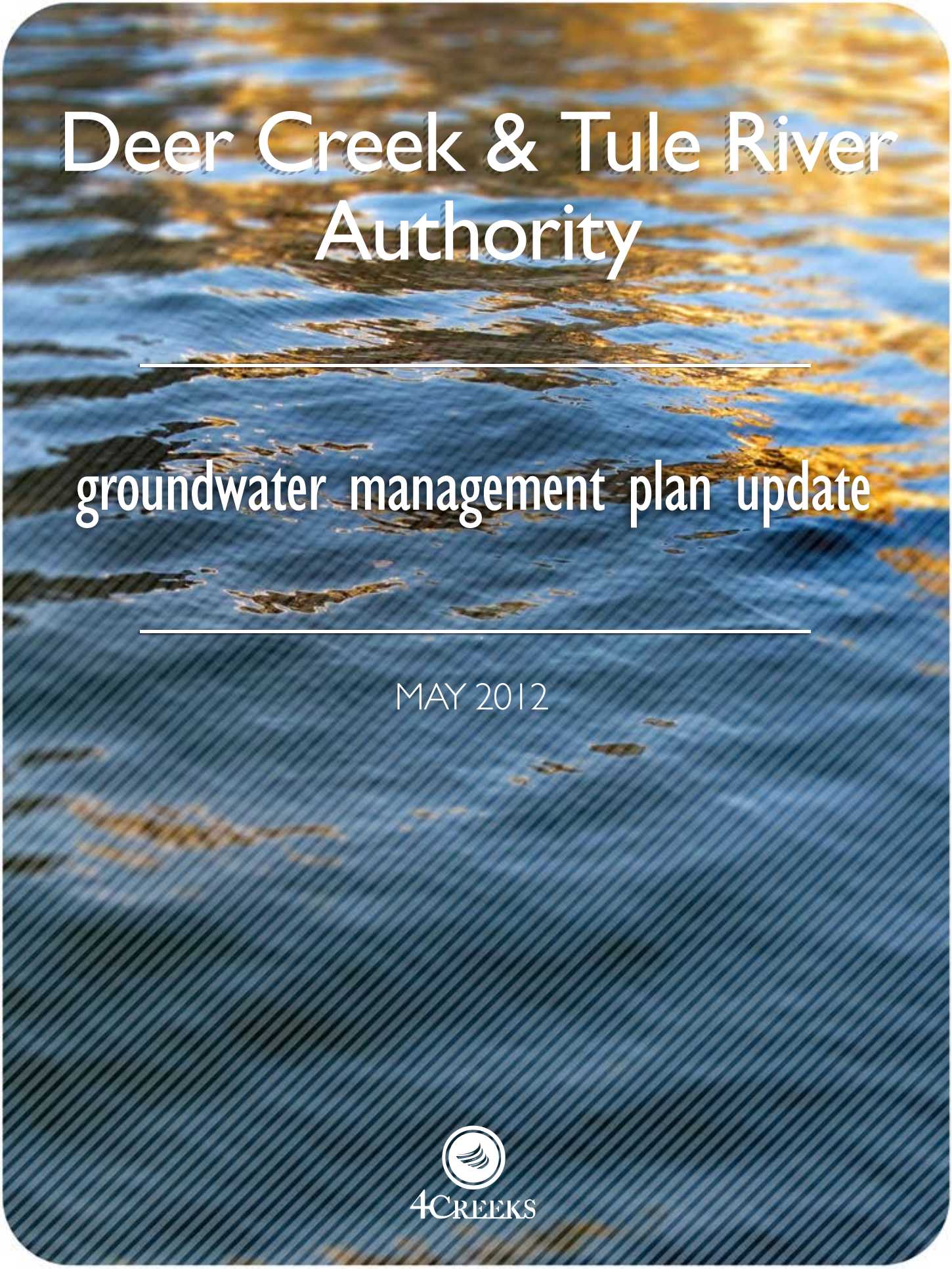

Deer Creek & Tule River Authority

groundwater management plan update

MAY 2012

4CREEKS

Deer Creek and Tule River Authority

Groundwater Management Plan Update

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APPENDIX

A. July 2006 DCTRA Groundwater Management Plan
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SECTION 1 – INTRODUCTION

1.1 Overview

The member agencies of the Deer Creek and Tule River Authority (DCTRA) implemented a Groundwater Management Plan ***(see Appendix A – Groundwater Management Plan 2006)*** to collectively monitor, manage, and implement groundwater activities between the participants of the DCTRA. The original Groundwater Management Plan was adopted by the DCTRA Board on March 24, 1995, and updated in July 2006. The DCTRA Board authorized on 15 November 2011 to update the original Plan goals and objectives based upon the data collected the past five years.

The DCTRA has long recognized the importance of groundwater to its service areas. The local economy, both for agriculture and domestic uses, has reliance, in whole or in part, on groundwater. Groundwater Management involves the planning and implementation required to provide an adequate, reliable, and acceptable quality of groundwater supply. The groundwater management program created a coordinated approach within the service area to monitor and collectively implement strategies to protect the groundwater pursuant to the requirements of the law.

1.2 Plan Coverage

The coverage area for the Groundwater Management Plan is within the Tule Basin (Basin), as defined per Department of Water Resources (DWR) Bulletin 118 Groundwater Basins of the San Joaquin Valley Hydrologic Study Area ***(see Figure 1-1)***. The DCTRA member districts make up the Plan area within the Tule Basin *(unless noted otherwise).* The area included within the Plan is described in more detail in **Section 2 – Basin Conditions.**

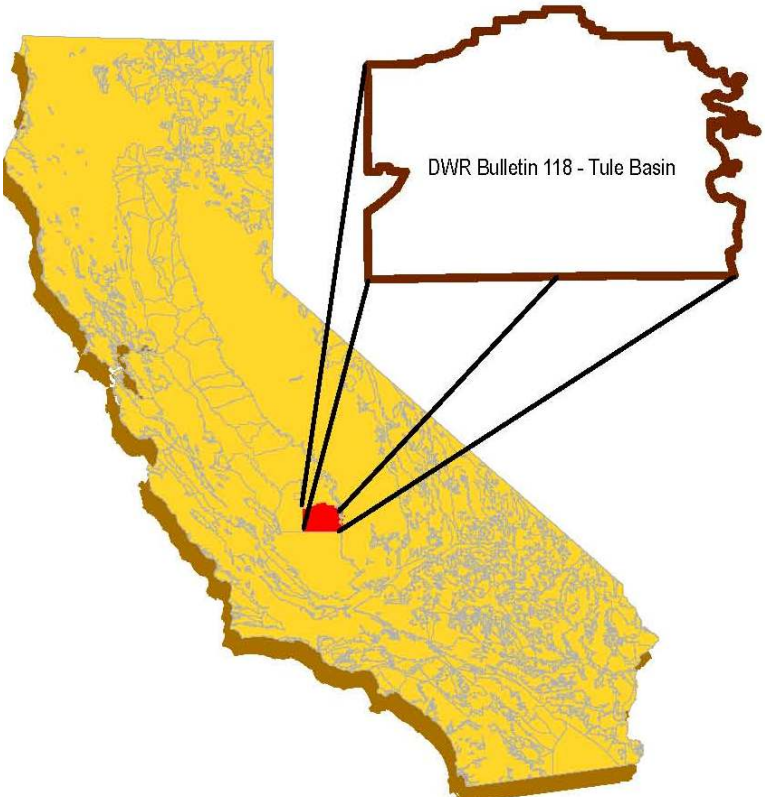


Figure 1-1 - Tule Basin

1.3 Plan Participants, Stakeholders, and Advisory Committee

The DCTRA is a Joint Powers Authority comprised of eight members. Attachment A identifies the location of the DCTRA members within the Basin. Stone Corral Irrigation District is a member agency outside the Basin. The members within the DCTRA Boundary are listed in **Table 1-1** below:

Table 1-1: DCTRA Participant Members

DCTRA Participant Member	**Total Area** (acres)
Lower Tule River Irrigation District	103,034
Pixley Irrigation District	69,014
Porterville Irrigation District	16,997
Terra Bella Irrigation District	15,053
Saucelito Irrigation District	19,702
Tea Pot Dome Irrigation District	3,481
Vandalia Irrigation District	1,379
DCTRA Participant Members Total Area:	**228,660**
Public Agencies (CSD, PUD, Cities):	*13,352*
Remaining Areas within DCTRA Plan Boundary:	*47,436*
Total DCTRA Plan Boundary Area:	**289,448**

As part of the Groundwater Management Plan, the stakeholders are defined as any individual, group, or entity with the DCTRA Plan area that may be affected by the implementation of the Plan. **Table 1-2** below identifies the stakeholders within the DCTRA Plan Boundary area.

