Sustainable Groundwater Management Act

Groundwater Sustainability Plan

Updated July 2022

Delano-Earlimart Irrigation District

Groundwater Sustainability Agency

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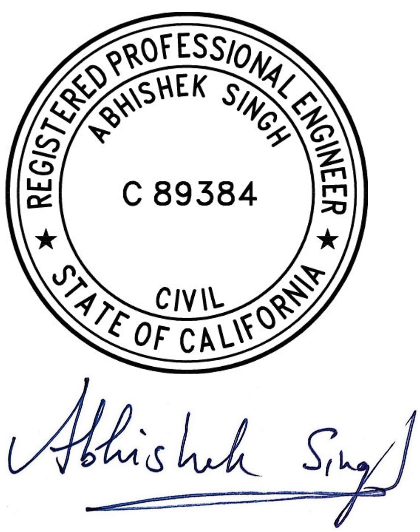
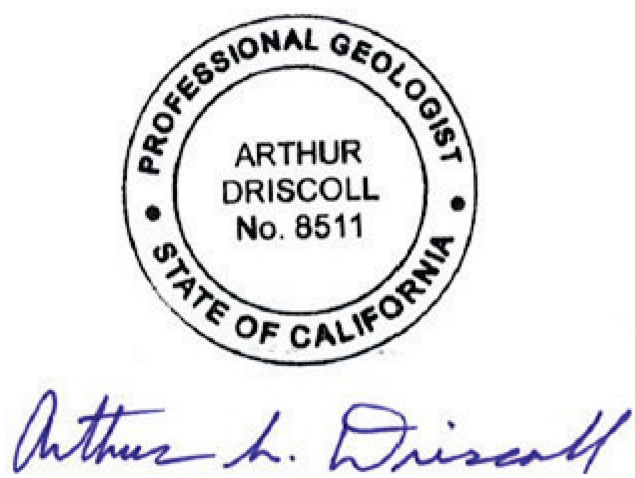
SIGNATURE PAGE

This Updated Groundwater Sustainability Plan for the Delano-Earlimart Irrigation District Groundwater Sustainability Agency has been prepared under the direction of a professional engineer and a professional geologist licensed in the State of California as required per California Code of Regulations, Title 23 Section 354.12 consistent with professional standards of practice.

This Updated Groundwater Sustainability Plan for the Delano-Earlimart Irrigation District Groundwater Sustainability Agency relies on work completed by Thomas Harder & Co. who prepared the Tule Subbasin Monitoring Plan, Tule Subbasin Setting, Groundwater Flow Model and other technical analyses using best available data at the time of preparation. This Updated Groundwater Sustainability Plan for the Delano-Earlimart Irrigation District Groundwater Sustainability Agency relies on this work and additional work prepared by 4Creeks for water quality analyses.



Abhishek Singh
PhD, PE No. 89384



Arthur Storer Driscoll, III (Trey)
PG No. 8511, CHG No. 936

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RESOLUTION NO. 22-02
DELANO-EARLIMART IRRIGATION DISTRICT GROUNDWATER SUSTAINABILITY AGENCY (DEID GSA)

ADOPTING THE UPDATED GROUNDWATER SUSTAINABILITY PLAN FOR THAT PORTION OF THE TULE SUBBASIN WITHIN THE DEID GSA AREA (GSP), APPROVING THE UPDATED TULE SUBBASIN COORDINATION AGREEMENT, AND FINDING THAT ADOPTION OF THIS RESOLUTION IS EXEMPT FROM SECTION 21000 ET SEQ. OF THE CALIFORNIA PUBLIC RESOURCES CODE (CEQA)

WHEREAS, in 2014 the California Legislature and the Governor passed into law the Sustainable Groundwater Management Act (SGMA) for local management of groundwater resources in California through the formation of Groundwater Sustainability Agencies (GSAs) and through preparation and implementation of Groundwater Sustainability Plans (GSPs); and

WHEREAS, SGMA requires that all groundwater basins designated as high- or medium-priority basins by the California Department of Water Resources (DWR) be managed by a GSA under a GSP; and

WHEREAS, the Tule Subbasin, as identified by DWR in Bulletin 118 as Subbasin No. 5.22-13, has been designated by DWR as a high priority groundwater basin subject to critical conditions of overdraft; and

WHEREAS, in addition to the DEID GSA, six other local agencies within the Tule Subbasin, namely, the Eastern Tule GSA, Tri-County Water Authority GSA, Pixley Irrigation District GSA, Alpaugh GSA, and Tulare County GSA (collectively, the Tule Subbasin GSAs) elected to become GSAs within their respective jurisdictions, such that all or a portion of the service areas of the Tule Subbasin GSAs collectively cover the entire Tule Subbasin; and

WHEREAS, consistent with Water Code sections 10727 and 10727.6, the Tule Subbasin GSAs have approved that certain Tule Subbasin Coordination Agreement, as updated in July 2022 (Updated Coordination Agreement) for purposes of preparing separate GSPs for each of their respective GSAs (except for Tulare County whose certain areas are covered in each of the other six GSPs) that, collectively, aim to achieve the sustainability goal for the entire Tule Subbasin as required by SGMA; and

WHEREAS, there is an area covered in the DEID GSP (Western Management Area) for which Tulare County is the de facto GSA pursuant to SGMA; and

WHEREAS, Tulare County and the DEID GSA have entered into that certain Memorandum of Understanding Between Delano-Earlimart Irrigation District Groundwater Sustainability Agency and the County of Tulare With Respect to Implementation of the Sustainable Groundwater Management Act, dated September 10, 2019 (County MOU); and

WHEREAS, pursuant to the County MOU, Tulare County was engaged in the DEID GSP preparation, and the DEID GSA and Tulare County agreed to manage the Western Management

Area pursuant to and in compliance with the DEID GSP, including a funding mechanism specific to the implementation of the DEID GSP with respect to the Western Management Area; and

WHEREAS, on or about January 27, 2020, the DEID GSA approved the DEID GSP and that document, with attachments and related documents, including the Tule Subbasin Coordination Agreement, were uploaded to the DWR GSP Portal on or about January 30, 2020; and

WHEREAS, on or about January 28, 2022, DWR submitted a letter (Determination Letter) to the Tule Subbasin Point of Contact identifying deficiencies and determining that the six GSPs for the Tule Subbasin submitted in January 2020 were incomplete under the SGMA GSP regulations; and

WHEREAS, the Determination Letter directed that the deficiencies identified by DWR in each of the Tule Subbasin GSPs be addressed and that "[w]here addressing the deficiencies requires modification of the Plan [GSP], the GSAs must adopt those modifications into their respective GSPs and all applicable coordination agreement materials;" and

WHEREAS, the DEID GSA has modified and updated its GSP (Updated GSP) to address the deficiencies identified in the Determination Letter; and

WHEREAS, the Tule Subbasin GSA's have produced the Updated Coordination Agreement to address deficiencies identified in the Determination Letter; and

WHEREAS, the DEID GSA conducted a public hearing to consider adoption of the Updated GSP after providing notice to each city and county within the boundaries of the DEID GSA at least 90 days prior to the public hearing and posted on its website the notice of the proposed adoption of the DEID GSP; and

WHEREAS, to encourage the involvement of diverse social, cultural, and beneficial users within the Tule Subbasin, the DEID GSA Board held multiple public meetings (including through regular staff updates to the Board), and conducted multiple public workshops related to the development of the Updated DEID GSP; and

WHEREAS, in accordance with California Code of Regulations, Title 23, sections 351(z) and 353.4, the DEID GSA hereby authorizes DEID management, the Chairperson of the Tule Subbasin Technical Advisory Committee, or their designees, to submit the Updated DEID GSP and associated documents to DWR; and

WHEREAS, the adoption of the Updated DEID GSP does not constitute a "project" subject to the California Environmental Quality Act (Public Resources Code §§ 21000 et seq.) (CEQA) because the adoption will not cause either a direct or a reasonably foreseeable indirect change in the environment. (Public Resources Code § 20165; CEQA Guidelines § 15378(a).) Further, adoption of the Updated DEID GSP is statutorily exempt from CEQA pursuant to Water Code section 10728.6. The adoption is also categorically exempt pursuant to CEQA Guidelines section 15061(b)(3) because it does not authorize or approve any project, development or construction activity. Accordingly, it can be seen with certainty that the adoption will not lead to any adverse physical changes in the environment. Finally, the categorical exemption applies because there is no evidence that adoption of the Updated DEID GSP involves any unusual circumstances that might cause a significant effect on the environment. (Public Resources Code § 15300.2.)

NOW, THEREFORE, THE DELANO-EARLIMART IRRIGATION DISTRICT GROUNDWATER SUSTAINABILITY AGENCY BOARD OF DIRECTORS HEREBY RESOLVES AS FOLLOWS:

Section 1: The foregoing recitals are true and correct and are incorporated herein by reference.

Section 2: The DEID GSA Board hereby adopts the Updated DEID GSP, including its attached and associated documents, and commits to implementing the Updated GSP.

Section 3: DEID Management staff, the Chairperson of the Tule Subbasin Technical Advisory Committee, or their designees, are directed to submit the DEID GSP to DWR.

Section 4: The DEID GSA Board hereby approves and authorizes the President of the Board or his designee to execute the Updated Coordination Agreement on behalf of the DEID GSA and directs DEID GSA management and its representative to the Tule Subbasin Technical Advisory Committee to continue cooperating on the DEID GSP implementation pursuant to the framework established by the Updated Coordination Agreement, consistent with SGMA requirements.

Section 5: The DEID GSA Board finds that pursuant to Public Resources Code section 20165 and CEQA Guidelines section 15378(a), the adoption of the DEID GSP is not a "project" subject to CEQA. The Board further finds that even if the adoption is a project, the adoption is exempt from CEQA pursuant to Water Code section 10728.6 and CEQA Guidelines sections 15061(b)(3) and 15300.2. The Board hereby directs that all documents and other materials constituting the record of proceedings related to the adoption of the DEID GSP be maintained by the General Manager of the Delano-Earlimart Irrigation District Groundwater Sustainability Agency, or his designee, on file at the Delano-Earlimart Irrigation District Groundwater Sustainability Agency, 14181 Avenue 24, Delano CA 93215. The Board of Directors directs Staff to file a Notice of Exemption with the County Clerks for the County of Tulare and the County of Kern

ADOPTED this twenty-first day of July 2022 on motion of Director Hronis, seconded by Director Wooten and passed by the following vote:

AYES: **Hampton, Hronis, Kovacevich, Wooten, Tartaglia**

NOES: **None**

ABSENT: **None**

ABSTAIN: **None**

Kelley T. Hampton

Kelley T. Hampton, President

CERTIFICATE OF SECRETARY

I do hereby certify that I am the Secretary of the Delano-Earlimart Irrigation District Groundwater Sustainability Agency, an agency organized and existing under the laws of the State of California, and that the foregoing Resolution was duly adopted by the Board of Directors of said Agency at a meeting thereof duly and regularly held at the office of the said Agency at 14181 Avenue 24, Delano, California on the 21st day of July, 2022, at which meeting a quorum of said Board of Directors was at all times present and acting, and that said Resolution has not been rescinded or amended in whole or any part thereof, and remains in force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this 21st day of July 2022.

Eric R. Quinley
Secretary
Delano-Earlimart Irrigation District Groundwater Sustainability Agency

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Abbreviations & Acronyms

µmohs/cm	micromohs per centimeter
AB	Assembly Bill
acre-feet/year	acre feet per year
amsl	above mean sea level
bgs	below ground surface
bmsl	below mean sea level
Bureau of Reclamation	U.S. Department of the Interior, Bureau of Reclamation
CASGEM	California State Groundwater Elevation Monitoring
CDWR	California Department of Water Resources
CEOP	Communication, Engagement and Outreach Plan
CEQA	California Environmental Quality Act
CGQMP	Comprehensive Groundwater Management Plan
COC	Constituents of Concern
CP	Community Plan
CSD	Community Services District
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
DEID	Delano-Earlimart Irrigation District
DDW	Division of Drinking Water
DMS	Data Management System
DWR	Department of Water Resources
EC	Electrical Conductivity
ET	Evapotranspiration
ETc	actual evaporation
EIR	Environmental Impact Report
EPUD	Earlimart Public Utility District
feet	ft
feet per day	ft/day
FKC	Friant-Kern Canal
FWA	Friant Water Authority
GAMA	Groundwater Ambient Monitoring and Assessment
GAR	Groundwater Assessment Report
GDEs	Groundwater Dependent Ecosystems
GFM	Groundwater Flow Model
GP	General Plan
GPS	global positioning system
GSA	Groundwater Sustainability Agency

GSP	Groundwater Sustainability Plan
GQTMP	Groundwater Quality Trend Monitoring Program
GQTMW	Groundwater Quality Trend Monitoring Workflow
GWMP	Groundwater Management Plans
HCM	Hydrogeologic Conceptual Model
HGL	hydraulic grade line
ILRP	Irrigated Lands Regulatory Program
InSAR	Interferometric Synthetic Aperture Radar
IRWM	Integrated Regional Water Management
IRWMGs	Integrated Regional Water Management Groups
IRWMP	Integrated Regional Water Management Plan
ITRC	Irrigation Training and Research Center
LAFCO	Local Agency Formation Commission
LUSTs	leaking underground storage tanks
M&I	municipal and industrial
MCL	maximum contaminant level
mg/L	milligrams per liter
MOU	Memorandum of Understanding
NASA	National Aeronautics and Space Administration
NC	Natural Communities
NEPA	National Environmental Policy Act
NO_3	nitrate
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priority List
NTFGW	net to from groundwater
OOD	out-of-district
PUD	Public Utility District
Plan	Groundwater Sustainability Plan
RWA	Recovered Water Account
RCSD	Richgrove Community Services District
RMS	Representative Monitoring Site
RWQCB	Regional Water Quality Control Board
SAGBI	Soil Agricultural Groundwater Banking Index
SB	Senate Bill
SCADA	Supervisory Control and Data Acquisition
SDWIS	Safe Drinking Water Information System
SGMA	Sustainable Groundwater Management Act
SJRRS	San Joaquin River Restoration Settlement
SMC	Sustainable Management Criteria

SREP	Success Reservoir Enlargement Project
SWRCB	State Water Resources Control Board
Subbasin	Tule Subbasin
TBWQC	Tule Basin Water Quality Coalition
TH&Co.	Thomas Harder and Company
TSMP	Tule Subbasin Monitoring Plan
UABs	Urban Area Boundaries
UDBs	Urban Development Boundaries
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WDL	Water Data Library
WMA	Western Management Area
WQO	water quality objectives

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Section 1. Introduction to DEID GSA

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1.1 Purpose of the Groundwater Sustainability Plan

In 2014, California approved a new groundwater management law commonly known as the Sustainable Groundwater Management Act (SGMA) which became effective January 1, 2015[1]. SGMA requires that all medium- and high-priority groundwater basins, as designated by the California Department of Water Resources (DWR), be governed by one or more Groundwater Sustainability Agencies (GSAs) formed for that purpose and that a Groundwater Sustainability Plan (GSP), or an alternative to such plan, if applicable, be prepared and adopted by the GSAs defining a course to achieve sustainable groundwater management within the basin within 20 years of plan implementation.

The Tule Subbasin (DWR Bulletin 118 Basin No. 5-022.13) has been designated by DWR as a high priority basin subject to critical conditions of overdraft. Multiple local agencies that overlie the Tule Subbasin formed into six GSAs, with no overlapping jurisdictions, in conformance with SGMA. Pursuant to SGMA, each GSA may develop, adopt, and implement a separate GSP within its respective jurisdictional boundaries, so long as the GSPs, collectively, cover the entire basin and the GSAs coordinate with one another and establish compatible sustainable groundwater management goals[2]. Under the provisions of SGMA, all areas of the Tule Subbasin were required to be covered by a duly adopted GSP no later than January 31, 2020. This July 2022 document serves as an update to the Delano-Earlimart Irrigation District (DEID) GSP originally submitted in January 2020 and is intended to be responsive to the DWR's January 28, 2022 "Incomplete Determination of the 2020 Groundwater Sustainability Plans Submitted for the San Joaquin Valley – Tule Subbasin."

The DEID GSA has developed this updated GSP or "Plan" for its jurisdictional area of the Tule Subbasin in compliance with SGMA. This GSP describes the DEID GSA and the areas it manages, establishes the quantifiable management objectives for beneficial groundwater uses and users, and identifies a group of projects and management actions that will allow the DEID GSA and all Tule Subbasin GSAs, through formal coordination with the Tule Subbasin Memorandum of Understanding (MOU) group beginning in 2015 via the Tule Subbasin Coordination Agreement (see **Appendix A**), to achieve sustainability by year 2040, within 20 years of plan adoption, and further to maintain sustainability through the planning and implementation horizon[3].

1.2 Executive Summary of the GSP *[23 CCR § 354.4]*

> **23 Cal. Code Regs. § 354.4 General Information.** *Each Plan shall include the following general information:*
>
> **(a)** *An executive summary written in plain language that provides an overview of the Plan and description of groundwater conditions in the basin.*

The Tule Subbasin (Subbasin), as identified by DWR in Bulletin 118 as Subbasin No. 5.22-13 (DWR, 2016), is situated primarily in southern Tulare County with a small portion in Kern County within the southern portion of the Central Valley of California. The Subbasin is one of the top producing agriculture regions in

[1] California Water Code §§ 10720, et seq.
[2] Water Code, § 10727.6; California Code of Regulations, Title 23, § 357.2.
[3] The "planning and implementation horizon" means the 50-year time period, from the date the GSP is adopted, over which a GSA determines that the GSP will be implemented to ensure that the basin is operated within its sustainable yield; Wat. Code, § 10721(r).

the area, with very fertile soils and wide diversity of crops. The Subbasin includes six GSAs that have coordinated efforts per the adopted SGMA regulations through a common Coordination Agreement to develop six GSPs that cover the entire Subbasin.

The GSA Plan area includes the political boundary of the DEID, the communities of Earlimart and Richgrove, and a portion of the unincorporated county area. The water supplies for the DEID GSA include the local supplies of White River and imported water through a Friant Contract with the DEID from the Central Valley Project as described further in **Section 1.4.3 Conjunctive Use Programs**. Imported water supplies are a vital component of overall water supply to the DEID GSA.

The Tule Subbasin is designated by DWR as a critically overdrafted basin with an estimated average Subbasin overdraft of 170,000 acre-feet per year (acre-ft/year) as defined in the Tule Subbasin Setting (see **Appendix A-2,** Tule Subbasin Setting as Attachment 2 of the Tule Subbasin Coordination Agreement). The DEID GSA historically does not contribute to the Subbasin overdraft conditions, but instead provides an average annual net deposit of an estimated 8,800 to 22,500 acre-ft/year due to the long-established management actions, including water importation of DEID (see **Sections 1.4.3, 2.4.6,** and **2.4.10**). While the DEID GSA is a net depositor of water in the Tule Subbasin on an overall basis, this is only made possible through the actions taken by DEID. Other lands within the DEID GSA lacking a supply of imported surface water, i.e., those not within DEID water service boundaries, contribute to overdraft conditions in the Subbasin. Overdraft conditions have caused a multitude of issues for those reliant on groundwater pumping, including well failures, increased operational costs for groundwater extraction, and increased capital costs to deepen and/or construct and operate new wells. These potential undesirable results have impacted municipal, domestic, and agricultural users within DEID, particularly users located near the District's boundaries with unstainable GSAs and management areas. The 2013 through 2016 drought highlighted the regional impacts of ongoing overdraft as groundwater levels along the boundary and within DEID's service area declined to historic depths, requiring deepening or replacement of several wells within DEID that water users were relying on to access the District's conjunctively managed reserves, which totaled in excess of 800,000 acre-feet from the period beginning in 1987 to 2012 (see **Sections 2.4.10**). Evaluation of the full volume of conjunctively managed reserves since DEID began importing surface water in 1950 is ongoing.

For lands outside DEID, both within the DEID GSA and throughout the Subbasin, transitional pumping has been proposed as a project and management action to allow lands that are reliant on groundwater pumping to transition to groundwater pumping levels over time that are sustainable while reducing the economic impact that would be otherwise felt in an "overnight" reduction in water supplies (see **Section 5.2.2.2**). In **Section 3 – Sustainable Management Criteria**, interim milestones, measurable objectives, and minimum thresholds are established by evaluating beneficial uses and users, incorporating the impacts of transitional pumping outside the DEID water service area, along with all other projects and management actions proposed by GSAs in the Subbasin. As part of the analysis in this updated GSP, these criteria are also compared to the hypothetical scenario of the entire Subbasin being operated at sustainable levels starting in 2020. This comparison is intended to show the expected difference in groundwater conditions in the DEID GSA due to ongoing and expected transitional pumping allowed by other GSAs in the Subbasin and to help identify appropriate corrective action to offset impacts to DEID beneficial uses and users. This comparison is also intended to show that the expected impacts to beneficial uses and users within DEID result from transitional pumping and not from ongoing sustainable pumping by pumpers within the DEID water service area.

Through a coordinated effort with the other GSAs within the Subbasin, a Coordination Agreement (**Appendix A**) has been prepared and updated describing the common basin setting, sustainability goal, definitions for undesirable results, and the program for basin-wide monitoring, which is included as an attachment to this Plan (see **Appendix A-2**). Generally, the Subbasin sustainability goal is to achieve no long-term change in groundwater storage by year 2040, by implementing a series of projects and management actions among the member agencies and stakeholders.

This updated GSP addresses the items identified in the SGMA regulations specific to DEID GSA, including descriptions of the physical characteristics, the water budget (historical and future), specific monitoring features and locations, quantifiable targets and minimum thresholds for depth to groundwater, groundwater storage, groundwater quality, and land subsidence between 2020 and 2040, and those projects and management actions proposed to implement during the 20-year planning horizon to achieve the sustainability goal. This updated GSP is also intended to address the deficiencies noted in the DWR Corrective Notice, to the extent applicable to DEID's GSP. The projects and management actions will be critical to the success of the Plan, which initially focuses on the implementation of a monitoring network and data management system to track and monitor progress. In addition, groundwater data will help inform and develop policies to adaptively manage water resources to reduce groundwater overdraft while minimizing impacts to agriculture production and economic impacts to the local communities through conjunctive use of water resources. Offsetting groundwater pumping through in-lieu use (on-farm recharge from irrigation return flows), and groundwater banking using imported water supplies at times of availability are the primary mechanisms to achieve the Subbasin's sustainability goal and objectives. In addition, a Mitigation Program Framework has been developed as a means to prevent significant and unreasonable impacts to agricultural, municipal, and industrial beneficial uses of groundwater (see **Appendix A-7** as Attachment 7 of the Tule Subbasin Coordination Agreement).

1.3 Agency Information

In addition to the information contained in this section, please see **Appendix B: Notice of the Delano-Earlimart Irrigation District to serve as a Groundwater Sustainability Agency for a portion of the Tule Subbasin.**

1.3.1 Name and Mailing Address of the Agency *[23 CCR § 354.6(a)]*

23 Cal. Code Regs. § 354. 6 Agency Information. *When submitting an adopted Plan to the Department, the Agency shall include a copy of the information provided pursuant to Water Code Section 10723.8, with any updates, if necessary, along with the following information*:

(a) *The name and mailing address of the Agency*

Delano-Earlimart Irrigation District Groundwater Sustainability Agency
14181 Avenue 24
Delano, CA 93215

1.3.2 Organization and Management Structure *[23 CCR § 354.6(b)(c)]*

23 Cal. Code Regs. § 354. 6 Agency Information. *When submitting an adopted Plan to the Department, the Agency shall include a copy of the information provided pursuant to Water Code Section 10723.8, with any updates, if necessary, along with the following information*:

(b) *The organization and management structure of the Agency, identifying persons with management authority for implementation of the Plan.*

(c) *The name and contact information, including the phone number, mailing address and electronic mail address, of the plan manager.*

The DEID GSA is governed by the board of directors: President Kelley Hampton; Vice-president Pete Hronis; Director Anthony Tartaglia; Director Heoth Wooten; and Director Mark Kovacevich. The board of directors has final authority for Plan implementation.

Mr. Eric Quinley has been appointed DEID GSA Manager by the board of directors.

DEID GSA and Plan implementation management is the responsibility of DEID GSA Manager Eric Quinley.

Contact information for Mr. Quinley:

Mailing address:	Telephone:	Email:
14181 Avenue 24 Delano, CA 93215	661-725-2526	equinley@deid.org

1.3.3 Legal Authority *[23 CCR § 354.6(d)]*

23 Cal. Code Regs. § 354. 6 Agency Information. *When submitting an adopted Plan to the Department, the Agency shall include a copy of the information provided pursuant to Water Code Section 10723.8, with any updates, if necessary, along with the following information*:

(d) *The legal authority of the Agency, with specific reference to citations setting forth the duties, powers, and responsibilities of the Agency, demonstrating that the Agency has the legal authority to implement the Plan.*

The DEID GSA consists of the DEID, the Earlimart Public Utility District (EPUD), the Richgrove Community Services District (RCSD), and lands under the jurisdiction of the County of Tulare (County). DEID, EPUD, and the RCSD are local agencies duly formed and given legal authority under the laws of the State of California (Division 11 of the Water Code, Section 16461 of the California Public Utility District Act, and Section 61060 of the Community Services District Law, respectively) with water supply and groundwater management responsibilities within their jurisdictional boundaries, all within the Tule Subbasin.

The DEID and the EPUD entered into a MOU on May 23, 2016, whereby the EPUD agreed to become a part of the GSA being formed by DEID (see **Appendix C: MOU Between DEID GSA and Earlimart Public Utility District**). DEID submitted the required notice of its election to become a GSA to DWR on September 6, 2016. The Department acknowledged the DEID GSA as the exclusive GSA for the area within its jurisdictional boundaries following the required 90-day public notice period.

On March 14, 2019, the DEID and the RCSD entered into a MOU whereby the RCSD agreed to become a part of the GSA that had been formed by DEID and EPUD (see **Appendix D: MOU Between DEID GSA and Richgrove Community Service District**). DEID GSA submitted the revised boundary notification to include

RCSD to DWR on June 5, 2019, and has been acknowledged as the exclusive GSA for the area within its jurisdictional boundaries following the required 90-day public notice period (see **Appendix B**).

On September 10, 2019, the DEID GSA and the County of Tulare entered into a MOU to ensure compliance with SGMA for those areas within the County's boundaries but outside of any other jurisdictional authority by managing the area in coordination with the DEID GSA under the terms and conditions of its GSP (see **Appendix E: MOU Between DEID GSA and Tulare County**).

As a duly formed Agency under the Act, the DEID GSA has the legal authority to implement the Plan (10723(a)).

1.3.4 Cost & Funding of Plan Implementation *[23 CCR § 354.6(e)]*

23 Cal. Code Regs. § 354. 6 Agency Information. *When submitting an adopted Plan to the Department, the Agency shall include a copy of the information provided pursuant to Water Code Section 10723.8, with any updates, if necessary, along with the following information*:

(e) *An estimate of the cost of implementing the Plan and a general description of how the Agency plans to meet those costs.*

Administrative costs of implementing the DEID GSP are anticipated to be $300,000 annually, over the next 20 years, subject to ongoing revision as time and experience dictates. Funding sources for costs associated with the preparation and implementation of this GSP are outlined in **Section 5** and **Section 6** of this GSP. Please refer to these two sections for additional details. **Table 1-1** provides a summary of the identified ongoing operating and capital costs for the DEID Management Area. This cost estimate is a preliminary estimate of known costs and does not include costs for all projects and management actions required to implement the DEID GSP as described in **Section 5** and **Section 6** of this GSP.

Table 1-1: Preliminary GSP Implementation Costs for DEID

Cost Item	Annual or Capital Cost
Administrative Cost	$300,000
Action 1 - Continued importation and optimization of surface water supplies	$26,000,000
Action 2 - Increase Imported Water Deliveries	$72,000
Action 3 - Operations of existing in-district groundwater recharge/banking	$136,050
Action 4 - Operations of existing in-district groundwater recharge/banking	$264,530
Action 4a - Operations of existing in-district groundwater recharge/banking (Capital Cost)	$52,000,000
Action 5 - Operations of existing out-of-district groundwater recharge/banking	$429,000
Action 6 - Actions to increase existing out-of-district groundwater recharge/banking	TBD
Action 7 - Implementation of Mitigation Plan for impacted wells groundwater recharge/banking (Capital Cost)	$4,800,000
Sub-total Ongoing DEID Management Area Annual Costs	***$27,201,580***
Sub-total DEID Management Area and Mitigation Program Capital Costs	***$56,800,000***

1.4 Description of Plan Area

1.4.1 DEID GSA Plan Area *[23 CCR § 354.8(a)(1), (b)]*

23 Cal. Code Regs. § 354.8 Description of Plan Area. *Each Plan shall include a description of the geographic areas covered, including the following information:*

(a) *One or more maps of the basin that depict the following, as applicable:*

(1) *The area covered by the Plan, delineating areas managed by the Agency as an exclusive Agency and any areas for which the Agency is not an exclusive Agency, and the name and location of any adjacent basins.*

(b) *A written description of the Plan area, including a summary of the jurisdictional areas and other features depicted on the map.*

The total area covered by the DEID GSA is 64,820 acres. It is located in southern Tulare County with a small portion within northern Kern County. Its northern-most boundary is Avenue 72, eastern-most boundary is California Highway 65, southern-most boundary is Woollomes Avenue, and the eastern-most boundary is California Highway 43. All boundaries are irregular.

The area covered by the DEID GSA has been divided into four separate Management Areas corresponding to the jurisdictional status, principal land use, water use sector, and the water source type of those respective areas. The following sections describe the four Management Areas and their jurisdictional status. **Figure 1-1: DEID GSA Management Areas** shows the boundaries of the management areas within the DEID GSA.

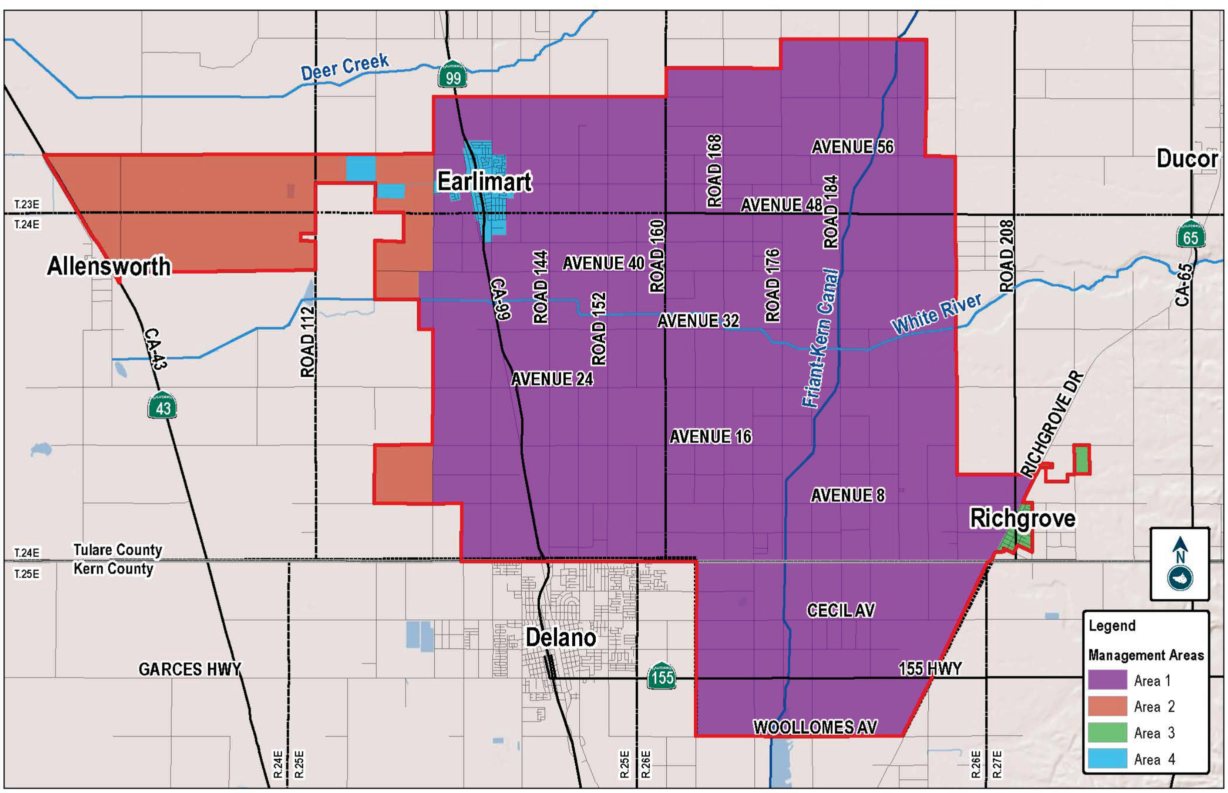

Figure 1-1: DEID GSA Management Areas

Management Area 1 - DEID Management Area:

The DEID Management Area follows the original service area of the DEID and excludes the areas served by EPUD, RCSD, and the unincorporated area under the jurisdiction of the County. It is 56,203 acres in size. It is located in southern Tulare County with a small portion within northern Kern County. Its northern-most boundary is Avenue 72, eastern-most boundary is California Highway 65, southern-most is Woollomes Avenue, and the eastern-most boundary is Avenue 128. All boundaries are irregular.

Management Area 2 - Western Management Area:

The Western Management Area is 7,554 acres in size. It serves a portion of the unincorporated county area and is considered “white lands” as it has been historically dependent on groundwater for a water supply. It is located in southern Tulare County. Its northern-most boundary is Avenue 56, eastern-most boundary is Road 128, southern-most is Avenue 36, and the eastern-most boundary is California Highway 43. All boundaries are irregular. A MOU between DEID GSA and Tulare County designates DEID GSA as the primary agency with jurisdiction over the Western Management Area for the purposes of SGMA and the implementation of this Plan (see **Appendix E**).

Management Area 3 - Richgrove Community Service District Management Area:

The RCSD Management Area follows the service area of the RCSD. It is 234 acres in size. It serves the unincorporated townsite of Richgrove and is located in southeastern Tulare County. Its northern-most boundary is along the alignment of Avenue 8, eastern-most boundary is along the alignment of Road 120, southern-most is Avenue 0, and the eastern-most boundary follows Richgrove Drive. All boundaries are irregular. The MOU between DEID GSA and RCSD designates DEID GSA as the primary agency with jurisdiction over RCSD Management Area for the purposes of SGMA and the implementation of this Plan (see **Appendix D**).

Management Area 4 - Earlimart Public Utility District Management Area:

The EPUD Management Area follows the service area of the EPUD. It is 773 acres in size. It serves the unincorporated townsite of Earlimart and is located in southern Tulare County. Its northern-most boundary is along the alignment of Avenue 60, eastern-most boundary is along the alignment of Road 139, southern-most is Avenue 44, and the eastern-most boundary is Avenue 128. All boundaries are irregular. The MOU between DEID GSA and Earlimart Public Utility District designates DEID GSA as the primary agency with jurisdiction over EPUD Management Area for the purposes of SGMA and the implementation of this Plan (see **Appendix C**).

1.4.1.1 Other Plans in the Subbasin and Adjacent Basins

The DEID GSA is located in the southern part of the Tule Subbasin (DWR Basin 5-022.13) as described in **Section 1.4.1** of this Plan. The Tule Subbasin includes six separate GSAs:

1. Alpaugh GSA
2. Delano-Earlimart Irrigation District GSA
3. Eastern Tule GSA JPA
4. Lower Tule River Irrigation District GSA
5. Pixley Irrigation District GSA

6. Tri-County Water Authority GSA

See **Figure 1-2: Tule Subbasin GSAs and Adjacent Subbasins** for the boundaries of each of the six GSAs within the Subbasin. **Figure 1-2** also shows the following three subbasins adjacent to the Tule Subbasin:

1. Kaweah Subbasin (DWR Basin 5-022.11)
2. Tulare Lake Subbasin (DWR Bain 5-022.12)
3. Kern County Subbasin (DWR Basin 5-022.14)

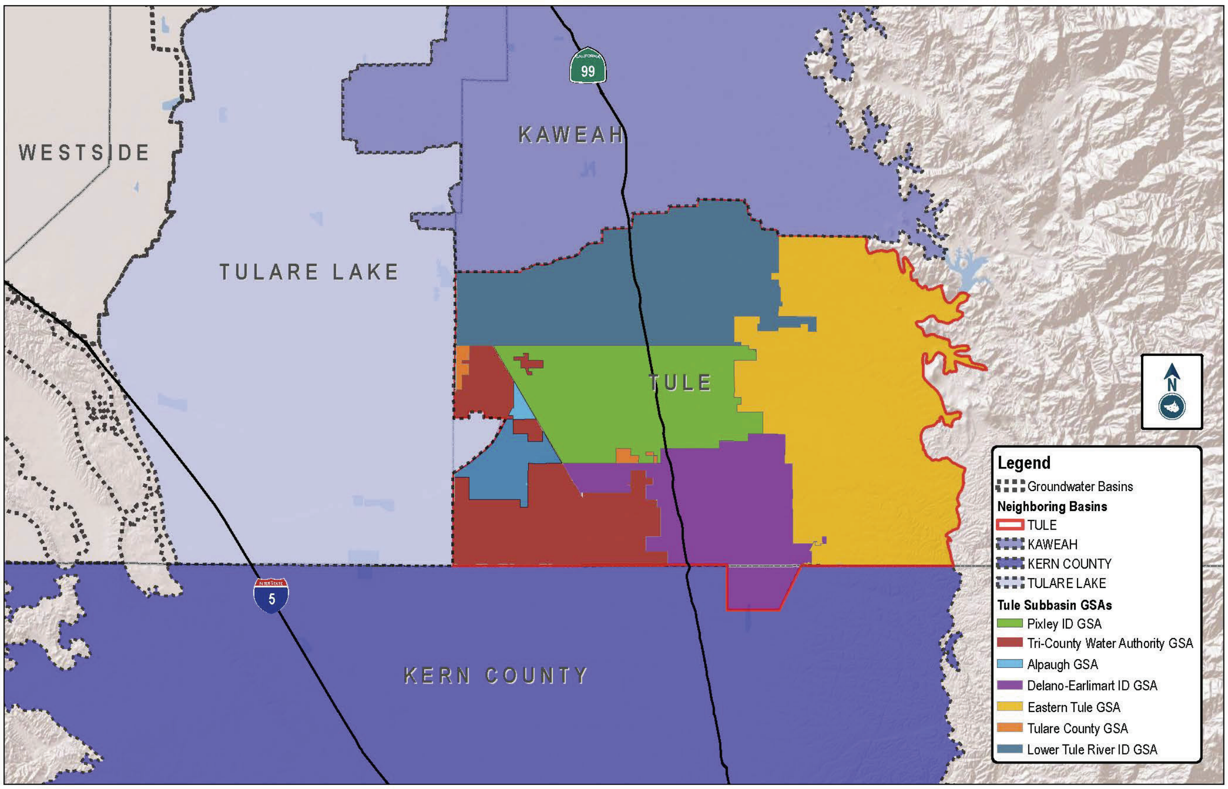

Figure 1-2: Tule Subbasin GSAs and Adjacent Subbasins

1.4.1.2 Jurisdictional Boundaries within DEID GSA *[23 CCR § 354.8(a)(3)]*

23 Cal. Code Regs. § 354.8 Description of Plan Area. *Each Plan shall include a description of the geographic areas covered, including the following information:*

(a) *One or more maps of the basin that depict the following, as applicable:*

(3) *Jurisdictional boundaries of federal or state land (including the identity of the agency with jurisdiction over that land), tribal land, cities, counties, agencies with water management responsibilities, and areas covered by relevant general plans.*

The DEID GSA includes four agencies with separate, water-related jurisdictions: the DEID, EPUD, RCSD, and the County of Tulare. The County of Tulare and the County of Kern each has a General Plan covering specific portions of the DEID GSA area, following county lines. The county governments each retains general land use planning authority and jurisdiction over its respective area. **Figure 1-3: Jurisdictional**

Boundaries within DEID GSA indicates the jurisdictional boundaries of the agencies along with the DEID GSA.

As noted previously, the DEID GSP covers a total of 64,820 acres and wholly includes the jurisdictional boundaries of the DEID, EPUD, and the RCSD. A discussion of the water management responsibilities of each of the agencies within the DEID GSA area is provided in **Section 1.4.1.4 Identification of Water Use Sector & Water Source Type**.

Combined, RCSD and EPUD cover the entirety of the unincorporated communities of Richgrove and Earlimart. Both the Richgrove and Earlimart communities are recognized by the State of California as Severely Disadvantaged Communities.

The U.S. Department of the Interior, Bureau of Reclamation (Bureau of Reclamation) is the only federal agency with any significant land holdings and water management responsibilities within or near DEID GSA. Specifically, a reach of the FKC, a canal integral to the Friant Division of the Central Valley Project, runs through the western portion of DEID GSA boundary over the entire length of the GSA north to south between Road 160 and Road 208. The lands associated with the FKC are owned by the Bureau of Reclamation, while the Friant Water Authority maintains and operates the FKC. The FKC conveys imported water to approximately 850,000 acres of irrigated land and several communities by way of contracts maintained by various water districts. There are no ecological reserves administered by the California Department of Fish and Wildlife within the DEID GSA, nor are there any other significant state or federal agencies known to administer land within the DEID GSA. Further, no tribal lands are documented in the DWR Water Management Planning Tool or are known to exist within the DEID GSA area.

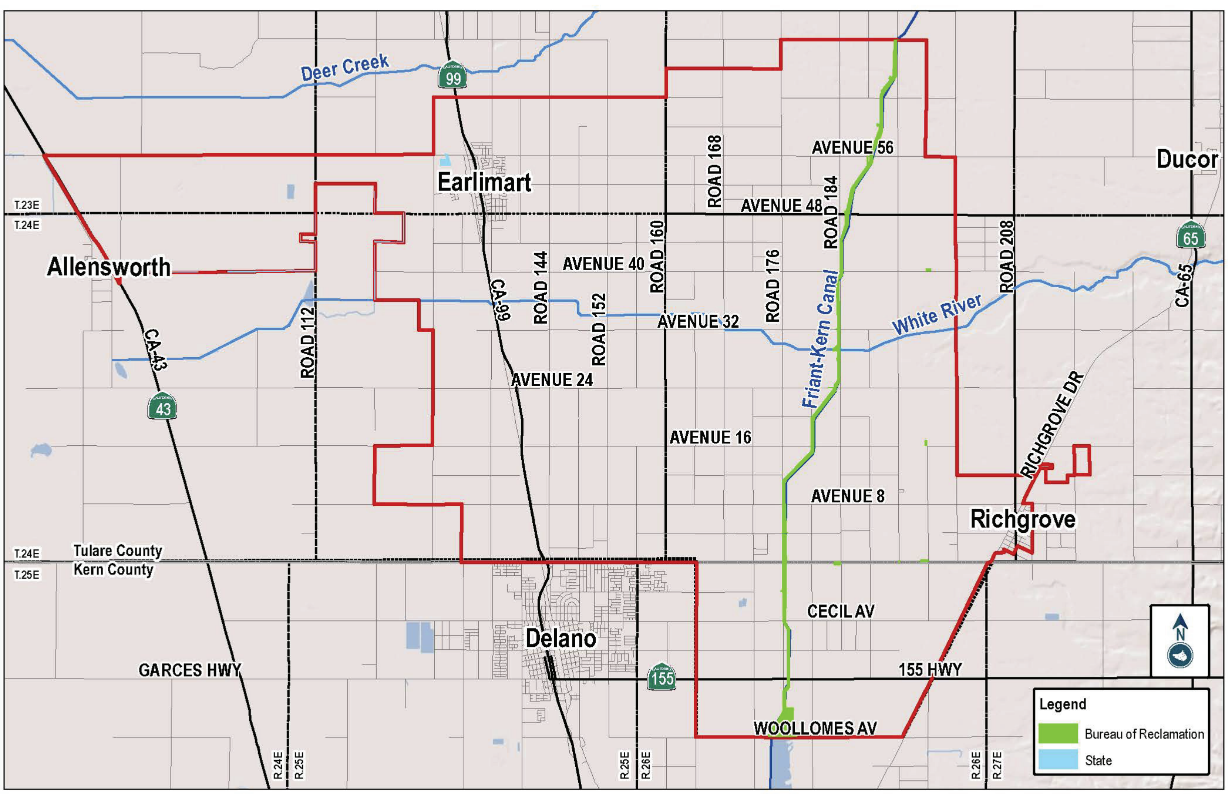

Figure 1-3: Jurisdictional Boundaries within DEID GSA

1.4.1.3 Existing Land Use Designations *[23 CCR § 354.8(a)(4)*

23 Cal. Code Regs. § 354.8 Description of Plan Area. *Each Plan shall include a description of the geographic areas covered, including the following information:*

(a) *One or more maps of the basin that depict the following, as applicable:*

(4) *Existing land use designations and the identification of water use sector and water source type.*

Current land use is primarily permanent planting of grapes, almonds, pistachios, and other tree crops within DEID. Land use within the EPUD and the RCSD, which includes the unincorporated cities of Earlimart and Richgrove, is that of a typical rural community. **Figure 1-4: Land Use within DEID GSA per DWR 2014** provides land use of the DEID GSA according to 2014 Statewide Crop Mapping Global Information Systems Geodatabase (Land IQ, 2014). These are not General Plan land use designations. See **Section 1.4.4.1** for further information and discussion of General Plan land use designations.

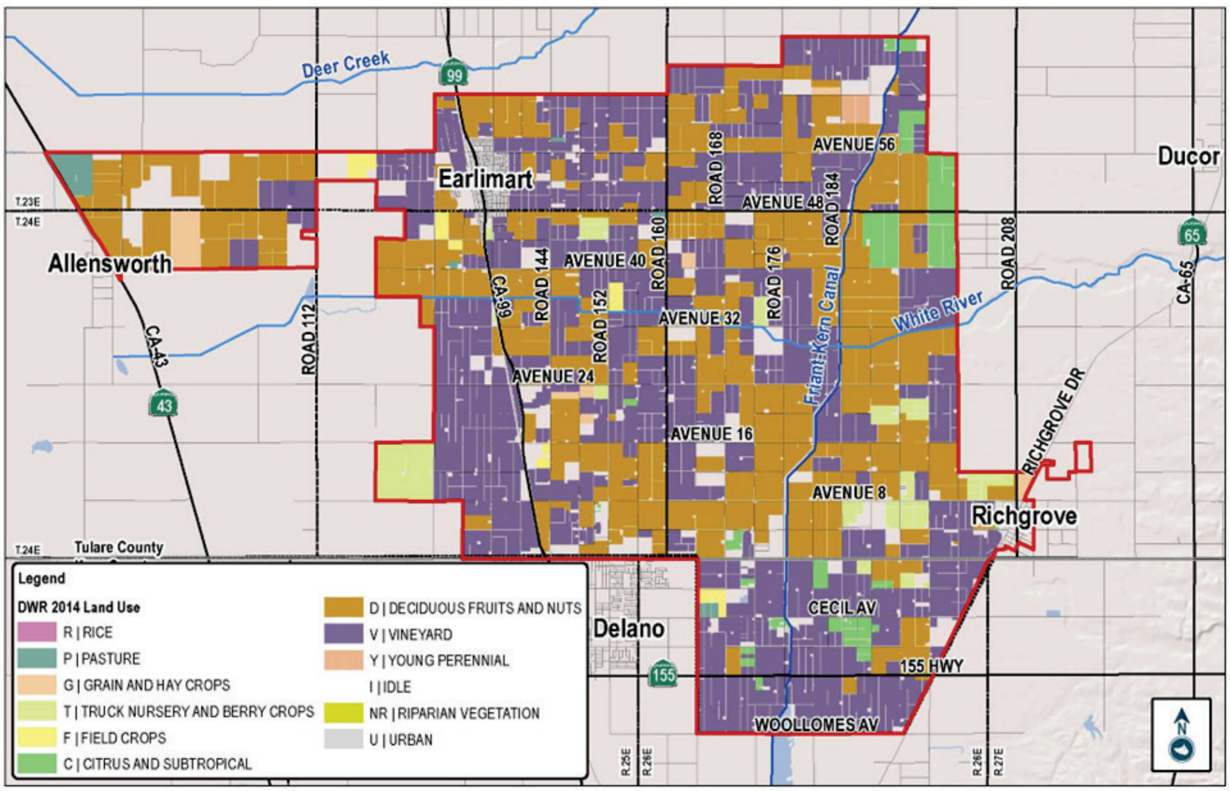

Figure 1-4: Land Use within DEID GSA per DWR 2014

Table 1-2 lists the crop type and approximate number of acres of each crop type using land use data available from DWR (2014).

Table 1-2: Land Use within DEID GSA per DWR (2014)

Crop Type	Acres
D | DECIDUOUS FRUITS AND NUTS	22,805
V | VINEYARD	27,477
I | IDLE	2,457
T | TRUCK NURSERY AND BERRY CROPS	1,657
P | PASTURE	389
C | CITRUS AND SUBTROPICAL	1,668
G | GRAIN AND HAY CROPS	595
Y | YOUNG PERENNIAL	151
F | FIELD CROPS	601
U | URBAN	5,053
UNK | UNKOWN	1,968
Total	**64,820**

1.4.1.4 Identification of Water Use Sector & Water Source Type

Each water use sector within DEID GSA area utilizes one or more water source types. Pursuant to the definition of water use sector in 23 CCR § 351(al), DEID GSA has identified and grouped water use into three primary sectors:

- **Urban/Industrial**: Urban and industrial water use is assigned to household and commercial water use in the two communities, rural domestic household use, and the limited industrial use of water—primarily associated with packing houses and agricultural facilities—that resides both within and outside of incorporated areas.
- **Agricultural:** Agricultural water use is assigned to water applied for commercial crop production, water utilized in dairy facilities, and water for livestock.
- **Managed Recharge:** Managed recharge water use is assigned to imported water specifically diverted to percolation water banking basins.

The DEID, EPUD, and RCSD each operate and maintain separate water supply and distribution systems. DEID primarily provides water for agricultural irrigation purposes. RCSD and EPUD provide potable water supply to customers within their respective service areas. Within the DEID GSA are also several private water wells utilizing groundwater for irrigation, industrial, and domestic uses. A portion of the DEID GSA relies exclusively on groundwater pumping for its domestic and/or irrigation water supply.

Water use sectors within the DEID GSA area utilize one or more of the following water source types: areal precipitation, groundwater, local surface water, imported water, and recharged imported water.

Section 2.3 of this Plan provides additional detail regarding DEID GSA's water budget and further describes the water use sectors and the water source types used to meet the demand of each sector within DEID GSA.

Figure 1-5: Water Use Sector by Water Use Type within DEID GSA identifies water use sectors within the DEID GSA by water source, and existing recharge percolation water banking basins within the GSA area.

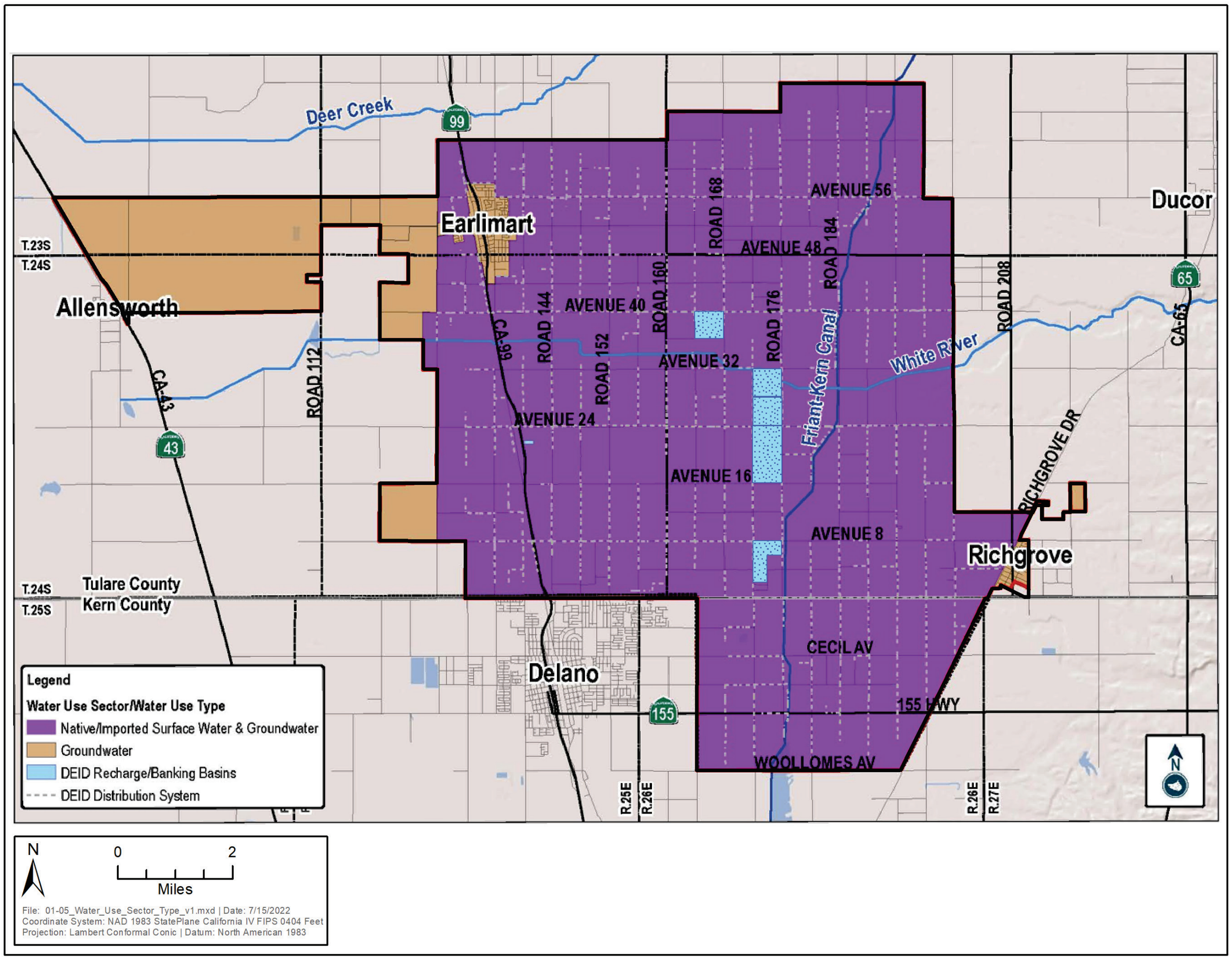

Figure 1-5: Water Use Sector by Water Use Type within DEID GSA

1.4.1.4.1 Existing Wells, Well Types, and Density *[23 CCR § 354.8(a)(5)]*

> **23 Cal. Code Regs. § 354.8 Description of Plan Area.** *Each Plan shall include a description of the geographic areas covered, including the following information:*
>
> **(a)** *One or more maps of the basin that depict the following, as applicable:*
>
> **(5)** *The density of wells per square mile, by dasymetric or similar mapping techniques, showing the general distribution of agricultural, industrial, and domestic water supply wells in the basin, including de minimis extractors, and the location and extent of communities dependent upon groundwater, utilizing data provided by the Department, as specified in Section 353.2, or the best available information.*

Figure 1-6: Well Density within DEID GSA reflects the density of wells in the DEID GSA per square mile based on the DWR Well Completion Report Map Application tool and **Table 1-3: Wells within DEID GSA by Well Type** identifies the count of wells by type. Please note that not all wells within each category of well types identified in **Table 1-3** may have been reported by the DWR reporting tool.

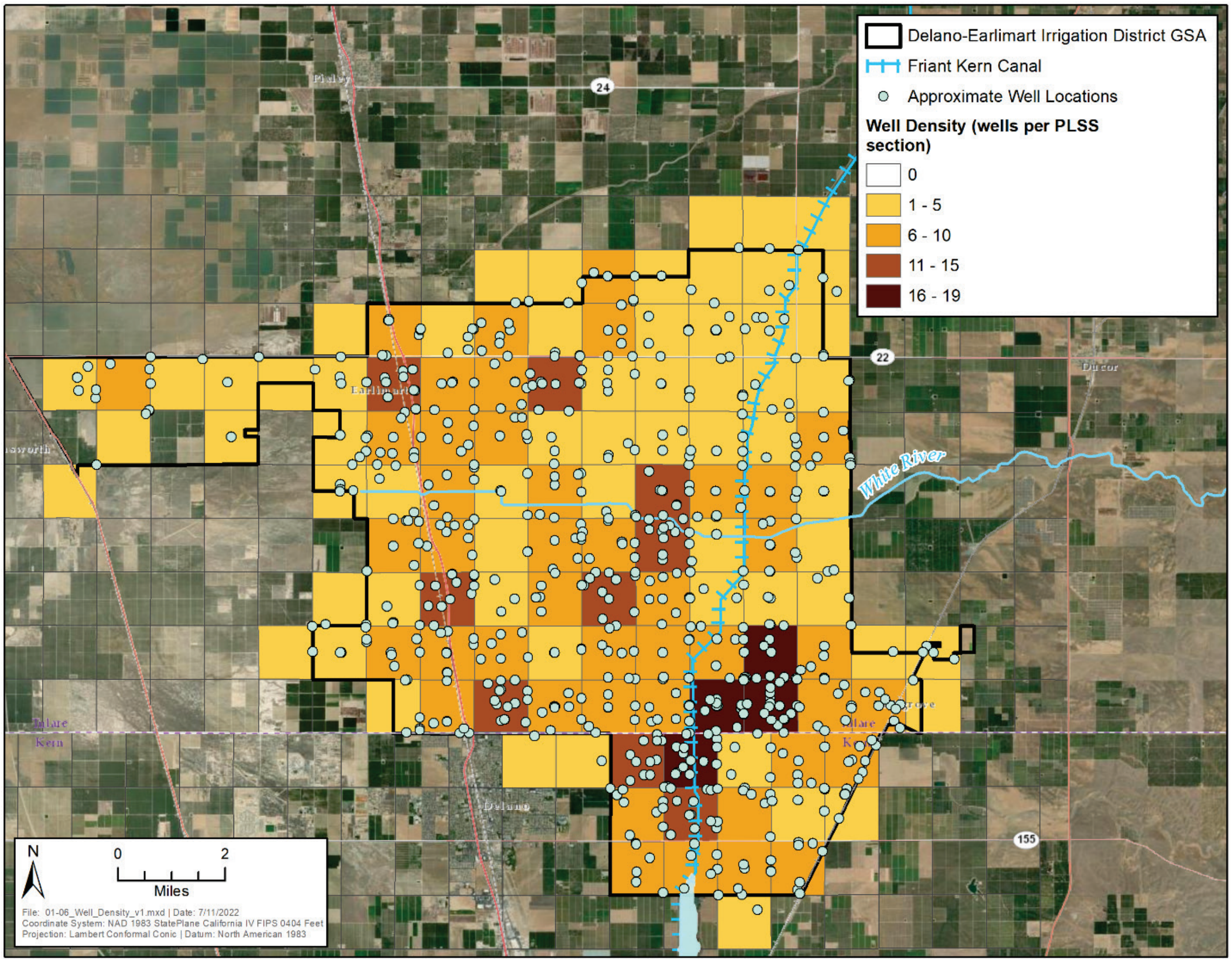

Figure 1-6: Well Density within DEID GSA

Table 1-3: Wells within DEID GSA by Well Type

Well Type	Count
Public/Municipal/Industrial	15
Domestic	79
Agricultural	524
Monitoring	15
Unknown	122
Total	**755**

Notes: Type and number of wells described within DEID GSA is the best available data at the time of this document (2020).

1.4.1.4.2 Communities Dependent on Groundwater

23 Cal. Code Regs. § 354.8 Description of Plan Area. *Each Plan shall include a description of the geographic areas covered, including the following information:*

(a) *One or more maps of the basin that depict the following, as applicable:*

(5) *The density of wells per square mile, by dasymetric or similar mapping techniques, showing the general distribution of agricultural, industrial, and domestic water supply wells in the basin, including de minimis extractors, and the location and extent of communities dependent upon groundwater, utilizing data provided by the Department, as specified in Section 353.2, or the best available information.*

This plan distinguishes between human communities (i.e. Groundwater Dependent Communities) and ecological communities (i.e. Groundwater Dependent Ecosystems) in its description of those communities dependent upon groundwater.

1.4.1.4.2.1 Potentially Groundwater Dependent Ecosystems

Groundwater Dependent Ecosystems (GDEs) are defined as "ecological communities or species that depend on groundwater emerging from the aquifers or on groundwater occurring near the groundwater surface." Utilizing the DWR Natural Communities (NC) Dataset Viewer map application (DWR, 2019), these ecosystems are shown to potentially occur along the natural reaches of the Tule River.

Figure 1-7: Potentially Groundwater Dependent Ecosystems within DEID GSA provides a map visualizing the extent of GDEs that may potentially occur within DEID GSA. The areas identified as potential GDEs on **Figure 1-7** are undeveloped parcels with the presence of iodine bush and shrubby seepweed as designated by the DWC NC Dataset Viewer Map application.

Section 2.2.7 of the Tule Subbasin Setting (**Appendix A-2**) notes that GDEs are unlikely to occur in the Tule Subbasin given that the average depth to groundwater relative to the root zone for groundwater dependent plants is well below those plants' roots systems.

