

Appendix A-5

Tule Subbasin Coordination Agreement Attachment 5: Technical Memorandum Re: Addressing SWRCB Staff's Degraded Groundwater Quality Sustainable Management Criteria Deficiencies

TECHNICAL MEMORANDUM



To: Tule Subbasin SGMA Managers
From: Don Tucker – 4Creeks, Inc.
Date: July 20, 2024
Re: Addressing SWRCB Staffs Degraded Groundwater Quality Sustainable Management Criteria Deficiencies

1 Introduction

This technical memorandum (TM) was prepared as a Tule Subbasin-wide coordinated approach to address the degraded groundwater quality deficiencies from the State Water Resources Control Board (SWRCB) Staff on the 2022 Groundwater Sustainability Plans (GSPs). Each of the seven Tule Subbasin Groundwater Sustainability Agencies (GSAs) have agreed that this TM as Attachment 5 to the Tule Subbasin Coordination Agreement will be incorporated into their individual GSPs as the basis for establishing sustainable management criteria (SMC) for degraded groundwater quality.

1.1 Background

The Tule Subbasin Coordination Agreement was submitted to the California Department of Water Resources (CDWR) on behalf of the Tule Subbasin GSAs on January 30, 2020. The CDWR found the initial Tule Subbasin GSPs and Coordination Agreement incomplete in the January 28, 2022 issued Staff Report and Findings. A revision of the Tule Subbasin GSPs and Coordination Agreement was submitted on behalf of the Tule Subbasin GSAs on July 27, 2022.

The 2022 Tule Subbasin Coordination Agreement proposed a revised approach for defining undesirable results and sustainable management criteria for degrading groundwater quality in response to the deficiencies identified by the CDWR. The revised proposal included defining beneficial users/use of groundwater within the vicinity of groundwater quality representative monitoring sites (RMS) as “drinking water” or “agricultural”, assigned constituents of concern (COCs) to be monitored at the RMS, and established SMC based on historical concentrations of COCs at the site as either the regulatory drinking water maximum contaminant level (MCL) or the agricultural water quality objectives (WQOs).

At locations where concentrations exceeded regulatory limits prior to implementation of SGMA in 2015, the pre-SGMA concentration was established as the minimum threshold (MT). When historical COC concentrations were below the regulatory thresholds, measurable objectives were established at 75% of the regulatory limits and minimum thresholds were established at the regulatory limits.

Lastly, the 2022 GSP revisions to degraded groundwater quality identified the coordination between Tule Subbasin GSAs and other existing groundwater quality regulatory programs and agencies within the Subbasin.

The 2022 revised GSPs and Coordination Agreement were determined to be inadequate in CDWR’s March 2, 2023 determination letter, but CDWR found the Tule’s approach for degraded groundwater quality to be adequate.

In March 2024, the SWRCB released the “Tule Subbasin Probationary Hearing Draft Staff Report” (Staff Report) to address deficiencies in the 2022 Tule Subbasin Coordination Agreement and GSPs, which included additional deficiencies related to degraded groundwater quality.

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1.2 SWRCB Staff Response

The SWRCB Draft Staff Report March 2024 identified the following deficiencies related to degraded groundwater quality beyond the comments received from DWR:

GWQ -1: The GSPs Did not clearly define the conditions that would be considered an undesirable result.

The 2022 GSPs and coordination agreement defines an undesirable result as “the significant and unreasonable degradation of groundwater quality due to groundwater pumping and recharge projects such that the quality of groundwater is no longer generally suitable for agricultural and/or domestic use” (2022 Coordination Agreement, p. 53). GSPs do not clearly describe how the subbasin would determine if SMC exceedances are “due to the result of groundwater pumping and recharge projects” as opposed to other factors.

GWQ-2: Minimum Thresholds set by the GSPs are not consistent with GSP Regulations.

2a) *The 2022 Coordination Agreement for setting MTs states that “for RMS wells that already have historical exceedances of the MCLs or WQOs... [MTs will be set at] pre-2015 implementation concentration.” The 2022 GSPs therefore establish MTs that exceed primary MCLs or upper SMCLs yet does not demonstrate that exceeding health- or quality-protective standards is not an undesirable result.*

2b) *The GSPs do not consider all the constituents with exceedances (This is based on the SGMA Groundwater Quality Visualization Tool).*

2c) *MTs for RMS in agricultural areas are based on Water Quality Objectives rather than MCLs. This means that water quality in domestic wells could degrade below drinking water standards without being considered an undesirable result.*

GWQ-4: The water quality monitoring plan in the 2022 GSO is not consistent with GSP regulations.

4a) *The monitoring network described in the 2022 Coordination Agreement differs substantially from the monitoring networks described in the GSPs. The Coordination Agreement indicates there are 76 RMS; GSPs indicate there are 26. It’s not clear:*

- 1) which wells are being monitored;*
- 2) if the GSAs know which aquifers the wells monitor;*
- 3) if the monitoring network adequately monitors key aquifers;*
- 4) if the network relies on composite wells; and*
- 5) whether the scientific rationale for selecting RMS is adequate.*

4b) *The GSAs propose to collect only annual summer groundwater samples from RMS wells*

GWQ-5: Management actions are not responsive to water quality degradation.

5a) *Additional sampling is not triggered when Minimum Thresholds are exceeded.*

5b) *Well mitigation plans don’t address water quality degradation.*

1.3 Purpose and Scope

This TM outlines a revised approach to respond to the SWRCB comments by updating the sustainable management criteria and quantification of undesirable results to avoid significant and unreasonable groundwater quality conditions for beneficial users in the Tule Subbasin. Additionally, this TM addresses deficiencies identified by SWRCB staff relating to data and information relied upon as the basis for determining constituents of concerns, representative groundwater quality monitoring network design and monitoring frequency, projects and management actions to be implemented by GSAs, and coordination with existing regulatory agencies and programs with common interests and objectives.

2 Identification of Beneficial Users

The Tule Subbasin supports a diverse range of uses and users of groundwater. Beneficial uses and users within the Tule Subbasin identified for groundwater quality include:

Municipal and Domestic Water Supply: Groundwater used for drinking, cooking, sanitation, and hygiene in homes, businesses, and institutions. The beneficial users of municipal and domestic supply include cities and towns connected to municipal water systems and individual private domestic well owners.

Agricultural Irrigation: Groundwater is a vital source for a variety of crops grown in the Tule Subbasin. beneficial users of agricultural irrigation include farms and landowners with private agricultural wells and entities such as irrigation districts that manage and distribute water for agricultural use.

Industrial Water Supply: Certain industries may rely on groundwater for specific processes. Beneficial Users of Industrial water supply include Industrial facilities that utilize groundwater in their operations.

California Water Code Section 106.3 states *“every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes.”*

In terms of groundwater quality, drinking water supply wells are the highest priority due to essential need, social equity and the risks to human health associated with degradation of groundwater quality. Well types from the OSCWR database that are categorized as “drinking water” are:

- Domestic
- Public
- Water Supply
- Water Supply Domestic
- Water Supply Public

Figure 1a and **Figure 1b** show the locations and density of drinking water wells within the Tule Subbasin according to data accessed from DWR’s Well Completion report database for the upper and lower aquifer, respectively. This data assists in prioritizing development of the groundwater quality monitoring network features to ensure sustainable management criteria is representative of the most vulnerable categories of beneficial users.

3 Assessment of Baseline Groundwater Quality Conditions in the Subbasin

Assessing groundwater quality in the Tule Subbasin involves utilizing several data sources and monitoring programs. Statewide groundwater quality data, including information on various constituents, can be obtained from the Groundwater Ambient Monitoring and Assessment Program (GAMA). This data provides trends in groundwater quality parameters. Additionally, Geotracker, a database maintained by the California State Water Resources Control Board (SWRCB), can be used to pinpoint potential sources

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of contamination by tracking active cleanup sites. California Integrated Water Quality System (CIWQS) is another valuable resource, storing water quality data collected by various agencies, including groundwater information. This data, searchable by basin or specific monitoring site, helps identify trends and potential exceedances of water quality standards. Lastly, the SGMA Data Visualization Tool, offered by the California Department of Water Resources (CDWR), allows for visualizing groundwater data submitted by GSAs, including groundwater levels and water quality data.

Groundwater quality conditions from 2005 through 2023 have been analyzed in the subbasin to identify areas where conditions have historically been degraded, or are vulnerable to future degradation, which may result in significant and unreasonable impacts to beneficial uses and users within the subbasin. The results of the assessment are used as the basis to inform GSAs decisions such as:

1. Determining the presence of constituents of that may potentially impact beneficial users
2. Development of a representative monitoring network that is spatially and temporally representative of groundwater quality conditions to protect beneficial uses and users
3. Establishment of sustainable management criteria at RMS wells
4. Implementation projects and management actions

As defined in Section 2, the most vulnerable beneficial users to degraded groundwater quality are domestic well owners. As such, the focus of the analysis was to evaluate groundwater quality conditions relative to state and federal drinking water standards, including the following constituents of concern (COCs).

3.1 Constituent of Concern Selection

Constituent of concern selection is based on the efficacy to determine degradation in groundwater quality by chronic lowering of groundwater levels and by existing regional exceedances of constituents of concern determined by existing data sources. Each constituent has been identified as a constituent of concern where exceedances of the SWRCB's Division of Drinking Water standards for Maximum Contaminant Level (MCL) may present significant risks to beneficial users and uses of groundwater from existing data sources or a monitoring parameter to determine changes in groundwater quality over time.

SMCs will be established based on constituents of concern listed below. Additional constituents may be monitored as supplemental data for indicating potential impacts to groundwater quality.

Constituents of Concern

- Arsenic
- Uranium
- Hexavalent Chromium
- Total Dissolved Solids (TDS)
- Dibromo-3-chloropropane (DBCP)
- Nitrate as N
- 1,2,3-trichloropropane

Arsenic (As): Arsenic is naturally occurring in the environment and is found in rocks and minerals. Arsenic can dissolve into groundwater when rocks weather and erode. Contamination of Arsenic in groundwater can also be sourced from Industrial activities and previously in agricultural use, however Arsenic compounds have been phased out in California. Over pumping can mobilize naturally occurring arsenic from aquifer materials. The MCL of arsenic is 10 parts per billion (ppb). Exceedances of Arsenic have been reported in municipal water systems and in private wells within the Tule Subbasin (**Figure 2a**).

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Uranium (U): Uranium is a naturally occurring radioactive element found in rocks and soils. Geologic sources of uranium are the primary source of uranium in groundwater. Over pumping of groundwater can mobilize naturally occurring uranium from aquifer materials. Sources of contamination in groundwater include natural sources from geologic formations, industrial activities and agricultural practices. Some phosphate-based fertilizers contain trace amounts of uranium which could over time create a source of groundwater contamination. The MCL of Uranium is 30 ppb or 20 picocuries per liter (pCi/L). Exceedances of uranium in groundwater have been reported in municipal water systems and private wells within the Tule Subbasin (**Figure 2b**).

Hexavalent Chromium (Cr(VI)): Hexavalent chromium is a form of elemental chromium, a naturally occurring element found in rocks and soils. Sources of contamination can include natural sources from the weathering and erosion of rocks as well as industrial activities that can include chrome plating, wood treatment and chemical manufacturing. Improperly disposed of chromium materials in landfills can leach into groundwater over time. Additionally, some wastewater treatment processes can generate hexavalent chromium as a byproduct which can contaminate groundwater. Groundwater pumping can mobilize naturally occurring hexavalent chromium from aquifer materials. The MCL of hexavalent chromium is 10 ppb. Exceedances of hexavalent chromium in groundwater have been reported primarily in Municipal water systems within the Tule subbasin (**Figure 2c**).

Total Dissolved Solids: Total dissolved solids (TDS) is a measurement of the total amount of Inorganic and organic substances in water. Typical sources of TDS are mineral dissolution from rocks and soils. A large contributor to high TDS values are the cations. Additional sources can include urban run-off and agricultural activities. Over pumping can concentrate existing dissolved solids in remaining groundwater, thus contributing to higher TDS values. The Secondary MCL for TDS is 1,000 ppm. High TDS can be an indicator of impacted groundwater, however exceedances of TDS within the Tule subbasin are generally low (**Figure 2d**).

Tetrachloroethane (PCE): PCE is a synthetic chlorinated solvent used as a degreaser in industrial activities. Storage tank leaks and improper disposal of PCE waste are primary sources of contamination. Over pumping can increase mobility of PCE already present in the subsurface, which can expand zones of influence within the aquifer. The MCL of PCE is 5 ppb. Exceedances of PCE have been reported in municipal water systems within the Tule Subbasin (**Figure 2e**).

1,2,3- Trichloropropane (1,2,3-TCP): 1,2,3-TCP is a synthetic chlorinated hydrocarbon historically used as a soil fumigant in agricultural practices. 1,2,3-TCP has also been used as a solvent and extracting agent in industrial activities. Though 1,2,3-TCP was banned in soil fumigants and was added to SWRCB's list of carcinogens 1992 (Prop 65), it is still currently used as a chemical intermediate in the production, synthesis and cross-linking agent of other chemicals. In addition to agricultural and industrial activities, sources of 1,2,3-TCP contamination can include improper disposal of 1,2,3-TCP materials in landfills. Similar to PCE, over pumping can increase mobility of 1,2,3-TCE already present in the subsurface, which can expand zones of influence within the aquifer. The MCL of 1,2,3-TCP is 5 parts per trillion. Exceedances have been reported in municipal and domestic wells within the Tule Subbasin (**Figure 2f**).

Dibromo-3-chloropropane (DBCP): DBCP is a halogenated hydrocarbon historically used as a soil fumigant to control nematodes. DBCP was banned in the United States in 1979 but remains a legacy contamination issue in aquifer systems. Over pumping can increase mobility and spread contamination plumes of existing DBCP contamination which can increase areas of impacted groundwater. The MCL for DBCP is 0.2 ppb. Exceedances of DBCP have been reported in municipal and domestic supply wells within the Tule Subbasin (**Figure 2g**).

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Chloride (Cl): Chloride is a negatively charged ion found dissolved in groundwater composed of chlorine. Chloride can occur naturally in groundwater when chloride minerals such as Halite and Sylvite are dissolved in water. Chloride exceedances can also be attributed to municipal and industrial wastewater discharges. Agricultural practices that involve saline water and certain fertilizers can also elevate chloride in groundwater. Over-pumping can increase chloride concentrations in remaining groundwater. Mobilization may also occur under certain geologic features. The Secondary MCL of Chloride is 500 ppm. Exceedances of Chloride are present in small concentrations within the Tule Subbasin (**Figure 2h**).

Perchlorate: While Perchlorate is a negatively charged ion, it is not used as a measurement of groundwater quality and is not used in determining water balance in the same way Sulfate, Chloride, Nitrate and Bicarbonate is used. Perchlorate is a manufactured constituent used in industrial processes and explosives. Primary sources of contamination include improper disposal of perchlorate in landfills and accidental spills during transportation of perchlorate materials. Over pumping groundwater can potentially draw contaminated shallow water into the aquifer. The MCL of perchlorate is 6 ppb. Exceedances of perchlorate MCL between 2005-2023 in the Tule Subbasin are shown in **Figure 2i**.

Nitrate as N: Nitrate is a form of nitrogen in groundwater. While septic systems and animal waste can contribute, agricultural fertilizers are the primary source of nitrate contamination in groundwater. Over pumping of groundwater can draw contaminated shallow water into the aquifer or contaminants from soil can be pulled into the aquifer. The MCL of nitrates in groundwater is 10 ppm. Exceedances of nitrate are a subbasin-wide issue (**Figure 2j**). The Tule Basin Water Quality Coalition (TBWQC) operates as the third-party group under the Irrigated Lands Regulatory Program to address agricultural impacts to water quality within the Subbasin. The Tule Basin Management Zone also addresses nitrate exceedances within the Tule Subbasin.

3.1.1 Additional Monitoring Considerations

Per-and polyfluoroalkyl Substances (PFAS): PFAS is a group of man-made chemicals that consist of long-chain carbon molecules saturated with Fluorine. Fluorine atoms create a highly electronegative surface which makes PFAS repel water and oil. A carbon-fluorine bond is one of the strongest single bonds in chemistry which makes this group of chemicals incredibly resistant to degradation, both chemically and biologically. This strength prevents the breakdown of these chemicals by water and oil which makes PFAS an ideal coating on cookware, clothing and carpets. Due to the heat resistant nature of PFAS, it is used in Class B firefighting agents such as aqueous form-filming foams (AFFF). Perfluorooctanic Acid (PFOA) is a specific type of long-chain fluorocarbon phased out in the U.S in 2015 but still persists within the environment. Sources of PFAS and PFOA contamination include locations where firefighting foams have been used such as in training exercises, filling stations and locations of fires. The widespread use of PFAS in consumer goods and improper disposal in landfills can leach PFAS chemicals into soil and lead to the contamination of groundwater. Because of high resistance to degradation, removal and remediation efforts PFAS and PFOA are very difficult. Because of this, wastewater treatments plants may potential sources contamination to groundwater. In April 2024, the USEPA published National Primary Drinking Water Regulation (NPDWR) for six PFAS and established enforceable MCL's between 4 - 10 parts per trillion (ng/L) depending on the chemical. Under the NPDWR, public water systems have three years (by 2027) to complete initial monitoring and five years (by 2029) to implement solutions that reduce exceedances of MCL's of PFAS chemicals. Additionally, the SWRCB has issued General Order 2024-0002-DDW which requires monitoring for PFAS pursuant to Health and Safety Code Section 116378. As data becomes available, the GSA's will determine the impacts and degradation of groundwater by PFAS in the Tule Subbasin.

Indicator Constituents

Organic Nitrogen Determination: In addition to monitoring for Nitrates as N in RMS wells, the Tule Subbasin GSAs are proposing a full suite of monitoring parameters to further understand the impacts, sources and cycles of nitrate exceedances within the Tule Subbasin. Fertilizers and decaying matter contain Ammonia, which is the first product of organic nitrogen decomposition. Microbes convert Ammonia into nitrites. Nitrite as N is the intermediate stage in the nitrification process. Microbes further break nitrite down into Nitrate. Nitrate is the final and most oxidized stage of the nitrification process. Total Kjeldahl Nitrogen (TKN) represents the organic nitrogen in decomposing organic matter. Total organic nitrogen in groundwater can be calculated by subtracting Ammonia values from TKN.

Monitoring these four constituents of concern in the RMS quality network is a comprehensive approach in identifying sources of contamination, determining future exceedances, assessing ecosystems and optimizing management strategies.

Ionic Composition: Cations are positively charged ions commonly found dissolved in groundwater and contribute to the hardness of water. Contamination sources are naturally occurring and over pumping of groundwater generally has minimal impact unless specific minerals are mobilized within the aquifer. While these cations do not pose significant risk to human health, each constituent can indicate specific contamination sources from agricultural and industrial activities. Additionally, long-term monitoring of cations can show changes in groundwater quality over time and potentially assist in identifying sources of contamination. Calcium, magnesium, potassium and sodium do not have MCL's or SMCL's and there are no measurable objectives or minimum thresholds for these constituents. Cations will be used to generate stiff and piper diagrams to determine the Cation/Anion balance in RMS wells.

3.2 Discharges to Groundwater

Natural discharge from rocks and soils will be identified to determine locations where naturally occurring COC's have been to determine if contamination sources within the aquifers could be caused from underlying geologic formations and weathering. Geologic maps and soil surveys will be provided within each GSP and Geologic setting is discussed in the Basin setting section of the Coordination Agreement.

There are twenty-six active cleanup sites in the Tule Subbasin identified on the California GeoTracker website (**Figure 5**). Twelve of the point source contamination sites are associated with leaking underground storage tanks (LUSTs) for which the primary contaminant is petroleum hydrocarbons (gasoline, diesel and kerosene). These twelve contamination sites operate remediation programs under individual Monitoring and Reporting Programs determined by the RWQCB. There are fourteen Regional Water Quality Control Board Cleanup Program operated by the Department of Toxic Substance Control (DTSC) sites within the subbasin. Contaminants associated with these sites include metals, volatile organic compounds (VOCs), pesticides, herbicides, cyanide, and polyaromatic hydrocarbons (PAHs). Each of these fourteen sites operate under an individual Monitoring and Reporting Program determined by the RWQCB.

Data from the California Integrated Water Quality System (CIWQS) identified fifty-five Individual and General Orders for waste discharge currently operating within the Tule Subbasin. These Water Quality Orders are categorized under regulatory programs classified by the SWRCB. Regulatory programs operating within the Tule Subbasin are provided in **Table 1**.

Under the regulatory programs listed in Table 1, there are 297 agencies and facilities that hold active waste discharge permits under these fifty-five orders within the Tule Subbasin (**Table 2**). Each of the 297

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facility locations were plotted against groundwater quality data to determine their impacts on groundwater quality.

3.3 De-designated Areas in the Tule Subbasin

Areas where poor water quality is naturally occurring have been identified in **Figure 6** and will not be included in the Tule Subbasin GSA's assessment of quality. A Basin Plan Amendment under Resolution R5-2017-0032 has been approved for the Tulare Lake Basin along the western edge of the Tule Subbasin. Groundwater in this region is naturally high in sodium and has been de-designated for municipal, domestic and agricultural use. This de-designation of groundwater use prevents the Tule Subbasin GSA's from determining degradation of groundwater quality due to lowering of groundwater levels.

3.4 Public Supply Assessment Grid (PSAG)

The Tule Subbasin GSAs have adopted the use of the Public Supply Assessment Grid System (PSAG) developed by the USGS for the Groundwater Ambient Monitoring and Assessment - Priority Basin Project (GAMA PBP Study). The goals of the study conducted in the initial phase of the project was to determine areas where groundwater was not meeting drinking water standards and to monitoring and evaluate changes in the groundwater over time. The PSAG grid system was developed to divide the State of California into manageable study units to identify quality, trends, and influences of impacted groundwater. The PSAG system within the Tule Subbasin is located in **Figure 7**.

The USGS Public Supply Assessment Grid (PSAG) is used to determine regional baseline groundwater quality characteristics for assigning minimum thresholds at GWQ RMS wells when COC data is not historically available for the selected RMS wells. Baseline concentrations for each PSAG region in the Tule Subbasin are provided in **Table 3**.

4 Representative Groundwater Quality Monitoring

Characterization and monitoring of groundwater quality conditions has historically been conducted and reported by other public agencies and/or non-profits to meet requirements of existing regulatory programs, which focus on the prevention of degradation of groundwater quality. Existing groundwater quality monitoring programs that the Tule Subbasin GSAs coordinate with for groundwater quality are provided in **Table 4**.

To prevent duplication of efforts and competing datasets for the ILRP, CV-Salts Nitrate Control Program, and SGMA GSAs, the Tule Subbasin utilizes a single third-party group to manage monitoring efforts within the Subbasin to collectively meet the various requirements being implemented by each program at the local level. This level of coordination between these agencies and groups ensures that the efforts performed under each program help provide a cohesive response to providing both short and long-term solutions to groundwater management.

The groundwater quality monitoring network described in the 2022 GSPs relied on monitoring features included in the Tule Basin Water Quality Coalition's (TBWQC) groundwater quality trend monitoring program. The monitoring network and sampling schedule requirements fall under ILRP General Order R5-2013-0120-09. The GSAs have also relied upon publicly available dataset from SDWIS to characterize and monitor groundwater quality in public water systems.

In addition to the existing monitoring programs utilized for groundwater quality, The Tule Subbasin GSAs analyze groundwater quality samples collected from a network of Representative Monitoring Sites (RMS).

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These RMS are strategically placed wells monitored annually during the summertime when groundwater pumps are running to determine groundwater quality trends and conditions within the Tule Subbasin. The RMS well network is comprised of privately owned domestic and agricultural wells throughout the subbasin. In the 2022 revision of the Coordination Agreement, it was proposed that RMS quality wells be designated for Agricultural or Domestic use depending on the dominate surrounding land use.

This approach has been modified to ensure that all current and future RMS locations will be monitored to regulatory drinking water standards for applicable Constituents of Concern.

4.1 Representative Monitoring Sites

The RMS selection process utilizes a comprehensive risk assessment framework to determine high vulnerability areas within the Tule Subbasin. This process identifies priority beneficial uses and users in the most vulnerable regions of the Tule subbasin and compares it with current groundwater conditions with respect to quality and elevation.

Well Density by Beneficial Use – Well completion data was accessed from the DWR's Well Completion Report Database, the USGS National Water System Information System (NWIS), the OSCR GeoTracker groundwater database, and from well permits accessed from Tulare County Environmental Health department. This data was compiled and sorted to remove overlap between agencies. Where total completed depths and perforation intervals were provided, wells were designated by upper and lower aquifer. The number of wells per PLSS section were grouped by Beneficial use in each aquifer. The priority Beneficial use in the upper aquifer is Domestic well owners and Public Water Supply. In the Lower aquifer, domestic and Ag well use are the prioritized beneficial users. If depths were unknown, wells were assumed to be perforated in the upper aquifer where groundwater contamination is higher risk. This data is provided in **Figure 1a** and **1b**.

Groundwater Quality – Groundwater quality data was accessed from the SWRCB's Groundwater Ambient Monitoring Assessment (GAMA), reporting data from published Tule Basin Water Quality Coalition reports and from the current RMS network and compared with the SGMA Groundwater Visualization Tool. Geospatial overlays of ambient concentrations of COC's were generated between 2018-2023 (Upper Aquifer **Figures 3a-3g** and **lower aquifer 4a-4g**). The geospatial quality data in the upper and lower aquifers were interpolated using an inverse distance weighted (IDW) technique applied to each section of the subbasin to yield the ambient conditions of specified COC's. Ambient concentrations are a representative value of each constituent by PLSS section. The average COC concentration for each well was interpolated to within a 1.5-mile boundary due to constraints in the number and distribution of samples. Large gaps in sample locations could result in inaccurate representations of groundwater conditions and were excluded from the analysis. Constituent values were assigned to sections based on the interpolated value at the centroid of each section.

Groundwater quality issues that fall under dischargers and known waste discharge requirements are identified on a site-specific basis. Known exceedances currently being managed under others regulatory statutes are discussed in section 4.

Hydrogeologic Conditions – Current groundwater elevation contour maps are generated and used to determine changing groundwater levels. Static water levels are collected semi-annually from RMS elevation monitoring locations throughout the Tule Subbasin. The Groundwater Model published xx is also used in the analysis. This data is separated by associated aquifer based on completed well depth. During each monitoring event, data is collected and interpolated in GIS to estimate the potentiometric surface elevations across the Tule Subbasin. Depth, flow direction, and hydraulic gradient within each

section are used to determine vulnerable areas of potential contamination within the upper and lower aquifers. Groundwater depth can help determine aquifer access. Groundwater flow direction is used to determine potential migration of existing exceedances. Hydraulic gradient is calculated to determine the slope of the water table to identify steeper gradients where contaminants may move more quickly through a region. Additionally, InSAR data of regional land subsidence is used to determine regions of the subbasin more vulnerable to the degradation of groundwater quality from overpumping.