Table 1-2: DCTRA Stakeholders

STAKEHOLDER	***INTEREST***	**STAKEHOLDER**	***INTEREST***
Lower Tule River Irrigation District	*District Landowners*	**Pixley Community Services District**	*Domestic Water Use/Supply*
Pixley Irrigation District	*District Landowners*	**Pixley Wildlife Refuge**	*Wildlife*
Porterville Irrigation District	*District Landowners*	**Bureau of Reclamation**	*Surface Water Supplies*
Saucelito Irrigation District	*District Landowners*	**Friant Water Authority**	*Surface Water Supplies*
Stone Corral Irrigation District	*District Landowners (Note – Not in Basin)*	**National Resources Conservation Service**	*Natural Resources*
Vandalia Irrigation District	*District Landowners*	**Audubon Society**	*Wildlife/Monitoring*
Tea Pot Dome Water District	*District Landowners*	**Tulare County**	*Land Use/Planning*
Terra Bella Irrigation District	*District Landowners, Domestic Water Use/Supply*	**Vandalia Irrigation District**	*District Landowners*
Tipton Community Services District	*Domestic Water Use/Supply*	**Teviston Community Services District**	*Domestic Water Use/Supply*
Poplar Community Services District	*Domestic Water Use/Supply*	**City of Porterville**	*Domestic Water Use/Supply*
Woodville Public Utility District	*Domestic Water Use/Supply*		

The DCTRA established an Advisory Committee to oversee the development, implementation, and refinement of the Plan. The members of the Advisory Committee are as follows:

Advisory Committee

- Dan Vink – General Manager representing Lower Tule Irrigation District and Pixley Irrigation District
- Dave Hoffman – Consultant for DCTRA
- Keith Norris – Manager representing Tea Pot Dome Water District
- Sean Geivet – General Manager representing Terra Bella Irrigation District, Saucelito Irrigation District, and Porterville Irrigation District
- Steve Drumright –Manager representing Vandalia Irrigation District
- William West – Manager representing Stone Corral Irrigation District

1.4 Statutory Authority

In 1989 The California State Legislature passed Assembly Bill 255 (AB 255), allowing local public agencies in any of the 11 groundwater basins that were identified by DWR Bulletin 118-80, as critically overdrafted to undertake management of groundwater. On January 1, 1993, AB 3030 became effective, superseding AB 255. AB 3030 authorized local agencies that are within groundwater basins, as defined by DWR Bulletin 118, to prepare and adopt groundwater management plans. The DWR Bulletin 118-80 identified the Tule Basin to be a Basin subject to critical overdraft. The Legislature found and declared that additional study of groundwater is necessary to better understand how to manage groundwater effectively to ensure the safe production, quality and proper storage of groundwater.

In September of 2002, the California State Legislature adopted Senate Bill 1938, which amended California Water Code Section 10750 requiring new groundwater management plans to include documentation "describing the manner in which interested parties may participate in developing the groundwater management plan" which may include the appointment of a technical advisory committee. SB 1938 also requires that an agency developing a Groundwater Management Plan, work cooperatively with other public agencies or private parties whose service area or boundary overlie the same groundwater basin. In 2003, DWR Bulletin 118, Appendix C was updated to include recommended components for a Groundwater Management Plan *(**see Appendix B – Statutory Authority – Excerpts from AB 3030, SB 1938, Water Code Section 10750.9, DWR Bulletin 118**).*

The original DCTRA Groundwater Management Plan was adopted in 1995 per AB 3030 and updated to meet the requirements of SB 1938 and DWR Bulletin 118 in 2006.

1.5 Purpose & Goals

The purpose of the Groundwater Management Plan update (Plan) is to evaluate the monitoring data and information collected compared to the management goals and objectives. The continued efforts for the Plan is to document the existing groundwater management activities of the DCTRA and to formalize other actions that will be used in implementing a monitoring and management program for conjunctive use, replenishment and preservation of the quantity and quality of groundwater within the Basin for long term beneficial uses.

The primary action items in the Plan will be gathering and evaluating additional data concerning the quantity and quality of groundwater allowing for strategic development and implementation of the management objectives. Following is a list of the highest priority goals for the Plan:

1. Continue to monitor groundwater levels by measuring the depth to groundwater of existng wells annually during the Spring within the DCTRA boundary.
2. Prepare annual map of Lines of Equal Elevation of Water in Wells and Lines of Equal Depth of Water in Wells based on field measured data.
3. Publish an updated tabulation of the average depth to groundwater for each participant member and for the DCTRA service area.
4. Continue the acquisition and importation of available, supplemental surface water for crop irrigation and in-lieu groundwater recharge
5. Establish additional groundwater re-charge facilities for groundwater banking.
6. Evaluate existing land use within the DCTRA boundary area to determine the approximate water demands per land use and crop type.
7. Investigate potential groundwater banking opportunities, and continue to monitor and evaluate existing groundwater banking projects.
8. Develop a groundwater quality program by collecting groundwater quality data from a select group of wells within the DCTRA service area, such as data on file with th Tulare County Department of Health Services.
9. Continue collaboration with other agencies within the Basin for the collection of quality and quantity data for the establishment of groundwater policies.
10. Encourage public outreach and participation.

These goals highlight the core activities and objectives included within the DCTRA Groundwater Management Plan and are discussed in further detail through the provisions of **Section 3: Basin Management Objectives and Strategies**.

1.6 Authority of the DCTRA

In order to manage the quality and quantity of groundwater, the DCTRA is granted the powers of a water replenishment district *(Part 4, Division 18, California Water Code)* upon the adoption of the Groundwater Management Plan. To the extent not already possessed by the entity, the DCTRA is entitled to the following powers:

1. The DCTRA may do any act necessary to replenish the groundwater in the Basin *(Water Code Section 60220 and 60221).* The Authority may do, but is not limited to, the following for the purposes of replenishing groundwater:
    a. Buy and sell water
    b. Exchange water
    c. Distribute water to persons in exchange for ceasing or reducing groundwater extractions
    d. Spread, sink and inject water into the underground
    e. Store, transport, recapture, recycle, purify, treat or otherwise manage and control water for the beneficial use of persons or property within the district
    f. Build the necessary works to achieve groundwater replenishment
2. The DCTRA may take any action necessary to protect or prevent interference with water, the quality thereof, or water rights of persons or property within the Basin. *(Water Code Section 60230)*
3. For the purpose of replenishing water, the DCTRA may take any action necessary to put water under its control to beneficial use. *(Water Code Section 60223)*
4. Pursuant to Water Code Section 60224, the Authority may take any action needed for the protection and preservation of groundwater supplies within the Basin for beneficial uses including:

a. Preventing contaminants from entering the groundwater supplies of the Basin, whether or not the threat is immediate
b. Remove contaminants from the groundwater supplies of the Basin
c. Determine the existence , extent and location of contaminants in, or which may enter, the groundwater supplies of the Authority
d. Determine persons, whether natural persons or public entities, responsible for those contaminants
e. Perform or obtain engineering, hydrologic, and scientific studies for any of the foregoing purposes