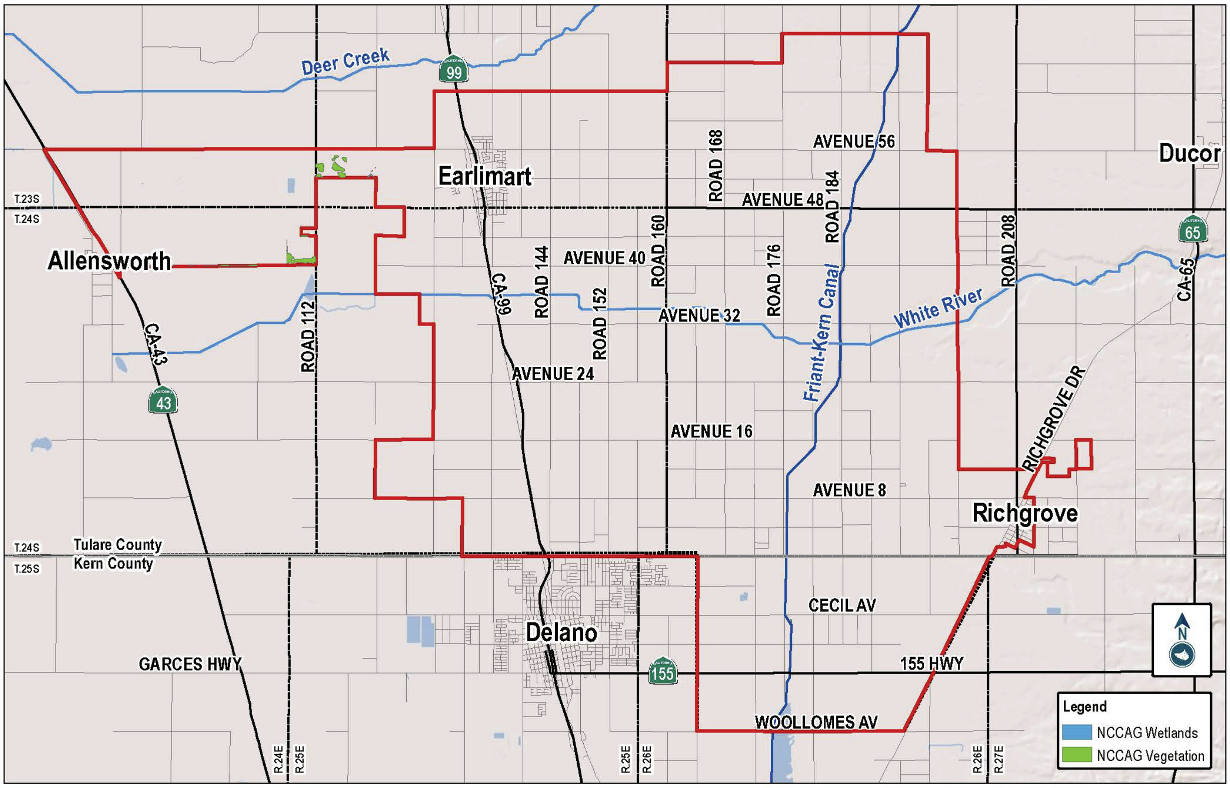

Figure 1-7: Potentially Groundwater Dependent Ecosystems within DEID GSA

1.4.1.4.2.2 Groundwater Dependent Communities

As previously described in **Section 1.4.1.4 Identification of Water Use Sector & Water Source Type** (see **Figure 1-5)**, the Earlimart and Richgrove communities, which are part of the DEID GSA, rely exclusively on groundwater extractions to meet their municipal and industrial needs. Both communities are considered either Disadvantaged or Severely Disadvantaged Communities.

1.4.2 Existing Water Resource Monitoring and Management Programs

[23 CCR § 354.8(c)]

23 Cal. Code Regs. § 354.8 Description of Plan Area. *Each Plan shall include a description of the geographic areas covered, including the following information:*

(c) *Identification of existing water resource monitoring and management programs, and description of any such programs the Agency plans to incorporate in its monitoring network or in development of its Plan. The Agency may coordinate with existing water resource monitoring and management programs to incorporate and adopt that program as part of the Plan.*

Within the DEID GSA, DEID first established an ongoing groundwater monitoring program in its 2007 adopted Groundwater Management Plan (GWMP) for the DEID Management Area. Regular monitoring of groundwater levels, groundwater quality, imported water, and conjunctive use operations continues today. Additional monitoring data are available from local, state, and federal agencies. Water resource monitoring programs for the DEID GSA are summarized below.

Water resources monitoring and management have a long history in the Tule Subbasin. Monitoring and management programs are conducted at regional and local scales, ranging from Federal and State programs (e.g., National Oceanic and Atmospheric Administration and California Statewide Groundwater Elevation Monitoring Program, respectively) and regional plans (e.g., Integrated Regional Water Management Plan) to water system monitoring by local entities. Water resource monitoring programs reviewed in the development of this plan include:

DEID Groundwater Management Plans (GWMP) - The Groundwater Management Act, passed in 1992 as AB 3030, provided for local groundwater management through voluntary GWMPs developed by existing local agencies. The bill has since been modified by SB 1938 and AB 359**.** GWMPs provide for planned and coordinated groundwater monitoring, operation, and administration of groundwater basins with the goal of long-term groundwater conjunctive use and resource sustainability. DEID last prepared a GWMP in 2007; however, with the development of this GSP, much of the data contained in the GWMP has been updated and in some cases corrected. Even to the extent the GWMP may no longer be in effect due to DEID's adoption of its GSP, the monitoring program continues.

Irrigated Lands Regulatory Program (ILRP) - The Irrigated Lands Regulatory Program (ILRP) of the Regional Water Quality Control Board (RWQCB) regulates waste discharges from irrigated lands. The ILRP focuses on priority water quality issues, such as pesticides and toxicity, nutrients, and sediments. There are 14 coalitions in the Central Valley region that help growers comply with the general orders; one of these is the Tule Basin Water Quality Coalition (TBWQC), which operates programs to monitor and improve surface water and groundwater quality associated with agricultural activities.

In response to the RWQCB's General Order, TBWQC prepared a Groundwater Quality Assessment Report (GAR, TBWQC, 2015), which provided a groundwater quality assessment and documented high vulnerability areas where discharges from irrigated agriculture may have degraded groundwater quality. The focus was primarily on nitrate (NO_3) with evaluation of electrical conductivity (EC) in the same area.

With the recognition of high vulnerability areas and areas with confirmed water quality exceedances, in 2017 TBWQC also prepared a Revised Comprehensive Groundwater Quality Management Plan (CGWMP; TBWQC, 2017). While CGQMP implementation is focused on irrigation and nutrient management practices to improve water quality, it also provides a Groundwater Quality Trend Monitoring Program (GQTMP) to develop long-term groundwater quality information to evaluate regional effects of irrigated agriculture ()

<u>Surface Water Quality Monitoring Plan, 2014</u> - TBWQC has prepared a Surface Water Quality Monitoring Plan (TBWQC, 2014) in response to the RWQCB's General Order No. R5-2013-0120 (Waste Discharge Requirements General Order for Growers within the Tulare Lake Basin Area that are Members of a Third-Party Group; herein General Order).

In the TBWQC area, there are three natural waterways that enter the TBWQC coverage area and exit into other areas that can benefit from its beneficial uses: the Tule River, the Deer Creek, and the White River ()

Since 2006, the Tule River Sub-Watershed has sampled and monitored the surface water quality at each of seven monitoring stations as follows:

- Porter Slough below Road 192

- Tule River at Road 144
- Tule River at Road 92
- Deer Creek at Road 248
- Deer Creek at Road 176
- Deer Creek at Road 120
- White River at Road 208

The proposed sites selected for the fixed monitoring locations along the Tule River, Deer Creek, and White River were chosen to provide a series of monitoring sites among the irrigated agricultural lands along each water body within the TBWQC. In general, along each of the three natural waterways within the TBWQC, a monitoring station was established at the location the waterway enters the irrigated agriculture area of the Subbasin from the Sierra Nevada Mountains and at the downstream end of the waterway where limited flow occurs. For the Tule River and Deer Creek, intermediate monitoring sites were added to better characterize and distinguish between potential discharges from the different irrigated lands and municipalities along the channel.

Sampling generally occurs over one or two days per monitoring event, with one event occurring each month. Consistent with RWQCB requirements, the surface water monitoring parameters include field measurements, general physical parameters, metals, nutrients, pesticides, and water toxicity for designated species. These parameters are provided in the TBWQC Surface Water Monitoring Plan (TBWQC, 2014).

State-Wide Groundwater Quality Monitoring - State-wide sources of groundwater quality data include the Water Data Library (WDL), GeoTracker/GAMA program, and the State Water Resources Control Board's (SWRCB) Division of Drinking Water. DWR's WDL is a repository for groundwater quality data. Samples are collected from a variety of well types including irrigation, stock, domestic, and some public supply wells.

Established in 2000, the GeoTracker Groundwater Ambient Monitoring and Assessment (GAMA) Program monitors groundwater quality throughout the state of California. GAMA is intended to create a comprehensive groundwater monitoring program throughout California and increase public availability and access to groundwater quality and contamination information. GAMA receives data from a variety of monitoring entities including DWR, U.S. Geological Survey (USGS), and the SWRCB.

The SWRCB's Division of Drinking Water (DDW, and formerly the Department of Health Services) monitors public water system wells for California Code of Regulations Title 22 requirements relative to levels of organic and inorganic compounds such as metals, microbial compounds and radiological analytes. Data are available for active and inactive drinking water sources for water systems that serve the public, and wells defined as serving 15 or more connections or more than 25 people per day. Such systems within the DEID GSA include EPUD, RCSD and the Rodriquez Labor Camp. The Rodriquez Labor Camp is rural housing area of approximately 60 acres in size with approximately 35 homes served by a single groundwater extraction well.

DEID Water Quality Monitoring - The DEID relies on the water quality monitoring program conducted by the Friant Water Authority as well as monitoring programs conducted by other contractors that receive imported water for municipal drinking water supplies from the FKC. These programs provide a history of ongoing water quality sampling events and test results. Test results are public information and available to any interested party upon request. While this program is primarily designed to address domestic water quality, the generated data covers many constituents of concern related to agricultural uses as well.

Consistent with the current practice of DEID, the DEID GSA will refer all requests for water quality information to Friant Water Authority, TBWQC, the GAMA program, and/or the State DDW.

1.4.2.1 Limitations of Existing Monitoring and Management *[23 CCR § 354.8(d)]*

23 Cal. Code Regs. § 354.8 Description of Plan Area. *Each Plan shall include a description of the geographic areas covered, including the following information:*

(d) *A description of how existing water resource monitoring or management programs may limit operational flexibility in the basin, and how the Plan has been developed to adapt to those limits.*

In terms of limiting operational flexibility, there exists a redundancy between the California Statewide Groundwater Elevation Monitoring (CASGEM) and the Assembly Bill (AB) 3030 plan, requiring individuals and agencies to complete the same work in multiple efforts.

Since 2009, the CASGEM Program has tracked seasonal and long-term groundwater elevation trends in groundwater basins statewide. The program's mission is to establish a permanent, locally managed program of regular and systematic monitoring in all of California's alluvial groundwater basins. This early attempt to monitor groundwater continues to exist as a tool to help achieve the goals set out under the SGMA.

Additionally, **Section 4. Monitoring Network** and the *Tule Subbasin Monitoring Network* (**Appendix A-1** as Attachment 1 of the Tule Subbasin Coordination Agreement) provides a description of existing monitoring programs that will be utilized for implementing this Plan and were data gaps exist in said programs that will be addressed throughout the implementation period.

1.4.3 Conjunctive Use Programs *[23 CCR § 354.8(e)]*

23 Cal. Code Regs. § 354.8 Description of Plan Area. *Each Plan shall include a description of the geographic areas covered, including the following information:*

(e) *A description of conjunctive use programs in the basin.*

Conjunctive use of water is defined as the coordinated use of both subsurface and imported water sources so that the combination will result in optimum benefits. Importation of water through contracts held by irrigation and water districts with the federal government along with local surface water projects provides the basic water supply that allows conjunctive use to be employed in the Tule Subbasin. By utilizing imported water, conjunctive use can be implemented through in-lieu use (direct delivery of imported water to users that is a direct offset of groundwater that would have otherwise been extracted), direct groundwater recharge (delivery of imported water to projects designed and constructed for recharging groundwater), and groundwater banking (direct recharge projects that include the ability to recover groundwater that was previously recharged for delivery to users).

DEID Management Area:

The DEID Management Area is the area of the DEID GSA that is within the boundaries of the DEID. Irrigation in the Delano and Earlimart areas began in the late 1800s with artesian wells, but by the 1930s, declining groundwater levels threatened the continued economic viability of agricultural operations. By 1947, the mean depth to groundwater had fallen every year since 1905, indicating an imbalance of water demand and supply. DEID was formed in 1938 and signed its original water service contract for water delivery from the Friant Division of the Central Valley Project (CVP) with the Bureau of Reclamation in 1951, which has been renewed several times since. The Bureau of Reclamation facilities include the Friant Dam (Millerton Reservoir), the 152-mile FKC and the 36-mile Madera Canal. Construction of Friant Dam was completed in 1944, the FKC in 1951, and the Madera Canal in 1945. On average, the canals deliver 1.2 million acre-ft of irrigation water annually to more than 15,000 farms on over one million acres of the most productive farmland in the world (Friant Water Authority, 2022). The Friant Division was designed and is operated as a conjunctive use project to convey surface water for direct beneficial uses, such as irrigation and municipal supplies, and to recharge groundwater basins in the southern San Joaquin Valley. The ability to move significant water through the Friant Division’s canals in wetter years to store in groundwater recharge basins is critically important for the project to work as intended, and these operations sustain the primary source of drinking water for nearly all cities, towns, and rural communities on the Valley’s East side (Friant Water Authority, 2022).

Imported water is delivered to DEID through nine separate points of diversion on the FKC. From 1951 to 1955 DEID constructed a distribution system consisting of 172 miles of pipeline, 18 pumping plants and 5 regulating reservoirs that serves over 450 landowners, with an average farm size of approximately 120 acres. **Figure 1-8: DEID Distribution System and Recharge Facilities** shows the location of pipelines and recharge facilities. The cost of the distribution system exceeded $14,000,000 at the time of construction. Since its inception, DEID has implemented a conjunctive use program to provide a consistent and reliable water supply.

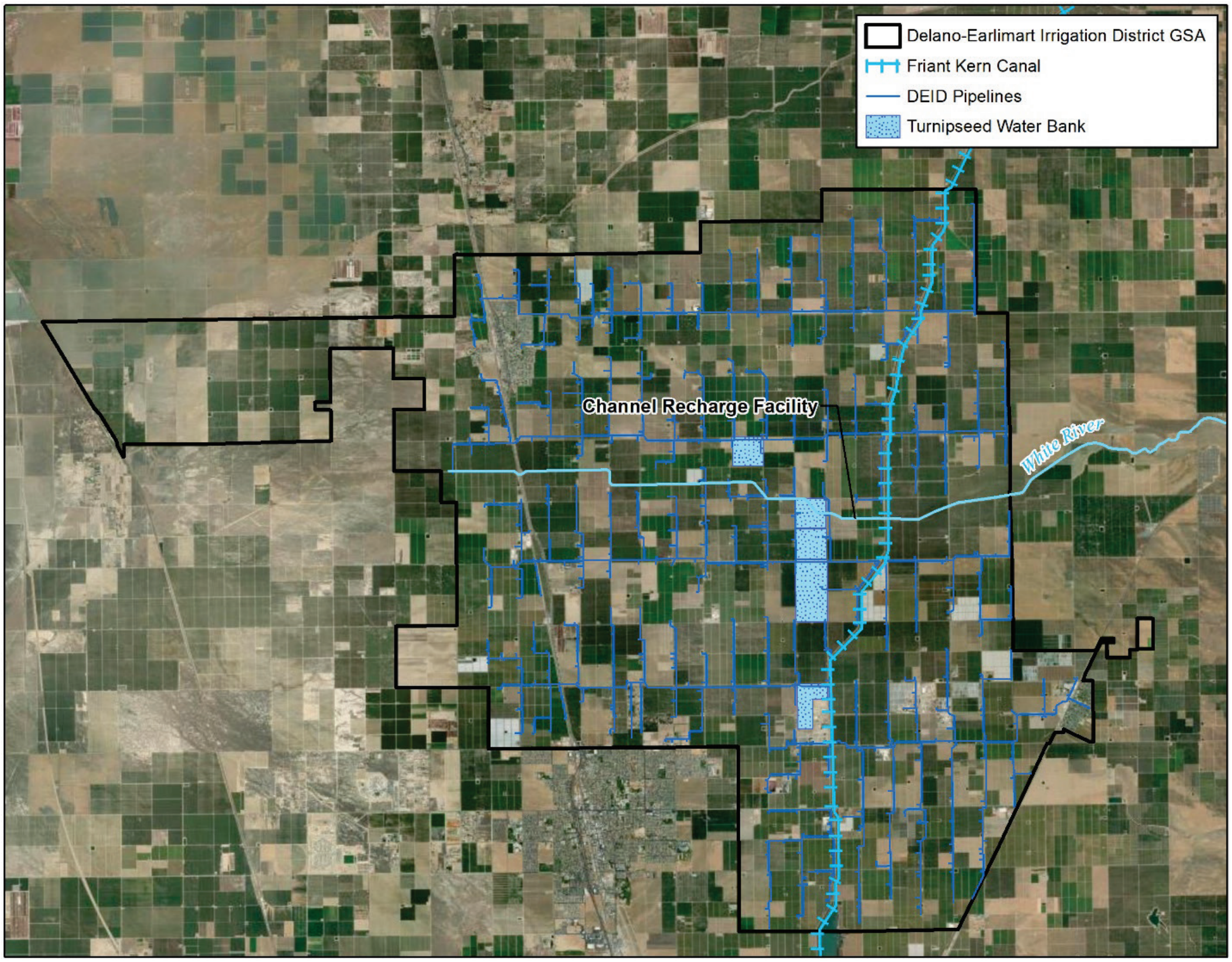

Figure 1-8: DEID Distribution System and Recharge Facilities

The Friant Division of the CVP uses a "Class 1/Class 2" water contracting system. Class 1 water is commonly referred to as the "firm yield" of the CVP and was intended to be a supply that would be dependable in every year regardless of hydrology. Class 1 water has historically been reliable until the 2006 San Joaquin River Restoration Settlement (SJRRS or Settlement) Agreement in *NRDC, et al., v. Kirk Rodgers*.

The Settlement was signed thatand brought the end to an 18-year lawsuit. The dispute resolved by the SJRRS was over the operation of Friant Dam and longstanding legal claims brought by a coalition of environmental groups related to the river's historic population of salmon. Since Friant Dam became fully operational in the late 1940s, approximately 60 miles of the river have been dried up in most years, eliminating salmon above the San Joaquin River's confluence with the Merced River. The SJRRS includes two goals: (1) restoration and (2) water management. The restoration goal is to restore and maintain fish populations in "good condition" in the main stem of the San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish. The water management goal is to reduce or avoid adverse water supply impacts to all of the Friant Division long-term contractors that may result from the Interim Flows and Restoration Flows provided for in the SJRRS. The SJRRS requires specific releases of water from Friant Dam to the confluence of the Merced River to meet the various life stage needs for spring and fall run Chinook salmon. The release schedule assumes continuation of the current average Friant Dam release of 116,741 acre-ft, with additional flow requirements depending on the water year type. characterized by six hydrologic year types based on a recurrence over an 82-year simulation (1922–2003): wet, normal-wet, normal-dry, dry, critical-high, and critical-low. For example, approximately 247,000 acre-ft would be released in most dry years, whereas about 555,000 acre-ft would be released in wet years. As a long-term annual average, Friant contractors will give up approximately 18 percent of their water supply. The Bureau of Reclamation's San Joaquin River Restoration Program (SJRRP) is charged with implementation of the Settlement.

The SJRRS provides for water supply benefits to Friant Contractors described in the Stipulation of Settlement Paragraph 16(a) for recirculation, recapture, reuse, exchange or transfer of Interim Flows and Restoration Flows and 16(b) a Recovered Water Account (RWA) and water program to make water available to all Friant water contractors who provide water to meet Interim Flows and Restoration Flows (Stipulation of Settlement 2006). The Friant Water Authority indicates Paragraph 16(a) recaptured/recirculated water is restricted at this time and limited to recapture of flows that can be released from Friant Dam for the purpose of meeting the Restoration Goal (Friant Water Authority 2018). Paragraph 16(b) RWA is currently underutilized but provides for a fixed $10 per acre foot price for wet year supplies of water spilled from Friant Dam. 16(b) stipulates RWA that represents water not required to meet SJRRS or other requirements be made available to Class 1 and 2 contract supplies that experience a reduction in water deliveries from the implementation of the SJRRS.

The first 800,000 acre-ft of CVP Friant Division yield made available is considered Class 1 water. Class 2 water is the next 1.4 million acre-ft. Historically, on average, about 650,000 acre-ft of Class 2 water is made available in a water year. DEID is the largest Class 1 Friant contractor, with a contract for 108,800 acre-ft of Class 1 water. DEID also contracts for 74,500 acre-ft of Class 2 water (Bureau of Reclamation Contract Number I75r-3327D [**Appendix K**]). Additionally, DEID's CVP contract provides opportunity to access other water supplies that are made available from time to time during particularly wet years. Such supplies including the following categories:

1. Section 215 Water: Unsortable water that is made available to Friant Contractors pursuant to contracts with Bureau of Reclamation when the opportunity to fully utilize their Class 1 and 2 contracts is afforded and hydrology further requires an urgent evacuation of water from Millerton Lake for flood control purposes.

2. Flood Waters: In extremely wet hydrologic periods when Bureau of Reclamation has exercised all available contractual and flood control means to evacuate water from Millerton Lake and further need exists to evacuate water, flood water has been provided to contractors.

3. Unreleased Restoration Flows: Restoration Flows not released for purposes of the Restoration Goal are made available to Friant Contractors on an exchange or sale basis as Unreleased Restoration Flows.

4. Recaptured/Recirculated Water: When Restoration Flows are released from Millerton Lake into the San Joaquin River to meet the Restoration Goal, any water no longer needed for the Restoration Goal that is recaptured in Mendota Pool or remaining flows recaptured past the confluence of the Merced River is accounted for as Recaptured Water. These volumes accrue in San Luis Reservoir in the accounts of Friant Contractors and can be exchanged for other water or recirculated back to the Friant Division.

5. Recovered Water Account (RWA) Water: Prior to implementation of the Settlement, Restoration Flows would have been delivered to Friant Contractors as contracted Friant Supply. The Recovered Water Accounts are used to track the cumulative volumes of water that have been taken out of the Friant Supply by the SJRRP. As hydrology allows, these volumes are then made available to Friant Contractors to offset the impacts of reduced deliveries experienced during drier years.

The historical surface water available to DEID from the Bureau of Reclamation during each hydrologic year was initially defined by the 2006 Settlement Agreement and has since been updated by the Friant Water Authority as provided in **Table 1-4: Available CVP Allocation 2015 Historical Conditions** presents simulated water availability by water year type and for three levels of restoration and water management goal implementation.

Table 1-4: Available CVP Allocation 2015 Historical Conditions

Water Year Type[1]	Percent of Total Years	Millerton Inflow (TAF/yr)	SJRRP Releases (TAF/yr)	Number of Years in Water Year Type	DEID Class 1 Allocation Percent / Acre-feet	DEID Class 2 Allocation Percent / Acre-feet
Pre-SJRSS						
Wet	20%	2,947.8	116.8	16	100% / 108,800	100% / 74,500
Normal-Wet	30%	1,922.7	116.8	25	100% / 108,800	66.8% / 49,780
Normal-Dry	29%	1,317.6	116.8	24	99.5% / 108,292	28.0% / 20,837
Dry	15%	1,002.9	116.8	12	88.1% / 95,890	2.4% / 1,774
Critical[2]	6%	694.1	116.8	5	50.5% / 54,915	0.0% / 0
Long-Term		1,733.8	116.8	82	95.1% / 103,411	48.2 % / 35,903
Limited SJRSS / Limited Access						
Wet	20%	2,947.8	501.5	16	100% / 108,800	98.6% / 73,483
Normal-Wet	30%	1,922.7	358.3	25	100% / 108,800	61.2% / 45,590
Normal-Dry	29%	1,317.6	331.6	24	95.8% / 104,192	9.6% / 7,128
Dry	15%	1,002.9	287.2	12	71.4% / 77,712	0.1% / 40
Critical[2]	6%	694.1	227.9	5	43.4% / 47,264	0.0% / 0
Long-Term		1,733.8	360.1	82	91.0% / 99,031	40.5 % / 30,141
Limited SJRSS / Full Access						
Wet	20%	2,947.8	501.5	16	100% / 108,800	99.1% / 73,844
Normal-Wet	30%	1,922.7	358.3	25	100% / 108,800	61.2% / 45,588
Normal-Dry	29%	1,317.6	331.6	24	95.4% / 103,762	9.6% / 7,145
Dry	15%	1,002.9	287.2	12	69.8% / 75,952	0.0% / 0
Critical[2]	6%	694.1	227.9	5	44.1% / 48,029	0.0% / 0
Long-Term		1,733.8	360.1	82	90.7% / 98,690	40.6 % / 30,211

Notes: 1. The six water year types are classified as follows: 20% wet, 30% normal-wet, 30% normal-dry, 15% dry and 5% critical.
2. A subset of critical years are classified as critical high and critical low with the critical low yeas having less than 400,000 acre-ft of unimpaired runoff. DEID's Class 1 delivery in critical years 2014 and 2015 was 30% and 16%, respectively. Under current and future conditions, it is expected that less water will be available under critical conditions than under historical conditions. DEID will have access to additional water supply from the RWA and other sources under wet conditions.

Source: Friant Water Authority, 2018.

As a result of DEID's extremely efficient distribution system and its large CVP water contracts, the DEID Management Area has successfully implemented conjunctive use programs throughout its history. From 1986 to 2021, DEID imported a total of 3.9 million acre-ft of water or on average 107,000 acre-ft/year as shown in **Figure 1-9: DEID Imported Water.** Since 1951, cumulative imported water from the Friant Division of the CVP is more than 8 million acre-ft.

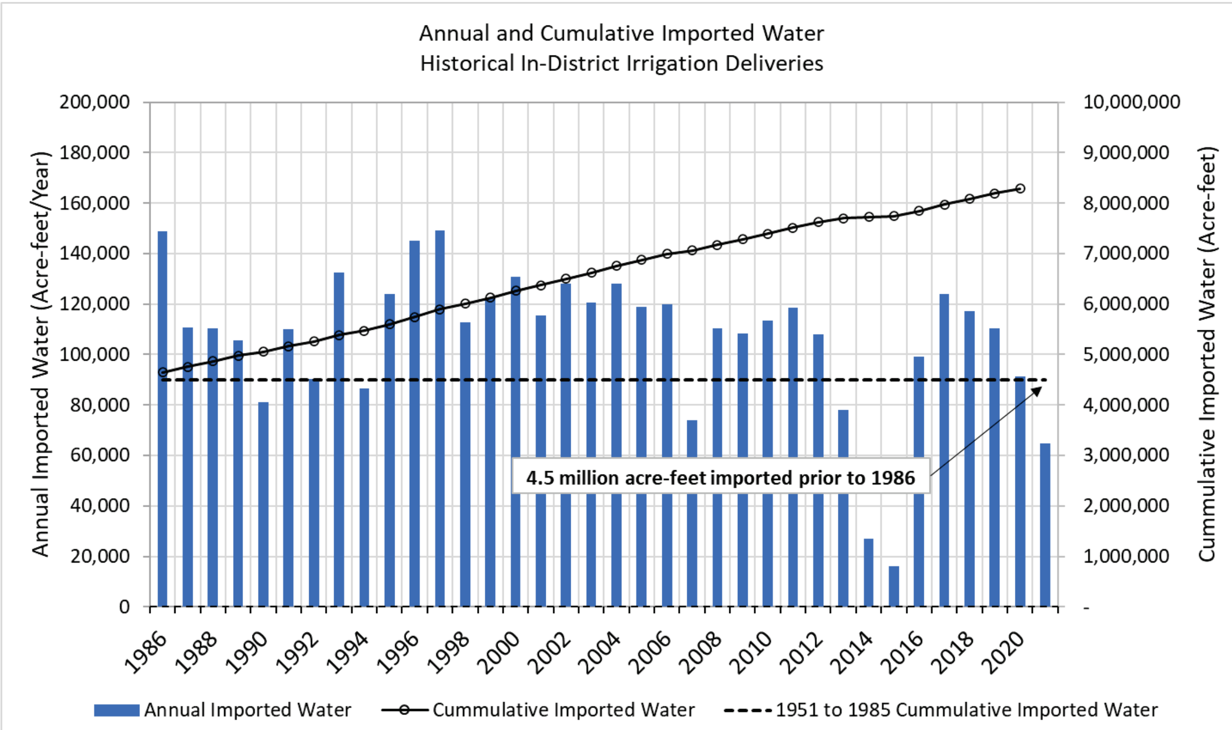

Figure 1-9: DEID Imported Water

DEID conducts direct groundwater recharge during surplus water years through recharge operations within the White River channel, at a small 5-acre recharge basin near the DEID headquarters, and at the dedicated Turnipseed groundwater banking project within the DEID Management Area. The banking project initially began in 1993 with the purchase of an 80-acre parcel adjacent to White River. The site was developed for direct groundwater recharge with five separate cells and dual methods of introducing water to each cell, either from DEID's distribution system or from direct diversions of Friant Division supply from White River.

DEID doubled the groundwater banking project footprint when it purchased an adjacent 80-acre parcel in mid-2009. The property was developed during 2010 into four inter-connected recharge basins with the ability to receive water from either DEID's distribution system or from White River. By 2010, this 160-acre direct groundwater recharge project was converted to groundwater banking project with the construction of the last of five groundwater recovery wells on the project site. In February 2021, DEID added Phase 3, which expanded Turnipseed by an additional 320 acres. Construction of Phase 4, an additional 160-acre site, was completed in June of 2022. When Phases 5 and 6 come online, the total area of the groundwater bank is planned for up to 944 acres and will have the capability to recharge an average annual 31,000 acre-ft/year of imported water.

DEID is also involved in two separate out-of-district (OOD) groundwater banking projects that allows DEID to deliver project and non-project water in surplus years for later recovery and use in DEID. DEID has been involved in OOD projects since 2006. DEID's OOD banking projects have a total banking capacity of 154,000 acre-ft. A total of 240,833 acre-ft have been banked over the life of the two OOD projects. From 2006 to 2021, approximately 103,494 acre-ft or an average annual water supply of 6,468 acre-ft was recovered from OOD projects.

Additional long-term OOD water exchanges have also been entered into for the benefit of the DEID MA. In 2017, 2018, 2019, 2020, and 2021 surplus CVP supplies were banked through long-term exchanges that will provide 36,322 acre-feet of return water.

On an average annual basis DEID has deposited 18,002 acre-ft of water in all OOD projects and as of 2022 has over 76,456 acre-ft of OOD project water available for recovery in future years. This is an important extension of DEID's conjunctive use program.

Western Management Area:

No dedicated conjunctive use program exists within the Western Management Area.

RCSD Management Area:

No dedicated conjunctive use program exists within the RCSD Management Area.

EPUD Management Area:

No dedicated conjunctive use program exists within the EPUD Management Area.

1.4.4 Summary of Land Use Plans *[23 CCR § 354.8(f)(1)]*

23 Cal. Code Regs. § 354.8 Description of Plan Area. *Each Plan shall include a description of the geographic areas covered, including the following information:*

(f) *A plain language description of the land use elements or topic categories of applicable general plans that includes the following:*

(1) *A summary of general plans and other land use plans governing the basin.*

The Tulare County General Plan is provided by the Tulare County Zoning Ordinance. Zoning in the DEID GSA is mostly classified as Exclusive Agricultural. The communities of Earlimart and Richgrove are comprised mainly of residential, retail, agricultural cold storage, and light manufacturing zones.

Under Government Code seciton 65300 *et seq*, state law requires each City and County to prepare and adopt a comprehensive long-range General Plan (GP) for its future development. City and county land use plans contain provisions that may affect water demand in the basin. Further, the Urban Water Management Planning Act of 1983 requires urban water suppliers report on water resources and water shortage contingency planning. Within that context, SGMA requires that the GSP include a description of the considerations given to applicable city and county GPs and a description of any other adopted plans or programs related to water resources within the basin. The GSP must also include an assessment of how the GSP may affect those plans.[4]

[4] Water Code, § 10727.2(g).

GPs must address, to the extent the elements exist in the planning area (GOV §§ 65301(c), 65302) seven mandatory elements which are: land use; circulation; housing; open space; conservation; safety; and noise.

Tulare County possess the land use authority within DEID GSA. Tulare County also administers Community Plans, which are a part of the land use element of the county-wide GP. Within DEID GSA, areas with Community Plans addressed in this GSP include Richgrove and Earlimart.

Below is a description of land use and water management plans applicable to the Tule Subbasin, a discussion of the consideration given to those plans and an assessment of how the DEID GSP may affect those plans.

1.4.4.1 Tulare County 2030 General Plan Update

The Tulare County General Plan 2030 Update (Tulare County GP, County of Tulare, 2012) is a three-part planning document, officially adopted by the County Board of Supervisors in August 2012. Part I, entitled "Goals and Policies Report," covers the seven mandatory elements of a General Plan and several optional elements. Part II, entitled "Area Plans," consists of four adopted area plans: The Rural Valley Lands Plan, the Corridors Framework Plan, the Foothill Growth Management Plan, and The Mountain Framework Plan. These four plans cover the major geographical areas within the unincorporated areas of the County and establish policies applicable in these areas. Part III, entitled "Community, Hamlet, County Adopted City General, Valley Sub-Area, Corridor Sub-Area, Foothill Sub-Area, and Mountain Sub-Area Plans" consists of a number of existing planning documents and applies tailored policies to specified portions of the County.

Specific policies related to general plan Elements are found in Part I, which is organized into four components. Each of the components address one or more of the 14 elements covered by the Tulare County GP, guided by a series of concepts and principles. Listed under each element are a series of goals and policies that are to be implemented through measures that constitute a preliminary, anticipated work plan to carry out the identified goals and policies.

The County's Area Plans in Part II provide policies and designate land uses that generally encompass agricultural, rural, semi-rural, open space, and mountainous areas not otherwise within the designated urban or community boundaries described in Part III. Individual community plans are found in Part III. These plans provide an overview of each community plan area's general conditions, describe specific policies relevant to the area, and designate land use and development boundaries.

Land Use

Land Use is a primary focus of the Tulare County GP and is specifically addressed as an Element in Chapter 4 of Part I in the Tulare County GP. Among other things, this element describes the County's land use designations, which are applied based upon regional planning frameworks and other land use boundaries. A land use designation is "*an applied policy on the General Plan Land Use Diagrams that defines allowable uses and development standards for agricultural, residential, commercial, industrial development, and other basic categories of land use*." **Exhibit 1-1: Tulare and Kern County Planning Framework within DEID GSA** provided at the end of this section shows the land use planning Framework for within DEID according to Tulare County 2030 general Plan Update (County of Tulare, 2012) and the Kern County 2040 General

Plan Update (Kern County, 2009). Other Elements and Parts of the Tulare County GP relevant to general land uses within DEID GSA include:

- Part I, Component A, Chapter 2 - Planning Framework
- Part I, Component B, Chapter 3 – Agriculture
- Part I, Component C, Chapter 8 – Environmental Resource Management
- Part II, Chapter 1 – Rural Valley Lands Plan

Urban land use is more specifically managed in the Tulare County GP through the official adoption of Urban Development Boundaries (UDBs) and Urban Area Boundaries (UABs). UDBs establish a 20-year growth boundary that is consistent with the General Plan's time horizon and delineate an area around incorporated cities or unincorporated communities wherein urban development is allowed and services are likely to be extended. UABs are areas where land uses are presumed to have an impact upon the adjacent incorporated city. To coordinate land use planning with cities, the County adopts City UABs and City UDBs wherein the city regulates land use within the City UDB and the city and the County coordinate on land use within the City UAB. Generally, the Planning Area of a city's General Plan is coterminous with the County Adopted City UAB. Within DEID GSA, there are two Community Plans that include UDBs and/or UABs that are addressed by this GSP. The most recent version of these plans, as well as the UDBs and/or UABs that they define, include:

- Richgrove Community Plan Update (County of Tulare, 2017a)
    - UDB for Richgrove
- Earlimart Community Plan Update (County of Tulare, 2017b)
    - UDB for Earlimart

The Rural Valley Lands Plan encompasses the majority of DEID GSA's non-urban areas (County of Tulare 2012). This plan establishes policies for preserving agricultural and working landscapes. Policies include the establishment of minimum parcel sizes for areas zoned for agricultural and a fifteen-factor evaluation that must be undertaken to determine if certain agricultural lands may be suitable for urban/suburban type uses prior to approving such a change in land use designation or zoning.

The individual Community Plans noted above, as well as the respective information provided on population, land use, and water supply, are provided in Part III of the Tulare County GP, and are further described in **Section 1.4.4.2** and **Section 1.4.4.3**.

Water Resources and Supply

The Water Resources Element (Part 1, Component C, Chapter 11) of the Tulare County GP specifically addresses water resources Goals and Policies related to both County water quality and supply. Several other Elements described in Part 1 of the Tulare County GP also include Concepts, Principles, and Policies that address water resources management, including the Planning Framework Element (Part 1, Component A, Chapter 2), the Agriculture Element (Part 1, Component B, Chapter 3), the Environmental Resources Management Element (Part 1, Component C, Chapter 8), the Health and Safety Element (Part 1, Component C, Chapter 10), and the Public Facilities and Services Element (Part 1, Component D, Chapter 14). Additionally, the County's Community Plans also address water resources and supply.

Following the structure for Part I of the Tulare County GP, a selected subset of Part I's Concepts, Principles, Goals and Policies from various Elements describing water resources management have been provided below:

Component: A. General Plan Framework

Element: **2. Planning Framework**

Section: **2.5 New Towns**

Policy: **PF-5.2 Criteria for New Towns**

Policy Text: *"When evaluating proposals for New Town development, the County shall require all of the following: … 9. The adequate and sustainable water supplies be documented…."*

Component: B. Prosperity

Element: **3. Agriculture**

Section: **3.1 Agriculture Preservation**

Policy: **AG-1.13 Agriculture Related Land Uses**

Policy Text: *"The County shall allow agriculturally related uses, including value-added processing facilities by discretionary approvals in areas designated Valley or Foothill Agriculture, subject to the following criteria: … The operational or physical characteristics of the use shall not have a significant adverse impact on water resources or the use or management of surrounding agricultural properties within at least one-quarter (1/4) mile radius…."*

Policy: **AG-1.17 Agricultural Water Resources**

Policy Text: *"The County shall seek to protect and enhance surface water and groundwater resources critical to agriculture."*

Component: C. Environmental

Concept: **5. Water**

Concept Text: *"The long-term strategy for water in Tulare County centers on protecting and conserving existing water supplies and identifying new sources of water. As Tulare County continues to grow, new methods for conserving, treating, and supplying water will enable County residents and farmers to continue to have an adequate supply of quality water that limits long-term impacts on groundwater."*

Principle: **1. Protection**

Principle Text: *"Protect the supply and quality of urban, agricultural, and environmental water serving the County..."*

Principle: **2. New Sources**

Principle Text: *"Identify and encourage the development of new sources for water that do not deplete or negative impact groundwater…."*

Principle: **3. Recharge**

Principle Text: *"Identify and encourage the development of locations where water recharge systems can be developed to replenish water supplies…."*

Principle: **4. Adequate Supply**

Principle Text: *"Plan delivery systems to ensure adequate water is available to meet demands..."*

Principle: **5. Conservation**

Principle Text: *"Encourage efficient use, conservation, and reuse of water…"*

Element: **10. Health and Safety**

Section: **10.2 Geologic and Seismic Hazards**

Policy: **HS-2.7 Subsidence**

Policy Text: *"The County shall confirm the development is not located any known areas of active subsidence. If urban development may be located in such an area, a special safety study will be prepared and needed safety measures implemented. The County shall also request that developments provide evidence that its long-term use of ground water resources, where applicable, will not result in notable subsidence attributed to the new extraction of groundwater resources for the use by the development."*

Section: **10.5 Flood Hazards**

Policy: **HS-5.4 Multi-Purpose Flood Control Measures**

Policy Text: *"The County shall encourage multipurpose flood control projects that incorporate recreation, resource conservation, preservation of natural riparian habitat, and scenic values of the County's streams, creeks, and lakes. Where appropriate, the County shall also encourage the use of flood and/or stormwater retention facilities for use as groundwater recharge facilities."*

Element: **11. Water Resources**

Section: **11.1 General**

Policy: **WR-1.1 Groundwater Withdrawal**

Policy Text: *"The County shall cooperate with water agencies and management agencies during land development processes to help promote an adequate, safe, and economically viable groundwater supply of existing and future development within the County. These actions shall be intended to help the County mitigate the potential impact on groundwater resources identified during the planning and approval processes."*

Policy: **WR-1.3 Water Export Outside County**

Policy Text: *The County shall regulate the permanent export of groundwater and surface water resources allocated to users within the county to cities and service providers outside the*

County to the extent necessary to protect the public health, safety, and welfare. The County shall strive for a "no net loss" where there may be exchanges serving a public purpose."

Policy: **WR-1.8 Groundwater Basin Management**

Policy Text: *"The County shall take an active role in cooperating in the management of the County's groundwater resources."*

Policy: **WR-1.11 Groundwater Overdraft**

Policy Text: "*The County shall consult with water agencies within those areas of the County where groundwater extraction exceeds groundwater recharge, with the goal of reducing and ultimately reversing groundwater overdraft conditions in the County."*

Section: **11.2 Water Quality**

Policy: **WR-2.1 Protect Water Quality**

Policy Text: *"All major land use and development plans shall be evaluated as to their potential to create surface and groundwater contamination hazards from point and non-point sources. The County shall confer with other appropriate agencies, as necessary, to assure adequate water quality review to prevent soil erosion; direct discharge of potentially harmful substances; ground leaching from storage of raw materials, petroleum products, or wastes; floating debris; and runoff from the site."*

Section: **11.3 Water Supply**

Policy: **WR-3.1 Develop Additional Water Resources**

Policy Text: *"The County shall encourage, support and, as warranted, require the identification and development of additional water sources through the expansion of water storage reservoirs, development of groundwater banking for recharge and infiltration, and promotion of water conservation programs, and support of other projects and programs that intend to increase the water resources available to the County and reduce the individual demands of urban and agricultural users."*

Policy: **WR-3.3 Adequate Water Availability**

Policy Text: *"The County shall review new development proposals to ensure the intensity and timing of growth will be consistent with the availability of adequate water supplies. Projects must submit a Will-Serve letter as part of the application process and provide evidence of adequate and sustainable water availability prior to approval of the tentative map or other urban development entitlement."*

Policy: **WR-3.4 Water Resource Planning**

Policy Text: *"The County shall continue participation in State, regional, and local water resource planning efforts affecting water resource supply and quality."*

Policy: **WR-3.9 Establish Critical Water Supply Areas**

Policy Text: *"The County shall designate Critical Water Supply Areas to include the specific areas used by a municipality or community for its water supply system, areas critical to groundwater recharge, and other areas possessing a vital role in the management of the water resources in the County, including those areas with degraded groundwater quality."*

Pursuant SB 244, County of Tulare undertook and included as Appendix D of the Tulare County GP a Disadvantaged Communities Assessment. This Assessment provides an inventory of water and sewer systems, services, and connections for the County's disadvantaged communities. Communities described in this report that reside within DEID GSA include Tipton, Woodville, and Poplar.

Additionally, the County prepared an Environmental Impact Report (EIR) as part of the development and adoption of the Tulare County GP. Included as Exhibit G of this EIR is the County's Phase 1 Water Supply Evaluation. This document provides an initial analysis to support the determination of environmental impacts to water resources within Tulare County as associated with the adoption of the General Plan Update. The analysis indicates that groundwater basins within Tulare County are in a state of overdraft, but states "*the actions contemplated in the General Plan Update are not anticipated to cause overall demand in the County to vary from within the range of demands seen historically and documented by DWR - a range of about 2,600,000 acre-feet to 2,850,000 acre-feet." (Tulare County General Plan Update, Phase 1 - Water Supply Evaluation*). Several issues that the EIR assumes may affect water supplies include changes in California groundwater law, water supply and use legislation, regulatory risk, groundwater adjudications, population growth, and ongoing groundwater overdraft.

Tulare County's role in water management is broad and active, particularly through the implementation of its General Plan and its Zoning Ordinance (*Ordinance No. 352*), which translates Tulare County GP policies into specific use regulations and development standards. The County also administers other ordinances that influence the use and management of water within the County, and it may adopt additional ordinances in the future if deemed necessary. However, limited only to the implementation of its GP, Tulare County recognizes that its role in water management is neither comprehensive, nor is it to be construed as such; rather, water management within the County is carried out by way of dynamic interactions between the many participants who each bear a variety of responsibilities:

> "*Policies in this Element discussing the management of water resources are relative to the areas of water usage that the County has regulatory control, such as the approval of new land use development. The policies in this Element should not be construed to insert the County into the allocation or management of water resources. This is a complicated system over which the County does not have direct regulatory control.*" (*Tulare County General Plan 2030 Update)*

More explicit discussion of water needs, water supply, and water resources and services infrastructure for communities within DEID GSA with active Community Plans is provided below.

1.4.4.2 Richgrove Community Plan Update 2017

The Richgrove Community Plan 2017 Update (Richgrove CP) is a component of Part III of the Tulare County GP. Richgrove is a small, unincorporated severely disadvantaged community with a UBD of approximately 234 acres (County of Tulare, 2015). The community is located in the southeastern portion of Tulare

County. The Richgrove CP provides an overview of the community's general conditions, states the Tulare County GP policies relevant to Richgrove, describes goals and policies specific to Richgrove, and designates land use and development boundaries.

Land Use

The Richgrove CP provides four categories of Goals, Objectives and Policies specific to Richgrove that generally provide a framework for sustainable community and land use development. These are, namely, Community Development, Housing, Economic Base, and Environmental Quality.

Pursuant to the adoption of the Richgrove CP by the County of Tulare, land uses within Richgrove's UDB were updated in 2017. These land uses reflect the policies specific to Richgrove pursuant the Richgrove CP, as well as the policies within the Tulare County GP relevant to Richgrove. The current UBD for the community is projected to be sufficient for the community's growth according to the Richgrove CP, as vacant land is available for future development. However, it should be noted that some land uses identified in the Richgrove CP may have changed since adoption of the document, as warranted or requested in relation to various development projects and General Plan Amendments. **Exhibit 1-2: Richgrove Proposed Land Use** provided at the end of this section shows the proposed land uses within Richgrove from the 2017 community plan update (County of Tulare 2017a).

Water Resources and Supply

Water resources and supply are addressed under the Infrastructure section of the Richgrove CP. Municipal water services are supplied to the community by the RCSD. Richgrove CSD utilizes several underground wells for supplying municipal water to the community for residential and commercial usage.

The Richgrove CP addresses policies related to land development in the *Goals, Objective and Policies Specific to Richgrove* section of the Tulare County GP.

1.4.4.3 Earlimart Community Plan Update 2017

The Earlimart Community Plan 2017 Update (Earlimart CP) is a component of Part III of the Tulare County GP. Earlimart is a small, unincorporated Severely Disadvantaged Community with a UBD of approximately 773 acres (County of Tulare, 2017b). The community is located in the southeastern portion of Tulare County. The Earlimart CP provides an overview of the community's general conditions, states the Tulare County GP policies relevant to Earlimart, describes goals and policies specific to Earlimart, and designates land use and development boundaries.

Land Use

The Earlimart CP provides four categories of Goals, Objectives and Policies specific to Earlimart that generally provide a framework for sustainable community and land use development. These are, namely, Community Development, Housing, Economic Base, and Environmental Quality.

Pursuant to the adoption of the Earlimart CP by the County of Tulare, land uses within Earlimart's UDB were updated in 2015. These land uses reflect the policies specific to Earlimart pursuant the Earlimart CP, as well as the policies within the Tulare County GP relevant to Earlimart. The current UBD for the community is projected to be sufficient for the community's growth according to the Earlimart CP, as vacant land is available for future development. However, it should be noted that some land uses identified in the Earlimart CP may have changed since adoption of the document, as warranted or requested in relation to various development projects and General Plan Amendments. **Exhibit 1-3: Earlimart Proposed Land Use** provided at the end of this section shows the proposed land uses within Earlimart from the 2017 CP update (County of Tulare, 2017b).

Water Resources and Supply

Water resources and supply are addressed under the Infrastructure section of the Earlimart CP. Municipal water services are supplied to the community by the Earlimart Community Service District (CSD). Earlimart CSD utilizes two underground wells for supplying municipal water to the community for residential and commercial usage.

The Earlimart CP addresses policies related to land development in the *Goals, Objective and Policies Specific to Earlimart* section of the Tulare County GP.

1.4.4.4 Effects of Land Use Plans within the Tule Subbasin *[23 CCR § 354.8(f)(2)]*

23 Cal. Code Regs. § 354.8 Description of Plan Area. *Each Plan shall include a description of the geographic areas covered, including the following information:*

(f) *A plain language description of the land use elements or topic categories of applicable general plans that includes the following:*

(2) *A general description of how implementation of existing land use plans may change water demands within the basin or affect the ability of the Agency to achieve sustainable groundwater management over the planning and implementation horizon, and how the Plan addresses those potential effects.*

The long-term strategy for water in Tulare County centers on protecting and conserving existing water supplies and identifying new sources of water. As Tulare County continues to grow, continuing current and identifying new methods for conserving, treating, and supplying water will enable County residents and farmers to continue to have an adequate supply of quality water that limits long-term impacts on groundwater.

This GSP provides a detailed approach for sustainable use of water resources within its jurisdiction, staying within the generally stated goals and policies detailed in land use plans in **Section 1.4.4.1** through **Section 1.4.4.3**. Therefore, the implementation of existing land use plans is not anticipated to cause significant changes in water demand that would alter the GSA's ability to successfully implement its GSP and ultimately achieve its sustainability goal.

The DEID GSA does anticipate being involved in future proposed land use changes within its jurisdiction by the County of Tulare and the County of Kern as the agencies with jurisdiction over water use to ensure future land use plans align with the objectives outlined by this GSP.

1.4.4.5 Water Supply Assumptions of Land Use Plans *[23 CCR § 354.8(f)(3)]*

23 Cal. Code Regs. § 354.8 Description of Plan Area. *Each Plan shall include a description of the geographic areas covered, including the following information:*

(f) *A plain language description of the land use elements or topic categories of applicable general plans that includes the following:*

(3) *A general description of how implementation of the Plan may affect the water supply assumptions of relevant land use plans over the planning and implementation horizon.*

Water supply assumptions within the recently adopted General and Community Plans active within DEID GSA's jurisdiction generally provide global estimations (which may or may not extend out to 2070 population levels) of future water supplies and demands. Additionally, these plans provide Goals and Policies that recognize the need and, when implemented, provide for sustainable water management.

As part of the EIR developed for the Tulare County GP, the *Phase 1- Water Supply Evaluation* contemplates four scenarios of future supplies assuming baseline groundwater use across the County to be 1,633,100 acre-ft/year (County of Tulare, 2018). It should be noted that Scenarios 1 and 2 assume groundwater supplies to be available as historically used with projected groundwater use increasing or decreasing depending on hydrologic year type and implemented conservation measures, and Scenarios 3 and 4 assume constraints in available surface water supplies that project increases in average annual groundwater use. However, the EIR indicates that several issues may affect future water supplies, including changes in California groundwater law, water supply and use legislation, regulatory risk, groundwater adjudications, population growth, and ongoing groundwater overdraft.

Tulare County's Water Resources Goal 3, which recognizes the importance of a sustainable water supply, is "[t]o provide a sustainable, long-term supply of water resources to meet domestic, agricultural, industrial, and recreational needs and to assure that new urban development is consistent with available water resources" (Tulare County General Plan 2030 Update). This Goal resonates across all the Community Plans administered and adopted by Tulare County.

Development of this GSP has occurred in consultation with Tulare County who is a Member Agency of the Tule Subbasin MOU Group. This GSP provides for a sustainable groundwater management approach that appropriately observes the land use designations maintained by the county, and has considered the relative impact that current land use may have on existing groundwater supply and demand. DEID anticipates an active role in the future development and facilitation of the Tulare County's respective land use plans.

The projects and management actions proposed in this GSP provide a framework by which the opportunity to use lands according to existing land use designations as permitted by land use designations and zoning ordinances remains unaltered, subject to the sustainable use of groundwater within the DEID GSA's jurisdiction. However, the assumptions made by DEID GSA in this GSP anticipate a shift in water demand due to the implementation of certain projects and management actions that ultimately reduces the total volume of groundwater supply available for extraction on an annual basis and, therefore, current actual land uses reliant upon these groundwater supplies may change during the Plan's implementation horizon.

1.4.4.6 Well Permitting Process *[23 CCR § 354.8(f)(4)]*

23 Cal. Code Regs. § 354.8 Description of Plan Area. *Each Plan shall include a description of the geographic areas covered, including the following information:*

(f) *A plain language description of the land use elements or topic categories of applicable general plans that includes the following:*

(4) *A summary of the process for permitting new or replacement wells in the basin, including adopted standards in local well ordinances, zoning codes, and policies contained in adopted land use plans.*

Permitting of new or replacement water supply wells in Tulare County and Kern County are administered by their respective departments of jurisdiction. Each county maintains its own standards for the design, construction, repair, and reconstruction of agricultural wells, domestic wells, cathodic protection wells, industrial wells, monitoring wells, observation wells, geothermal heat exchange wells, and test wells in such a manner that the groundwater of the county will not be contaminated or polluted, and that water obtained for beneficial uses will not jeopardize the health and safety or welfare of the citizens of the respective county.

Each county has its own policies and procedures to obtain a water well permit. The DEID GSA shall request notification of any proposed water wells within the DEID GSA and shall further request the opportunity to review said requests so that the potential for undesirable effects that a new well might have on implementation of the GSP and provide comments and/or approval prior to issuance of any well permit. This process will also allow accurate tracking of groundwater wells in the GSA.

The Tulare County Well Ordinance has been revised to comply with Governor Newsom's Executive Order N-7-22 which requires that GSAs review permits for new wells to ensure consistency with the GSP.

Tulare County Well Ordinance can be found in **Appendix F: County of Tulare Well Permit Application.**

1.4.4.7 Effect of Land Use Plans Outside of the Tule Subbasin *[23 CCR § 354.8(f)(5)]*

23 Cal. Code Regs. § 354.8 Description of Plan Area. *Each Plan shall include a description of the geographic areas covered, including the following information:*

(f) *A plain language description of the land use elements or topic categories of applicable general plans that includes the following:*

(5) *To the extent known, the Agency may include information regarding the implementation of land use plans outside the basin that could affect the ability of the Agency to achieve sustainable groundwater management.*

All Subbasins adjacent to the Tule Subbasin, which include the Kaweah Subbasin, Tulare Lake Subbasin, and Kern Subbasin, are considered critically over-drafted and must achieve sustainable groundwater management by 2040. Moreover, DWR is required to evaluation all GSPs "… [*C*]*onsistent with the objective that a basin be sustainably managed within 20 years of Plan implementation without adversely affecting the ability of an adjacent basin to implement its Plan that groundwater resources within their respective Subbasins are sustainability managed by 2040*."

Given that GSPs implemented within adjacent Subbasins must (1) ensure no adverse impact to the GSPs implemented within the Tule Subbasin and must also (2) address any impact that the various land use plans active within their GSPs' respective Plan Areas may have on their successful implementation of their respective GSPs, DEID GSA does not anticipate any significant adverse impacts resulting from the implementation of land use plans adjacent to the Tule Subbasin.

1.5 Notices and Communications

1.5.1 Beneficial Uses and Users *[23 CCR § 354.10(a)]*

> **23 Cal. Code Regs. § 354.10 Notice and Communication.** *Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:*
>
> **(a)** *A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties.*

The DEID GSA has a number of beneficial uses and users of groundwater. Beneficial uses include agricultural irrigation as the primary use with municipal water and water used by agricultural support industries (i.e. processing facilities, cold storage facilities) as additional uses. Rural homesteads, which use groundwater for domestic purposes, are also located throughout the DEID GSA area.

Users associated with the above water uses include agricultural operators/irrigators, residents of the unincorporated communities of Richgrove and Earlimart, owners of ag-related industries, and rural homeowners.

Stakeholders from each of these types of users of groundwater were invited to various public meetings. Outreach was also made to groups affiliated with each of these groups including the local town council, service clubs, and school district boards. Additionally, the DEID board of directors as well as the DEID GSA board held publicly noticed meetings where members of the public could meet with and ask questions of their locally elected representatives.

1.5.2 List of Public Meetings *[23 CCR § 354.10(b)]*

> **23 Cal. Code Regs. § 354.10 Notice and Communication.** *Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:*
>
> **(b)** *A list of public meetings at which the Plan was discussed or considered by the Agency.*

The DEID GSA held a number of public meetings and other meetings at the request of stakeholders. See Section VIII of the DEID GSA Communication and Engagement Plan (see *Section 8* of *DEID GSA's Communication & Engagement Plan*) for the public outreach/engagement logs for a listing of meetings held. These meetings were held on both the original DEID GSP and this updated DEID GSP.

1.5.3 Comments Received on Plan and Agency Responses *[23 CCR § 354.10(c)]*

23 Cal. Code Regs. § 354.10 Notice and Communication. *Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:*

(c) *Comments regarding the Plan received by the Agency and a summary of any responses by the Agency.*

A number of oral comments were received on plan elements as they were proposed and discussed during various stakeholder meetings as the GSP was being developed. Written comments were also received during the development period which were considered as a part of stakeholder comments (**Appendix L**). DEID also reviewed the January 2022 Deficiency Letter from DWR and revised its GSP based upon the detailed review comments provided.

1.5.3.1 Agency Decision-Making Process *[23 CCR § 354.10(d)(1)]*

23 Cal. Code Regs. § 354.10 Notice and Communication. *Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:*

(d) *A communication section of the Plan that includes the following:*

(1) *An explanation of the Agency's decision-making process.*

The DEID GSA's decision-making process is broken down by the roles of the Board of Directors, Stakeholder Committee, and through a Subbasin Coordination Committee. The roles of these DEID GSA entities and their responsibilities are outlined below and described in more detail in **Section I.A.3** of the DEID GSA's Communication and Engagement Plan (see **Appendix G**).

Board of Directors – Responsible for all final decisions relative to the development of the GSA, GSP adoption, implementation of the GSP, and other related matters.

Stakeholder Committee – Advises the Board of Directors on matters dealing with GSA and GSP development, GSP implementation, and other GSA/GSP matters; open to all interested stakeholders who wish to participate. Committee meetings are generally split by the four management areas.

Subbasin Coordination Committee – The Committee consists of representatives from each of the Tule Subbasin GSAs to thoroughly collaborate efforts throughout the GSP development phase to meet the sustainability requirements for the entire Tule Subbasin.

1.5.3.2 Public Engagement Opportunities [23 CCR § 354.10(d)(2)]

23 Cal. Code Regs. § 354.10 Notice and Communication. *Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:*

(d) *A communication section of the Plan that includes the following:*

(2) *Identification of opportunities for public engagement and a discussion of how public input and response will be used.*

In addition to the information contained in the following sections, G provides more detail regarding public engagement opportunities, how DEID GSA encourages public involvement, and the processes in place informing the public of the progress of implementing this Plan.

Regular meetings with active stakeholder groups have been and will continue to be held. Members of the public and partners from other local agencies are encouraged to attend Board of Directors and Stakeholder Committee meetings to voice their thoughts and concerns throughout the GSP development process, public review, and implementation phases. Meeting notices and agendas are routinely distributed to the Interested Parties List and on the DEID GSA's page on the DEID website.

Public input has been and will continue to be important in the development and implementation the GSP, as the GSP will affect all groundwater users within the DEID GSA jurisdiction, and the impact of the SGMA implementation is significant. With that in mind, the DEID GSA views all public input as key to a successful sustainability plan. Input received from the public will be used in all aspects on GSP development and implementation.

Public engagement opportunities center around the following:

- Board of Directors Meetings – Held periodically, as necessary, usually preceding the DEID Board of Directors meeting at 4 p.m. on the second Thursday of every month at the DEID office, located at 14181 Avenue 24 in Delano, California.
- Stakeholder Committee Meetings – Held periodically at the DEID office, located at 14181 Avenue 24 in Delano, California; open to all stakeholders, interested parties and the public.
- Subbasin Coordination Committee Meetings – Public meeting notices are distributed to the Interested Parties List when scheduled.

  More specifically, educational and public outreach meetings are scheduled for the identified distinct phases of GSP development and implementation contained in the DEID GSA's Communication and Engagement Plan as noted below.
- Phase 2: GSP Preparation and Submission – Public outreach meetings held during Phase 2 gave stakeholders and opportunity to be involved in the GSP development and share their thoughts and concerns. Presentations and discussions will be geared towards an overview of SGMA, overview of the process of GSP development, public review and implementation (what stakeholders can expect), and question/answer sessions.
- Phase 3: GSP Review and Evaluation – During Phase 3, the draft of the Updated DEID GSA GSP was distributed for public review. During the public review period, public meetings were held at suitable venues to accommodate targeted stakeholders. The presentations and discussions included an overview of the updated GSP and gave stakeholders the opportunity to comment on the draft in a public forum.
- Phase 4: Implementation & Reporting – Public meetings will be crucial during Phase 4 and will be ongoing to educate stakeholders on implementation requirements and guide them through the steps to compliance and groundwater sustainability.

1.5.3.3 Encouragement of Active Participation of the Public *[23 CCR § 354.10(d)(3)]*

23 Cal. Code Regs. § 354.10 Notice and Communication. *Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:*

(d) *A communication section of the Plan that includes the following:*

(3) *A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin.*

Community organizations, public agencies and other entities listed in **Appendix G,** the DEID GSA's Communication and Engagement Plan, have been and will continue to be contacted to schedule opportunities to present or facilitate discussions with their members throughout the GSP development and implementation phase. These entities include local and regional entities that represent agricultural/industry organizations, environmental justice, irrigation/water districts/water agencies/water organizations, municipal agencies, school districts, and service clubs. Presentations and discussions will include an overview on SGMA and why it is important to them, an explanation of the GSP development process, including an awareness of the public review period. In addition, the DEID GSA will work with these organizations and agencies to distribute newsletters, public outreach meeting notices, and other educational information via email distribution, social media posts, and printed materials.