4.2 RMS Selection

The combined calculations of well density, ambient groundwater quality and hydrogeologic conditions are used when selecting RMS monitoring locations. RMS monitoring prioritizes domestic beneficial users and uses of groundwater (See Section 2). Selection is based on five years of ambient concentration data to identify trends that are representative of recent groundwater conditions. Data accessed from the same sources from 2005-2023 is used as a general guideline when establishing SMC's but is not used in RMS selection due to the infrequency of reporting and the lack of available long-term trending data within the Tule Subbasin.

Short-term, focused analysis of data is utilized to address groundwater quality issues within the Tule Subbasin using an iterative approach to refine the monitoring program as needed. RMS selection is intended to be updated as needed to ensure that temporal variability of changing groundwater conditions from lowering of groundwater levels based on seasonal pumping and current groundwater elevations is being addressed in real-time. This timeframe enables GSA's to identify areas where groundwater quality issues exist and to mitigate the degradation of groundwater quality.

Water quality data is collected annually from the SDWIS database for each community water system operating within the Tule Subbasin. Community water systems operate under the California Department of Public Health's Division of Drinking water (**Table 6**) and adhere to specific standards for water quality, treatment and monitoring. RMS locations focus on basin-wide management and monitor outside of communities where groundwater quality monitoring is nominal.

4.3 Current RMS Monitoring Network

The GSA's current monitoring network consists of wells perforated in the upper and lower aquifers. The current network is iterative and will change based on access, availability to sample and the value of the data with respect to groundwater quality degradation. This network will expand to include regions: where beneficial use is impacted by the lowering of groundwater levels; and where exceedances of groundwater quality constituents are determined based on available data. Current deficiencies within the network have been identified and are discussed in the following section.

4.3.1 Upper Aquifer Monitoring Network

The current RMS network for the upper aquifer is provided in **Figure 8a**. This figure shows RMS locations over the density of domestic and public supply wells perforated within the upper aquifer within each section. Domestic and Public supply have been identify as most vulnerable beneficial users within the lower aquifer.

Groundwater in the upper aquifer moves generally in a westward direction from higher ground surface elevations to lower elevations toward the western margins of the subbasin. Within the western central portion of the subbasin, a groundwater depression exists in the upper aquifer that dictates the flow of

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groundwater toward Pixley Irrigation District. Detailed discussion of groundwater elevation conditions is presented in the Subbasin Setting.

High priority monitoring regions based on groundwater quality exceedances and well density by beneficial use in the upper aquifer and focus on the northern boundary of the subbasin including the City of Porterville. Ambient concentrations of 1,2,3-TCP, Arsenic, Nitrate as N, and Uranium are present in groundwater in this region. RMS in the areas around Porterville were selected to prioritize domestic well owners not connected to a community water system and to determine exceedances within the area. RMS wells were selected to the south and southwest of Porterville to prioritize migration of exceedances from source contamination locations (RMS-Tule_E0081, Tule_E0082, Tule_E0094).

Rural communities along highway 99 are also considered high priority including Tipton, Pixley, Earlimart and Teviston based on groundwater quality and domestic well density. Ambient concentrations of Nitrate as N, 1,2,3-TCP, Arsenic and Uranium are present in groundwater in this region. In addition to the data gathered from each community water system, RMS locations have been selected upgradient of these locations to based on groundwater flow and availability (Tule_P0117, Tule_P0024, Tule_D0084, Tule_D0085, Tule_D0173).

RMS wells have been selected near the communities of Alpaugh and Allensworth to address ambient concentrations of Arsenic and higher TDS in the lower aquifer (Tule_T0064, Tule_T0089).

The region surrounding the community of Terra Bella is considered high priority due to well density and the high rates of land subsidence within the region. The upper aquifer is dry in the southeast portion of the subbasin just south of the Ducor and no monitoring can be conducted in this region.

RMS near the unincorporated community of Angiola have been added to the RMS network based on availability and well density. Ambient concentrations of Arsenic, TDS and uranium are present in this region (Tule_P0133).

Ambient concentrations of 1,2,3-TCP, Arsenic, nitrate as N, DBCP, TDS and Uranium are present in the southern boundary of the subbasin near the city of Richgrove. RMS locations were selected upgradient of the Richgrove CSD (Tule_D0173) to identify potential impacts from over-pumping in the region.

Further discussion of the groundwater quality exceedances within these high priority areas is provided in section 3.

The complete RMS monitoring network for quality in the upper aquifer is provided in **Table 7**.

4.3.2 Lower Aquifer Monitoring Network

The current RMS network for the lower aquifer is provided in **Figure 8b**. This figure shows RMS locations over the density of domestic and agricultural wells within each section. Domestic and Agricultural beneficial users have been identified as most vulnerable within the lower aquifer.

Groundwater in the lower aquifer, similar to the upper aquifer, moves generally in a westward direction from higher ground surface elevations to lower elevations toward the western margins of the subbasin. Detailed discussion of groundwater elevation conditions is presented in the Subbasin Setting.

High priority monitoring regions based on groundwater quality exceedances and well density by beneficial use in the lower aquifer and focus on the northeast and eastern boundary of the subbasin including the

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City of Porterville and Terra Bella. RMS near Porterville were selected to prioritize domestic well owners and to determine exceedances within the area.

RMS wells were selected southeast of Porterville based on the vulnerability of agricultural use within the area (Tule_E0164, ETGSA_01L, Tule_E0165)

Rural communities along highway 99 are considered high priority including Tipton, Pixley, Earlimart and Teviston based on groundwater quality exceedances in the lower aquifer. Ambient concentrations of 1,2,3-TCP, Hexavalent Chromium, Nitrate as N and TDS are present within these communities. In addition to the data gathered from each community water system, RMS locations have been selected to identify potential impacts to agricultural and domestic users of lower aquifer groundwater (Tule_L0014, Tule_EL0083, Tule_P0121, Tule_D1067).

The region surrounding the community of Terra Bella and Ducor is considered high priority due to agricultural and domestic well density and the high rates of land subsidence within the region (Tule_E0142, Tule_E0123, Tule_E0160).

While the upper aquifer is dry in the southeast portion of the subbasin just south of the Ducor, two RMS locations have been added to monitor the lower aquifer within this area (Tule_E0038). Further discussion of the groundwater quality exceedances within these high priority areas is provided in section 3. Ambient concentrations of Arsenic, Nitrate and TDS are present in this region.

RMS wells have been selected in the city of Alpaugh and near Allensworth to address ambient concentrations of Arsenic and higher TDS in the lower aquifer (Tule_A0159, Tule_T1027).

RMS wells near the unincorporated community of Angiola have been added to the RMS network based on availability. The Angiola Water District manages groundwater resources within this region and provides GSA access to the monitoring locations. Ambient concentrations of Arsenic, TDS and uranium are present in this region (Tule_T0135, Tule_T0136, Tule_T0148).

Ambient concentrations of 1,2,3-TCP, Arsenic, nitrate as N, DBCP, TDS and Uranium are present in the southern boundary of the subbasin near the city of Richgrove. RMS locations were selected upgradient of the Richgrove CSD (Tule_D0168, Tule_K155) to identify potential impacts from over-pumping in the region.

The complete RMS monitoring network for quality in the lower aquifer is provided in **Table 8**.

4.4 Data Gaps & Future Refinement

The current groundwater quality RMS network was derived from existing monitoring programs in the Tule Subbasin. As such, the requirements of these programs in terms of monitoring features and frequency has guided the implementation of the Tule Subbasin SGMA groundwater quality monitoring network. Shortcomings of the existing monitoring programs is discussed below and the Tule Subbasin GSAs have identified a plan to address data gaps to improve the groundwater quality monitoring program.

Many of the current RMS network wells are privately owned domestic or agricultural wells. The GSAs are not responsible for maintenance and upkeep of wells and therefore cannot guarantee that samples can be collected during monitoring events. Groundwater quality samples are not able to be collected from agricultural wells if the pump is not operating and actively pumping water to the measuring point. Monitoring wells must also be purged prior to sampling for an accurate analysis of groundwater quality from the subbasin. Agricultural wells do not typically run when surface water supplies are available to

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meet crop demands during wet years or in winter or spring seasons. This prevents the current RMS network from being monitored on a semi-annual or quarterly basis to capture short-term seasonal trends. Additionally, static groundwater levels cannot be collected from wells if the pump has not been shut-off for at least 24 hours for collecting accurate groundwater level measurements. Groundwater levels are measured in the Spring and Fall when groundwater pumps are not running. This means that groundwater elevation is more difficult to correlate with groundwater quality data. The GSA's are currently identifying methods to re-imburse landowners for the costs associated with starting wells outside of pumping times in order to monitor RMS wells more frequently.

The GSAs are working to refine and improve groundwater quality RMS well network to additional dedicated monitoring wells that are representative of groundwater conditions and beneficial users, and allow for adequate monitoring frequency to detect short-term and seasonal trends. Additionally, the GSA's are currently implementing incentivizing landowners to turn on pumps at the GSA's request by monetarily covering the costs associated with running the pumps for sample collection to ensure consistent sample collection at privately owned RMS locations.

As conditions change and new information and data becomes available the Tule Subbasin GSAs will adaptively refine the groundwater quality monitoring network to ensure it provides adequate coverage of groundwater quality characterization of the subbasin.

To commence these efforts, areas designated as data gaps will be prioritize for future groundwater quality RMS locations. Initial efforts will include re-evaluating monitoring sites from existing groundwater quality programs for adequacy to be utilized as a groundwater quality RMS well. When existing monitoring features are not found to be adequate, the Tule Subbasin GSAs will coordinate with landowners to get permission to utilize domestic wells as dedicated monitoring sites.

5 Sustainable Management Criteria for Degraded Groundwater Quality

5.1 Definition of Significant and Unreasonable Degraded Groundwater Quality Conditions

A key driver of the analysis presented herein to address CDWR and SWRCB Staff deficiencies is protection of the basic human right to water. As stated in the California Water Code Section 106.3, "every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes." In the Tule Subbasin, most private rural residences and residents of the small severely disadvantage communities rely on private domestic wells or municipal wells to meet their domestic water supply needs. These wells are vulnerable to, among other things, degraded groundwater quality that may be caused by GSA authorized activities such as groundwater pumping or recharge activities.

The Tule Subbasin GSAs have revised the definition of significant and unreasonable conditions, as it relates to groundwater quality, as follows:

"Degraded groundwater quality that does not meet state and federal regulatory standards resulting in impacts to Beneficial Uses and Users that are not mitigated"

The level at which groundwater quality is considered an impact to a beneficial user is the point when the quality exceeds the established regulatory threshold for the defined beneficial use. Impacts to beneficial uses and users become significant and unreasonable if mitigation is not provided. As such, the Tule Subbasin GSAs have adopted a subbasin-wide mitigation plan to address unavoidable impacts, making them less than significant and unreasonable, including degraded groundwater quality.

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Per SGMA regulations¹ GSAs are not responsible for addressing significant and unreasonable conditions that were present and have not been corrected prior to January 1, 2015. Additionally, many factors can contribute to degraded groundwater quality conditions that are not attributed to GSA groundwater management activities. Therefore, GSAs are not mitigating for pre-2015 legacy groundwater quality that exceed regulatory thresholds, or but rather to implement GSPs in a manner that does not further degrade groundwater conditions where exceedances exist. GSAs are not mitigating impacts that are not attributed to GSA authorized groundwater management activities.

5.2 Quantification of Undesirable Results for Degraded Groundwater Quality

By regulation, the undesirable result for degradation of groundwater quality is a quantitative combination of groundwater quality minimum threshold exceedances. The Tule Subbasin GSAs have defined undesirable results for degraded groundwater quality as:

“An undesirable result occurs if any single groundwater quality RMS well experience a minimum threshold exceedance resulting from a GSA’s groundwater management for 2 consecutive years, and cannot be mitigated by a GSA, is undesirable.”

Two years of consecutive exceedances is chosen to ensure that the exceedance represents an ongoing condition, while being short enough to address groundwater quality exceedances before significant degradation below state and federal groundwater quality standards. Any groundwater quality RMS well minimum thresholds exceeded will trigger an assessment of whether the exceedance results from the GSAs’ authorized groundwater management activities for the purpose of determining the mitigation responsibility of the GSA. This assessment is discussed in Section 5.3.1 of this document. The ability of the Tule Subbasin GSAs to mitigate groundwater quality impacts is informed by conservatively estimating the potential mitigation costs, discussed further in **Section 6**.

5.3 Minimum Thresholds and Measurable Objectives for Degraded Groundwater Quality

Minimum thresholds and measurable objectives are established at each groundwater quality RMS well with consideration to the drinking water Maximum Contamination Level (MCL) or agricultural Water Quality Objective (WQO). For COCs that had both an MCL and agricultural WQO, the more restrictive standard was adopted as the minimum threshold (e.g., for TDS, the agricultural WQO of 750 mg/L was used to establish minimum thresholds).

For groundwater quality RMS wells that had 2005-2014 baseline data for COCs, the minimum threshold was set at the greater of:

- (1) Drinking water MCL or agricultural WQO, or
- (2) Maximum 2005-2014 concentration

Measurable objectives were set at the greater of:

- (1) 75% of the minimum threshold, or
- (2) maximum 2005-2014 concentration.

For wells with insufficient 2005-2014 COC data, 2005-2023 is used to determine the maximum baseline concentration at the GWQ-RMS wells. For wells with insufficient 2005-2023 data, the MT is set at the greater of:

¹ California Water Code Part 2.74, Ch. 6, Section 10727.2 (b) (4)

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- (1) the average 2005-2014 baseline concentration in the applicable Public Supply Assessment Grid (PSAG); if insufficient 2005-2014 PSAG data, the average 2005-2013 baseline concentration in the applicable PSAG was used.
- (2) the drinking water standard MCL.

Degraded groundwater quality measurable objectives, interim milestones, and minimum threshold at each GWQ RMS upper and lower aquifer wells are provided in **Table 9** and **Table 10**, respectively.

5.3.1 Determining Groundwater Quality Degradation caused by GSA Authorized Groundwater Management Criteria

Groundwater Quality degradation from GSA authorized groundwater management activities will be evaluated by the Tule Subbasin Mitigation Advisory Committee (MAC). The Tule Subbasin MAC is further detailed in the Tule Subbasin Mitigation Plan as Attachment 7 of the Tule Subbasin Coordination Agreement. GSA authorized groundwater management activities that have been identified to potentially impact groundwater quality conditions include groundwater extraction and managed aquifer recharge.

Groundwater extraction could potentially result in changing groundwater quality conditions groundwater extractions in the GSA are modified in terms of timing, magnitude and spatial distribution for how groundwater is extracted. The following GSA authorized groundwater management activities are considered when evaluating probable cause of degrading water quality conditions:

Water trading: Buying and selling groundwater rights can lead to changes in pumping patterns across an area. While it can improve water management, it's important to consider potential consequences for water quality.

New pumping: Drilling new wells or increasing extraction from existing wells can disturb the aquifer, potentially mobilizing contaminants that were previously trapped or inactive.

The Tule subbasin GSA's utilize MAR as a management action for preventing the chronic lowering of groundwater levels. MAR is a strategic approach to augmenting groundwater resources through controlled introduction of water into aquifers. Different MAR methods are suited for different water sources and geologic conditions. MAR activities may consist of the following:

Infiltration ponds: Surface water is collected in designated ponds and allowed to slowly seep into the ground, replenishing the aquifer. If the infiltrating water chemistry differs from native groundwater, this can create geochemical changes in composition. pH and Redox chemistry may be significantly impacted. Shallow groundwater may be more adversely affected by these changes and water levels. Additionally, run-off from urban and agricultural practices can cause contaminants to leak into the soil and potentially impact groundwater.

Injection wells: Water is directly injected into the aquifer through drilled wells, providing a more targeted approach to recharge. This can alter flow patterns and generate faster transport between different aquifer zones. Geochemical changes in native groundwater are similar to those in infiltration ponds however, injection wells can create higher mobilization rates of aquifer materials.

Agricultural Managed Aquifer Recharge (Ag-MAR): Irrigation water is strategically used to recharge aquifers in agricultural areas, potentially offering a cost-effective solution. While returning irrigated water back into the aquifer does not change the geochemistry of the water composition, fertilizers, pesticides may impact aquifer quality. AG-Mar relies on native soils to

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naturally remove contaminants as water infiltrates, significant changes in water quality are not likely.

Flood-Managed Aquifer Recharge (Flood-MAR): Flood-MAR is the use of rainfall and snow melts for recharge to aquifers. Geochemical and hydrological conditions of flood waters may differ from native groundwater and may contribute to changes within the aquifer as well as transport contaminants into the water table.

The following process and criteria will be used to determine if an MT exceedance at a groundwater quality RMS can be attributed to GSA authorized groundwater management activities.

1. When a new minimum threshold exceedance occurs at a groundwater quality RMS well, investigate nearby historical data:
 - a. Evaluate common groundwater management activities that leading to COC occurrence
 - b. Collect data on surrounding area conditions to determine potential cause
 - i. Surrounding area land use history (discharges, groundwater pumping depths and quantity, recharge activities, etc.)
 - ii. Surrounding area historical groundwater quality conditions (is there historical data of nearby exceedances or is this a new exceedance)
 - iii. Surrounding area historical groundwater level conditions (have there been changes in groundwater gradients to migrate the COC)
 - iv. Surrounding Area Land Subsidence (is there new, recently observed subsidence)
 - c. Evaluate data to conclude if exceedance of groundwater quality degradation

5.3.2 Actions Triggered by Minimum Threshold Exceedances to Avoid Undesirable Results

Additional Monitoring When available, additional monitoring events for specific exceedances of minimum thresholds or measurable objectives may be required in order to track changes and identify trends that are creating undesirable results. Exceedances of COC's in dedicated monitoring wells within the Tule Subbasin may be monitored quarterly, if required. Exceedances of COC's in privately owned agricultural wells may only be sampled when pumps are running. If additional sampling is required for an impacted agricultural well, the Tule Subbasin GSA's will make attempts to collect additional samples but may be limited by the data gaps discussed in Section 4.2.

Potentially Impacted Resident Outreach If COC exceeds the minimum threshold or exceeded the measurable objective with increasing trends, the GSAs will coordinate with the TBWF to conduct outreach to potential impacted beneficial users in vicinity of GWQ RMS well of the potential health risk and offer free testing of domestic wells.

Interim and Long-term Mitigation If test well results drinking water MCLs have been exceeded the impacted well owners will be provided with clean drinking water at no cost to the landowner. The TBWF provides outreach to inform and encourage well owners to sign up for the free service. The GSAs are responsible for reimbursing the TBWF for any costs associated with non-nitrate exceedances that would have otherwise been funded through SAFER funds awarded to the TBWF, if the MCL exceedances is determined to be a result of GSA authorized groundwater management activities through the analysis described in Section 5.3.1, and the MCL exceedances is not determined to be a legacy conditions the existed pre-2015. More information on the Tule Subbasin Mitigation Plan is provided in Attachment 7 of the Tule Subbasin Coordination Agreement, well testing.

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It's important to note, the GSA's evaluation whether the MCL exceedances can be attributed to GSA authorized groundwater management activities does not determine whether the impacted benefit is eligible for emergency, interim, and long-term mitigation. Through the TBWF all drinking water wells that test above the MCL will be eligible for emergency and interim supplies.

Management Actions In addition to outreach and mitigation, the GSAs may also implement management actions such as special management zones with more stringent pumping reduction or recharge policies to protect beneficial users from being impacted by degraded groundwater quality.

6 Groundwater Quality Mitigation Funding

Anticipated costs for potential degraded groundwater quality impacts are informed by cost estimates by the TBWF to implement their safe drinking water program to provide testing and emergency water supplies to residents that have exceedance of COCs. These costs only include non-nitrate exceedances that are found to be caused by GSA authorized groundwater management activities to ensure that SAFER funds awarded to the TBWF are not utilized to offset GSA related impacts. Mitigation for nitrate exceedance would fall under the purview of the TBWF.

As a basis for the estimate, the Tule Subbasin GSAs assume 50% of the non-nitrate impacts could potentially be related to GSA authorized activities. In 2023 the TBWF submitted a proposed 3-year budget of \$4,528,822 for SAFER grant funds for costs associated with anticipated non-nitrate impacts that was approved by the Department of Financial Assistance (DFA). Based on 50% estimated liability of the non-nitrate costs for implementing the clean drinking water program, the annual cost estimates for the GSAs equates to \$754,804 with a total over the GSP implementation period of \$11,322,060.

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Table 1: Active Regulatory Programs within the Tule Subbasin

Regulatory Acronym	Regulatory Program	Active Permits in Tule Subbasin
WDR	Waste Discharge Requirements	47
STRMWTR	Stormwater Discharge	72
SSO	Sanitary Sewer Operations	6
NPDES	National Pollutant Discharge Elimination System	5
LNDISP	Landfill/Composting Facilities	12
CERFILLEX	Dredge/Fill Sites	3
ANIWST	Animal Feeding Facilities	151
IRRI	ILRP Coalitions and Cannabis	1
TANKS	Wastewater Treatment Facilities	4

California Integrated Water Quality System (CIWQS) Project - <https://ciwqs.waterboards.ca.gov/>

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Table 2: Active Waste Discharge Orders in the Tule Subbasin

Acronym	Order No.	No. of Active Permits in TSB	Description
WDR/TANKS	2020-0015-DWQ	2	Determination of PFAS and PFOA at publicly owned treatment facilities
WDR	01-246	1	Reclamation Project - Utilities
WDR	2003-0003-DWQ	1	Discharges to land with a low threat to water quality
WDR	2004-0012-DWQ	1	discharge of biosolids to land for use as soil amendment in Ag and Reclamation
WDR	2014-0153-DWQ	4	Waste discharge from small domestic wastewater treatment systems
WDR	5-00-163	6	oil/gas mining operations
WDR	82-006	1	Waste Water treatment Woodville Farm Labor Camp
WDR	83-088	1	Waste Water treatment Richgrove
WDR	85-107	1	Food Processing - Euclid
WDR	85-170	1	Waste Water treatment Tipton
WDR	86-108	1	Waste Water treatment Woodville
WDR	88-097	1	Wastewater Treatment Facility - Delft colony
WDR	92-191	1	Food Processing - Pistachio
WDR	94-302	1	Food Processing - Citrus
WDR	94-347	1	Food Processing - Citrus
WDR	95-029	1	Wastewater Treatment Facility- Terra Bella
WDR	95-184	1	Recycled Water Use Area
WDR	97-010-DWQ	1	Discharge to land by small domestic Wastewater treatment systems
WDR	97-080	1	TBMZ discharger -RPC Packing
WDR	97-248	1	Woodville Dehydrator
WDR	98-140	1	Sanitary Sewer lift station - Earlimart
WDR	98-157	1	Discharge from Winery
WDR	98-214	1	Wastewater Treatment Facility- Poplar
WDR	99-081	1	Wastewater Treatment Facility- Campground
WDR	99-106	1	Wastewater Treatment Facility - Trailer park
WDR	99-107	1	Wastewater Treatment Facility - RV park
WDR	R5-2007-0123	1	Wastewater Treatment Facility - Pixley
WDR	R5-2009-0050	1	Food Processor - Pistachio
WDR	R5-2011-0039	2	Discharge req's for Manure Anaerobic digester co-digester facilities
WDR	R5-2013-0145 (5F)	1	Waiver of reports for specific types of discharge w/in Central Valley region
WDR	R5-2015-0135	1	Discharge req's for Tipton Juice plant
WDR	R5-2016-0052	1	Discharge req's for ARE Pistachios Plant
WDR	R5-2018-0066	1	Discharge Req's for Earlimart Almond Plant
WDR	R5-2019-0014	1	Discharge Req's for Sawmill Facility
WDR	R5-2020-0002	1	discharge req's for small food processors, wineries and Ag relation processors
WDR	R5-2022-0006-02	3	Discharge req's for limited threat discharges to surface water
STRMWTR	2009-0009-DWQ	42	stormwater discharges assoc. with Construction and Land Disturbance
STRMWTR	2013-0001-DWQ	8	stormwater discharges from small municipal separate storm sewer systems
STRMWTR	2014-0057-DWQ	22	stormwater discharges assoc. with industrial activities
SSO	2022-0103-DWQ	6	Discharge req's for Sanitary Sewer Systems
NPDES	2013-0002-DWQ	1	NPDES aquatic pesticide discharge to waters from algae and Aquatic weed control
NPDES	2014-0194-DWQ	3	Permit for drinking water system discharges to waters of U.S.A
NPDES	2016-0039-DWQ	1	Biological and residual pesticide discharges to waters from Vector Control Applications
LNDISP/TANKS	2019-0006-DWQ	6	determination of PFAS and PFOA Substances in landfills
LNDISP	2015-0121-DWQ	2	Discharge req's for Composting Operations
LNDISP	R5-2020-0052	1	Title 27 Discharges to land from Solid waste Disposal Site
LNDISP	R5-2022-0027	1	Title 27 discharges to land Woodville Disposal site
CERFILLEX	2004-0004-WQC	1	Dredged or fill discharges to Waters deemed by the USACE to be outside of Federal
CERFILLEX	2018-0025-EXEC	1	Executive order: clean Water Act Emergency repair and protection services
CERFILLEX	SB20031GN	1	General order for the CORPS' Nationwide Permits - Oil and Gas Fill Excavation
ANIWST	96-012	1	Animal waste - Pigs
ANIWST	R5-2010-0130	3	Discharge req's for Manure Anaerobic digester co-digester facilities
ANIWST	R5-2013-0122	129	Discharge Req's for Existing Milk Cow dairies
ANIWST	R5-2016-0087-01	3	Discharge req's for Poultry Operations
ANIWST	R5-2017-0058	15	Discharge req's for confined Bovine feeding operations

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Table 3a: PSAG Baseline Concentrations for COCs 2005-2014

PSAG	DBCP (µg/L)	Arsenic (µg/L)	1,2,3 - TCP (µg/L)	PCE (µg/L)	Perchlorate (µg/L)	Nitrate as N (mg/L)	Uranium (pCi/L)
SVJ_TULE 1	IS Data	IS Data	IS Data	IS Data	IS Data	IS Data	IS Data
SVJ_TULE 2	IS Data	21.32	IS Data	IS Data	IS Data	IS Data	IS Data
SVJ_TULE 3	IS Data	IS Data	IS Data	IS Data	IS Data	IS Data	IS Data
SVJ_TULE 4	IS Data	67.30	0.75	IS Data	170.00	IS Data	23.87
SVJ_TULE 5	IS Data	IS Data	IS Data	IS Data	IS Data	IS Data	IS Data
SVJ_TULE 6	IS Data	IS Data	0.23	9.00	IS Data	10.62	34.27
SVJ_TULE 7	IS Data	8.96	0.60	IS Data	13.00	10.16	IS Data
SVJ_TULE 8	IS Data	19.78	0.36	IS Data	IS Data	IS Data	IS Data
SVJ_TULE 9	IS Data	17.60	0.15	IS Data	IS Data	11.20	IS Data
SVJ_TULE 10	IS Data	11.68	0.19	IS Data	IS Data	17.43	IS Data
SVJ_TULE 11	0.27	10.61	0.69	IS Data	IS Data	18.72	IS Data
SVJ_TULE 12	IS Data	IS Data	IS Data	IS Data	IS Data	IS Data	IS Data
SVJ_TULE 13	0.21	IS Data	0.39	IS Data	IS Data	11.12	IS Data
SVJ_TULE 14	IS Data	IS Data	0.35	4.30	IS Data	13.60	IS Data
SVJ_TULE 15	IS Data	IS Data	0.16	IS Data	IS Data	10.08	IS Data
SVJ_TULE 16	IS Data	9.17	0.50	4.67	6.37	13.42	IS Data
SVJ_TULE 17	IS Data	IS Data	0.47	IS Data	IS Data	10.95	IS Data
SVJ_TULE 18	IS Data	11.00	0.23	IS Data	IS Data	11.86	49.00
SVJ_TULE 19	IS Data	IS Data	0.20	IS Data	IS Data	11.97	IS Data
SVJ_TULE 20	IS Data	IS Data	IS Data	IS Data	IS Data	IS Data	IS Data
SJV_KERN78	IS Data	8.40	IS Data	IS Data	IS Data	8.28	IS Data

Notes: 1. IS Data = Insufficient data available to determine baseline concentrations 2. Cells with red font indicate an exceedance of the Maximum Contaminant Level (MCL) for drinking water quality. 3. Baseline concentration values were generated from data accessed from Groundwater Ambient Monitoring and Assessment from 2005-2014. Maximum values were assessed from every available data point within each grid cell to determine pre-SGMA averages for risk assessment. If no exceedances occurred within the grid cell, the MCL for each COC is deferred to.