5. The DCTRA may take any action outside the Basin, including, but not limited to, those set forth in Section 60224, provided the Board finds both of the following pursuant to Water Code Section 60225:
    a. The action is reasonably necessary to protect groundwater supplies within the Basin
    b. There is a direct, material relationship between the groundwater supply where the action is to be taken and the groundwater supply within the Basin
6. The DCTRA may sue and recover the amount of any DCTRA expenditures under Section 60224 from the person or persons responsible for the contaminants causing the expenditures. *(Water Code Section 60226)*
7. Pursuant to Water Code Section 60230, the DCTRA is granted additional powers of a replenishment district, which allow the DCTRA to do the following:
    a. Construct, purchase, lease or acquire and to operate and maintain waterworks, machinery and facilities, canals, conduits, water and water rights, spreading grounds and lands needed to replenish the groundwater supplies of the Basin
    b. Store water in groundwater basins or reservoirs, to appropriate and acquire water and water rights, import water into the Basin, and conserve water
    c. Participate in legal proceedings as required to defend the water rights and supplies of the DCTRA members, and to prevent unlawful exportation of water from the Basin
    d. Under certain conditions, to exercise the right of eminent domain
    e. Act jointly with other entities in order to economically perform required activities
    f. Carry out investigations required to implement the program
    g. Fix rates for water for replenishment purposes
    h. Fix the terms and condition for contracts for use of surface water in lieu of groundwater
8. The DCTRA shall investigate and consider the use of existing facilities of other agencies to carry out the Ground Water Management Program, and if economically feasible and in the best interest of the Basin, an attempt shall be made to enter into a contract with the agency for use of their facility. *(Water Code Section 60231)*
9. The DCTRA may fix and collect fees for the extraction of groundwater to pay for the expenses incurred by the DCTRA for the purposes of groundwater management including, but not limited to administrative expenses and real costs associated with the acquisition of replenishment water. *(Water Code Section 10759)*
10. The DCTRA may also levy a water replenishment assessment; however, before any fees may be levied and collected, a majority of the voters in the DCTRA must ratify the assessment. *(Water Code 10760)*

1.7 Plan Elements

The DCTRA Groundwater Management Plan update includes both the required and recommended components of a Groundwater Management plan as established by the California Water Code Section 10753. The plan also includes the recommended elements for a Groundwater Management Plan as described in DWR Bulletin 118 (2003 Update), Appendix C.

The California Water Code Section 10753.7, added by SB 1938, (statutes of 2002, Chapter 603) provides that a Groundwater Management Plan shall contain the following components to be eligible for funding administered by the DWR for the construction of groundwater projects or groundwater quality projects.

Required Components of a Groundwater Management Plan
(Water Code Section 10750)

1. Plan shall include components relating to the monitoring and management of groundwater levels within the groundwater basin, groundwater quality degradation, inelastic land surface subsidence, and changes in surface flow and surface water quality that directly affect groundwater levels or quality.
2. For the purpose of carrying out paragraph (1), the local agency shall prepare a plan to involve other agencies and public entities within the groundwater basin.
3. Plan should include a map that details the area of the groundwater basin, per DWR Bulletin 118, and the area of the local agency subject to the plan, incorporating the boundaries of participants and stakeholders within the Plan area.
4. Plan should identify monitoring protocols to detect changes in groundwater levels, groundwater quality, inelastic surface subsidence, and flow and quality of surface water. The monitoring protocols should be designed to generate information which promotes efficient and effective groundwater management.

The California Water Code Section 10753.7 states a groundwater management plan may include the following components:

Optional Components of a Groundwater Management Plan
(Water Code Section 10753.7)

1. The control of saline water intrusion.
2. Identification and management of wellhead protection areas and recharge areas.
3. Regulation of the migration of contaminated groundwater.
4. The Administration of well abandonment and well destruction programs.
5. Mitigation of conditions of overdraft.
6. Replenishment of groundwater levels and storage.
7. Monitoring of groundwater levels and storage.
8. Facilitating conjunctive use operations.
9. Identification of well construction policies.
10. The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects.
11. The development of relationships with the state and federal regulatory agencies.
12. The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.

The recommended and required components of the Groundwater Management Plan from DWR Bulletin 118, update 2003, Appendix C, are summarized in Appendix B of this plan. The components included in the DCTRA Groundwater Management Plan are itemized in ***Table 1-3: Groundwater Management Plan Components.*** The table also identifies the section each component listed can be found within this plan.

Table 1-3: Groundwater Management Plan Components

Plan Component	Section Reference
Mandatory Plan Components (CWC Section 10753.7(a))	
(1) Basin Management Goals and Objectives	Section 1.5, Section 3
(2) Other Agency Involvement	Section 1.3, Section 3.5
(3) Plan Coverage	Section 1.2, Section 2
(4) Monitoring Protocols	Section 3.3, Section 4
Optional Plan Components (CWC Section 10753.8)	
(1) Saline Water Intrusion	Section 3.1
(2) Wellhead and Recharge Area Protection	Section 3.1
(3) Migration of Contaminated Groundwater Controls	Section 3.1
(4) Well Abandonment and Construction Policies	Section 3.1
(5) Well Construction Policies	Section 3.1
(6) Overdraft Mitigation	Section 3.2
(7) Groundwater Recharge Management	Section 3.2
(8) Groundwater Extraction Policies	Section 3.2
(9) Conjunctive Use of Water Resources Policies	Section 3.2
(10) Surface Water Management	Section 3.2
(11) Operation Faciliites	Section 3.2
(12) Groundwater Monitoring	Section 3.3
(13) Land Subsidence Monitoring	Section 3.4
(14) Land Use Planning	Section 3.4
(15) Groundwater Basin and Resource Reports	Section 3.5
(16) Local Agency and Stakeholder Involvement	Section 3.5
Recommended Plan Components (Bulletin 118 - Update 2003, Appendix C)	
(1) Stakeholder Participation	Section 5.1
(2) Plan Area Description	Section 1.2, Section 2
(3) Basin Description and Conditions	Section 2
(4) Management Plan Objectives	Section 1-5, Section 3
(5) Mandatory Protocols	Section 1
(6) Monitoring Program	Section 4
(7) Periodic Groundwater Reports	Section 5.3
(8) Periodic Plan Re-evaluation	Section 5.4

1.8 Plan Contact Information and Public Participation

Questions or requests for additional information regarding the DCTRA's Plan should be directed to the Program Manager at the following address:

Deer Creek and Tule River Authority
357 East Olive Street
Tipton, CA 93272
Phone: 559.686.4716
Fax: 559.686.0151

Business Hours: 8:00 am – 4:30 pm (Monday through Friday)

The DCTRA Board meets on the 3rd Friday of each month. DCTRA meetings are held at the above address and are open to the public.

SECTION 2 – BASIN CONDITIONS

2.1 General

The Tule Groundwater Sub-Basin (Basin) has been defined by DWR Bulletin 118 as a groundwater basin that is critically overdrafted. The Tule Basin is bordered by Kern County to the South, Tulare Lake to the West, Kaweah River to the North and the foothills to the East. There are three major surface watersheds located within the boundary of the Tule Groundwater Basin: Tule River, Deer Creek, and White River. The Tulare Lake Hydrologic Region is described in more detail in Appendix B: Tulare Lake Hydrologic Region, DWR Bulletin 118.

The Deer Creek and Tule River Authority (DCTRA) is located completely within the Tule Basin. The DCTRA Plan Boundary area (DCTRA Boundary) coverage includes the areas of the member districts and some additional land not within a particular member boundary. The DCTRA Boundary is located entirely within the County of Tulare and encompasses an area of approximately 289,000 acres bounded by:

East: Foothills of the Sierra Nevada Mountains
West: Kings/Tulare County Line
North: Northern boundary of Lower Tule Irrigation District and Porterville Irrigation District
South: Southern boundary of Pixley Irrigation District, Saucelito Irrigation District, and Terra Bella Irrigation District.

The City of Tulare is approximately 5 miles north of the Basin. Elevations range from approximately 250 feet above mean sea level in the western portion of the area to 500 feet above mean sea level in the eastern portion of the area (**Attachment B: USGS Quadrangle Map**). Two of the three major surface watersheds within the Tule Basin, the Tule River and Deer Creek, are within the DCTRA Boundary. **Attachment A** identifies the general location of the DCTRA Boundary within the Tule Basin and the member agencies and stakeholders within the DCTRA Boundary.

2.2 Geology

The Tule Basin is located in the Central Valley of California, also known as the San Joaquin Valley. The San Joaquin Valley comprises the area from the Sacramento - San Joaquin Delta to the North and the Tehachapi Mountains on the South. The Basin is located in the Southern portion of the San Joaquin Valley.