1.5.3.4 Informing the Public *[23 CCR § 354.10(d)(4)]*

23 Cal. Code Regs. § 354.10 Notice and Communication. *Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:*

(d) *A communication section of the Plan that includes the following:*

(4) *The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions.*

Venues and methods to inform the public on plan implementation and progress will be a continuation of the public outreach efforts used during GSP development, including updated GSP development, which include the following:

- Stakeholders will be invited to public meetings through direct mail and email blasts by obtaining mailing and email addresses of property owners within the DEID GSA boundary through the DEID, RCSD and EPUD customer lists. For direct mailings, postcards are most cost effective for mailing and can later be used to expedite meeting check-in and track attendance, if required during the implementation phases. Local community organizations will be asked to distribute meeting notices via email blasts to their membership/contact lists.
- Venue locations will be selected to provide convenient places to meet that can accommodate anticipated audience size and needs. The DEID GSA will work various stakeholder groups including disadvantaged communities and potentially community organizations to hold outreach meetings at convenient times and locations.
- Printed materials will incorporate the visual imagery established through branding efforts and will be tailored for specific means of communication throughout the phases of GSP development,

public review and implementation. Printed materials will be translated into Spanish as required. Printed materials to be used include:

- Periodic newsletters will be created to inform stakeholders of compliance requirements and groundwater sustainability updates, opportunities and programs within the DEID GSA and Tule Subbasin. Newsletters will be distributed to those on the Interested Parties List and made available in public locations such as the school sites within the Columbine, Richgrove and Earlimart school districts and EPUD, RCSD and DEID offices.
- Fact sheets, fliers or post cards will be developed, as needed. Information may include meeting notices or updated SGMA information for the DEID GSA. These materials will be available for download on the DEID GSA's website, distributed at public meetings and community organizations/entities meetings, distributed door-to-door if necessary, and emailed to the Interested Parties List and other organizations' email distribution lists.
- Letter correspondence may be necessary in certain situations, particularly during the public review and implementation phases. Letters will be distributed via email and/or direct mail. Letters will include pertinent facts and explanations that need to be communicated to stakeholders.
- Power Point presentations will be utilized at educational/outreach public meetings. If a Power Point isn't possible to display for a meeting, display boards printed at 24-inch x 36-inch or larger in size will be used and set up on easels. Handouts of presentations and smaller versions of display boards may be distributed to stakeholders in attendance and can also be emailed to the Interested Parties list and posted on DEID GSA's website for access by stakeholders as a recap of the meeting.

- Digital communication outlets will be a significant mode of communication through the GSP implementation phase and will include:
  - Website – Public meeting notices and agendas of the Board of Directors meetings are posted on the GSA's page on the DEID website. This website will serve as an integral resource for stakeholders within the DEID GSA boundary. Electronic files of newsletters, presentations, fact sheets/fliers/postcards, and other educational resources will be accessible via the website in both English and Spanish translations. This will serve as a way for stakeholders to easily educate themselves on the GSP implementation process.
  - Email Distribution – As required by SGMA 10723.4 "Maintenance of Interested Persons List," DEID GSA maintains a contact list and regularly distribute emails to those who have expressed interest in the GSA's progress. These email blasts consist of meeting notices and other documents that are pertinent to the DEID GSA and stakeholder communication efforts. This process will continue.
  - Email blasts with newsletter links, meeting notices, public review notices, and other crucial information will be coordinated with community organizations and stakeholder groups by utilizing their distribution lists. Examples of these organizations are DEID, RCSD, EPUD, and school districts within the DEID GSA boundary. A complete working list of organizations that will be contacted are listed in Table II-3 in the DEID GSA's Communication and Engagement Plan.
- While there is a lack of specific news sources representing the communities and stakeholders within the DEID GSA boundary, the GSA will be responsive to any requests received from media outlets regarding GSP and SGMA implementation.

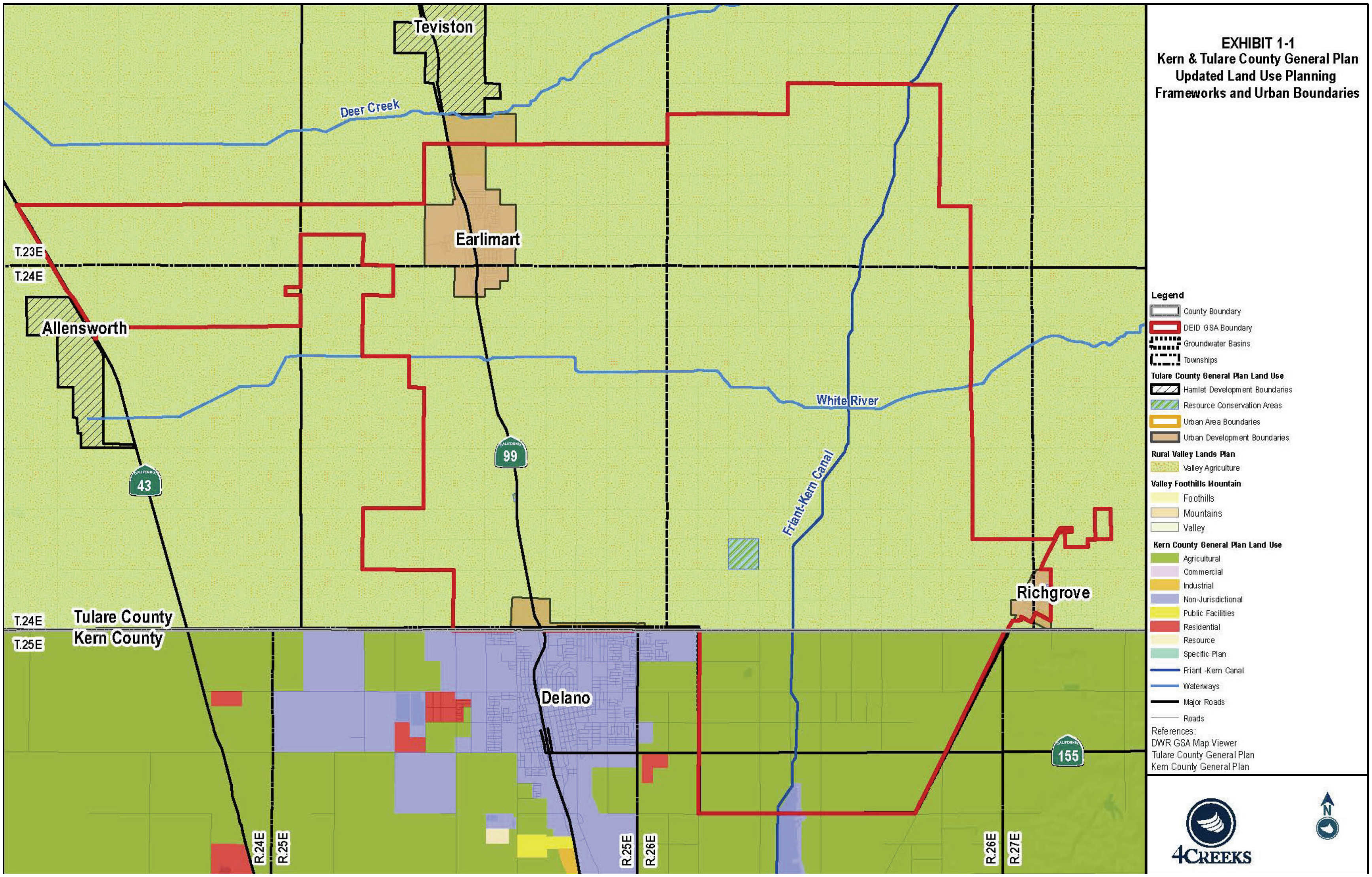

Exhibit 1-1: Tulare and Kern County Planning Framework within DEID GSA

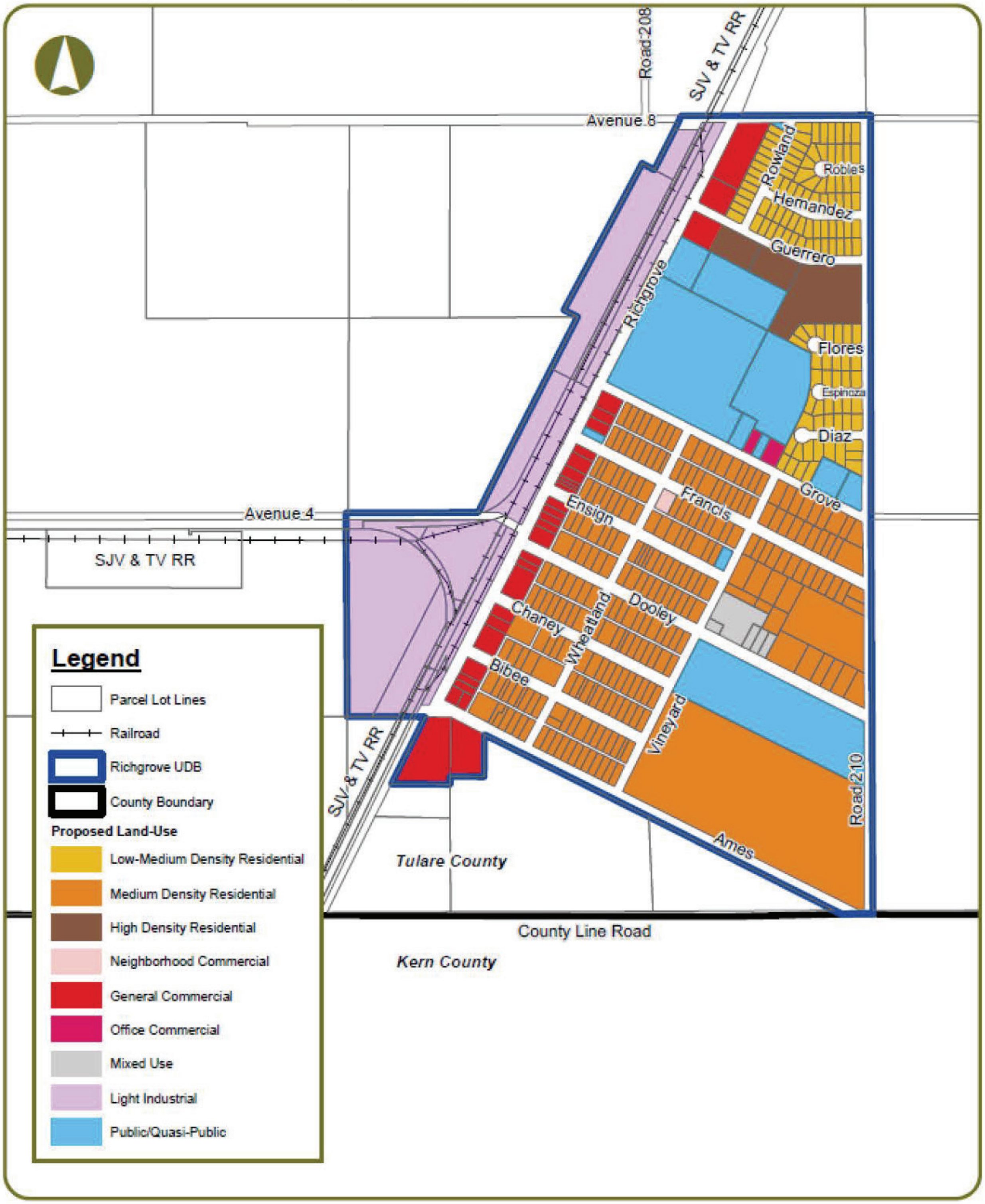

Exhibit 1-2: Richgrove Proposed Land Use

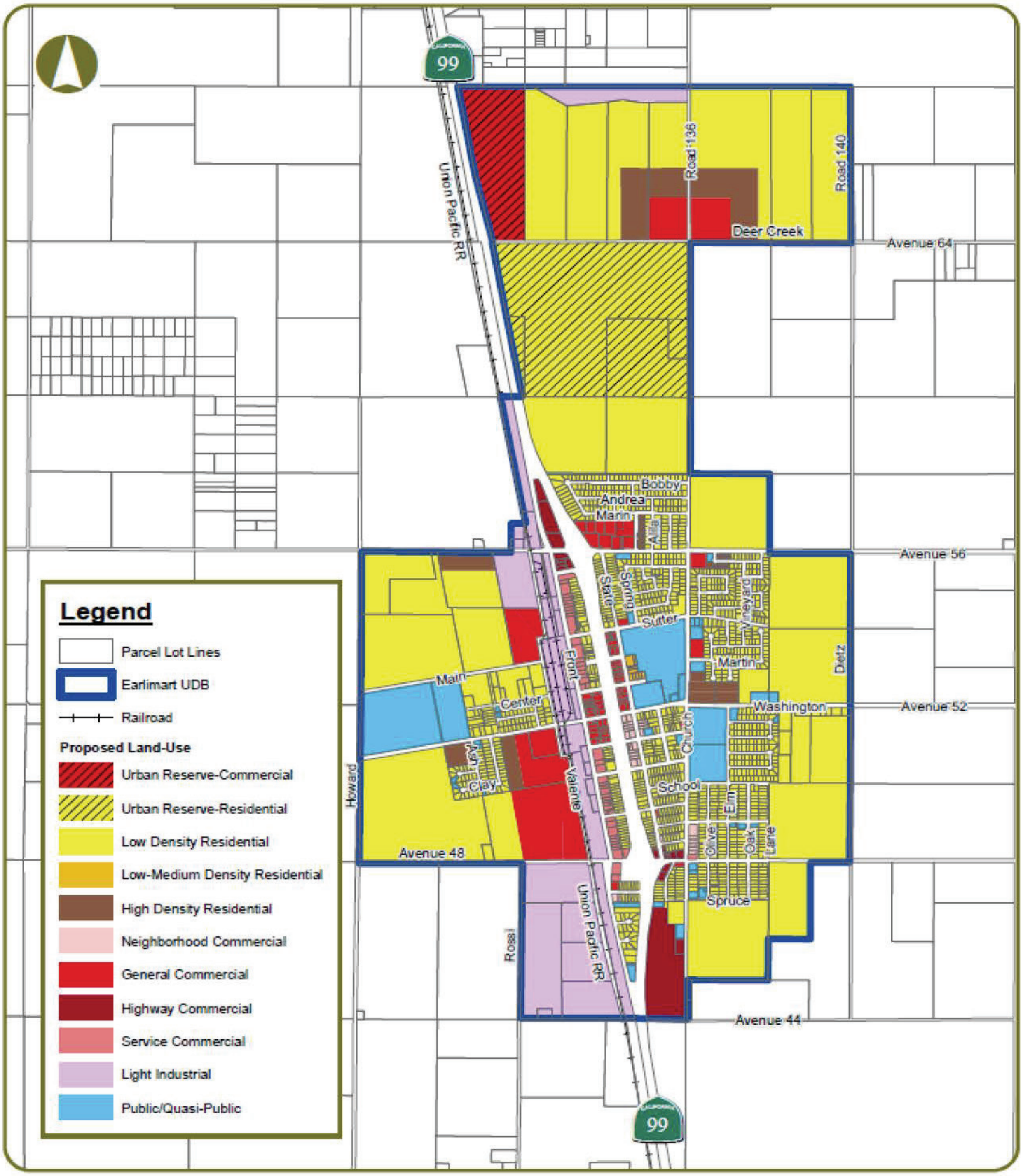

Exhibit 1-3: Earlimart Proposed Land Use

Section 2. Basin Setting

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2.1 Introduction *[23 CCR § 354.12]*

23 Cal. Code Regs. § 354.12 Introduction to Basin Setting. *This Subarticle describes the information about the physical setting and characteristics of the basin and current conditions of the basin that shall be part of each Plan, including the identification of data gaps and levels of uncertainty, which comprise the basin setting that serves as the basis for defining and assessing reasonable sustainable management criteria and projects and management actions. Information provided pursuant to this Subarticle shall be prepared by or under the direction of a professional geologist or professional engineer.*

The Basin Setting for the DEID GSA is derived from the Tule Subbasin Setting, which was developed for the Tule Subbasin by Thomas Harder & Company. The Tule Subbasin Setting is provided as Attachment 2 to the Draft Tule Subbasin Coordination Agreement (see **Appendix A-2**)[1]. This section of the GSP describes information about the physical setting and characteristics of the Subbasin, and its historical and current conditions by providing reference to the Tule Subbasin Setting and, when necessary, provides additional information specific to the DEID GSA.

A description of the Tule Subbasin's physical setting, including its location, size, and jurisdictional areas is described in the introduction of the Tule Subbasin Setting (**Appendix A-2**).

DEID GSA's particular jurisdictional setting within the Tule Subbasin and its Plan Area is described in **Section 1.4: Description of Plan Area.** The DEID GSA is located in the south-central portion of the Tule Subbasin (DWR Basin 5-22.13). The DEID GSA is comprised of 64,820 acres or approximately 14 percent of the Tule Subbasin area. DEID GSA is bordered to the north by the Pixley Irrigation District GSA, to the east by the Eastern Tule GSA, to the west by the Tri-County Water Authority GSA and to the south by the Kern County Subbasin (DWR Basin 5-022.14).

2.2 Hydrogeologic Conceptual Model *[23 CCR § 354.14(a)]*

23 Cal. Code Regs. § 354.14 Hydrogeologic Conceptual Model. **(a)** *Each Plan shall include a descriptive hydrogeologic conceptual model of the basin based on technical studies and qualified maps that characterizes the physical components and interaction of the surface water and groundwater systems in the basin.*

The Hydrogeologic Conceptual Model (HCM) for the Tule Subbasin is provided in Chapter 2.1: Hydrogeologic Conceptual Model of the Tule Subbasin Setting (**Appendix A-2**).

The regulatory requirements provided in 23 CCR § 354.14 are addressed and fulfilled by the HCM described in Chapter 2.1 of the Tule Subbasin Setting (**Appendix A-2**).

Table 2-1: Components of CCR 354.14 links the requirements of 23 CCR § 354.14 to the sections in the Tule Subbasin Setting and the sections of this GSP that apply to and fulfill each regulatory component.

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[1] The *Tule Subbasin Setting* is referenced as Appendix A-2 hereafter.

Table 2-1: Components of CCR 354.14

23 CCR	Section Title	Tule Subbasin Setting	DEID GSA GSP
N/A	Sources of Data	2.1.1	n/a
§ 354.14 (b)(1) & (c)	Geologic Setting	2.1.2	2.2.1
§ 354.14 (b)(2)	Lateral Basin Boundaries	2.1.3	2.2.2
§ 354.14 (b)(3)	Bottom of Basin	2.1.4	2.2.3
§ 354.14 (d)(5)	Surface Water Features	2.1.5	2.2.4
§ 354.14 (d)(6)	Imported Water	2.1.5.6	2.2.4.6
§ 354.14 (d)(4)	Areas of Groundwater Recharge and Discharge	2.1.6	2.2.5
§ 354.14 (b)(4)	Principle Aquifers and Aquitards	2.1.7	2.2.6
§ 354.14 (b)(4)(A)	Aquifer Formations	2.1.7.1	2.2.6.1
§ 354.14 (b)(4)(B)	Aquifer Physical Properties	2.1.7.2	2.2.6.2
§ 354.14 (b)(4)(C)	Geologic Structures that Affect Groundwater Flow	2.1.7.3	2.2.6.3
§ 354.14 (b)(4)(D)	Aquifer Water Quality	2.1.7.4	2.2.6.4
§ 354.14 (b)(4)(E)	Aquifer Primary Uses	2.1.7.5	2.2.6.5
§ 354.14 (b)(5)	Uncertainty in the Hydrogeologic Conceptual Model	2.1.8	2.2.7

The HCM provides the framework for the development of water budgets, analytical and numerical models, and monitoring networks. Additionally, the HCM serves as a tool for stakeholder outreach and communication and assists with the identification of data gaps. The HCM does not compute specific quantities of water flowing through or moving into or out of the DEID GSA, but rather provides a general understanding of the physical setting, characteristics, and processes that govern groundwater occurrence and movement. The parameters of the HCM developed for the DEID GSA are depicted on **Figure 2-1, Hydrogeologic Conceptual Model.** These parameters include DEID GSA jurisdictional boundaries, stratigraphy, surface water bodies, distribution pipelines, and the general processes that contribute to recharge and discharge from the DEID GSA. Excerpts and brief summaries of the HCM information described in the Tule Subbasin Setting, as well as brief descriptions of the physical and hydrogeological components of the HCM present within the DEID GSA, are provided below.

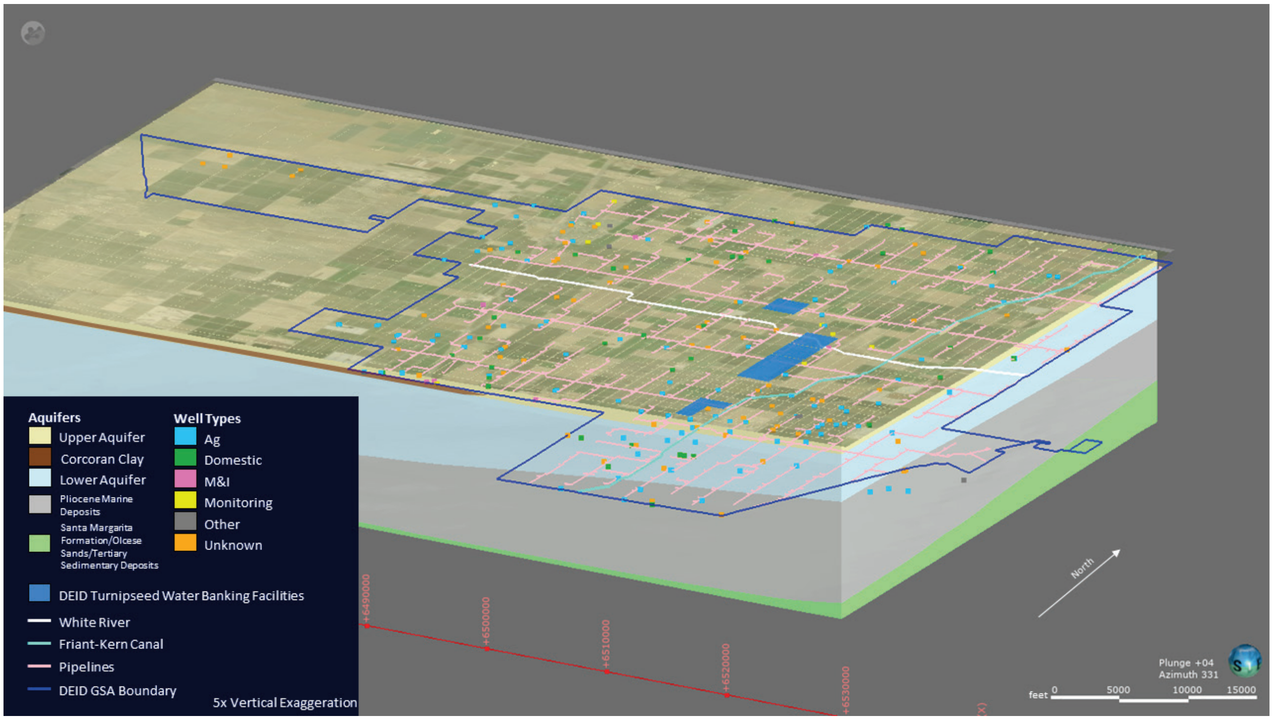

Figure 2-1: Hydrogeologic Conceptual Model

2.2.1 Geologic Setting *[23 CCR § 354.14(b)(1) & (c)]*

23 Cal. Code Regs. § 354.14 Hydrogeologic Conceptual Model. (b) *The hydrogeologic conceptual model shall be summarized in a written description that includes the following:*

(1) *The regional geologic and structural setting of the basin including the immediate surrounding area, as necessary for geologic consistency.*

(c) *The hydrogeologic conceptual model shall be represented graphically by at least two scaled cross-sections that display the information required by this section and are sufficient to depict major stratigraphic and structural features in the basin.*

(d) *Physical characteristics of the basin shall be represented on one or more maps that depict the following:*

(1) *Topographic information derived from the U.S. Geological Survey or another reliable source.*

(2) *Surficial geology derived from a qualified map including the locations of cross-sections required by this Section.*

(3) *Soil characteristics as described by the appropriate Natural Resources Conservation Service soil survey or other applicable studies.*

DEID GSA is located in the south-central portion of the Tule Subbasin within the Tulare Lake Hydrologic Region (see Figure 2-1 in **Appendix A-2**).

The Tule Subbasin is located on a series of coalescing alluvial fans that extend toward the center of the of the Subbasin and merge with lacustrine deposits in the western portion of the DEID GSA (**Figure 2-2 Geology and Cross Section Locations**). Land surface elevations for the DEID GSA range from 500 ft above mean sea level (amsl) along the eastern boundary of the GSA to 225 ft amsl at the western edge of the GSA.

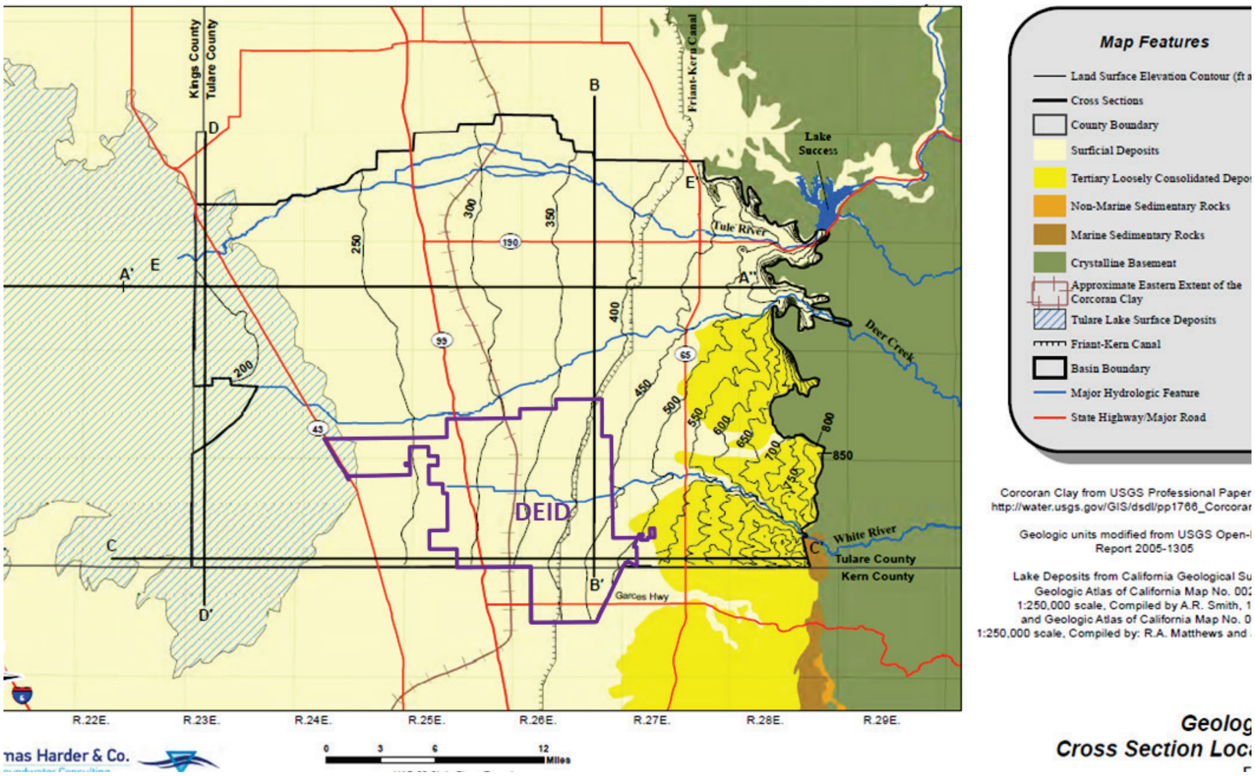

Figure 2-2: Geology and Cross Section Locations

Six cross sections are used to describe the geologic features within the Tule Subbasin (see **Figure 2-2**). Of these six cross sections, two occur within the DEID GSA as follows: B-B' east, C-C' south. By examination of the cross-sections, three of the five geologic formations observed within the Subbasin occur within the DEID GSA or along the GSA's boundary. These formations, described in more detail in the Tule Subbasin Setting (**Appendix A-2**), include:

- Unconsolidated Continental Deposits
- Pliocene Marine Deposits; and
- Santa Margarita Formation/ Olcese Sands/Tertiary Sedimentary Deposits.

Soil characteristics of the Subbasin are shown in Figure 2-8 of the Tule Subbasin Setting (**Appendix A-2**). From visual examination of Figure 2-8, DEID GSA soil is a mixture of:

- Centerville Clay;
- Exeter loam;
- Nord fine loam;
- Honcut sandy loam; and
- Yettem sandy loam

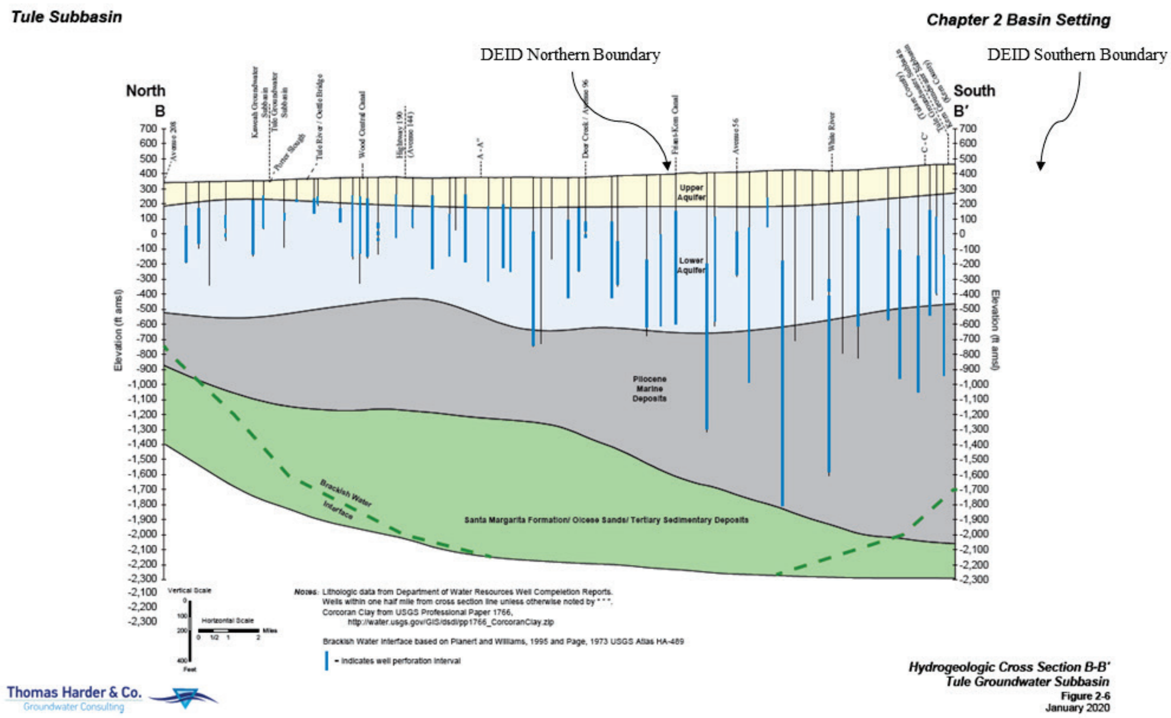

Figure 2-3: Cross Section B–B'

2.2.2 Lateral Basin Boundary *[23 CCR § 354.14 (b)(2)]*

23 Cal. Code Regs. § 354.14 Hydrogeologic Conceptual Model. (b) *The hydrogeologic conceptual model shall be summarized in a written description that includes the following:* **(2)** *Lateral basin boundaries, including major geologic features that significantly affect groundwater flow.*

The lateral Basin Boundaries for the Tule Subbasin are defined in DWR Bulletin 118 (DWR, 2016) and include both natural and political boundaries. Chapter 2.1.3 of the Tule Subbasin Setting (**Appendix A-2**), provides a detailed description of the lateral boundaries of the Subbasin.

The western portion of the DEID GSA is defined by the Tulare Lake surface deposits (Figure 2-1 in **Appendix A-2**) and the political boundaries of the Tri-County Water Authority GSA (see **Figure 1-2**). The northern portion is defined by the political boundary of Pixley Irrigation District and the Saucelito

Irrigation District[2]. The southern boundary is defined by the political boundaries of the Southern San Joaquin Municipal Utility District and the Kern Subbasin. The eastern boundary of the GSA is generally defined by political boundaries of the Kern-Tulare Water District and the Eastern Tule GSA.

2.2.3 Bottom of Basin *[23 CCR § 354.14 (b)(3)]*

23 Cal. Code Regs. § 354.14 Hydrogeologic Conceptual Model. (b) *The hydrogeologic conceptual model shall be summarized in a written description that includes the following:*

(3) *The definable bottom of the basin.*

The definable bottom of the Tule Subbasin is described in the Tule Subbasin Setting, Chapter 2.1.4 of **Appendix A-2**.

The bottom of the basin beneath the DEID GSA is greater than 2,100 ft below ground surface (bgs) east of State Highway 99 and greater than 2,000 ft bgs west of the Highway 65 and is defined by the interface between the Santa Margarita Formation and the relatively impermeable granitic bedrock (see **Figure 2-2** and **Appendix A-2**). The fresh water/brackish water interface is thought to occur at less than 2,000 ft bgs in portions of the GSA and extents to a depth greater than 2,500 ft bgs in the eastern portion of the GSA (Page, 1973; Planert and Williams, 1995). The bottom of the effective groundwater basin, based on the fresh water/brackish water interface, is shown in Figures 2-5 and 2-6 of the Tule Subbasin Setting (**Appendix A-2**).

2.2.4 Surface Water Features *[23 CCR § 354.14 (d)(5)]*

23 Cal. Code Regs. § 354.14 Hydrogeologic Conceptual Model. (b) *The hydrogeologic conceptual model shall be summarized in a written description that includes the following:*

(5) *Surface water bodies that are significant to the management of the basin.*

The natural water ways within the Tule Subbasin consist of Tule River, Deer Creek, and White River. These systems form in the Sierra Nevada Mountains east of the Tule Subbasin and flow westerly toward the lakebed of the historic Tulare Lake. The White River flows westerly across the DEID GSA's jurisdiction. Each of the major surface water features of the Tule Subbasin are described in further detail in Chapter 2.1.5 of the Tule Subbasin Setting (**Appendix A-2**) and those occurring within DEID GSA are White River and the FKC.

Imported water from the FKC is distributed within DEID GSA using a pipeline distribution system and the White River channel. DEID's distribution system covers most of the GSA area, including all of the DEID GSA (**Figure 1-8**). Imported surface water is conveyed in the White River channel to some features of the DEID water banking facilities as supply is available.

[2] Saucelito Irrigation District was formed on July 29, 1941, under the Irrigation District Act with a current size of 19,737 acres. The district has a contract with the Bureau of Reclamation for 21,200 acre-ft of Class 1 water and 32,800 acre-ft of Class 2 water. The district is a member of the Eastern Tule GSA.

2.2.4.1 White River

As described in Tule Subbasin Setting Chapter 2.1.5.5 (**Appendix A-2**), stream flow in the White River has been measured at the USGS gaging station near Ducor from 1972-2005. Data after 2005 has been interpolated. Average annual flow from water year 1986/1987 to 2016/2017 was approximately 5,800 acre-ft/year with a low of approximately 250 acre-ft in water year 2014/2015 and a high of approximately 37,000 acre-ft in water year 1997/1998. The White River channel extends as far as State Highway 99 but does not reach the historic Tulare Lakebed. DEID conducts direct groundwater recharge during surplus water years through recharge operations within the White River channel at a small 5-acre recharge basin near the DEID headquarters and at a dedicated groundwater banking project within the DEID MA as previously described in **Section 1.4.3, Conjunctive Use Programs**. The Turnipseed groundwater banking facilities are designed to recharge imported water delivered from the FKC into the White River.

2.2.4.2 Imported Water *[23 CCR §354.14(d)(6)]*

23 Cal. Code Regs. § 354.14 Hydrogeologic Conceptual Model. (b) *The hydrogeologic conceptual model shall be summarized in a written description that includes the following:*

(6) *The source and point of delivery for imported water supplies.*

Tule Subbasin Setting Chapter 2.1.5.6 (**Appendix A-2**) describes imported water sources to the Tule Subbasin. DEID imports water through nine separate points of diversion on the FKC. DEID distributes water from the Friant Division of the CVP exclusively via pipeline distribution systems (**Figure 1-8**). DEID is the largest Class 1 Friant contractor, with a contract for 108,800 acre-ft of Class 1 water and 74,500 acre-ft of Class 2 water (Bureau of Reclamation Contract number I75r-3327D). Additionally, DEID's CVP contract provides opportunity to access other water supplies that, depending on hydrologic conditions, may be made available to it, including flood waters, unreleased restoration flows, Section 215 water, and recaptured/recirculated water. Other non-CVP water supplies are also accessible on an opportunistic basis. From 1986 to 2021, DEID imported a total of 3.9 million acre-ft of water or on average 107,000 acre-ft/year. Since 1950, cumulative imported water is more than 8 million acre-ft.

DEID conducts direct groundwater recharge through recharge operations within the White River channel and groundwater baking operations within the Turnipseed Water Bank (**Figure 1-8**). Additional information regarding imported water to DEID is provided in **Section 1.4.3 Conjunctive Use Programs**.

2.2.5 Areas of Groundwater Recharge and Discharge *[23 CCR § 354.14(d)(4)]*

23 Cal. Code Regs. § 354.14 Hydrogeologic Conceptual Model. (d) *Physical characteristics of the basin shall be represented on one or more maps that depict the following:*

(4) *Delineation of existing recharge areas that substantially contribute to the replenishment of the basin, potential recharge areas, and discharge areas, including significant active springs, seeps, and wetlands within or adjacent to the basin The hydrogeologic conceptual model shall be summarized in a written description that includes the following:*

Groundwater recharge occurs throughout the Tule Subbasin within stream channels, unlined canals, in managed recharge basins, and in areas of the Subbasin with irrigated agriculture. All these types of features occur within the DEID GSA with the exception of unlined canals. Imported water distribution within the DEID GSA occurs through underground pipelines. According to the Soil Agricultural Groundwater Banking Index (SAGBI) (see Figure 2-9 in **Appendix A-2**), areas generally suitable for recharge within the DEID GSA occur along the stream channels and floodplains of the White River. Figure 2-9 of the Tule Subbasin Setting (**Appendix A-2**) and **Figure 1-8** display the locations of existing groundwater recharge basins. DEID directly recharges local and imported water at its Turnipseed Water Bank. **Section 1.4.3** describes the DEID groundwater banking program.

Due to the depth of groundwater, there are no areas within the Tule Subbasin or DEID GSA where groundwater discharges at the land surface. See Tule Subbasin Setting Chapter 2.1.6 (**Appendix A-2**) for additional information regarding areas of groundwater recharge and discharge within the Tule Subbasin.

2.2.6 Principal Aquifers and Aquitards

2.2.6.1 Aquifer Formations [23 CCR § 354.14(b)(4)(A)]

23 Cal. Code Regs. § 354.14 Hydrogeologic Conceptual Model. (d) *Physical characteristics of the basin shall be represented on one or more maps that depict the following:*

(4) *Delineation of existing recharge areas that substantially contribute to the replenishment of the basin, potential recharge areas, and discharge areas, including significant active springs, seeps, and wetlands within or adjacent to the basin The hydrogeologic conceptual model shall be summarized in a written description that includes the following:*

(A) *Formation names, if defined.*

Of the five-general aquifer/aquitard units described to be present in the subsurface beneath the Tule Subbasin, four occur within the subsurface of the DEID GSA area (see **Figure 2-2** and **Attachment 1***)*:

1. Upper Aquifer;
2. Confining Layer;
3. Lower Aquifer; and
4. Pliocene Marine Deposits (generally considered an aquitard).

The upper aquifer occurs over the entire DEID area and is generally unconfined to semi-confined. The upper aquifer occurs in the upper 450 ft of sediments on the western side of the DEID area and shallows to the east to approximately 250 ft along DEID's eastern boundary. The Corcoran Clay confining unit occurs beneath the upper aquifer in the western portions of the DEID area. The Corcoran Clay thins to the east, pinching out approximately 2 to 3 miles east of State Highway 99. The lower aquifer is conceptualized as semi-confined generally to the east of Highway 99 and confined by the Corcoran clay layer generally to the west of the Highway (Cross-Section C-C,' presented as **Appendix H**). The depth to the top of the lower aquifer is approximately 250 ft bgs in the eastern portion of the GSA and deepens to approximately 350 ft toward the western edge of the GSA boundary, where the base of the Corcoran Clay defines the top of the lower aquifer. In the eastern region of the GSA, the lower aquifer system is separated from the underlying Santa Margarita Formation and the Olcese Formation by a thick layer (approximately 500 ft to 1,600 ft) of Pliocene marine deposits. These deposits are conceptualized as a confining unit that separates the lower aquifer from the Santa Margarita Formation aquifer and the Olcese Sands/Tertiary Sedimentary Deposits Formations. The Santa Margarita Formation and Olcese Sands/Tertiary Sedimentary Deposits Formations form a localized aquifer in the southeastern portion of the Tule Subbasin but is not present in the DEID area. The formations and their occurrence are described in Chapter 2.1.7.1. of the Tule Subbasin Setting (**Appendix A-2**).

2.2.6.2 Aquifer Physical Properties [23 CCR § 354.14(b)(4)(B)]

23 Cal. Code Regs. § 354.14 Hydrogeologic Conceptual Model. (b) *The hydrogeologic conceptual model shall be summarized in a written description that includes the following:*

(4) *Principal aquifers and aquitards, including the following information:*

(B) *Physical properties of aquifers and aquitards, including the vertical and lateral extent, hydraulic conductivity, and storativity, which may be based on existing technical studies or other best available information.*

The principal water-bearing aquifers of the Tule Subbasin consist of permeable sand and gravel layers, interbedded with low-permeability silt and clay lenses. Shallower saturated sediments are generally unconfined to semi-confined, whereas aquifers beneath the Corcoran Clay in the western portion of the basin are confined.

The ability of aquifer sediments to transmit and store water is described in terms of transmissivity[3], hydraulic conductivity[4], and storativity[5]. The quantitative values for each of these parameters (for both the upper aquifer and lower aquifer) and the process by which these values were developed or derived are discussed in Chapter 2.1.7.2 and Figures 2-10 through 2-11 of the Tule Subbasin Setting (**Appendix A-2**). Aquifer parameters were developed and assigned using short-term pump tests, long-term pump tests (24 hours or more at a constant rate), and values published in literature.

[3] Transmissivity is the rate at which water flows through a vertical strip of the aquifer 1-foot wide and extending through the full saturated thickness, under a hydraulic gradient of 1 or 100%.
[4] Hydraulic conductivity is the rate of flow through a unit cross-sectional area of aquifer, under a unit hydraulic gradient.
[5] The aquifer coefficient of storage (also called storativity) is the volume of water released from storage per unit decline in hydraulic head in the aquifer per unit area of the aquifer.

Transmissivity/Hydraulic Conductivity

The description of transmissivity is provided in Chapter 2.1.7.2 of the Tule Subbasin Setting (**Appendix A-2**).

Horizontal hydraulic conductivity for the upper aquifer within the DEID GSA range from 20 to 40 feet per day (ft/day) in the eastern portion of the GSA to 10 to 20 ft/day in the western portion of the GSA (see Figure 2-10 of Tule Subbasin Setting [**Appendix A-2**]). The higher values in the eastern portion of the GSA indicate more permeable sediments and the lower values in the western portion of the GSA indicate less permeable sediments. Horizontal hydraulic conductivity values in the lower aquifer within the DEID GSA range from less than 5 ft/day to 80–100 ft/day (see Figure 2-11, Tule Subbasin Setting, **Appendix A-2**).

Specific Yield/Storativity

Chapter 2.1.7.2 of the Tule Subbasin Setting (**Appendix A-2**) describes the storage properties of the Tule Subbasin's upper aquifer in terms of specific yield.

Specific yield values range from approximately 0.05 to 0.25 in the upper aquifer within the DEID GSA (see Figure 2-12; Tule Subbasin Setting, **Appendix A-2**). Areas of higher specific yield occur around the areas east of Highway 99 in the GSA and areas of low specific yield are more common in the areas west of Highway 99 in the GSA.

In the Subbasin's lower aquifer, Chapter 2.1.7.2 of **Appendix A-2** describes specific yield in terms of storativity.

Figure 2-13 of **Appendix A-2** indicates that specific yield applies to areas of the Subbasin that are unconfined in the upper aquifer (generally occurring in the east side of the Subbasin) and storativity is the measure used for the lower aquifer under confined conditions. In unconfined conditions, the specific yield values of the lower aquifer range from 0.05 to 0.25 within the DEID GSA. Areas of higher specific yield are prevalent in the eastern parts of the GSA around the White River. In confined conditions, storativity values for the lower aquifer underlying DEID GSA range from 1.5e-04 to 5.7e-04, generally increasing from east to west.

2.2.6.3 Geologic Structures that Affect Groundwater Flow *[23 CCR § 354.14(b)(4)(C)]*

23 Cal. Code Regs. § 354.14 Hydrogeologic Conceptual Model. (b) *The hydrogeologic conceptual model shall be summarized in a written description that includes the following:*

(4) *Principal aquifers and aquitards, including the following information:*

(C) *Structural properties of the basin that restrict groundwater flow within the principal aquifers, including information regarding stratigraphic changes, truncation of units, or other features*

Chapter 2.1.7.3 of the Tule Subbasin Setting (**Appendix A-2**) provides a description of features throughout the entire Subbasin that affect groundwater flow. There are no significant faults mapped within the Tule Subbasin that would affect groundwater flow. The Corcoran Clay is most significant feature to affect groundwater flow in the Subbasin. The Corcoran Clay and associated clay lenses act as a confining unit that separates the upper aquifer from the lower aquifer where present in the western portion of the DEID GSA area. In addition, there may be communication between the upper and lower aquifers in areas where composite wells perforate both aquifer systems; such wells may also facilitate recharge of the deep aquifer from the shallow aquifer. The Pliocene marine deposits are conceptualized as a confining unit that separates the deep alluvial aquifer from the Santa Margarita Formation aquifer and the Olcese Sands/Tertiary Sedimentary Deposits Formations.

2.2.6.4 Aquifer Water Quality *[23 CCR § 354.14(b)(4)(D)]*

23 Cal. Code Regs. § 354.14 Hydrogeologic Conceptual Model. (b) *The hydrogeologic conceptual model shall be summarized in a written description that includes the following:*

(4) *Principal aquifers and aquitards, including the following information:*

(D) *General water quality of the principal aquifers, which may be based on information derived from existing technical studies or regulatory programs.*

Groundwater quality varies across the DEID GSA and with the depth in the aquifer system. The native groundwater quality is generally considered good, with groundwater quality issues stemming from both non-point source and point-source contamination. The following excerpt from Chapter 2.1.7.4 of **Appendix A-2** provides a general description of non-point source conditions and their effect on groundwater conditions in the subbasin.

Concentrations for electrical conductivity (EC) in the DEID GSA are relatively low with concentrations typically ranging from 180 to 500 micromhos per centimeter (µmho/cm) (see Figure 2-14, Tule Subbasin Setting, **Appendix A-2**). The altitude of the fresh water/brackish water interface is approximately 1,600 ft below mean sea level (bmsl) as defined by EC concentrations exceeding 3,000 µmoh/cm (Page, 1973). While the depth to the fresh water/brackish water interface varies spatially in the DEID GSA, it likely ranges from less than 2,000 ft bgs to greater than 3,000 ft bgs (Page, 1973). Nitrate (NO_3) concentrations in the GSA range from less than 6 milligrams per liter (mg/L) to 100 mg/L with higher concentrations in the southern portion of the GSA (see Figures 2-15 of **Appendix A-2**).

Twenty-six active cleanup sites have been identified within the Tule Subbasin using the Geotracker website (see Figure 2-16 and Table 2-1 of **Appendix A-2**). Most of these sites are associated with leaking underground storage tanks (LUSTs) with two being in the DEID GSA, located slightly north of the town of Earlimart. Problems associated with the identified sites are highly localized.

2.2.6.5 Aquifer Primary Uses *[23 CCR § 354.14(b)(4)(E)]*

23 Cal. Code Regs. § 354.14 Hydrogeologic Conceptual Model. (b) *The hydrogeologic conceptual model shall be summarized in a written description that includes the following:*

(4) *Principal aquifers and aquitards, including the following information:*

(E) *Identification of the primary use or uses of each aquifer, such as domestic, irrigation, or municipal water supply.*

Chapter 2.1.7.5 of the Tule Subbasin Setting (**Appendix A-2**) describes the predominant beneficial uses and users of groundwater in the Subbasin as agricultural irrigation, with other beneficial uses including municipal water supply, private domestic water supply, and livestock washing and watering. Both the upper and lower aquifers are used to supply agricultural, municipal, and domestic water supply. The contribution of water from each aquifer is unknown because composite wells extract groundwater from both the upper and lower aquifers. Groundwater extractions are not metered. Therefore, pumping cannot be assigned to individual wells with known screened interval by aquifer type. Furthermore, the screened intervals for many wells are unknown. Pumping by aquifer type is a recognized data gap in the Tule Subbasin and DEID GSA.

Section 1.4.1.4: Identification of Water Use Sector & Water Use Type of this GSP details the primary water use sectors and water source types within the DEID GSA.

2.2.7 Uncertainty in the Hydrogeologic Conceptual Model *[23 CCR § 354.14(b)(5)]*

23 Cal. Code Regs. § 354.14 Hydrogeologic Conceptual Model. (b) *The hydrogeologic conceptual model shall be summarized in a written description that includes the following:*

(5) *Identification of data gaps and uncertainty within the hydrogeologic conceptual model.*

The primary sources of uncertainty in the hydrogeologic conceptual model are listed in Chapter 2.1.8 of **Appendix A-2** and described as follows:

- Knowledge of the hydraulic interaction between the shallow and deep aquifer.
- Lack of aquifer-specific groundwater levels with adequate spatial distribution to enable preparation of representative groundwater level maps of each aquifer in parts of the Subbasin.
- Characteristics of the Santa Margarita Formation aquifer.
- Underflow recharge into the alluvial aquifer system from the Sierra Nevada mountain block.
- Aquifer characteristics of hydraulic conductivity, transmissivity, and storativity.
- Well construction and pumping proportion between the shallow and deep aquifers.
- Distribution and extent of clay layers in the subsurface within the Subbasin that are susceptible to compaction and resulting land subsidence (additional DEID GSA identified data gap).
- Lack of differentiation among static, recovering, and pumping groundwater levels that may skew analysis of groundwater levels, groundwater flow direction and gradients (additional DEID GSA identified data gap).

All the uncertainties listed in Chapter 2.1.8 of **Appendix A-2** are applicable to the DEID GSA.

2.3 Groundwater Conditions [23 CCR § 354.16]

23 Cal. Code Regs. § 354.14 Hydrogeologic Conceptual Model. (b) *The hydrogeologic conceptual model shall be summarized in a written description that includes the following:*

(5) *Identification of data gaps and uncertainty within the hydrogeologic conceptual model.*

The regulatory requirements outlined in 23 CCR § 354.16 for describing the current and historical groundwater conditions of the Tule Subbasin are addressed and fulfilled throughout Chapter 2.2: Groundwater Conditions of the Tule Subbasin Setting (**Appendix A-2**).

Table 2-2: Components of 23 CCR § 354.16 links the requirements of 23 CCR § 354.16 to the sections in the Tule Subbasin Setting (**Appendix A-2**) and the sections of this GSP that apply to and fulfill each regulatory component.

Table 2-2: Components of 23 CCR § 354.16

23 CCR	Section Title	Tule Subbasin Setting	DEID GSA GSP
§ 354.16 (a)	Groundwater Occurrence and Flow	2.2.1	2.3.1
§ 354.16 (b)	Groundwater Storage	2.2.2	2.3.2
§ 354.16 (c)	Seawater Intrusion	2.2.3	2.3.3
§ 354.16 (d)	Groundwater Quality Issues	2.2.4	2.3.4
§ 354.16 (e)	Subsidence	2.2.5	2.3.5
§ 354.16 (f)	Interconnected Surface Water Systems	2.2.6	2.3.6
§ 354.16 (g)	Groundwater Dependent Ecosystems	2.1.7	2.3.7

Excerpts and brief summaries of the groundwater conditions described in the Tule Subbasin Setting (**Appendix A-2**), as well as brief descriptions of the Subbasin groundwater conditions observed historically or currently within DEID GSA, are provided below.

2.3.1 Groundwater Occurrence and Flow *[23 CCR § 354.16 (a)]*

23 Cal. Code Regs. § 354.16 Groundwater Conditions. (a) *Groundwater elevation data demonstrating flow directions, lateral and vertical gradients, and regional pumping patterns, including:*

(1) *Groundwater elevation contour maps depicting the groundwater table or potentiometric surface associated with the current seasonal high and seasonal low for each principal aquifer within the basin.*

(2) *Hydrographs depicting long-term groundwater elevations, historical highs and lows, and hydraulic gradients between principal aquifers.*

The groundwater elevation, flow, gradient, and regional pumping patterns in the Tule Subbasin are described in Chapter 2.2.1 of the Tule Subbasin Setting (**Appendix A-2**).

Groundwater occurrence and flow in the DEID GSA and Tule Subbasin have been radically altered from pre-development conditions. As previously described in **Section 1.4.3 Conjunctive Use Programs**, overdraft conditions were first identified in the DEID GSA in the 1930s. Prior to the availability of imported water from the FKC, the mean depth to groundwater had fallen every year from 1905 to 1947. Once conjunctive use was implemented by the DEID starting in 1951, groundwater levels increased by 225 ft from 1947-1976 as indicated at composite well 24S/26E-32G01. The lowest historic groundwater elevation at well 24S/26E-32G01 occurred in 1947 at 70 ft amsl. In Spring 2022, the groundwater elevation at this well was 139 ft amsl. The groundwater level elevation at well 24S/26E-32G01 ranged from 228 ft amsl to 310 ft amsl between 1960 to 2006 with groundwater level fluctuations occurring in response to dry and wet climatic cycles. Lower aquifer hydrographs for wells within the DEID GSA display fluctuation within a similar range for multiple decades prior to 2006 (see wells 36GH01, 17C01, 03A01, DEID MW #2, DEID MW #75).

From 2006-2016, the groundwater level at well 24S/26E-32G01 declined by 134 ft to a groundwater elevation of 106 ft amsl (36 ft higher than the historic low that occurred in 1947) due to unsustainable groundwater extractions by neighboring lands and other GSAs. Today, the groundwater elevation at well

24S/26E-32G01 is approximately 55 ft higher than the historic low as a result of DEID's conjunctive use and water banking programs. Historic low water levels occurred in two other wells (24S/26E-33P01 and 25S/26E-10B03) within the DEID GSA in the early 1950's. Groundwater levels in these wells and wells 24S/26E-07R01, 24S/25E-28P01 and 24S/25E-36H01 all recovered by 100 to 200 ft or more from the early 1950s through the 1970s, 1980s, and 1990s, depending on location in the DEID GSA. These hydrographs demonstrate the successful conjunctive use operations of the DEID. From 1951-1985, DEID imported 4.5 million acre-ft of water and 3.9 million acre-ft of water from 1986-2021 (**Figure 1-9, DEID Imported Water**). Imported water is the primary source of recharge to the DEID. Recharge occurs through on-farm recharge from irrigation return flows and groundwater banking. This artificial recharge has resulted in a mound of stored water within the DEID GSA. Groundwater levels at composite well 24S/26E-32G01 and nested well M-19 in the vicinity of the Turnipseed recharge ponds indicate that the upper aquifer and lower aquifer recover when water is infiltrated at these facilities. The Corcoran Clay layer is not present underlying the Turnipseed recharge ponds. Review of groundwater levels in nested well M-19 indicate that the upper and lower aquifers are hydraulically connected in this portion of the Subbasin. This complicates bifurcation of the aquifer system into an upper aquifer and lower aquifer for development of groundwater level contours and analysis of groundwater flow direction. As previously indicated, there is a lack of aquifer-specific groundwater levels with adequate spatial distribution to enable preparation of representative groundwater level maps of each aquifer in parts of the Subbasin. The groundwater elevation contours provided in Figures 2-17 and Figure 2-18 in **Appendix A-2** were prepared using best available data and generally represent groundwater elevations and groundwater flow direction at the Subbasin scale; however, they may not be representative of localized conditions due to lack of data and hydraulic connection of the upper and lower aquifers in portions of the DEID GSA.

Chapter 2.2.1 in **Appendix A-2** describes groundwater flow with respect to the upper and lower aquifers[6]. Groundwater levels in upper aquifer wells indicate a general downward trend between 1987 - 2017 (see Figure 2-20 in **Appendix A-2**).

In the deep aquifer, a downward trend is present in the northwestern portion of the Subbasin. However, in the southern part of the Subbasin, groundwater levels in the deep aquifer were relatively stable between 1987-2007 but began to decline after 2007 (see Figure 2-21 in **Appendix A-2**). Groundwater levels in the Subbasin are generally higher in the shallow aquifer than in the deep aquifer, indicating a downward hydraulic gradient that may suggest possible recharge of the deep aquifer by the shallow aquifer in some parts of the Subbasin—particularly in areas where composite wells perforate both aquifers.

Groundwater elevations and contours within the Tule Subbasin's shallow aquifer as of the spring and fall of 2017 are shown in the *Tule Subbasin Setting* (see Figures 2-17 and Figure 2-18 in **Appendix A-2**). Groundwater elevations and contours within the Tule Subbasin's deep aquifer as of the fall of 2010 are shown in Figure 2-19 of the Tule Subbasin Setting (**Appendix A-2**). By examination of these contour

[6] Wells used in the analysis include composite wells screened in the upper and lower aquifers. In addition, the Corcoran Clay layer is not present in the eastern portion of the DEID GSA where the upper and lower aquifers are likely hydraulically connected.

maps, groundwater in the DEID GSA is shown to predominantly flow in an east-to-west and northwest fashion from areas of artificial (primary) and natural (minor) recharge. Within the eastern portion of the DEID GSA there is a mound of stored groundwater resulting from on-farm recharge and direct recharge/banking of significant amounts of imported CVP water by the DEID, a schematic of this stored water is provided in **Figure 2-4, Schematic of Stored Groundwater within the DEID**. Because of DEID's historical in-lieu use and direct recharge efforts in conjunction with overdraft pumping of groundwater outside DEID GSA plan area, conditions have been created which has resulted in the upper aquifer flowing west and out of the DEID GSA towards a groundwater pumping depression in the west-northwest portion of the Tule Subbasin (see Figures 2-17 and Figure 2-18 in **Appendix A-2**), with the lower aquifer flowing to the west, northwest, and southwest out of the DEID GSA toward groundwater pumping depressions in the west and central portions of the Tule Subbasin and the northern portion of the Kern Subbasin. These conditions are shown as subsurface outflow in Table 2 of Appendix C of the Tule Subbasin Setting (**Appendix A-2**). Section 2.4.4.3 Subsurface Outflow of **Appendix A-2** provides more details to this condition in DEID GSA.

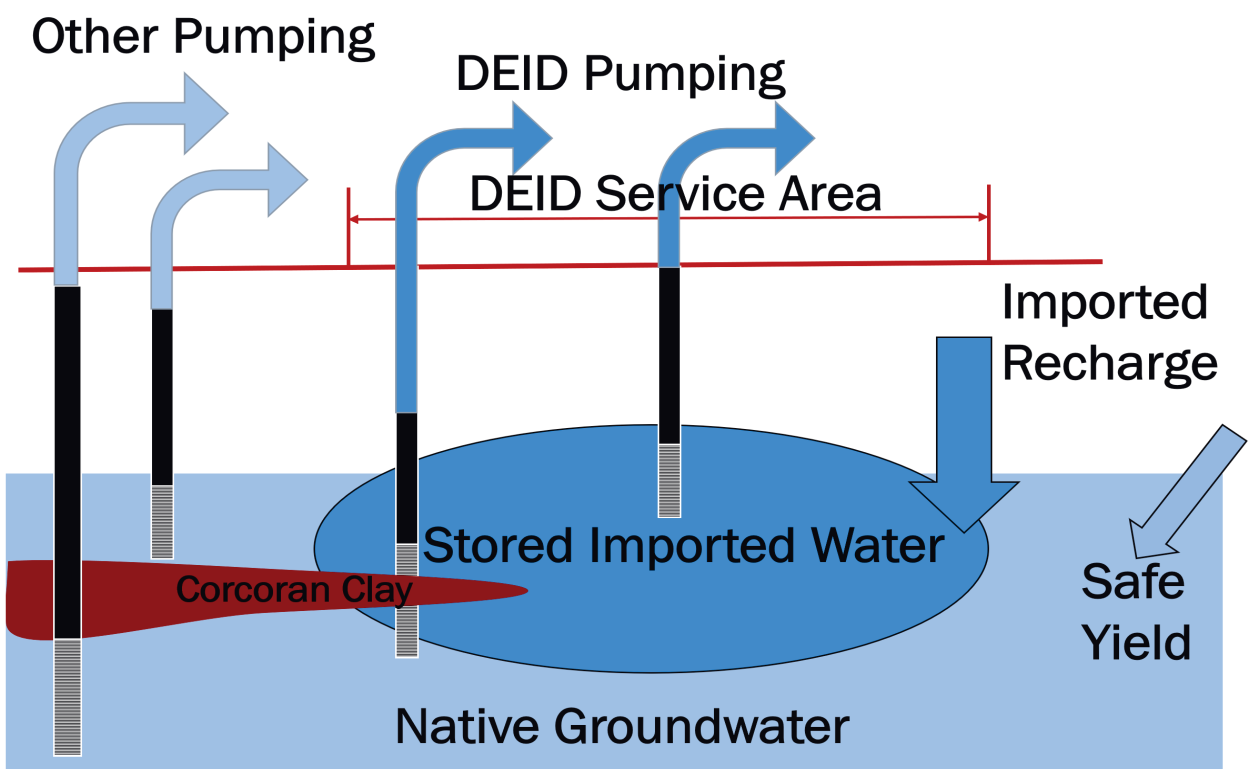

Figure 2-4: Schematic of Stored Groundwater within the DEID

2.3.2 Groundwater Storage *[23 CCR § 354.16 (b)]*

> **23 Cal. Code Regs. § 354.16 Groundwater Conditions. (b)** *A graph depicting estimates of the change in groundwater in storage, based on data, demonstrating the annual and cumulative change in the volume of groundwater in storage between seasonal high groundwater conditions, including the annual groundwater use and water year type.*

Groundwater storage in the Tule Subbasin is described in Chapter 2.2.2 and listed in Table 2-3, Tule Subbasin Historical Groundwater Budget of the Tule Subbasin Setting of **Appendix A-2**. The average annual change in storage for the Tule Subbasin from 1986/1987 to 2016/2017 is estimated to be approximately -160,000 acre-ft/year. The cumulative change in storage for the Tule Subbasin from 1986/1987 to 2016/2017 is -4,948,000 acre-ft.

