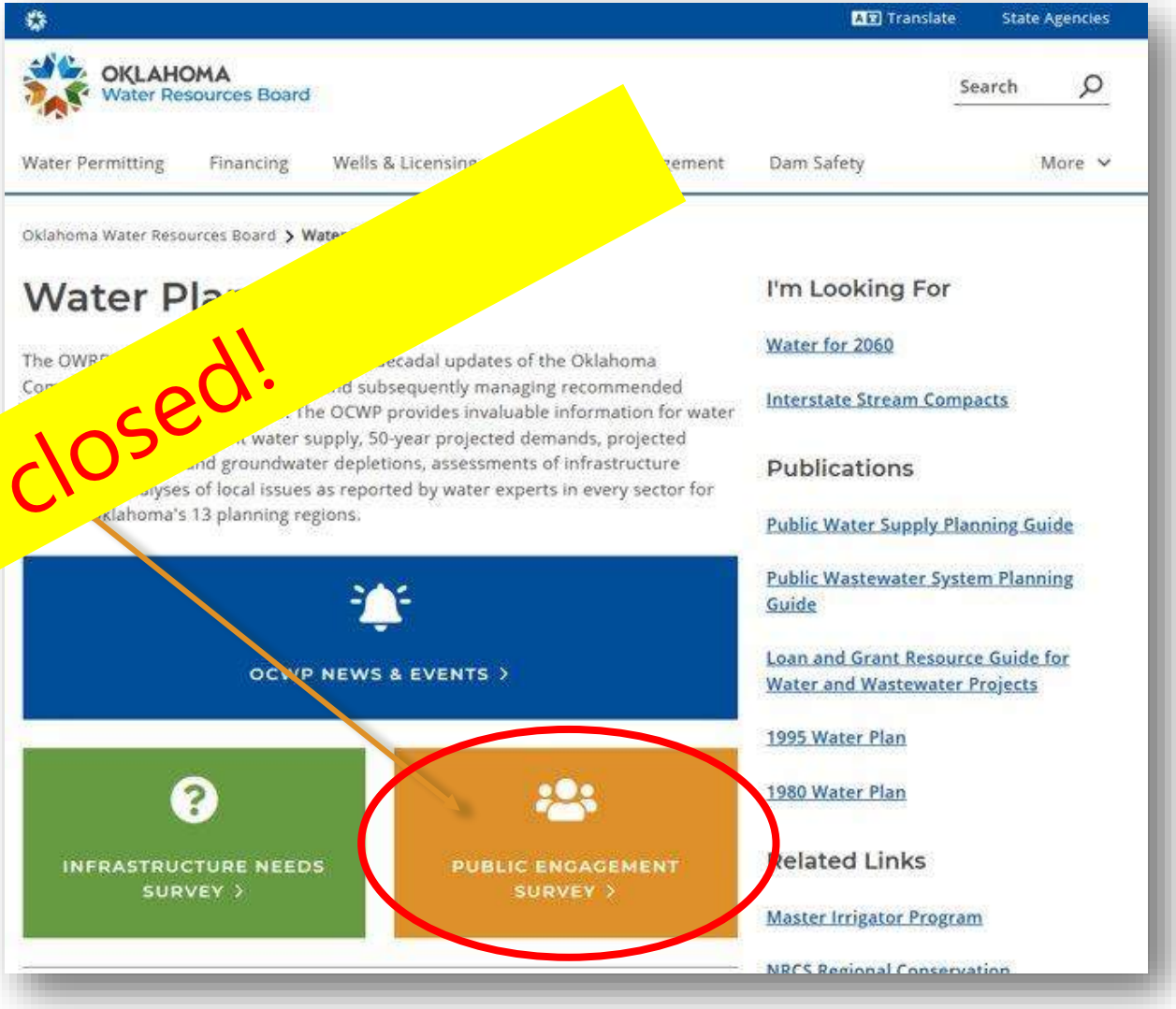
Contact Owen or fill out the LPP Data Collection Form on OWRB's website.



# OCWP Public Engagement Survey

Launches the OCWP Public Engagement Survey.

Let us know what concerns YOU!



# Future rounds of regional meetings



Follow up on today's conversations



Present data and findings from technical studies



Discuss recommendations to include in the OCWP

# Questions? Comments? Get Involved!

OKLAHOMA Water Resources Board

US Army Corps of Engineers



**Owen Mills** | Director of Water Planning
Oklahoma Water Resources Board
405.530.8904 Office | 405.421.4127 Cell
Owen.Mills@owrb.ok.gov