The Basin slopes very gradually along the surface from the east to the west (**Attachment B: USGS Quadrangle Map)**. Alluvial sediments are found within the Basin, and are bounded on the east by the granite from the Sierra Nevada Mountains and bounded on the west by the Tulare Lake bed, which contains a layer of diatomaceous E-Clay (Corcoran Clay). The alluvium within the Basin is a heterogeneous mix of clay, silt, sand, and gravel. Throughout the Basin are isolated locations of coarse grained material with high percolation rates, typically found where old streambeds historically meandered through the valley (**Attachment C: Soil Map**).

Along the east side of the Basin, the unconfined aquifer is deeper with a higher specific yield. Along the western portion of the Basin, there are locations of both a confined aquifer and unconfined aquifer, primarily due to the E-Clay.

The groundwater flow direction typically follows the direction of the ground surface gradient, from the east to the west. The direction of groundwater flow from the Spring of 2011 groundwater level measurements is primarily east to west as identified in **Attachment D**.

2.3 Hydrology

The hydrology of the DCTRA Boundary area is greatly impacted by the amount of snow that the upper portion of the Tule River and Deer Creek Watershed receives and the amount of precipitation that occurs on a yearly basis. The Basin is composed of both confined and unconfined aquifers. Groundwater typically flows from the foothills to the western edge of the groundwater basin. Groundwater is extracted for municipal, industrial and agricultural purposes. With reduced precipitation and surface water supply, groundwater extractions increase significantly to meet the demands, causing fluctuations in the depth to groundwater. When surface water is more readily available, the groundwater extractions are reduced and the demands supplemented with surface water.

2.3.1 Climate

The Climate of the region is semi-arid with mild winters and hot, dry summers. The average rainfall received in Basin is approximately 9 inches per year. The eastern edge of the Basin along the foothills experiences higher amounts of rainfall, while the western edge of the Basin is typically more arid and dry. Precipitation usually occurs from November to May. Snow typically melts during the spring months of April through June. From May through November, the area generally experiences dry summers where almost no rain occurs. A summary of the average monthly precipitation throughout the Basin as recorded by the Army Corps of Engineers (COE), California Irrigation Management Information System (CIMIS), and the Department of Water Resources (DWR) are shown below in **Table 2-1**.

Table 2-1: DCTRA Basin Precipitation Averages

Station Name	Success Reservoir (COE)	Porterville (CIMIS 169)	Alpaugh (CIMIS 203)	Delano (CIMIS 182)	Visalia (DWR VSL)
Data Range	1966 - 2011	2000 - 2012	2006 - 2012	2002 - 2012	1905 - 2012
Location within DCTRA Basin	Eastern Edge	East-Central	South Western Edge	Southern Boundary	Northern Boundary
Monthly Precipitation Averages (inches):					
January	2.36	1.44	1.11	1.14	1.94
February	2.18	1.28	0.93	1.05	1.80
March	2.24	1.05	0.68	0.99	1.61
April	1.15	1.13	0.53	1.00	0.94
May	0.38	0.47	0.17	0.35	0.36
June	0.10	0.02	0.11	0.06	0.08
July	0.03	0.01	0.01	0.00	0.01
August	0.03	0.00	0.00	0.00	0.01
September	0.30	0.05	0.06	0.01	0.12
October	0.60	0.49	0.23	0.63	0.47
November	1.33	0.80	0.50	0.89	0.93
December	1.94	1.77	1.40	1.34	1.61
Total Yearly Average:	**12.65**	**8.52**	**5.71**	**7.45**	**9.88**

2.3.2 Surface Water Supplies

The DCTRA members have three main sources of surface water supply: snow melt, precipitation, and stormwater run-off captured from the Tule River and Deer Creek, and the Central Valley Project (CVP) water supply obtained through the long term contracts with the United States Bureau of Reclamation (Bureau).

The Tule River and Deer Creek naturally flow through the Basin. Surface water flow of the Tule River is controlled in Success Reservoir, which is owned and operated by the Army Corps of Engineers (COE). The Tule River run-off from snow melt and precipitation is controlled in Success Reservoir through flood control operations by the COE during the flood season (November – April). After the flood controlled season, the run-off may be stored or released to satisfy the demands of the member districts of the DCTRA that are a part of the Tule River Association (*Lower Tule Irrigation District, Porterville Irrigation District, Vandalia Irrigation District*).

Deer Creek is categorized as an ephemeral stream, wherein the run-off is seasonal based upon precipitation and snow melt from the Sierra Nevada Mountains. Recharge basins along Deer Creek help manage the seasonal flows. Typically, the timing of the seasonal flows does not correspond with the downstream irrigation water demands. Efforts to control Deer Creek for recharge has been underway as part of the implementation of this Plan.

The CVP water originates from the Friant Division, and the Cross Valley Canal Project of the Central Valley Project under long-term contracts with the Bureau. Additional CVP water may be available to the member agencies in addition to the contracted amounts on a year to year basis depending upon the hydrologic conditions of the San Joaquin River.

Table 2-2 below summarizes the average surface water supply and source of surface water for each member district of the DCTRA.

Table 2-2: DCTRA Member Surface Water Supply Summary

MEMBER DISTRICT	AVERAGE TULE RIVER SUPPLY (Acre-ft)	AVERAGE DEER CREEK SUPPLY (Acre-ft)	CVP/CVC SUPPLY CONTRACTS (Acre-ft)	AVERAGE YEARLY CVP SUPPLY (Acre-ft)	CONVEYANCE SYSTEM
Lower Tule River Irrigation District *(not including DKTRA)*	92,000	*N/A*	61,200 Class I 238,000 Class 2 31,102 CVC	156,240	163 miles of canal 47 miles of Tule River Channels 5 miles of pipeline
Pixley Irrigation District	*N/A*	4,645	31,102 CVC	33,000	46 miles of canal 14 miles of Deer Creek River Channel
Porterville Irrigation District	26,000	*N/A*	16,000 Class I 30,000 Class 2	27,320	13 miles of canal 7 miles of pipeline 12 miles of Tule River/ Porter Slough Channels
Saucelito Irrigation District	*N/A*	*N/A*	21,200 Class I 32,800 Class 2	33,300	All Pipeline
Terra Bella Irrigation District	*N/A*	*N/A*	29,000 Class I	26,680	All Pipeline
Tea Pot Dome Irrigation District	*N/A*	*N/A*	7,500 Class I	6,688	All Pipeline
Vandalia Irrigation District	6,582	*N/A*	*N/A*	*N/A*	8 miles of canal
TOTAL *(Within DCTRA BASIN)*:	***124,582***	***4,645***		***283,228***	
Stone Corral Irrigation District[1]	*N/A*	*N/A*	10,000 Class I	9,200	100% Pipeline