Within the DEID GSA, as indicated in Table 2 of Appendix C the Tule Subbasin Setting (**Appendix A-2**), the average annual change in storage from 1986/1987 to 2016/2017 is estimated to be approximately -35,774 acre-ft/year and the cumulative change in storage is -1,109,000 acre-ft/year as shown in **Figure 2-5, Change in Groundwater Storage from 1986/87 to 2016/17 within the DEID**. Predominant sources of groundwater outflow within the DEID GSA include municipal and agricultural pumping and subsurface outflows both out of the Subbasin and to other GSAs within the Subbasin. A graph depicting estimates of the change in groundwater in storage for the Tule Subbasin is shown in Figure 2-23 of the Tule Subbasin Setting (**Appendix A-2**).

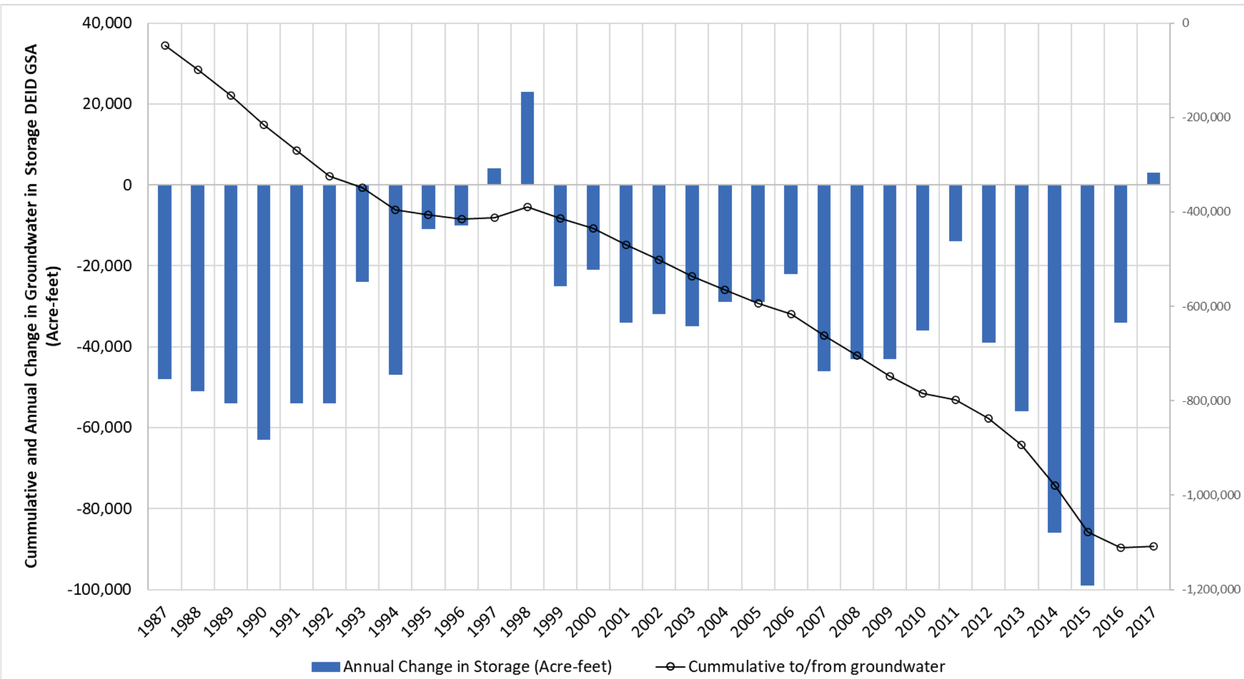

Figure 2-5: Change in Groundwater Storage from 1986/87 to 2016/17 within the DEID[7]

If no subsurface outflow from the DEID GSA occurred from 1986/1987 to 2016/2017, the DEID GSA change in groundwater storage would be approximately 2,675,000 acre-ft.

[7] Figure 2-5, Change in Groundwater Storage from 1986/87 to 2016/17 within the DEID represents the annual and cumulative change in groundwater in storage for SGMA reporting purposes and does not represent an accounting of water rights.

2.3.3 Seawater Intrusion *[23 CCR § 354.16 (c)]*

23 Cal. Code Regs. § 354.16 Groundwater Conditions. (c) *Seawater intrusion conditions in the basin, including maps and cross-sections of the seawater intrusion front for each principal aquifer.*

Seawater intrusion does not occur in the Tule Subbasin for reasons described in Chapter 2.2.3 of the Tule Subbasin Setting (**Appendix A-2**).

2.3.4 Groundwater Quality Issues *[23 CCR § 354.16 (d)]*

23 Cal. Code Regs. § 354.16 Groundwater Conditions. (d) *Groundwater quality issues that may affect the supply and beneficial uses of groundwater, including a description and map of the location of known groundwater contamination sites and plumes.*

Groundwater quality was previously discussed in **Section 2.2.6.4: Aquifer Water Quality** of this GSP and groundwater quality issues are further described in Chapter 2.2.4 of the Tule Subbasin Setting (**Appendix A-2**). DEID GSA experiences relatively good groundwater quality; however, per data provided by SWRCB's Geotracker (SWRCB 2020), there are two active clean-up sites within the jurisdiction of the Agency

2.3.5 Subsidence *[23 CCR § 354.16 (e)]*

23 Cal. Code Regs. § 354.16 Groundwater Conditions. (e) *The extent, cumulative total, and annual rate of land subsidence, including maps depicting total subsidence, utilizing data available from the Department, as specified in Section 353.2, or the best available information.*

Per Chapter 2.2.5 of **Appendix A-2,** the cause of land subsidence within the Tule Subbasin is well documented. Known causes of land subsidence are linked to the pumping of groundwater in aquifers where sediments are susceptible to consolidation from increased effective stress from lowering aquifer heads. Historical subsidence in the Tule Subbasin is well documented (Poland and others, 1975). A primary objective of the DEID GSP is to control the rate of water level decline and as a result the continuation of subsidence from consolidation of fine grained sediments in the aquifer.

Subsidence was estimated using a combination of calibrated subsidence simulations at two measurement locations as well as extrapolations of measured data at a variety of other locations. The total average change in land surface elevation within the southern and eastern two-thirds of the Tule Subbasin, wherein DEID GSA is located, was estimated to be approximately 0.1 ft/year from 1987-2007. This information is shown in Figure 2-24 of the Tule Subbasin Setting (**Appendix A-2**).

Land subsidence from 2007-2011 observed in the southeastern portion of the Subbasin is based on an analysis of satellite data. For this period, satellite data indicates land subsidence values in the DEID GSA that range from 0 to 1.0 ft with the highest values located in the western portions of the GSA near Highway 43. For the period 1959-2017, measured subsidence along the FKC near White River totaled 4.8 ft (see Figure 2-25 in **Appendix A-2**).

Land subsidence from 2015-2021 observed in the DEID GSA from satellite data range from 0 to 3.0 ft with the highest values located in the northern portion of the GSA near the FKC and the western portions of the GSA.

2.3.6 Interconnected Surface Water Systems *[23 CCR § 354.16 (f)]*

23 Cal. Code Regs. § 354.16 Groundwater Conditions. (f) *Identification of interconnected surface water systems within the basin and an estimate of the quantity and timing of depletions of those systems, utilizing data available from the Department, as specified in Section 353.2, or the best available information.*

Surface water features are addressed in **Section 2.2.4** of this GSP, as well as in Chapter 2.1.5 and 2.2.6 of the Tule Subbasin Setting (**Appendix A-2**). As presently assessed, there is no indication of interconnected surface water systems within the Tule Subbasin per the definition provided in 23 CCR § 351(o).

2.3.7 Groundwater Dependent Ecosystems *[23 CCR § 354.16 (g)]*

23 Cal. Code Regs. § 354.16 Groundwater Conditions. (g) *Identification of groundwater dependent ecosystems within the basin, utilizing data available from the Department, as specified in Section 353.2, or the best available information.*

Groundwater Dependent Ecosystems are discussed in Chapter 2.2.7 of the Tule Subbasin Setting (**Appendix A-2**) as likely to not occur within the Tule Subbasin, based on the average depth to groundwater and the typical root zone reach of native vegetation.

2.4 Water Budget *[23 CCR § 354.18]*

23 Cal. Code Regs. § 354.18 Water Budget. (a) *Each Plan shall include a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current and projected water budget conditions, and the change in the volume of water stored. Water budget information shall be reported in tabular and graphical form.*

The regulatory requirements outlined in CCR § 354.18 for describing the total annual volume of groundwater, imported water, and surface water entering and leaving the Tule Subbasin, including historical, current, and projected water budget conditions, and the change in the volume of water stored are addressed and fulfilled in Chapter 2.3 of the Tule Subbasin Setting (**Appendix A-2**).

Table 2-3: Components of 23 CCR § 354.18 links the requirements of 23 CCR § 354.18 to the sections in the Tule Subbasin Setting (**Appendix A-2**) and the sections of this GSP that apply to and fulfil each regulatory component.

Table 2-3: Components of 23 CCR § 354.18

23 CCR	Section Title	Tule Subbasin Setting	DEID GSA GSP
§ 354.18 (b)(1)	Surface Water Budget	2.3.1	2.4.1
§ 354.18 (b)(2)	Sources of Groundwater Recharge	2.3.2.1	2.4.2.1
§ 354.18 (b)(3)	Sources of Groundwater Discharge	2.3.2.2	2.4.2.2
§ 354.18 (d)(4)	Change in Groundwater Storage	2.3.2.3	2.4.2.3
§ 354.18 (d)(5)	Overdraft	2.3.2.4	2.4.2.4
§ 354.18 (d)(6)	Water Year Type	2.3.2.5	2.4.2.5
§ 354.18 (b)(7)	Sustainable Yield	2.3.2.6	2.4.2.6
§ 354.18 (c)(1)	Current Water Budget	2.3.3	2.4.3
§ 354.18 (c)(2)	Historical Water Budget	2.3.4	2.4.4
§ 354.18 (c)(3)	Projected Water Budget	2.3.5	2.4.5

Excerpts and brief summaries of the Water Budget information described in the Tule Subbasin Setting, as well as brief descriptions of the water budget components and their accounting within the DEID GSA, are provided below.

Additionally, a separate historical water budget was prepared for the DEID GSA and is located in Tables 1a, 1b, and 2 of Appendix C of the Tule Subbasin Setting (**Appendix A-2**).

2.4.1 Surface Water Budget *[23 CCR § 354.18(b)(1)]*

23 Cal. Code Regs. § 354.18 Water Budget. (b) *The water budget shall quantify the following, either through direct measurements or estimates based on data:*

(1) *Total surface water entering and leaving a basin by water source type.*

Chapter 2.3.1 of **Appendix A-2** provides an overview of the Tule Subbasin's surface water budget and its components, including imported water. The surface water budget is based on a complete and accurate accounting of surface and imported water inflow and outflow over the period 1986/1987 to 2016/2017, with an average annual surface and imported water inflow of 1,477,000 acre-ft (see Table 2-2a in **Appendix A-2**) and average annual outflow of 1,474,000 acre-ft (see Table 2-2b in **Appendix A-2**). Based on the percent difference of 0.2 percent, the surface water budget is considered an accurate representation of actual surface water conditions in the Tule Subbasin.

Several sources of surface and imported water outflow are also sources of groundwater inflow. Of those water outflows that provide groundwater recharge, many sources are associated with diversions undertaken in accordance with existing water rights and/or purchased import water. These types of diversions are excluded from the estimate of sustainable yield.

DEID GSA's historical surface/imported water budget is a sub-budget of the total Tule Subbasin surface water budget. When surface water inflows are compared to surface water outflows, the DEID GSA is in balance (Tables 1a and 1b of Appendix C, Tule Subbasin Setting, **Appendix A-2**). Over the period 1986/1987 to 2016/2017, the average annual surface and imported water inflow and outflow are both 205,581 acre-ft.

2.4.1.1 Surface Water Inflow

2.4.1.1.1 Precipitation

Chapter 2.3.1.1.1 of the Tule Subbasin Setting (**Appendix A-2**) describes the methodology used to determine annual average precipitation throughout the Tule Subbasin. Annual precipitation was derived from annual precipitation values recorded at Porterville Station (see Figure 2-28 in **Appendix A-2**) and applying them against the long-term average annual isohyetal map for the region (see Figure 2-27 in **Appendix A-2**), with total estimated precipitation varying within each isohyetal zone based on historical records.

The total annual precipitation within the DEID GSA from water years 1986/1987 to 2016/2017 ranged from approximately 12,000 acre-ft in 2013/2014 to 91,000 acre-ft in 1997/1989, with an annual average volume of 38,000 acre-ft/year (see Table 1a of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.1.1.2 Stream Inflow

As previously mentioned in **Section 2.2.4** of this GSP, White River is the only natural surface waterway that flows through the DEID GSA in an east-to-west manner.

As described in Chapter 2.3.1.1.2 of the Tule Subbasin Setting (**Appendix A-2**), several different sources were used to estimate surface water inflows from native streams. The USGS White River Station along White River was used to estimate flow from White River; however, historical records at this station are only available from 1971-2005. Per a linear regression model indicating a correlation coefficient of 0.91 between White River and Deer Creek, the streamflow of White River was assumed to be proportional to the magnitude of flow in Deer Creek. For the period of 2005-2017, White River streamflow was based on a linear interpretation of measured data.

For the period from 1986/1987 to 2016/2017, average annual stream inflow into the DEID GSA was estimated to be approximately 2,000 acre-ft/year from White River (see Table 1a of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.1.1.3 Imported Water

Imported water is delivered to the DEID within the DEID GSA from the FKC (see Table 1a of Appendix C, Tule Subbasin Setting, **Appendix A-2**). Data related to the DEID service area was obtained directly from DEID. Additional information related to imported water in the Tule Subbasin is found in Chapter 2.3.1.1.3 of the Tule Subbasin Setting (**Appendix A-2**).

For the period from 1986/1987 to 2016/2017, average annual imported water inflow into the DEID GSA was estimated to be approximately 109,000 acre-ft/year (see Table 1a of Appendix C, Tule Subbasin Setting; **Appendix A-2**).

2.4.1.1.4 Discharge to Crops from Wells

For the Tule Subbasin surface water budget and as described in Chapter 2.3.1.1.4 of the Tule Subbasin Setting (**Appendix A-2**), the water applied to crops was assumed to be the total applied water minus water deliveries from imported water and diverted native streamflow (see Figure 2-30 in **Appendix A-2**). Total crop demand was assumed based on estimates of crop evapotranspiration and an assumed average irrigation efficiency of 0.79 (Thomas Harder & Co., 2017). However, it should be noted that this irrigation efficiency is different by crop type and year, and that the Tule Subbasin average is a volume-adjusted mean of these various irrigation efficiencies over time.

The estimated average annual discharge to crops from wells for water years 1986/87 to 2016/17 in the DEID GSA was estimated to be approximately 53,000 acre-ft/year (see Table 1a of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.1.1.5 Municipal Deliveries from Wells

As described in Chapter 2.3.1.1.5 of **Appendix A-2,** groundwater pumping for municipal supply is conducted by small municipalities in the DEID GSA. Households in the rural portions of the Tule Subbasin rely on private wells to meet their domestic needs; however, the volume pumped is considered to be negligible and de minimis under SGMA standards (Water Code, section 10721(e)). The total average annual municipal pumping in the DEID GSA is a small fraction of the total average annual municipal pumping in the Subbasin.

For the period from 1986/1987 to 2016/2017, municipal pumping within DEID GSA ranged from 1,600 acre-ft/ year to a current amount of 2,800 acre-ft/year with an average annual estimated amount of approximately 2,100 acre-ft/year (see Table 1a of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.1.2 Surface Water Outflow

2.4.1.2.1 Areal Recharge from Precipitation

Areal recharge for the Tule Subbasin is based on the Williamson Method, as described in Williamson et al. (1989) that estimates net infiltration from annual precipitation falling to the valley floor based on monthly soil moisture budgets based on records from the period from 1922-1971. For each year in the Tule Subbasin water budget, annual groundwater recharge was estimated for each isohyetal zone. It should be noted that the Williamson Method results in no groundwater recharge if annual precipitation is less than 9.69 inches per year. Further description of this method and areal recharge in the Tule Subbasin can be found in Chapter 2.3.1.2.1 of the Tule Subbasin Setting (**Appendix A-2**).

For the period from 1986/1987 to 2016/2017, areal recharge within DEID GSA ranged from 0 to 25,000 acre-ft/year, with an average annual volume estimated to be approximately 2,000 acre-ft/year (see Table 1b of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.1.2.2 Streambed Infiltration (Channel Loss)

Descriptions of streambed infiltration, or channel loss, occurring in White River and the methodology by which they were estimated are provided in Chapter 2.3.1.2.2 of **Appendix A-2.** Streambed infiltration within the Tule Subbasin is accounted between various reaches of each natural waterway, generally subdivided by monitoring or diversion points. Streambed infiltration within DEID GSA is described in Table 1b of Appendix C of the Tule Subbasin Setting (**Appendix A-2**).

2.4.1.2.2.1 White River

All surface water that is measured or interpolated at the White River stream gage, after accounting for ET losses, is assumed to become streambed infiltration. For the water years 1986/1987 to 2016/2017, annual streambed infiltration volumes of the White River within DEID GSA ranged from 0 acre-ft/year to 27,100 acre-ft/year, with an average annual volume estimated to be approximately 2,000 acre-ft/year (see Table 1b of Appendix C of the Tule Subbasin Setting, **Appendix A-2**). The total average annual infiltration for the White River within the Tule Subbasin is estimated to be approximately 5,600 acre-ft/yr.

2.4.1.2.3 Canal Loss

As described in Chapter 2.3.1.2.3 of the Tule Subbasin Setting (**Appendix A-2**), canal losses from diversions of local surface water deliveries occur outside the DEID and therefore no canal losses are accounted for in the water outflow portion of the DEID GSA surface water budget.

2.4.1.2.4 Managed Recharge in Basins

Managed aquifer recharge within the DEID GSA results from imported water supplies by DEID. (see Chapter 2.3.1.2.4 in **Appendix A-2**).

Section 1.3.1.4. Identification of Water Use Sector & Water Use Type of this GSP provides additional discussion regarding the recharge efforts of the DEID. **Figure 1-5: Water Use Sector by Water Use Type within DEID GSA** provides a map of percolation ponds and groundwater recharge sites currently operating within the DEID GSA.

For the period from 1986/1987 to 2016/2017, managed recharge in basins within DEID GSA on an average annual basis was estimated to be approximately 2,200 acre-ft/year (see Table 1b of Appendix C, Tule Subbasin Setting, **Appendix A-2**). Additional information regarding DEID recharge operations including ongoing expansion of the Turnipseed groundwater bank is described in **Section 1.4.3 Conjunctive Use Programs**.

2.4.1.2.5 Deep Percolation of Applied Water

Chapter 2.3.1.2.5 of the Tule Subbasin Setting (**Appendix A-2**) describes the deep percolation of applied water from native waterways, imported water, recycled water and native groundwater for the subbasin, including efficiencies that were used to determine the volume of water contributing to deep percolation compared to volume applied.

Table 1b of Appendix C of the Tule Subbasin Setting (**Appendix A-2**) identifies sources of deep percolation of applied water within the DEID GSA, which include imported water, agricultural groundwater pumping and municipal groundwater pumping. Each of these sources and the volume of water attributed to deep precoalition are described below.

2.4.1.2.5.1 Deep Percolation of Applied Imported Water

The estimate of deep percolation resulting from imported water applied to crops is based on total volume of imported water delivered to DEID minus evapotranspiration and recharge in the DEID GSA. Deep percolation of applied imported water is assumed to be approximately 21% (Thomas Harder &Co., 2017) of the total applied water, which is the balance after applying the basin-wide assumption of 79% irrigation efficiency

For the period from 1986/1987 to 2016/2017, deep percolation of applied imported water within DEID GSA on an average annual basis was estimated to be approximately 22,500 acre-ft/year (see Table 1b of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.1.2.5.2 Deep Percolation of Applied Native Groundwater for Agricultural Irrigation (Agricultural Pumping)

The balance of agricultural irrigation demand not met by imported water or stream diversions is assumed to be met by groundwater pumping. Return flow of applied water from groundwater pumping is assumed to be 21 percent of the applied water.

For the period from 1986/1987 to 2016/2017, deep percolation of applied agricultural pumping within DEID GSA on an average annual basis was estimated to be approximately 9,900 acre-ft/year (see Table 1b of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.1.2.5.3 Deep Percolation of Applied Native Groundwater for Municipal Irrigation (Municipal Pumping)

Deep percolation of applied groundwater for municipal irrigation is described in Chapter 2.3.1.2.5 of **Appendix A-2**.

For the period from 1986/1987 to 2016/2017, deep percolation of applied groundwater for municipal irrigation within DEID GSA ranged from 1,100 acre-ft/year to a current estimated amount of 1,800 acre-ft/year with an average annual amount estimated to be approximately 1,400 acre-ft/year (see Table 1b of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.1.2.6 Evapotranspiration

Evapotranspiration occurs in multiple forms and utilizing a variety of water sources within the Tule Subbasin, and its various occurrences within the Tule Subbasin are described by source in Chapter 2.3.1.2.6 of the Tule Subbasin Setting (**Appendix A-2**). As described in the aforementioned Chapter, evapotranspiration is "… the loss of water to the atmosphere from free-water evaporation, soil moisture evaporation, and transpiration by plants (Fetter, 1994)."

Table 1b of Appendix C of the Tule Subbasin Setting (**Appendix A-2**) identifies sources of evapotranspiration within the DEID GSA as evapotranspiration of precipitation from crops and native vegetation, agricultural consumptive use of imported water, agricultural consumptive use of pumped groundwater, and municipal consumptive use (landscape irrigation). Each of these sources and the volume of water attributed to evapotranspiration are described below.

2.4.1.2.7 Evapotranspiration of Precipitation from Crops and Native Vegetation

Chapter 2.3.1.2.6 of **Appendix A-2** describes evapotranspiration of precipitation from crops and native vegetation.

For the period from 1986/1987 to 2016/2017, evapotranspiration of precipitation from crops and native vegetation within the DEID GSA on an average annual basis was estimated to be approximately 36,000 acre-ft/year (see Table 1b of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.1.2.8 Agricultural Consumptive Use of Imported Water and Groundwater Pumping

Agricultural consumptive use and its method of estimation within the Tule Subbasin is described in Chapter 2.3.1.2.6 of the Tule Subbasin Setting (**Appendix A-2**).

For **Appendix A-2,** types of and areas of crops grown in the Tulare County portion of the DEID GSA were estimated from land use maps and associated data published by the DWR for 1993, 1999, 2007, and 2014[8]. For the portion of the DEID GSA in Kern County, land use maps were obtained from DWR (1990)[9] and the Kern County Department of Agriculture and Measurement Standards (1999 and 2007). These maps are provided in Figure 2-31 of the Tule Subbasin Setting (**Appendix A-2**). Consumptive use estimates were based on crop coefficients published in ITRC (2003) multiplied by the area of the crop multiplied by a return flow factor reflecting irrigation efficiency.

For the period from 1986/1987 to 2016/2017, the agricultural consumptive use of imported water within the DEID GSA on an average annual basis was estimated to be approximately 85,300 acre-ft/year. For the same time period, the estimated consumptive use of groundwater pumping (discharges from wells) was 44,000 acre-ft/year (see Table 1b of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.1.2.9 Municipal Consumptive Use

Municipal consumptive use is described in Chapter 2.3.1.2.6 of the Tule Subbasin Setting (**Appendix A-2**).

For the period from 1986/1987 to 2016/2017, the estimated municipal consumptive use from landscape irrigation within the DEID GSA ranged from 600 acre-ft/year to the current amount of 1,000 acre-ft/year with an average annual amount estimated to be approximately 700 acre-ft/year (see Table 1b of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.1.2.10 Surface Water Outflow

Surface water outflow for the DEID GSA could occur via the White River during extreme precipitation events; however, this is considered rare, and there are no available measured surface water outflows from the DEID GSA, so this component is not included in the surface water budget.

2.4.2 Groundwater Budget

The fundamental premise of the Tule Subbasin Groundwater Budget is as follows:

Inflow – Outflow = +/- ΔS

In this equation, "ΔS" serves as "change in groundwater storage." The groundwater budget of the Tule Subbasin, as well as its component terms and methodology of development, are described in Chapter 2.3.2 of the Tule Subbasin Setting (**Appendix A-2**).

[8] Land use data was obtained from California Department of Water Resources Land Use Viewer available at: https://gis.water.ca.gov/app/CADWRLandUseViewer/.

The accounting of DEID GSA's groundwater budget can be found in Table 2 of Appendix C of the Tule Subbasin Setting (**Appendix A-2**) and shown in **Figure 2-6, DEID GSA Groundwater Budget Average Annual Inflows/Outflows from 1986/87 to 2016/17**.

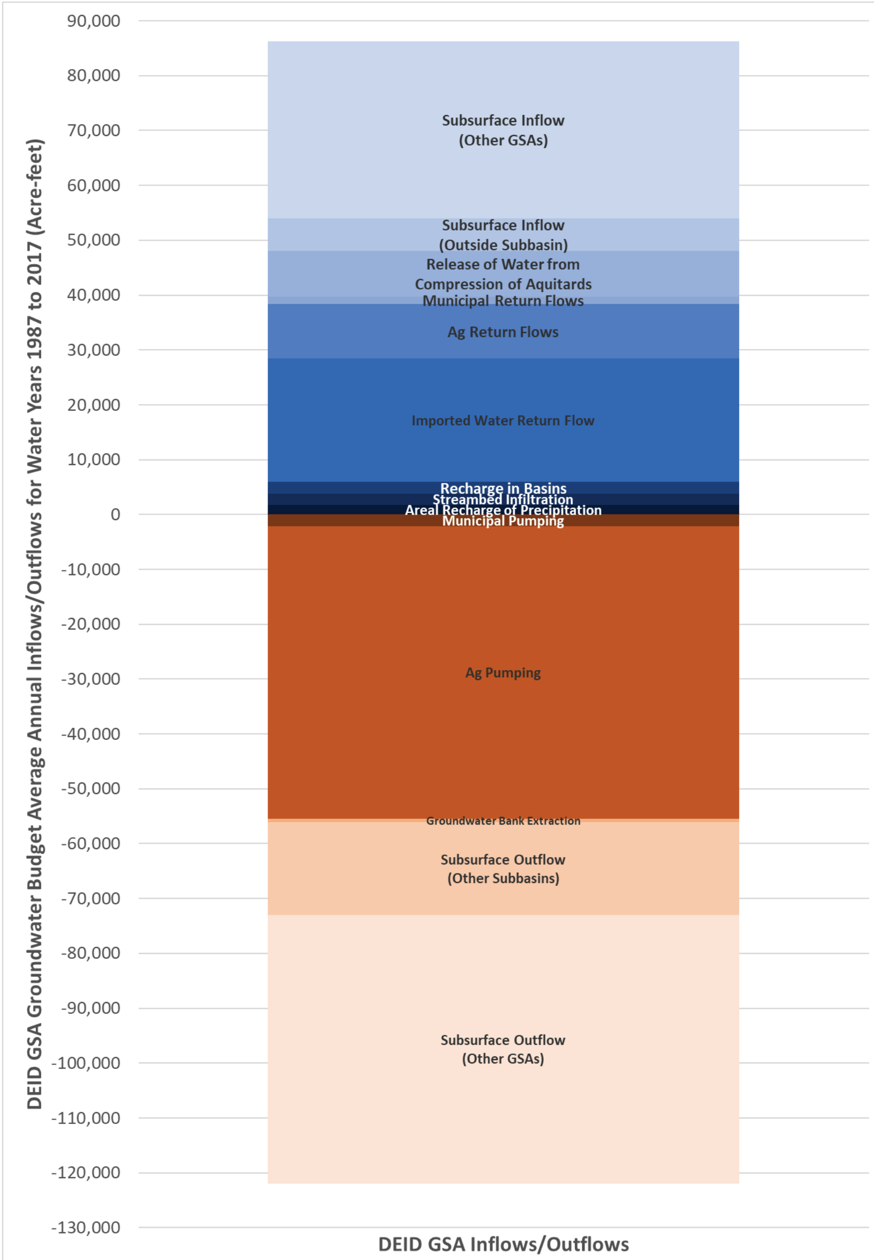

Figure 2-6: DEID GSA Groundwater Budget Average Annual Inflows/Outflows from 1986/87 to 2016/17[9]

[9] Figure 2-6: DEID GSA Groundwater Budget Average Annual Inflows/Outflows from 1986/87 to 2016/17 represents the average annual inflows and outflows to the DEID GSA for SGMA reporting purposes and does not represent an accounting of water rights.

2.4.3 Sources of Groundwater Recharge [23 CCR § 354.18(b)(2)]

23 Cal. Code Regs. § 354.18 Water Budget. (b) The water budget shall quantify the following, either through direct measurements or estimates based on data:

(2) Inflow to the groundwater system by water source type, including subsurface groundwater inflow and infiltration of precipitation, applied water, and surface water systems, such as lakes, streams, rivers, canals, springs and conveyance systems.

Sources of groundwater recharge are described Chapter 2.3.2.1 of the Tule Subbasin Setting (**Appendix A-2**). Those sources of groundwater recharge that are present and occur within DEID GSA are identified and discussed below.

2.4.3.1 Areal Recharge

Chapter 2.3.2.1.1 of the Tule Subbasin Setting (**Appendix A-2**) describes areal recharge as, "Groundwater recharge from precipitation falling on the valley floor in the Tule Subbasin…" See Section 2.4.1.2.1 of **Appendix A-2** for additional discussion on areal recharge.

For the period from 1986/1987 to 2016/2017, areal recharge within DEID GSA ranged from 0 to 25,000 acre-ft/year, with an average annual volume estimated to be approximately 2,000 acre-ft/year (see Table 1b of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.3.2 Groundwater Recharge from the White River

As described in Chapter 2.3.2.1.4 of the Tule Subbasin Setting (**Appendix A-2**), "Groundwater recharge of White River water occurs as streambed infiltration as described in Section 2.3.1.2 summarized in Column L of Table 2-3. Estimated average annual groundwater recharge from White River water was approximately 5,600 acre/ft/year for water years 1986/87 to 2016/17" See Section 2.4.1.2 of **Appendix A-2** for additional discussion on sources of groundwater recharge from the White River within DEID GSA.

For the period from 1986/1987 to 2016/2017, groundwater recharge from the White River within DEID GSA on an average annual basis was estimated to be approximately 2,000 acre-ft/year from streambed infiltration (see Table 1b of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.3.3 Groundwater Recharge from Imported Water Deliveries

As described in Chapter 2.3.2.1.5 of the Tule Subbasin Setting (**Appendix A-2**), "Groundwater recharge of imported water occurs as canal loss, recharge in basins, and deep percolation of applied water as described in Section 2.3.1.2…" See Section 2.4.1.2.5.1 of **Appendix A-2** for additional discussion on sources of groundwater recharge from imported water within DEID GSA.

For the period from 1986/1987 to 2016/2017, groundwater recharge from imported water within DEID GSA on an average annual basis was estimated to be approximately 2,200 acre-ft/year resulting from imported water delivered to recharge basins, and 22,500 acre-ft/year from return flow of applied water (see Table 1b of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.3.4 Recycled Water

As described in Chapter in Chapter 2.3.2.1.6 of the Tule Subbasin Setting (**Appendix A-2**), "Groundwater recharge of recycled water occurs as artificial recharge and return flow of applied water as described in Section 2.3.1.2…" There are no sources of groundwater recharge from recycled water within DEID GSA.

2.4.3.5 Deep Percolation of Applied Water from Groundwater Pumping

As described in Chapter 2.3.2.1.7 of the Tule Subbasin Setting (**Appendix A-2**), "A portion of irrigated agriculture and municipal applied water from groundwater pumping becomes deep percolation and groundwater recharge as described in Section 2.3.1.2.5…" See Section 2.4.1.2.5 of **Appendix A-2** for additional discussion on sources of groundwater recharge from return flow of applied groundwater pumping within DEID GSA.

For the period from 1986/1987 to 2016/2017, groundwater recharge from applied water from groundwater pumping within DEID GSA on an average annual basis was estimated to be approximately 9,900 acre-ft/year from return flow of groundwater applied for agricultural irrigation, and 1,400 acre-ft/year from return flow of groundwater applied for municipal irrigation (see Table 1b of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.3.6 Release of Water from Compression of Aquitards

Water released from compression of aquitards in the Tule Subbasin is described in Chapter 2.3.2.1.8 of the Tule Subbasin Setting (**Appendix A-2**).

For the period from 1986/1987 to 2016/2017, groundwater inflow from compression of aquitards within DEID GSA on an average annual basis was estimated to be approximately 8,000 acre-ft/year (see Table 2 of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.3.7 Subsurface Inflow

Subsurface inflow in the Tule Subbasin is described in Chapter 2.3.2.1.9 of the Tule Subbasin Setting (**Appendix A-2**).

Subsurface inflow into the DEID GSA occurs from both as inter- and intra-subbasin sources.

For the period from 1986/1987 to 2016/2017, groundwater inflow from subsurface inflow into DEID GSA on an average annual basis was estimated to be approximately 6,000 acre-ft/year from outside of the Tule Subbasin and 32,000 acre-ft/year from other GSAs within the Tule Subbasin (see Table 2 of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.3.8 Mountain Front Recharge

Chapter 2.3.2.1.10 of the Tule Subbasin Setting (**Appendix A-2**) describes mountain front recharge occurring in the subbasin and the methodology used to estimate the volume occurring within the Tule Subbasin.

The Eastern Tule GSA is on the DEID GSA's eastern boundary and is directly adjacent to the mountain front and, thus, the Eastern Tule GSA is the recipient of all mountain front recharge coming into the Tule Subbasin. As such, the DEID GSA receives no mountain front recharge.

2.4.4 Sources of Groundwater Discharge [23 CCR § 354.18(b)(3)]

> **23 Cal. Code Regs. § 354.18 Water Budget. (b)** The water budget shall quantify the following, either through direct measurements or estimates based on data:
>
> **(3)** Outflows from the groundwater system by water use sector, including evapotranspiration, groundwater extraction, groundwater discharge to surface water sources, and subsurface groundwater outflow.

Chapter 2.3.2.2 of the Tule Subbasin Setting (**Appendix A-2**) discusses sources of groundwater discharge or outflow within the Tule Subbasin. Those sources of groundwater recharge or outflow that are present and occur within DEID GSA are identified and discussed below.

2.4.4.1 Municipal Groundwater Pumping

As described in **Chapter 2.3.2.2.1** of the Tule Subbasin Setting (Appendix A-2)**,** "Groundwater pumping for municipal supply is conducted by the City of Porterville and small municipalities for the local communities in the Tule Subbasin as described in Section 2.3.1.1.5." See Section 2.4.1.1.5 of **Appendix A-2** for additional discussion on municipal groundwater pumping within DEID GSA. Additionally, households in the rural portions of the Tule Subbasin rely on private wells to meet their domestic needs; however, the volume pumped is considered to be negligible.

For the period from 1986/1987 to 2016/2017, municipal groundwater pumping within DEID GSA ranged from 1,600 acre-ft/year to the current amount of 2,800 acre-ft/year with an average annual amount estimated to be approximately 2,100 acre-ft/year (see Table 1a of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.4.2 Agricultural Groundwater Pumping

As described in Chapter 2.3.2.2.2 of the Tule Subbasin Setting (**Appendix A-2**), "Agricultural groundwater production is estimated as the total applied water demand for crops minus surface deliveries."

For the period from 1986/1987 to 2016/2017, agricultural groundwater pumping within DEID GSA on an average annual basis was estimated to be approximately 53,000 acre-ft/year (see Table 2 of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.4.3 Subsurface Outflow

As described in Chapter 2.3.2.2.4 of the Tule Subbasin Setting (**Appendix A-2**), "Subsurface outflow for 1986/87 through 2016/17 is based on output from the calibrated groundwater flow model of the Tule Subbasin."

Subsurface outflow from DEID GSA flows out of the Agency's boundaries into adjacent GSAs within the Tule Subbasin and into subbasins adjacent to the Tule Subbasin. The causation of subsurface outflow from the Agency's boundaries to adjacent boundaries is due to DEID in-lieu and direct recharge of imported water in excess of the district's consumptive demand and the pumping depressions created outside of the district's boundaries resulting in a groundwater gradient flowing from areas of in-lieu and direct recharge of imported water towards pumping depressions.

For the period from 1986/1987 to 2016/2017, subsurface outflow from DEID GSA on an average annual basis was estimated to be approximately 17,000 acre-ft/year to outside subbasins and 49,000 acre-ft/year to other GSAs within the Tule Subbasin (see Table 2 of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.5 Change in Groundwater Storage [23 CCR § 354.18(b)(4)]

> **23 Cal. Code Regs. § 354.18 Water Budget. (b)** The water budget shall quantify the following, either through direct measurements or estimates based on data:
>
> **(4)** The change in the annual volume of groundwater in storage between seasonal high conditions

The change in groundwater storage within the Tule Subbasin was estimated by comparing the groundwater inflow elements with the groundwater outflow elements of the groundwater budget. For the period from 1986/87 to 2016/17, the cumulative change in groundwater storage across the Tule Subbasin was estimated to be approximately -4,948,000 acre-ft. This is approximately -160,000 acre-ft/year (see Chapter 2.3.2.3 and Table 2-3 in **Appendix A-2**).

Within DEID GSA, the cumulative and average-annual change in storage can be estimated by utilizing the fundamental premise of the groundwater budget (Inflow – Outflow = +/- ΔS) to compare the sources of groundwater recharge and groundwater discharge occurring and present within DEID GSA, as described in **Sections 2.4.3 Sources of Groundwater Recharge** and **2.4.4 Sources of Groundwater Discharge.**

For the period from 1986/1987 to 2016/2017, the cumulative change in groundwater storage within DEID GSA was estimated to be approximately -1,109,000 acre-ft. This is approximately -36,000 acre-ft/year (see Table 2 of Appendix C, Tule Subbasin Setting, **Appendix A-2**).

2.4.6 Overdraft [23 CCR § 354.18(b)(5)]

> **23 Cal. Code Regs. § 354.18 Water Budget. (b)** The water budget shall quantify the following, either through direct measurements or estimates based on data:
>
> **(5)** If overdraft conditions occur, as defined in Bulletin 118, the water budget shall include a quantification of overdraft over a period of years during which water year and water supply conditions approximate average conditions.

Average hydrologic conditions in the Tule Subbasin are represented by the 20-year period from 1990/1991 to 2009/2010 (see Chapter 2.3.2.4 in **Appendix A-2**). Overdraft during this period is estimated to be approximately 115,300 acre-ft/year.

There are several ways to present overdraft within DEID GSA. One methodology is defining overdraft by change in groundwater storage based on the same average hydrologic period, which includes subsurface inflow and outflow of groundwater between DEID GSA and other Tule Subbasin GSAs and adjacent subbasins (see **Section 2.3.1 Groundwater Occurrence and Flow** [23 CCR § 354.16 (a)] which estimates overdraft from 1990/1991 to 2009/2010 to be approximately 28,400 acre-ft/year (see Table 2 of

Appendix C, Tule Subbasin Setting, **Appendix A-2**). This value is not representative of practices within DEID GSA because the change in groundwater storage includes groundwater leaving the GSA as subsurface outflow. On-farm recharge and banking of imported water results in higher groundwater level elevations within portions of the DEID GSA than adjacent Tule Subbasin GSAs and other subbasins. The overall groundwater flow gradient is from higher groundwater elevations in the DEID GSA to pumping depressions caused by over pumping of groundwater outside the DEID service area.

The second method, and more representative of the overdraft in DEID GSA, is based on actions made by groundwater users within the DEID GSA plan area, primarily lands associated with DEID, to provide a sustainable supply of water resources through in-lieu and direct recharge and application of imported water to prevent groundwater pumping in excess of what is sustainably available. This method excludes subsurface flow caused by reason described in **Section 2.3.1 Groundwater Occurrence and Flow** [23 CCR § 354.16 (a)], and is calculated based on the following equation:

Overdraft = (Net Pumping – Avg Share of Historical Net Sustainable Yield) / GSA Acreage

where,

Net Pumping = (Ag. Pumping + Municipal Pumping) - Recharge in Basins - Return Flow

Avg. Share of Historical Net S.Y. = A(real Recharge from Precip. + Stream Infiltration + MBR + SS Inflow – SS Outflow) / Area of each GSA

and,

S.Y. = Sustainable Yield

MBR = Mountain Block Recharge

SS = Subsurface

Using this methodology, DEID GSAs overdraft based on average hydrologic conditions from 1990/1991 to 2009/2020 is approximately -8,800 acre-ft/year. The negative overdraft value indicates the DEID GSA, due to its historical groundwater management actions of the DEID, is a net depositor of water in the Subbasin. A separate analysis of DEID GSA water accounting over the water years 1986/1987 to 2016/2017 is presented below in **Section 2.4.10 Historical Water Budget.**

2.4.7 Water Year Type [23 CCR § 354.18(b)(6)]

23 Cal. Code Regs. § 354.18 Water Budget. (b) The water budget shall quantify the following, either through direct measurements or estimates based on data:

(6) The water year type associated with the annual supply, demand, and change in groundwater stored.

All water year elements presented herein are based on a water year, which begins October 1 and ends September 30 (see Chapter 2.3.2.5 in **Appendix A-2**).

2.4.8 Sustainable Yield [23 CCR § 354.18(b)(7)]

23 Cal. Code Regs. § 354.18 Water Budget. (b) The water budget shall quantify the following, either through direct measurements or estimates based on data:

(7) An estimate of sustainable yield for the basin.

Chapter 2.3.2.6 of the Tule Subbasin Setting estimates the Sustainable Yield for the Tule Subbasin to be approximately 257,725 acre-ft/year (see Table 2-4 in **Appendix A-2**). This is based on the average hydrologic period of 1990/1991 to 2009/2010. The groundwater inflow components not included in the estimate of the subbasin's sustainable yield described below:

> "It is noted that sources of groundwater recharge in the subbasin that are associated with pre-existing water rights and/or imported water deliveries are not included in the Sustainable Yield estimate. These recharge sources include:
>
> - Diverted Tule River water canal losses, recharge in basins, and deep percolation of applied water,
> - Diverted Deer Creek water canal losses, recharge in basins, and deep percolation of applied water,
> - Imported water canal losses, recharge in basins, and deep percolation of applied water, and
> - Recycled water deep percolation of applied water and recharge in basins." (Tule Subbasin Setting)

If shared on a gross acreage basis, wherein each GSA's proportionate areal coverage of the Tule Subbasin is multiplied by the total sustainable yield, the DEID GSA's sustainable yield is estimated to be approximately 9,086 acre-ft/year[10]. While this number is based on a consumptive use sustainable yield of 0.14 acre/ft-acre, it is expected to be updated as conditions within the Subbasin vary over time and could change during the public comment period based on new information.

2.4.9 Current Water Budget [23 CCR § 354.18(c)(1)]

> **23 Cal. Code Regs. § 354.18 Water Budget. (c)** Each Plan shall quantify the current, historical, and projected water budget for the basin as follows:
>
> **(1)** Current water budget information shall quantify current inflows and outflows for the basin using the most recent hydrology, water supply, water demand, and land use information.

The surface and groundwater budgets for the Tule Subbasin for the 2016/2017 water year are described in Chapter 2.3.3 and their full accounting can be found in Tables 2-2a, 2-2b and 2-3 of the Tule Subbasin Setting (**Appendix A-2**). For 2017, total groundwater inflows were approximately 617,000 acre-ft and total groundwater outflows were approximately 777,000 acre-ft.

For the DEID GSA, the surface/imported and groundwater budgets for the 2016/2017 water year is shown in Table 2 of Appendix C of the Tule Subbasin Setting (**Appendix A-2**). For the current year, total groundwater inflows were approximately 107,000 acre-ft and total groundwater outflows were approximately 104,000 acre-ft.

[10] 64,898 acres x 0.14 acre-ft/year per acre = 9,086 acre-ft/year.

2.4.10 Historical Water Budget [23 CCR § 354.18(c)(2)]

23 Cal. Code Regs. § 354.18 Water Budget. (c) Each Plan shall quantify the current, historical, and projected water budget for the basin as follows:

(2) Historical water budget information shall be used to evaluate availability or reliability of past surface water supply deliveries and aquifer response to water supply and demand trends relative to water year type. The historical water budget shall include the following:

(A) A quantitative evaluation of the availability or reliability of historical surface water supply deliveries as a function of the historical planned versus actual annual surface water deliveries, by surface water source and water year type, and based on the most recent ten years of surface water supply information.

(B) A quantitative assessment of the historical water budget, starting with the most recently available information and extending back a minimum of 10 years, or as is sufficient to calibrate and reduce the uncertainty of the tools and methods used to estimate and project future water budget information and future aquifer response to proposed sustainable groundwater management practices over the planning and implementation horizon.

(C) A description of how historical conditions concerning hydrology, water demand, and surface water supply availability or reliability have impacted the ability of the Agency to operate the basin within sustainable yield. Basin hydrology may be characterized and evaluated using water year type.

The historical surface and groundwater budgets for the Tule Subbasin, as assessed over the water years 1986/87 to 2016/17, are shown in Table 2a, 2b and 2-3 of the Tule Subbasin Setting (**Appendix A-2**). The DEID GSA's historical surface/imported water and groundwater budgets are assessed over the same period, and are accounted for in Tables 1a, 1b, and 2 of Appendix C of the Tule Subbasin Setting (**Appendix A-2**) and summarized throughout **Section 2.4** of this GSP.

DEID GSA completed a separate water accounting to evaluate net annual and cumulative inflow and outflow to the groundwater system within the DEID Management Area over the water years 1986/1987 to 2016/2017. The approach used by the DEID GSA generally follows the net contribution to or extraction from groundwater (NTFGW) developed by the Irrigation Training and Research Center (ITRC), BioResource and Agricultural Engineering Department, California Polytechnic State University (Howes et al., 2014, 2018) The following equation was used for the water accounting for the DEID Management Area:

Imported Water + Banked Water + Precipitation + Sustainable Yield = Net DEID MA Water Supply – Etc = inflow/outflow from groundwater

where,

Imported Water = Annual imported water. Data sourced from Tule Subbasin Chapter 2 – Basin Setting Appendix C, Table 1a (Appendix A-2) - DEID GSA Historical Surface Water Budget 1986/1987 to 2016/2017, updated with 2018, 2019, 2020 and 2021 data from DEID delivery records and adjusted to a calendar year basis.

Banked Water = CVP contract and CVP water transferred In-District

Precipitation = Observed Precipitation using LandSAT data from 1991 – 2018 and LandIQ data from 2020 – Present. Historical Averages were used during 1987 – 1990 calendar years. Sustainable Yield = 0.14 acre-ft per acre * 56,203 acres = 7,868 acre-ft/year.

ETc = Actual Evapotranspiration as calculated by ITRC using Landsat Thematic Mapper (Landsat) data (ITRC, 2021) from 1991 – 2018. Data from LandIQ was used for 2020 – Present. Historical Averages were used during 1987 – 1990 calendar years. Analog data from 2017 was used in place of missing data for 2019 Calendar year.

The annual and cumulative net change in inflow and outflow to the groundwater system within the DEID Management Area over the calendar years 1987 to 2021 is shown in **Figure 2-7: Preliminary DEID Management Area Water Accounting**.

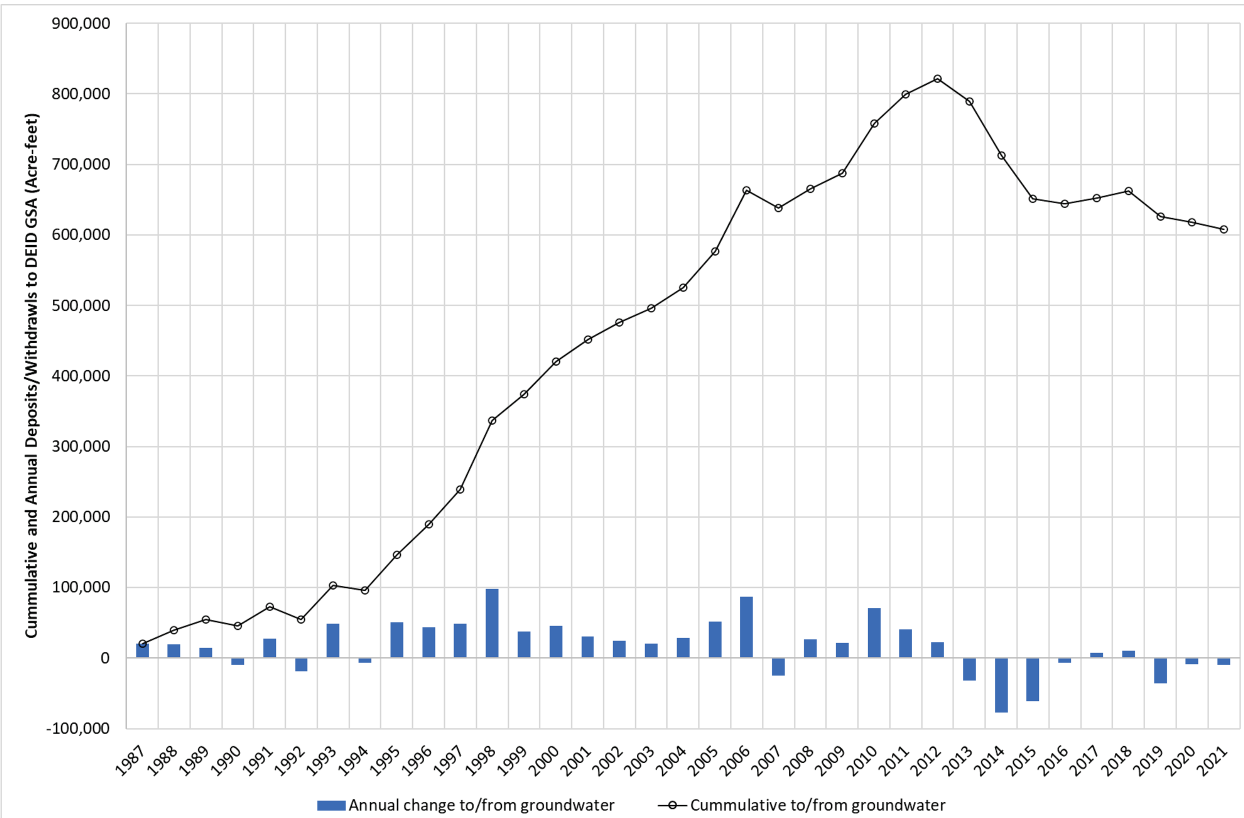

Figure 2-7: Preliminary DEID Water Accounting

Over the calendar years 1987 to 2021, the DEID was a net contributor of approximately 600,000 acre-ft to the Tule Subbasin. On average, DEID's net available water supply exceeded actual evaporation (ETc) by 21,027 acre-ft/year.

2.4.10.1 Evaluation of Historical Availability of Planned Surface Water Supplies versus Actual Deliveries [23 CCR § 354.18(c)(2)(A)]

The DEID GSA has historically operated in a sustainable manner, with total supply from imported water and sustainable yield exceeding water demand. This is discussed and evaluated in Table 2-2a, 2-2b and 2-3 of the Tule Subbasin Setting (**Appendix A-2**) and are accounted for in Tables 1a, 1b, and 2 of Appendix C of the Tule Subbasin Setting (**Appendix A-2**) and summarized throughout **Section 2.4** of this GSP.

DEID is the largest Class 1 Friant contractor, with a contract for 108,800 acre-ft of Class 1 water. DEID also contracts for 74,500 acre-ft of Class 2 water. Class 1 water is commonly referred to as the "firm yield" of the CVP and was intended to be as supply that would be dependable in every year regardless of hydrology. Class 1 water has historically been reliable until the 2006 SJRRS Agreement in *NRDC, et al., v. Kirk Rodgers.* The agreement characterized deliveries by six hydrologic year types based on a recurrence over an 82-year simulation (1922–2003): wet, normal-wet, normal-dry, dry, critical-high, and critical-low. Under the wet, normal-wet, and normal-dry scenarios, DEID typically receives almost 100% of its Class 1 allocation as shown in **Section 1.4.3, Conjunctive Use Programs, Table 1-4**.

2.4.10.2 Quantitative Assessment of Historical Water Budget [23 CCR § 354.18(c)(2)(B)]

The quantitative assessment and accounting of the Tule Subbasin's historical water budget and the DEID GSA's historical water budget are described throughout Chapter 2.3 of the Tule Subbasin Setting (**Appendix A-2**) and throughout **Section 2.4** of this GSP, respectively.

2.4.10.3 Assessment of Impact of Historical Hydrological Conditions on the Ability of the Agency to Operate its Jurisdiction within the Sustainable Yield [23 CCR § 354.18(c)(2)(C)]

Based on the historical average hydrologic conditions presented in **Section 2.4.6 Overdraft** [23 CCR § 354.18(b)(5)], when taken as a whole, the lands within the jurisdiction of DEID GSA have historically operated within its sustainable yield, and moreover provided a net benefit to groundwater conditions.

2.4.11 Projected Water Budget [23 CCR § 354.18(c)(3)]

23 Cal. Code Regs. § 354.18 Water Budget. (c) Each Plan shall quantify the current, historical, and projected water budget for the basin as follows:

(3) Projected water budgets shall be used to estimate future baseline conditions of supply, demand, and aquifer response to Plan implementation, and to identify the uncertainties of these projected water budget components. The projected water budget shall utilize the following methodologies and assumptions to estimate future baseline conditions concerning hydrology, water demand and surface water supply availability or reliability over the planning and implementation horizon:

(A) Projected hydrology shall utilize 50 years of historical precipitation, evapotranspiration, and streamflow information as the baseline condition for estimating future hydrology. The projected hydrology information shall also be applied as the baseline condition used to evaluate future scenarios of hydrologic uncertainty associated with projections of climate change and sea level rise.

(B) Projected water demand shall utilize the most recent land use, evapotranspiration, and crop coefficient information as the baseline condition for estimating future water demand. The projected water demand information shall also be applied as the baseline condition used to evaluate future scenarios of water demand uncertainty associated with projected changes in local land use planning, population growth, and climate.

Chapter 2.3.5 of the Tule Subbasin Setting (**Appendix A-2**) discusses methodologies, and information used to develop the Tule Subbasin projected water budget in the Groundwater Flow Model.

The projected surface and groundwater budgets for the Tule Subbasin, as assessed over the water years 2020-2070, are shown in Table 2-8a, 2-8b and 2-9 of the Tule Subbasin Setting (**Appendix A-2**).

Projected surface/imported and groundwater budgets for the DEID GSA over the same time period (2020-2070) are provided in Table 3a, 3b and 4, in Appendix C of the Tule Subbasin Setting (**Appendix A-2**).

2.5 Management Areas [23 CCR § 354.20]

23 Cal. Code Regs. § 354.20 Management Areas. (a) Each Agency may define one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin.

(c) If a Plan includes one or more management areas, the Plan shall include descriptions, maps, and other information required by this Subarticle sufficient to describe conditions in those areas.

The DEID GSA is subdivided into four Management Areas. These Management Areas are described in **Section 1.4.1 DEID GSA Plan Area** of this Plan and are summarized below:

- The DEID MA- this management area is composed of the area that was formed in 1938 and initially received its first imported water supplies in 1950. It is the area served by the DEID water distribution system and has contractual rights to a federal water supply through the Friant Division of the Central Valley Project. It is approximately 56,571 acres in size.
- The Western MA- this area is immediately west of the western boundary of DEID. The area is historically dependent on groundwater. Because of its limited water supply portfolio and historical dependence on groundwater, this area is its own management area in the DEID GSA and does not share in the positive contributions provided by the DEID MA. It is approximately 7,554 acres in size.
- The Richgrove Community Services District MA- The RCSD serves the water and wastewater needs of the unincorporated community of Richgrove. With a service area of 234 acres, the RCSD has been historically dependent on groundwater. Because of its location and being a purveyor of domestic water as well as managing wastewater, the RCSD is its own management area.
- The Earlimart Public Utilities District MA - The EPUD serves the water and wastewater needs of the unincorporated community of Earlimart. With a service area of 773 acres, the EPUD has been historically dependent on groundwater. Because of its location and being a purveyor of domestic water as well as managing wastewater, the EPUD is its own management area.

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Section 3. Sustainable Management Criteria

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3.1 Introduction *[23 CCR § 354.22]*

23 Cal. Code Regs. § 354.22 Introduction to Sustainable Management Criteria. *This Subarticle describes criteria by which an Agency defines CONDITIONS in its Plan that constitute sustainable groundwater management for the basin, including the process by which the Agency shall characterize undesirable results, and establish minimum thresholds and measurable objectives for each applicable sustainability indicator.*

This Section defines the process for determining the sustainable management criteria, specific to the DEID GSA, in order to achieve the sustainability goal of the Tule Subbasin outlined in the Coordination Agreement (**Appendix A**). Specifically, this Section includes the characterization and definition of minimum thresholds and measurable objectives with interim milestones for each applicable sustainability indicator.

3.2 Sustainable Goal *[23 CCR § 354.24]*

23 Cal. Code Regs. § 354.24 Sustainability Goal. *Each Agency shall establish in its Plan a sustainability goal for the basin that culminates in the absence of undesirable results within 20 years of the applicable statutory deadline. The Plan shall include a description of the sustainability goal, including information from the basin setting used to establish the sustainability goal, a discussion of the measures that will be implemented to ensure that the basin will be operated within its sustainable yield, and an explanation of how the sustainability goal is likely to be achieved within 20 years of Plan implementation and is likely to be maintained through the planning and implementation horizon.*

The Sustainability Goal of the Tule Subbasin is defined in the Coordination Agreement as the absence of significant and unreasonable undesirable results, accomplished by 2040 and achieved through an integrated program of sustainable groundwater management between the Tule Subbasin GSAs and their many stakeholders.

It is further the goal of the Tule Subbasin GSAs that coordinated implementation of their respective GSPs will achieve sustainability in a manner that facilitates the highest degree of collective economic, societal, environmental, cultural, and communal welfare and provides all beneficial uses and users the ability to manage the groundwater resource in the most cost-efficient manner. Moreover, this coordinated implementation is anticipated to ensure that the sustainability goal, once achieved, is also maintained through the remainder of the 50-year planning and implementation horizon, and well thereafter.

3.3 Process for Establishing Sustainable Management Criteria

The Sustainable Management Criteria (hereafter “SMC”) discussed and established in this Section were developed in consultation with the DEID GSA management area representatives, local stakeholders, Tule Subbasin GSA counterparts, technical leads, regional partners, interbasin stakeholders, and other interested parties. The process for setting SMC related to undesirable results and measurement methodology is generally consistent among the various GSAs within the Tule Subbasin, while the quantifiable process for setting measurable objectives, interim milestones, and minimum thresholds for Representative Monitoring Sites (RMSs) was determined independently by each GSA to cater to their unique conditions within the Tule Subbasin.

For lands outside of the DEID MA, both within the DEID GSA and throughout the Tule Subbasin, transitional pumping has been proposed as a project and management action to allow lands that are reliant on groundwater pumping to transition to levels that are sustainable while reducing the economic impact that would be otherwise felt in an “overnight” reduction in water supplies (see **Section 5.2.2.2**). This GSP recognizes that there will be continued impacts to groundwater conditions as a result of transitional pumping. Throughout this Section of the GSP, minimum thresholds are established based on Tule Subbasin Groundwater Flow Model (GFM, provided as **Appendix A-3**) results incorporating transitional pumping, along with all other projects and management actions proposed by GSAs in the Subbasin, and interim milestones and measurable objectives are established based on the GFM results for the scenario where the entire Subbasin operates at sustainable levels starting in 2020 and including Management Action #4 (see Section **5.2.1.4** - Increase In-District Recharge/Banking Operations; referred to as “safe yield” conditions). This comparison is intended to show the estimated difference in groundwater conditions in the DEID GSA as a result of transitional pumping and to identify impacts subject to mitigation due to those utilizing transitional pumping. This comparison is also intended to show the impacts from transitional pumping that are not a result of pumping from lands that operate sustainably, such as those in the DEID MA.