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Table 3b: PSAG Baseline Concentrations for COCs 2005-2023

PSAG	DBCP (µg/L)	Arsenic (µg/L)	1,2,3 - TCP (µg/L)	PCE (µg/L)	Perchlorate (µg/L)	Nitrate as N (mg/L)	Uranium (pCi/L)
SVJ_TULE 1	IS Data	93.15	0.06	IS Data	IS Data	IS Data	IS Data
SVJ_TULE 2	IS Data	NA	0.04	IS Data	IS Data	IS Data	IS Data
SVJ_TULE 3	IS Data	IS Data	0.09	IS Data	IS Data	IS Data	IS Data
SVJ_TULE 4	IS Data	NA	NA	IS Data	NA	IS Data	NA
SVJ_TULE 5	IS Data	IS Data	0.01	IS Data	IS Data	29.9	51.25
SVJ_TULE 6	IS Data	15.11	NA	NA	IS Data	NA	IS Data
SVJ_TULE 7	IS Data	NA	NA	IS Data	NA	NA	IS Data
SVJ_TULE 8	IS Data	NA	NA	IS Data	IS Data	10.20	IS Data
SVJ_TULE 9	IS Data	NA	NA	IS Data	IS Data	NA	IS Data
SVJ_TULE 10	0.21	NA	NA	IS Data	IS Data	NA	IS Data
SVJ_TULE 11	NA	NA	NA	IS Data	IS Data	NA	IS Data
SVJ_TULE 12	IS Data	IS Data	0.01	IS Data	IS Data	8.44	IS Data
SVJ_TULE 13	NA	IS Data	NA	IS Data	IS Data	NA	IS Data
SVJ_TULE 14	IS Data	IS Data	NA	NA	IS Data	NA	IS Data
SVJ_TULE 15	IS Data	IS Data	NA	IS Data	IS Data	NA	IS Data
SVJ_TULE 16	IS Data	NA	NA	NA	NA	NA	IS Data
SVJ_TULE 17	IS Data	IS Data	NA	IS Data	5	NA	IS Data
SVJ_TULE 18	IS Data	NA	NA	IS Data	NA	NA	NA
SVJ_TULE 19	IS Data	15.00	NA	IS Data	NA	NA	IS Data
SVJ_TULE 20	IS Data	IS Data	IS Data	IS Data	NA	IS Data	IS Data
SJV_KERN78	0.21	NA	0.04	IS Data	NA	NA	IS Data

Notes: 1. IS Data = Insufficient data available to determine baseline concentrations 2. Cells with red font indicate an exceedance of the Maximum Contaminant Level (MCL) for drinking water quality. 3. Baseline concentration values were generated from data accessed from Groundwater Ambient Monitoring and Assessment from 2005-2014. Maximum values were assessed from every available data point within each grid cell to determine pre-SGMA averages for risk assessment. If no exceedances occurred within the grid cell, the MCL for each COC is deferred to.

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Table 4: Existing Groundwater Quality Monitoring Programs

Programs or Data Portals	Tule Subbasin Agency Coordinating with GSAs	Parameters	Monitoring Frequency	Program Objectives
AB-3030 and SB-1938 Groundwater Management Plans	Tule Subbasin GSAs, requirements incorporated into GSP Annual Reports	- Water levels are typically monitored annually. - Ag Suitability analysis (limited suite of general minerals) monitoring frequency between annual to once every 3 years.	Semiannual to Annual	
California SDWIS	Varies Public Water Systems	Database for all public water system wells and historical sample results. Data available includes all Title 22 regulated constituents.	- Title 22 General Minerals and Metals every 3 years. - Nitrate as N annually, if ≥ 5 ppm, sampled quarterly - VOCs and SOCs sampled every 3 years. - Uranium sampling depends on historical results but varies between 1 sample every 3 (when ≥ 10 pCi/L), 6 (when < 10 pCi/L) or 9 (when no historical detection) years.	Demonstrate compliance with Drinking Water Standards through monitoring and reporting water quality data.
CV-SALTS	Tule Basin Management Zone, Tule Basin Water Foundation	Waste Discharge Requirements (WDR): monthly sodium, chloride, electrical conductivity, nitrogen species (N, NO ₂ , NO ₃ , NH ₃), pH and other constituents of concern. A limited suite of general minerals is required quarterly from the source and annually from the wastewater.	Most constituents sampled monthly, quarterly general minerals from source water and annual general minerals from waste discharge.	To monitor degradation potential from wastewaters discharged to land application areas and provide interim replacement water when MCL for nitrate as N is exceeded while developing long term solutions for safe drinking water.
Department of Pesticide Regulation	County of Tulare	Pesticides	Annual	DPR samples groundwater to determine: (1) Presence of hazardous pesticides (2) extent and source of contamination (3) Assessment of regulatory mitigation actions
GAMA (Collaboration with SWQCB, RWQCB, DWR, DPR, NWIS, LLNL)		- Constituents sampled vary by the Program Objectives. - Typically, USGS is the technical lead in conducting the studies and reporting data.	Varies	- Improve statewide comprehensive groundwater monitoring. - Increase the availability of groundwater quality for the public.
Geotracker and Envirostor Databases		Many contaminants of concern, organic and inorganic.	Individual Program Dependent schedule	Records database for cleanup program sites, permitted waste dischargers
ILRP	Tule Basin Water Quality Coalition	- Annually: static water level, temperature, pH, electrical conductivity, nitrate as nitrogen, and dissolved oxygen. - Once every five years: general minerals collection	Annual and Every 5 years	Monitor impacts of agricultural and fertilizer applications on first encountered groundwater
USGS California Water Science Center		Conducted multiple groundwater quality studies of the Tule Subbasin.	Reports, factsheet, and data publications range from 1994through 2017.	Special studies related to groundwater quality that provide comprehensive studies to characterize the basin.

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Table 5: Community Water Systems within the Tule Subbasin

Community	PWS ID	PWS Type	Population served
Allensworth	CA5400544	Allensworth CSD	521
Alpaugh	CA5410050	Alpaugh CSD	871
Ducor	CA5400542	Ducor CSD	616
Earlimart	CA5410021	Earlimart PUD	7,679
Pixley	CA5410009	Pixley Public Utility District	2,772
Poplar	CA5410026	Poplar Community Service District	2,200
Porterville	CA5410010	City of Porterville	62,988
Richgrove	CA5410024	Richgrove CSD	1,617
Terra Bella	CA5410038	Terra Bella Irrigation District	3,056
Teviston	CA5400641	Teviston Community Service district	343
Woodville	CA5410025	Woodville Public Utility District	1,740

Note: Data accessed from EPA-SDWIS Federal Report, Transient and non-community water systems not included

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Table 6: GWQ-RMS Well Network – Upper Aquifer

Well ID	Latitude	Longitude	Perforation Interval		Completed Depth
Tule_D0084_ILP	35.88429	-119.23127	265	305	305
Tule_D0085_ILP	35.84343	-119.21494	120	220	300
Tule_D0173_RMS	35.76965	-119.18989	400	600	600
Tule_E0081_ILP	36.09212	-119.11417	140	300	300
Tule_E0082_ILP	36.06022	-119.1076	--	--	152
Tule_E0094_ILP	36.02248	-119.03005	120	220	300
Tule_E0098_ILP	35.99859	-119.02597	140	300	300
Tule_E0145_ILP	36.03568	-118.92373	82	222	222
Tule_E0147_ILP	36.00732	-118.99141	190	510	510
Tule_E0171_ILP	36.01113	-118.97039	200	400	400
Tule_K0170_ILP	36.12027	-119.08108	116	160	170
Tule_L0007_RMS	36.06452	-119.18288	200	260	280
Tule_L0015_RMS	36.1307	-119.31281	150	280	290
Tule_L0071_ILP	36.0955	-119.21861	--	--	124
Tule_L0072_ILP	36.11991	-119.24802	--	--	252
Tule_L0073_ILP	36.12083	-119.23187	340	400	400
Tule_L0074_ILP	36.12386	-119.18867	160	360	500
Tule_L0080_ILP	36.09528	-119.17877	184	220	262
Tule_L0090_ILP	36.14377	-119.26197	220	380	400
Tule_L0093_ILP	36.07969	-119.3833	--	--	154
Tule_L0108_ILP	36.06646	-119.34128	146	186	188
Tule_L0174_RMS	36.04429	-119.15243	140	400	400
Tule_P0021_RMS	35.94577	-119.30339	320	420	420
Tule_P0024_RMS	35.9299	-119.23266	400	1005	1020
Tule_P0117_ILP	36.00747	-119.264	270	510	510
Tule_P0133_ILP	35.99277	-119.4657	280	480	480
Tule_T0064_RMS	35.83486	-119.50078	170	280	310
Tule_T0066_ILP	35.97229	-119.48324	--	--	--
Tule_T0089_ILP	35.81756	-119.39344	--	--	--

Note: wells with no perforation or completed depth are assumed upper aquifer based on groundwater levels

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Table 7: GWQ RMS Wells – Lower Aquifer

Well ID	Latitude	Longitude	TRS	Perforation Intervals		Well Depth
Tule_A0159_ILP	35.886141	-119.482427	23S23E34	1025	1210	1230
Tule_D0166_ILP	35.880607	-119.279173	23S25E33	340	810	820
Tule_D0168_ILP	35.794127	-119.111454	24S26E36	550	800	820
Tule_E0038_RMS	35.83131	-119.02881	24S27E23	1090	1500	1500
Tule_E0123_ILP	35.91673	-119.06122	23S27E21	340	700	770
Tule_E0140_ILP	35.949744	-119.173092	23S26E09	400	1000	1000
Tule_E0142_ILP	36.00553	-119.07539	22S27E20	220	420	720
Tule_KT155_ILP	35.84861	-119.0983	24S27E18	1281	1860	1870
Tule_E0160_ILP	35.89313	-119.04515	23S27E27	1136	1336	1341
Tule_E0164_ILP	36.05012	-118.9851	22S28E06	180	450	460
Tule_E0165_ILP	36.04951	-118.98461	22S28E06	160	340	395
Tule_L0006_RMS	36.0605	-119.23013	21S25E36	320	640	650
Tule_L0014_RMS	36.1307	-119.31281	21S25E06	500	805	815
Tule_L0083_ILP	35.959961	-119.279916	23S25E04	415	495	495
Tule_P0121_ILP	35.93736	-119.25956	23S25E10	320	800	800
Tule_T0127_ILP	35.80486	-119.37032	24S24E27	440	970	1260
Tule_T0135_ILP	35.99276	-119.45551	22S23E26	580	930	930
Tule_T0148_ILP	35.964077	-119.483344	23S23E33	870	990	1312
ETGSA-1L	36.0485573	-118.9930101	22S28E06	120	140	140
TSMW-4D	35.964058	-119.145256	23S26E03	1050	1350	1360

Table 8: COC Regulatory Thresholds used for establishing SMCs at GWQ RMS Wells

Constituent	Units	Minimum Thresholds	Measurable Objectives
		Drinking Water Limits (MCL/SMCL)	75 %Drinking Water Limits (MCL/SMCL)
Arsenic	µg/L	10	7.5
Nitrate as N	mg/L	10	7.5
Hexavalent Chromium	µg/L	10	7.5
Dibromochloropropane (DBCP)	ppb	0.2	0.15
1,2,3-Trichloropropane (TCP)	µg/L	0.005	3.75
Tetrachloroethene (PCE)	µg/L	5	3.75
Chloride	mg/L	500	375
Total Dissolved Solids ¹	mg/L	750	562.5
Perchlorate	µg/L	6	4.5
Uranium	pCi/L	20	15

1: Total Dissolved Solids regulatory threshold based on Agricultural Water Quality Objective

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Table 9: GWQ RMS Well SMCs - Upper Aquifer

GSA	PSAG	Well ID	Constituent of Concern	IMS & MO	MT
DEID	SVJ_Tule9	Tule_D0084_ILP	Nitrate as Nitrogen (mg/L)	9	12
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0059	0.0079
			Uranium (pCi/L)	15	20
DEID	SVJ_Tule11	Tule_D0085_ILP	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
DEID	SVJ_Kern7 8	Tule_D0173_RM S	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule15	Tule_E0081_ILP	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0041	0.0054
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule13	Tule_E0082_ILP	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule17	Tule_E0094_ILP	Nitrate as Nitrogen (mg/L)	15.75	21
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule17	Tule_E0098_ILP	Nitrate as Nitrogen (mg/L)	12	16
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10

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GSA	PSAG	Well ID	Constituent of Concern	IMS & MO	MT
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule17	Tule_E0145_ILP	Nitrate as Nitrogen (mg/L)	9	12
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule17	Tule_E0147_ILP	Nitrate as Nitrogen (mg/L)	11.25	15
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule17	Tule_E0171_ILP	Nitrate as Nitrogen (mg/L)	18	24
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
KTWD	SVJ_Tule16	Tule_K0170_ILP	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
LTRID	SVJ_Tule15	Tule_L0007_RM S	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
LTRID	SVJ_Tule6	Tule_L0015_RM S	Nitrate as Nitrogen (mg/L)	7.50	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	13.50	18
			Hexavalent Chromium (ug/L)	7.50	10
			1,2,3-Trichloropropane (ug/L)	0.00	0.005
			Uranium (pCi/L)	15.00	20
LTRID	SVJ_Tule17	Tule_L0071_ILP	Nitrate as Nitrogen (mg/L)	11.25	15

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GSA	PSAG	Well ID	Constituent of Concern	IMS & MO	MT
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
LTRID	SVJ_Tule15	Tule_L0072_ILP	Nitrate as Nitrogen (mg/L)	9	12
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
LTRID	SVJ_Tule15	Tule_L0073_ILP	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
LTRID	SVJ_Tule15	Tule_L0074_ILP	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
LTRID	SVJ_Tule15	Tule_L0080_ILP	Nitrate as Nitrogen (mg/L)	8.25	11
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
LTRID	SVJ_Tule6	Tule_L0090_ILP	Nitrate as Nitrogen (mg/L)	23.25	31
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.50	10
			Hexavalent Chromium (ug/L)	7.50	10
			1,2,3-Trichloropropane (ug/L)	0.00	0.005
			Uranium (pCi/L)	15.00	20
LTRID	SVJ_Tule5	Tule_L0093_ILP	Nitrate as Nitrogen (mg/L)	7.5	10
			DBCP (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005

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GSA	PSAG	Well ID	Constituent of Concern	IMS & MO	MT
			Uranium (pCi/L)	15	20
LTRID	SVJ_Tule6	Tule_L0108_ILP	Nitrate as Nitrogen (mg/L)	7.50	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.50	10
			Hexavalent Chromium (ug/L)	7.50	10
			1,2,3-Trichloropropane (ug/L)	0.00	0.005
			Uranium (pCi/L)	15.00	20
LTRID	SVJ_Tule14	Tule_L0174_RMS	Nitrate as Nitrogen (mg/L)	11.25	15
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
Pixley	SVJ_Tule8	Tule_P0021_RMS	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
Pixley	SVJ_Tule12	Tule_P0024_RMS	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
Pixley	SVJ_Tule7	Tule_P0117_ILP	Nitrate as Nitrogen (mg/L)	14.25	19
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
Pixley	SVJ_Tule4	Tule_P0133_ILP	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
TCWA	SVJ_Tule1	Tule_T0064_RMS	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10

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GSA	PSAG	Well ID	Constituent of Concern	IMS & MO	MT
			Hexavalent Chromium (ug/L)	0.15	0.2
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
TCWA	SVJ_Tule3	Tule_T0066_ILP	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
TCWA	SVJ_Tule1	Tule_T0089_ILP	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule16	ETGSA-1U	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule13	TSMW-4S	Nitrate as Nitrogen (mg/L)	7.5	10
			Dibromochloropropane (ug/L)	0.15	0.2
			Arsenic (ug/L)	7.5	10
			Hexavalent Chromium (ug/L)	7.5	10
			1,2,3-Trichloropropane (ug/L)	0.0038	0.005
			Uranium (pCi/L)	15	20

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Table 10: GWQ RMS Well SMCs - Lower Aquifer

GSA	PSAG	Master Well ID	Constituent	IMs & MO	MT
Alpaugh	SVJ_Tule2	Tule_A0159_ILP	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
DEID	SVJ_Tule9	Tule_D0166_ILP	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	9	12
			Uranium (pCi/L)	15	20
DEID	SVJ_Tule11	Tule_D0168_ILP	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.9575	10.61
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule20	Tule_E0038_RMS	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule18	Tule_E0123_ILP	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	9.75	13
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule13	Tule_E0140_ILP	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10

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GSA	PSAG	Master Well ID	Constituent	IMs & MO	MT
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule17	Tule_E0142_ILP	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
KTWD	SVJ_Tule11	Tule_KT155_ILP	DBCP (µg/L)	0.2025	0.27
			Arsenic (µg/L)	7.9575	10.61
			1,2,3 - TCP (µg/L)	0.5175	0.69
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule19	Tule_E0160_ILP	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule16	Tule_E0164_ILP	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	4.8	6.4
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule16	Tule_E0165_ILP	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	8.25	11
			1,2,3 - TCP (µg/L)	0.75	1
			PCE (µg/L)	4.8	6.4
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
LTRID	SVJ_Tule14	Tule_L0006_RMS	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10

ATTACHMENT 5 – TULE SUBBASIN COORDINATION AGREEMENT

GSA	PSAG	Master Well ID	Constituent	IMs & MO	MT
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
LTRID	SVJ_Tule6	Tule_L0014_RMS	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
LTRID	SVJ_Tule8	Tule_L0083_ILP	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.36	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
Pixley ID	SVJ_Tule8	Tule_P0121_ILP	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
TCWA	SVJ_Tule1	Tule_T0127_ILP	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	69.8625	93.15
			1,2,3 - TCP (µg/L)	0.045	0.06
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
TCWA	SVJ_Tule4	Tule_T0135_ILP	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
TCWA	SVJ_Tule3	Tule_T0148_ILP	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	10	76.5
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005

ATTACHMENT 5 – TULE SUBBASIN COORDINATION AGREEMENT

GSA	PSAG	Master Well ID	Constituent	IMs & MO	MT
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule16	ETGSA-1L	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	8.25	11
			Uranium (pCi/L)	15	20
ETGSA	SVJ_Tule13	TSMW-4L	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.2925	0.39
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
KTWD	SVJ_Tule20	Tule_KT041_RMS	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20
KTWD	SVJ_Tule20	Tule_KT042_RMS	DBCP (µg/L)	0.15	0.2
			Arsenic (µg/L)	7.5	10
			1,2,3 - TCP (µg/L)	0.00375	0.005
			PCE (µg/L)	0.00375	0.005
			Hexavalent Chromium (µg/L)	7.5	10
			Nitrate as N (mg/L)	7.5	10
			Uranium (pCi/L)	15	20

Figure 1a
Sections by Number of
Lower Aquifer Public,
Domestic, and Irrigation
Wells

Legend

- Public, Domestic, and
Irrigation Lower Aquifer
WCRs
- Tule Subbasin Boundary
- County Boundary
- Lake Success
- Friant-Kern Canal
- Waterways
- Major Roads
- Roads

Sections Symbolized by
Number of Lower Aquifer
Public, Domestic, and Irrigation
Wells

- 0 - 1
- 1 - 5
- 5 - 10
- 10 - 20
- 20+

Data based on State of California Well
Completion Report Database.



0 1.75 3.5
Miles

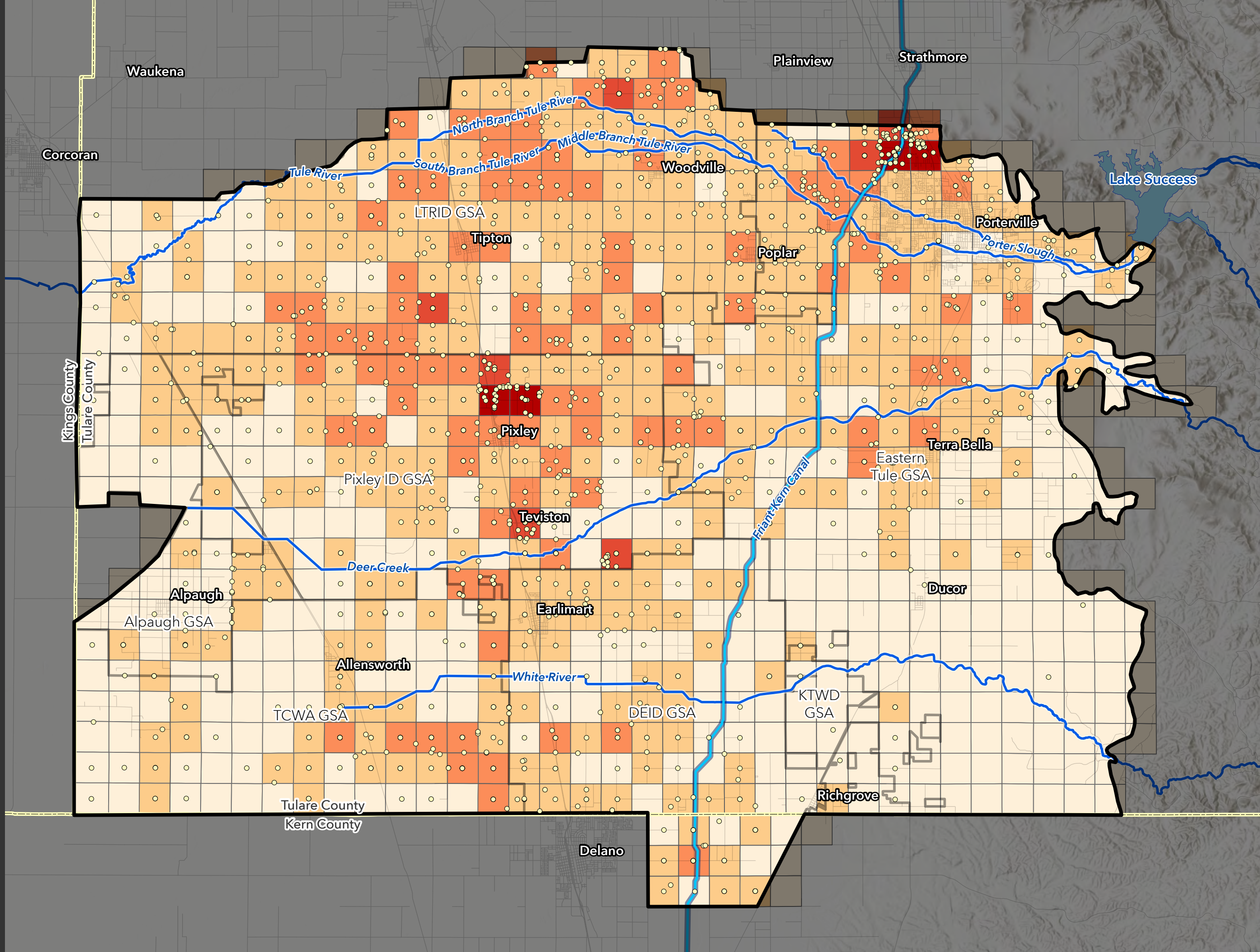


Figure 1b
Sections by Number of
Upper Aquifer Public
and Domestic Wells

Legend

- Public and Domestic Upper Aquifer WCRs
- Tule Subbasin Boundary
- County Boundary
- Lake Success
- Friant-Kern Canal
- Waterways
- Major Roads
- Roads

Sections Symbolized by
Number of Upper Aquifer
Public/Domestic Wells

- 0 - 1
- 1 - 5
- 5 - 10
- 10 - 20
- 20+

Data based on State of California Well
Completion Report Database.