[1] *- Not in DCTRA Groundwater Basin*

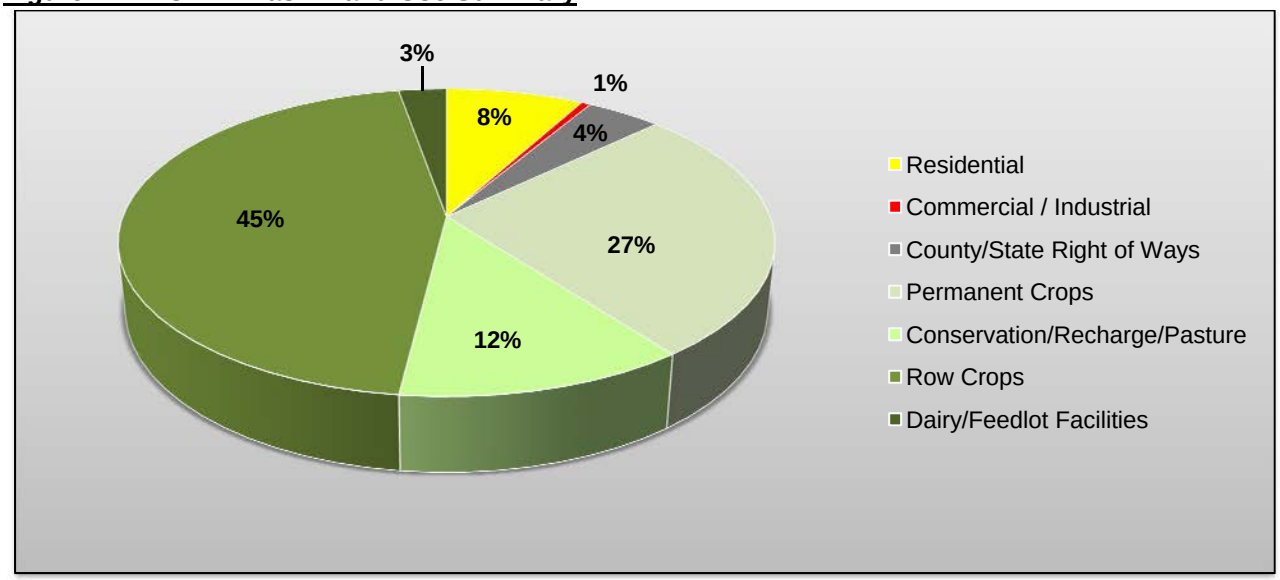
2.3.3 Surface Water Storage Facilities

Within the Tule Basin, there are approximately twenty eight (28) groundwater recharge basins covering a total area of approximately 2,100 acres. Some of these recharge basins have been set aside as part of a groundwater banking projects. In addition to the recharge basins, there are approximately sixty (60) miles of unlined Tule River, forty (40) miles of unlined Deer Creek, sixteen (*16*) miles of unlined Porter Slough, and several hundred miles of unlined canals that provide groundwater recharge when water is delivered through the channels. **Attachment E** identifies the location of the recharge basins and unlined channels within the DCTRA Boundary.

2.4 Land Use

The DCTRA Boundary area covers a total area of approximately 289,000 acres. The areas within the DCTRA Boundary have historically been rural in nature, dominated by agricultural land use. Over the years, the communities within the DCTRA Boundary have continued to grow and the lands developed in irrigated grown agricultural uses, but the pre-dominate land use continues to be agriculture. The primary demand for water in the Tule Basin is for irrigation of agriculture, although there are continual changes in the types of agriculture crops grown within the Basin. Within the Annual Report, yearly changes in water demands based on land use changes are identified. The current land use within the DCTRA Boundary is summarized in **Figure 2-1** below. A map identifying the land use locations and designations throughout the DCTRA Boundary area is included as **Attachment F**.

Figure 2-1: DCTRA Basin Land Use Summary



2.5 Population

There are six developed communities within the DCTRA Boundary area (**Attachment A**). The total population of the DCTRA Boundary area has increased from 57,365 people to 74,305 people in the past decade, between year 2000 and year 2010, approximately a 30% increase. The historical population, 1960 through 2010, for each community within the DCTRA Boundary area is summarized below in **Table 2-3.**

Table 2-3: Community Populations within DCTRA Basin

Community	**2010 Census**	2000 Census	1990 Census	1980 Census	1970 Census	1960 Census
Porterville, including East Porterville Urban Area	**60,932**	46,346	35,353	24,910	21,309	16,164
Terra Bella	**3,310**	3,466	2,740	< 2,500	1,037	2,287
Tipton	**2,543**	1,790	1,383	< 2,500	< 1,000	1,045
Pixley	**3,310**	2,589	2,457	< 2,500	1,584	1,327
Woodville	**1,740**	1,678	1,557	< 2,500	1,031	1,045
Poplar / Cotton Center	**2,470**	1,496	1,901	< 2,500	1,239	1,478
Total Population:	**74,305**	57,365	45,391	29,801	26,200	23,346

SECTION 3 – BASIN MANAGEMENT OBJECTIVES & STRATEGIES

The DCTRA member agencies have developed five Basin Management Objectives (BMO) to guide the Plan implementation. These BMO's are the key Plan components to help provide a more reliable groundwater supply for long-term beneficial uses within the Basin are listed as follows:

1. To promote and realize groundwater resource protection;
2. To facilitate groundwater resource sustainability;
3. To develop groundwater resource understanding;
4. To develop groundwater basin understanding; and
5. To promote and facilitate information dissemination regarding the groundwater resource.

The original Groundwater Management Plan (**Appendix A**) identified strategies for implementation of each BMO within the Basin. The strategy and narrative description of each BMO is summarized below. A complete table summarizing the BMO's is included within **Appendix D**.

3.1 Groundwater Resource Protection

The principal focus of the groundwater resource protection BMO is to identify strategies to protect groundwater quality. The beneficial uses of groundwater within the Basin are primarily for agriculture uses and domestic uses, both of which require a certain level of groundwater quality to continue as a viable resource. DWR Bulletin 118, per Water Code Section 10753, identifies the following strategies to be included within the Plan to help achieve the objective. A description and implementation strategy of each objective is summarized below.

3.1.1 Saline Water Intrusion

The western edge of the Tule Groundwater Sub-Basin is located about 90 miles east of the Pacific Ocean. A coastal mountain range physically separates the Basin from the Pacific Ocean as well. The DCTRA does not consider saline water intrusion control as a management strategy that warrants consideration.

3.1.2 Wellhead / Recharge Area Protection

The protection of the existing wells (both domestic and irrigation) and the recharge basins are essential to provide adequate protection to groundwater quality. Existing wells can provide a direct conduit to groundwater for septic waste, nutrients, fertilizers, and pesticides applied at or near the ground surface. Recharge basins are typically located and constructed in areas with high soil permeability, allowing surface water to quickly enter the groundwater aquifer.

The DCTRA will continue to promote protection of the wellheads and recharge basins within the DCTRA Boundary area, focusing on:

1. Physical protection measures such as fencing or established setback distances and dirt berms to protect the wellhead from surface inundation or dumping of wastes at recharge basins.
2. Work with other regulatory agencies, such as the Tulare County Environmental Health Department, the Regional Water Quality Control Board, and the Department of Water Resources to verify wells are constructed and installed to provide adequate protection of groundwater quality.

3. Provide outreach to landowners and growers within the DCTRA Boundary for education of different ways to protect existing wells and recharge basins.

3.1.3 Migration of Contaminated Groundwater Controls

The regulations and controls for contaminated groundwater from source specific plumes of contamination, such as underground storage tanks, fall under the jurisdiction of various state and federal agencies. The DCTRA has not pursued regulations regarding unattributed groundwater contamination.

The DCTRA has developed protocols to obtain and compile information regarding contaminated groundwater, including a groundwater monitoring program. The DCTRA has monitored regulatory activities and available records on groundwater within the Basin and has begun creating a database to evaluate the available data.

The DCTRA will continue to collect and compile available information regarding the contaminated groundwater within the basin from the different regulatory agencies. The data will be added to the database for determination of trends and problem areas that need to be addressed.

3.1.4 Well Abandonment and Destruction Policies

Improper well abandonment may allow contamination of groundwater by creating a direct or indirect conduit from the surface to the groundwater. Well abandonment must be conducted in conformance with standards adopted by Tulare County. The DCTRA will monitor these activities by reviewing abandonment records compiled by Tulare County. Appropriate information on proper abandonment of wells within the Plan area will be made available through the DCTRA. The DCTRA will pursue the conversion of production wells to monitoring wells if possible, in lieu of well abandonment.

3.1.5 Well Construction Policies

The increase in groundwater extractions resulting from the construction of additional wells affects the long-term balance of water in the Basin. Well construction may also allow contamination of groundwater if not constructed properly. Well construction must be conducted in conformance with standards adopted by the County of Tulare. The DCTRA will monitor these activities by reviewing well construction records compiled by the County. Appropriate information on proper construction of wells within the Plan area will be made available through the DCTRA.

Opportunities for additional groundwater monitoring wells may arise through the abandonment of existing production wells. The DCTRA will consider such a conversion to eliminate the construction of new monitoring wells.

The DCTRA has established plan activities regarding well construction, including establishing a protocol with Tulare County to create a database of constructed wells, establish public outreach and education with the stakeholders, and develop guidelines for converting an abandoned well to a monitoring well.

3.2 Groundwater Resource Sustainability

The principal purpose of the groundwater resource sustainability BMO is to identify strategies for maintaining adequate groundwater within the Basin to satisfy water use and water demands. Through a combination of groundwater and surface water supply, the users within the Basin are able to meet their water demands. The Basin has been identified as a critically overdrafted basin in the DWR Bulletin 118 evaluation. The goal of this BMO is to find ways for the DCTRA to provide a balance of the water quantity in conformance with water demands.