The general process leading up to the development and establishment of these SMC included:

- Regular agenda items, material reviews, and presentations at DEID GSA Board meetings and Stakeholder meetings wherein information pertinent to the development of SMC was discussed with recommendations provided.
- Holding public outreach landowner meetings within DEID GSA and, with other GSAs throughout the Tule Subbasin outlining the process for GSP development, discussing SMC, and providing data and context related to local groundwater-related issues.
- Reviewing existing hydrologic data, current and historical groundwater information assembled in the Tule Subbasin Setting (**Appendix A-2**), and future projections prepared by the DEID Hydrogeologist utilizing the GFM (**Appendix A-3**) to provide a summary of historical and projected groundwater conditions based upon implementation of the proposed projects and management actions described in **Section 5** of this Plan. Additionally, projected groundwater conditions based on the Subbasin operating sustainably starting in 2020 were evaluated, for the purpose of comparing how continued pumping above sustainable yield (i.e., transitional pumping) throughout the Subbasin affects conditions within the DEID GSA (see **Exhibit 3-1: RMS Groundwater Level Hydrographs** for examples of SMC with projected conditions with and without transitional pumping).
- Reviewing proposed SMC in relation to beneficial uses and users and deciding what constitutes significant and unreasonable conditions which lead to undesirable results.
- Developing a mitigation plan if SMC are exceeded or localized impacts occur that result in significant and unreasonable conditions, such as wells rendered inoperable due to lowering of groundwater levels.

3.4 Undesirable Results *[23 CCR § 354.26(a)]*

23 Cal. Code Regs. § 354.26 Undesirable Results. (a) *Each Agency shall describe in its Plan the processes and criteria relied upon to define undesirable results applicable to the basin. Undesirable results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the basin.*

Undesirable results are caused by groundwater conditions occurring throughout the Subbasin that, for any sustainability indicator, are considered significant and unreasonable. These sustainability indicators include:

- Chronic lowering of groundwater levels
- Reduction of groundwater storage
- Seawater intrusion
- Degraded water quality
- Land subsidence
- Depletions of interconnected surface water

The Tule Subbasin GSAs have evaluated the potential for significant and unreasonable groundwater conditions for each sustainability indicator, and have established common criteria within the Coordination Agreement (**Appendix A**) that defines the significant and unreasonable conditions that would lead to an undesirable result within the applicable GSA. The process to identify the conditions that constitute significant and unreasonable conditions in the Tule Subbasin was informed through:

- Research and documentation of the hydrogeological conceptual model of the Subbasin.
- Development of a calibrated numerical GFM of the Subbasin for use in estimating sustainable yield and analyzing the effects of projects and management actions on future groundwater levels and land subsidence.
- Analysis of potential future groundwater levels, land subsidence, and groundwater quality throughout the Subbasin for use in assessing significant and unreasonable groundwater conditions and identifying SMC.

Based on analysis of the hydrogeological conceptual model, there are four sustainability indicators that have potential to experience significant and unreasonable effects within the Tule Subbasin:

- Chronic lowering of groundwater levels
- Reduction of groundwater storage
- Degraded water quality
- Land subsidence

Two sustainability indicators, the depletion of interconnected surface waters and seawater intrusion, do not apply within the Tule Subbasin (defined in the Tule Subbasin Setting; **Appendix A-2**) and, therefore, cannot create adverse conditions that are significant and unreasonable. These two sustainability indicators will be evaluated every 5 years during the 5-year review process to confirm no change of the Tule Subbasin conditions.

Based on the analysis of potential impacts from projected groundwater levels and land subsidence using the Tule Subbasin GFM results for the transition period from 2020-2040, each GSA developed SMC for each of the applicable sustainability indicators to avoid undesirable results in consideration of the beneficial uses and users of groundwater, which include the following supplies and facilities:

- Municipal and Domestic Supply
- Agricultural Supply
- Industrial Supply
- Critical Infrastructure, including the FKC

The SMC identified to avoid undesirable results were vetted through a public process that included multiple stakeholder workshops, meetings, and document review. While the SMC are protective of undesirable results for most beneficial uses and users of groundwater during the transition period between 2020- 2040, a mitigation program has been developed to address impacts to avoid reaching a significant and unreasonable level (See **Appendix A-7**).

The groundwater conditions considered significant and unreasonable and the definition and description of the undesirable result for each sustainability indicator are commonly described between the GSAs in the Tule Subbasin, as set forth in the Coordination Agreement (**Appendix A**).

3.5 Minimum Thresholds, Interim Milestones, and Measurable Objectives for Sustainability Indicators *[23 CCR § 354.28(a); § 354.30(a)]*

23 Cal. Code Regs. § 354.28 Minimum Thresholds. (a) *Each Agency in its Plan shall establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26.*

23 Cal. Code Regs. § 354.30 Measurable Objectives (a). *Each Agency shall establish measurable objectives, including interim milestones in increments of five years, to achieve the sustainability goal for the basin within 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon.*

The DEID GSA has developed the numerical minimum thresholds, interim milestones, and measurable objectives for each of the four sustainability indicators applicable to the Tule Subbasin, including:

- Chronic Lowering of Groundwater Levels
- Reduction of Groundwater Storage
- Degraded Water Quality
- Land Subsidence

Significant and unreasonable conditions for each sustainability indicator are set at the various RMSs within the DEID GSA, defined in the Tule Subbasin Monitoring Plan (see **Appendix A-1**), to establish the numerical minimum threshold, interim milestones, and measurable objectives to achieve sustainability within 20 years. The locations of the current RMSs for each sustainability indicator are identified in **Figure 3-1: DEID GSA RMS Network Locations Map.**

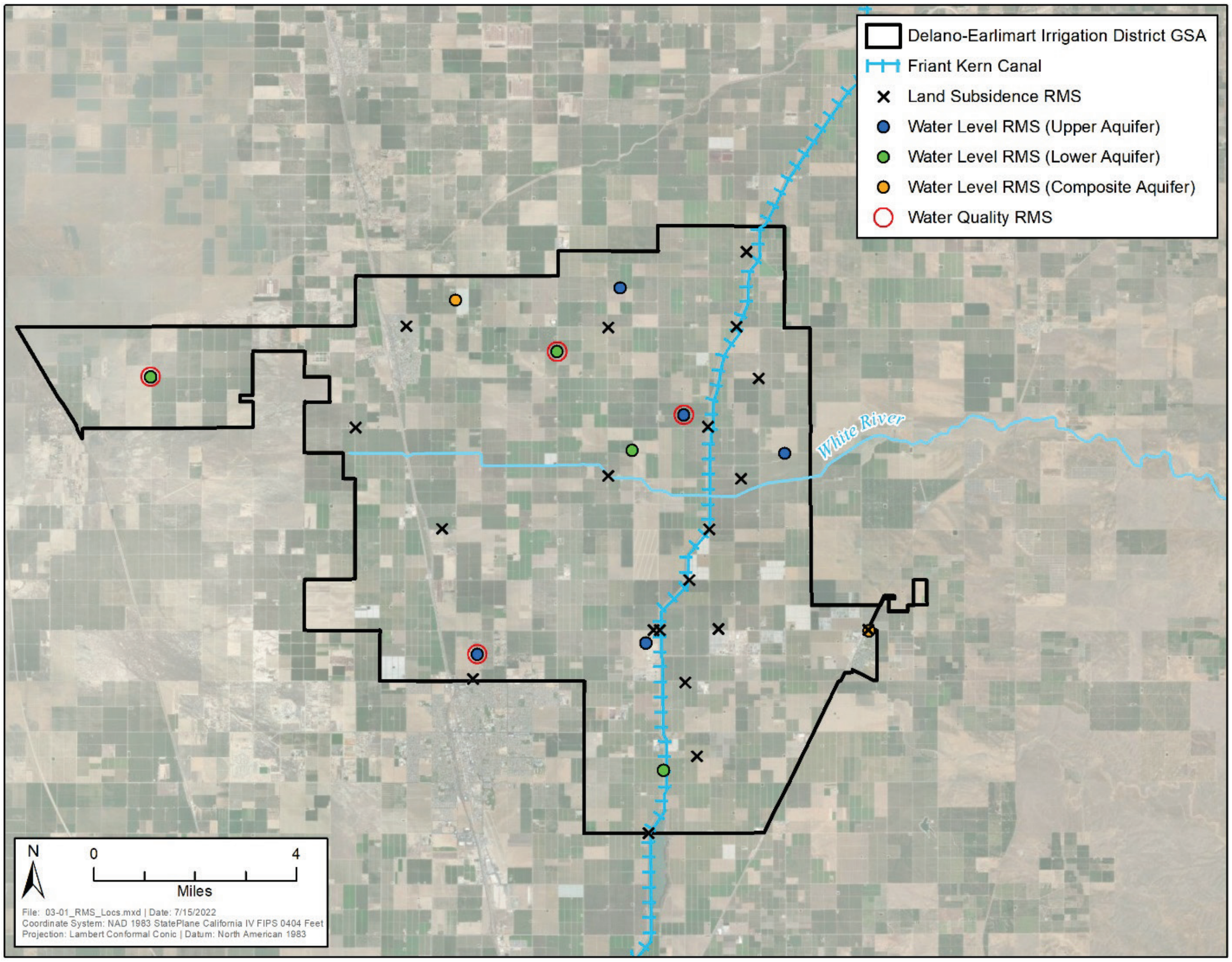

Figure 3-1: DEID GSA RMS Network Locations Map

In addition, for each sustainability indicator in the GSA, the metrics for quantifying the measurable objective and minimum threshold are established, as identified in **Table 3-1: Metrics for Quantifying Sustainability Indicators.**

Table 3-1: Metrics for Quantifying Sustainability Indicators

Sustainability Indicator	Metric for Quantifying
Chronic Lowing of Groundwater Levels	Depth to Groundwater
Reduction in Groundwater Storage	Depth to Groundwater
Seawater Intrusion	*Not Applicable to Tule Subbasin*
Degraded Water Quality	Measured Groundwater Quality
Land Subsidence	Measured Land Subsidence[1]
Depletion of Interconnected Surface Waters	*Not Applicable to Tule Subbasin*

3.5.1 Measurable Objectives and Interim Milestones *[23 CCR § 354.30(b), (c), (d), (e), (f), (g)]*

23 Cal. Code Regs. § 354.30 Measurable Objectives. (b) *Measurable objectives shall be established for each sustainability indicator, based on quantitative values using the same metrics and monitoring sites as are used to define the minimum thresholds.*

(c) *Measurable objectives shall provide a reasonable margin of operational flexibility under adverse conditions which shall take into consideration components such as historical water budgets, seasonal and long-term trends, and periods of drought, and be commensurate with levels of uncertainty.*

(d) *An Agency may establish a representative measurable objective for groundwater elevation to serve as the value for multiple sustainability indicators where the Agency can demonstrate that the representative value is a reasonable proxy for multiple individual measurable objectives as supported by adequate evidence.*

(e) *Each Plan shall describe a reasonable path to achieve the sustainability goal for the basin within 20 years of Plan implementation, including a description of interim milestones for each relevant sustainability indicator, using the same metric as the measurable objective, in increments of five years. The description shall explain how the Plan is likely to maintain sustainable groundwater management over the planning and implementation horizon.*

(f) *Each Plan may include measurable objectives and interim milestones for additional Plan elements described in Water Code Section 10727.4 where the Agency determines such measures are appropriate for sustainable groundwater management in the basin.*

(g) *An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for a finding of inadequacy of the Plan.*

Measurable objectives and interim milestones for each sustainability indicator have been defined at each RMS with a quantitative value using a technically based process described in **Section 3.5.1.1.1 Process for Determining Measurable Objectives and Interim Milestones**. The measurable objectives and interim milestones describe targets and goals for the DEID GSA to achieve the Tule Subbasin sustainability goal over the planning and implementation horizon. Additionally, operational flexibility was developed between the measurable objective/interim milestones and the minimum threshold to allow for seasonal hydrologic variations and periods of drought to occur.

During the spring monitoring event for each year of the GSP implementation period, the GSA will evaluate the data collected from the monitoring program and compare the data to the established SMC. The GSA will use adaptive management to adjust goals, if necessary, based on the data collected.

Each established measurable objective and interim milestone includes the following assumptions:

- The Projects and Management Actions outlined in **Section 5** of this plan are implemented during the initial 20-year GSP implementation period.
- The Projects and Management Actions proposed by the other GSAs within the Tule Subbasin are also implemented during the initial 20-year GSP implementation period.
- Average hydrology, including climate change factors, will occur throughout the Tule Subbasin during the 20 years of GSP implementation.
- Model projections will be adjusted to measured conditions in Spring 2020 (starting point) for each sustainability indicator.

The process for establishing the measurable objectives and interim milestones varies and is described separately for each sustainability indicator in the following sections.

3.5.1.1 Chronic Lowering of Groundwater Levels

The interim milestones and measurable objective for each RMS associated with the Chronic Lowering of Groundwater Levels sustainability indicator have been quantified using the following available data:

- Historical groundwater elevation data from wells monitored by DEID GSA member agencies, monitored by other local monitoring entities, or otherwise available through CASGEM.
- Projects and Management Actions as proposed by the DEID GSA and other Tule Subbasin GSAs incorporated into the GFM.
- Historical and future projection scenarios of groundwater elevation specific to each RMS well based on output from the Tule Subbasin GFM.
- Other relevant information discussed in the Tule Subbasin Setting.
- Evaluation of beneficial uses and users including the potential impacts to existing groundwater supply wells in the DEID GSA.

3.5.1.1.1 Process for Determining Measurable Objectives and Interim Milestones

The following five steps detail the process for setting interim milestones and the measurable objectives at each RMS well.

Step 1: Locate the RMS defined in the Tule Subbasin Monitoring Plan (**Appendix A-1**), identify which portion of the aquifer it represents, and prepare a hydrograph using available historical groundwater elevation data.

Step 2*: Plot projected groundwater elevation data from the "safe yield" GFM scenario on the RMS well hydrograph with historical groundwater elevation data.

Step 3: Adjust the GFM projected groundwater elevations at the RMS well to match the corresponding current representative measured groundwater elevation (e.g., spring of 2019) to establish the starting baseline conditions.

Step 4: Utilize the adjusted GFM projected groundwater elevations for the period 2020-2040 to quantify the interim milestones and the measurable objective value in 2040.

Step 5:** Create an interpolated surface of the measurable objective values established at each RMS well and compare the interpolated surface to existing well depth and screen interval information of potentially active pumping wells throughout the DEID GSA management area to determine if protective of beneficial uses and users. If necessary, interim milestones and measurable objective values were adjusted to avoid undesirable results or appropriate mitigation considered.

*Step 2 describes the process for establishing groundwater level interim milestones and measurable objectives at RMS wells that DEID GSA will utilize to quantify this GSP's effectiveness for reaching its sustainability goal and incorporates the scenario where all GSAs in the Subbasin operate sustainably (i.e., "safe yield" pumping conditions - absence of transitional pumping) and including Management Action #4 (see Section 5.2.1.4; Increase In-District Recharge/Banking Operations) starting in 2020.

**Step 5 describes the process for evaluating beneficial uses and users for existing wells in the DEID GSA. The well database for the DEID GSA was categorized by type (domestic, agricultural, Municipal and Industrial [M&I], unknown, monitoring, or other) to filter the potential active pumping wells for the analysis. Observed water levels in 2019 and projected water levels in 2040 (assuming sustainable pumping in addition to implementing Management Action #4) were evaluated to (1) identify existing wells that may be currently impacted, and (2) identify additional wells that may be affected in 2040. This analysis assumed that a minimum 70 ft of saturated screen interval[1] is required to maintain groundwater production rates, taking into account well inefficiency (well losses), pumping water levels and sufficient submergence of the pump to avoid cavitation (entrainment of air in the pumped water).

3.5.1.1.2 Quantifiable Measurable Objectives and Interim Milestones

Using the process described in the previous section, the quantifiable interim milestones and measurable objectives were established for each RMS hydrograph (**Exhibit 3-1: RMS Groundwater Level Hydrographs**), and are summarized in **Table 3-2: Chronic Lowering of Groundwater Levels Interim Milestones and Measurable Objective by RMS Well.**

Table 3-2: Chronic Lowering of Groundwater Levels Interim Milestones and Measurable Objective by RMS Well[2]

RMS ID	Mgmt. Area	Aquifer	Interim Milestone[4] Groundwater Elevation (ft amsl))			Meas. Obj.[3] GWE (ft amsl)
			2025	2030	2035	2040
32G01	DEID	Upper	134	141	144	146
04P01	DEID	Upper	91	105	122	158
35H01	DEID	Upper	166	163	163	165
E0119660	DEID	Upper	65	65	69	74
36201	DEID	Upper	145	153	168	189
M19	DEID	Upper	230	243	249	255
M19	DEID	Lower	126	141	153	165
36H01	DEID	Lower	72	86	100	114
60088	DEID	Lower	70	76	80	84
E0174371	DEID	Lower	64	78	90	102
03A01	Western	Lower	174	179	187	198
48911	Richgrove	Lower	139	144	153	166
TBD	Earlimart	TBD	TBD	TBD	TBD	TBD

[1] The minimum 70 ft of saturated screen interval is established based on the following criteria: 10 ft for well sump, 10 ft for pump intake, 20 ft for sufficient pump submergence, and 30 ft for pumping well losses.
[2] RMSs for groundwater levels are subject to change pending further investigations by the GSA.

3.5.1.2 Reduction of Groundwater Storage

The interim milestones and measurable objectives for the Reduction of Groundwater Storage sustainability indicator have been quantified using the following available data:

- Utilize the same GFM results as identified for the Chronic Lowering of Groundwater Levels to calculate groundwater storage.
- Other relevant information discussed in the Tule Subbasin Setting (**Appendix A-2**).

3.5.1.2.1 Process for Determining Measurable Objectives and Interim Milestones

The process to determine the interim milestones and measurable objective for the Reduction of Groundwater Storage sustainability indicator involved calculating the total volume of groundwater in storage for the DEID GSA using the GFM results from the analysis for the Chronic Lowering of Groundwater Levels interim milestones and measurable objective determination. From this modeled groundwater elevation data, along with applying the aquifer properties described in the Tule Subbasin Setting (**Appendix A-2**), the groundwater storage is calculated. The modeled head at 2025, 2030, 2035, and 2040 from the GFM results for the "safe yield" scenario were used as the groundwater elevations to calculate the saturated thickness associated with the groundwater in storage for the aquifers within the DEID GSA area. The model grid layering was used to assign the storage properties for the unconfined upper aquifer (specific yield in the uppermost saturated layers) and confined lower aquifer (specific storage in the lower layers below the upper aquifer). The total volume of groundwater in storage was calculated by multiplying the storativity (storage properties multiplied by the saturated thickness) by the area for the aquifers within the DEID GSA area.

The interim milestones and measurable objectives for the reduction of groundwater in storage shown in **Table 3-3** provide the total volume of groundwater stored beneath DEID GSA and do not account for allocation of available water. An additional analysis, conducted separately from this GSP, will determine allocation of water stored in the aquifer as a result of the activities of DEID and landowners within its service area to sustainably manage water resources by importing water, at their election, in lieu of pumping groundwater; thus helping stabilize groundwater storage over time.

The process for establishing groundwater storage volumes for interim milestones and measurable objectives—which DEID GSA will utilize to quantify this GSP's effectiveness for reaching the sustainability goal—incorporates the GFM scenario where all GSAs in the Subbasin operate sustainably (i.e., "safe yield" conditions – absence of transitional pumping) in addition to including Management Action #4 (Increase In-District Recharge/Banking Operations, see **Section 5.2.1.4**) starting in 2020 (**Table 3-3)**.

3.5.1.2.2 Quantified Measurable Objectives and Interim Milestones

The interim milestones and measurable objective for groundwater in storage for each management area are summarized in **Table 3-3: Reduction of Groundwater Storage Interim Milestones and Measurable Objectives.**

Table 3-3: Reduction of Groundwater Storage Interim Milestones and Measurable Objectives

Baseline Condition	Interim Milestone[3]						Measurable Objective[4]	
GW Storage Volume (million	*GW Storage Volume (millions ac-ft)*						*GW Storage Volume (million ac-ft)*	
2017	2025		2030		2035		2040	
		Safe yield		Safe yield		Safe yield		Safe yield
5.5		5.3		5.5		5.6		5.7

The DEID GSA has a separate water accounting system to track the amount of groundwater that has been banked by the DEID or individual landowners per **Section 5** of this Plan, which will be internally calculated from the gross groundwater storage for the GSA.

3.5.1.3 Groundwater Quality

The interim milestones and measurable objective for the Groundwater Quality sustainability indicator have been quantified using the following available data:

- Utilizing historical groundwater quality data from the existing RMS wells which are monitored under separate groundwater quality regulatory programs, such as those wells monitored under the California Regional Water Quality Control Board Irrigated Lands Regulatory Program, CV-Salts Nitrate Control Program, and those associated with Public Water Systems.
- Other relevant information discussed in the Tule Subbasin Setting (**Appendix A-2**).

3.5.1.3.1 Process for Determining Measurable Objectives and Interim Milestones

The following four steps detail the process for setting interim milestones and the measurable objective at individual RMS related to Groundwater Quality:

Step 1:
Locate the RMS defined in the Tule Subbasin Monitoring Plan (see **Appendix A-1**), identify which portion of the aquifer it represents, and the associated constituents of concern (COCs) to be monitored based on beneficial uses and users of groundwater represented by the RMS (Agricultural or Drinking Water) as described below:

Drinking Water: The RMS well is within an urban management area or within 1 mile of a public water system.

Agricultural: Greater than 50% of the pumping within the representative area is determined to be agricultural and there are no public water systems within a 1-mile radius.

Agricultural or drinking water COCs will be evaluated based on the established maximum contaminant level (MCL) or water quality objectives (WQO) by the responsible regulatory agency. In the case of drinking water, Title 22 constituents will be monitored, and for agricultural water, Basin Plan WQOs and COCs will be monitored, as identified in **Table 3 4: Constituents of Concern by Beneficial Uses and Users**.

[3] Groundwater storage calculations under development

Table 3-4: Constituents of Concern by Beneficial Uses and Users

Drinking Water	Agricultural
Arsenic	Nitrogen as N
Nitrate as N	Chloride
Hexavalent Chromium	Sodium
Dibromochloropropane (DBCP)	Total Dissolved Solids
1,2,3-Trichloropropane (TCP)	Perchlorate
Tetrachloroethene (PCE)	
Chloride	
Total Dissolved Solids	
Perchlorate	

Step 2:

Establish measurable objectives and interim milestones at each Groundwater Quality RMS based on 75% of the regulatory limits set as part of the responsible regulatory programs that are applicable to the identified beneficial uses and users of groundwater represented by the RMS as shown in **Table 3-5: Interim Milestones & Measurable Objectives for Groundwater Quality.**

Table 3-5: Interim Milestones & Measurable Objectives for Groundwater Quality

Constituent	Units	Interim Milestone & Measurable Objective	
		75% Drinking Water Limits (MCL/SMCL)	75% Agricultural Water Quality Objective (WQOs)
Arsenic	ppb	7.5	N/A
Nitrate as N	ppm	7.5	N/A
Hexavalent Chromium	ppb	7.5	N/A
Dibromochloropropane (DBCP)	ppb	0.15	N/A
1,2,3-Trichloropropane (TCP)	ppt	3.75	N/A
Tetrachloroethene (PCE)	ppb	3.75	N/A
Chloride	ppm	375	79.5
Sodium	ppm	N/A	51.75
Total Dissolved Solids	ppm	750	337.5
Perchlorate	ppb	4.5	N/A

Step 3:

Evaluate historical groundwater quality data for instances where SMC established at RMSs have been historically exceeded. In those instances, SMC will not be set at the MCLs or WQOs, but rather the pre-SGMA implementation concentration. These RMSs will be closely monitored to evaluate if further degradation is occurring at the RMS as a result of GSP implementation during the GSP planning and implementation horizon.

Under the terms of the cooperative agreements with the RCSD and EPUD, those agencies have an ongoing opportunity to propose minimum thresholds for additional constituents and determine whether additional changes to the monitoring network should be made to address water quality issues. DEID GSA will consider such proposals when made. In addition, the DEID GSA will collect water quality data from the public water systems as part of its monitoring efforts. The collected data will reflect what the public water systems report to existing regulatory agencies and will be evaluated to determine if existing regulatory requirements are being met and if specific management actions would be warranted by the DEID GSA under its authority to manage groundwater. The DEID GSA will evaluate the water quality data in coordination with the public water systems to determine if groundwater pumping activities are contributing to significant and unreasonable effects related to degraded water quality.

(Note that Point Source/Non-Point Source Discharges unrelated to groundwater recharge are not monitored under this Plan or regulated by the Agency).

The DEID GSA acknowledges a data gap related to individual domestic well locations, elevations, and water quality. The DEID GSA will address this data gap in coordination with Tulare County, to the extent it is not addressed by any other water quality monitoring regulatory programs and agencies that are being coordinated with this GSP, such as the Tule Basin Management Zone. In addition to the Mitigation Program described in this Updated GSP (**Appendix A-7**), the GSA may consider additional management actions beyond those identified in **Section 5** of this GSP if specific data is developed that identifies water quality impacts during GSP implementation. Any such action should be in coordination with Tulare County, including the potential for the continuation by the County of existing programs for drought mitigation assistance implemented during the last major drought.

3.5.1.3.2 Quantified Measurable Objectives and Interim Milestones

The interim milestones and measurable objective for groundwater quality for each RMS are summarized in **Table 3-6: Groundwater Quality Interim Milestones and Measurable Objectives.**

Table 3-6: Groundwater Quality Interim Milestones and Measurable Objectives

RMS ID	Management Area	Aquifer	COC Baseline Measurement 2018[4]				
			Conductivity	pH	Nitrate as N	Arsenic	Hexavalent Chromium
			(µm/cm)	*-*	*(mg/L)*	*(ppb)*	*(µg/L)*
E0083349	DEID	Upper	615	7.89	12	N/A	N/A
1095774	DEID	Upper	588	7.93	13	N/A	N/A
03A01	Western	Lower	No Data	No Data	No Data	No Data	No Data
Richgrove CSD CCR	Richgrove	Lower	N/A	N/A	3.4	9.1	No Data
Earlimart PUD CCR	Earlimart	N/A	N/A	N/A	3.47	4.0	8.65

RMS ID	COC Interim Milestone and Measurable Objectives[5]																			
	Conductivity *(µm/cm)*				pH *-*				Nitrate as N *(mg/L)*				Arsenic *(ppb)*				Hexavalent Chromium *(ppb)*			
	2025	2030	2035	2040	2025	2030	2035	2040	2025	2030	2035	2040	2025	2030	2035	2040	2025	2030	2035	2040
E0083349	680	680	680	680	>6.5, <8.3	>6.5, <8.3	>6.5, <8.3	>6.5, <8.3	<13.2	<13.2	<13.2	<13.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1095774	<700	<700	<700	<700	>6.5, <8.3	>6.5, <8.3	>6.5, <8.3	>6.5, <8.3	<14.3	<14.3	<14.3	<14.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
03A01	<700	<700	<700	<700	>6.5, <8.3	>6.5, <8.3	>6.5, <8.3	>6.5, <8.3	<10	<10	<10	<10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RCSD CCR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
EPUD CCR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

[4] Values are based on 2018 quality data. Values to be updated based on 2020 quality data.

3.5.1.4 Land Subsidence

The interim milestones and measurable objective for each RMS associated with the Land Subsidence sustainability indicator have been quantified using the following available data:

- Historical land subsidence data from USGS extensometer, National Aeronautics and Space Administration (NASA) Interferometric Synthetic Aperture Radar (InSAR) Jet Propulsion laboratory, and Global Positioning System (GPS) stations.
- Projects and Management Actions as proposed by the DEID GSA and other Tule Subbasin GSAs incorporated into the GFM.
- Historical and future projection scenarios of land subsidence specific to each RMS based on output from the Tule Subbasin GFM.
- Evaluation of critical infrastructure including the FKC and DEID pipelines (see Attachment 6 to the Coordination Agreement for the Tule Subbasin; **Appendix A-6** in this GSP).
- Other relevant information discussed in the Tule Subbasin Setting (**Appendix A-2**).

3.5.1.4.1 Process for Determining Measurable Objectives and Interim Milestones

The following four steps detail the process for setting interim milestones and the measurable objective at individual RMS locations.

Step 1: Locate the RMS defined in the Tule Subbasin Monitoring Plan (**Appendix A-1**).

Step 2*: Extract the projected (from 2020-2040) land subsidence from the GFM "safe yield" scenario at each RMS location.

Step 3: Subtract the projected land subsidence from the baseline 2020 ground surface elevation at each RMS location for the period 2020-2040 to quantify numerically the interim milestones (2025, 2030, and 2035) and the measurable objective value in 2040.

Step 4:** Compare the interim milestones and measurable objective value to estimates of tolerable subsidence for surface land uses and critical infrastructure such as the FKC and DEID pipelines. If necessary, adjust interim milestones and measurable objective values to avoid undesirable results or provide appropriate mitigation.

*Step 2 describes the process for establishing land subsidence interim milestones and measurable objectives at RMS locations that DEID GSA will utilize to quantify this GSP's effectiveness for reaching its sustainability goal and incorporates projects and management actions starting in 2020 proposed by all GSAs in the Tule Subbasin, specifically under the scenario all GSAs in the Subbasin operate sustainably (i.e., "safe yield" conditions—absence of transitional pumping) in addition to including Management Action #4 (Increase In-District Recharge/Banking Operations; see **Section 5.2.1.4**).

Step 4 describes the process for evaluating potential adverse conditions from land subsidence on beneficial uses and users for high priority land uses and low-priority land uses as described in the Tule Subbasin Coordination Agreement (see **Appendix A-6). High-priority land uses are those that are potentially impacted by regional land subsidence regardless of whether there is differential land subsidence. Low-priority land uses are not typically impacted by regional land subsidence but are susceptible to differential land subsidence .

3.5.1.4.2 Quantifiable Measurable Objectives and Interim Milestones

The quantifiable interim milestones and measurable objectives are summarized in **Table 3-7: Land Subsidence Interim Milestones and Measurable Objective by RMS Location.**

Table 3-7: Land Subsidence Interim Milestones and Measurable Objective by RMS Location

RMS ID	Baseline *GSE (ft amsl)* 2020	Interim Milestone *Ground Surface Elevation (ft amsl))* 2025 Safe Yield	2030 Safe Yield	2035 Safe Yield	Meas. Obj6 *GSE (ft amsl)* 2040 Safe Yield
D0012_B_RMS	267.1	266.5	265.9	265.3	264.7
D0030_B_RMS	272.8	272.6	272.3	272.1	271.8
D0031_B_RMS	296.7	296.3	296.0	295.6	295.3
D0032_B_RMS	316.7	316.5	316.2	316.0	315.7
D0033_B_RMS	366.1	366.0	365.9	365.7	365.6
D0034_B_RMS	340.8	340.3	339.9	339.4	339.0
D0070_B_FKC	389.4	389.4	389.4	389.4	389.4
D0073_G_FKC	406.2	406.2	406.2	406.2	406.2
D0074_B_FKC	415.5	415.3	415.2	415.0	414.8
D0075_B_FKC	403.2	403.1	402.9	402.8	402.7
D0076_B_FKC	408.9	408.7	408.5	408.3	408.1
D0077_B_FKC	401.9	401.8	401.6	401.5	401.4
D0078_B_FKC	406.1	406.0	405.9	405.8	405.6
D0079_G_FKC	407.1	407.0	407.0	406.9	406.8
D0080_B_FKC	433.1	433.0	433.0	432.9	432.9
D0081_B_FKC	399.5	399.4	399.4	399.3	399.2
D0082_B_FKC	423.4	423.4	423.3	423.3	423.3
D0083_B_FKC	419.5	419.5	419.5	419.5	419.5
D0084_B_FKC	407.3	407.3	407.3	407.3	407.3
D0089_B_RMS	498.2	498.2	498.1	498.1	498.0

Notes: A rate of subsidence is not calculated for the interim milestones and the measurable objective as the GFM land subsidence results indicate that subsidence is abated under this scenario; however, additional work is required to determine the potential for residual subsidence in the Tule Subbasin.

2The "safe yield" GFM land subsidence results indicate little to no subsidence at the RMS locations due to the substantial increase in groundwater levels within the DEID GSA boundary under the "safe yield" conditions—absence of transitional pumping. This provides conservative interim milestones and measurable objectives for the GSP and is reasonable due to the planned increased recharge at the Turnipseed water banking facilities and decreased pumping within portions of the DEID GSA and throughout the Tule Subbasin over the GSP implementation period. An uncertainty identified with the GFM is the exclusion of residual subsidence, which is a phenomenon known to occur in areas that have experienced long term subsidence while groundwater levels have ceased declining (Lees, 2022). The GFM simulates little to no subsidence, when it is likely that residual subsidence may occur for multiple years after water levels recover. The interim milestones and measurable objectives will be reevaluated following each monitoring event and addressed in subsequent GSP updates.

3.5.2 Minimum Thresholds [23 CCR § 354.28(b)(1)(6)]

23 Cal. Code Regs. § 354.28 Minimum Thresholds. (b) *The description of minimum thresholds shall include the following:*

(1) *The information and criteria relied upon to establish and justify the minimum thresholds for each sustainability indicator. The justification for the minimum threshold shall be supported by information provided in the basin setting, and other data or models as appropriate, and qualified by the uncertainty in the understanding of the basin setting.*

(6) *How each minimum threshold will be quantitatively measured, consistent with the monitoring network requirements described in Subarticle 4.*

Minimum thresholds are quantified for the applicable sustainability indicators at each RMS location within the DEID GSA, such that if the value used to define a minimum threshold at a particular RMS is exceeded, on its own or in combination with other RMSs within the DEID GSA, that condition may lead to an undesirable result (Undesirable results are defined using minimum thresholds in the Tule Subbasin Coordination Agreement, presented as **Appendix A**). When a minimum threshold is exceeded, the GSA will evaluate the management actions and projects described in **Section 5: Projects and Management Actions** that are intended to prevent the occurrence of an undesirable result.

During each year of the GSP implementation period, the GSA will evaluate the data collected from the monitoring program during each spring monitoring event and compare to the minimum thresholds established. The GSA will adjust thresholds, if necessary, based on the data collected.

Each established minimum threshold includes the following assumptions:

- The projects and management actions outlined in **Section 5** of this plan are implemented during the initial 20-year GSP implementation period.
- The projects and management actions proposed by the other GSAs within the Tule Subbasin are also implemented during the initial 20-year GSP implementation period.
- Current Baseline Conditions (starting point) for each sustainability indicator will be adjusted to spring 2020.
- Minimum thresholds are evaluated to determine if protective of beneficial uses and users. If necessary, adjust minimum threshold values to avoid significant and unreasonable conditions that may lead to undesirable results and/or provide appropriate mitigation.

The measurement for each minimum threshold varies depending on the RMS and is described within the Tule Subbasin Monitoring Plan (**Appendix A-1**). The process for establishing the minimum threshold varies and is described separately for each sustainability indicator in the following sections.

3.5.2.1 Chronic Lowering of Groundwater Levels *[23 CCR § 354.28(c)(1)(A)]*

23 Cal. Code Regs. § 354.28 Minimum Thresholds. (c) *Minimum thresholds for each sustainability indicator shall be defined as follows:*

(1) *Chronic Lowering of Groundwater Levels. The minimum threshold for chronic lowering of groundwater levels shall be the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results. Minimum thresholds for chronic lowering of groundwater levels shall be supported by the following:*

(A) *The rate of groundwater elevation decline based on historical trend, water year type, and projected water use in the basin.*

The minimum thresholds for the RMS locations associated with the Chronic Lowering of Groundwater Levels sustainability indicator have been quantified using the same data set described in **Section 3.5.1.1** of this Plan.

3.5.2.1.1 Process for Determining Minimum Threshold

The following five steps detail the process for setting the minimum threshold at each RMS well.

Step 1: Utilize the hydrograph created for each RMS well based on the process for establishing the interim milestones and measurable objective which assumes average hydrology.

Step 2: Evaluate representative current groundwater levels for each RMS location using the best available data.

Step 3*: Deduct the modeled change in groundwater elevation during the 20-year plan implementation period (2020-2040) from the representative current groundwater levels (i.e., 2019) at each RMS location.

Step 4: Establish the minimum threshold for the chronic lowering of groundwater elevation sustainability indicator for the entire plan implementation period as a single value at each RMS location. The difference between the minimum threshold and measurable objective is the operational flexibility established at each RMS well.

Step 5:** Create an interpolated surface of the minimum threshold values established at each RMS well and compare the interpolated surface to existing well depth and screen interval information of potentially active pumping wells throughout the DEID GSA management area to determine if protective of beneficial uses and users. If necessary, minimum threshold values were adjusted to avoid significant and unreasonable conditions that may lead to undesirable results or provide appropriate mitigation.

*Step 3 describes the process for establishing minimum thresholds at RMS locations for the Chronic Lowering of Groundwater Levels sustainability indicator that DEID GSA will utilize to quantify this GSP's effectiveness for reaching its sustainability goal and incorporates projects and management actions proposed by all GSAs in the Tule Subbasin, specifically transitional pumping.

**Step 5 describes the process for evaluating beneficial uses and users for existing wells in the DEID GSA. For this analysis, the representative current groundwater water levels (i.e., 2019) and projected groundwater levels for 2040, assuming projects and management actions are implemented, were evaluated to (1) identify existing wells that may be currently impacted and (2) identify additional wells that may be affected in 2040. This analysis assumed that a minimum 70 ft of saturated screen interval[5] is required to maintain groundwater production rates taking into account well inefficiency (well losses), pumping water levels and sufficient submergence of the pump to avoid cavitation (entrainment of air in the pumped water).

3.5.2.1.2 Quantifiable Minimum Threshold

Using the process described, a minimum threshold value was added to each RMS well hydrograph (see **Exhibit 3-1: RMS Groundwater Level Hydrographs**), and is summarized in **Table 3-8: Chronic Lowering of Groundwater Levels Minimum Threshold by RMS Well.**

The hydrographs depict the observed groundwater level data, the projected decline, the minimum threshold value extracted from the 2040 value of the projected decline, and the well screen information for the RMS (see **Exhibit 3-1: RMS Groundwater Level Hydrographs**). RMS location M-19 is a nested monitoring well (in the upper and lower aquifer) that was installed in 2010 and dedicated to the Turnipseed water banking facilities. The hydrograph analysis for M-19 produced relatively high minimum threshold values for the upper and lower aquifers due to the observed 2019 groundwater levels being higher compared to the historical data, which is limited to the last 10 years. The resulting minimum threshold values are reasonable for groundwater levels during GSP implementation, which includes PMAs for increased recharge for the banking facilities. Groundwater levels are expected to continue to increase due to increased recharge to the Turnipseed groundwater bank. Seasonally low groundwater levels (when recharge has not occurred for several months) are expected when the water banking facilities are not in use and may result in temporary minimum threshold exceedances. RMS well M-19 will be monitored closely and the minimum threshold for the upper and lower aquifers may be revised in subsequent updates based on seasonal and climatic trends. Similarly, the hydrograph analysis for RMS location 03A01 produced relatively high minimum threshold values for the lower aquifer, primarily because the GFM projected an increase of approximately 50 ft by 2040. In addition, the 2019 representative groundwater level is much higher compared to the historical data. This RMS location is likely influenced by pumping and the historical data for this well may not be representative of static conditions. Recent measurements show relatively stable groundwater levels that may represent static conditions; however, the groundwater level data requires additional review to confirm the actual groundwater conditions at this RMS location, and the minimum threshold may be revised as necessary for future updates.

[5] The minimum 70 ft of saturated screen interval is established based on the following criteria: 10 ft for well sump, 10 ft for pump intake, 20 ft for sufficient pump submergence and 30 ft for pumping well losses.

Table 3-8: Chronic Lowering of Groundwater Levels Minimum Threshold by RMS Well[6]

RMS ID	Management Area	Aquifer	Minimum Threshold[7] GWE (ft amsl) With Transitional
24S/26E-32G01	DEID	Upper	**83**
24S/26E-04P01	DEID	Upper	**61**
24S/25E-35H01	DEID	Upper	**149**
23S/26E-29D01	DEID	Upper	**54**
24S/26E-11	DEID	Upper	**106**
M19-U	DEID	Upper	**196**
M19-L	DEID	Lower	**92**
23S/25E-36H01	DEID	Lower	**33**
25S/26E-9C01	DEID	Lower	**66**
23S/25E-27	DEID	Composite	**13**
24S/24E-03A01	Western	Lower	**143**
24S/27E-31	Richgrove	Composite	**117**
TBD	Earlimart	TBD	**TBD**

3.5.2.2 Reduction of Groundwater Storage *[23 CCR § 354.28(c)]*

23 Cal. Code Regs. § 354.28 Minimum Thresholds. (c) *Minimum thresholds for each sustainability indicator shall be defined as follows:*

(2) *Reduction of Groundwater Storage. The minimum threshold for reduction of groundwater storage shall be a total volume of groundwater that can be withdrawn from the basin without causing conditions that my lead to undesirable results. Minimum thresholds for reduction of groundwater storage shall be supported by the sustainable yield of the basin, calculated based on historical trends, water year type, and projected water use in the basin.*

The minimum threshold for the Reduction of Groundwater Storage Sustainability Indicator was quantified using the same data set described in **Section 3.5.1.2** of this Plan above.

3.5.2.2.1 Process for Determining Minimum Thresholds

The process to determine the minimum threshold for the reduction of groundwater storage sustainability indicator for the DEID GSA includes calculating the volume of groundwater in storage using the GFM results from the analysis for which the minimum thresholds for the chronic lowering of groundwater levels were determined . The modeled head at 2040 from the GFM results for the transitional pumping scenario were used as the groundwater elevation to calculate the saturated thickness of the aquifers within the DEID GSA area. The model grid layering was used to assign the storage properties for the unconfined upper aquifer (specific yield in the uppermost saturated layers) and confined lower aquifer (specific storage in the lower layers below the upper aquifer). The total

[6] RMS for groundwater levels are subject to change pending further investigations by the GSA.
[7] Minimum thresholds are based on 2019 data and will be updated based on 2020 monitoring.

volume of groundwater in storage was calculated by multiplying the storativity (storage properties multiplied by the saturated thickness) by the area for the aquifers within the DEID GSA area.

The minimum threshold for the reduction of groundwater storage sustainability indicator is shown in **Table 3-8** and provides the total volume of groundwater in storage within DEID GSA and does not account for legal rights associated with the stored groundwater. An additional analysis—conducted separately from this GSP—will determine sources of groundwater stored in the aquifer as a result of DEID purchases and storage of imported water and activities of landowners within its service area to sustainably manage water resources to help prevent reduction in groundwater storage over time.

3.5.2.2.2 Quantified Minimum Thresholds

The minimum threshold for the Reduction of Groundwater Storage sustainability indicator within the DEID MA is summarized in **Table 3-9: Reduction of Groundwater Storage Minimum Thresholds**.

Table 3-9: Reduction of Groundwater Storage Minimum Thresholds

Minimum Threshold[10] *GW Storage Volume (millions ac-ft)*
4.9

3.5.2.3 Degraded Groundwater Quality [23 CCR § 354.28(c)(4)]

23 Cal. Code Regs. § 354.28 Minimum Thresholds. (c) *Minimum thresholds for each sustainability indicator shall be defined as follows:*

(4) *Degraded Water Quality. The minimum threshold for degraded water quality shall be the degradation of water quality, including the migration of contaminant plumes that impair water supplies or other indicator of water quality as determined by the Agency that may lead to undesirable results. The minimum threshold shall be based on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the Agency to be of concern for the basin. In setting minimum thresholds for degraded water quality, the Agency shall consider local, state, and federal water quality standards applicable to the basin.*

The minimum threshold for each RMS associated with the Groundwater Quality sustainability indicator have been quantified using the same data set described in **Section 3.5.1.3** of this Plan.

3.5.2.3.1 Process for Determining Minimum Thresholds

The following three steps detail the process for setting minimum threshold values at individual RMS wells related to Groundwater Quality:

Step 1:

Locate the RMS defined in the Tule Subbasin Monitoring Plan (**Appendix A-1**), identify which portion of the aquifer it represents, and the associated COC to be monitored at the RMS based on beneficial uses and users of groundwater represented by the RMS (Agricultural or Drinking Water) as described below:

Drinking Water: The RMS well is within an urban management area or 1 mile of a public water system.

Agricultural: Greater than 50% of the pumping within the representative area is determined to be agricultural and there are no public water systems within a 1-mile radius.

Agricultural or drinking water COCs will be evaluated based on the established MCL or WQO by the DEID GSA. In the case of drinking water, the following Title 22 constituents will be monitored and for agricultural the following Basin Plan WQO and COCs as previously identified in **Table 3-4: Constituents of Concern by Beneficial Uses and Users**.

Step 2:

Establish minimum thresholds at each Groundwater Quality RMS based on the regulatory limits set as part of the responsible regulatory programs that are applicable to the identified beneficial uses and users of groundwater represented by the RMS as shown in **Table 3-10: Minimum Thresholds for Groundwater Quality**.

Table 3-10: Minimum Threshold for Groundwater Quality

Constituent	Units	Minimum Thresholds	
		Drinking Water Limits (MCL/SMCL)	Agricultural Water Quality Objective (WQOs)
Arsenic	ppb	10	N/A
Nitrate as N	ppm	10	N/A
Hexavalent Chromium	ppb	10	N/A
Dibromochloropropane (DBCP)	ppb	0.20	N/A
1,2,3-Trichloropropane (TCP)	ppt	5	N/A
Tetrachloroethene (PCE)	ppb	5	N/A
Chloride	ppm	500	106
Sodium	ppm	N/A	69
Total Dissolved Solids	ppm	1,000	450
Perchlorate	ppb	6	N/A

Step 3:

Evaluate historical groundwater quality data for instances where SMC established at RMS wells have been historically exceeded. In those instances, SMC will not be set at the MCLs or WQOs, but rather the pre-SGMA implementation concentration. These RMS will be closely monitored to evaluate if further degradation is occurring at the RMS as a result of GSP implementation.

(Note that Point Source/Non-Point Source Discharges unrelated to groundwater recharge are not monitored under this Plan or regulated by the GSA and may trigger a minimum threshold).

3.5.2.3.2 Quantified Minimum Thresholds

The minimum thresholds for groundwater quality for each management area are summarized in **Table 3-11: Groundwater Quality Minimum Thresholds**.

Table 3-11: Groundwater Quality Minimum Thresholds

RMS ID	Management Area	Aquifer	COC Minimum Thresholds[8]				
			Conductivity	pH	Nitrate as N	Arsenic	Hexavalent Chromium
			(µm/cm)	*-*	*(mg/L)*	*(ppb)*	*(ppb)*
E0083349	DEID	Upper	<708	>6.5, <8.3	<14	N/A	N/A
E0070434	DEID	Upper	<700	>6.5, <8.3	<15	N/A	N/A
03A01	Western	Upper	<700	>6.5, <8.3	<10	N/A	N/A
TCSD CCR	Richgrove CSD	Lower	<900	>6.5, <8.5	<10	<10.5	<10
EPUD CCR	Earlimart PUD	Lower	<900	>6.5, <8.5	<10	<10	<10

3.5.2.4 Land Subsidence [23 CCR § 354.28(c)(5)(A)(B)]

23 Cal. Code Regs. § 354.28 Minimum Thresholds. (c) *Minimum thresholds for each sustainability indicator shall be defined as follows:*

(5) *Land Subsidence. The minimum threshold for land subsidence shall be the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results. Minimum thresholds for land subsidence shall be supported by the following:*

(A) *Identification of land uses and property interests that have been affected or are likely to be affected by land subsidence in the basin, including an explanation of how the Agency has determined and considered those uses and interests, and the Agency's rationale for establishing minimum thresholds in light of those effects.*

(B) *Maps and graphs showing the extent and rate of land subsidence in the basin that defines the minimum threshold and measurable objectives.*

The minimum thresholds for each RMS associated with the Land Subsidence sustainability indicator have been quantified using the same data set described in Section 3.5.1.4 of this Plan.

3.5.2.4.1 Process for Determining Minimum Threshold

The following four steps detail the process for setting the minimum threshold at each RMS.

Step 1: Utilize each RMS well location based on the process for establishing the interim milestones and measurable objective.

Step 2*: Extract the projected land subsidence (from 2020-2040) from the GFM "transitional pumping" scenario.

[8] Values are based on 2018 quality data. Values to be updated based on 2020 quality data and 10-year historical data.

Step 3: Subtract the maximum forecasted land subsidence from the baseline 2020 ground surface elevation (see **Appendix A-6**) at each RMS location to quantify the minimum threshold.

Establish the minimum threshold for land subsidence for the entire plan implementation period as a single value below the interim milestones and measurable objective. The difference between the interim milestones and measurable objective is the operational flexibility established at each RMS.

Step 4:** Compare the minimum threshold value to estimates of tolerable subsidence for surface land uses and critical infrastructure such as the FKC and DEID pipelines (see **Appendix A-6** in this GSP). If necessary, adjust interim milestones and measurable objective values to avoid undesirable results or provide appropriate mitigation.

*Step 2 describes the process for establishing land subsidence minimum thresholds at RMS locations that DEID GSA will utilize to quantify this GSP's effectiveness for reaching its sustainability goal and incorporates projects and management actions proposed by all GSAs in the Tule Subbasin, specifically transitional pumping (**Table 3-6**).

Step 4 describes the process for evaluating potential adverse conditions from land subsidence on beneficial uses and users for high priority land uses and low priority land uses as described in the Tule Subbasin Coordination Agreement (Appendix A-6**). High-priority land uses are those that are potentially impacted by regional land subsidence regardless of if there is differential land subsidence. Low-priority land uses are not typically impacted by regional land subsidence but are susceptible to differential land subsidence if it occurs.

The potential for adverse conditions from land subsidence on the high-priority land use of the DEID distribution pipelines was also evaluated by DEID independently of the Coordination Agreement technical analysis (**Appendix A-6**). DEID's evaluation included a 2020 land survey of the pipeline elevation to calculate the hydraulic head within the pipe based on the hydraulic grade line (HGL) along 3 gravity-fed pipeline laterals starting at the FKC (**Figure 3-2, Preliminary DEID Distribution Pipelines Subsidence Susceptibility Analysis**). The as-built pressure class (based on pipe size and material) along each pipeline lateral varies with distance from the canal. The hydraulic head at each pipe segment was compared to the respective pressure class to evaluate the pipeline's susceptibility to damage (see inset charts on **Figure 3-2**). If the hydraulic head at any location along the pipeline meets or exceeds the respective pressure class for the pipe, the pipe design may fail.

The recent historical measured subsidence rate (calculated using InSAR data) along the pipeline was extrapolated to 2040, and assuming the head at the canal remains static, the change in head due to subsidence of the pipeline was calculated to determine if any pipe segments could potentially exceed their respective pressure class. The inset charts on **Figure 3-2** show the present head, projected head due to subsidence, and the as-built pressure class along the length of each lateral and indicates areas along the pipeline that may be susceptible to pressure class exceedance from increasing heads (areas on the inset charts and map circled in dashed red).

Based on the assumption that the canal head remains static (does not subside) while the pipeline experiences subsidence at constant rates equal to measurements within the past 7 years (averaging approximately 0.2 ft/year), the heads along the pipelines increase up to approximately 5.4 ft, which increases the risk for pipeline damage to occur. The land subsidence minimum threshold rates established using the GFM (averaging approximately 0.1 ft/year) may result in less increases in head along the pipeline. This independent evaluation indicates that current subsidence rates at select locations along the laterals would have to nearly triple (increase from rates of 0.3 ft/year to 0.8 ft/year) to exceed the pressure class in susceptible areas along the pipeline. Although the pressure class is not exceeded based on projected head calculations due to subsidence, piping failure can be caused by a pressure surge or high-pressure shockwave (i.e., water hammer). Therefore, there is likely an increased risk of future failure susceptibility to DEID's pipelines due to subsidence. The results of this independent assessment of the distribution pipeline's potential for susceptibility to damage from land subsidence caused by increased pumping provide justification that the minimum thresholds established for the Land Subsidence sustainability indicator are reasonable; however, the full effects of subsidence on the distribution pipelines is unknown at this point and currently undergoing additional review and analysis to determine if an additional factor of safety should be applied.

For the FKC, the land subsidence minimum thresholds were compared to the tolerable subsidence provided for the parallel canal design, which varies along its length to accommodate the varying levels of subsidence as provided in **Table 3-12, Future Subsidence Design Tolerance for FKC.** The parallel canal will be built to convey full design capacity, and enough freeboard will be added to maintain the design capacity through 2070 provided the future subsidence is less than the design criteria. The highlighted rows are located within the DEID GSA and indicate that 1 to 4 ft of future subsidence is designed into the parallel canal design (Stantec Pers. Comm. Matt Carpenter, June 9, 2022).

Table 3-12: Future Subsidence Design Tolerance for Middle Reach of New Parallel Canal and Existing Canal Raise

Middle Reach Segment	Action	Sta	Sta	Future Subsidence Designed Into Bank and Lining Heights (feet)
Future Phase – 5th Ave Check to Tule River Check	Raise Existing Canal Lining	4774+20	5166+36	Raise Existing Canal Lining by 15" to 24"
Future Phase - Tule River Check to Ave 136	New Parallel Canal	5171+35	5294+00	1
Phase 1 – Ave 136 to Ave 108	New Parallel Canal	5294+00	5502+00	2
Phase 1 – Ave 108 to upstream of Rd 208	New Parallel Canal	5502+00	5621+00	5
Phase 1 –upstream Rd 208 to upstream Ave 56	New Parallel Canal	5621+00	5885+00	4
Future Phase – upstream of Ave 56 to upstream of Ave 32	New Parallel Canal	5885+00	6034+00	3
Future Phase – upstream of Ave 32 to upstream of Ave 24	New Parallel Canal	6034+00	6100+00	2
Future Phase – upstream of Ave 24 to Ave 16	New Parallel Canal	6100+00	6180+46	1
Future Phase – Ave 16 to Lake Woollies	Raise Existing Canal Lining	6181+82	6430+00	Raise Existing Canal Lining by 25" to 44"

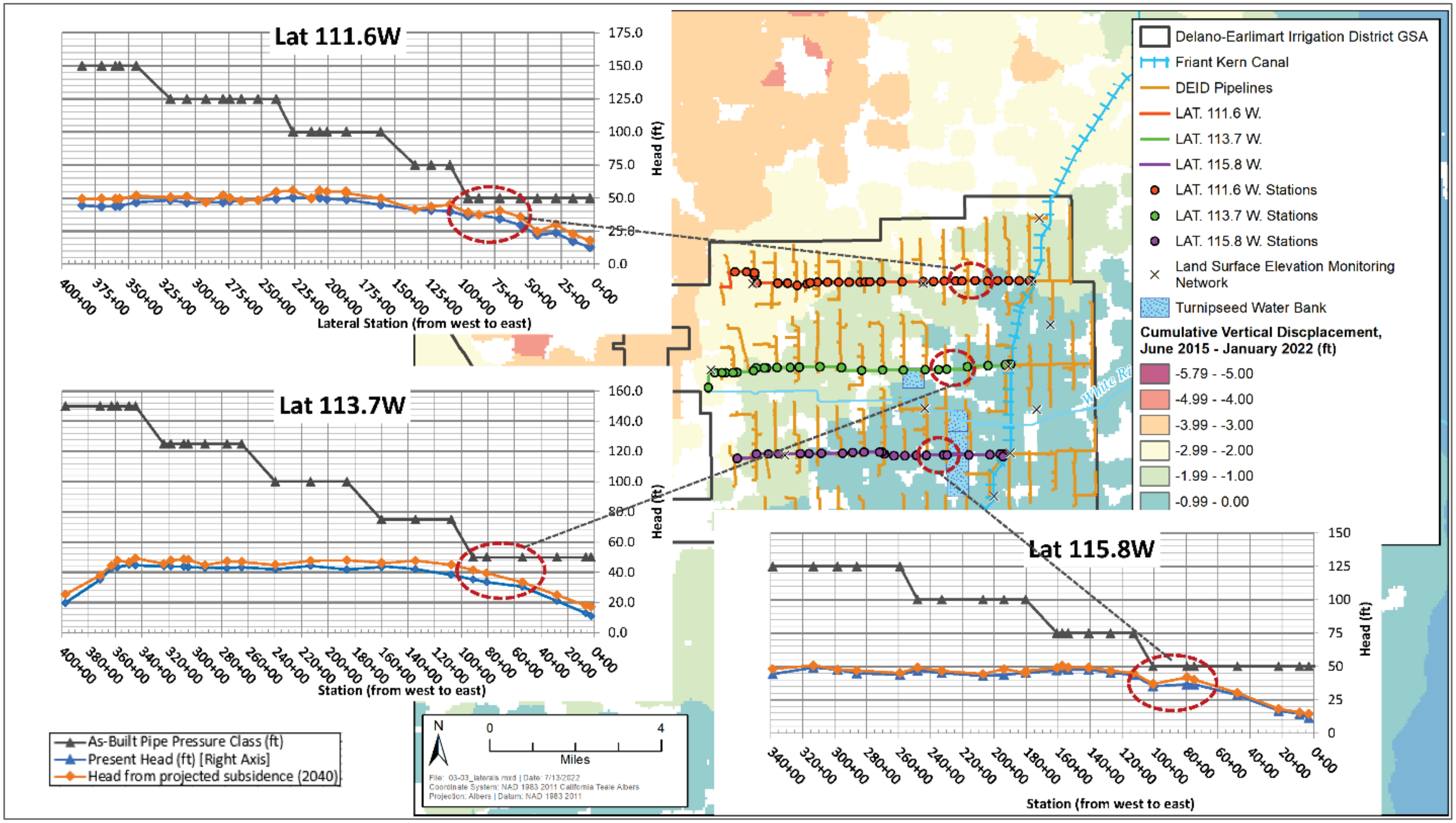

Figure 3-2: Preliminary DEID Distribution Pipelines Subsidence Susceptibility Analysis

3.5.2.4.2 Quantifiable Minimum Thresholds

The quantifiable minimum thresholds are summarized in **Table 3-13: Land Subsidence Minimum Thresholds by RMS Location.**

Table 3-43: Land Subsidence Minimum Thresholds by RMS Location

RMS ID	Management Area	GPS Coordinates		2020 Baseline Elevation	Minimum Threshold Elevation	Minimum Threshold Extent of Subsidence	Minimum Threshold Rate
		Latitude	Longitude	(ft amsl)	(ft amsl)	(ft)	(ft per year)
D0012_B_RMS	DEID	35.862818	-119.285763	267.1	262.1	5.0	0.3
D0030_B_RMS	Earlimart	35.891982	-119.268016	272.8	269.2	3.6	0.2
D0031_B_RMS	DEID	35.833956	-119.255191	296.7	293.9	2.8	0.1
D0032_B_RMS	DEID	35.79103	-119.24428	316.7	315.6	1.1	0.1
D0033_B_RMS	DEID	35.849263	-119.196881	366.1	363.9	2.2	0.1
D0034_B_RMS	DEID	35.891666	-119.196996	340.8	337.8	3.0	0.2
D0070_B_FKC	DEID	35.91343	-119.148269	389.4	388.2	1.2	0.1
D0073_G_FKC	DEID	35.892022	-119.151852	406.2	403.9	2.3	0.1
D0074_B_FKC	DEID	35.877256	-119.143982	415.5	412.8	2.7	0.1
D0075_B_FKC	DEID	35.86335	-119.162	403.2	400.7	2.5	0.1
D0076_B_FKC	DEID	35.84863	-119.150061	408.9	407.5	1.4	0.1
D0077_B_FKC	DEID	35.834073	-119.161183	401.9	400.4	1.5	0.1
D0078_B_FKC	DEID	35.819486	-119.168215	406.1	404.6	1.5	0.1
D0079_G_FKC	DEID	35.805073	-119.178585	407.1	405.9	1.2	0.1
D0080_B_FKC	DEID	35.80553	-119.157965	433.1	431.5	1.6	0.1
D0081_B_FKC	DEID	35.805089	-119.180813	399.5	398.3	1.2	0.1
D0082_B_FKC	DEID	35.790221	-119.169645	423.4	422.0	1.4	0.1
D0083_B_FKC	DEID	35.769064	-119.165418	419.5	417.8	1.7	0.1
D0084_B_FKC	DEID	35.747001	-119.182358	407.3	404.9	2.4	0.1
D0089_B_RMS	Richgrove	35.805288	-119.105225	498.2	496.3	1.9	0.1

Notes: The Minimum Threshold Rate is the 2020 Baseline Elevation minus the Minimum Threshold divided by 20 years.

The minimum thresholds at these RMSs represent conditions that, if experienced, could generate significant and unreasonable conditions that could lead to undesirable results. Additionally, using the GFM, a map of the Tule Subbasin identifying the potential land subsidence that would occur using the minimum threshold values is shown in Attachment 6 of the Coordination Agreement (**Appendix A-6**).

3.5.2.5 3Minimum Threshold Potential Effects

The following sections describe the potential effects the minimum thresholds might have to other sustainability indicators, other GSAs, other subbasins, the beneficial users within the GSA, and government agency standards.

3.5.2.5.1 Minimum Threshold Relationship Between Sustainability Indicators *[23 CCR § 354.28(b)(2)]*

> **23 Cal. Code Regs. § 354.28 Minimum Thresholds. (b)** *The description of minimum thresholds shall include the following:*
>
> **(2)** *The relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators.*

Although each of the sustainability indicators were evaluated independently with different measurement methodologies, the overall GFM prepared includes the projects and management actions, which establish a common basis for holistically evaluating minimum thresholds for all of the sustainability indicators. Groundwater elevations generally also affect each of the sustainability indicators, and the groundwater elevations established at the various RMS wells help establish the numerical values for the other sustainability indicators, such as groundwater storage volumes.

During the GSP implementation period, DEID GSA plans to adaptively manage based on the data collected from the monitoring program. If one set of data for one sustainability indicator can be correlated to contributing to a minimum threshold exceedance of another sustainability indicator, projects or management actions will be revised to prevent further issues.