Website: Oklahoma.gov/OWRB/Water-Planning

Facebook: Oklahoma Comprehensive Water Plan

Provide comments on Round 3 Meeting

2025 OCWP Oklahoma Comprehensive Water Plan

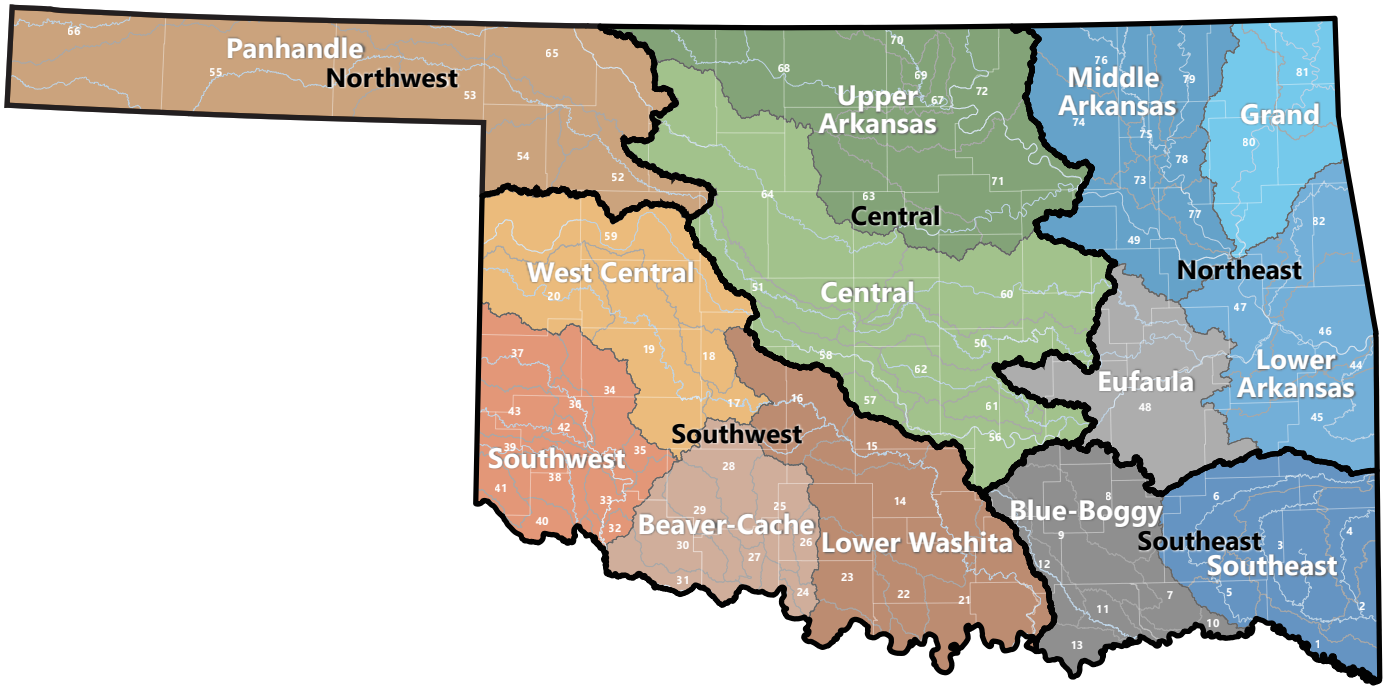
APPENDIX B

# WATER MANAGEMENT STRATEGIES HANDOUT

# WATER MANAGEMENT STRATEGY

| NAME | DESCRIPTION |
|---|---|
| **Demand Management**  | Demand management refers to the potential to reduce water demands and alleviate gaps or depletions by implementing conservation or drought management measures. It is a vitally important tool that can be implemented either temporarily or permanently to decrease demand. This strategy is specific to non-agriculture uses. Examples include water utility-driven conservation programs, industrial conservation, water loss control, and drought management measures. |
| **Agriculture Options**  | Agriculture options are water conservation and efficiency tools specifically for the irrigated cropland and livestock production sectors. Examples include irrigation system improvements, soil moisture probes, meters, electrified pumps, operational changes, growing less water intensive crops, reuse of tailwater, and using municipal recycled water for agriculture purposes. |
| **Water Transfers**  | Water transfers describe the strategy of obtaining either surface or groundwater resources from an outsourced local supplier or region and conveying the supply to where it is needed. Examples include water purchases, out-of-basin transfers, water provider collaboration, interconnections, and regionalization. |
| **Increase Reliance on Surface Water**  | Surface water is any water resource found above ground, such as a lake, river, reservoir, or stream. There are various means of increasing surface water resources, but the applicability is highly dependent upon location. Examples of increased reliance on surface water include constructing new reservoirs, conveying or allocating water from existing reservoirs, expanding existing reservoirs, treating brackish surface water to suitable standards, and diverting additional stream water. |
| **Increase Reliance on Groundwater**  | Groundwater refers to any water resource that is found underground in saturated zones. Site-specific information on the suitability of aquifers for supply should be considered. Examples of increased reliance on groundwater include drilling additional wells, treating brackish groundwater to suitable standards, and developing managed aquifer recharge and recovery wells. |
| **Stormwater Capture and Use**  | Stormwater capture and use refers to collecting and beneficially using water that does not infiltrate after a precipitation event. Large volumes can be generated in urban settings where impervious cover is typical. Most municipalities have infrastructure in place to divert stormwater to nearby bodies of water. However, this water could potentially be stored, treated, and used for potable or non-potable uses. |
| **Reuse**  | Water reuse refers to the reclamation of water from various sources and then treated and utilized again for beneficial purposes (e.g., irrigation, potable water supply, groundwater recharge, etc.). Typically, the most common source of reclaimed water is treated municipal wastewater. Examples include indirect potable reuse, non-potable reuse, direct potable reuse. |

## OCWP PLANNING REGION MAP




*To submit a comment or ask a question, please contact:*

**Owen Mills**

*Director of Water Planning*

**Oklahoma Water Resources Board**
405-530-8904 Direct | 405-530-8800 Main

*owen.mills@owrb.ok.gov*
*oklahoma.gov/owrb/water-planning*