This BMO will begin the process of quantifying the surface and groundwater supplies available to the DCTRA members and stakeholders and to define the interaction between these supplies. Groundwater storage is affected by groundwater pumping and groundwater recharge as water users meet their water demands. The net result of the use of the available water supplies, both surface and groundwater, and the water demand is a change in groundwater storage. This BMO is intended to provide the DCTRA member participants with the information and tools required to maintain and improve the total water supply through coordinated regional management of groundwater.

DWR Bulletin 118, per the Water Code Section 10753, identifies the following strategies to be included within the Plan to help achieve this objective. Descriptions of the existing and updated strategies are summarized as follows:

3.2.1 Overdraft Mitigation

The Basin has been identified by DWR Bulletin 118 as an overdrafted basin, which has been verified by the continued historical trend of declining groundwater levels. The purpose of the overdraft mitigation strategy is to find ways to balance water demands to available water (surface water and groundwater) within the Basin by the stakeholders. This strategy has been companioned with other management strategies, namely: Groundwater Recharge/Management, Groundwater Extraction Policies, Conjunctive Use Policies, and Surface Water Management.

The goal of this overall strategy is to achieve a net hydrologic balance within the Basin, which would result in preventing additional groundwater overdraft.

3.2.2 Groundwater Recharge Management

The groundwater within the Basin is recharged both naturally and through deliberate controlled measures. Natural recharge is based upon the hydrologic conditions of a particular year which includes precipitation occurring within the Basin and from the adjacent Sierra Nevada snow melt. The natural recharge occurs in localized low points and in natural streams or waterways. Because the participants and stakeholders within the Basin are located throughout the entire Basin, in areas not adjacent to natural streams or localized low spots, they rely on groundwater as the sole source of water. But, through controlled measures, the DCTRA members have constructed canals and pipelines to distribute surface water to the areas otherwise reliant exclusively upon groundwater to minimize groundwater pumping. In addition to the canals and streams, recharge basins have been constructed within the Basin that have high permeable soils.

The delivery of surface water for irrigation purposes reduces the need for water users to draw on groundwater. The availability surface water fluctuates on a yearly basis, dry years

requires more groundwater pumping to meet water demands, wet years allow surface water to be discharged in recharge basins to replenish the groundwater and to be diverted through the canals to the water users to minimize groundwater pumping. The use of surface water in this manner is known as in-lieu recharge and is practiced by the DCTRA participants. An additional groundwater recharge benefit is also derived when irrigation water is applied in excess of the crop demands.

The DCTRA has implemented activities to maintain and expand the network of groundwater recharge facilities, maintain and expand the surface water delivery network within the DCTRA Boundary, and pursue additional surface water supplies that may be available, specifically for groundwater recharge.

3.2.3 Groundwater Extraction Management

A critical strategy in preventing groundwater overdraft is to minimize the extraction of groundwater and to maximize the use of available surface water. Within the Basin, the pumping of groundwater is principally by private wells for irrigation of agricultural crops.

The DCTRA members have strategized to provide economically priced surface water to the participants to encourage the use of surface water rather than pumping groundwater.

The DCTRA members have implemented activities to secure surface water supplies and pricing that encourages surface water use by the growers, developed and implemented educational programs focused on the time of use of groundwater and surface water, and developed grower incentive based banking programs.

3.2.4 Conjunctive Use Policies

Groundwater management in California is rooted in the conjunctive use of surface and groundwater resources. Use of the water from the two sources is integrated to accomplish the optimum utilization of each source.

In years of surface water shortage, the previously stored water is pumped to supplement the available surface water. DCTRA participants will attempt to maximize the utilization of available facilities and resources for conjunctive use through cooperative management.

Conjunctive use opportunities motivated the DCTRA participants to enter into long-term contracts with the United States beginning in 1950 for the importation of supplemental surface water from the Friant Unit of the Central Valley Project.

Water transfers and exchanges are an integral part of the existing conjunctive use programs. Under the Plan, the DCTRA participants will seek to preserve and enhance conjunctive use activities through coordinated use of available supplies made possible by water transfers and exchanges and through expansion of recharge facilities. Enhancement of conjunctive use activities could include the development of water banking arrangements with other agencies by utilizing available groundwater storage capacity for temporary storage of water.

The DCTRA management strategy for conjunctive use will result from the integration of the following Plan strategies including Groundwater Recharge Management, Groundwater Extraction Management, and Surface Water Management.

3.2.5 Operation of Facilities

The operation of the facilities is a management strategy which includes both the construction of new facilities and the operation of existing facilities to address groundwater recharge, extraction of stored water, conservation, contamination clean-up and water recycling. Current efforts primarily address groundwater recharge through recharge basins and unlined irrigation distribution canals. In general, the current operations are the result of the construction of facilities by the individual members of the DCTRA.

Additional facilities will be needed to sustain the groundwater resource as additional water demands are placed on the groundwater resource. The DCTRA participants will continue to evaluate potential projects which will allow surface water to be distributed and recharged throughout the Basin. The current scope of this strategy will be expanded as necessary. Opportunities to incorporate recycling and reclamation of water and water conservation may be possible through coordination with domestic utility providers.

The DCTRA participants have implemented Plan activities to encourage the use of unlined channels, maintain recharge basins, develop and implement protocol to identify operational projects, and upgrade and expand surface water conveyance facilities.

3.3 Groundwater Resource Understanding

The purpose of the Groundwater Resource Understanding BMO is to further develop knowledge about the groundwater of the Basin. With detailed information regarding the groundwater resource, improved characterization will lead to future groundwater management decisions. The primary Plan element strategy that will achieve this BMO is groundwater monitoring.

3.3.1 Groundwater Monitoring

Monitoring of groundwater levels annually will provide history of the change in storage which will reveal the effectiveness of other strategies, such as groundwater recharge efforts. Monitoring data developed over time will serve as the foundation of conclusions on groundwater reliability and management strategies effectiveness. The Groundwater Monitoring protocol and details are summarized in Section 4 of this Plan.

3.4 Groundwater Basin Understanding

This BMO involves the collection of information in the Basin to facilitate evaluations regarding Basin features and potential groundwater resource impacts.

Changes in the Basin's topographic, geologic, and hydrologic conditions may adversely impact the groundwater. Land use development can impact both the quantity and quality of groundwater. The availability of surface water reduces overall demand on the groundwater.

Through the strategies developed for this BMO, the DCTRA participants will remain familiar with the Basin topographic, geologic, and hydrologic conditions that may effect the groundwater resource. The DCTRA

participants will have the capability to react to proposed projects and changing conditions to avoid adverse groundwater impacts.

The original Groundwater Management Plan identified strategies to help implement each BMO within the DCTRA Basin. A description, along with the strategies associated, of each BMO is summarized below.

3.4.1 Land Subsidence Monitoring

The DCTRA participants have not collected information regarding land subsidence within the Basin. This management strategy requires the survey of a baseline control network and then periodically a resurvey of the control points for determination of the change or to determine land subsidence. Once the baseline data has been collected, this data can be used as comparison data for future subsidence evaluations.

The DCTRA will continue to participate with other agencies that may have funds for land subsidence monitoring that will establish an elevation control network throughout the Basin and conduct periodic resurveys of the control network to determine a presence of land subsidence. These efforts will continue to be implemented through this amended plan.

3.4.2 Land Use Planning

The Land Use Planning management strategy consists of reviewing land use plans and coordination with local planning agencies. Under this strategy, the DCTRA participants will review projects and proposed activities within the basin that may affect groundwater or surface water quality or quantity.

The DCTRA participants have planned to maintain protocols to participate in local land use planning efforts and continue the participation in the California Environmental Quality Act as a responsible agency.

3.4.3 Surface Water Management

The DCTRA participants have three main sources of surface water supply, the Tule River, Deer Creek, and the Central Valley Project (CVP) water as described previously under **Section 2: Basin Conditions**.