3.5.2.5.2 Effects on Adjacent Basins [23 CCR § 354.28(b)(3)]

> **23 Cal. Code Regs. § 354.28 Minimum Thresholds. (b)** *The description of minimum thresholds shall include the following:*
>
> **(3)** *How minimum thresholds have been selected to avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals.*

DEID GSA is a party to the Tule Subbasin Coordination Agreement (**Appendix A**), established to coordinate minimum thresholds and measurable objectives within the Subbasin. The minimum thresholds for the applicable sustainability indicators in the Tule Subbasin were established based on the proposed projects and management actions for achieving the Subbasin sustainability goal by 2040. As a result, groundwater inflow from adjacent subbasins is expected to decrease. As groundwater elevations are stabilized during the GSP implementation period, adjacent subbasins should not be affected by the GSA. As data is collected during the GSP implementation period, the Tule Subbasin GSAs, including DEID GSA will adapt and amend projects and management actions to achieve the sustainability goal.

3.5.2.5.3 Effects on Beneficial Uses *[23 CCR § 354.28(b)(4)]*

23 Cal. Code Regs. § 354.28 Minimum Thresholds. (b) *The description of minimum thresholds shall include the following:*

(4) *How minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.*

Each minimum threshold established for the various sustainability indicators considered the avoidance of significant and unreasonable conditions that lead to undesirable results for the beneficial uses and users. The DEID GSA, with input from its stakeholders, developed projects and management actions to balance the economic impacts while achieving sustainability within its jurisdictional limitations. The DEID GSA has notified and discussed with other Tule Subbasin GSAs the potential negative impacts that certain projects and management actions included in their respective GSPs may have on the items of concern listed below in the DEID GSA if not mitigated by those GSAs. The DEID GSA will continue monitoring the effects on beneficial uses and users within the DEID GSA for negative impacts from projects and management actions of other GSAs throughout the implementation period with the intent to seek mitigation by the responsible GSAs.

- **Well failures** (*e.g. collapsed casing due to excessive groundwater level decline or land subsidence*): Minimum Thresholds established for groundwater levels to minimize loss of existing wells.
- **Increased operational costs for groundwater extraction**: With the lowering of groundwater levels, the cost to pump groundwater will increase. The minimum thresholds for groundwater levels were established to minimize increase in pumping costs.
- **Increased capital costs to wells:** With the lowering of groundwater levels, well pumps may need to be replaced to pump from deeper depths, modifications to lower pump impellors, or replacing cracked/shifted well casings due to subsidence. The minimum thresholds for both groundwater levels, groundwater storage, and land subsidence were established to minimize additional capital cost to existing infrastructure.
- **Degradation of water quality**: With the lowering of groundwater levels, or the increased groundwater recharge, groundwater quality may be adversely affected. Within DEID GSA, there are no known groundwater plumes that could spread to groundwater beneficial users. The minimum thresholds for groundwater levels, groundwater storage, and groundwater quality were established to minimize impacts and extra costs to the groundwater users reliant on drinking water or agriculture pumping.
- **Land subsidence:** With the lowering of groundwater levels, reduction of groundwater storage, land subsidence could have costly impacts to existing critical infrastructure including the FKC and the DEID's pipeline water distribution system. The minimum thresholds were established to minimize land subsidence impacts to critical infrastructure.
- **Reduction of prime agricultural farming**: By reducing pumping over the plan implementation period to achieve the sustainability goal, a reduction of agriculture production will occur, causing impacts to local economic development, property tax revenue, jobs, and produce to feed the growing populations. DEID GSA intends to adaptively manage the Plan, using

monitoring data to adjust management actions to prevent, as feasible, the reduction of prime agriculture farming.

Based on groundwater level and land subsidence projections from the Tule Subbasin GFM and analysis of potential impacts of the additional groundwater level decline and land subsidence projected for the transition period from 2020 to 2040, the DEID GSA developed SMC for each of the sustainability indicators to avoid undesirable results in consideration of the beneficial uses of groundwater and the beneficial users of these supplies and facilities:

- Municipal and Domestic Supply
- Agricultural Supply
- Industrial Supply
- Critical Infrastructure, including the FKC

The SMC identified to avoid undesirable results were vetted through a public process that included multiple stakeholder workshops, meetings, and document review. While the SMC are protective of undesirable results for most beneficial uses and users, during the transition period between 2020- 2040, the Tule Subbasin GSAs will also adopt a Mitigation Plan consistent with the Mitigation Framework attached hereto as **Appendix A-7.**

Chronic Lowering of Groundwater Levels Minimum Thresholds Reevaluation

The DEID performed additional analyses of how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests. The analyses are summarized as follows:

Existing Well Analysis

DEID compared several interpolated surfaces based on observed groundwater levels, GFM model results, and minimum thresholds to well-specific “Protective Levels” developed for all wells in the DEID MA. As previously described, this analysis assumed that a minimum of 70 ft of saturated screen interval is required to maintain groundwater production rates for agricultural, domestic, and M&I wells. The analysis evaluated 244 agricultural wells, 40 domestic wells, 18 M&I wells and 157 wells of unknown type for a total of 459 wells. There were 149 wells without depth information that were not included in the analysis. The analysis was completed using five interpolation scenarios to compare the potential impacts under varying conditions:

1. Original GSP Minimum Thresholds
2. 2015 Representative Groundwater Levels
3. 2019 Representative Groundwater Levels
4. Modeled decline to 2040 – New Minimum Threshold (Transitional Pumping Scenario)
5. Modeled decline to 2040 – New Measurable Objective (Safe Yield Scenario)

The following steps were taken to evaluate potential impacts to wells for each of the five scenarios:

1. A surface was generated:
    a. For the original GSP minimum thresholds (scenario #1 above), a surface was generated

based on the minimum thresholds assigned to each RMS location (from the originally submitted GSP) for both the upper and lower aquifers, using the kriging method[9].

b. For the representative groundwater levels (scenarios #2 and #3 above), observed groundwater levels at monitoring wells within the DEID for the selected time frame, including representative groundwater levels (extrapolated based on observed data) assigned to the 12 RMS locations (6 Upper Aquifer and 6 Lower Aquifer) and 3 control points outside the DEID GSA extrapolated based on previously mapped contours, were used to develop a potentiometric (water table) surface over the entire DEID GSA using the kriging method.

2. For the modeled decline to 2040 (scenarios #4 and #5 above), the projected decline (the difference between 2040 and 2019 modeled values) was subtracted from the 2019 representative groundwater level data at each RMS location and a new surface was generated based on the values at each RMS location for the upper and lower aquifers using the kriging method.
3. The Protective Level maintaining a saturated screen interval of a minimum of 70 ft above the total depth of the well was determined for 459 wells.
4. The Protective Level at each existing well site was compared to the interpolated surface under each of the five scenarios previously described to determine the number of Upper Aquifer and Lower Aquifer wells potentially impacted by well type.
5. A first-order cost estimate[10] was developed by well type to mitigate impacted wells.

A summary of the existing well analysis potential impacts based on the five scenarios evaluated is provided in **Table 3-14 Existing Wells Impact Analysis and Exhibit 3-3 Existing Well Impact Analysis.**

[9] Kriging gives the best linear unbiased prediction at unsampled locations by distance average-weighting.
[10] First-order cost estimate has an accuracy of plus/minus 50 percent.

Table 3-145: Existing Wells Impact Analysis

Upper Aquifer Potential Impacts					
	2015 Observed	*2019 Observed*	*New MT*	*Safe Yield Scenario*	*Original GSP MT*
Ag	2	5	**6**	2	10
Domestic	9	11	**11**	4	28
Unknown	6	9	**8**	5	20
M&I	0	0	**0**	0	1
Sub-Total	*17*	*25*	*25*	*11*	*59*
Lower Aquifer Potential Impacts					
Ag	0	0	**0**	0	5
Domestic	0	0	**0**	0	10
Unknown	0	0	**3**	1	16
M&I	0	0	**0**	0	0
Sub-Total	*0*	*0*	*0*	*0*	*31*
TOTAL	**17**	**25**	**28**	**12**	**90**

The existing well impact analysis reveals that under the original GSP minimum threshold scenario #1, 59 wells in the Upper Aquifer and 31 wells in the Lower Aquifer are potentially impacted. For the four other scenarios, few to no wells are impacted in the Lower Aquifer. Significantly fewer wells are impacted for the four other scenarios.

Based on the existing well impact analysis, the DEID GSA has revised the original minimum threshold to be more protective of beneficial uses and users and minimize the potential financial impact from the need to mitigate adversely impacted wells. The new minimum threshold is protective of nearly all wells screened in the Lower Aquifer whereas the original minimum threshold resulted in potential impacts to 31 wells, including agricultural and domestic type wells. While the results indicate that impacts to wells screened solely in the Upper Aquifer may occur under the new minimum threshold, those impacts are similar to the baseline conditions under the 2015 and 2019 observed water level scenarios. In particular, the new minimum threshold is more protective of domestic well users who are the most sensitive to well impacts because they often lack alternative supply and the financial means to replace wells. This GSP recognizes that significant and unreasonable effects including well failure and dry wells have historically occurred and will likely occur during GSP implementation. The Tule Subbasin GSAs have prepared a Mitigation Program Framework (**Attachment A-7**) to address claims of adverse well impacts. The DEID GSA will develop a Mitigation Plan as required by the Mitigation Program Framework as a project and management action.

The DEID GSA has completed a rough order of magnitude cost estimate for the existing well impacts evaluation. The cost estimate is presented in **Section 5.2.1.7.**

3.5.2.5.4 Existing Standards [23 CCR § 354.28(b)(5)]

23 Cal. Code Regs. § 354.28 Minimum Thresholds. (b) *The description of minimum thresholds shall include the following:*

(5) *How state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the Agency shall explain the nature of and basis for the difference.*

Federal, state, or local standards were used to establish the minimum thresholds for degradation of groundwater quality. In some cases, groundwater quality MCLs were exceeded prior to this plan implementation, and in such cases, to allow for operational flexibility, groundwater quality may continue to degrade without resulting in a minimum threshold exceedance, so long as the percent change in water quality remains within the thresholds described in **Section 3.5.2.3.1 Process for Determining Minimum Thresholds.** Further the continued degradation of water quality would need to be linked to be a result of lowering of groundwater levels from over pumping, or surface water recharge efforts.

Exhibit 3-1: RMS Groundwater Level Hydrographs

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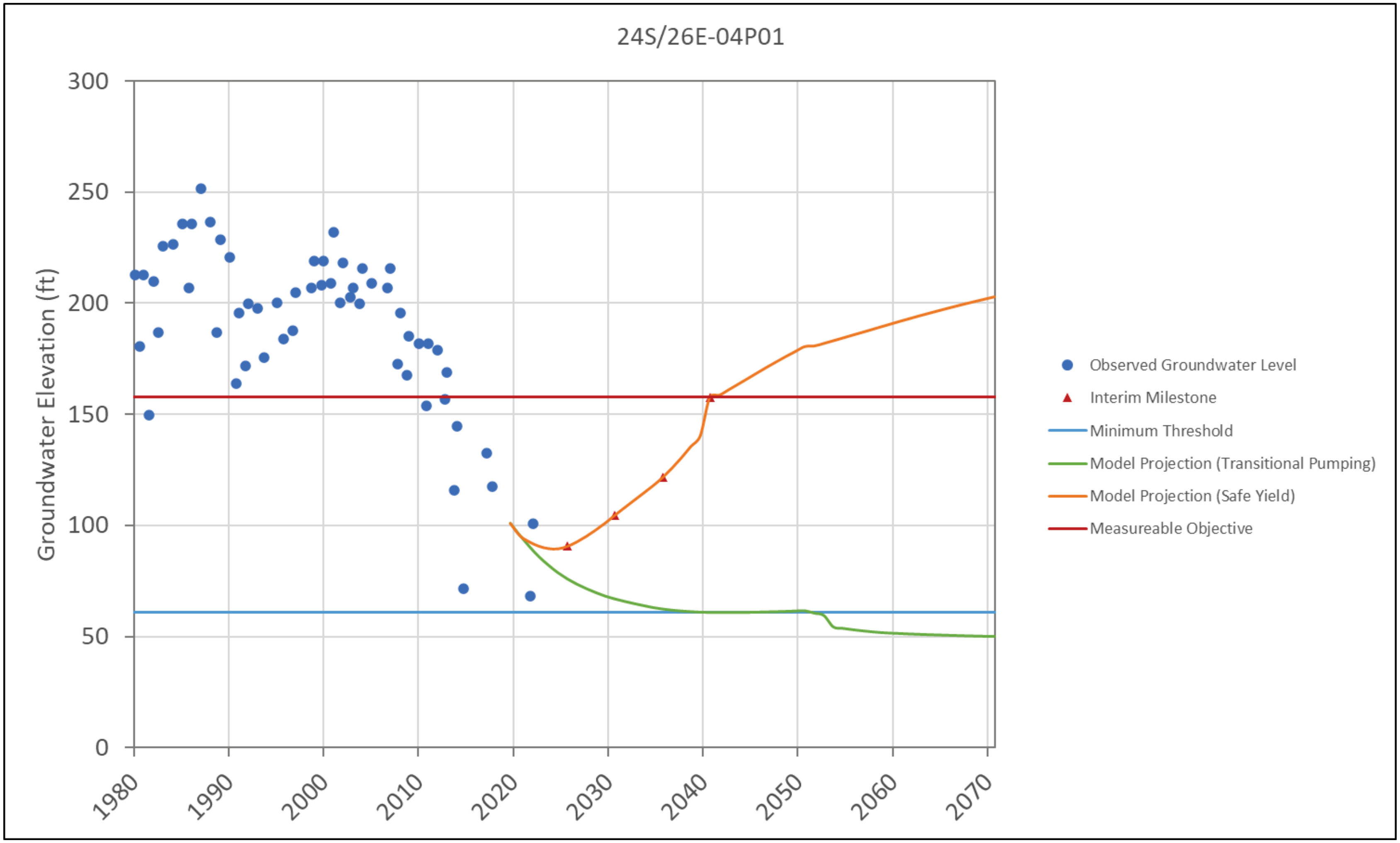
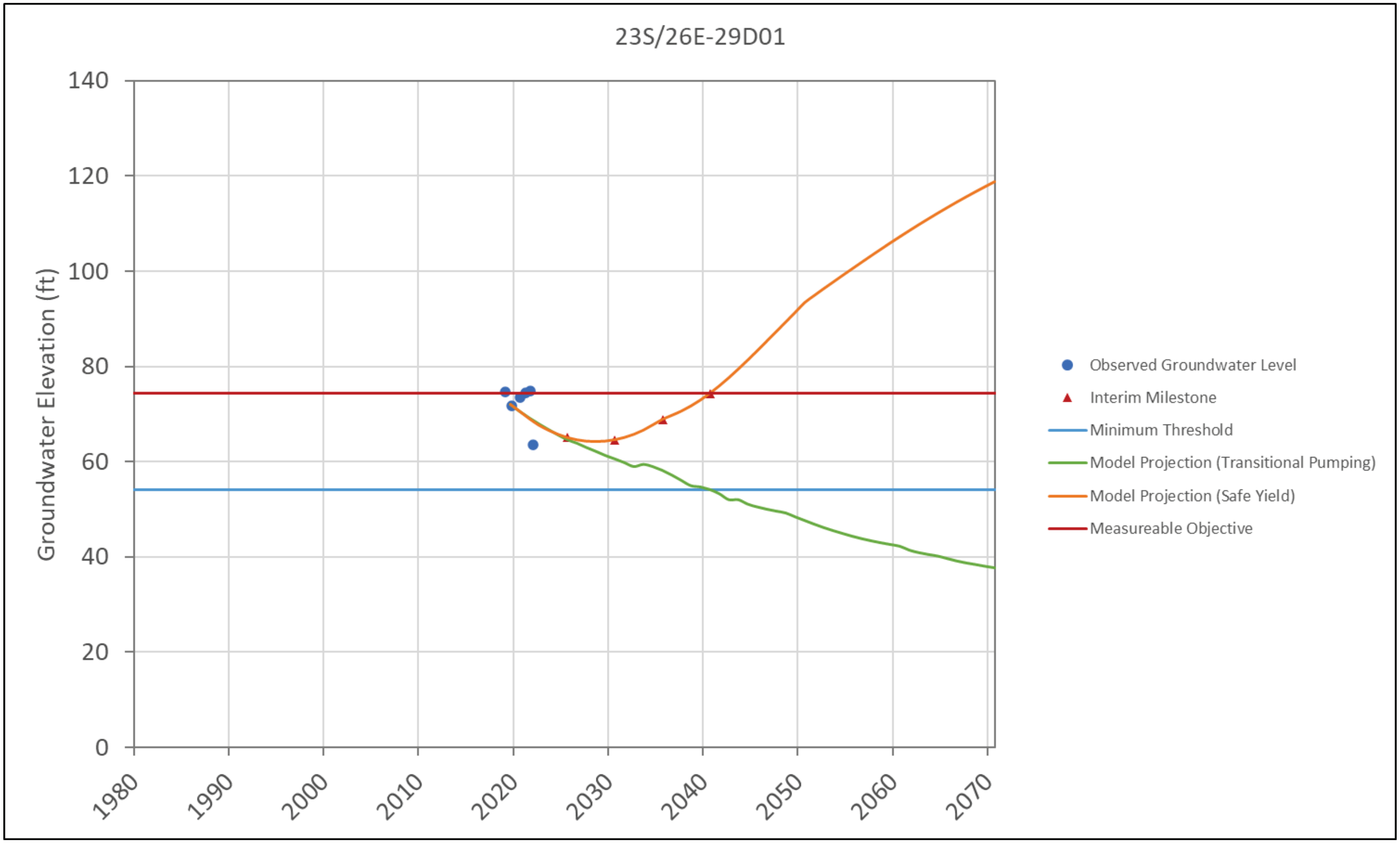
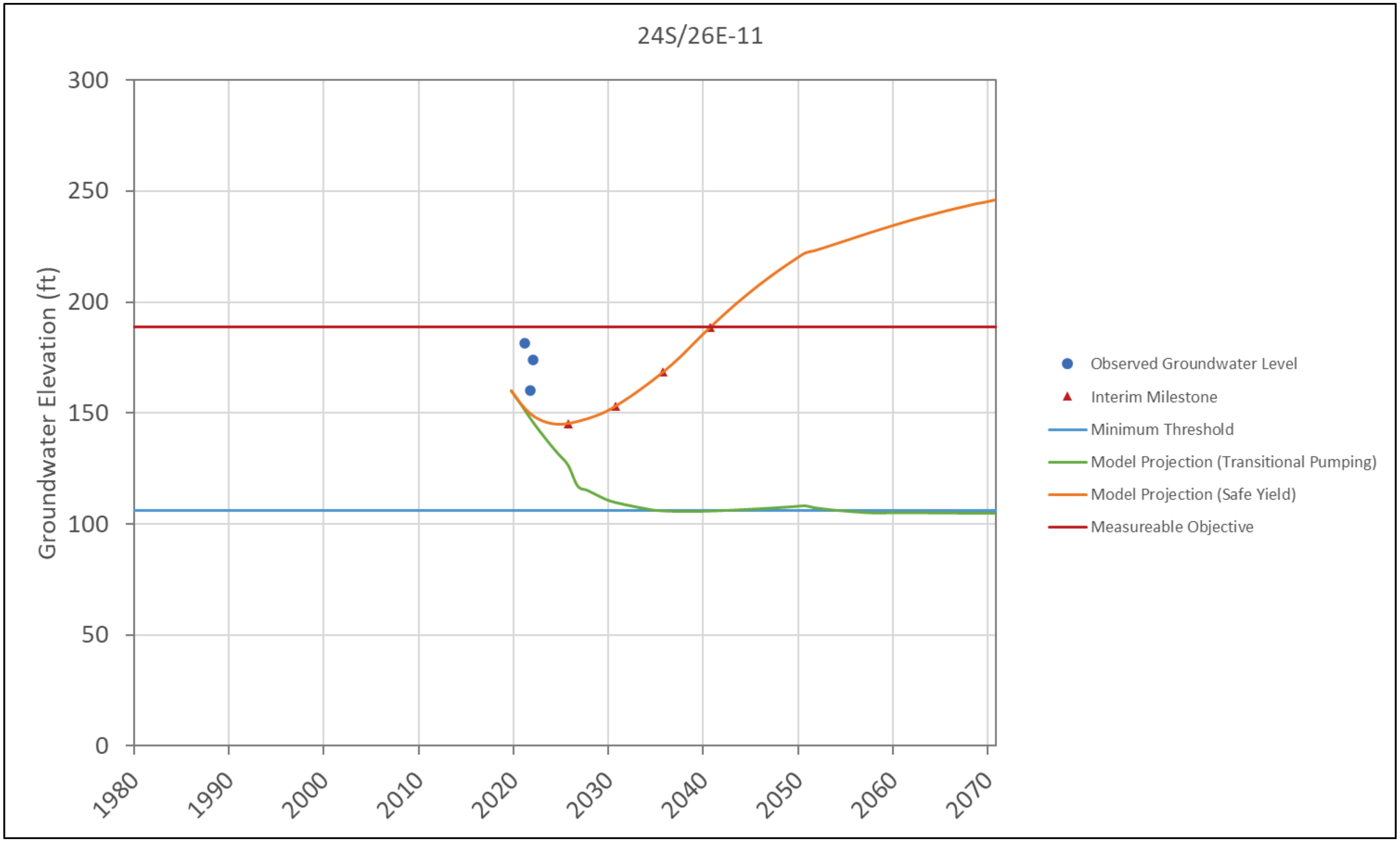
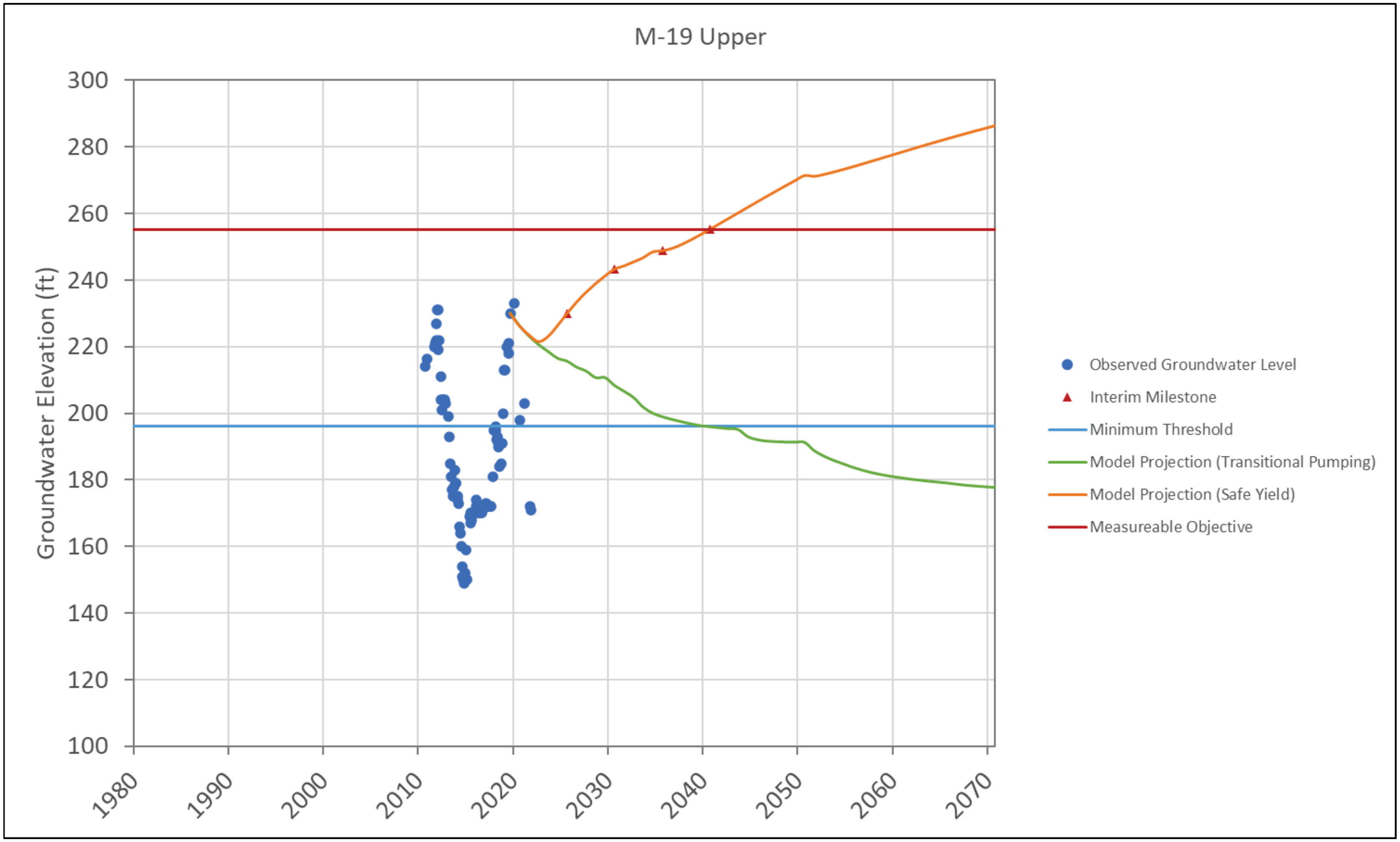
24S/26E-32G01
Groundwater Elevation (ft)
350
300
250
200
150
100
50
0
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Model Projection (Transitional Pumping)
Model Projection (Safe Yield)
Measurable Objective

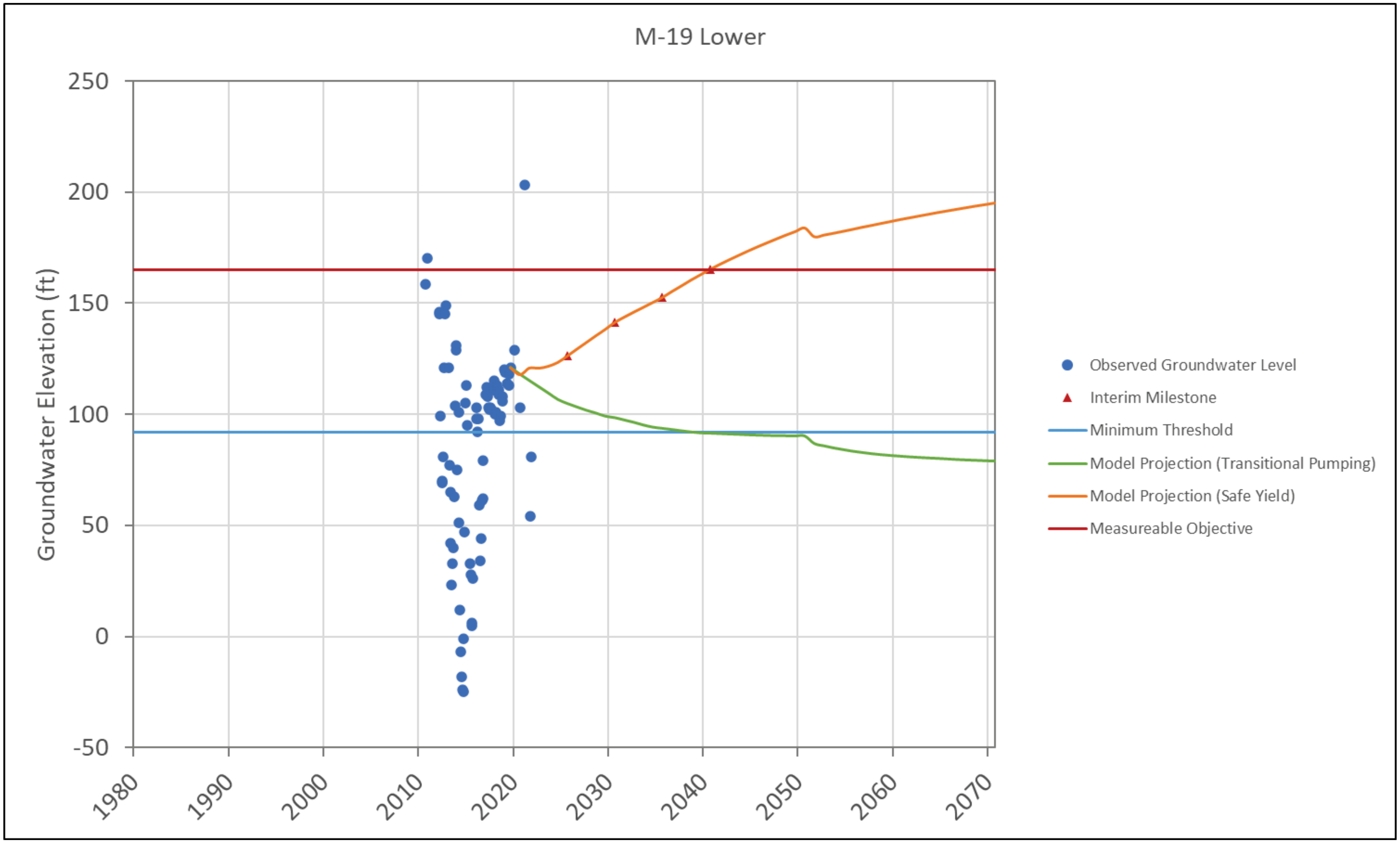

24S/26E-04P01
Groundwater Elevation (ft)
300
250
200
150
100
50
0
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Model Projection (Transitional Pumping)
Model Projection (Safe Yield)
Measureable Objective


23S/26E-29D01
Groundwater Elevation (ft)
0
20
40
60
80
100
120
140
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Model Projection (Transitional Pumping)
Model Projection (Safe Yield)
Measureable Objective

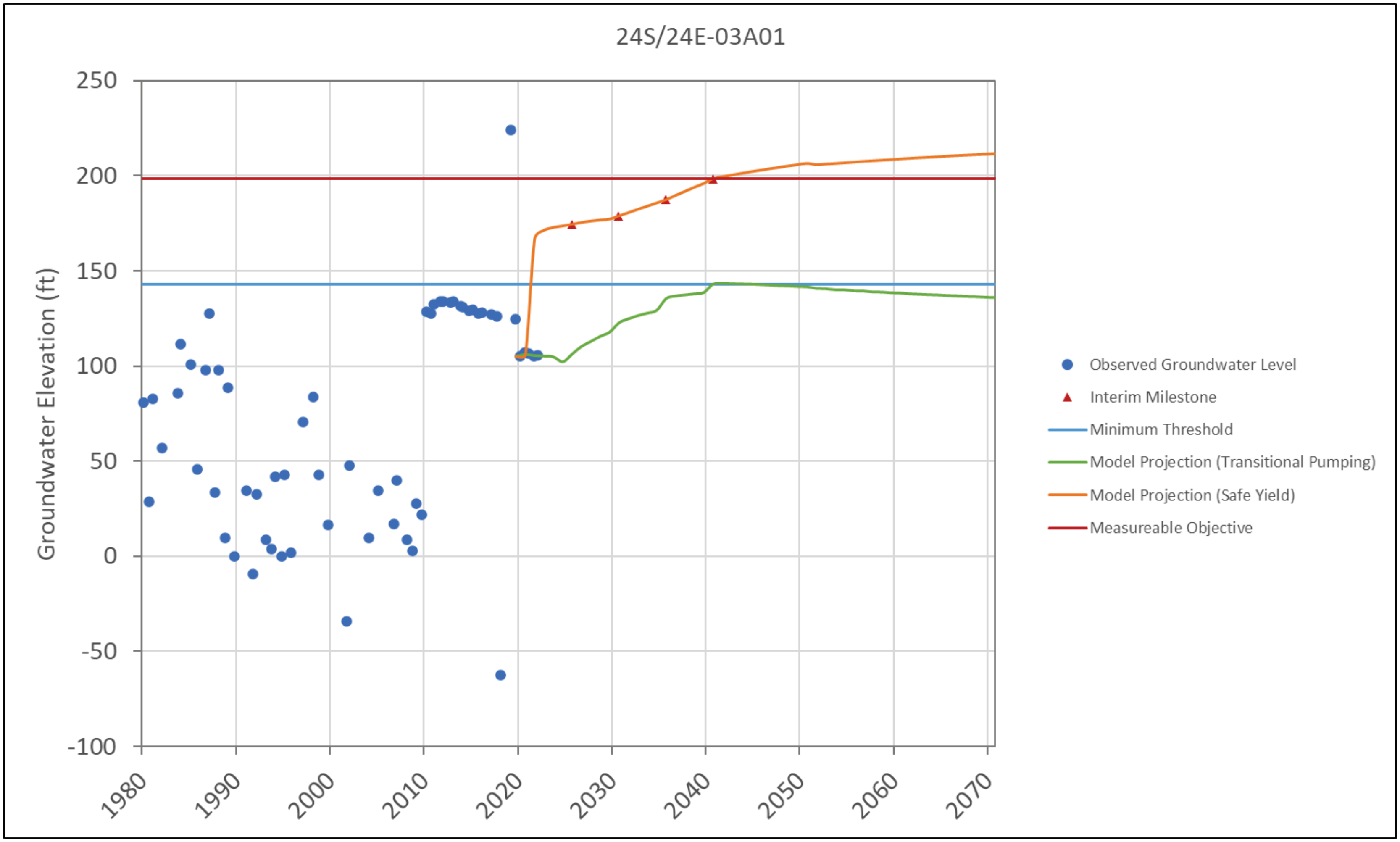

24S/25E-35H01
Groundwater Elevation (ft)
190
180
170
160
150
140
130
120
110
100
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Model Projection (Transitional Pumping)
Model Projection (Safe Yield)
Measureable Objective

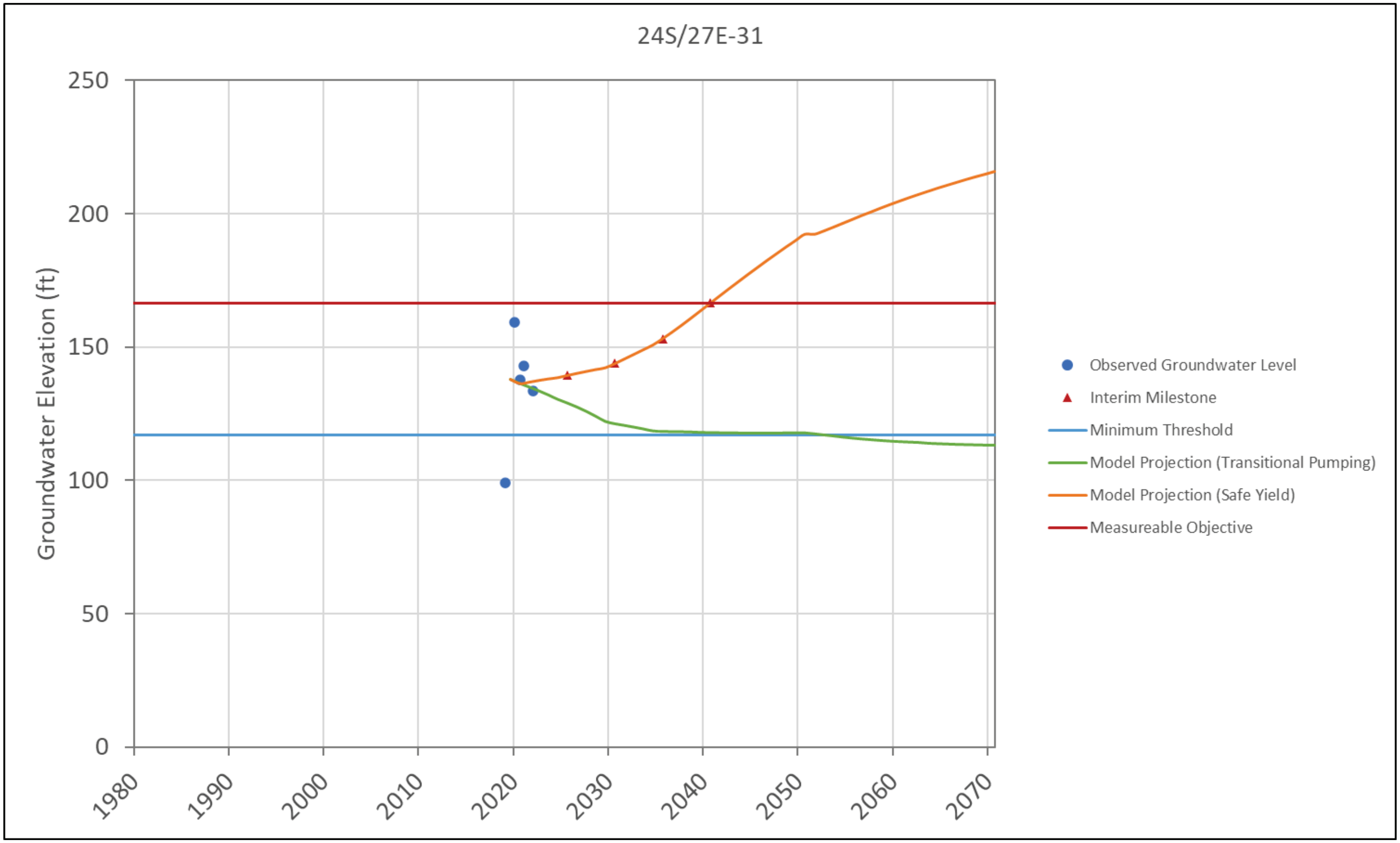

24S/26E-11
Groundwater Elevation (ft)
300
250
200
150
100
50
0
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Model Projection (Transitional Pumping)
Model Projection (Safe Yield)
Measureable Objective

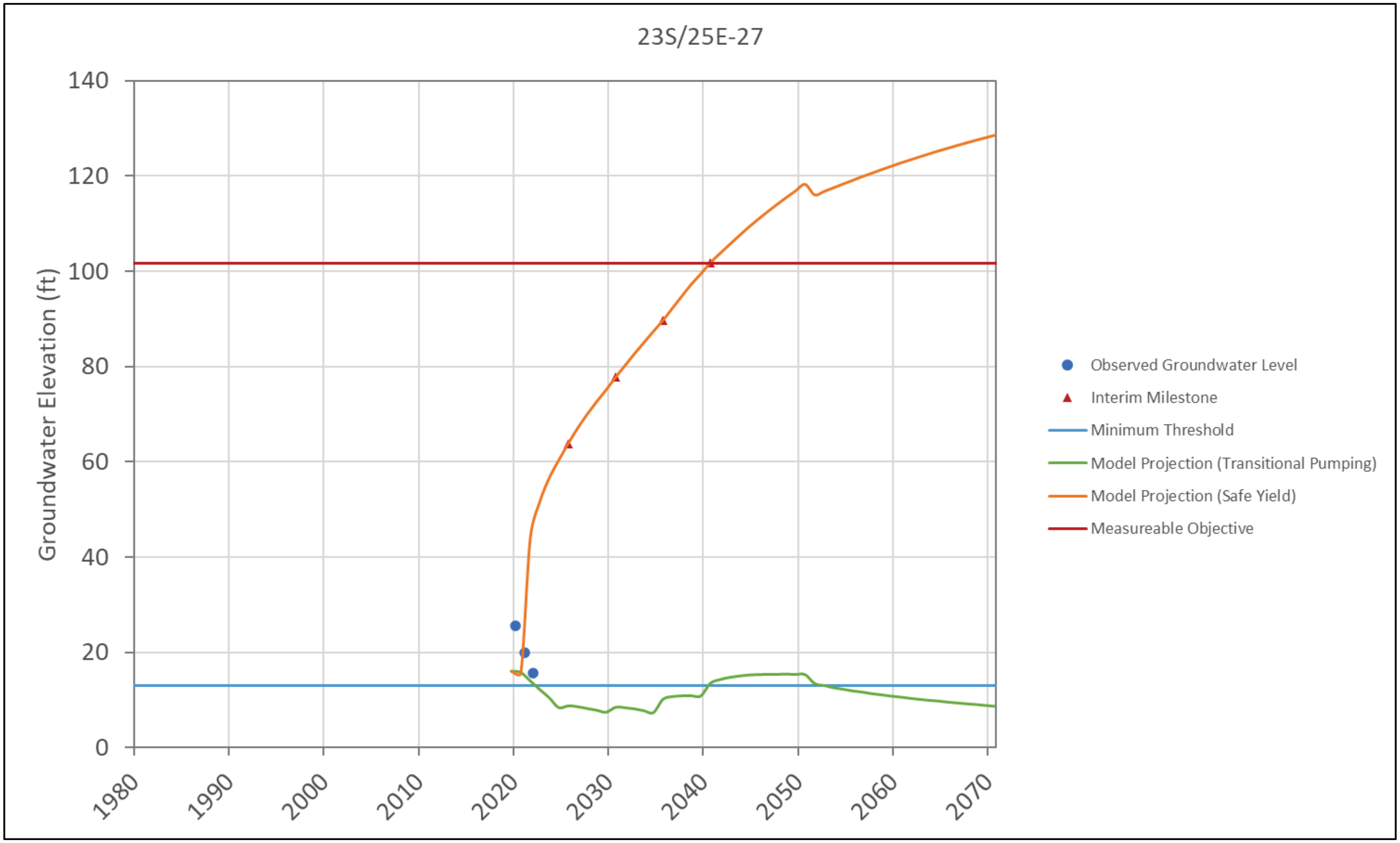

M-19 Upper
Groundwater Elevation (ft)
300
280
260
240
220
200
180
160
140
120
100
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Model Projection (Transitional Pumping)
Model Projection (Safe Yield)
Measureable Objective


M-19 Lower
Groundwater Elevation (ft)
250
200
150
100
50
0
-50
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Model Projection (Transitional Pumping)
Model Projection (Safe Yield)
Measureable Objective


23S/25E-36H01
Groundwater Elevation (ft)
250
200
150
100
50
0
-50
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Model Projection (Transitional Pumping)
Model Projection (Safe Yield)
Measureable Objective


24S/24E-03A01
250
200
150
100
50
0
-50
-100
Groundwater Elevation (ft)
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Model Projection (Transitional Pumping)
Model Projection (Safe Yield)
Measureable Objective


24S/27E-31
Groundwater Elevation (ft)
250
200
150
100
50
0
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Model Projection (Transitional Pumping)
Model Projection (Safe Yield)
Measureable Objective


23S/25E-27
Groundwater Elevation (ft)
140
120
100
80
60
40
20
0
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Model Projection (Transitional Pumping)
Model Projection (Safe Yield)
Measureable Objective


25S/26E-9C01
Groundwater Elevation (ft)
120
100
80
60
40
20
0
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Model Projection (Transitional Pumping)
Model Projection (Safe Yield)
Measureable Objective

Exhibit 3-2: COC Groundwater Quality Isocontour Maps

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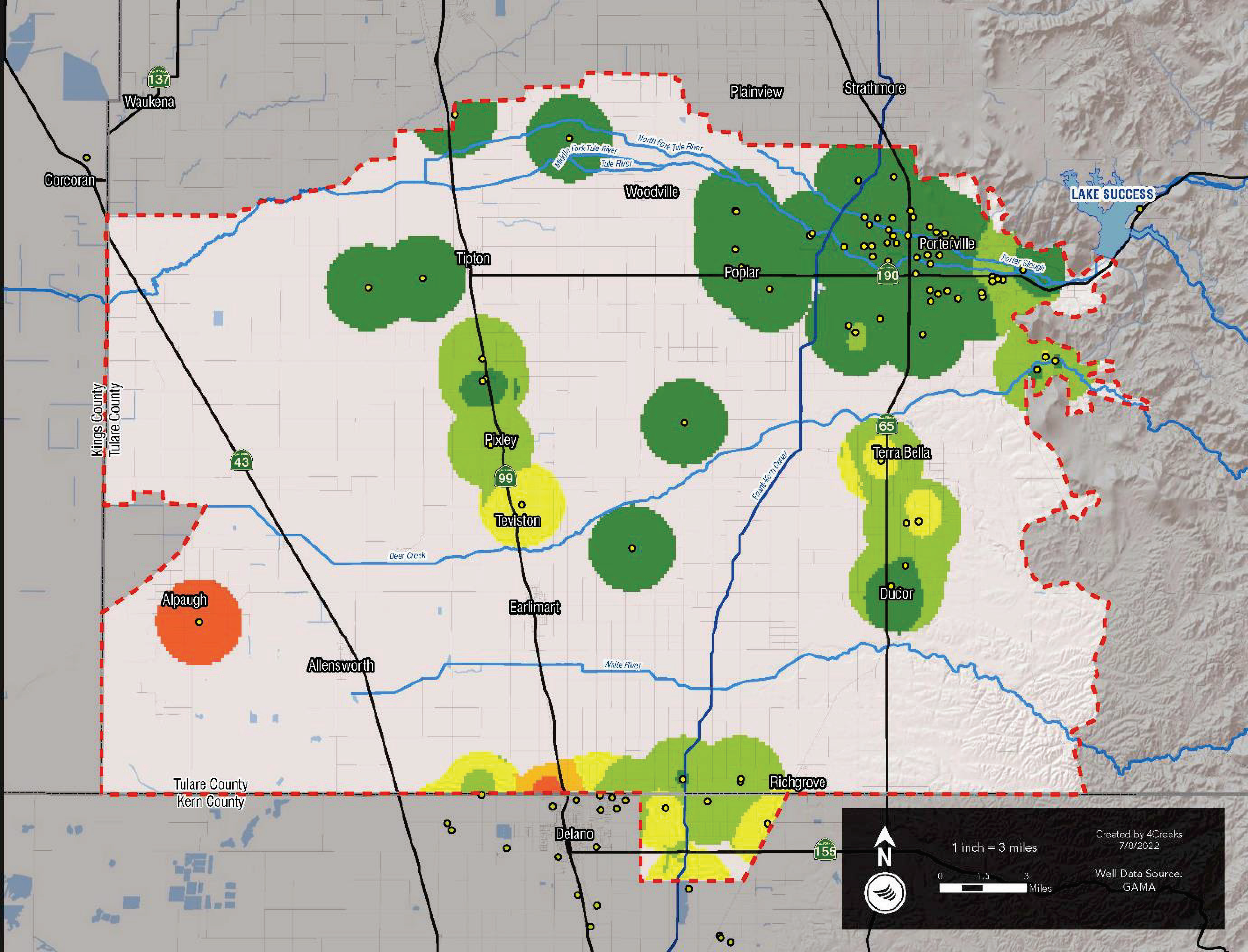
Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient Arsenic
2017-2022

Drinking Water MCL:
10 µg/L



Legend

- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Arsenic (µg/L)

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

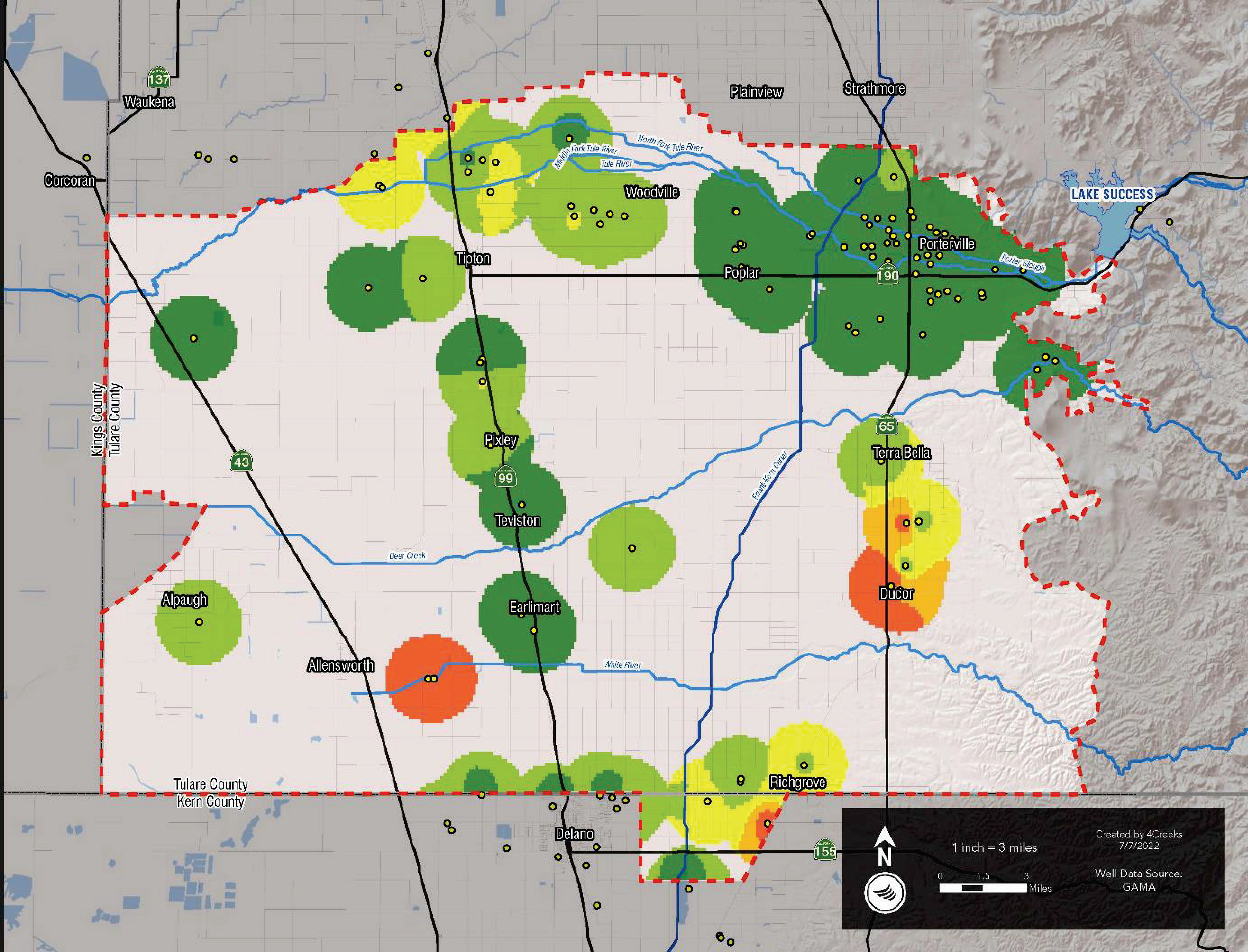
4CREEKS

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient Chloride 2017-2022

Agricultural Water Quality Goal: 106 mg/L



Legend

- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Chloride (mg/L)

- 0 - 26.5
- 26.5 - 53.0
- 53.0 - 79.5
- 79.5 - 106
- 106+

4CREEKS

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin Groundwater Quality Analysis

Ambient Chloride 2017-2022

Drinking Water MCL: 500 mg/L

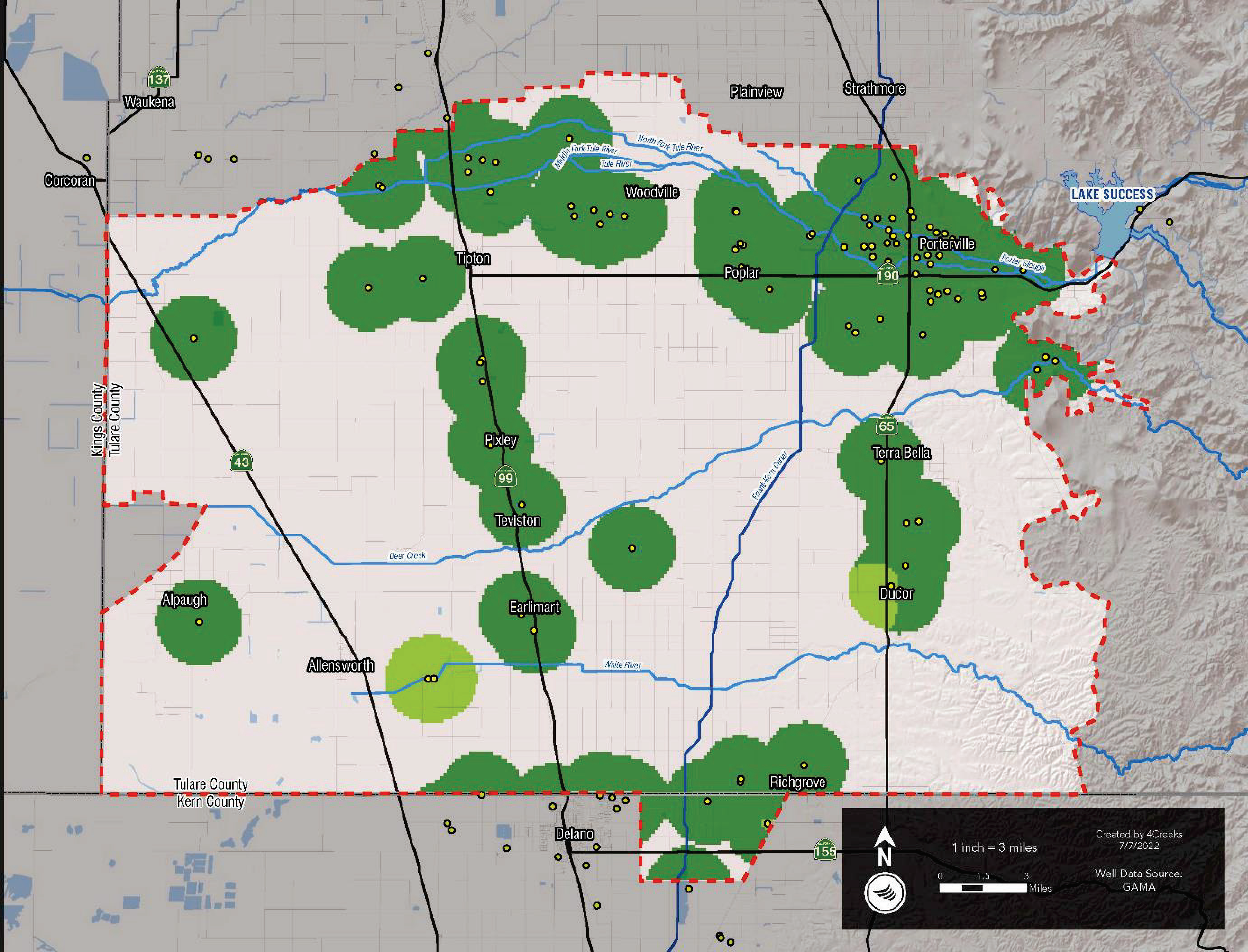
Legend

- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Chloride (mg/L)

- 0 - 125
- 125 - 250
- 250 - 375
- 375 - 500
- 500+

4CREEKS



Tule Subbasin

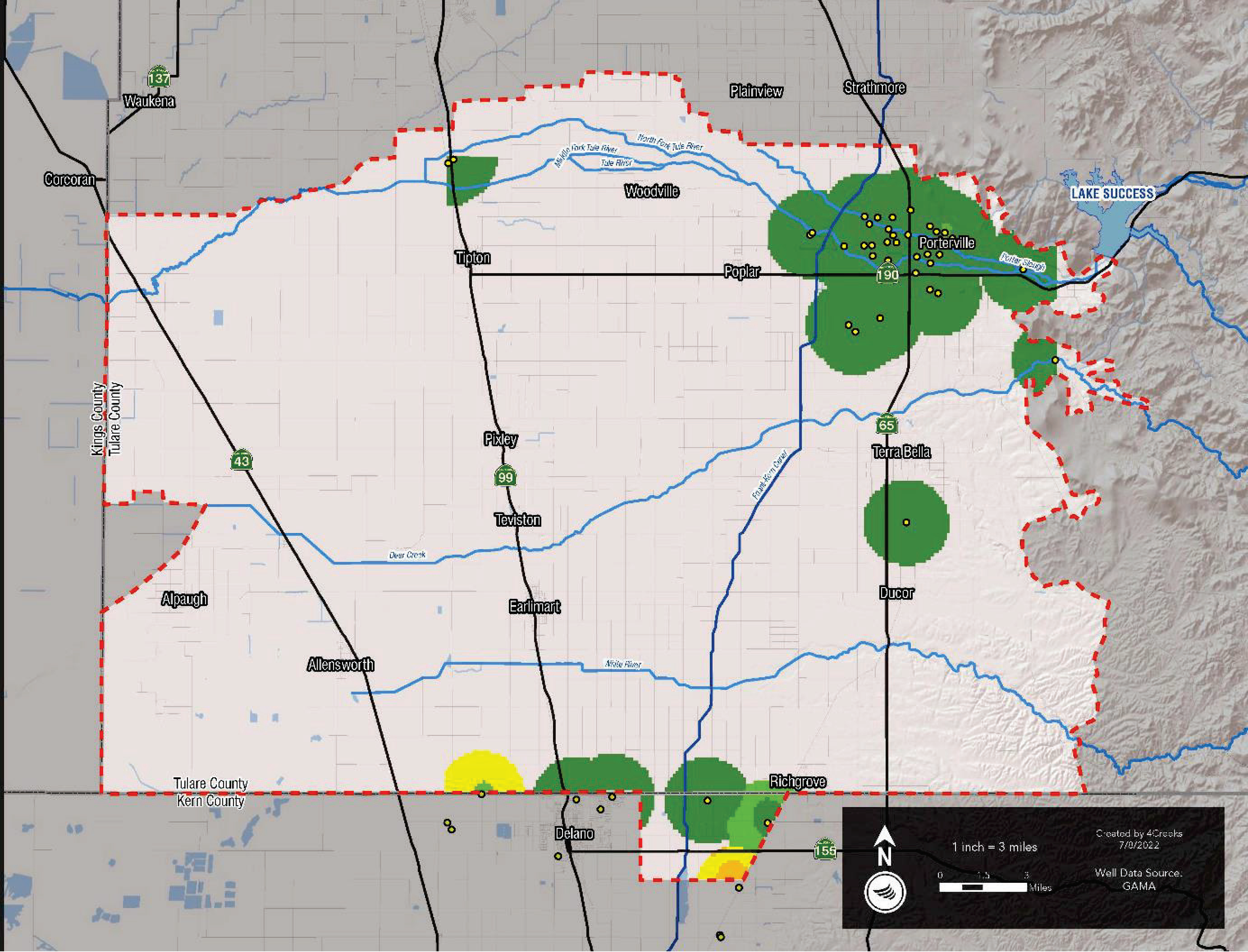
Sustainable Groundwater Management Act

Tule Subbasin

Groundwater Quality Analysis

Ambient Chromium-6 2017-2022

Drinking Water MCL: 10 μg/L



Legend

- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Chromium-6 (μg/L)

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

4CREEKS

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient Dibromochloropropane 2017-2022

Drinking Water MCL: 0.2 µg/L

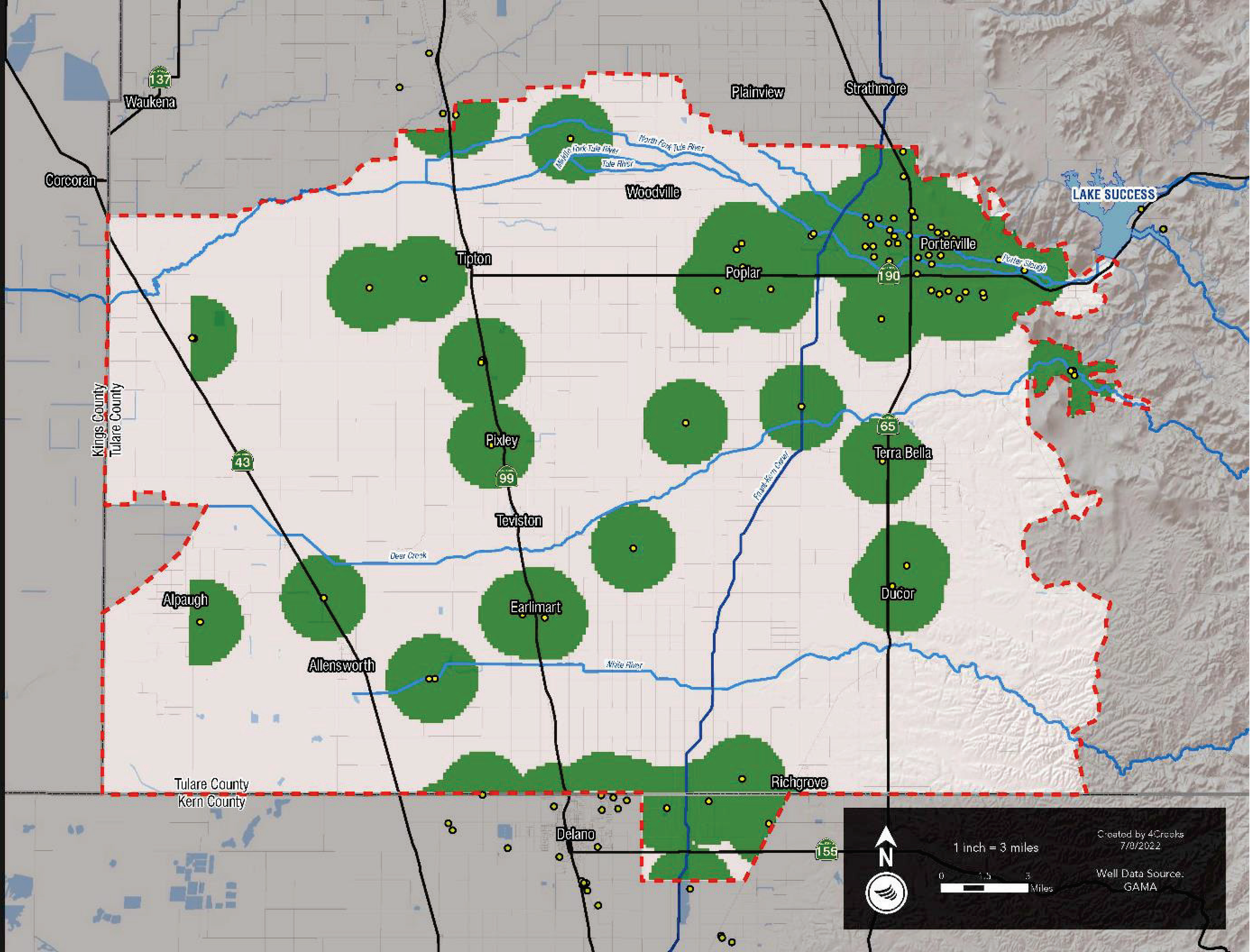
Legend

- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Dibromochloropropane (µg/L)

- 0 - 0.05
- 0.05 - 0.1
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20+

4CREEKS



Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin Groundwater Quality Analysis