0 1.75 3.5
Miles

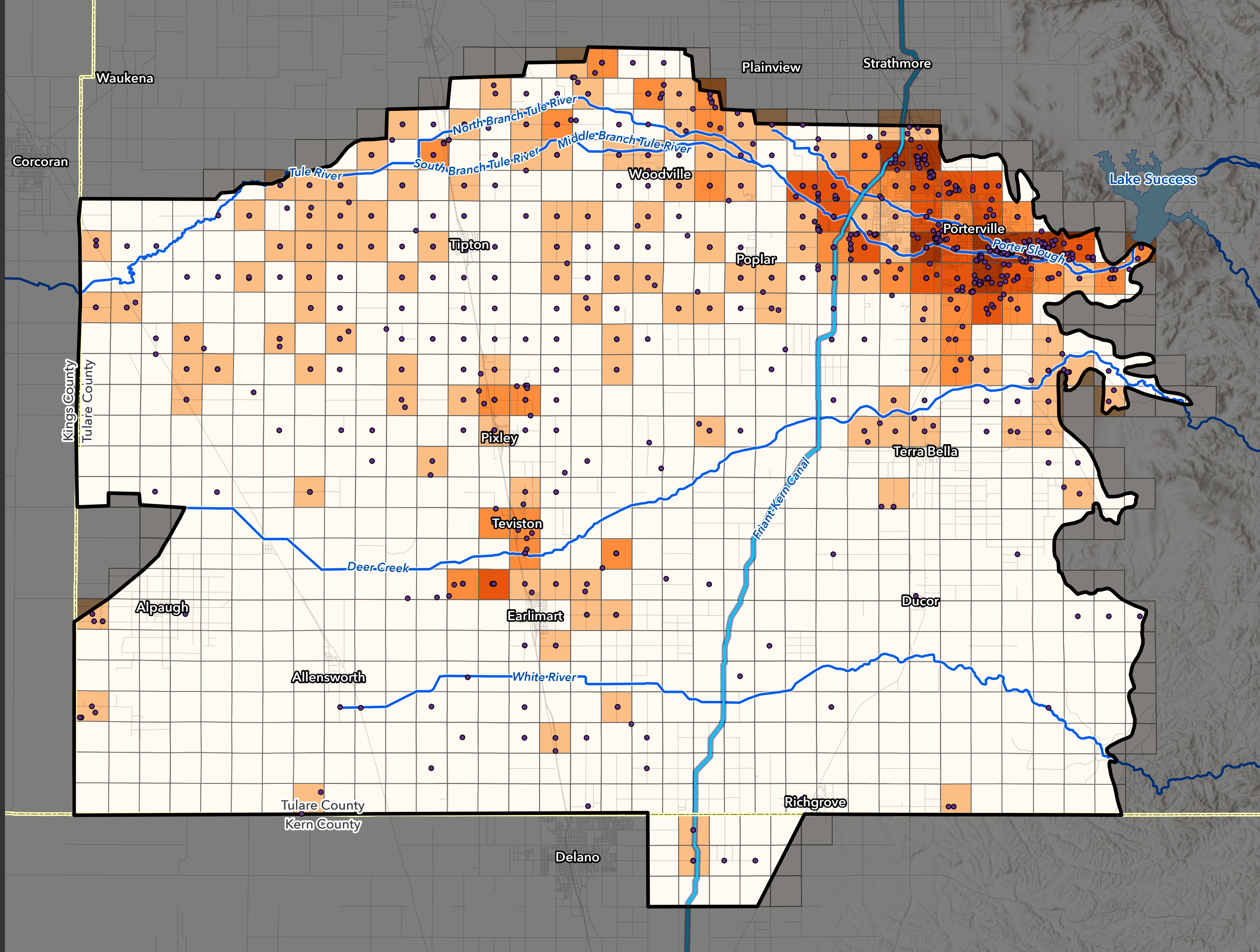
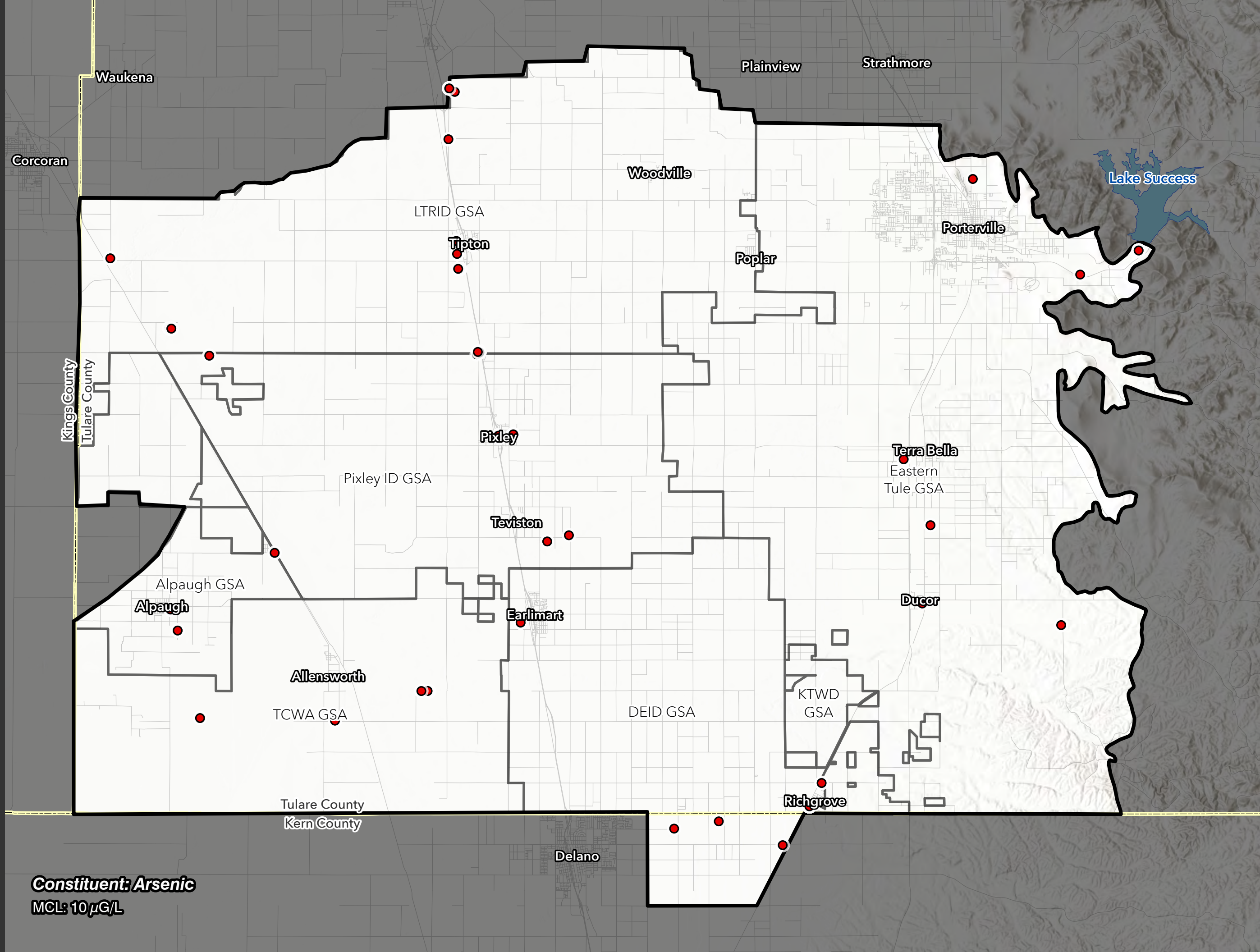


Figure 2a
Arsenic MCL
Exceedances
2005-2023

Legend

-  MCL Exceedance Locations
-  County Boundary
-  Tule Subbasin Boundary
-  GSA Boundary
-  Lake Success
-  Friant-Kern Canal
-  Waterways
-  Major Roads
-  Roads

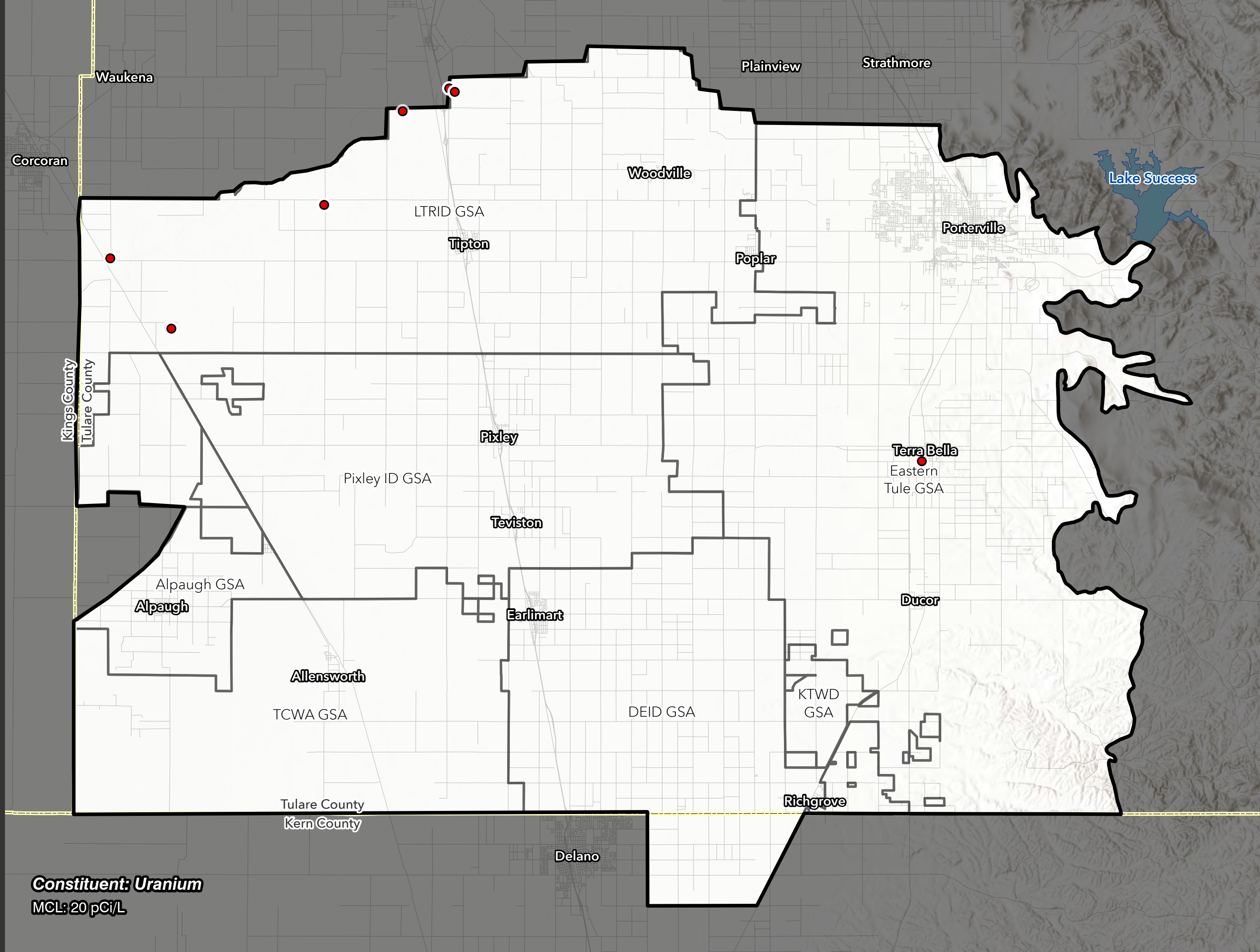


Constituent: Arsenic
MCL: 10µG/L

Figure 2b
Uranium MCL
Exceedances
2005-2023

Legend

-  MCL Exceedance Locations
-  County Boundary
-  Tule Subbasin Boundary
-  GSA Boundary
-  Lake Success
-  Friant-Kern Canal
-  Waterways
-  Major Roads
-  Roads

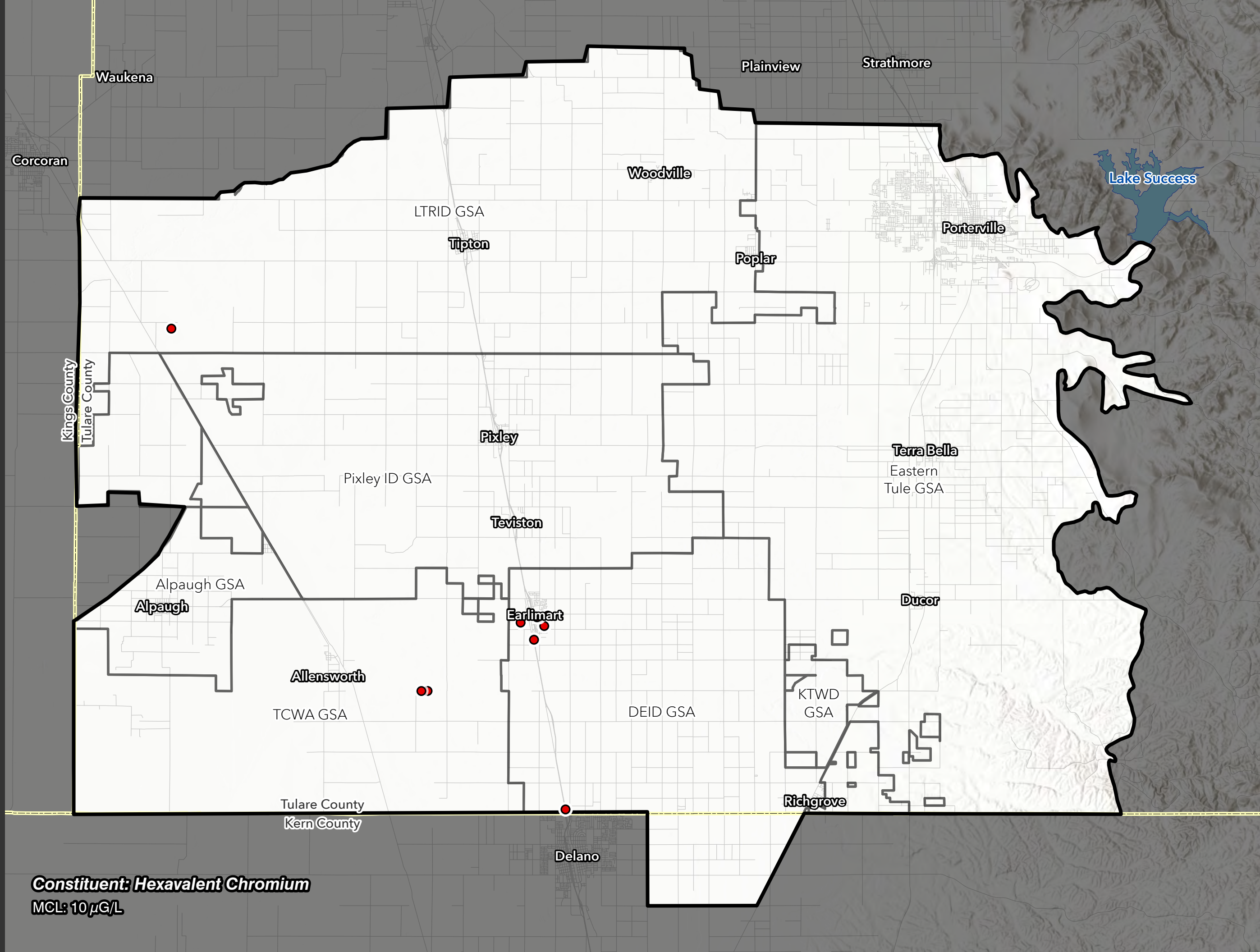


0 1.75 3.5
Miles

Figure 2c
Hexavalent Chromium
MCL Exceedances
2005-2023

Legend

-  MCL Exceedance Locations
-  County Boundary
-  Tule Subbasin Boundary
-  GSA Boundary
-  Lake Success
-  Friant-Kern Canal
-  Waterways
-  Major Roads
-  Roads

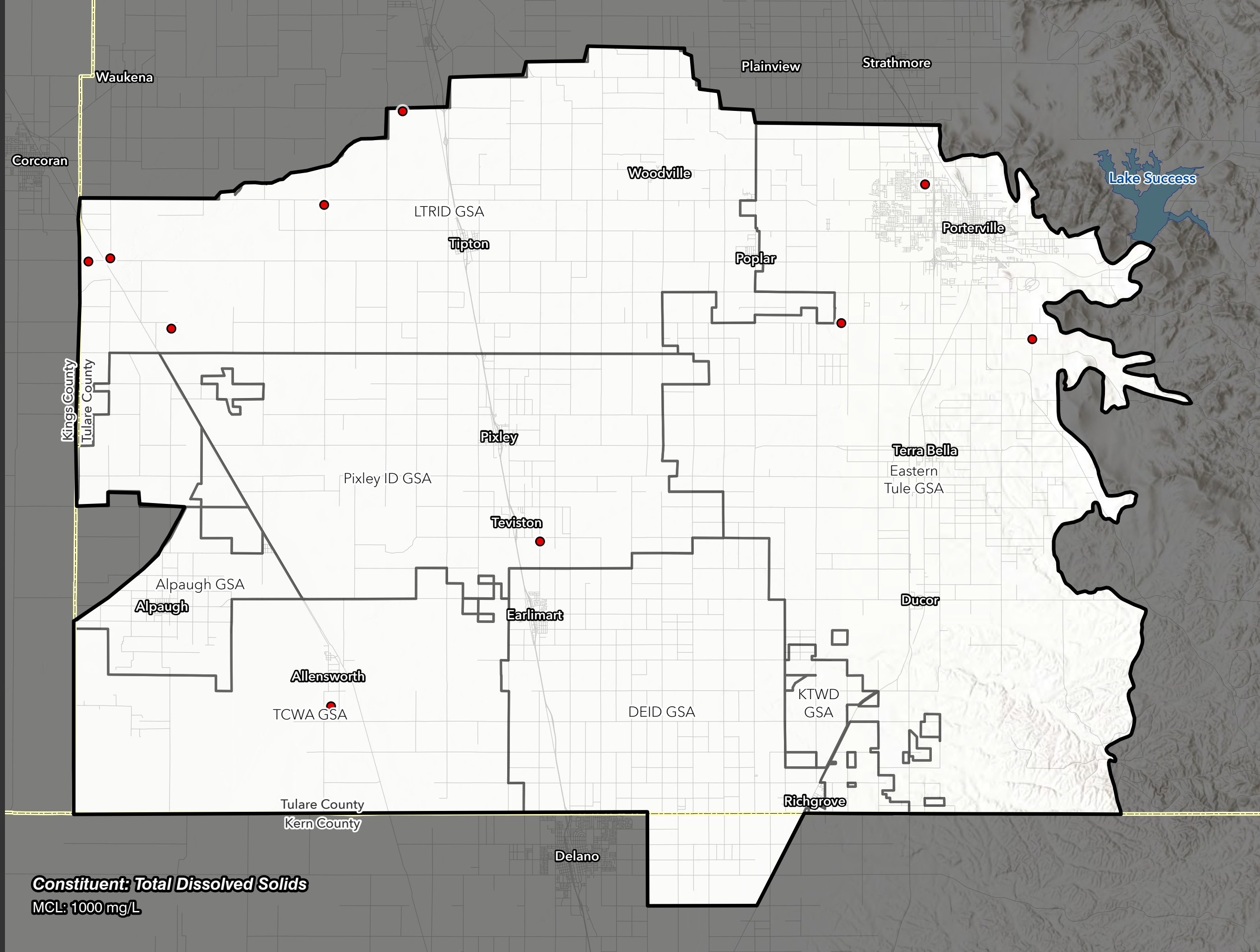


Constituent: Hexavalent Chromium
MCL: 10 μ G/L

Figure 2d
Total Dissolved Solids
MCL Exceedances
2005-2023

Legend

-  MCL Exceedance Locations
-  County Boundary
-  Tule Subbasin Boundary
-  GSA Boundary
-  Lake Success
-  Friant-Kern Canal
-  Waterways
-  Major Roads
-  Roads



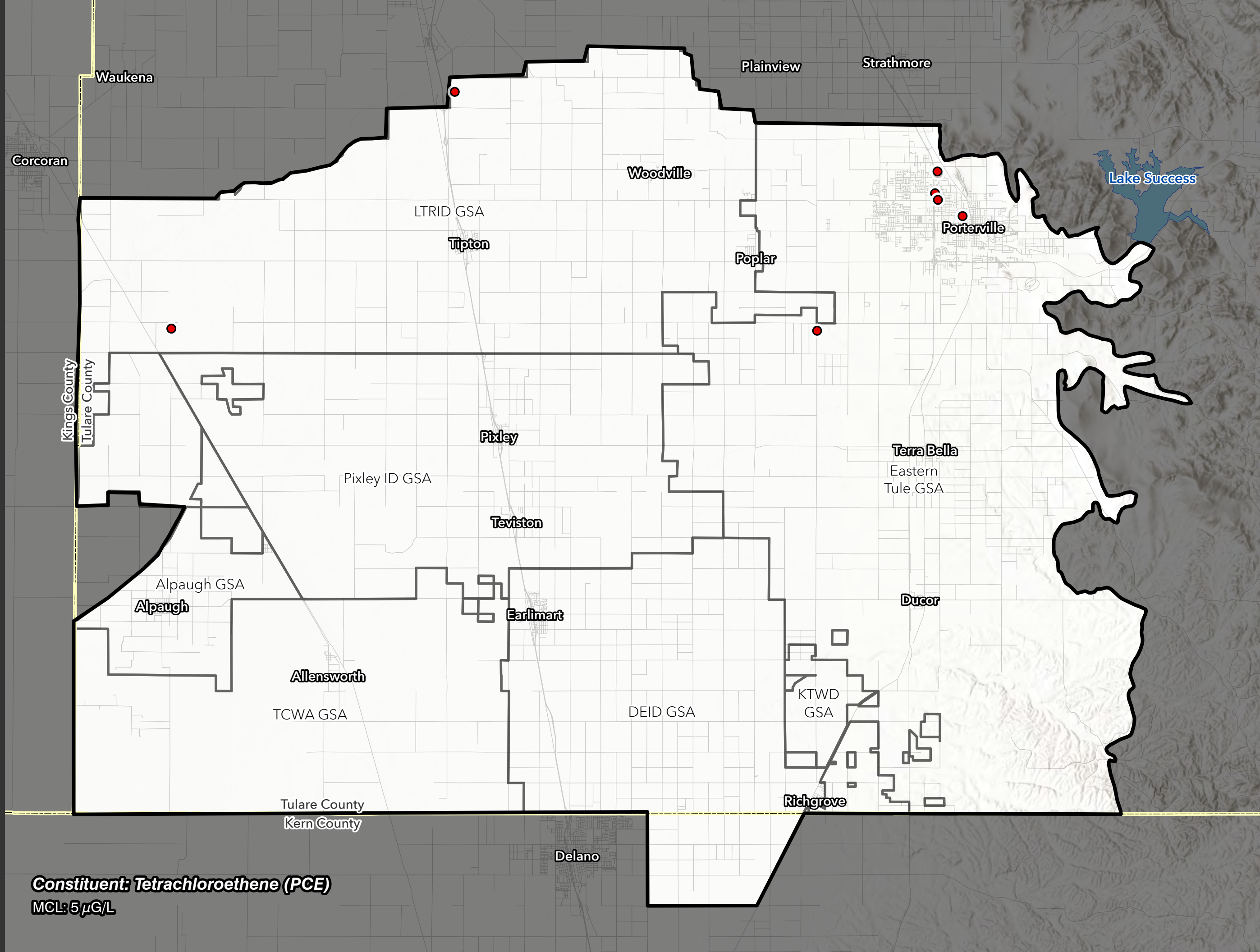
0 1.75 3.5
Miles

Constituent: Total Dissolved Solids
MCL: 1000 mg/L

Figure 2e
Tetrachloroethene (PCE)
MCL Exceedances
2005-2023

Legend

-  MCL Exceedance Locations
-  County Boundary
-  Tule Subbasin Boundary
-  GSA Boundary
-  Lake Success
-  Friant-Kern Canal
-  Waterways
-  Major Roads
-  Roads

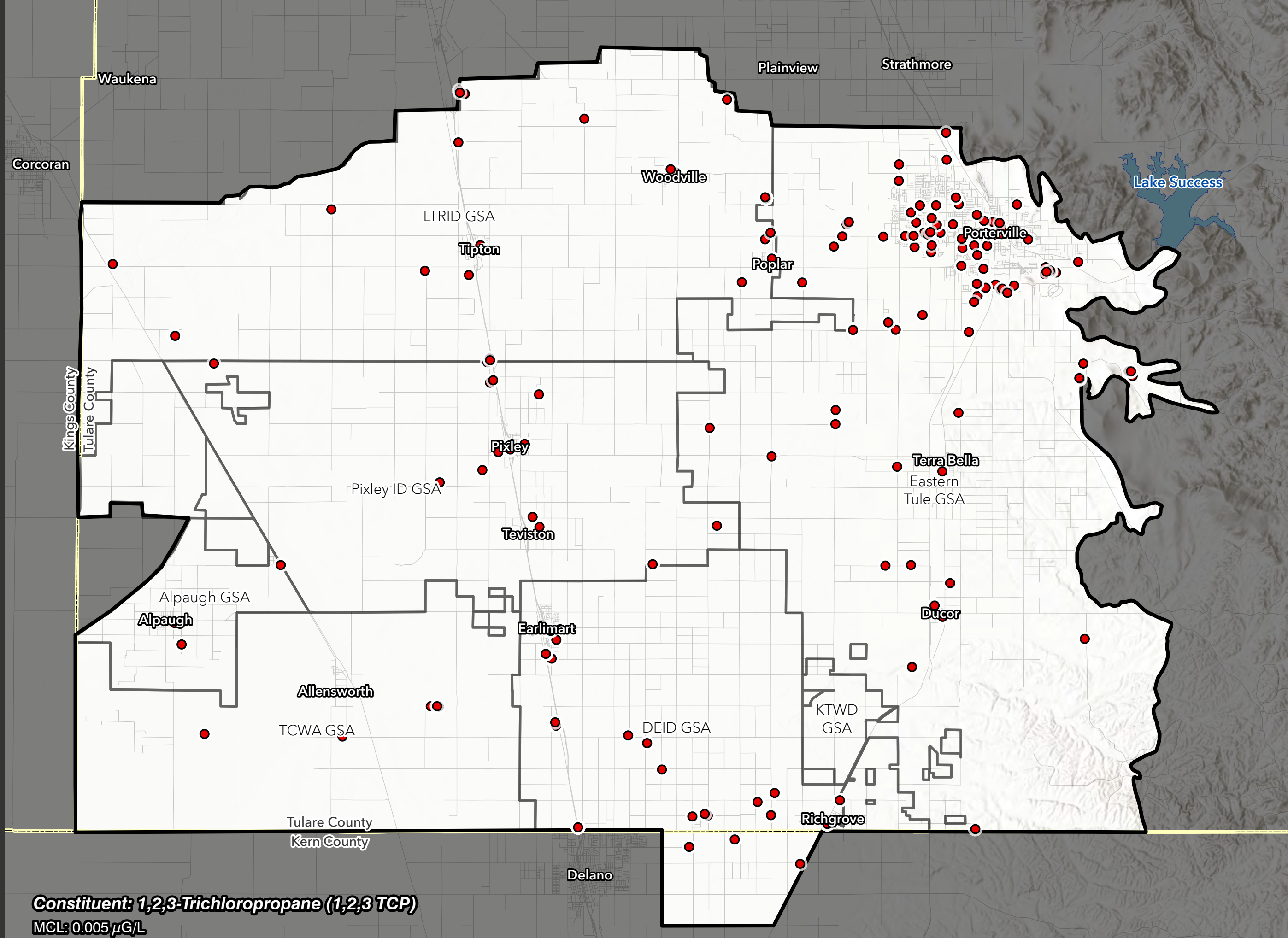


Constituent: Tetrachloroethene (PCE)
MCL: 5 μ G/L

Figure 2f
1,2,3-Trichloropropane
(1,2,3 TCP) MCL
Exceedances
2005-2023

Legend

-  MCL Exceedance Locations
-  County Boundary
-  Tule Subbasin Boundary
-  GSA Boundary
-  Lake Success
-  Friant-Kern Canal
-  Waterways
-  Major Roads
-  Roads