Under this Plan, the DCTRA participants will seek to preserve the existing water rights and contracts and will pursue opportunities to supplement these supplies through importation of additional water supplies through the DCTRA participants. Supplementary supplies may be obtained through the purchase of additional CVP water from other entities, “Section 215 water” from the United States and through other programs as may be available. Efficient water use and distribution within the management area will be encouraged through the use of transfers and exchanges among DCTRA participants.

Importation of affordable water supplies, in quantities sufficient to achieve a long-term water balance within the service area of the DCTRA participants, is a prerequisite for successful implementation of the recharge groundwater management strategy. All opportunities to supplement the regular supplies of the DCTRA participants through long-term water exchanges and banking agreements will be evaluated for compatibility with the goals of this Plan pursuant to an adopted evaluation process.

This evaluation process will consist of the following steps:

1. Submittal of a written proposal and technical report to the DCTRA
2. DCTRA Advisory Committee and consultant evaluation
3. Proponent and DCTRA coordination
4. DCTRA Advisory Committee recommendation and Board of Directors action

For any proposed project, the proponent will initiate the process through the transmittal of a written proposal describing the project, including the anticipated benefits. A technical report will be prepared by the proponent and evaluated by the DCTRA, which shall include:

1. Quantities and Sources of Water
2. Structures and other physical features of the project
3. Water accounting measures and methods
4. Funding
5. Schedule, including CEQA compliance
6. Anticipated Benefits
7. Proponents Evaluation of compliance with Plan's management objectives.

The DCTRA Advisory Committee will evaluate the Technical Report prior to any Board determination regarding the proposed project.

The DCTRA Advisory Committee will utilize outside consultants, as necessary, for further evaluations. The proposal and technical report will be reviewed for consistency with the Plan BMO's and utilization of adopted management strategies.

The resulting evaluation will be returned to the project proponent. The DCTRA Advisory Committee will coordinate with the Proponent to develop the final proposed project. Upon finalization of the proposed project, the DCTRA Board of Directors will act to determine the compatibility of the proposed project with the goals of this Plan. Similarly, water exchange and banking agreements among the DCTRA participants will be used where they may enable the DCTRA participants to distribute water to areas identified under this Plan suffering from groundwater depletion and as being suitable for groundwater storage.

The quality of the surface water is important to the Basin. Because of the different sources of surface water, the quality of the surface water varies. Imported surface water generally originates in the San Joaquin River watershed (*Friant-Kern Canal*). Local surface water generally originates in the Tule River and Deer Creek watersheds. These imported and local surface waters are subject to monitoring by various agencies. Under this management strategy, the DCTRA will review data from the existing monitoring programs identified in **Table 3-1.**

TABLE 3-1: SURFACE WATER QUALITY MONITORING

SURFACE WATER	MONITORING AGENCY	FREQUENCY
Friant-Kern Canal	Reclamation District 770	Annually
	Terra Bella Irrigation District	Varies - month to annually
Tule River	Reclamation District 770	Annually
	Tule River Association	Seasonal
	Southern San Joaquin Valley Water Quality Coalition - ILRP Waiver Program	Varies - month to annually
Deer Creek	Southern San Joaquin Valley Water Quality Coalition - ILRP Waiver Program	Varies - month to annually

The DCTRA Plan has implemented activities to maintain or increase quantities of imported surface water, preserve existing surface water rights, promote efficient water use through the use of water exchanges and transfers, investigate potential for water banking opportunities within the Plan area, develop additional water storage capacity within the Plan area, and monitor existing surface water quality data completed by other agencies.

3.5 Information Dissemination

Groundwater resource and basin information and knowledge will result from the active implementation of the Plan. The DCTRA participants will serve as the primary conduit of information regarding the Plan and the subsequent data and results.

Through the strategies from the BMO's, the Plan will compile various data and information regarding the Basin and the resources available. The DCTRA participants will compile, manage, and disseminate this information to facilitate improved coordination and use of the Plan's hydrologic resources. The plan will also result in various opportunities for the DCTRA stakeholders to respond to BMO's and efforts.

The original Groundwater Management Plan identified strategies to help implement each BMO within the Basin. A description, along with the strategies associated, of each existing and updated BMO is summarized below.

3.5.1 Groundwater Basin and Resource Information Management

The purpose of the groundwater basin and resource information management strategy utilized by the DCTRA participants for the Plan is to collect all available information and compile into a standard database that is readily available for evaluation purposes. Many of the Plan efforts are completed by individual DCTRA participants or stakeholders. Creating a centralized database is critical to the Basin groundwater management.

Under this management strategy, the DCTRA participants will conduct assessments and evaluations of the data available. These efforts will serve as the basis of development for the DCTRA Annual Reports and other Plan documents.

In addition, a conjunctive use model for the Tule Groundwater Basin was developed by the DWR Bulletin 118 evaluation in 2002. This model will be used as a part of the database for information of the DCTRA.

The DCTRA participants have implemented activities to better collect and organize the data, including establishing data management authority and responsibilities, develop and implement data collection and inventory protocols and standards, and conduct periodic refinement and use of groundwater models.

3.5.2 Groundwater Basin and Resource Reports

This management strategy consists of the preparation of reports and other documents used by the DCTRA participants to disseminate information and findings regarding its efforts under the Plan. Reports will be used to document Plan activities and subsequent effectiveness. These reports will also be used to present new and / or additional knowledge regarding the Basin characteristics and resources.

Detailed information regarding the DCTRA participants reporting efforts are identified in **Section 5: Plan Implementation and Reports**.

3.5.3 Local Agency and Stakeholder Involvement

The purpose of the Local Agency and Stakeholder involvement Management strategy is to engage the individuals and agencies within the Basin. Three primary elements will form the foundation of this management strategy: Plan participation, Advisory Committee, and Public Review.

The first element is plan participation. There are many agencies within the Basin that are not directly involved in the groundwater management planning but benefit from the Plan efforts. The current DCTRA participants will continue to engage the agencies not involved to encourage involvement. The additional participants would increase the extent of coordinated groundwater resource management and the amount of resources available to the Plan.

The second element of this strategy is the development and utilization of a Plan Advisory Committee to address the implementation of the Plan. The DCTRA Participants will establish the Advisory committee to have representatives of the various agencies and resource interest in the Plan.

The third element of this strategy consists of public participation and review. The meetings of the DCTRA Board are open to the public. Public Notification will be completed to encourage public participation. During Plan reporting efforts, the public will be given opportunity to review and publicly comment on the Plan and its implementation. The Plan will be considered a Public Document available for inspection upon request.

SECTION 4 – BASIN MONITORING

To effectively manage the groundwater in the Basin, hydrological data is collected per the established groundwater monitoring program. The purpose of this element of the DCTRA Groundwater Management Plan is to identify the hydrological conditions within the Basin that will be monitored. The data collected through the monitoring program will be used to provide a better and more complete understanding, along with the trends, of the current and historical conditions within the Basin. The primary focus of the Monitoring Program is currently to measure the depth to groundwater to identify direction of groundwater flow and changes in groundwater depth year to year.

4.1 Monitoring Protocols

The goal of the Monitoring Program is to track the changes in conditions within the Basin for the purposes of meeting the groundwater management plan objectives. Accuracy of this data is critical. Consistency should be reflected in factors such as location and reference elevation at sample points, sampling procedures, testing procedures, time of year and frequency of sample collection. Consequently, uniform data gathering procedures are required for reliability of analyses. Specific protocols for water level and water quality monitoring are set forth below:

General protocols for the groundwater level measurement program include:

- Perform all groundwater level measurements of the Plan wells in as short a time period as possible.
- Perform semi-annual groundwater measurements at the same time of the year each year (February and October)
- Document the measurement reference point for each well
- Document the date and time of each measurement
- Measure each well twice, or more if needed, until consistent results are obtained
- If there is reason to suspect groundwater contamination, water level measure equipment should be decontaminated after the measurement
- Landowners will be contacted for permission to access their property for field measurement of their well(s)

General protocols for the groundwater quality monitoring program include:

- Adequate well pumping time prior to sample collection with documentation of stabilized parameters
- Proper sample containers, preservatives, and holding time
- Secure chain-of-custody procedures
- Testing shall be performed by an accredited, state-certified laboratory that uses proper quality control and quality assurance procedures
- Samples shall be given a quality assurance code, which represents the relative confidence in the sample
- Certain tests shall include spiked, duplicate and field-blank samples for comparison to genuine samples
- Proper handling procedures
- Documentation of all protocols and procedures that are used
- Uniform time of year for sampling
- Document the name, contact information, and qualifications of the individual taking the sample

- Landowners will be contacted for permission to access their property and sample the groundwater pumped from their well.