Ambient Nitrate 2017-2022

Drinking Water MCL: 10 mg/L

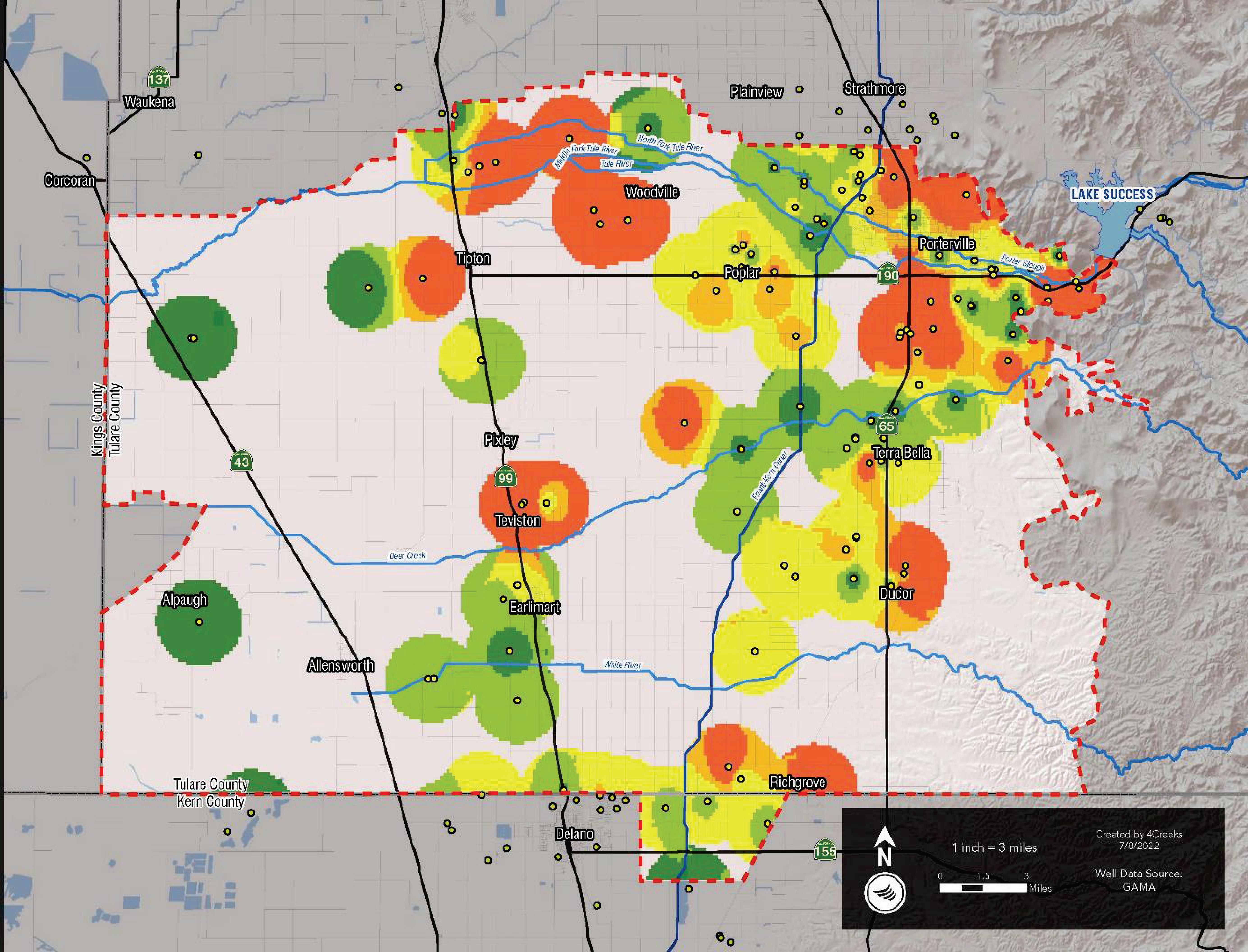
Legend

- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Nitrate (mg/L)

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

4CREEKS

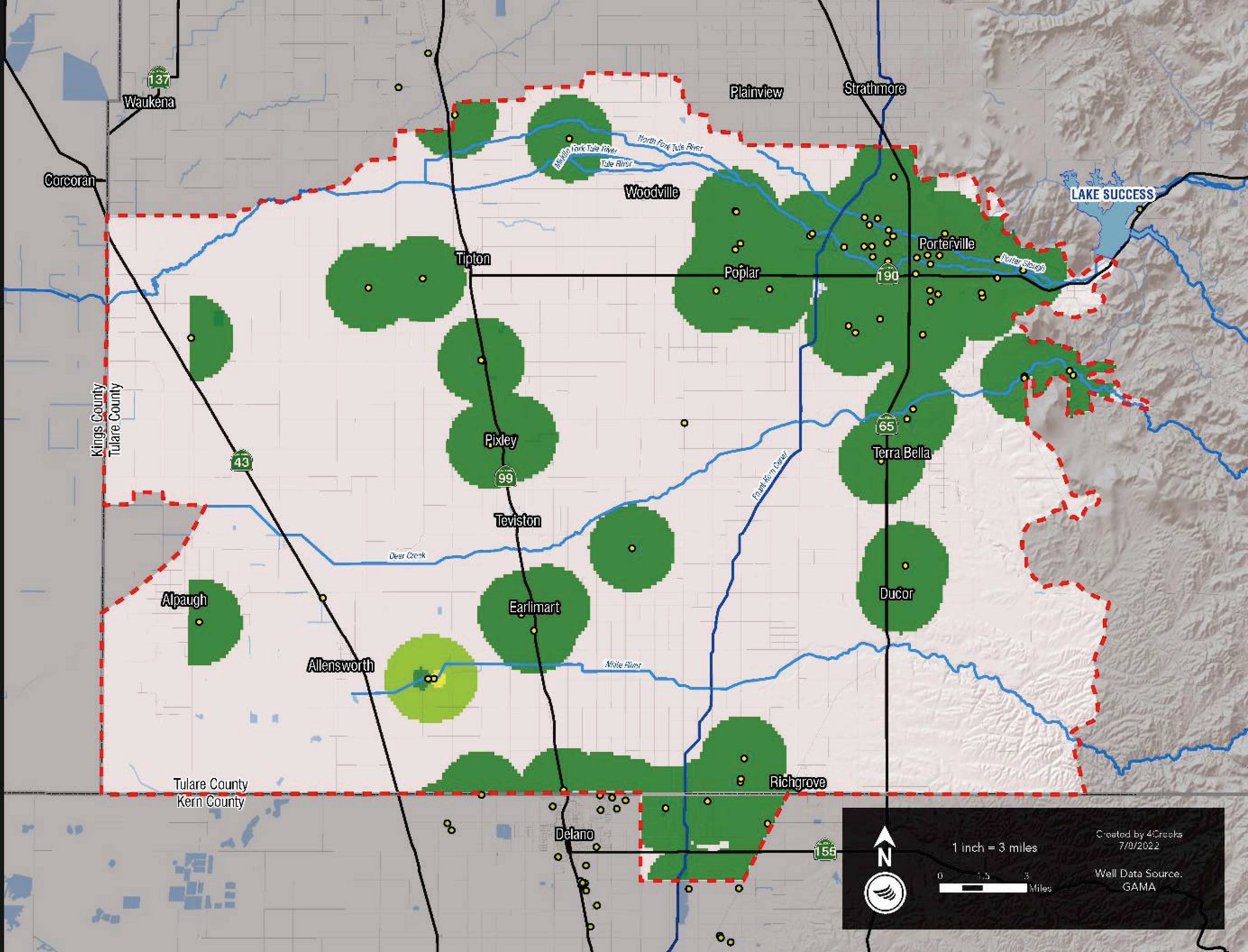


Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient PCE (Tetrachloroethene) 2017-2022

Drinking Water MCL: 5 µg/L



Legend

- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Tetrachloroethene (µg/L)

- 0 - 1.25
- 1.25 - 2.5
- 2.50 - 3.75
- 3.75 - 5.0
- 5.0+

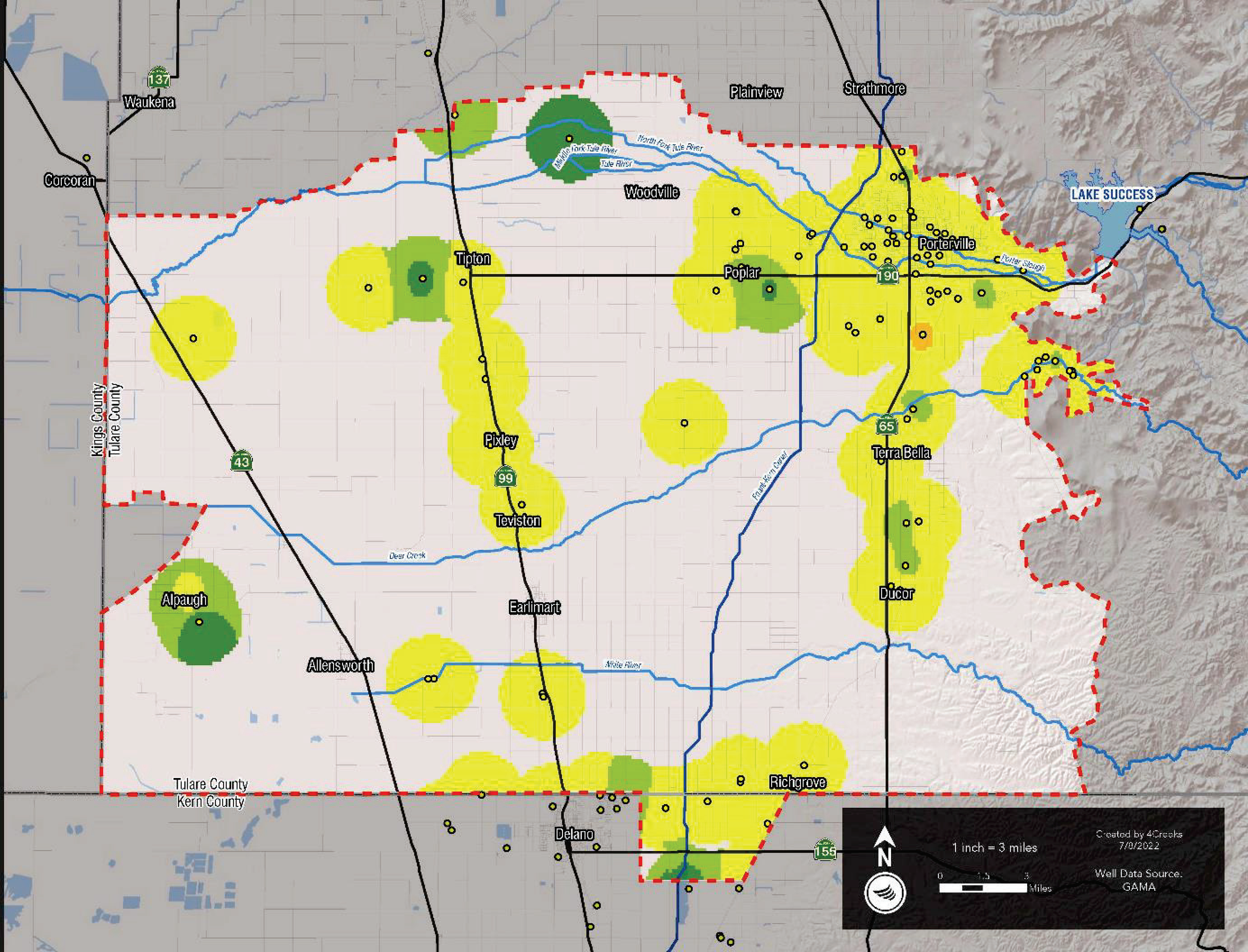
4CREEKS

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient Perchlorate 2017-2022

Drinking Water MCL: 6 µg/L



Legend

- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Perchlorate (µg/L)

- 0.0 - 1.5
- 1.5 - 3.0
- 3.0 - 4.5
- 4.5 - 6.0
- 6.0+

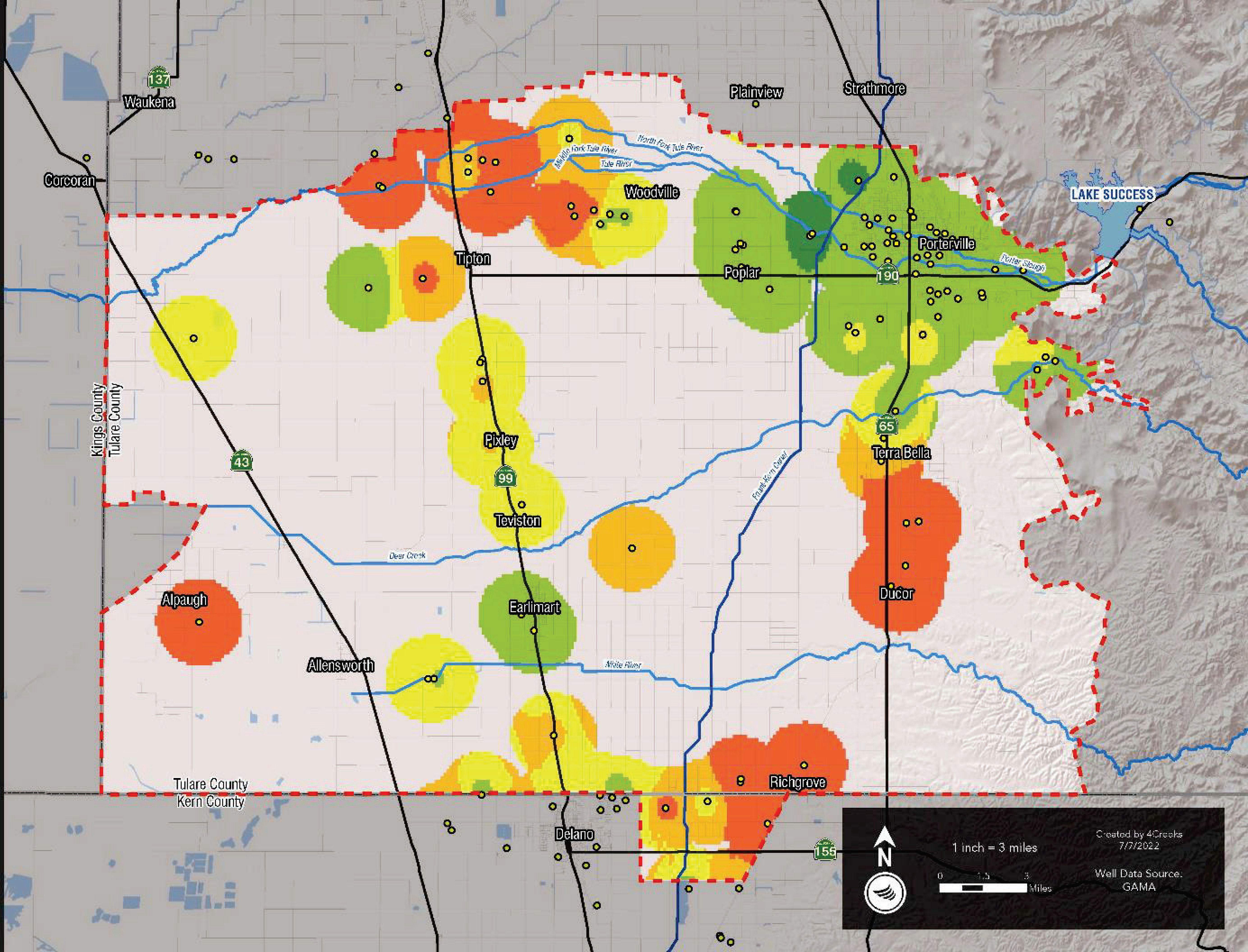
4CREEKS

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient Sodium
2017-2022

Agricultural Water Quality Goal: 69 mg/L



Legend

- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Sodium (mg/L)

- 0 - 17.25
- 17.25 - 34.5
- 34.5 - 51.75
- 51.75 - 69.0
- 69.0+

4CREEKS

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient
1,2,3-Trichloropropane
2017-2022

Drinking Water MCL:
0.005 µg/L

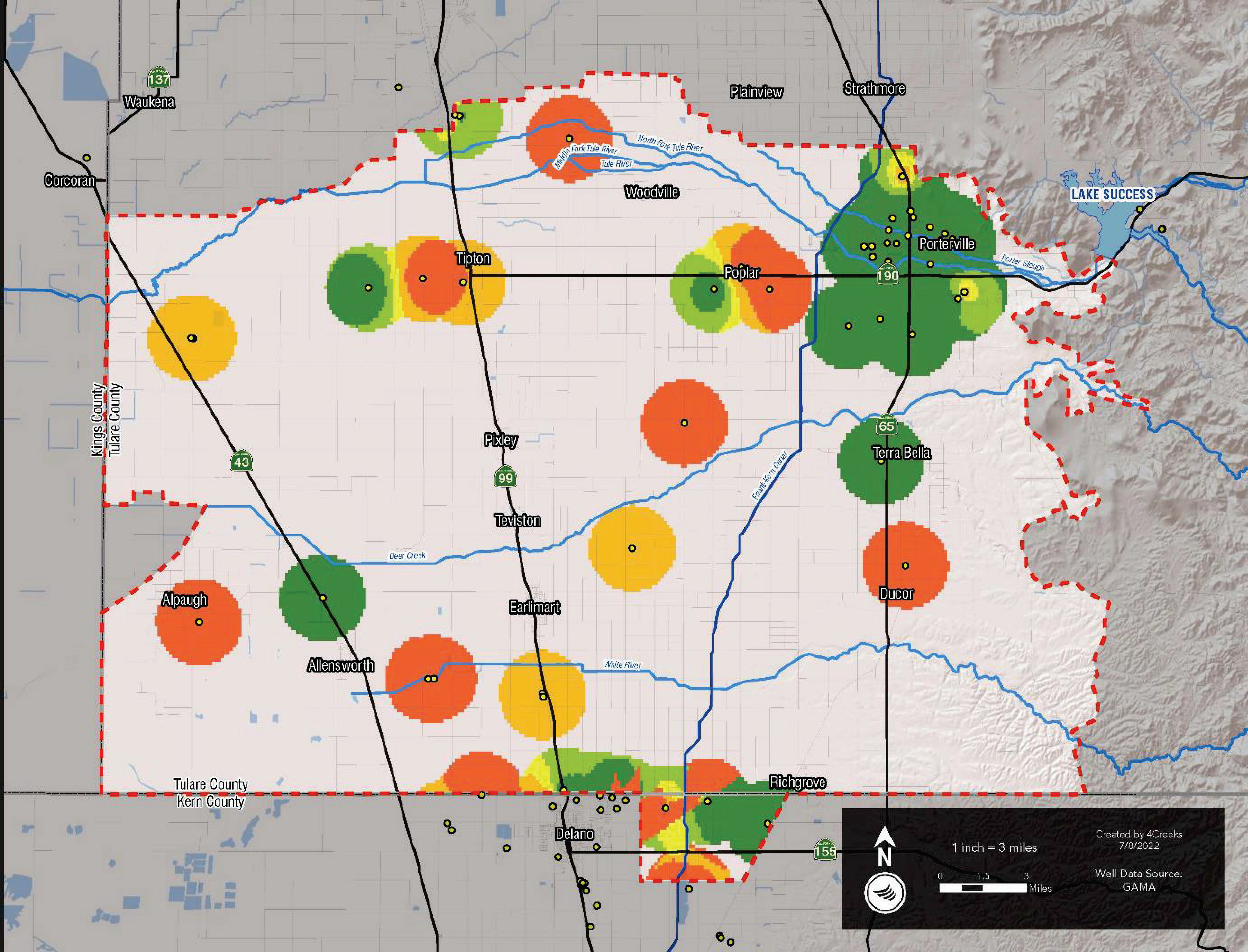
Legend

- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

1,2,3-Trichloropropane (µg/L)

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

4CREEKS

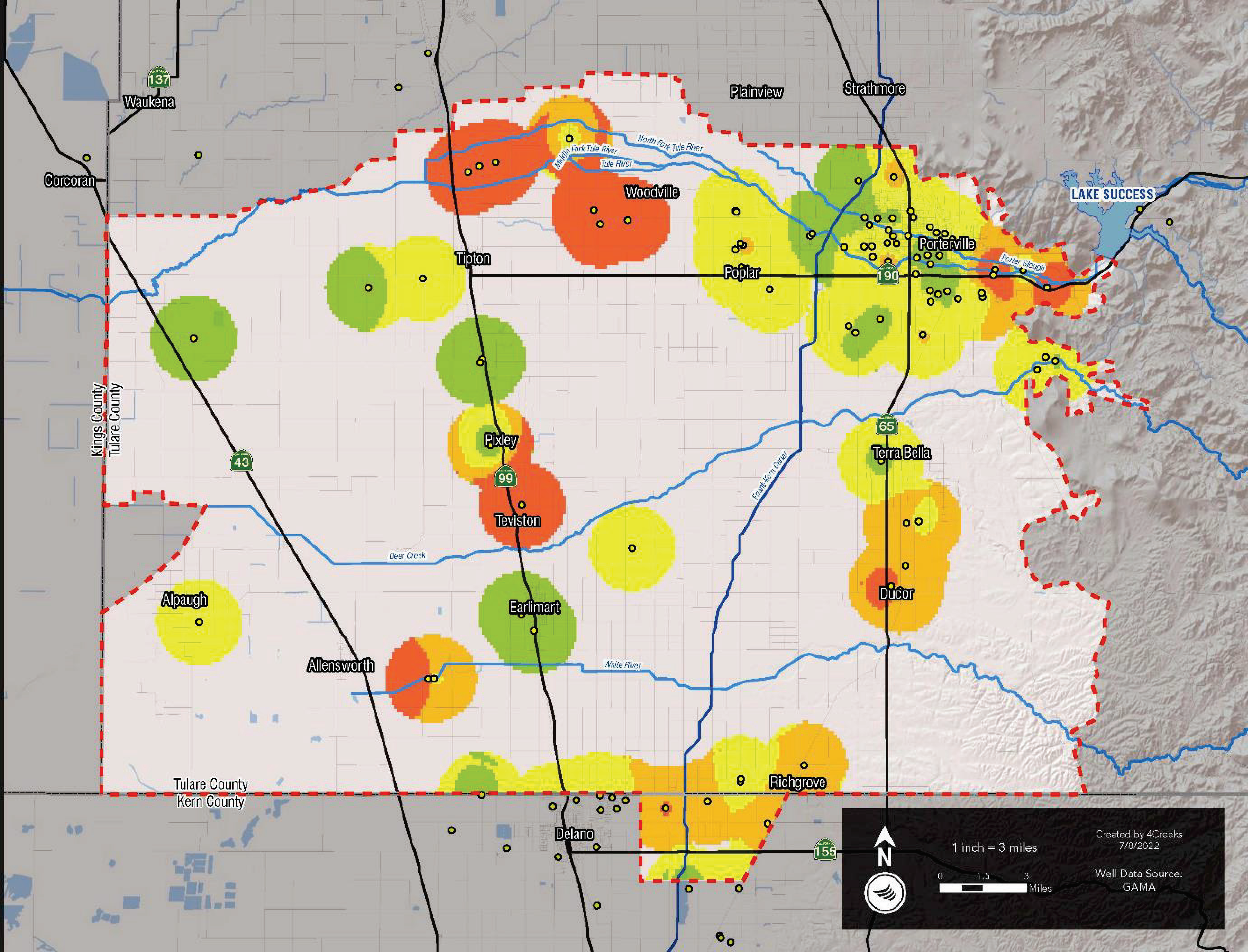


Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient
Total Dissolved Solids
2017-2022

Agricultural Water Quality Goal:
450 mg/L



Legend
- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Total Dissolved Solids (mg/L)
- 0 - 112.5
- 112.5 - 225
- 225 - 337.5
- 337.5 - 450
- 450+

4CREEKS

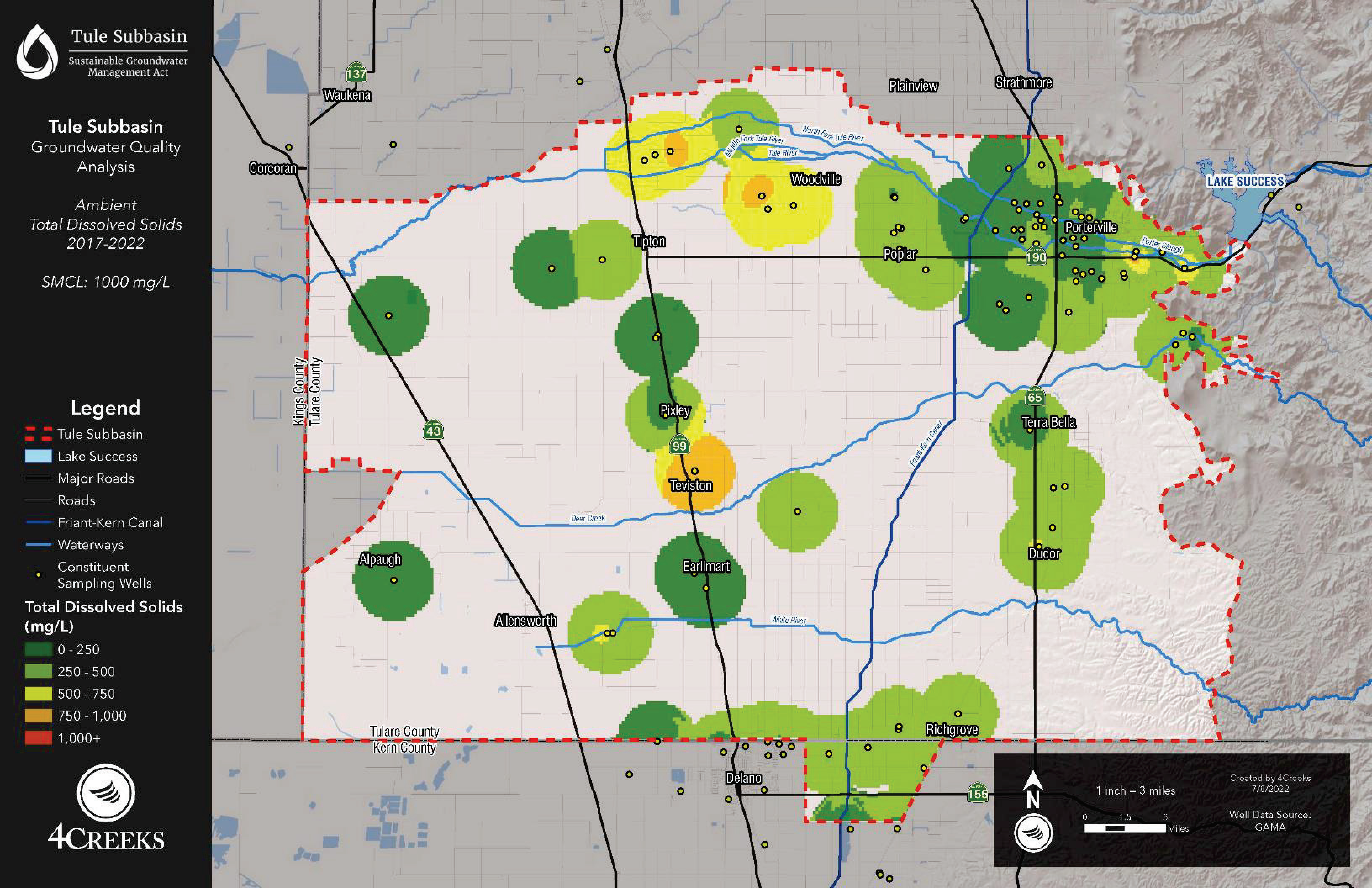

Tule Subbasin
Sustainable Groundwater Management Act
Tule Subbasin
Groundwater Quality Analysis
Ambient
Total Dissolved Solids
2017-2022
SMCL: 1000 mg/L
Legend
Tule Subbasin
Lake Success
Major Roads
Roads
Friant-Kern Canal
Waterways
Constituent Sampling Wells
Total Dissolved Solids (mg/L)
0 - 250
250 - 500
500 - 750
750 - 1,000
1,000+
4CREEKS
Waukena
137
Corcoran
Plainview
Strathmore
North Fork Tule River
Middle Fork Tule River
Tule River
Woodville
LAKE SUCCESS
Porterville
Porter Slough
Tipton
Poplar
190
Kings County
Tulare County
43
Pixley
99
65
Terra Bella
Friant-Kern Canal
Teviston
Deer Creek
Alpaugh
Earlimart
Ducor
Allensworth
White River
Richgrove
Tulare County
Kern County
Delano
155
N
1 inch = 3 miles
0 1.5 3 Miles
Created by 4Creeks 7/8/2022
Well Data Source: GAMA

Exhibit 3-3: Existing Wells Impact Analysis

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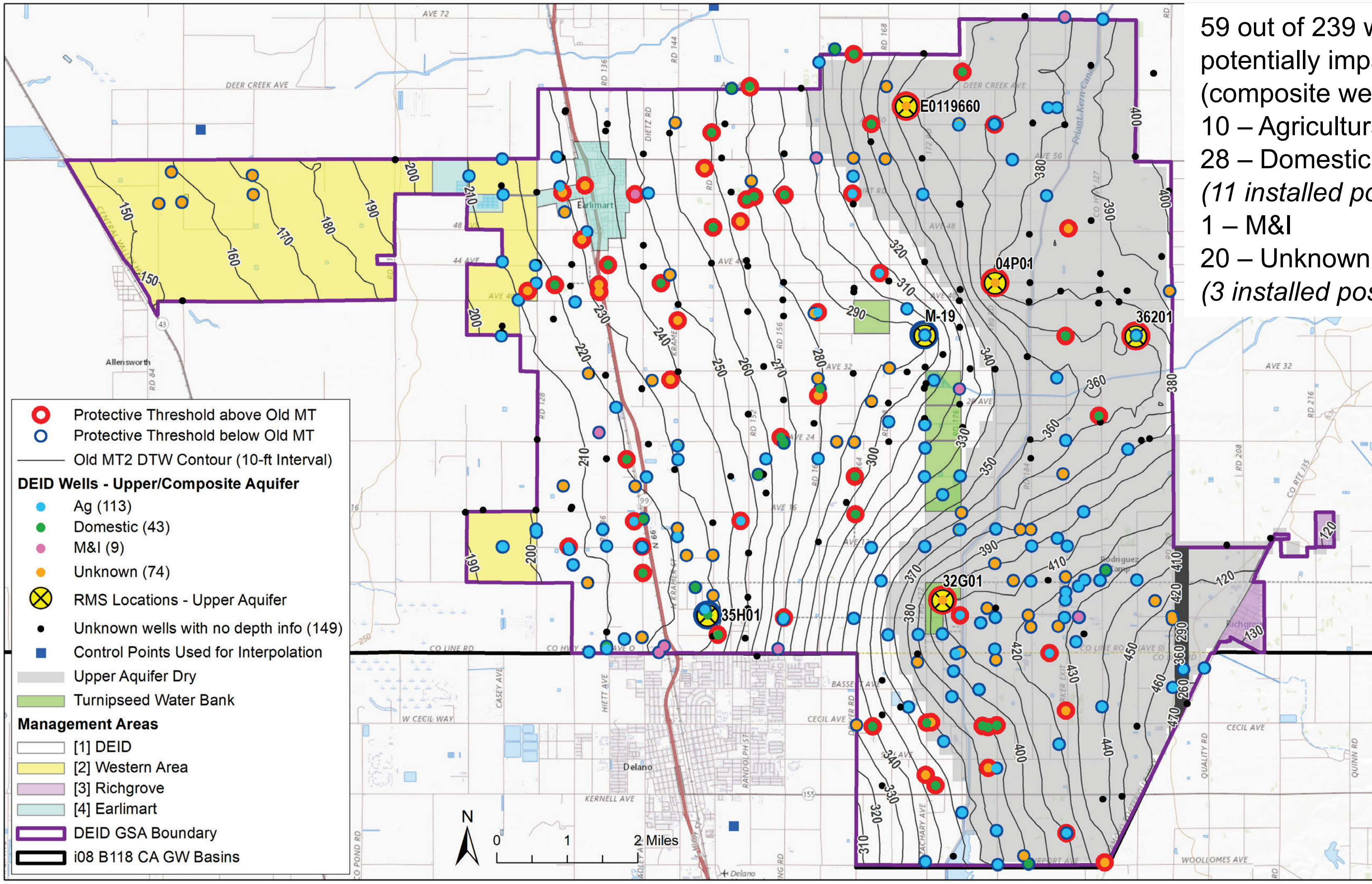
Original MT – Upper Aquifer



59 out of 239 wells potentially impacted (composite wells – 12)

10 – Agricultural

28 – Domestic

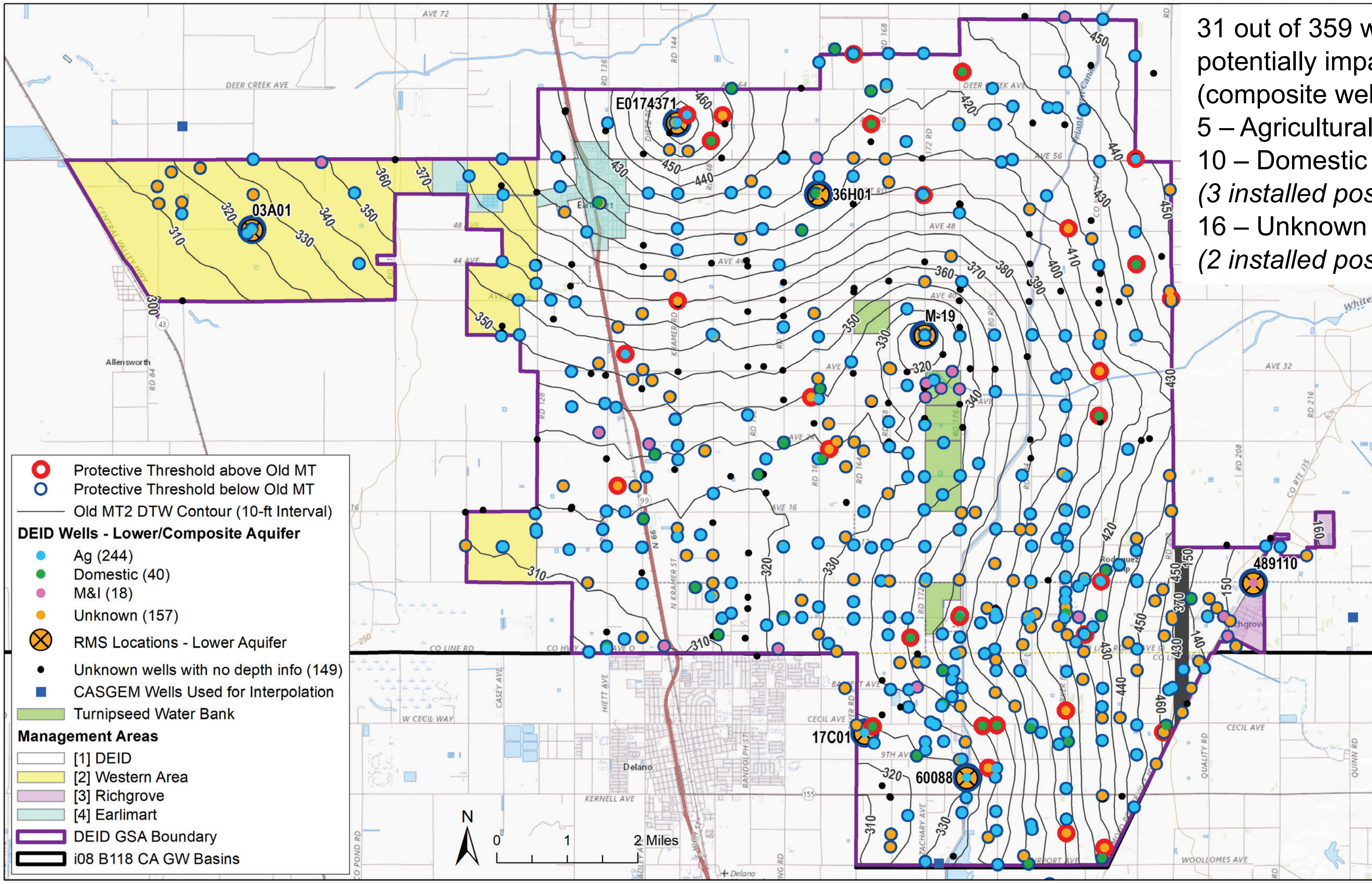
(11 installed post-2000)

1 – M&I

20 – Unknown

(3 installed post-2000)

Original MT – Lower Aquifer



31 out of 359 wells potentially impacted (composite wells – 12)

5 – Agricultural

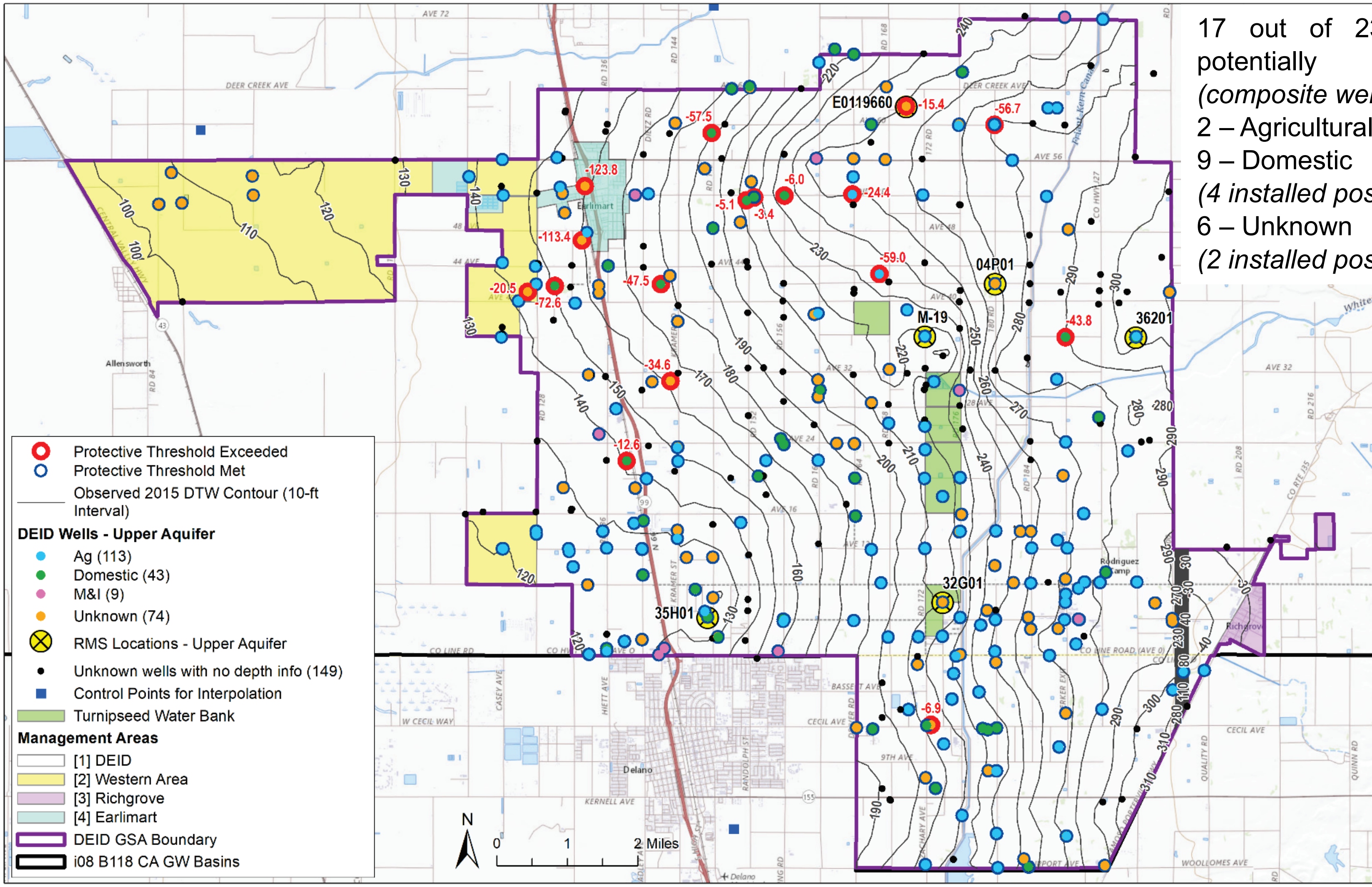
10 – Domestic

(3 installed post-2000)

16 – Unknown

(2 installed post-2000)

2015 Groundwater Levels – Upper Aquifer



17 out of 239 wells potentially impacted (*composite wells – 0)*

2 – Agricultural

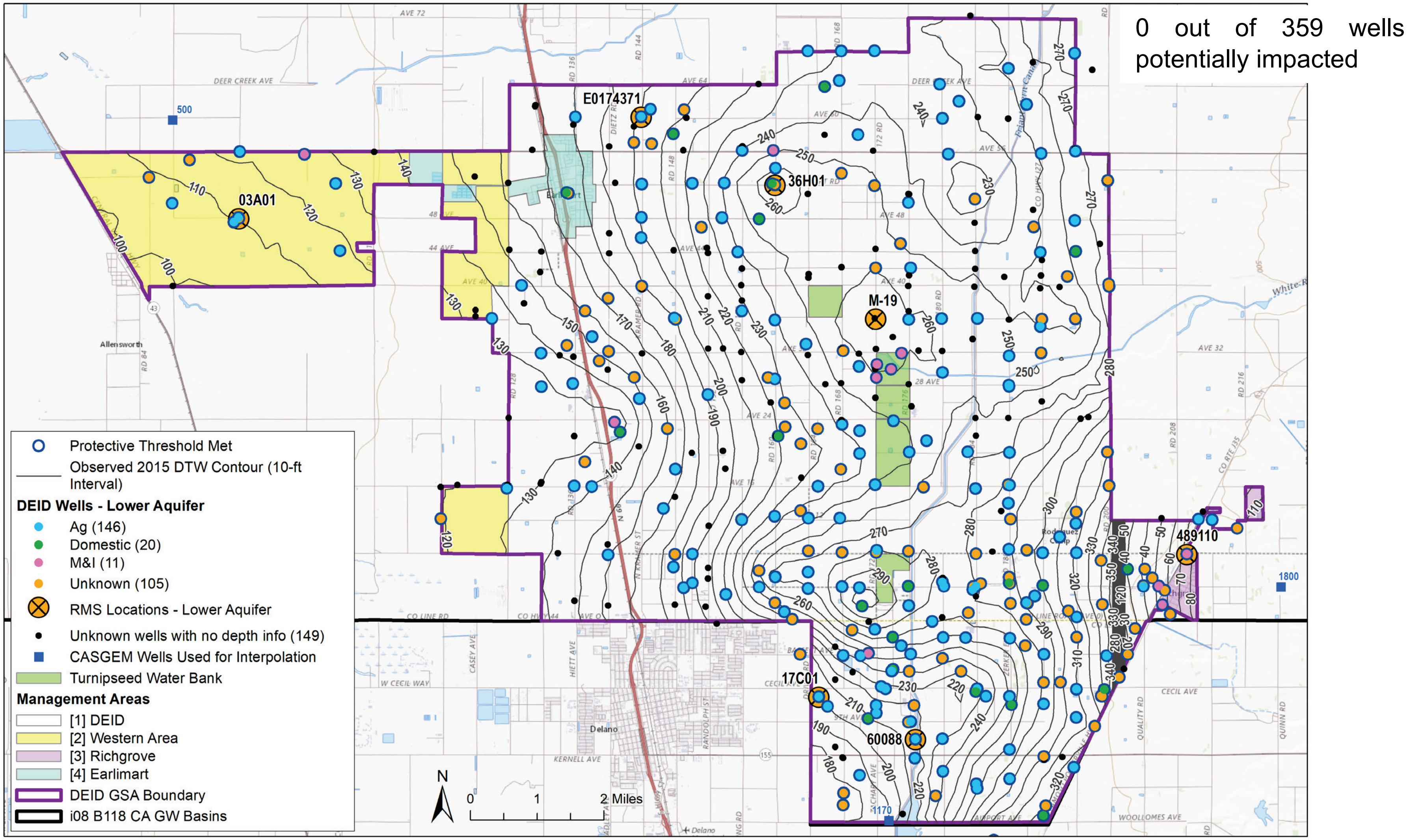
9 – Domestic

(4 installed post-2000)

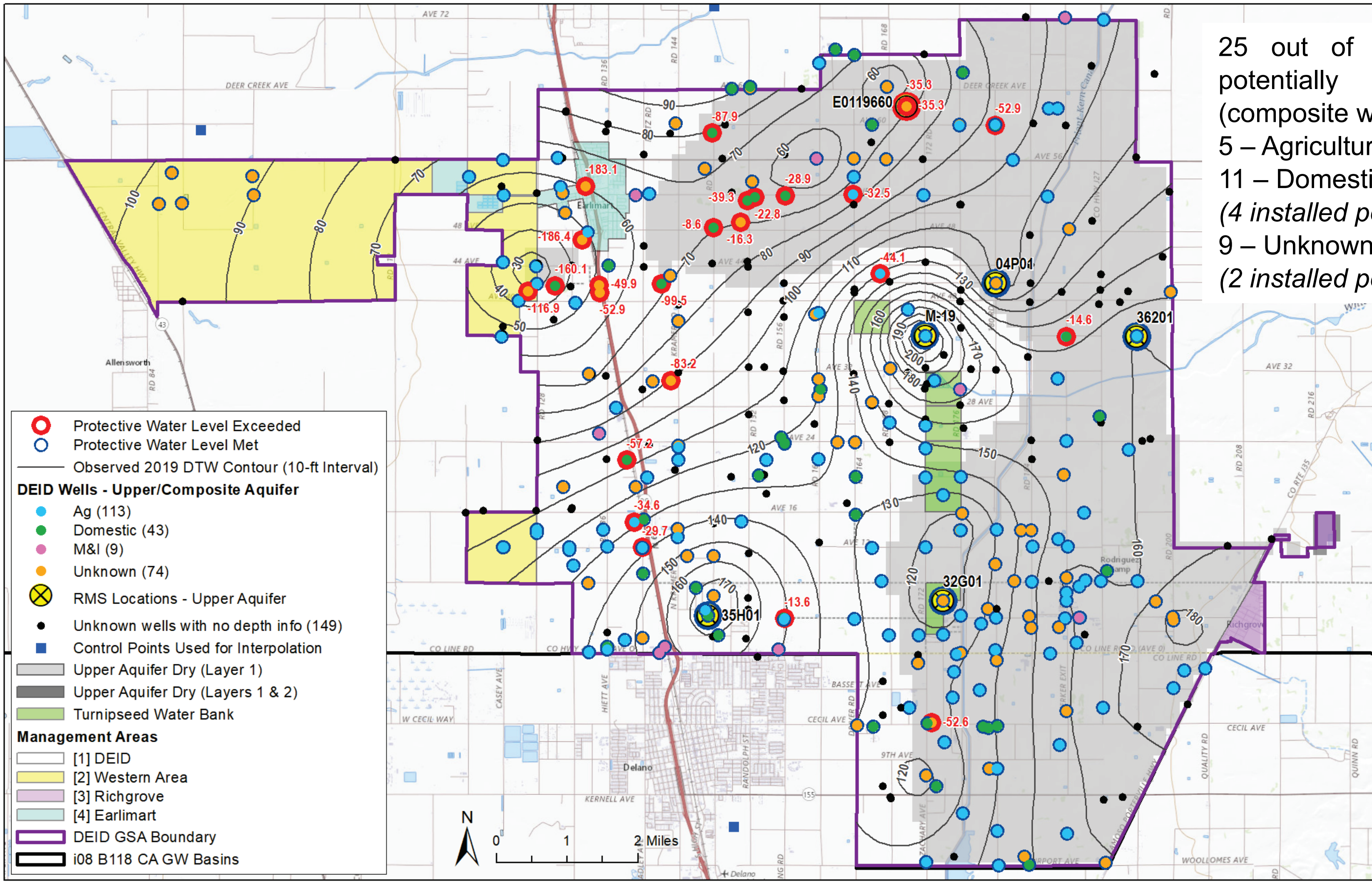
6 – Unknown

(2 installed post-2000)

2015 Groundwater Levels – Lower Aquifer

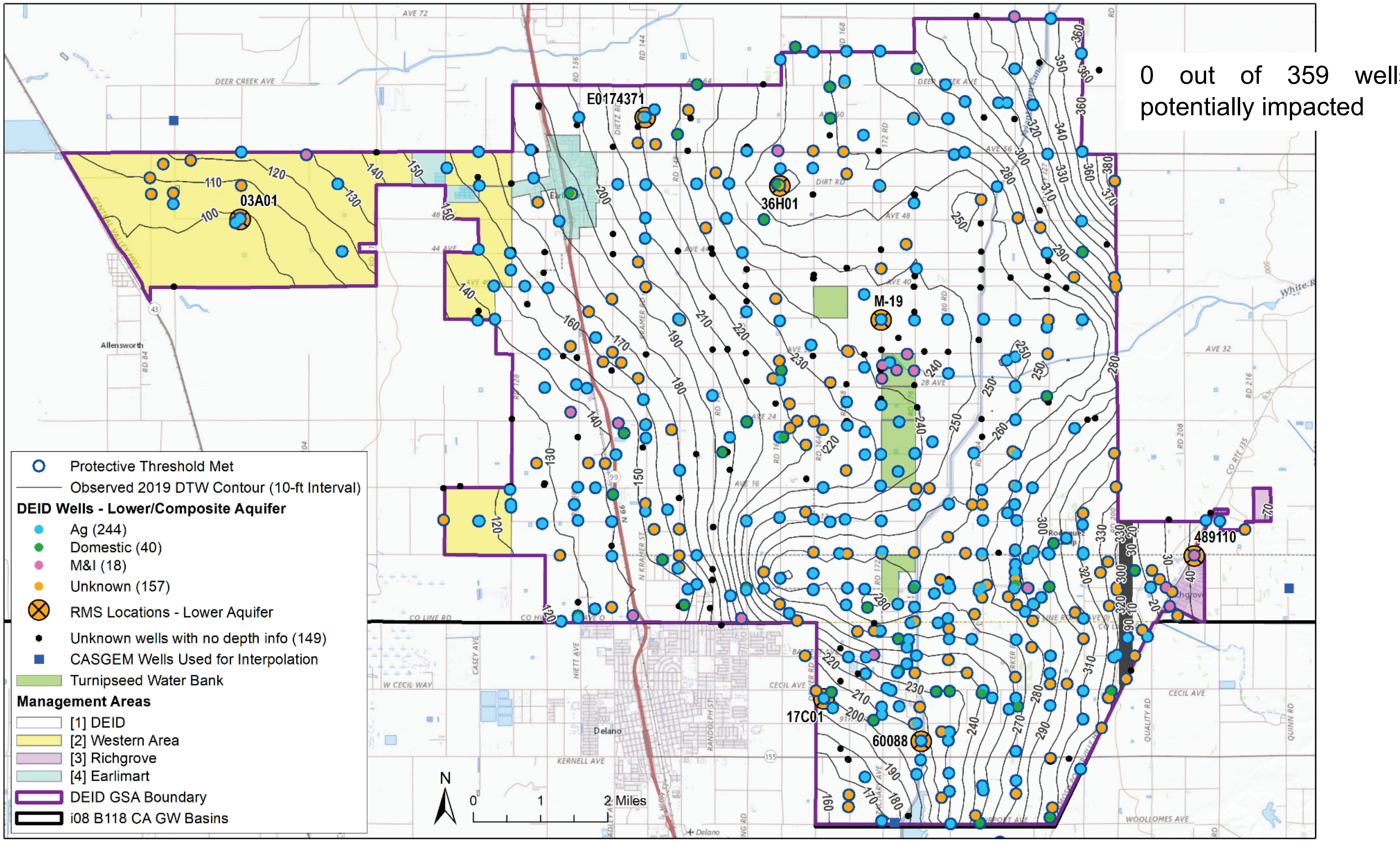


2019 Groundwater Levels – Upper Aquifer

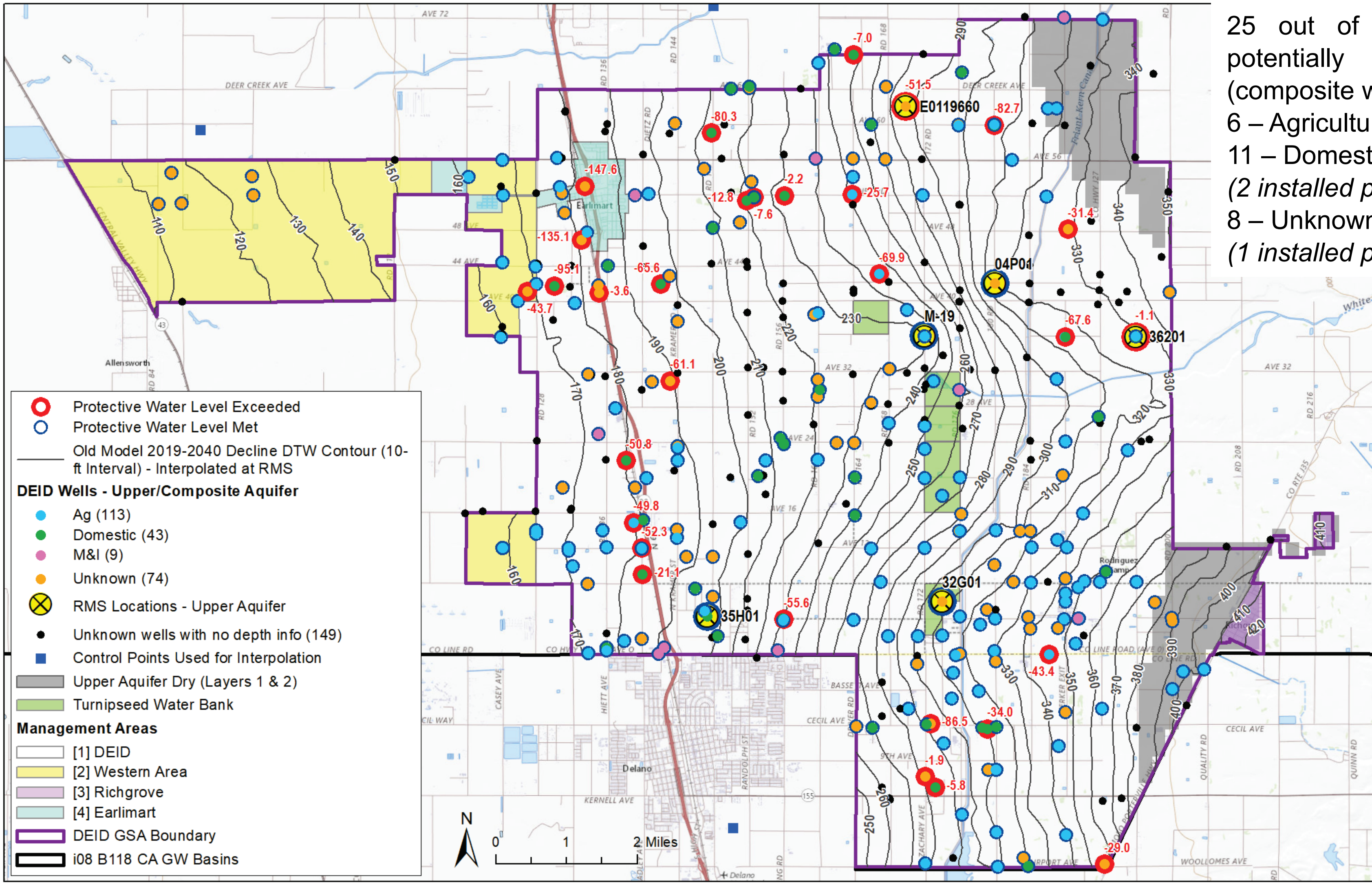


25 out of 239 wells potentially impacted (composite wells – 0)
5 – Agricultural
11 – Domestic
(4 installed post-2000)
9 – Unknown
(2 installed post-2000)

2019 Groundwater Levels – Lower Aquifer

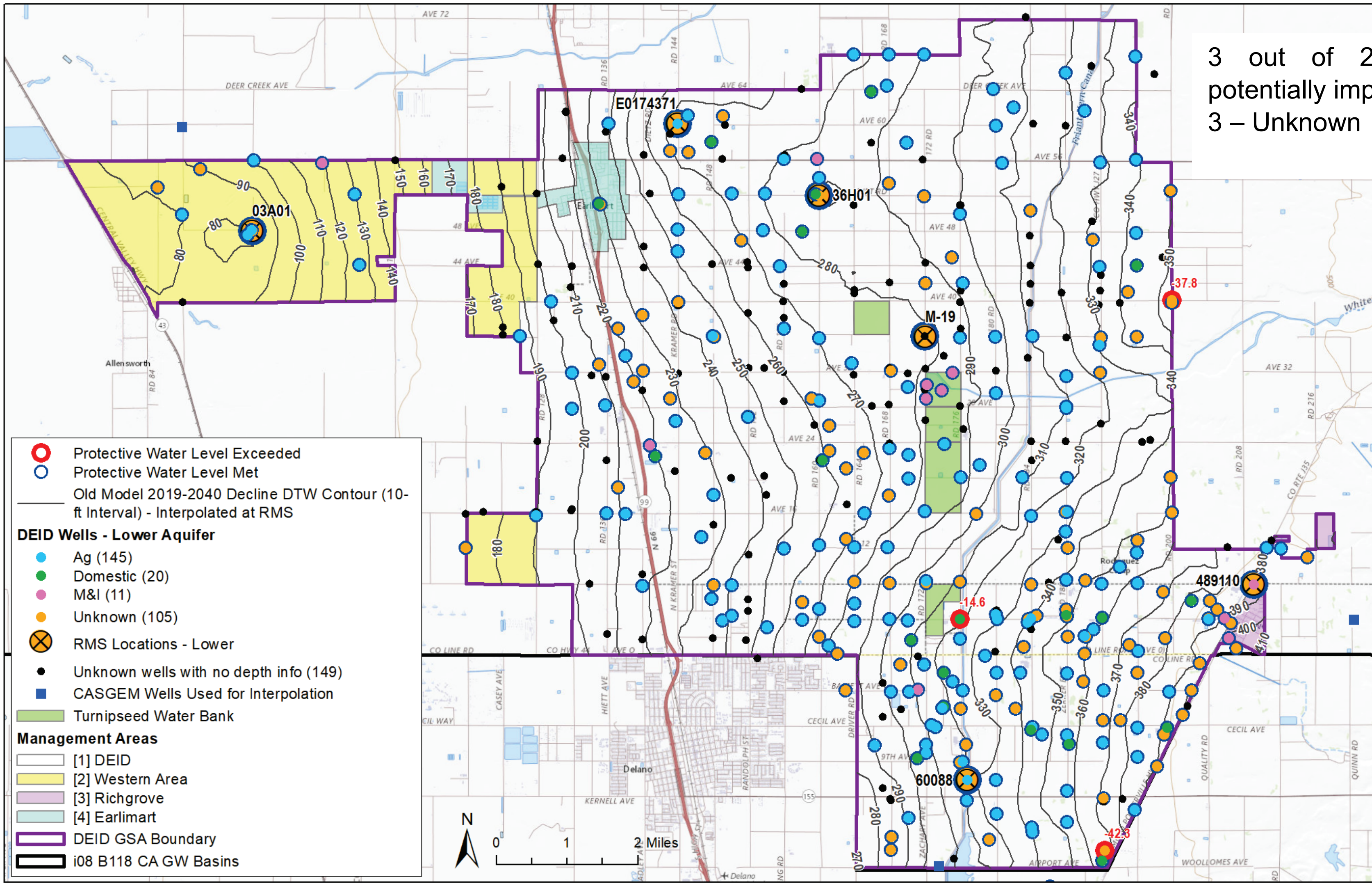


Revised Minimum Threshold – Upper Aquifer



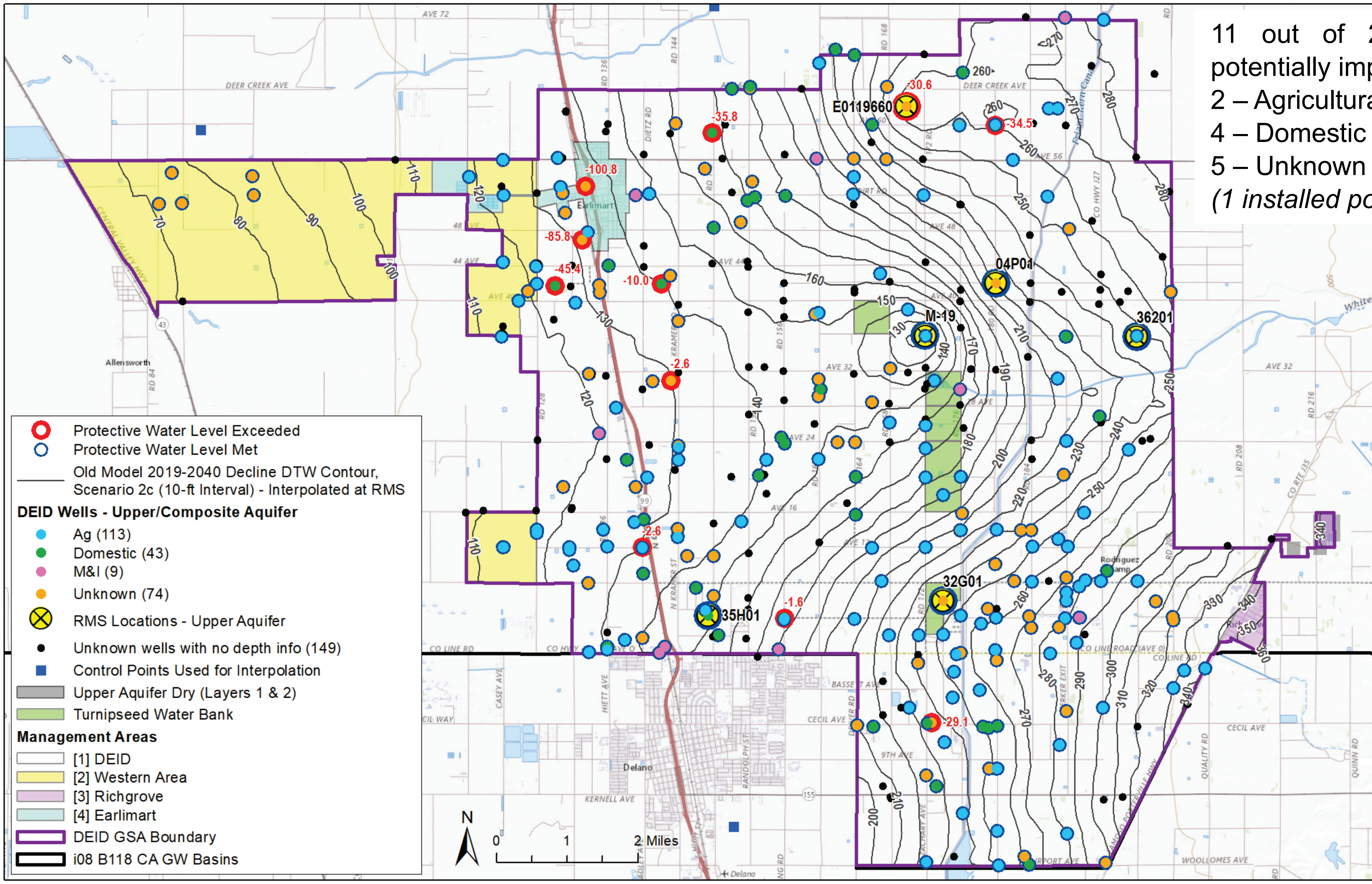
25 out of 239 wells potentially impacted (composite wells – 2)
6 – Agricultural
11 – Domestic
(2 installed post-2000)
8 – Unknown
(1 installed post-2000)

Revised Minimum Threshold – Lower Aquifer



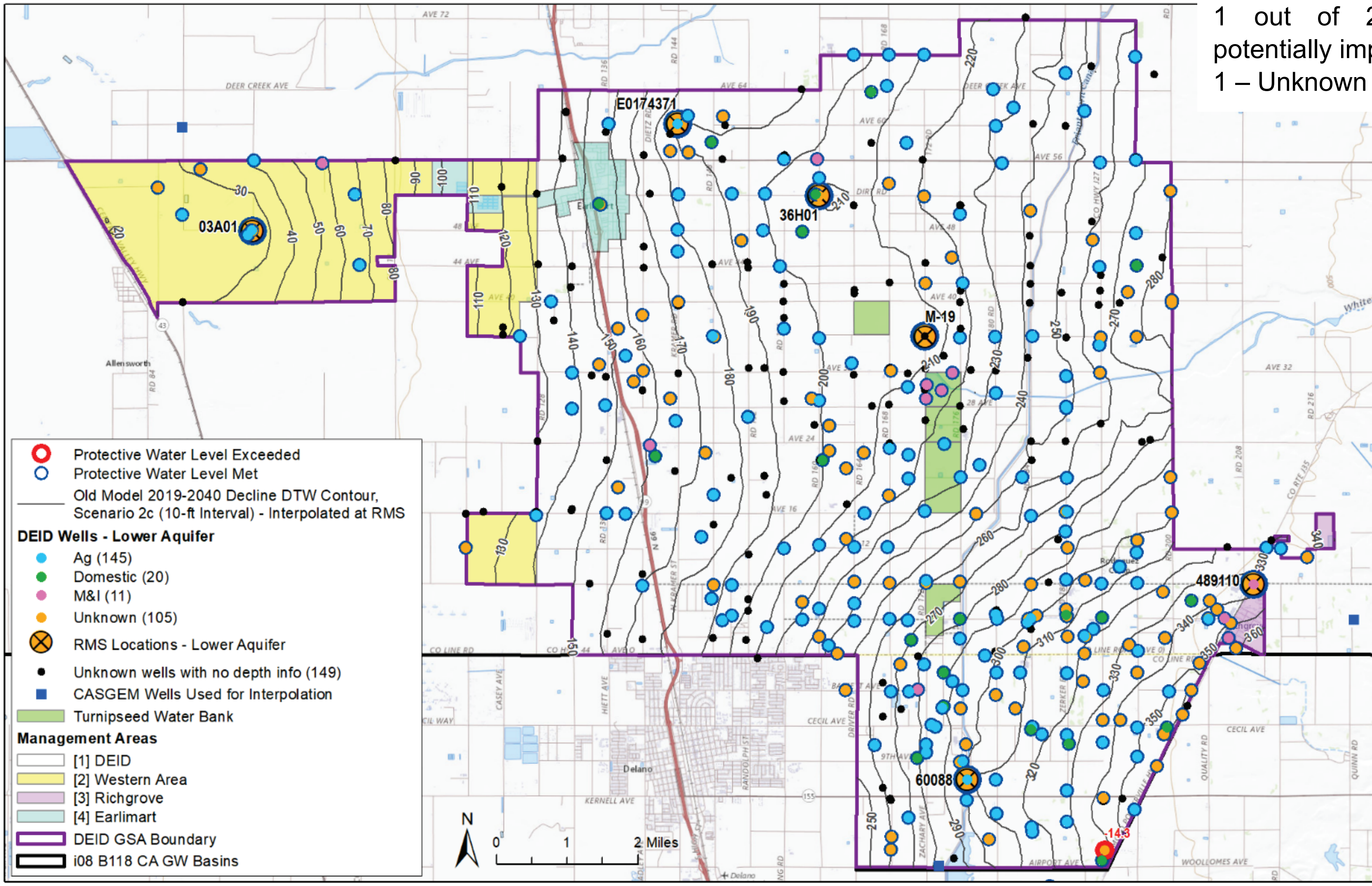
3 out of 239 wells potentially impacted
3 – Unknown

Safe Yield Pumping Scenario – Upper Aquifer



11 out of 239 wells potentially impacted
2 – Agricultural
4 – Domestic
5 – Unknown
(1 installed post-2000)

Safe Yield Pumping Scenario – Lower Aquifer



1 out of 239 wells potentially impacted
1 – Unknown

Section 4. Monitoring Networks

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Table of Figures

List of Tables

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4.1 Introduction to Monitoring Networks *[23 CCR § 354.32]*

> **23 Cal. Code Regs. § 354.32 Introduction to Monitoring Networks**. *This Subarticle describes the monitoring network that shall be developed for each basin, including monitoring objectives, monitoring protocols, and data reporting requirements. The monitoring network shall promote the collection of data of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the basin and evaluate changing conditions that occur through implementation of the Plan.*

The GSAs in the Tule Subbasin have prepared a coordinated Monitoring Plan, the Tule Subbasin Monitoring Plan (TSMP; Thomas Harder & Co., 2020), as Attachment 1 to the Tule Subbasin Coordination Agreement (**Appendix A-1**). This section of the GSP summarizes the Tule Subbasin monitoring network by providing reference to the TSMP and, providing additional information that directly relates to the DEID GSA monitoring network for each sustainability indicator applicable to the Tule Subbasin.