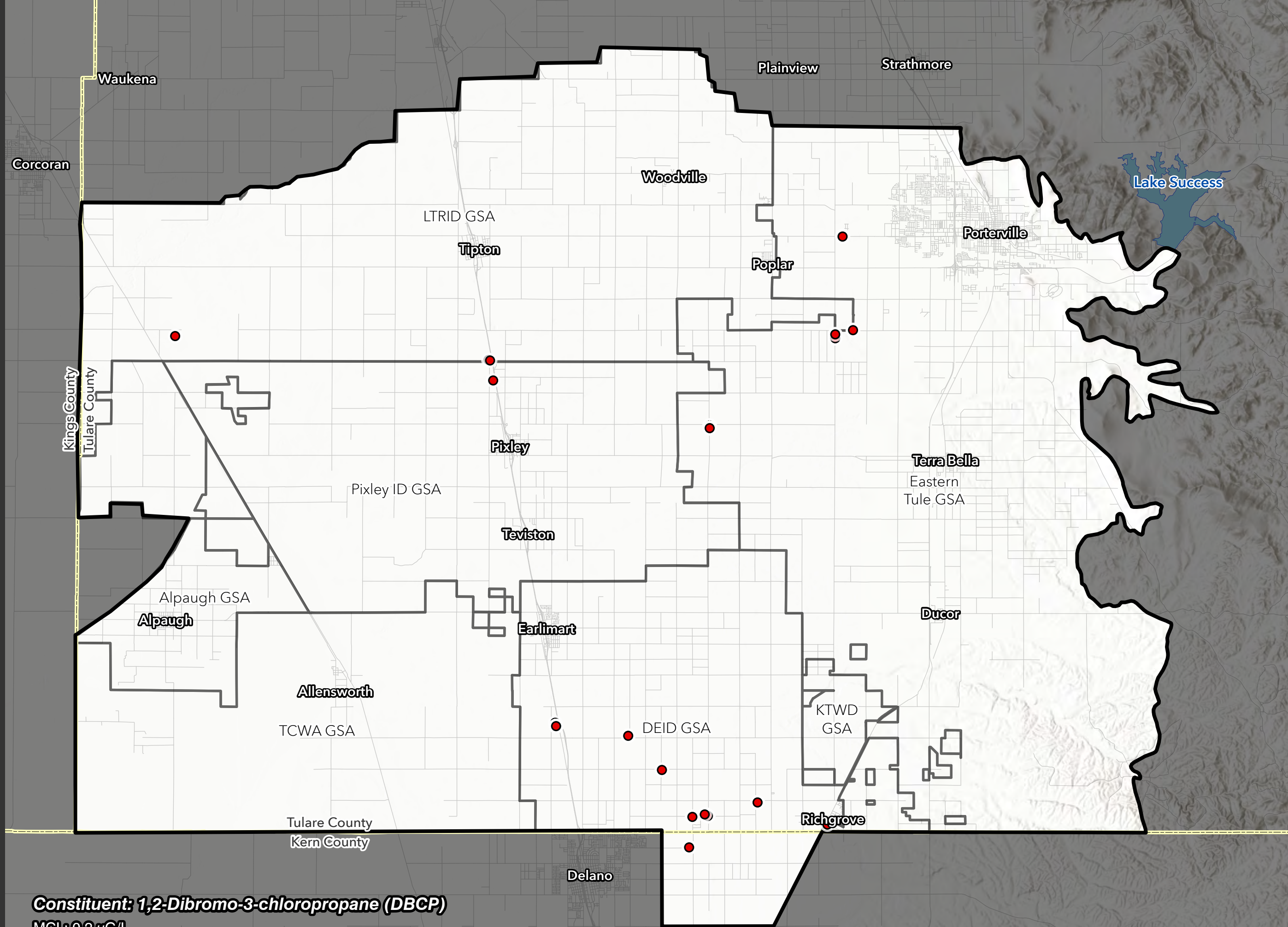


Constituent: 1,2,3-Trichloropropane (1,2,3 TCP)
MCL: 0.005 μ G/L

Figure 2g
1,2-Dibromo-3-
chloropropane (DBCP)
MCL Exceedances
2005-2023

Legend

-  MCL Exceedance Locations
-  County Boundary
-  Tule Subbasin Boundary
-  GSA Boundary
-  Lake Success
-  Friant-Kern Canal
-  Waterways
-  Major Roads
-  Roads

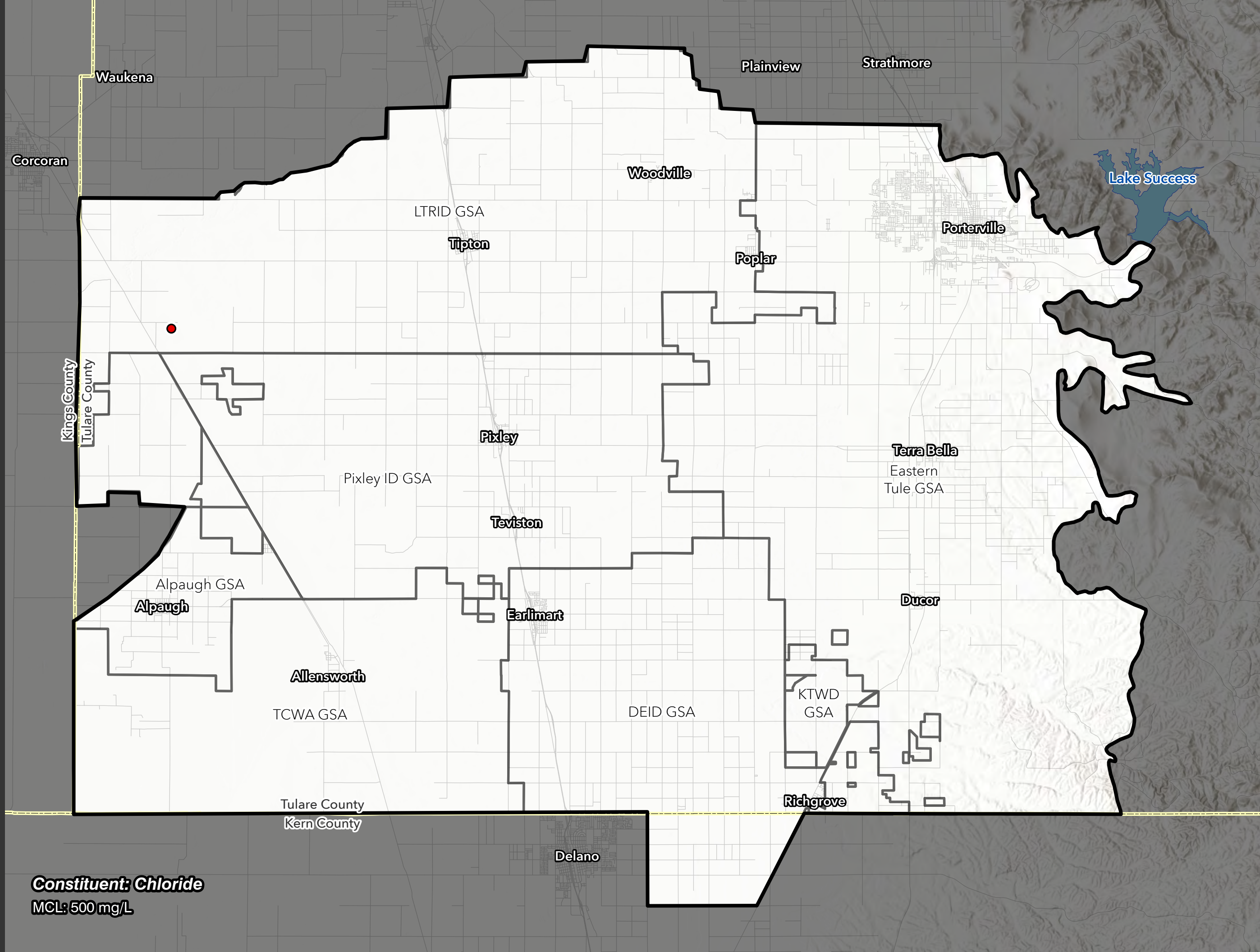


Constituent: 1,2-Dibromo-3-chloropropane (DBCP)
MCL: 0.2 μ G/L

Figure 2h
Chloride MCL
Exceedances
2005-2023

Legend

-  MCL Exceedance Locations
-  County Boundary
-  Tule Subbasin Boundary
-  GSA Boundary
-  Lake Success
-  Friant-Kern Canal
-  Waterways
-  Major Roads
-  Roads

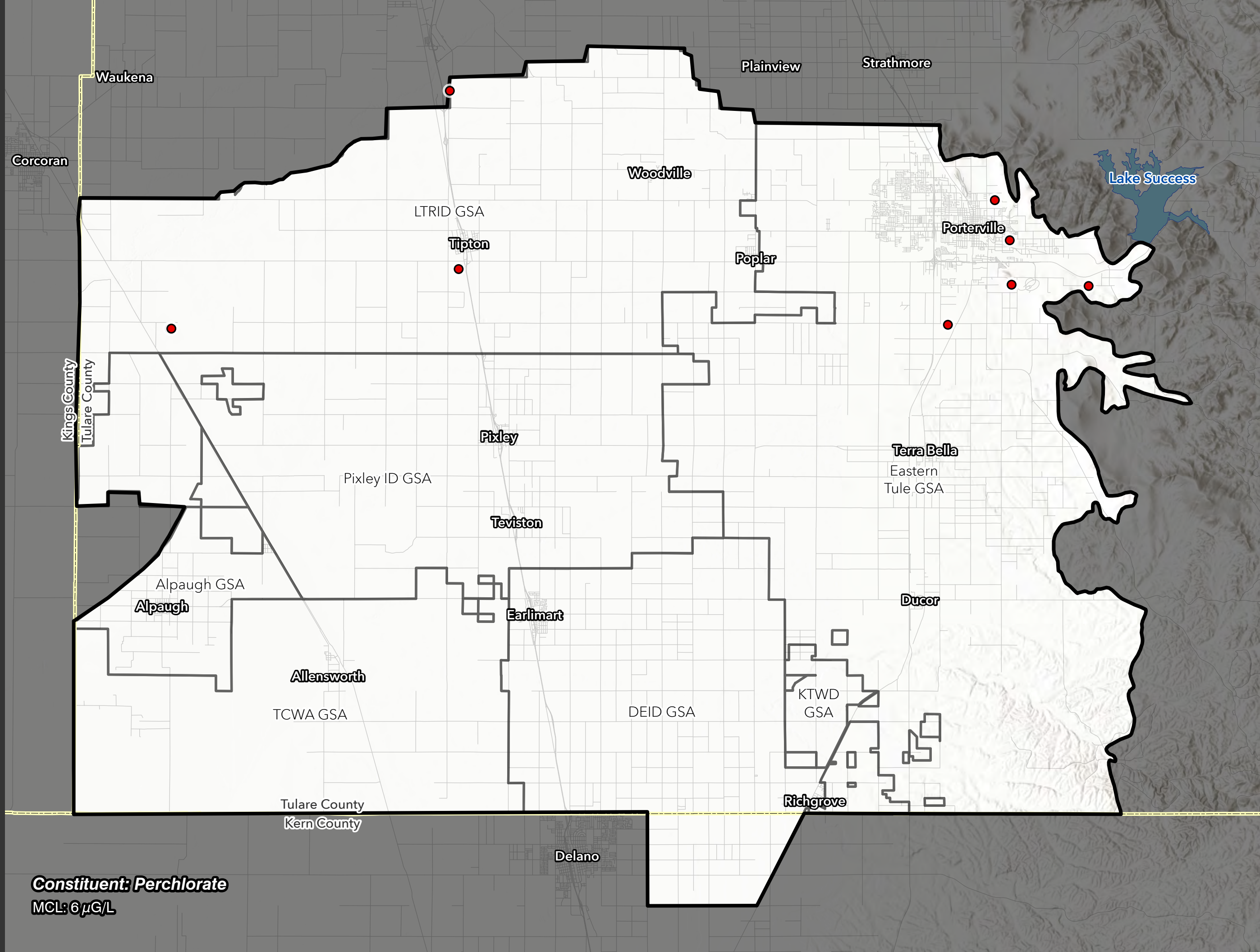


0 1.75 3.5
Miles

Figure 2i
Perchlorate MCL
Exceedances
2005-2023

Legend

-  MCL Exceedance Locations
-  County Boundary
-  Tule Subbasin Boundary
-  GSA Boundary
-  Lake Success
-  Friant-Kern Canal
-  Waterways
-  Major Roads
-  Roads



Constituent: Perchlorate
MCL: 6 μ G/L

Figure 2j
Nitrate as N MCL
Exceedances
2005-2023

Legend

-  MCL Exceedance Locations
-  County Boundary
-  Tule Subbasin Boundary
-  GSA Boundary
-  Lake Success
-  Friant-Kern Canal
-  Waterways
-  Major Roads
-  Roads

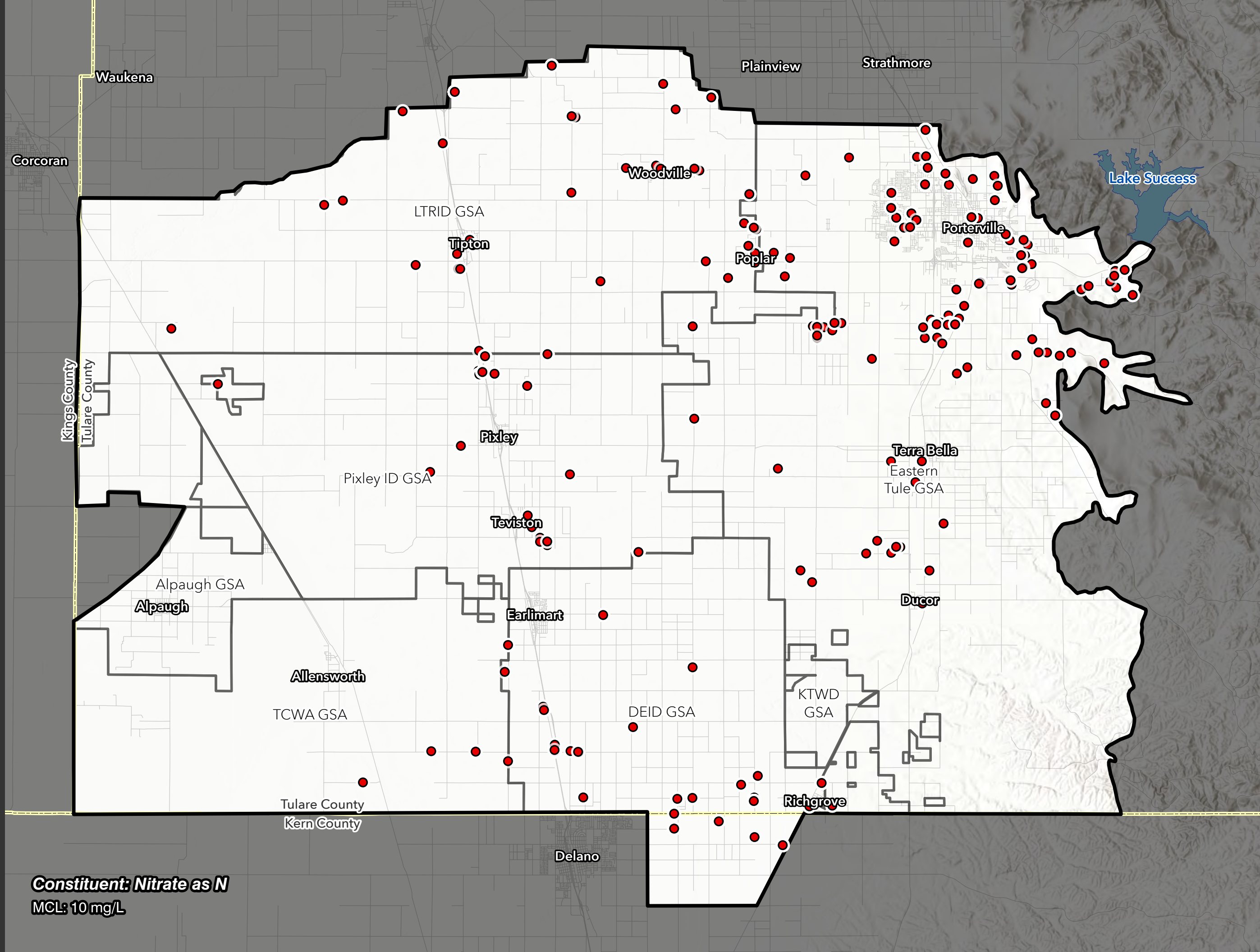
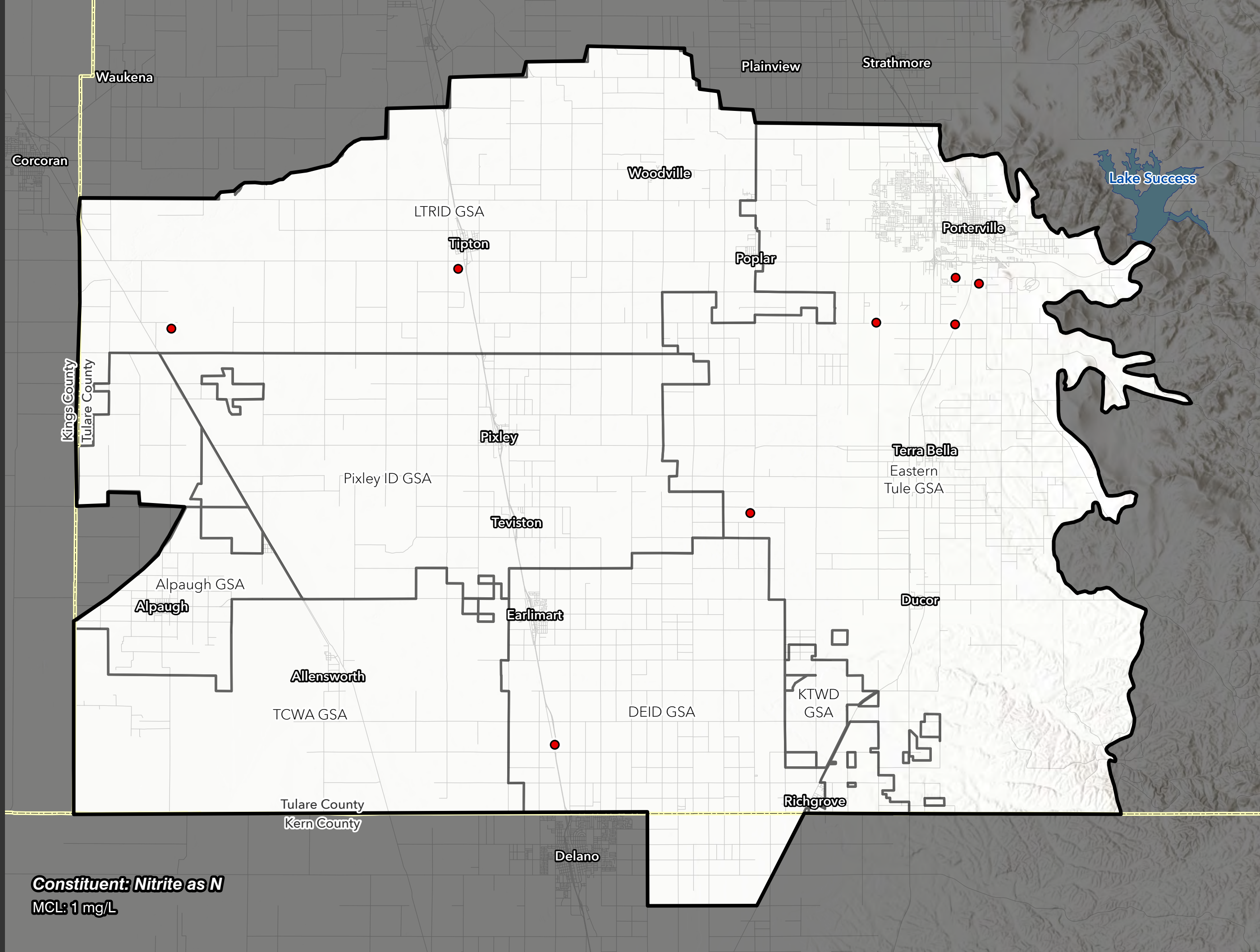


Figure 2k
Nitrite as N MCL
Exceedances
2005-2023

Legend

-  MCL Exceedance Locations
-  County Boundary
-  Tule Subbasin Boundary
-  GSA Boundary
-  Lake Success
-  Friant-Kern Canal
-  Waterways
-  Major Roads
-  Roads



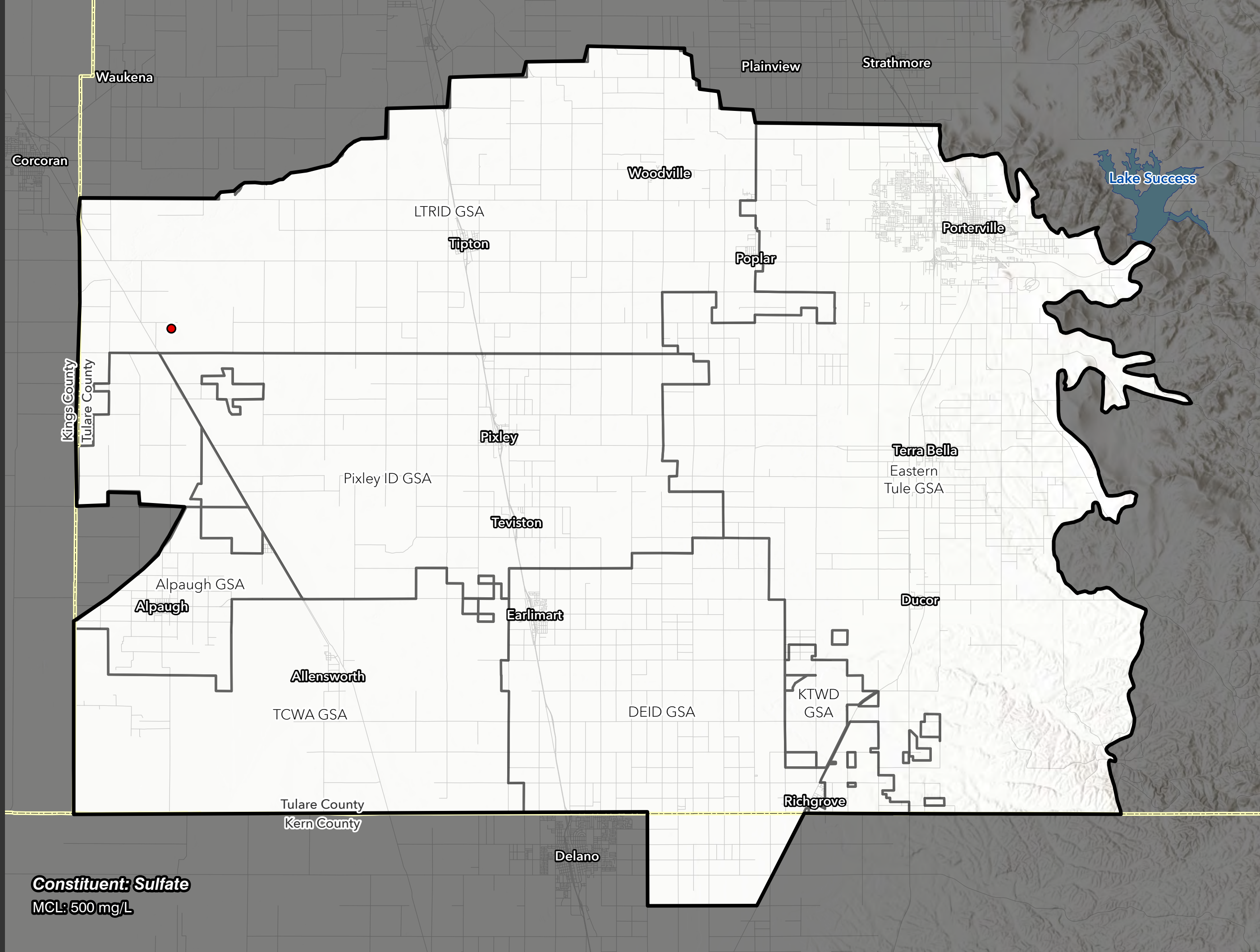
0 1.75 3.5
Miles

Constituent: Nitrite as N
MCL: 1 mg/L

Figure 21
Sulfate MCL
Exceedances
2005-2023

Legend

-  MCL Exceedance Locations
-  County Boundary
-  Tule Subbasin Boundary
-  GSA Boundary
-  Lake Success
-  Friant-Kern Canal
-  Waterways
-  Major Roads
-  Roads



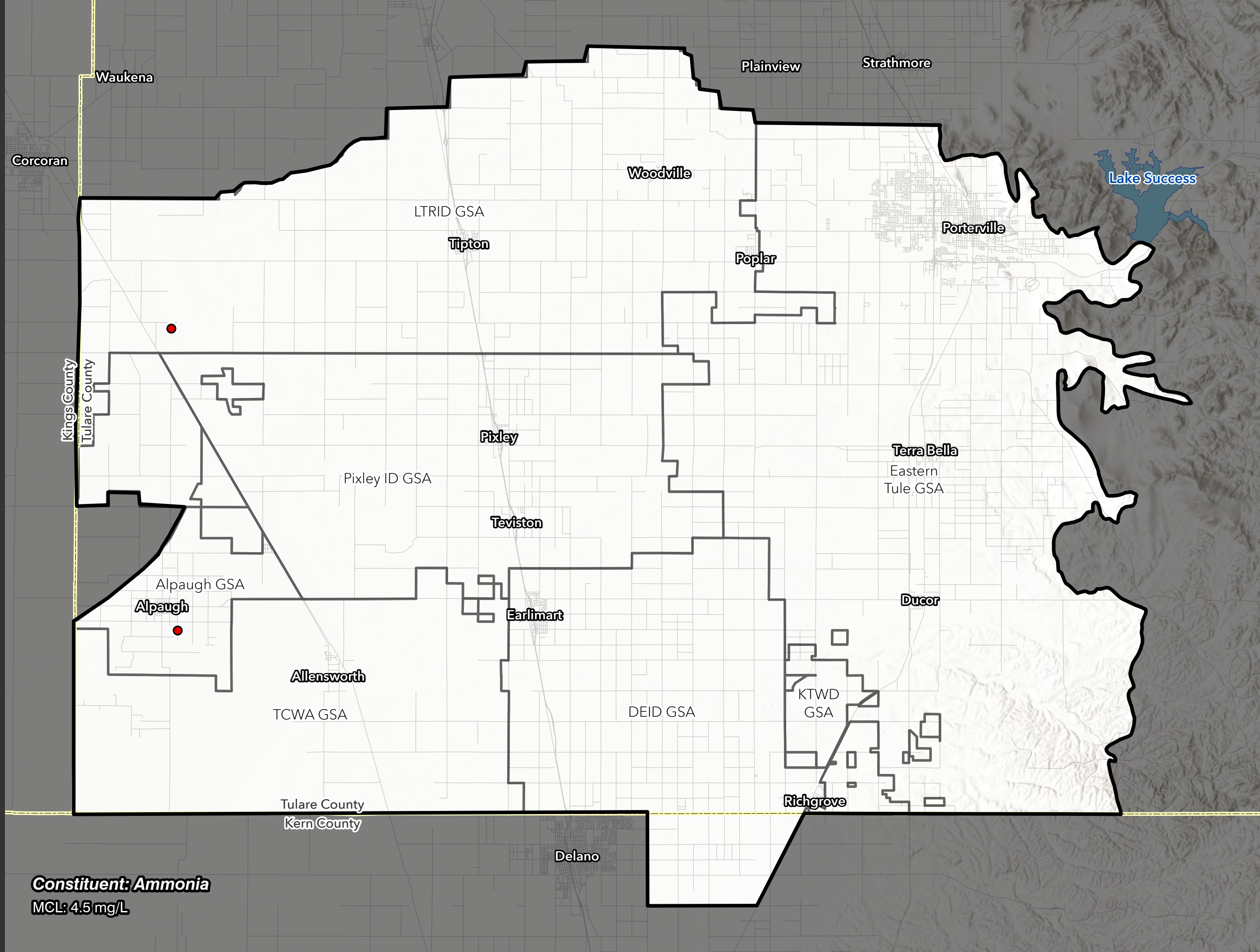
0 1.75 3.5
Miles

Constituent: Sulfate
MCL: 500 mg/L

**Figure 2m
Ammonia MCL
Exceedances
2005-2023**

Legend

-  MCL Exceedance Locations
-  County Boundary
-  Tule Subbasin Boundary
-  GSA Boundary
-  Lake Success
-  Friant-Kern Canal
-  Waterways
-  Major Roads
-  Roads



Constituent: Ammonia
MCL: 4.5 mg/L

Figure 3a
Upper Aquifer Ambient
Arsenic
2018 - 2023

Legend

Ambient Arsenic ($\mu\text{G/L}$)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0
- 10.0+

Tule Subbasin Boundary

GSA Boundary

County Boundary

Lake Success

Friant-Kern Canal

Waterways

Major Roads

Roads

Ambient Upper Aquifer
Arsenic ($\mu\text{G/L}$)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0
- 10.0+

Data based on GAMA Groundwater
Information System ([https://
gamagroundwater.waterboards.ca.gov/
gama/gamamap/public/](https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/)), June 11, 2024.