4.2 Monitoring Network

4.2.1 Monitoring Network Objective *[23 CCR § 354.34 (a), (b)]*

> **23 Cal. Code Regs. § 354.34 Monitoring Network**. **(a)** *Each Agency shall develop a monitoring network capable of collecting sufficient data to demonstrate short-term, seasonal, and long-term trends in groundwater and related surface conditions, and yield representative information about groundwater conditions as necessary to evaluate Plan implementation*.
>
> **(b)** *Each Plan shall include a description of the monitoring network objectives for the basin, including an explanation of how the network will be developed and implemented to monitor groundwater and related surface conditions, and the interconnection of surface water and groundwater, with sufficient temporal frequency and spatial density to evaluate the affects and effectiveness of Plan implementation.*

The objectives used in developing the TSMP are provided in Chapter 1.1 of the TSMP (**Appendix A-1**).

4.2.1.1 Progress Towards Achieving Measurable Objective *[23 CCR § 354.34 (b)(1)(2)(3)(4)]*

> **23 Cal. Code Regs. § 354.34 Monitoring Network**. **(b)** *…The monitoring network objectives shall be implemented to accomplish the following:*
>
> **(1)** *Demonstrate progress toward achieving measurable objectives described in the Plan.*
>
> **(2)** *Monitor impacts to the beneficial uses or users of groundwater.*
>
> ***(3)*** *Monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds.*
>
> ***(4)*** *Quantify annual changes in water budget components.*

Annually, the GSA will prepare reports documenting the results from the prior year monitoring activities. Utilizing the data collected each year, the Tule Subbasin Data Management System (DMS) and the Groundwater Flow Model (GFM) will be updated and calibrated to match current groundwater conditions. This data and the GFM will be evaluated each year to quantify changes to the DEID GSA water budget components.

Each year, results from annual monitoring will be compared to the interim milestones and minimum threshold numerical targets established in **Section 3: Sustainability Management Criteria**. If results from several monitoring events provide data more representative of actual conditions than what was available or predicted during development of this Updated GSP, the numerical targets may be adjusted. If data indicates an exceedance of a minimum threshold, the Project and Management Actions described under **Section 5: Projects and Management Actions** will be evaluated by the DEID GSA and implemented as determined necessary.

Quantitative minimum thresholds, interim milestones, and measurable objectives were established at each RMS within the GSA and are listed in **Section 3: Sustainability Management Criteria** for each applicable sustainability indicator. Criteria for selecting RMS were based on GSA established management areas which correlate to the beneficial uses and users of groundwater within the area. Additional discussion for potential impacts to beneficial uses and users of groundwater relative to the established minimum threshold for each of the applicable sustainability indicators is provided in **Section 3.**

4.2.2 Monitoring Network Design *[23 CCR § 354.34 (j)]*

23 Cal. Code Regs. § 354.34 Monitoring Network. **(j)** *An Agency that has demonstrated that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin, as described in Section 354.26, shall not be required to establish a monitoring network related to those sustainability indicators*.

The DEID GSA monitoring network has been established to monitor data from the four sustainability indicators that may have potential to cause significant and unreasonable effects within the Tule Subbasin (defined in **Section 5.2**):

- Chronic lowering of groundwater levels;
- Reduction of groundwater storage;
- Degraded water quality; and
- Land subsidence.

The sustainability indicators of depletion of interconnected surface water and seawater intrusion are not applicable to the Tule Subbasin (see **Sections 3.9** and **3.10,** respectively).

The following sections provide a brief summary of the process, information, and procedures that were incorporated into the development of the DEID GSA monitoring network and is supported by the TSMP, which was developed for all GSAs within the Tule Subbasin.

The TSMP (**Appendix A-1**) is intended to adapt to the data being collected, allowing for the addition or removal of monitoring features, changes in monitoring frequency, and updates to alternative monitoring methodologies, as the monitoring evolves during the Plan implementation period.

4.2.2.1 Monitoring Network Rationale *[23 CCR § 354.34 (g)(1)(3)]*

23 Cal. Code Regs. § 354.34 Monitoring Network. **(g)** *Each Plan shall describe the following information about the monitoring network:*

(1) *Scientific rationale for the monitoring site selection process.*

(3) *For each sustainability indicator, the quantitative values for the minimum threshold, measurable objective, and interim milestones that will be measured at each monitoring site or representative monitoring sites established pursuant to Section 354.36.*

The rationale and process for selecting RMSs for each sustainability indicator is described in Chapter 2.0 of the TSMP (**Appendix A-1**). For each sustainability indicator established, quantitative values for minimum thresholds, measurable objectives, and interim milestones were set for the RMSs described in **Section 3.5** of this Plan.

4.2.2.2 Spatial Density and Frequency of Measurement *[23 CCR § 354.34 (d), (f)(1)(2)(3), (h)]*

23 Cal. Code Regs. § 354.34 Monitoring Network. **(d)** *The monitoring network shall be designed to ensure adequate coverage of sustainability indicators. If management areas are established, the quantity and density of monitoring sites in those areas shall be sufficient to evaluate conditions of the basin setting and sustainable management criteria specific to that area***.**

(f) *The Agency shall determine the density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends based upon the following factors:*

(1) *Amount of current and projected groundwater use.*

(2) *Aquifer characteristics, including confined or unconfined aquifer conditions, or other physical characteristics that affect groundwater flow.*

(3) *Impacts to beneficial uses and users of groundwater and land uses and property interests affected by groundwater production, and adjacent basins that could affect the ability of that basin to meet the sustainability goal.*

(h) *The location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used.*

The locations of RMSs in the Subbasin are provided in Figure A1-2, Figure A1-5, Figure A1-7, Figure A1-8, and Figure A1-9, with additional details listed in Table A1-1, Table A1-2, Table A1-3, and Table A1-6 of the TSMP.

The criteria considered during selection of RMS included aquifer characteristics, current and projected groundwater uses, and beneficial uses and users of groundwater and is discussed in Chapter 2.0 of the TSMP for each sustainability indicator.

Existing monitoring features were used as RMSs based on the conditions outlined in **Section 2**. The areas where existing monitoring features and networks did not provide adequate coverage of sustainability indicators were identified as data gaps in Chapter 4.0 of the TSMP. To address these data gaps, a discussion of additional monitoring features is provided in Chapter 4.0 of the TSMP (**Appendix A-1**).

The locations of RMSs and frequency of measurement details are described in **Section 4.2.3**.

4.2.2.3 Monitoring Protocols and Reporting Standards *[23 CCR § 354.34 (g)(2), (i)]*

23 Cal. Code Regs. § 354.34 Monitoring Network. **(g)** *Each Plan shall describe the following information about the monitoring network:*

(2) *Consistency with data and reporting standards described in Section 352.4. If a site is not consistent with those standards, the Plan shall explain the necessity of the site to the monitoring network, and how any variation from the standards will not affect the usefulness of the results obtained***.**

(i) *The monitoring protocols developed by each Agency shall include a description of technical standards, data collection methods, and other procedures or protocols pursuant to Water Code Section 10727.2(f) for monitoring sites or other data collection facilities to ensure that the monitoring network utilizes comparable data and methodologies.*

Monitoring protocols relative to each sustainability indicator are described in Chapter 2.0 of the TSMP. Additionally, a Subbasin-wide DMS developed to provide a common database for the Tule Subbasin GSAs to store data is described in Chapter 5.0 of the TSMP (**Appendix A-1**).

4.2.2.4 Existing Monitoring *[23 CCR § 354.34 (e), (f)(4)]*

23 Cal. Code Regs. § 354.34 Monitoring Network. **(e)** *A Plan may utilize site information and monitoring data from existing sources as part of the monitoring network.*

(f) *The Agency shall determine the density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends based upon the following factors:*

(4) *Whether the Agency has adequate long-term existing monitoring results or other technical information to demonstrate an understanding of aquifer response***.**

Existing water resource monitoring and management programs specific to the DEID GSA that were incorporated into the TSMP are introduced and described in Section 1.4.9 and Table A1-9 in Chapter 5.3 of the TSMP. This information lists existing data sources and monitoring programs that were used during the development and implementation of the TSMP (**Appendix A-1**).

4.2.3 Representative Monitoring *[23 CCR § 354.36 (a), (b)(1)(2), (c)]*

23 Cal. Code Regs. § 354.36 Representative Monitoring. *Each Agency may designate a subset of monitoring sites as representative of conditions in the basin or an area of the basin, as follows:*

(a) *Representative monitoring sites may be designated by the Agency as the point at which sustainability indicators are monitored, and for which quantitative values for minimum thresholds, measurable objectives, and interim milestones are defined.*

(b) *Groundwater elevations may be used as a proxy for monitoring other sustainability indicators if the Agency demonstrates the following:*

(1) *Significant correlation exists between groundwater elevations and the sustainability indicators for which groundwater elevation measurements serve as a proxy.*

(2) *Measurable objectives established for groundwater elevation shall include a reasonable margin of operational flexibility taking into consideration the basin setting to avoid undesirable results for the sustainability indicators for which groundwater elevation measurements serve as a proxy.*

(c) *The designation of a representative monitoring site shall be supported by adequate evidence demonstrating that the site reflects general conditions in the area.*

Chapter 3.0 of the TSMP describes representative monitoring in the Tule Subbasin by identifying one or more RMS within each management area for monitoring sustainability indicators. **Section 4.2.3.1** through **Section 4.2.3.6** of this Plan reference the TSMP chapters for the corresponding sustainability indicator and further provides a list of each RMS in the DEID GSA, including identification of the management area the RMS represents.

Management areas within DEID GSA were introduced in **Section 1.3.1** of this Plan and further described in **Section 3.5.** In summary, the area covered by the DEID GSA has been divided into four separate management areas corresponding to the jurisdictional status and primary land use of those respective areas. The management areas are shown on **Figure 1-1** in **Section 1.3.1** of this Plan and consist of:

1. DEID Management Area
2. Western Management Area
3. RCSD Management Area
4. EPUD Management Area

4.2.3.1 Chronic Lowering of Groundwater Levels *[23 CCR § 354.34 (c) (1)(A)(B)]*

23 Cal. Code Regs. § 354.34 Monitoring Network. **(c)** *Each monitoring network shall be designed to accomplish the following for each sustainability indicator:*

(1) *Chronic Lowering of Groundwater Levels. Demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features by the following methods:*

(A) *A sufficient density of monitoring wells to collect representative measurements through depth-discrete perforated intervals to characterize the groundwater table or potentiometric surface for each principal aquifer.*

(B) *Static groundwater elevation measurements shall be collected at least two times per year, to represent seasonal low and seasonal high groundwater conditions.*

Groundwater levels will be monitored as described in Chapter 2.1 of the TSMP. The GSA will monitor groundwater levels at RMSs within management areas shown on **Figure 4-1: RMS for Monitoring Groundwater Levels**. The methods used to establish the RMSs and the frequency of monitoring are discussed in Chapter 3.1 of the TSMP. Existing and proposed RMSs identified for monitoring groundwater levels in the upper and lower aquifer in the Tule Subbasin are included in Table A1-1 and Table A1-3 and mapped in Figure A1-2 and Figure A1-5 of the TSMP (**Appendix A-1**).

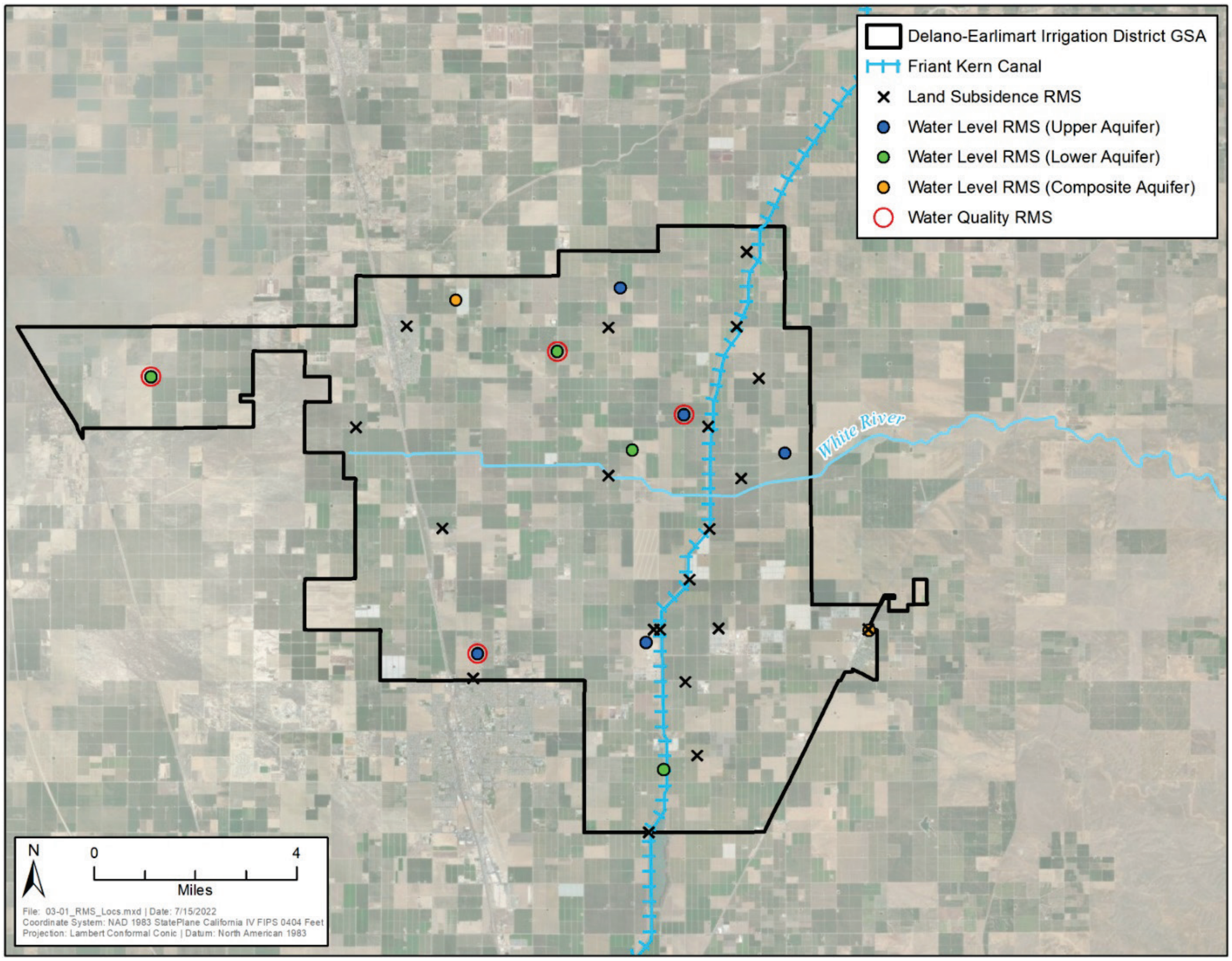

Figure 4-1: RMSs for Monitoring Groundwater Levels

Within the DEID GSA, 12[1] RMSs have been identified for monitoring groundwater levels semiannually (spring and fall). **Table 4-1: RMS for Monitoring Groundwater Levels** lists the 12 RMSs, identifies the aquifer and management area, latitude and longitude, and well construction details.

[1] All RMSs are subject to change as potential new sites are identified throughout the public comment period.

Table 4-1: RMSs for Monitoring Groundwater Levels

RMS Well ID	Management Area	Aquifer	Lat	Long	Ground Surface Elevation	Total Depth	Top of Screen	Bottom of Screen
					(ft amsl)	*(ft bgs)*	*(ft bgs)*	*(ft bgs)*
24S/26E-32G01	DEID	Upper	35.80142	-119.18346	397.836	470	23	461
24S/26E-04P01	DEID	Upper	35.86655	-119.17041	388	393	216	393
24S/25E-35H01	DEID	Upper	35.79836	-119.24277	318	340	160	320
23S/26E-29D01	DEID	Upper	35.90218	-119.19274	345.567	300	160	300
24S/26E-11	DEID	Upper	35.85590	-119.13475	436	399	301	399
M19-U	DEID	Upper	35.85595	-119.18824	369	805	200	350
M19-L	DEID	Lower	35.85595	-119.18824	369	805	705	805
23S/25E-36H01	DEID	Lower	35.88502	-119.21574	330	600	360	600
25S/26E-9C01	DEID	Lower	35.76495	-119.17725	395.903	1,002	450	1,002
23S/25E-27	DEID	Lower	35.89947	-119.25076	294	800	300	800
24S/24E-03A01	Western	Lower	35.87720	-119.35810	221.032	1,602	804	1,602
24S/27E-31	Richgrove	Lower	35.80513	-119.10438	505.249	850	480	830
TBD	Earlimart	TBD	TBD	TBD	TBD	TBD	TBD	TBD

4.2.3.2 Reduction in Groundwater Storage *[23 CCR § 354.34 (c)(2)]*

23 Cal. Code Regs. § 354.34 Monitoring Network. **(c)** *Each monitoring network shall be designed to accomplish the following for each sustainability indicator:*

(2) *Reduction of Groundwater Storage. Provide an estimate of the change in annual groundwater in storage.*

Annual change of groundwater in storage within the GSA will be estimated using either of the methods identified in Section 3.6 of the *Tule Subbasin Coordination Agreement*, utilizing groundwater level data as a proxy for the calculation. The estimated change in annual groundwater in storage may also be calculated by the GFM using the groundwater level data collected each year for each management area within the DEID GSA and the Tule Subbasin.

4.2.3.3 Seawater Intrusion *[23 CCR § 354.34 (c)(3)]*

23 Cal. Code Regs. § 354.34 Monitoring Network. **(c)** *Each monitoring network shall be designed to accomplish the following for each sustainability indicator:*

(3) *Seawater Intrusion. Monitor seawater intrusion using chloride concentrations, or other measurements convertible to chloride concentrations, so that the current and projected rate and extent of seawater intrusion for each applicable principal aquifer may be calculated.*

Seawater intrusion does not occur in the Tule Subbasin for reasons described in Chapter 2.3.3 of the Tule Subbasin Setting (**Appendix A-2**).

4.2.3.4 Degraded Water Quality *[23 CCR § 354.34 (c)(4)]*

23 Cal. Code Regs. § 354.34 Monitoring Network. **(c)** *Each monitoring network shall be designed to accomplish the following for each sustainability indicator:*

(4) *Degraded Water Quality. Collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues.*

Degraded water quality will be monitored as described in Chapter 2.4 of the TSMP. Monitoring locations are shown on Figure A1-7 of the TSMP and **Figure 4 2: RMS for Monitoring Groundwater Quality**. The GSA will also evaluate groundwater quality conditions using data collected under separate groundwater quality regulatory programs. These programs include (1) public water systems, for compliance with the requirements of Title 22[2], (2) Tule Basin Water Quality Coalition (TBWQC, 2017) for compliance with the requirements of General order R5-2013-0120; and (3) other sources that may be applicable.

The COCs vary depending on the suitability of the groundwater, whether agricultural or drinking water, and beneficial use associated with the RMS well. RMS sites will be monitored for COCs identified in **Section 3**: **Sustainable Management Criteria,** depending on the management area the RMS is representative of.

The analysis used to determine the beneficial uses at each RMS well consisted of querying DWR well completion reports, public water systems, and schools using ArcGIS. The detailed breakdown of the steps to conduct analysis is described below.

1. Create a layer in ArcGIS by combining data from the following:
   - Well locations and well types from the DWR Well Completion Report Mapping Application
   - Boundaries of Safe Drinking Water Information System (SDWIS) Public Water Systems
   - Boundaries of Community/Urban areas from Local Agency Formation Commission(LAFCO)
2. Overlay groundwater quality locations of RMS wells and create a 1-mile buffer for analysis.
3. Summarize the data identified in step 1 relative to each groundwater quality RMS well 1-mile buffer.
4. Define the groundwater quality RMS well as representative of drinking water and/or agricultural beneficial pumping beneficial use.

Well types are categorized as drinking water, agricultural, or not applicable based on breakdown in **Table 4-2: Categories of Well Types.**

Table 4-2: Categories of Well Types

[2] California Division of Drinking Water, 2018

Drinking Water	Agricultural	Not Applicable
Domestic	Irrigation - Agricultural	Cathodic Protection
Public	Other Irrigation	Destruction Monitoring
Water Supply	Water Supply Irrigation - Agricultural	Destruction Unknown Soil Boring
Water Supply Domestic	Water Supply Irrigation - Agriculture	Monitoring
Water Supply Public	Water Supply Stock or Animal Watering	Other Destruction
		Test Well
		Test Well Unknown
		Unknown
		Vapor Extraction
		Vapor Extraction n/a
		Water Supply Industrial
		Blanks

Within the DEID GSA, three RMSs have been identified for monitoring groundwater quality annually. Each have been designated as a drinking water RMS or Agricultural RMS based on the results from the above-described analysis and are displayed as such in **Figure 4-2.** Additionally, Consumer Confidence Reports for each of the communities will be utilized for groundwater quality monitoring (see **Figure 4-2: RMS for Monitoring Groundwater Quality**). **Table 4-3: RMS for Monitoring Groundwater Quality** lists the three RMS wells, identifies the aquifer and management area, latitude and longitude, and well construction details.

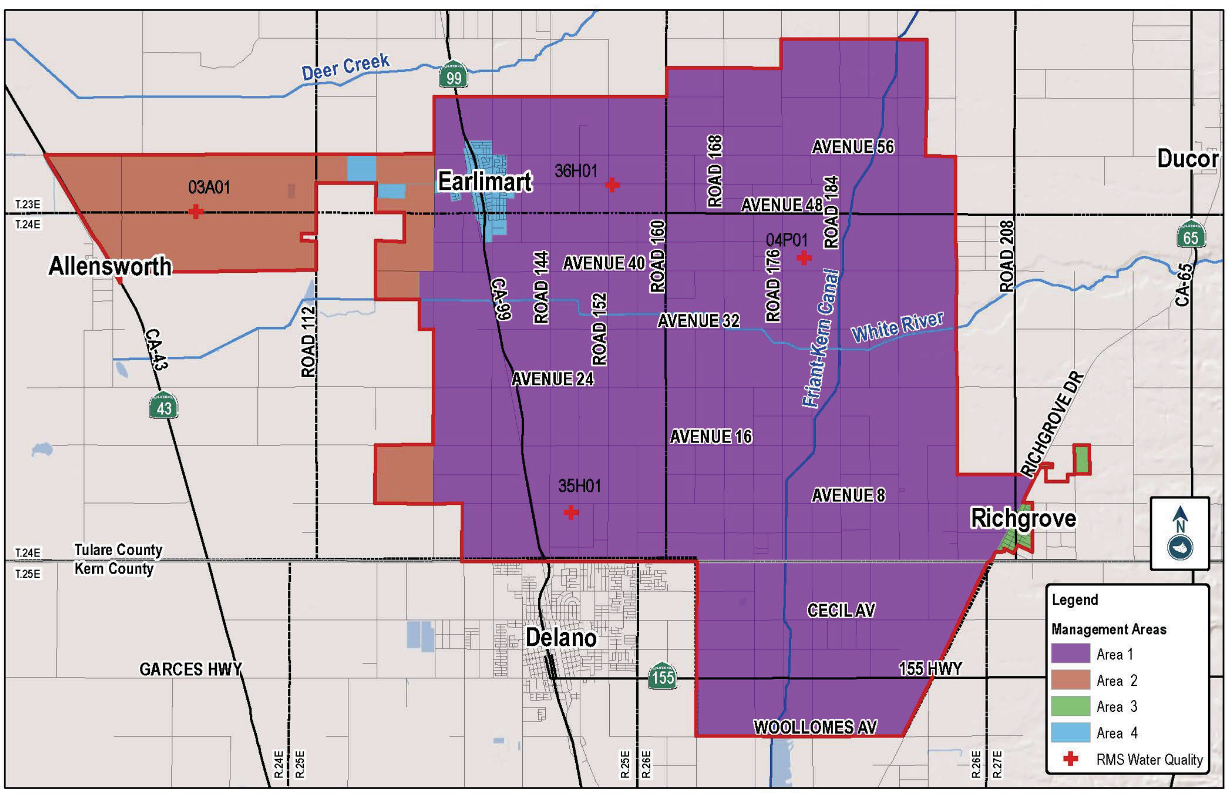

Figure 4-2: RMSs for Monitoring Groundwater Quality

Table 4-3: RMSs for Monitoring Groundwater Quality

RMS ID	Management Area	Aquifer	Lat	Long	Well Depth (ft bgs)	Top of Perforation (ft bgs)	Bottom of Perforation (ft bgs)
E0083349	DEID	Upper	35.88429	-119.23127	305	265	305
1095774	DEID	Upper	35.79809	-119.24255	340	160	320
03A01	Western	Lower	35.87720	-119.35810	1,602	804	1,602
RCSD CCR	Richgrove	N/A	N/A	N/A	N/A	N/A	N/A
EPUD CCR	Earlimart	N/A	N/A	N/A	N/A	N/A	N/A

4.2.3.5 Land Subsidence [23 CCR § 354.34 (c)(5)]

23 Cal. Code Regs. § 354.34 Monitoring Network. **(c)** *Each monitoring network shall be designed to accomplish the following for each sustainability indicator:*

(5) *Land Subsidence. Identify the rate and extent of land subsidence, which may be measured by extensometers, surveying, remote sensing technology, or other appropriate method.*

Land subsidence within the Tule Subbasin will be monitored as described in Chapter 2.5 and at the RMS shown on Figure A1-8 of the TSMP (**Appendix A-1**). Within the GSA, RMS for land subsidence will consist of GPS monitoring sites supplemented by InSAR data when available, monitored annually. RMS land subsidence are shown in **Figure 4-3: RMS for Monitoring Land Subsidence** and listed in **Table 4-3: RMS for Monitoring Land Subsidence.**

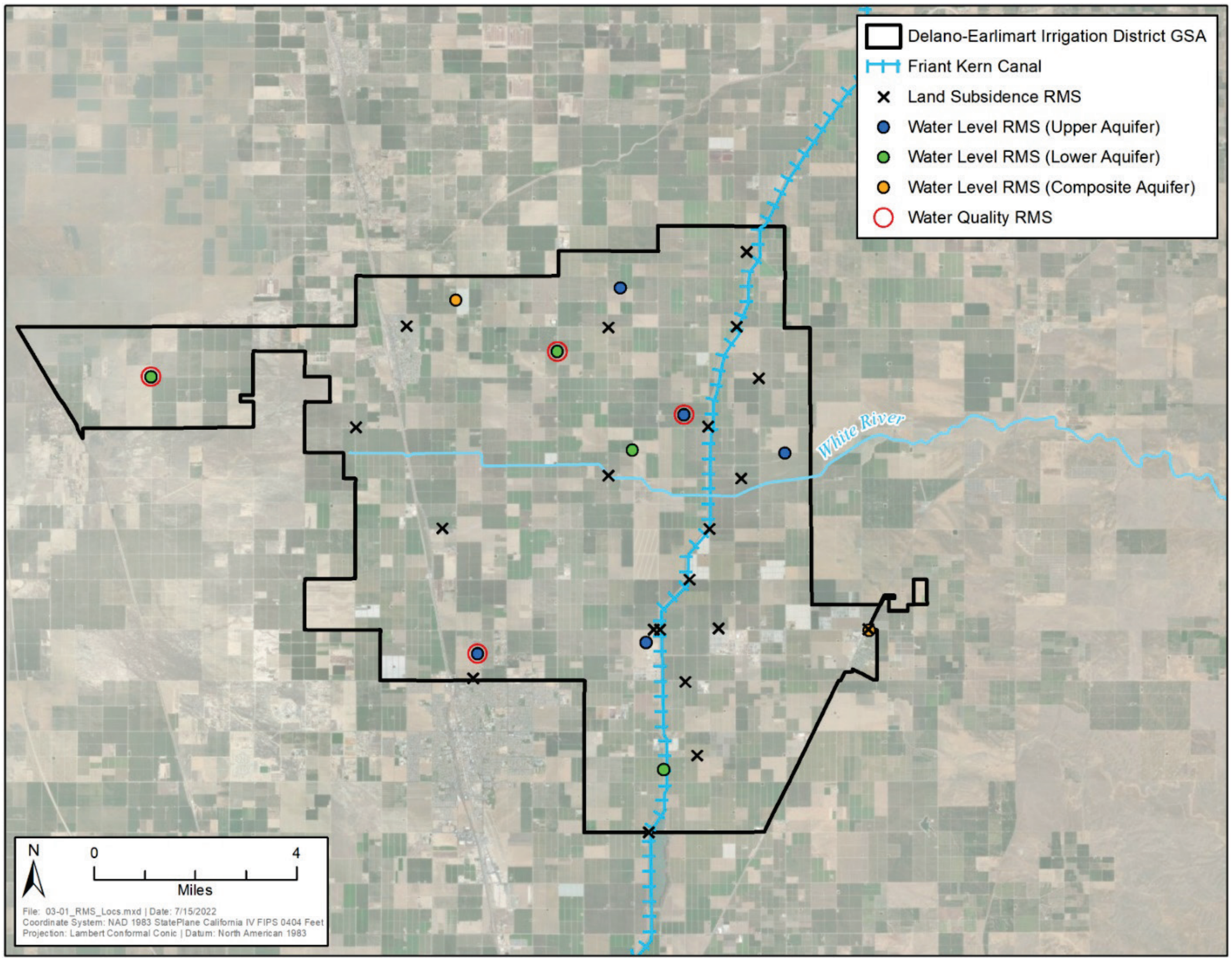

Figure 4-3: RMSs for Monitoring Land Subsidence[3]

[3] Land subsidence sites are subject to change based on field survey.

Table 4-42: RMSs for Monitoring Land Subsidence

RMS ID	Management Area	GPS Coordinates		Baseline Elevation
		Latitude	Longitude	*(ft amsl)*
D0070_B_FKC	DEID	35.91343	-119.148269	396
D0073_G_FKC	DEID	35.892022	-119.151852	395
D0081_B_FKC	DEID	35.805089	-119.180813	399
D0078_B_FKC	DEID	35.819486	-119.168215	405
D0077_B_FKC	DEID	35.834073	-119.161183	401
D0076_B_FKC	DEID	35.84863	-119.150061	409
D0074_B_FKC	DEID	35.877256	-119.143982	418
D0079_G_FKC	DEID	35.805073	-119.178585	400
D0080_B_FKC	DEID	35.80553	-119.157965	432
D0082_B_FKC	DEID	35.790221	-119.169645	422
D0083_B_FKC	DEID	35.769064	-119.165418	417
D0084_B_FKC	DEID	35.747001	-119.182358	387
D0089_B_RMS	Richgrove	35.805288	-119.105225	505
D0033_B_RMS	DEID	35.849263	-119.196881	361
D0034_B_RMS	DEID	35.891666	-119.196996	346
D0030_B_RMS	Earlimart	35.891982	-119.268016	281
D0012_B_RMS	DEID	35.862818	-119.285763	273
D0031_B_RMS	DEID	35.833956	-119.255191	300
D0032_B_RMS	DEID	35.79103	-119.24428	317

4.2.3.6 Interconnected Surface Water [23 CCR § 354.34 (c)(6)]

23 Cal. Code Regs. § 354.34 Monitoring Network. **(c)** *Each monitoring network shall be designed to accomplish the following for each sustainability indicator:*

(6) *Depletions of Interconnected Surface Water. Monitor surface water and groundwater, where interconnected surface water conditions exist, to characterize the spatial and temporal exchanges between surface water and groundwater, and to calibrate and apply the tools and methods necessary to calculate depletions of surface water caused by groundwater extractions. The monitoring network shall be able to characterize the following:*

(A) *Flow conditions including surface water discharge, surface water head, and baseflow contribution.*

(B) *Identifying the approximate date and location where ephemeral or intermittent flowing streams and rivers cease to flow, if applicable.*

(C) *Temporal change in conditions due to variations in stream discharge and regional groundwater extraction.*

(D) *Other factors that may be necessary to identify adverse impacts on beneficial uses of the surface water.*

Interconnected surface water does not apply to the Tule Subbasin for reasons described in Chapter 2.3.6 of the Tule Subbasin Setting (**Appendix A-2**) and **Section 2.3.6** of this Plan.

4.3 Assessment and Improvement of Monitoring Network *[23 CCR § 354.38 (a), (e)(1)(2)(3)(4)]*

23 Cal. Code Regs. § 354.38 Assessment and Improvement of Monitoring Network. **(a)** *Each Agency shall review the monitoring network and include an evaluation in the Plan and each five-year assessment, including a determination of uncertainty and whether there are data gaps that could affect the ability of the Plan to achieve the sustainability goal for the basin.*

(e) *Each Agency shall adjust the monitoring frequency and density of monitoring sites to provide an adequate level of detail about site-specific surface water and groundwater conditions and to assess the effectiveness of management actions under circumstances that include the following:*

(1) *Minimum threshold exceedances.*

(2) *Highly variable spatial or temporal conditions.*

(3) *Adverse impacts to beneficial uses and users of groundwater.*

(4) *The potential to adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of sustainability goals in an adjacent basin.*

Chapter 4.0 of the TSMP provides the following general statement regarding the monitoring network developed for the Tule Subbasin:

> *"The TSMP is both flexible and iterative, allowing for the addition or subtraction of monitoring features, as necessary, and to accommodate changes in monitoring frequency and alternative methodologies, as appropriate."*

Annually, data would be collected and analyzed providing for a better understanding of the groundwater conditions in the Tule Subbasin and how the actual groundwater conditions react to the projects and management actions implemented by each GSA. At a minimum, the monitoring network will be evaluated on a 5-year basis and adjustments will be made accordingly. Additionally, when minimum threshold exceedances or adverse impacts to beneficial uses and users of groundwater occur, the monitoring networks will be evaluated for potential improvement to better understand the sources and causation leading to these occurrences.

4.3.1 Data Gaps *[23 CCR § 354.38 (b), (c)(1)(2), (d)]*

23 Cal. Code Regs. § 354.38 Assessment and Improvement of Monitoring Network. **(b)** *Each Agency shall identify data gaps wherever the basin does not contain a sufficient number of monitoring sites, does not monitor sites at a sufficient frequency, or utilizes monitoring sites that are unreliable, including those that do not satisfy minimum standards of the monitoring network adopted by the Agency.*

(c) *If the monitoring network contains data gaps, the Plan shall include a description of the following:*

(1) *The location and reason for data gaps in the monitoring network.*

(2) *Local issues and circumstances that limit or prevent monitoring.*

(d) *Each Agency shall describe steps that will be taken to fill data gaps before the next five-year assessment, including the location and purpose of newly added or installed monitoring sites.*

See Chapter 4.1 in the TSMP, which identifies data gaps within the Tule Subbasin and recommends new features to address the data gaps.

Of the proposed monitoring networks, the insufficient number of monitoring wells represents the biggest data gap in the Subbasin. To address the data gap, new dedicated monitoring wells have been identified for monitoring the various aquifers at RMS in the Subbasin and are described in Chapter 2.1.1.1 and shown in Figure A1-2 (upper aquifer) and in Chapter 2.1.1.2 and Figure A1-5 (lower aquifer) of the TSMP (**Appendix A-1**). Funding generated during the plan implementation period may be used to further develop the monitoring features where there are data gaps, as described in **Section 2** of this Plan.

4.4 Reporting Monitoring Data to the Department *[23 CCR § 354.40]*

23 Cal. Code Regs. § 354.40 Reporting Monitoring Data to the Department. *Monitoring data shall be stored in the data management system developed pursuant to Section 352.6. A copy of the monitoring data shall be included in the Annual Report and submitted electronically on forms provided by the Department.*

Chapter 5.0 of the TSMP (**Appendix A-1**) provides a detailed description of the Tule Subbasin DMS that each of the GSAs will utilize for reporting monitoring data according to the standardized monitoring protocols at RMSs discussed within this Plan.

Data stored in the DMS will be assembled in standardized formats as required for the annual and 5-year reports to DWR.

Section 5. Projects and Management Actions

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5.1 Introduction [Reg. § 354.42]

23 Cal. Code Regs. § 354.42 Introduction to Projects and Management Actions. *This Subarticle describes the criteria for projects and management actions to be included in a Plan to meet the sustainability goal for the basin in a manner that can be maintained over the planning and implementation horizon.*

This Section describes the projects and management actions that the DEID GSA intends to undertake that are intended to achieve sustainable groundwater conditions over the planning horizon and maintain sustainability thereafter within the DEID GSA as well as the Tule Subbasin through coordination with other GSAs in the Subbasin.

5.2 Projects and Management Actions *[Reg. § 354.44]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (a) *Each Plan shall include a description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.*

As a result of the Tule Subbasin's current status as a critically over-drafted basin as noted in Section 2.3.2.4 of the Tule Subbasin Setting (see **Appendix A-2**) and the ongoing trajectory of groundwater conditions within the Subbasin to potentially cause undesirable results, in coordination with other GSAs in the Subbasin the DEID GSA has identified specific projects and management actions that it proposes to undertake as a means to achieve groundwater sustainability throughout the DEID GSA. The projects and management actions fall into the following general categories of actions:

1. Current Surface Water Supply Optimization
2. Development of Additional Surface Water Supplies
3. Existing and Future Managed Aquifer Recharge
4. Municipal Water Supply and Quality Projects
5. Transitional Pumping (for Western Management Area only)

Each of the identified projects and management actions will benefit and continue to achieve the sustainability goal of the DEID GSA as well as assist the Tule Subbasin in its overall ability to achieve its sustainability goals through one or more of the following effects:

- Increased or optimized availability of sustainable water supplies;
- Improved balance of water demands with available water supplies;
- Assisting the Subbasin in achieving improved or stabilized groundwater levels;
- Assisting the Subbasin in reduction or cessation of subsidence near critical infrastructure and across the Tule Subbasin;
- Improved or stabilized water quality for agronomic and municipal purposes;
- Increased or more efficient use of available funding for local water management; and/or
- Improved quantities, quality, and transparency of relevant regional water management data.

Because of the unique attributes, water assets, and needs of the four individual Management Areas that compose the DEID GSA, proposed projects and management actions are arranged by and presented for each Management Area. The four Management Areas in the DEID GSA are:

- DEID Management Area: the service area of DEID;
- Western Management Area: “white area” lands (detailed further in **Section 5.2.2**) adjacent to DEID’s west boundary, historically reliant on groundwater;
- EPUD Management Area: the service area of EPUD;
- RCSD Management Area: the service area of RCSD.

Each individual project and management action includes a description that meets the DWR GSP Regulations’ requirements and provides:

- A general summary of the action [Reg. § 354.44(a)]
- A description of the circumstances that have or will lead to the consideration and/or trigger the implementation of the action [Reg. § 354.44(b)(1)(A)]
- A summary of the anticipated process of public notice regarding the consideration and implementation of the action [Reg. § 354.44(b)(1)(B)]
- If applicable, a quantification of the anticipated groundwater demand to be reduced as a result implementing of the action [Reg. § 354.44(b)(2)]
- A summary of the permitting and regulatory processes that may be required to undertake the action [Reg. § 354.44(b)(3)]
- A timeline summarizing the expected initiation, completion, and accrual of expected benefits for the action [Reg. § 354.44(b)(4)]
- An explanation of the benefits that are expected to be realized and how those benefits will be evaluated for the action [Reg. § 354.44(b)(5)]
- A general explanation of how the action will be accomplished and, if applicable, the source and reliability of waters relied upon from outside of the Agency’s jurisdiction to accomplish the action [Reg. § 354.44(b)(6)]
- A summary of the legal authority to undertake the action [Reg. § 354.44(b)(7)]
- An estimate of the cost and funding source anticipated to undertake the action [Reg. § 354.44(b)(8)]
- If applicable, an explanation of how groundwater extractions and/or recharge during periods of drought will be offset during other periods to ensure the avoidance of chronic lowering of groundwater levels and/or the depletion of supplies [Reg. § 354.44(b)(9)]

5.2.1 Delano-Earlimart Irrigation District Management Area: DEID Service Area *[Reg. § 354.44(b)(1)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(1) *A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.*

Projects and management actions for the DEID Management Area ("DEID MA)" are associated with the following general categories of actions:

- Optimization of existing imported water supplies
- Development of additional imported water supplies
- Existing and future managed aquifer recharge
- Mitigation of identified adverse conditions

Successful implementation of the projects and management actions for the DEID MA will insure its continued sustainability.

The following project and management actions have been identified for the DEID MA:

Action 1 Continued importation and optimization of imported water supplies to meet consumptive use requirements and reduce reliance on groundwater pumping

Action 2 Actions to increase imported water quantities above historic operations to meet consumptive use requirements, new water demands, and reduce reliance on groundwater pumping

Action 3 Continued operations of existing in-district recharge/banking operations for future groundwater extraction needs

Action 4 Actions to increase in-district recharge/banking operations for future groundwater extraction needs

Action 5 Continued operations of existing out-of-district banking operations to augment future imported water supplies

Action 6 Actions to increase out-of-district groundwater banking operations to augment future imported water supplies

Action 7 Implementation of mitigation plan for impacted wells and potentially other beneficial uses

5.2.1.1 Action 1 – Continued Importation and Optimization of Imported Water Supplies

5.2.1.1.1 Description

The original DEID service area consists of approximately 56,500 acres that began importing CVP water in 1950. DEID has the largest Class 1 contract in the Friant Division and a sizeable Class 2 contract. Additionally, DEID's CVP water contract provides opportunity to access other water supplies that, depending on hydrologic conditions, are routinely available to it, including flood waters, unreleased restoration flows, Section 215 water, and recaptured/recirculated water. Other non-CVP water supplies are also accessible on an opportunistic basis. These additional sources of water are defined, along with further description of DEID's CVP contract, in **Section 1.4.3 Conjunctive Use Programs**.

Water records from DEID indicate that from 1986 to 2021 DEID imported nearly 3.9 million acre-feet or an average of 107,000 acre-feet per year to meet in-district water demands.

The Tule Subbasin Setting (see **Appendix A-2**) documents average annual water deliveries of imported surface water to the DEID MA of 121,457 acre-feet for the period from 1990/1991 to 2009/2010. When taking into consideration all available water to the DEID MA during this period, the amount of water available on an average annual basis is 128,775 acre-feet. When the total available water of 128,775 acre-feet per year over this 20-year period is compared to the 2017 crop consumptive use in the DEID MA of 111,126 acre-feet, the DEID MA is estimated to have an annual surplus of 17,649 acre-feet. This analysis indicates that the DEID MA has been and will continue to be, on average, a net contributor of imported water to the Subbasin.

The DEID MA will continue its current practice of importing available water supplies from both CVP and non-CVP sources and optimize those supplies for use within the DEID MA.

5.2.1.1.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Given the continuing need for the DEID MA to remain sustainable as required by SGMA, this continued importation and optimization of imported water supplies management action will be implemented as an ongoing and historical practice.

5.2.1.1.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(1) *…The Plan shall include the following:*

(B) *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken*.

No additional public notice is necessary to implement this ongoing action.

5.2.1.1.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(2) *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

As a result of this action, it is anticipated that there will be a net contribution of 17,000 to 21,000 acre-feet per year of imported water stored in the Subbasin for future recovery and use by customers of the DEID MA through the continuation of importing water by DEID. After taking into account future reductions in supplies from a fully restored San Joaquin River and climate change, an average annual net contribution of 17,000 acre-feet of stored imported water will be used for future water budgets.

5.2.1.1.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(3) *A summary of the permitting and regulatory process required for each project and management action.*

No additional permitting or regulatory process is necessary to implement this ongoing action.

5.2.1.1.6 Timeline *[Reg. § 354.44(b)(4)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(4) *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

Implementation of the action is historical and ongoing and will continue throughout the SGMA implementation period and beyond.

5.2.1.1.7 Anticipated Benefits & Evaluation *[Reg. § 354.44(b)(5)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(5) *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

As noted above, the DEID MA is a net contributor to the Tule Subbasin, fully offsetting all DEID MA pumping on an annual average basis. Historically and projected into the future, any pumping required in the DEID MA is offset from past and future deposits to the Tule Subbasin and then recovered by pumping in water years when surface water imports and other available supplies are insufficient to meet crop demands. By continuing importation and optimization of surface water supplies DEID expects to increase/stabilize groundwater levels and water in storage in the Basin, notwithstanding the effect of anticipated continued over-pumping that will occur during the SGMA implementation period by others adjacent to the DEID MA as well as projected reductions in Tule Subbasin groundwater levels post-2020 as adjacent GSA's implement their projects and management actions over time and groundwater levels continue to equilibrate in the Tule Subbasin and adjoining subbasins.

Evaluation of the benefits of this action will occur through continued evaluation of impacts to the DEID MA and the Tule Subbasin of annual CVP water importation, use and storage, and other water deliveries into the DEID MA. A full accounting of said deliveries, including sources of supply and final use of all water obtained, will be described in the annual reports and 5-year periodic reviews of the GSP required by the Regulations. Benefits from this action will also be evaluated through groundwater level measurements.

5.2.1.1.8 Accomplishment *[Reg. § 354.44(b)(6)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(6) *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Accomplishment and implementation of this action will be documented as noted in the above sections.

5.2.1.1.9 Legal Authority *[Reg. § 354.44(b)(7)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(7) *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

DEID has the contractual right to certain quantities of water under its contract with the Bureau of Reclamation. Contract number I75r-3327D provides the DEID MA with up to 108,800 acre-feet of Class 1 water and up to 74,500 of Class 2 water annually. This CVP contract also provides access to other water supplies that may be available on an annual basis dependent on hydrology.

5.2.1.1.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Because the jurisdictional boundaries of DEID and those of the DEID MA are coterminous, cost and funding of Action 1 will be a function of DEID.

Cost: Implementation of this action is an ongoing cost for the DEID, which includes the cost of the supply as well as the distribution of that supply through DEID's dedicated pipeline distribution system and related pumping plants, regulating reservoirs, and related operational and maintenance expenses. Cost of implementing this action (and other actions identified in this section) composes most of the annual budget of DEID, which totaled $26,154,904 in 2019. Components of this budget total that are associated with implementation of this action are:

- Water Supply (variable) - $11,678,451
- Water Supply (fixed) - $3,997,166
- Energy Supply - $738,386
- Water Operations - $302,916
- System Maintenance - $660,610
- System Maintenance Support - $49,500
- Administration - $1,573,676
- Buildings and Yards - $32,600
- Long-term Bonding annual expense - $1,573,538
- Capital Expenditures - $5,153,822
- Non-Operating Expenses - $372,239

Therefore, based on the costs provided above, full implementation of this action is anticipated to cost approximately $26,000,000.

Funding: The total cost of Action 1 is budgeted and funded annually. There are four primary categories of funding currently used and will continue to be used to fund this action:

- Revenue from annual water sales – includes sales to individual water users, other districts, and other sales; 2019 budget total = $16,190,880
- Other operating revenue – includes income from participation in energy projects, pumping charges paid by water users, and use of facilities by others; 2019 budget total = $2,035,819
- Non-operating revenues – Income from investments and rents/leases; 2019 budget total = $803,150.
- Fixed revenues – income from property assessments, standby charges, and voter-approved special benefit and supplemental assessments; 2019 budget total = $7,146,003

Total current funding from these sources is $26,175,852, which is sufficient to fund this action.

5.2.1.1.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

DEID adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. DEID MA has already reached long-term sustainability and is a net contributor of water to the Subbasin, which is a function of in-lieu recharge, irrigation return flows and direct groundwater recharge/banking projects both inside and outside of the DEID boundaries. Through its importation of water, DEID has historically placed a lesser burden, and in many years no burden, on native groundwater, whose sustainability is the focus of SGMA.

The DEID MA's drought offset measures are primarily centered in exercising its stored water recovery rights of previously deposited imported water in the Subbasin and recovery of banked water in other subbasins where out-of-district banking projects are located. Future operations anticipate continued recovery of stored water when necessary in drought years.

5.2.1.1.12 Corresponding Attachments *[Reg. § 354.44(c)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (c)** *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

5.2.1.2 Action 2 – Increase Importation of Imported Waters

Action 2 of the DEID MA consists of increasing imported water quantities above historical operations to meet consumptive use requirements and new water demands, and also reduce reliance on groundwater pumping.

5.2.1.2.1 Description

The original DEID service area consists of approximately 56,500 acres that began importing CVP water in 1950. DEID has the largest Class 1 contract in the Friant Division and a sizeable Class 2 contract as well. Additionally, DEID's CVP water contract provides opportunity to access other water supplies that, depending on hydrologic conditions, are sometimes available to it, including flood waters, unreleased restoration flows, Section 215 water, and recaptured/recirculated water. Other non-CVP water supplies are also accessible on an opportunistic basis.

Water records from DEID indicate that between 1986 and 2021 DEID imported nearly 3.9 million acre-feet for meeting in-district water demands, an average of 107,000 acre-feet per year.

As noted in Action 1, the DEID MA has been historically sustainable and is projected to remain so throughout the SGMA planning and implementation horizon. Despite this fact, the DEID MA will continue to take advantage of opportunities to increase importation of surface water by accessing maximum amounts through its CVP contract as those supplies become available. In this management action, the focus will be on meeting additional demands within the DEID MA. Examples of this additional demand are:

- Irrigation demand time shifting – irrigation demands in the peak irrigation season may sometimes exceed the delivery capacity of the FKC due to current canal capacity constraints caused by subsidence impacts. So that full demands for irrigation water may be met with surface water (and therefore limit groundwater pumping), the DEID MA may create incentives to encourage irrigation demands be shifted from mid-week to weekends when there is typically unused capacity in the FKC. Successful implementation would result in reduced reliance on native groundwater use during times when current FKC capacity constraints restrict full delivery of imported water to customers in the DEID MA.
- Fallowed Area Recharge Management – The DEID MA began a new program in 2019 to promote the use of lands that are periodically fallowed as part of a crop rotation/replacement program as recharge sites. The Fallowed Area Recharge Management (FARM) Program encourages short-term groundwater recharge on private lands for the benefit of the DEID MA.

These and other opportunistic programs and projects will be sought out for implementation in the DEID MA.

5.2.1.2.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Assessment of the feasibility and acceptance of irrigation demand time shifting by DEID customers is anticipated to begin in 2020, with potential implementation during the 2020 peak irrigation season.

The FARM program was successfully tested in 2019 with two pilot projects. These pilot projects were operated as an extension of the Turnipseed Water Banking facilities, such that water recharged on grower owned parcels was made available to all District landowners for later well recovery. In total, 3,358 acre-ft of imported surface water was recharged during the FARM program pilot projects. The FARM program remains open to all DEID landowners with land suitable for this purpose, however, hydrology following the 2019 pilot has not allowed for operation of the FARM program. At this time, DEID considers the program to be a success and will continue to coordinate with growers during wet years to maximize the District's recharge opportunities through the use of this program.

Given the continuing need for the DEID MA to remain sustainable as required by SGMA, this management action anticipates assessment of potential Action 2 opportunities on a continuing basis.

5.2.1.2.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(B)** *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken*.

Opportunities to participate in Action 2 projects are noticed to all DEID MA water users through direct contact and other available means. Additional public notice is provided through DEID's compliance with the Brown Act's noticing requirements.

5.2.1.2.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

The DEID MA has transferred to others an annual average amount of just over 16,000 acre-feet of imported CVP water supplies that were available to DEID but were in excess to its ability to use. Action 2 projects are designed to increase the use of imported water, which would use some of this water that has been historically transferred to others and thereby lessen the burden on native groundwater, whose sustainability is the focus of SGMA.

5.2.1.2.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

It is anticipated that periodic approval of Action 2 projects by the DEID board of directors will be required. Action 2 projects may also be subject to California Environmental Quality Act (CEQA) and/or National Environmental Policy Act (NEPA) requirements.

5.2.1.2.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

The timeline to implement this action will be determined.

5.2.1.2.7 Anticipated Benefits and Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

Stored imported water in the DEID MA is recovered in water years when surface water imports and other available supplies are insufficient to meet crop demands. By acquiring new and/or optimizing existing imported water supplies, the district expects to increase/stabilize groundwater levels and groundwater storage in its portion of the Tule Subbasin, notwithstanding the effect of anticipated continued over-pumping that will occur during the SGMA implementation period by others adjacent to the DEID MA, as well as projected reductions in Tule Subbasin groundwater levels post-2020 as groundwater levels continue to equilibrate in the Tule Subbasin and adjoining subbasins.

Evaluation of the benefits of this action will occur through continued evaluation of annual CVP water and other water deliveries into the DEID MA and a full accounting of said deliveries, including sources of supply and final use of all water obtained and will be addressed as needed in the annual reports and 5-year updates provided to DWR. Benefits from this action will also be evaluated through groundwater level measurements.

5.2.1.2.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

This action will be accomplished by optimizing existing and acquiring new imported water supplies. As previously described, DEID has transferred to others an annual average amount of just over 16,000 acre-feet of imported CVP water supplies that were available to DEID but were in excess to its ability to use. Through the proposed irrigation demand time shifting and FARM programs, DEID will optimize use of its existing available CVP water supplies. New imported water supplies will be identified on a case-by-case basis and will be dependent on hydrology and will need to consider other factors to be transferred. DEID has contractual rights to certain quantities of water under its contract with the Bureau of Reclamation. Contract number I75r-3327D provides the DEID MA with up to 108,800 acre-feet of Class 1 water and up to 74,500 of Class 2 water annually. This CVP contract also provides access to other water supplies that may be available on an annual basis dependent on hydrology. Reliability of this source of water is high because of these contractual water rights.

5.2.1.2.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

DEID has the contractual right to certain quantities of water under its contract with the Bureau of Reclamation. Contract number I75r-3327D provides the DEID MA with up to 108,800 acre-feet of Class 1 water and up to 74,500 of Class 2 water annually. This CVP contract also provides access to other water supplies that may be available on an annual basis dependent on hydrology.

5.2.1.2.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: The FARM program will be used to illustrate the cost of funding of Action 2.

The cost is anticipated to primarily be the additional cost of the water supply. Labor expense to implement the program is negligible. Costs of the supply is anticipated to be $40 per acre-foot (2019 dollars). Program demand is expected to be a function of the following physical/operational parameters:

- Operating 3 months in any given year when excess water is available, which is anticipated to be 3 out of every 10 years.
- Deliveries totaling 200 acre-feet per month per participating metered connection.
- Targeted number of participating connections is ten.

The anticipated amount of water that will be used under Action 2 is 6,000 acre-feet in any year the FARM program is operational (3 months x 200 acre-feet/month X 10 participating connections). At $40 per acre-foot, full implementation of this action is anticipated to cost $240,000 (6,000 acre-feet x $40/acre-feet).

Using the estimated opportunity window of 3 out of every 10 years for the FARM program to be utilized, the average annual cost of this action is $72,000 ($240,000/year x 3 years/10 years).

Funding: Funding of the additional cost of the water supply is minor and is likely to be initially absorbed into the existing annual budget of DEID and potentially funded through annual adjustments in the water rate charged to DEID Customers. Pumping fees are not considered necessary to implement this action.

5.2.1.2.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

DEID adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. DEID MA has already reached long-term sustainability and is a net contributor of water to the Subbasin, which is a function of in-lieu recharge, irrigation return flows and direct recharge/banking projects both inside and outside of the DEID boundaries. Accordingly, the DEID MA's drought offset measures are primarily centered in exercising its stored water recovery rights of previously deposited imported water in the Subbasin and