0 1.75 3.5
Miles

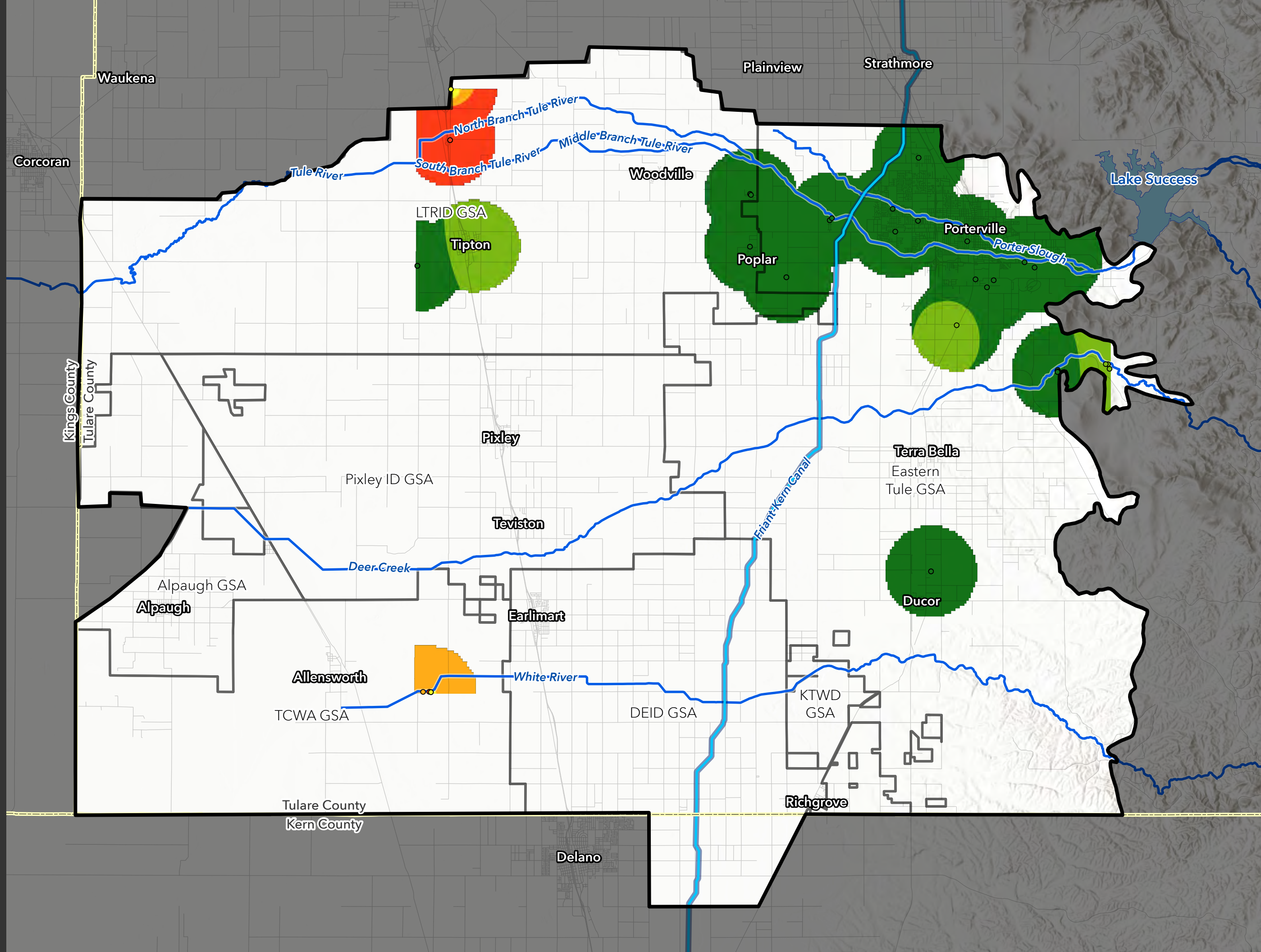


Figure 3b
Upper Aquifer Ambient
Uranium
2018 - 2023

Legend

Ambient Uranium (pCi/L)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 10.0
- 10.0 - 15.0

Tule Subbasin Boundary

GSA Boundary

County Boundary

Lake Success

Friant-Kern Canal

Waterways

Major Roads

Roads

Ambient Upper Aquifer
Uranium (pCi/L)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 10.0
- 10.0 - 15.0
- 15.0+

Data based on GAMA Groundwater
Information System (<https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/>), June 11, 2024.



0 1.75 3.5
Miles

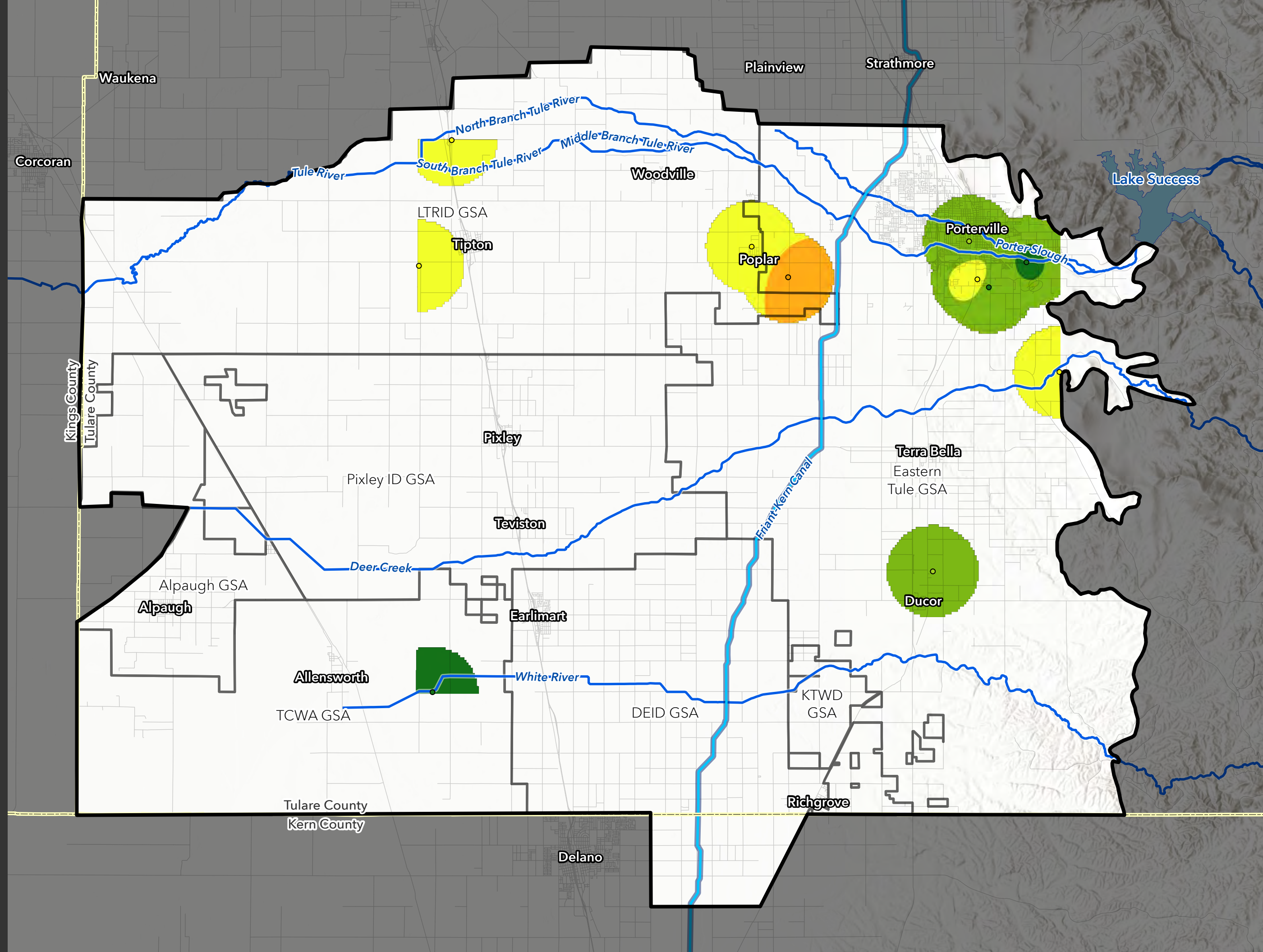


Figure 3c
Upper Aquifer Ambient
Hexavalent Chromium
2018 - 2023

Legend

Ambient Hexavalent
Chromium ($\mu\text{G/L}$)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0
- 10.0+

Tule Subbasin Boundary

GSA Boundary

County Boundary

Lake Success

Friant-Kern Canal

Waterways

Major Roads

Roads

Ambient Upper Aquifer
Hexavalent Chromium ($\mu\text{G/L}$)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0
- 10.0+

Data based on GAMA Groundwater
Information System ([https://
gamagroundwater.waterboards.ca.gov/
gama/gamamap/public/](https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/)), June 11, 2024.



0 1.75 3.5
Miles

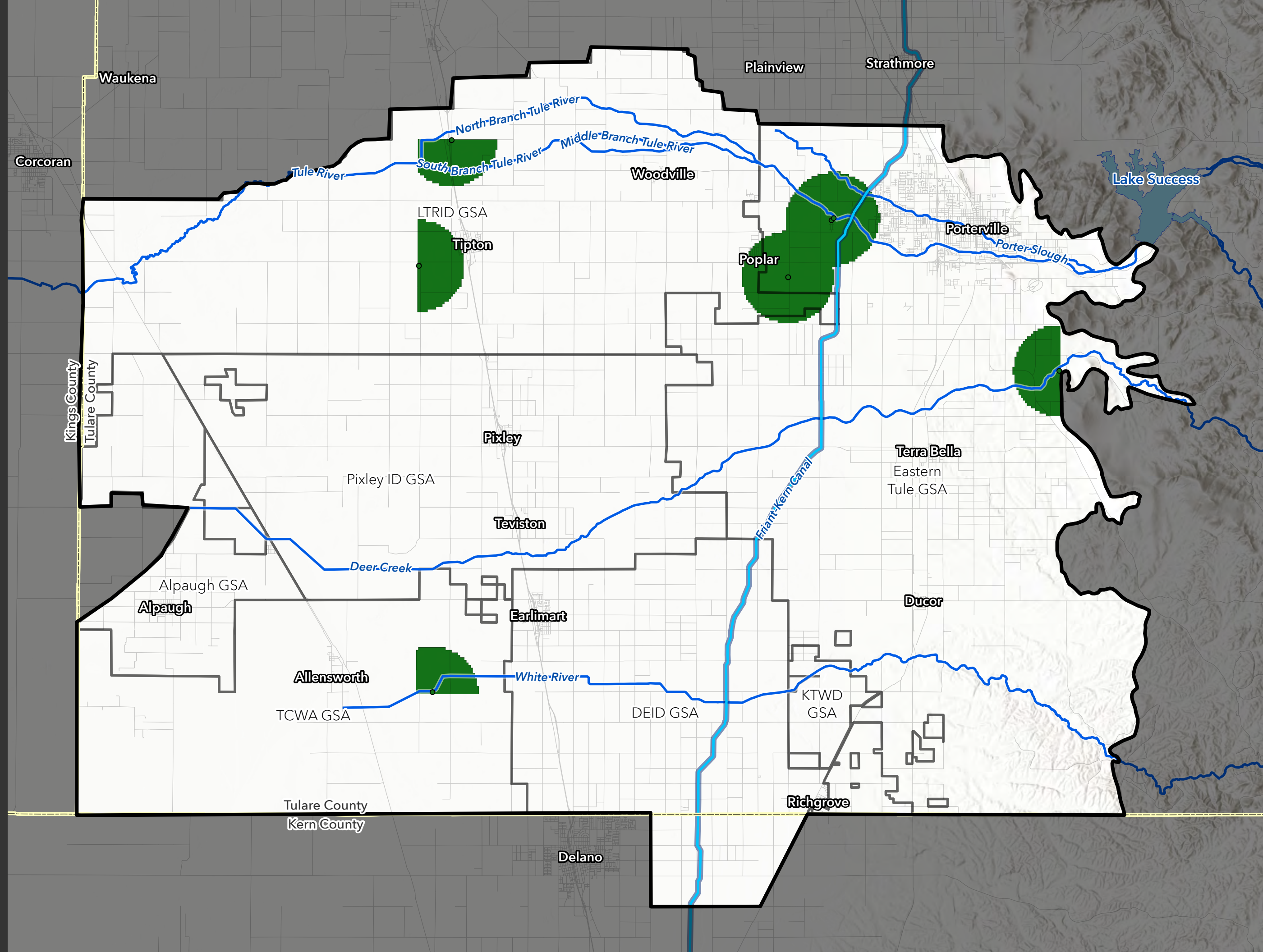


Figure 3d
Upper Aquifer Ambient
1,2,3-TCP
2018 - 2023

Legend

Ambient 1,2,3-TCP (µG/L)

- 0.0 - 0.00125
- 0.00125 - 0.0025
- 0.0025 - 0.00375
- 0.00375 - 0.005
- 0.005+

Tule Subbasin Boundary

GSA Boundary

County Boundary

Lake Success

Friant-Kern Canal

Waterways

Major Roads

Roads

Ambient Upper Aquifer 1,2,3-TCP (µG/L)

- 0.0 - 0.00125
- 0.00125 - 0.0025
- 0.0025 - 0.00375
- 0.00375 - 0.005
- 0.005+

Data based on GAMA Groundwater
Information System (<https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/>), June 11, 2024.



0 1.75 3.5
Miles

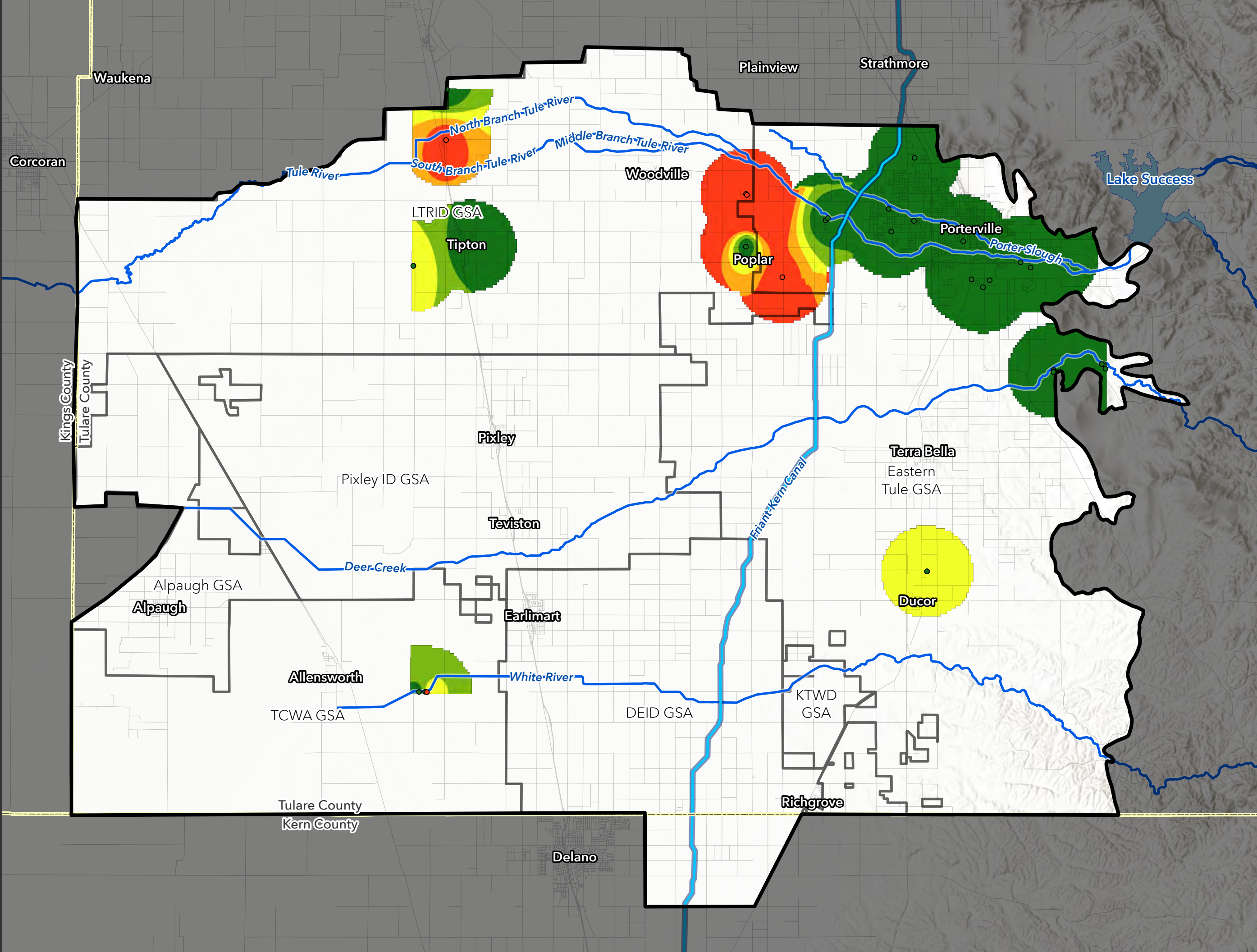


Figure 3e
Upper Aquifer Ambient
Total Dissolved Solids
2018 - 2023

Legend

Total Dissolved Solids (mg/L)

- 100.0 - 250.0
- 250.0 - 500.0
- 500.0 - 750.0

▬ Tule Subbasin Boundary

▬ GSA Boundary

▬ County Boundary

▬ Lake Success

▬ Friant-Kern Canal

▬ Waterways

▬ Major Roads

▬ Roads

Ambient Upper Aquifer Total
Dissolved Solids (mg/L)

- 100.0 - 250.0
- 250.0 - 500.0
- 500.0 - 750.0

Data based on GAMA Groundwater
Information System (<https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/>), June 11, 2024.



0 1.75 3.5
 Miles

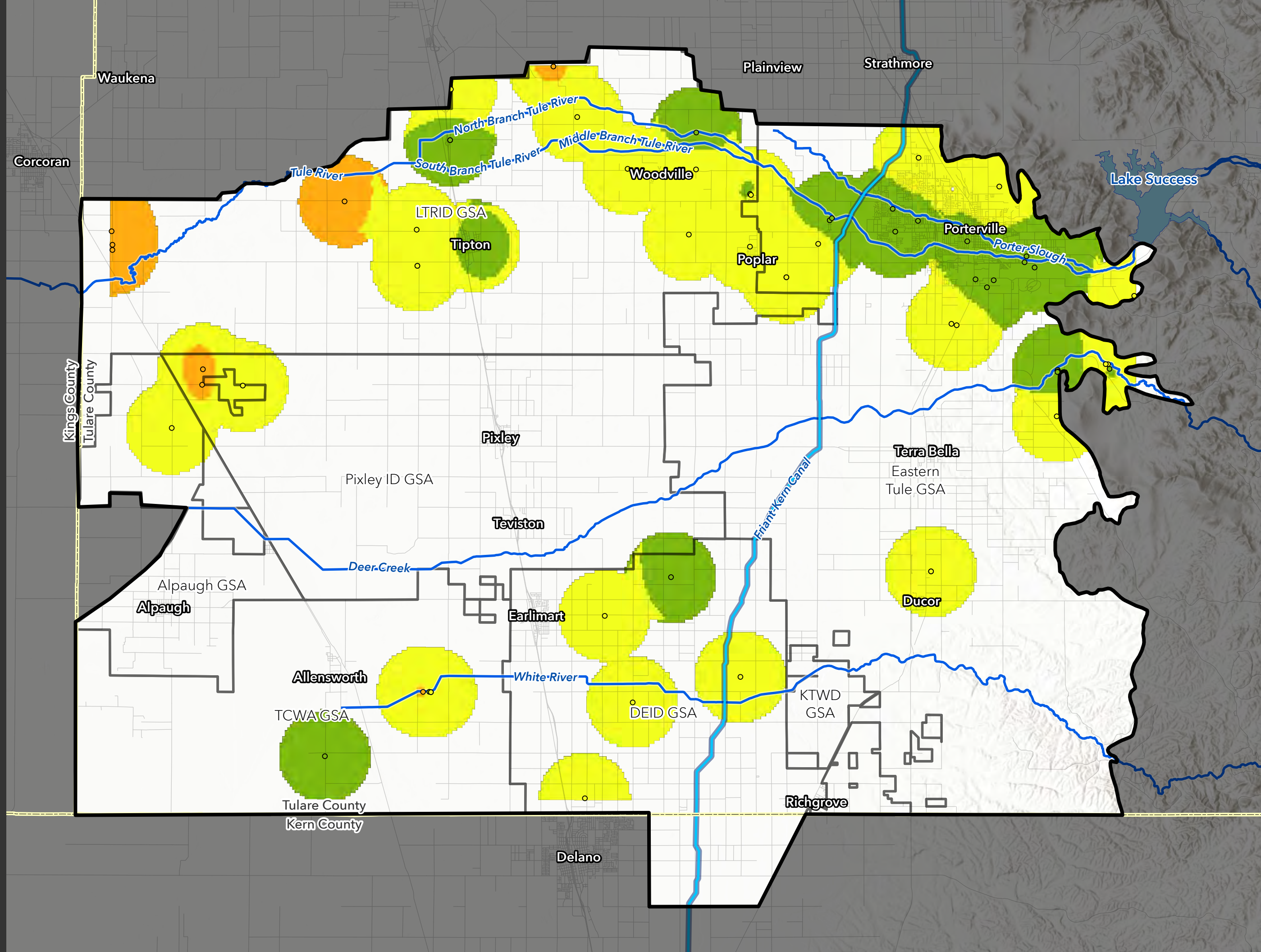


Figure 3f
Upper Aquifer Ambient
DBCP
2018 - 2023

Legend

Ambient DBCP (µG/L)

- 0.0 - 0.05
- 0.05 - 0.1
- 0.1 - 0.15
- 0.15 - 0.2
- 0.2+

■ Tule Subbasin Boundary

■ GSA Boundary

■ County Boundary

■ Lake Success

■ Friant-Kern Canal

■ Waterways

■ Major Roads

■ Roads

Ambient Upper Aquifer DBCP
(µG/L)

- 0.0 - 0.05
- 0.05 - 0.1
- 0.1 - 0.15
- 0.15 - 0.2
- 0.2+

Data based on GAMA Groundwater
Information System (<https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/>), June 11, 2024.



0 1.75 3.5
Miles

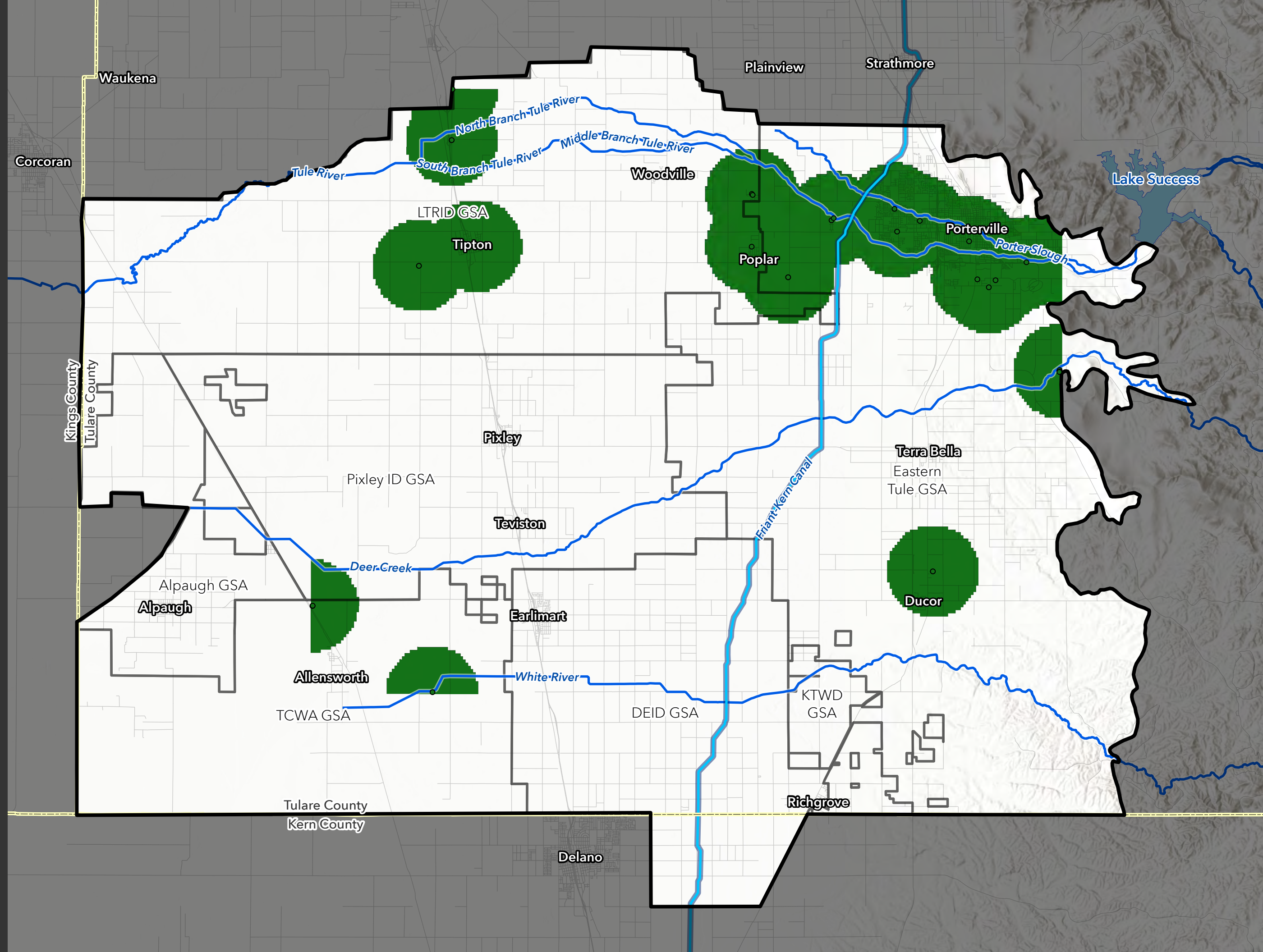


Figure 3g
Upper Aquifer Ambient
Nitrate as N
2018 - 2023

Legend

Ambient Nitrate as N (mg/L)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0
- 10.0+

Tule Subbasin Boundary

GSA Boundary

County Boundary

Lake Success

Friant-Kern Canal

Waterways

Major Roads

Roads

Ambient Upper Aquifer Nitrate
 as N (mg/L)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0
- 10.0+

Data based on GAMA Groundwater
 Information System (<https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/>), June 11, 2024.



0 1.75 3.5
 Miles

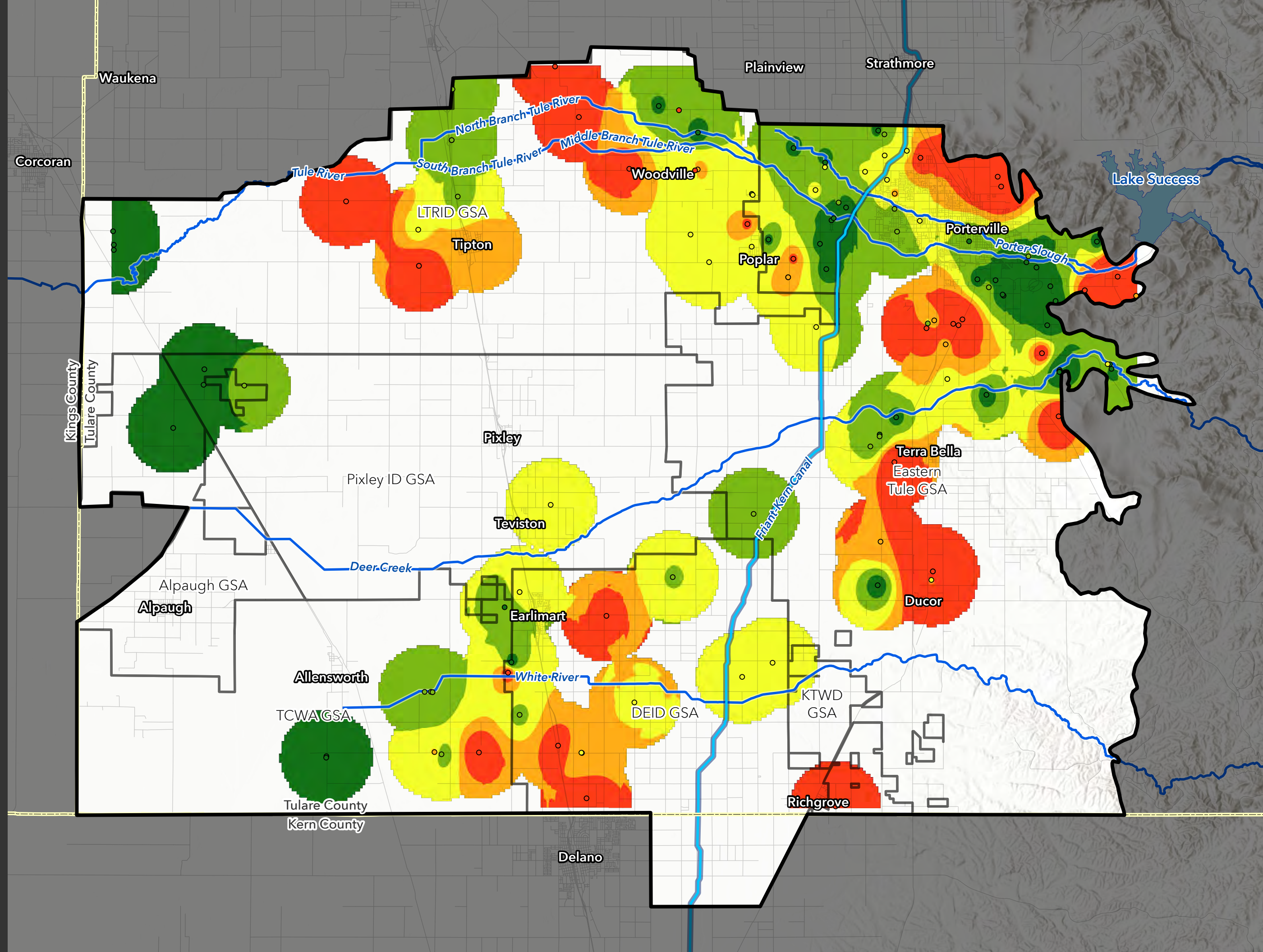


Figure 4a
Ambient Lower Aquifer
Arsenic
2018 - 2023

Legend

Ambient Arsenic (µG/L)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0
- 10.0+

▬ Tule Subbasin Boundary

▬ GSA Boundaries

▬ County Boundary

▬ Lake Success

▬ Friant-Kern Canal

▬ Waterways

▬ Major Roads

▬ Roads

Ambient Arsenic (µG/L)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0
- 10.0+

Data based on GAMA Groundwater
 Information System (<https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/>), June 11, 2024.



0 1.75 3.5
 Miles

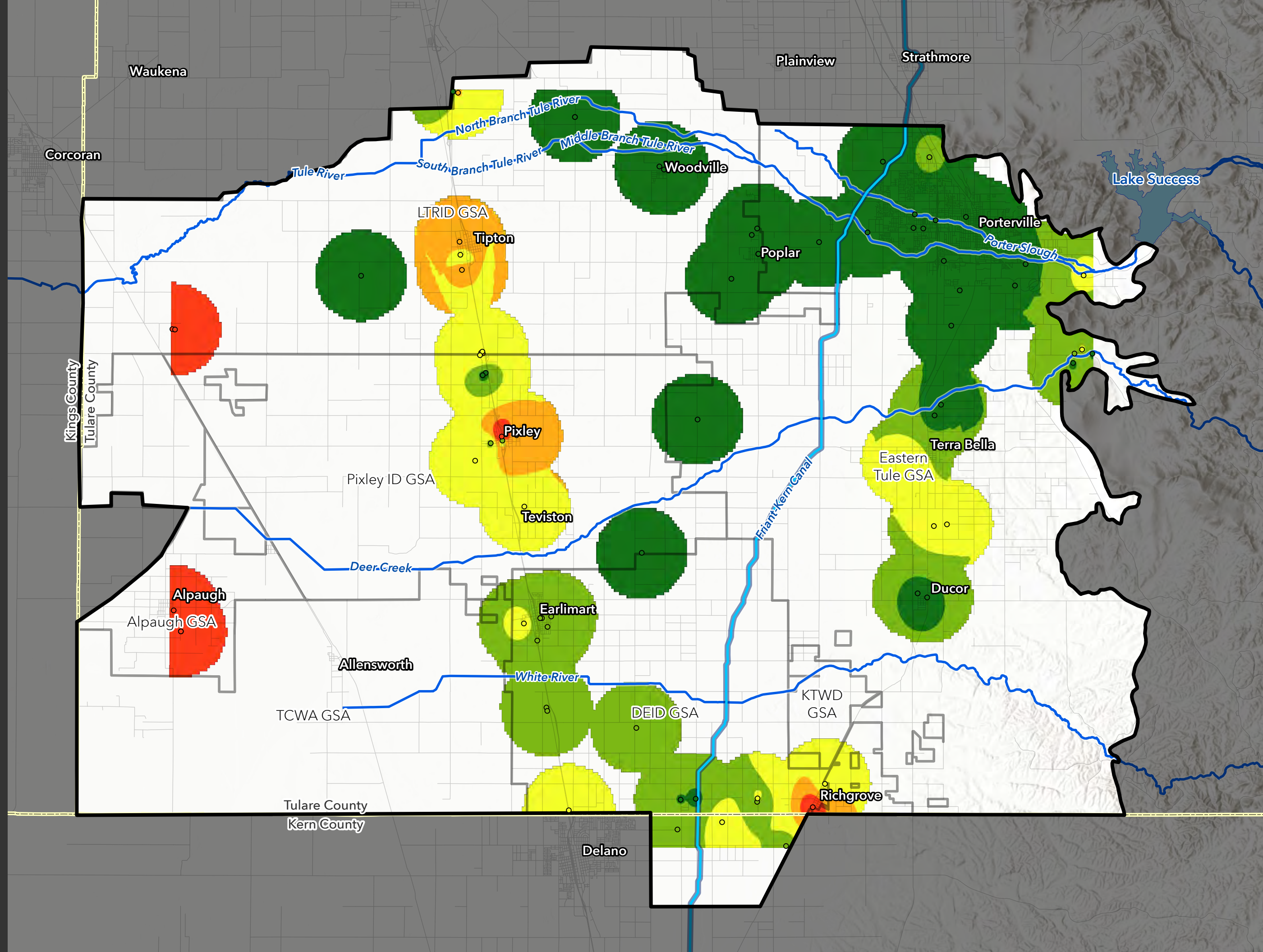


Figure 4b
Ambient Lower Aquifer
Uranium
2018 - 2023

Legend

Ambient Uranium (pCi/L)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 10.0
- 10.0 - 15.0

■ Tule Subbasin Boundary

■ GSA Boundaries

■ County Boundary

■ Lake Success

■ Friant-Kern Canal

■ Waterways

■ Major Roads

■ Roads

Ambient Uranium (pCi/L)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 10.0
- 10.0 - 15.0
- 15.0+

Data based on GAMA Groundwater
Information System (<https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/>), June 11, 2024.



0 1.75 3.5
Miles

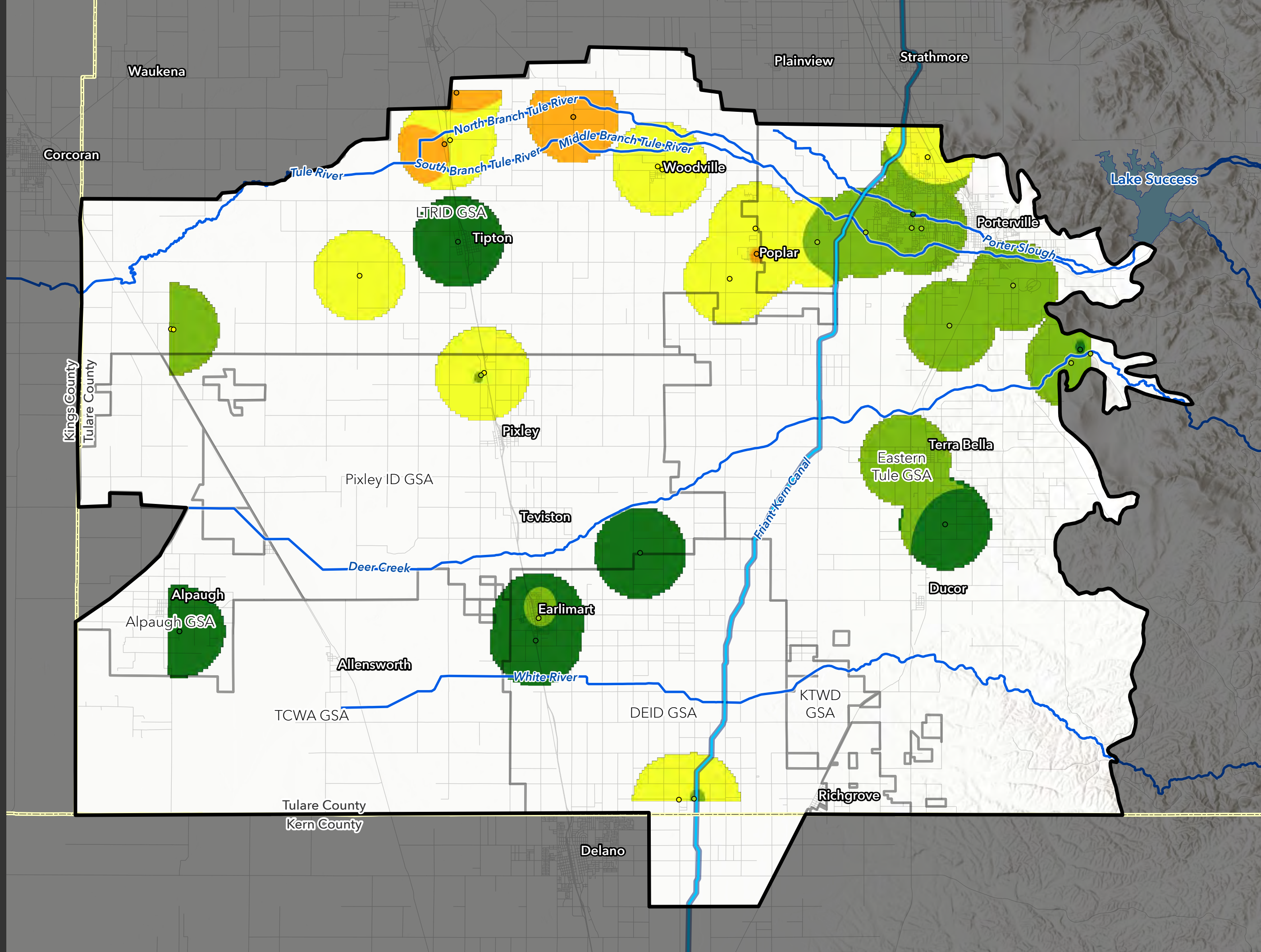


Figure 4c
Ambient Lower Aquifer
Hexavalent Chromium
2018 - 2023

Legend

Ambient Hexavalent Chromium (µG/L)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0
- 10.0+

- Tule Subbasin Boundary
- GSA Boundaries
- County Boundary
- Lake Success
- Friant-Kern Canal
- Waterways
- Major Roads
- Roads

Ambient Hexavalent Chromium (µG/L)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0
- 10.0+

Data based on GAMA Groundwater Information System (<https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/>), June 11, 2024.



0 1.75 3.5
Miles

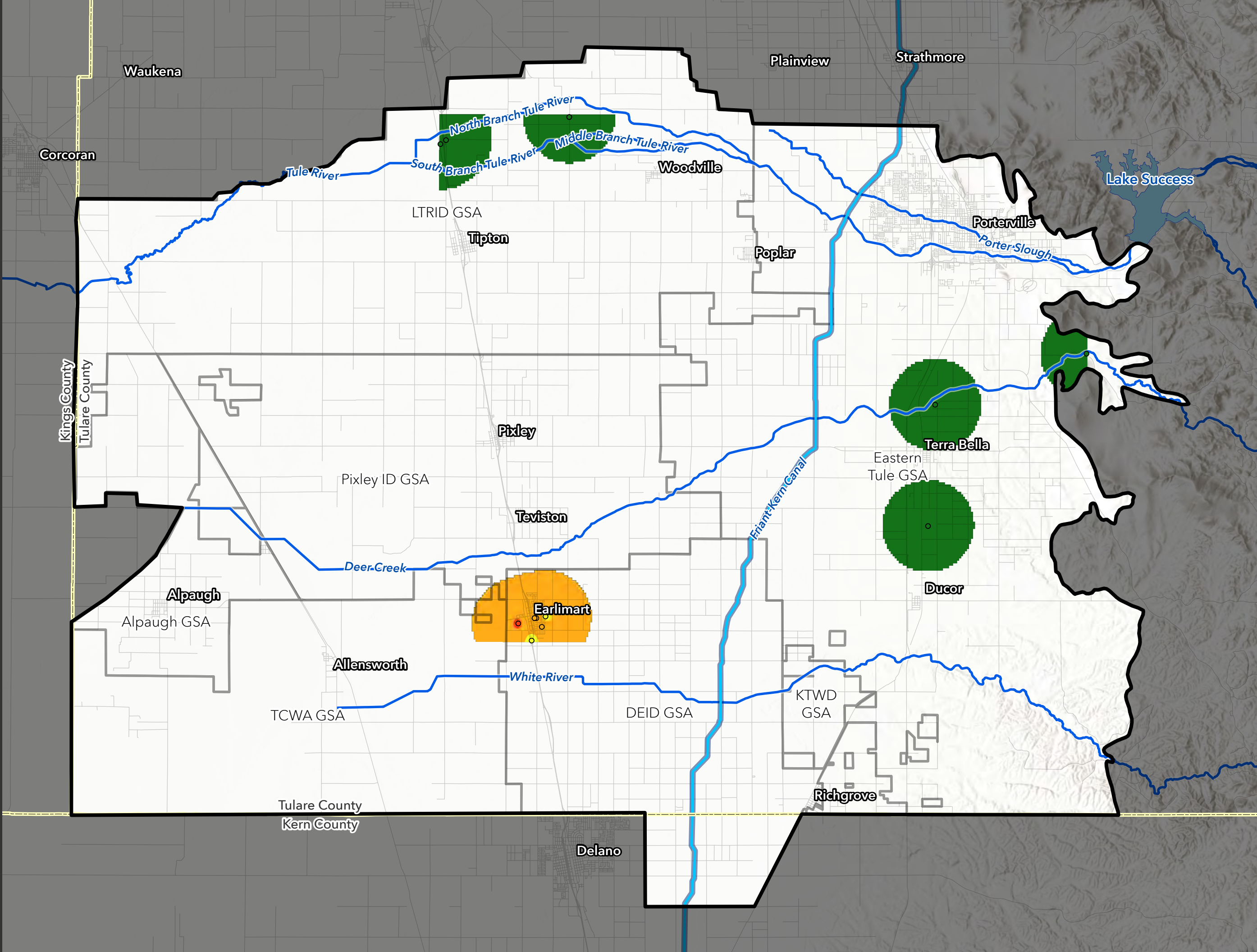


Figure 4d
Ambient Lower Aquifer
1,2,3-TCP
2018 - 2023

Legend

Ambient 1,2,3-TCP (µG/L)

- 0.0 - 0.00125
- 0.00125 - 0.0025
- 0.0025 - 0.00375
- 0.00375 - 0.005
- 0.005+

▬ Tule Subbasin Boundary

▬ GSA Boundaries

▬ County Boundary

▬ Lake Success

▬ Friant-Kern Canal

▬ Waterways

▬ Major Roads

▬ Roads

Ambient 1,2,3-TCP (µG/L)

- 0.0 - 0.00125
- 0.00125 - 0.0025
- 0.0025 - 0.00375
- 0.00375 - 0.005
- 0.005+

Data based on GAMA Groundwater
Information System (<https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/>), June 11, 2024.



0 1.75 3.5
Miles

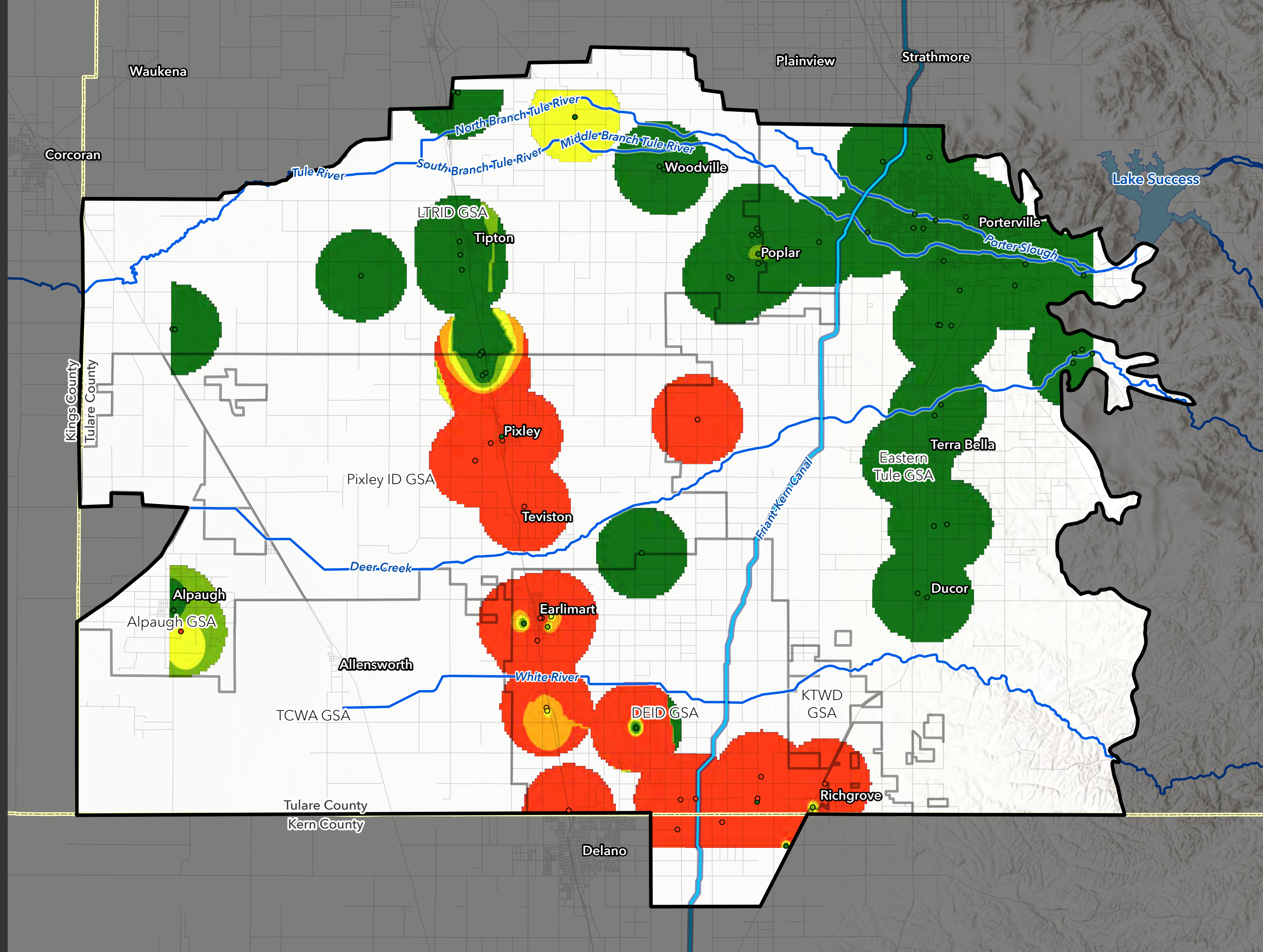


Figure 4e
Ambient Lower Aquifer
Total Dissolved Solids
2018 - 2023

Legend

Total Dissolved Solids (mg/L)

- 0.0 - 150.0
- 150.0 - 250.0
- 250.0 - 500.0
- 500.0 - 750.0
- 750.0+

■ Tule Subbasin Boundary

■ GSA Boundaries

■ County Boundary

■ Lake Success

■ Friant-Kern Canal

■ Waterways

■ Major Roads

■ Roads

Ambient Lower Aquifer Total
Dissolved Solids (mg/L)

- 0.0 - 100.0
- 100.0 - 250.0
- 250.0 - 500.0
- 500.0 - 750.0
- 750.0+

Data based on GAMA Groundwater
Information System ([https://
gamagroundwater.waterboards.ca.gov/
gama/gamamap/public/](https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/)), June 11, 2024.



0 1.75 3.5
Miles

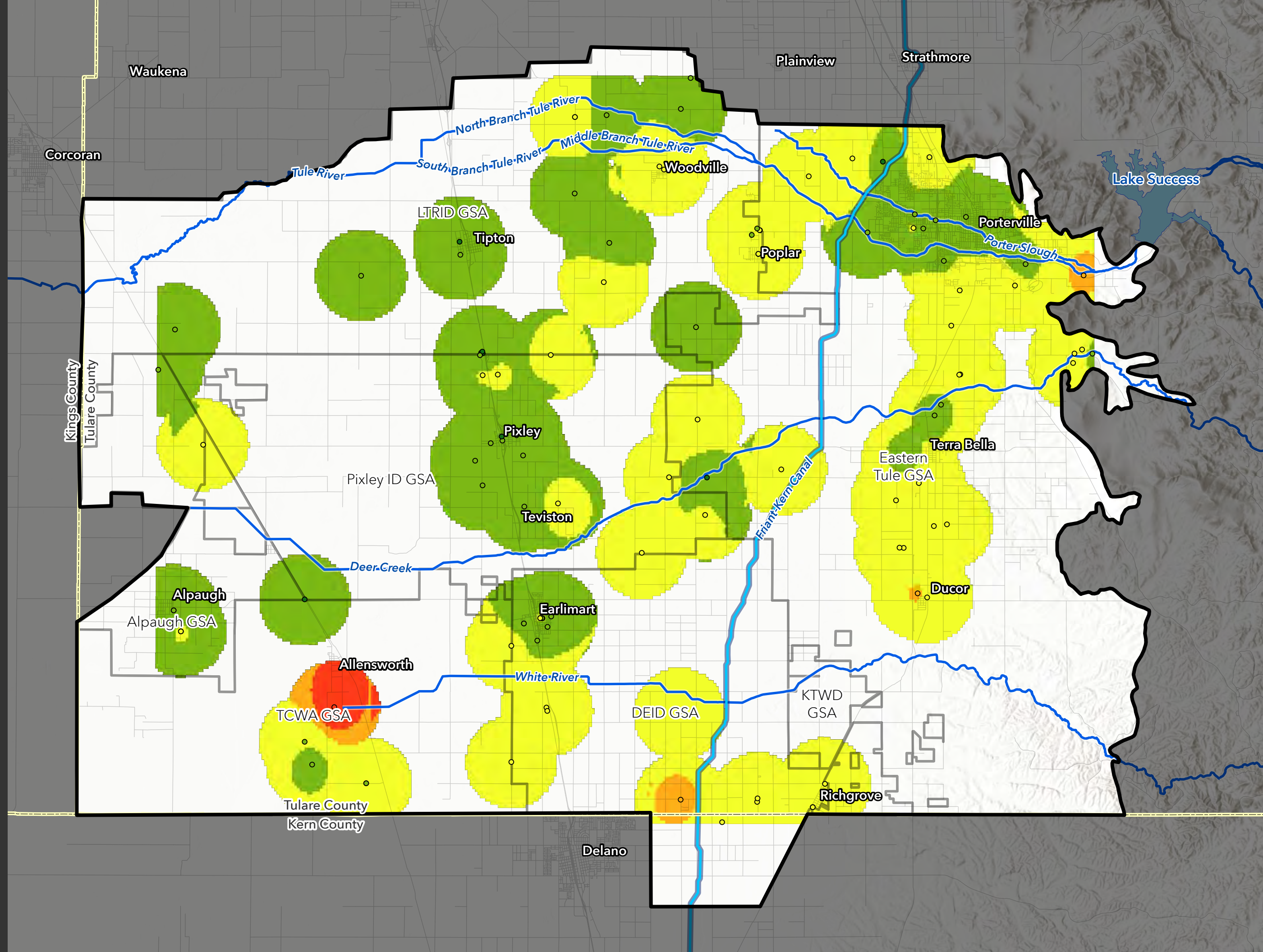


Figure 4f
Ambient Lower Aquifer
DBCP
2018 - 2023

Legend

Ambient DBCP (µG/L)

- 0.0 - 0.05
- 0.05 - 0.1
- 0.1 - 0.15
- 0.15 - 0.2
- 0.2+

▬ Tule Subbasin Boundary

▬ GSA Boundaries

▬ County Boundary

▬ Lake Success

▬ Friant-Kern Canal

▬ Waterways

▬ Major Roads

▬ Roads

Ambient DBCP (µG/L)

- 0.0 - 0.05
- 0.05 - 0.1
- 0.1 - 0.15
- 0.15 - 0.2
- 0.2+

Data based on GAMA Groundwater
Information System (<https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/>), June 11, 2024.



0 1.75 3.5
Miles

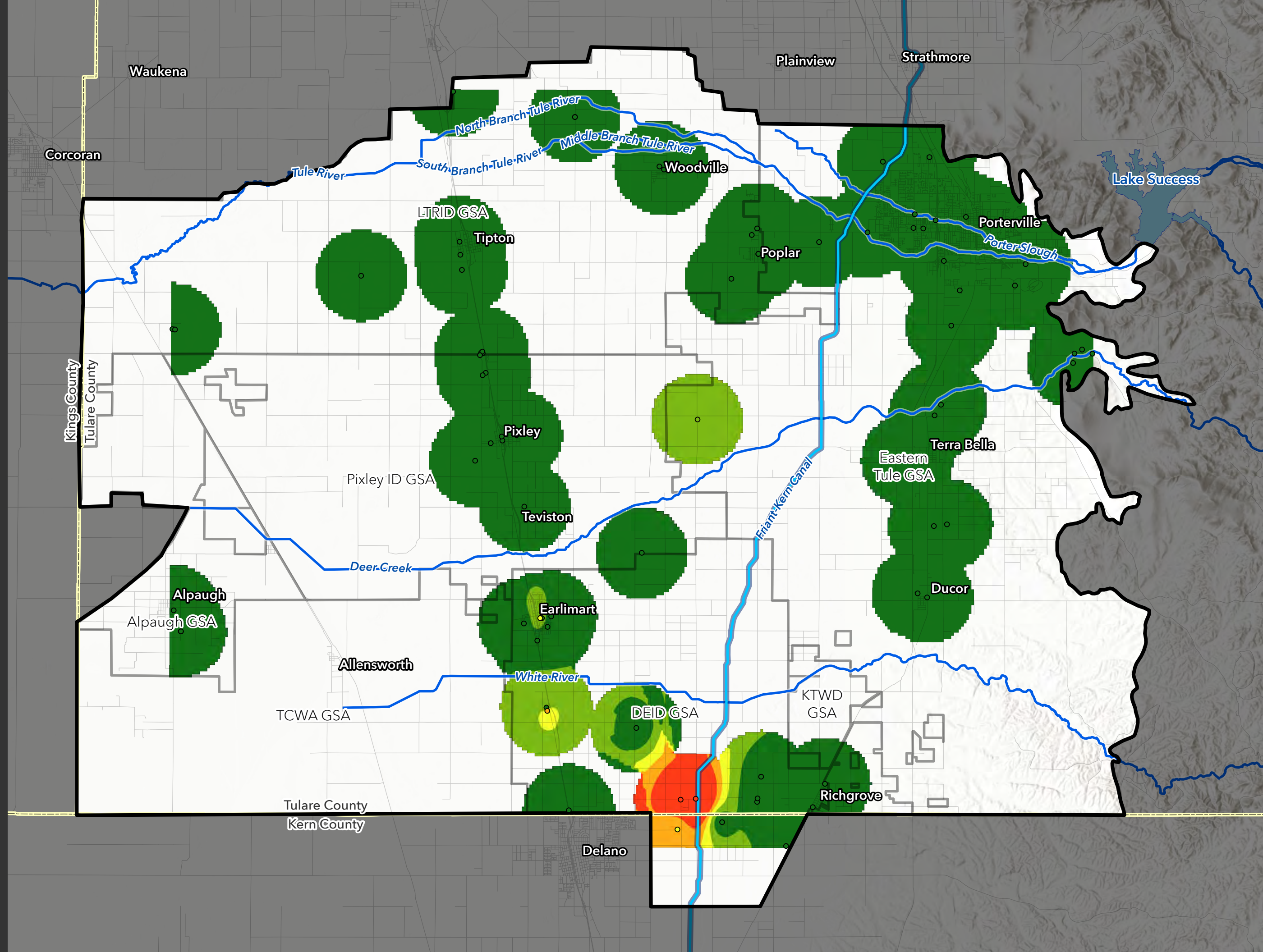


Figure 4g
Ambient Lower Aquifer
Nitrate as N
2018 - 2023

Legend

Ambient Nitrate as N (mg/L)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0
- 10.0+

- Tule Subbasin Boundary
- GSA Boundaries
- County Boundary
- Lake Success
- Friant-Kern Canal
- Waterways
- Major Roads
- Roads

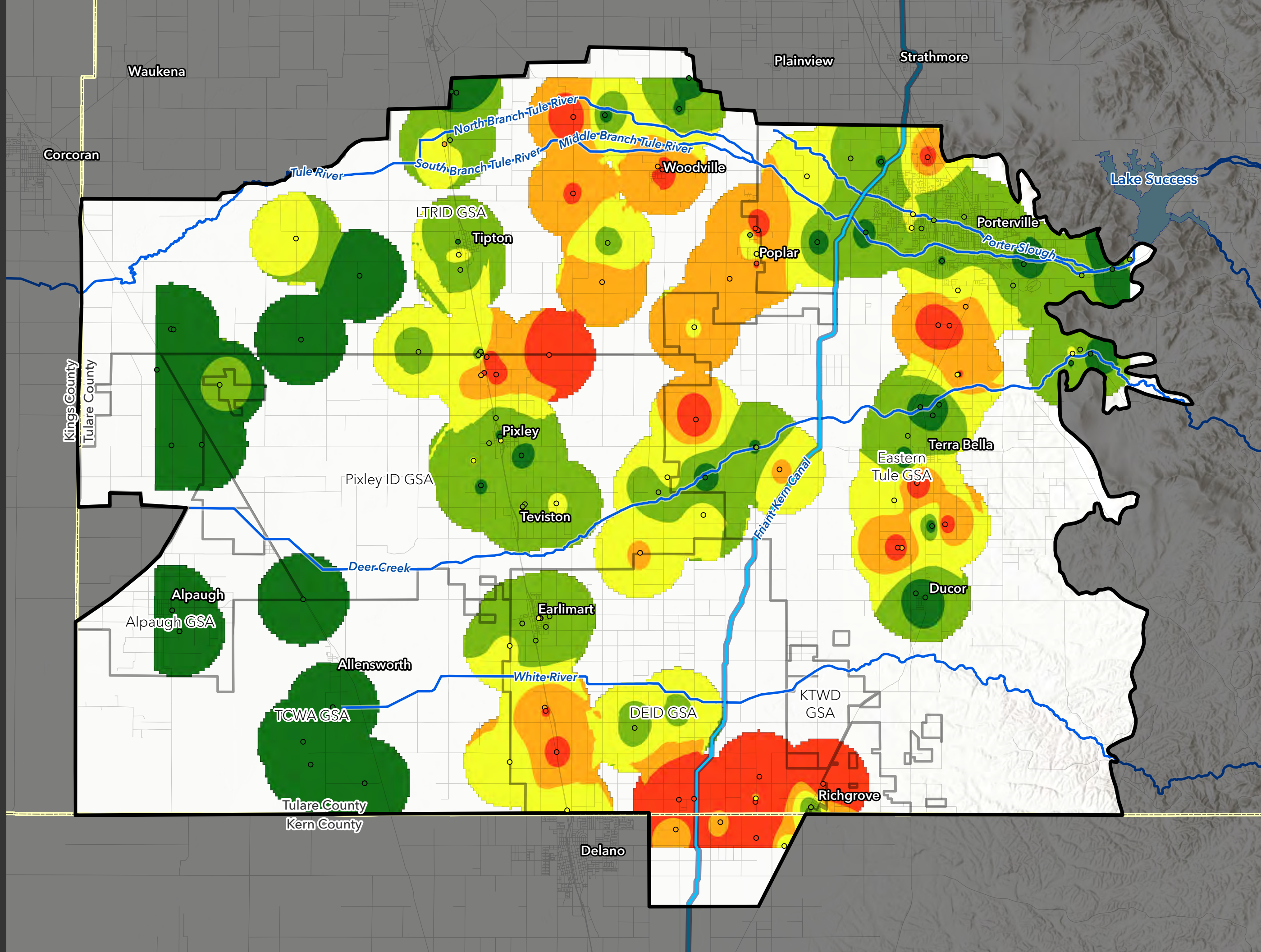
Ambient Nitrate as N (mg/L)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0
- 10.0+

Data based on GAMA Groundwater
Information System (<https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/>), June 11, 2024.



0 1.75 3.5
Miles





Tule Subbasin

Sustainable Groundwater
Management Act

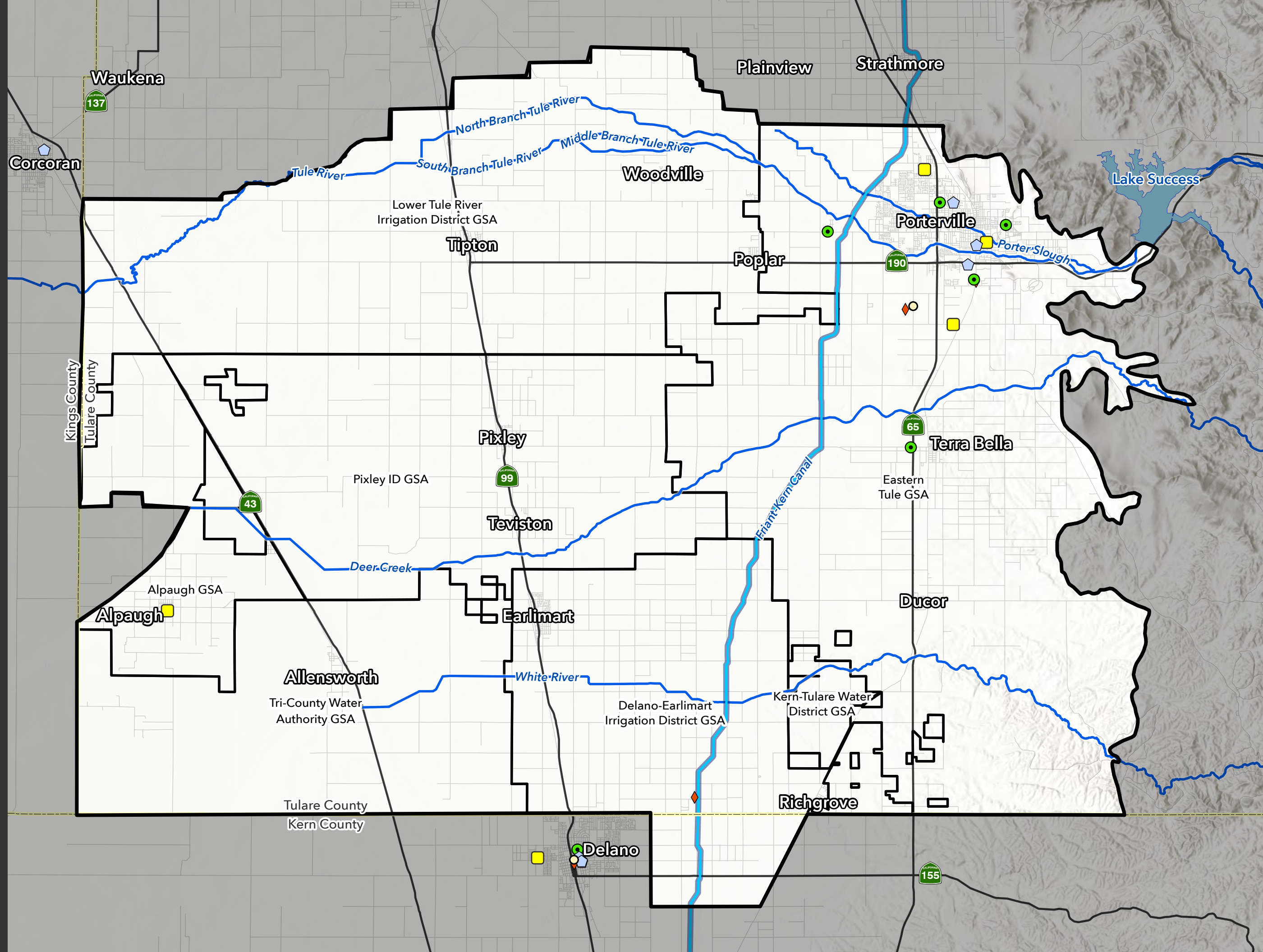
Figure 5
Geotracker
Cleanup Sites

Legend

- Roads
- Major Roads
- Friant-Kern Canal
- Waterways
- County Boundary
- Lake Success
- Tule Subbasin Boundary
- GSA Boundary

Geotracker Cleanup Sites by Type

- Cleanup Program Site
- LUST Cleanup Site
- School
- State Response or NPL
- Voluntary Agreement





Tule Subbasin

Sustainable Groundwater
Management Act

Figure 6
Tulare Lake Bed
Beneficial Use Exemption
Areas

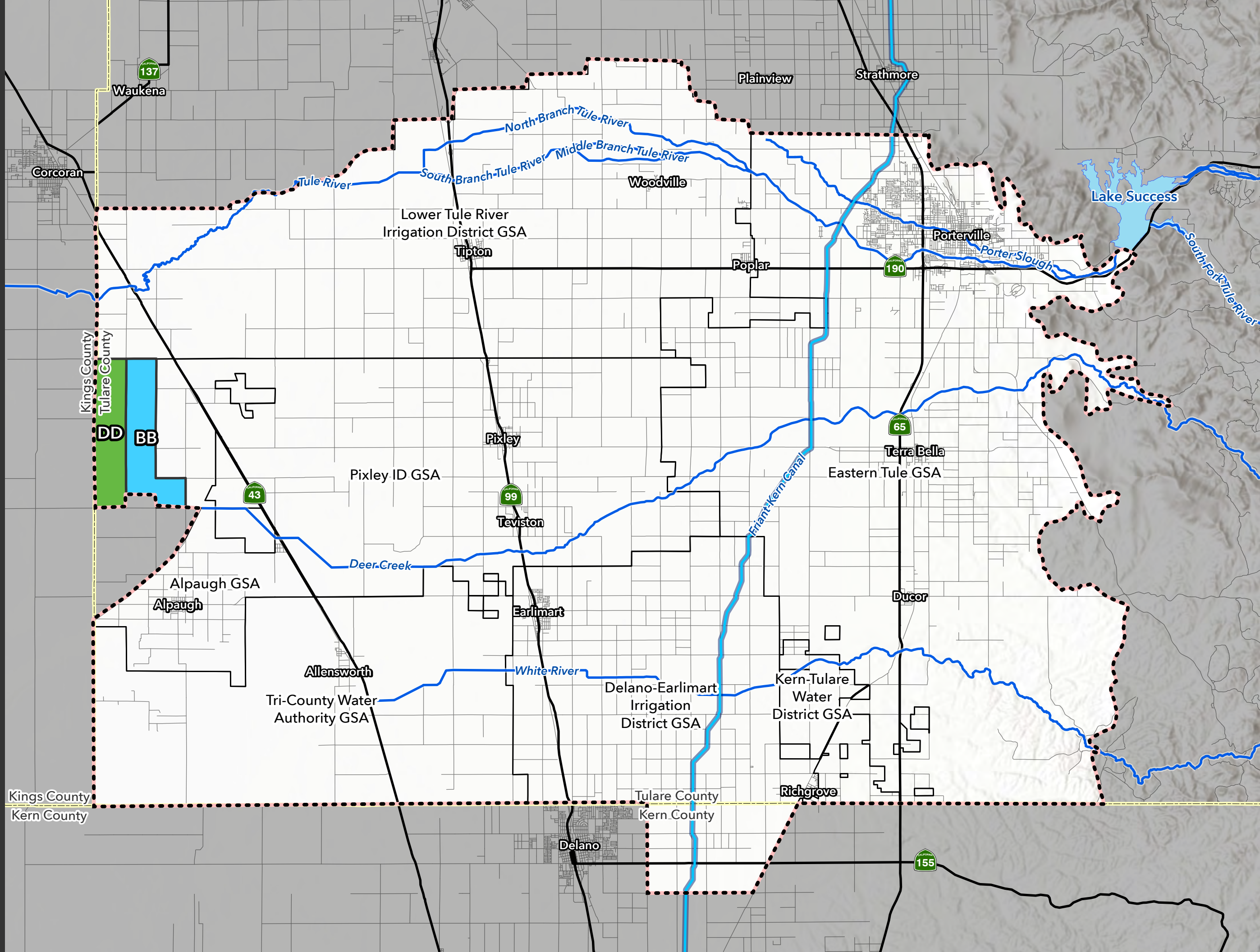
Legend

- Tule Subbasin Boundary
- County Boundary
- GSA Boundary
- Friant-Kern Canal
- Waterways
- Major Roads
- Roads

Beneficial Use Exemption Areas

- BB - De-designate to
Top of A-Clay (Minimum
of 110 feet in depth)
- DD - De-designate to
Top of Corcoran Clay

0 1.5 3
Miles





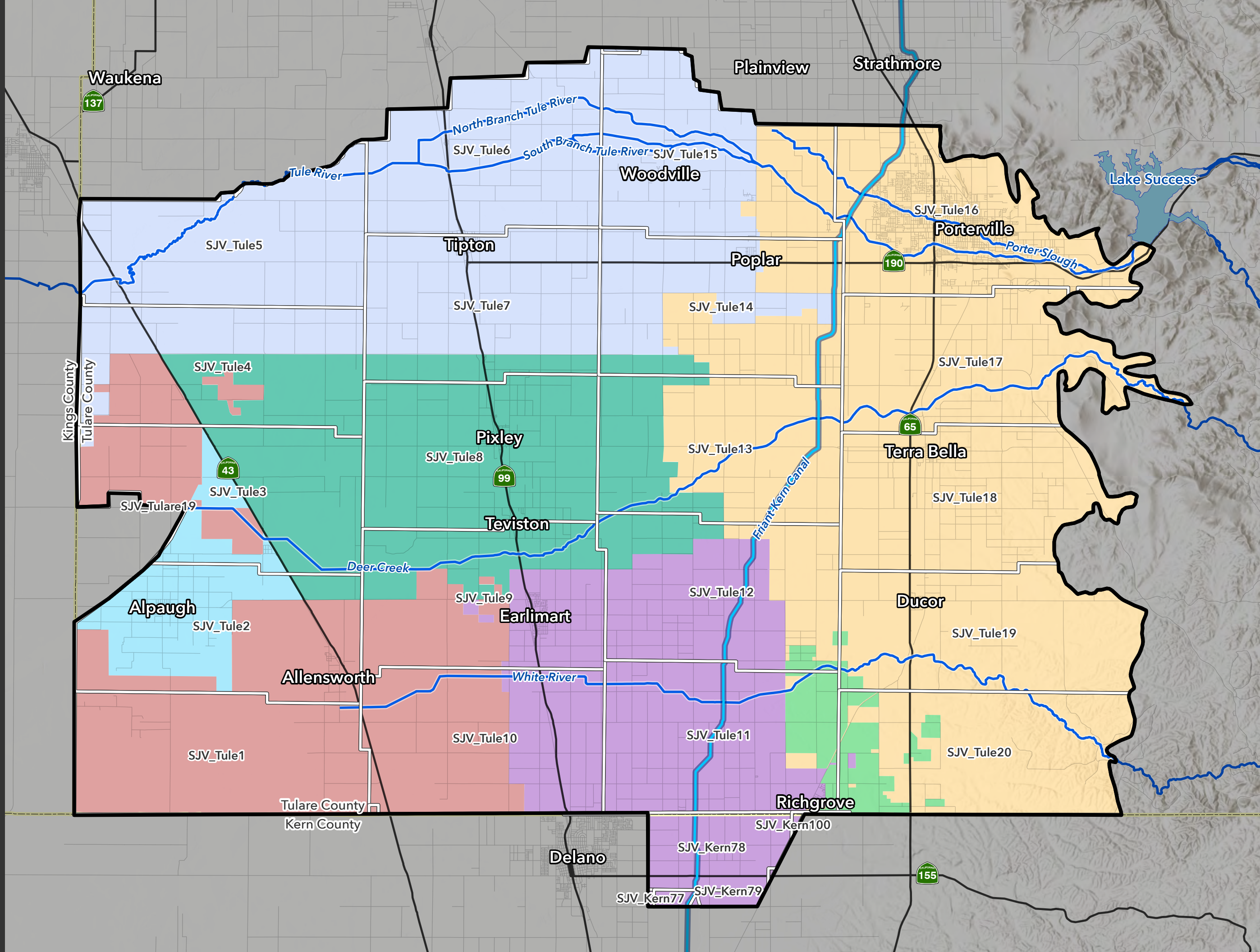
Tule Subbasin

Sustainable Groundwater
Management Act

Figure 7
GAMA PSAG Grids

Legend

- Roads
- Major Roads
- Friant-Kern Canal
- Waterways
- GAMA PBP Grids
- County Boundary
- Lake Success
- Tule Subbasin Boundary
- Groundwater Sustainability Agencies
- Alpaugh GSA
- Delano-Earlimart Irrigation District GSA
- Eastern Tule GSA
- Kern-Tulare Water District GSA
- Lower Tule River Irrigation District GSA
- Pixley ID GSA
- Tri-County Water Authority GSA



0 1.5 3
Miles

Figure 8a
RMS Quality Monitoring
Network - Upper
Aquifer

Legend

- Public Supply Wells
- Composite Public Supply Wells
- RMS Quality Monitoring Network - Upper Aquifer
- RMS Privately-Owned Domestic and Irrigation Wells
- RMS Dedicated Monitoring Wells
- Public Water System Boundaries
- GSA Boundaries
- Tule Subbasin Boundary
- County Boundary
- Lake Success
- Friant-Kern Canal
- Waterways
- Major Roads
- Roads

Public Supply Wells based on State of California Well Completion Report database. Public Water System Boundaries courtesy of Division of Drinking Water.



0 1.75 3.5
Miles

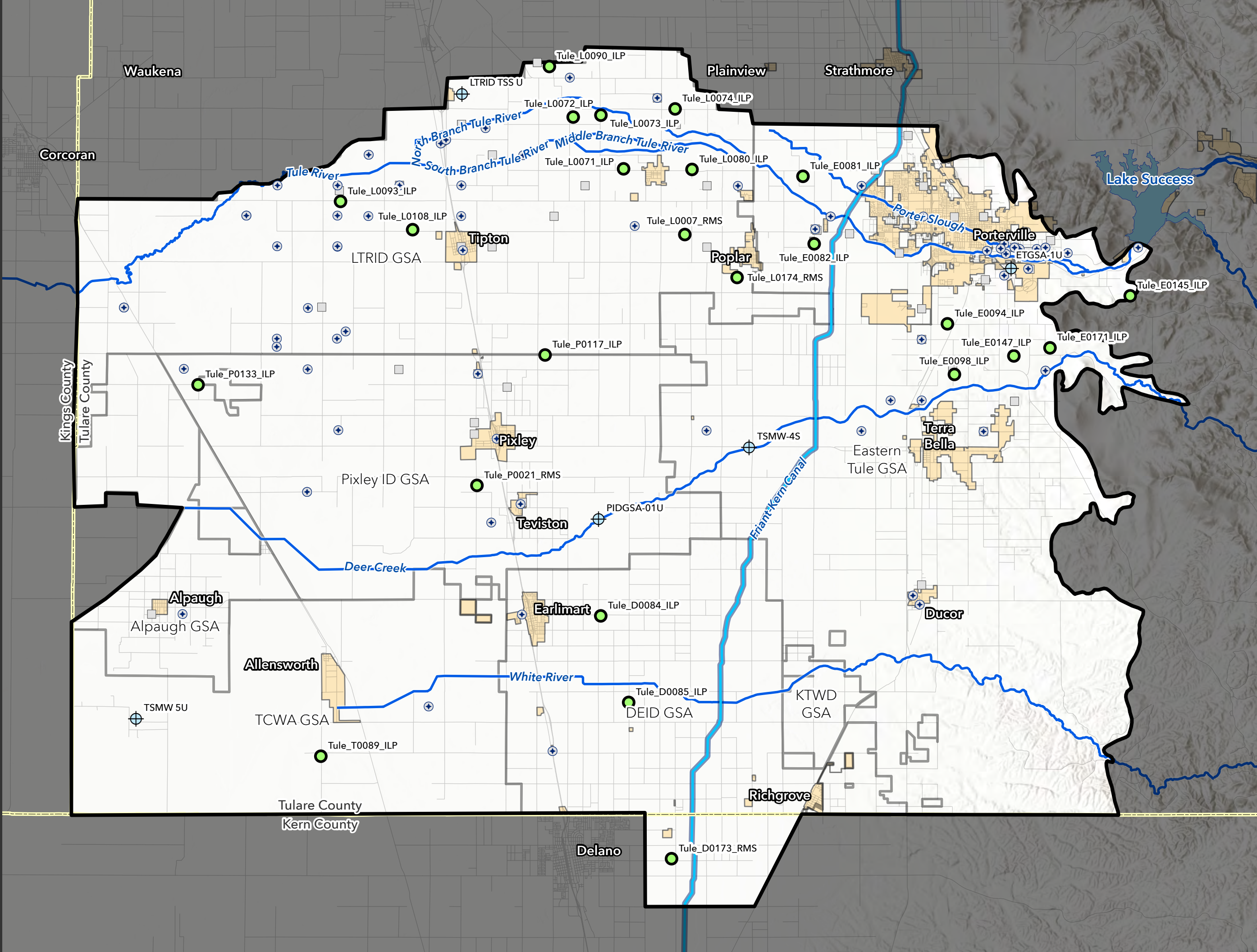




Figure 8b
RMS Quality Monitoring
Network - Lower Aquifer

Legend

-  Public Supply Wells
-  Composite Public Supply Wells
- RMS Quality Monitoring Network - Lower Aquifer**
 -  RMS Privately-Owned Domestic and Irrigation Wells
 -  RMS Dedicated Monitoring Wells
 -  Public Water System Boundaries
 -  GSA Boundaries
 -  Tule Subbasin Boundary
 -  County Boundary
 -  Lake Success
 -  Friant-Kern Canal
 -  Waterways
 -  Major Roads
 -  Roads

Public Supply Wells based on State of California Well Completion Report database. Public Water System Boundaries courtesy of Division of Drinking Water.



0 1.75 3.5
Miles