These protocols and new protocols may be adopted and implemented as required by the DCTRA board.

4.2 Groundwater Levels

Data on groundwater levels are used to evaluate groundwater movement and storage conditions. Groundwater contour maps showing lines of equal elevation of the groundwater surface indicate the direction of groundwater movement and also can be used to develop estimates of groundwater flow entering or leaving the management area. Maps of depth to groundwater can provide insight into the distribution of pumping lifts and resultant energy cost for extraction. Maps showing changes in groundwater levels, when used in conjunction with data on specific yield, can also be used to estimate changes in groundwater storage.

The member districts of the DCTRA regularly measure groundwater levels in approximately 300 wells. These wells are shown on ***Attachment G: Well Location Map***. Measurements are taken twice a year, once in the Spring (February) and again in the Fall (October). The current monitoring networks will be maintained or enhanced to assure the availability of sufficient data for the preparation of groundwater level and depth contour maps. Measurement of groundwater levels will continue to be performed twice a year in order to show seasonal variations.

In addition to the wells measured by the DCTRA members, additional groundwater data is being collected from readily available sources such as the Tulare County and the Department of Water Resources. Although this data does not have the consistency and standardization of the wells measured by the member districts, this data is used for analyzing overall trends in groundwater levels.

The DCTRA Annual Report summarizes both the historical and current groundwater trends within the Basin, based upon data collected and made available each year.

4.3 Groundwater Quality

Monitoring of groundwater quality provides the information required to determine the suitability of groundwater for various beneficial uses. Compiled groundwater quality data for the Plan area does not currently exist. The DCTRA participants will develop protocols to obtain groundwater quality data from readily available regulatory agencies that collect this data from domestic water providers, farmers, and dairies. Currently data from the community water systems within the basin are collected through the Consumer Confidence Reports. Other additional data that is readily available will be analyzed and reported within the Annual Report each year.

The sampling of the DCTRA participant wells will be expanded, if needed, to provide sufficient data to allow identification of areas where water quality is of concern. Supplemental sampling may also be performed to better define localized areas of impaired water quality. Testing will typically include standard agricultural type analysis, but may also include additional testing as required. The current strategy is to continue to find other sources of readily available data to begin monitoring yearly trends in groundwater quality throughout the Basin.

4.4 Additional Monitoring

Data related to the hydrologic inventory will be collected annually for quantification and analysis. Components of the hydrologic inventory include precipitation, runoff, imported supplies, amounts of groundwater replenished and quantities of groundwater extracted. Additional monitoring efforts will result from the following Plan management strategies: Groundwater Recharge Management, Groundwater Extraction Management, Surface Water Management, Land Use Planning, Well Abandonment/Destruction Policies, and Well Construction Policies.

SECTION 5 – PLAN IMPLEMENTATION & REPORTS

The DCTRA Groundwater Management Plan documents will be maintained at the office of the Lower Tule River Irrigation District. The office will act as the Plan's resource center and data clearinghouse. Monitoring Data and information gathered during the Plan implementation will be compiled and stored at the office. The DCTRA Advisory Committee will provide the lead for Plan activities, report preparation and information dissemination efforts.

5.1 Plan Participation

The Plan officially recognizes stakeholders through the execution of a Memorandum of Understanding (MOU). The original participants of the DCTRA executed a MOU to indicate their support of the original Plan. A copy of this MOU is presented in ***Appendix E.*** The purpose of the MOU is to document the interest and responsibilities of the participants in the adoption and implementation of the plan. The MOU also promotes the sharing of information, the developing of courses of action and the resolution of differences that may arise regarding the Plan. It is anticipated that stakeholder involvement will increase with time. The DCTRA will continue to pursue new stakeholder involvement and shall endeavor to enter into agreements with other local agencies. The form of agreement shall be consistent with the existing MOU and shall also be in compliance with California Water Code Section 10750.8.

5.2 Dispute Resolution

The Plan acknowledges that controversial issues may arise concerning the groundwater resource. Stakeholders and Participants are encouraged to work through the Plan in addressing and resolving differences. When this process proves insufficient, the DCTRA has a policy in place that can be applied. The Plan adopted the DCTRA's Alternative Dispute Resolution Policy (***Appendix F***).

5.3 Annual Report

Documentation in the form of an annual report will be prepared as required to document the results of the management strategy activities and monitoring elements of the Plan. The contents of the report will include:

1. Maps and/or tables showing:
    a. Spring and Fall groundwater elevations
    b. Modifications to the monitoring well network
    c. Change in groundwater levels between subsequent spring readings
    d. Groundwater quality data
2. Estimation of the change in groundwater storage computed using specific yield data and maps of change in groundwater levels
3. Summary of water resource data
4. Assessment of the effectiveness of management activities completed during the year

The Plan will be re-evaluated annually subsequent to the findings of the Plan's Annual Report. The DCTRA Advisory Committee will be responsible for monitoring the Plan strategies and monitoring to make sure progress is made towards the Basin Management objectives.

Additional reports and technical memoranda may be produced as a result of a particular Plan activity, due to grant funding requirements or need for more documentation or better understanding of the Basin.

5.4 Schedule

The schedule for the DCTRA Plan implementation and Annual Report will be structured to follow the schedule below:

Plan Management Strategies and Activities	Monthly (as required)
Advisory Committee	Bi-Monthly
DCTRA General Meeting	Bi-Monthly
Plan Annual Report	Annually
Plan Re-evaluation	Every 5 years
Groundwater Monitoring Levels	Semi-Annually – Spring and Fall
Groundwater Quality Levels	Annually

5.5 Program Funding and Fees

Implementation of the Plan will require dedicated funding through the DCTRA and the Plan Participants. Generally, the funding for the Plan and its activities will be derived from grants, in-lieu of contributions, cost sharing agreements and/or assessments.

The DCTRA will pursue opportunities to fund Plan activities through grants offered by the Bureau, the DWR, and other agencies. DCTRA Members may be asked to file a grant application on behalf of the DCTRA.

Cost for annual groundwater reports, Plan updates and other reporting efforts will be distributed and collected according to the cost-sharing agreements for DCTRA project activities. Additional cost-sharing agreements may be developed as necessary to fund other projects considered during the implementation of the plan.

Some Plan activities, such as groundwater level monitoring will be funded by the Districts' own operations.

Upon adoption of this Plan, the DCTRA has the ability to levy and collect general groundwater replenishment assessments, as well as water extraction fees based on the amount of groundwater extracted from the aquifer within the DCTRA Basin. Any assessment or fees proposed to be collected by the DCTRA under this Plan for the purpose of groundwater management must be approved per the statutory provisions related to Assembly Bill 3030.

5.6 Plan Implementation

Portions of the Basin Management Objectives identified in the previous DCTRA Plan have been implemented during the past 6 years. Primarily the focus has been on organizing data, monitoring groundwater levels, and compiling available data. But during this period, several actual projects have been completed and several others have been listed as potential projects to be completed to help implement the goals and objectives of this Plan. **Table 5-1** below lists the projects that are part of the DCTRA Plan implementation to date.

Table 5-1: DCTRA Groundwater Management Project List

Overall DCTRA Projects

1. Groundwater Banking Project at intersection of Deer Creek and Friant Kern Canal

Lower Tule River Irrigation District

1. 13 Existing Re-Charge Basins
2. Canal Inter-tie Project to more easily transport the available Tule River water throughout the district

Pixley Irrigation District

1. New Canal Project along Avenue 116 Alignment *(CEQA completed)*
2. 12 Existing Re-Charge Basins

Porterville Irrigation District

1. 2 Existing Re-Charge Basins

Tea Pot Dome Water District

1. 10 acre Groundwater Storage and Conjunctive Management of Surface Water and Groundwater Project

ATTACHMENTS

A. DCTRA Participant Member Districts

B. USGS Quadrangle Map

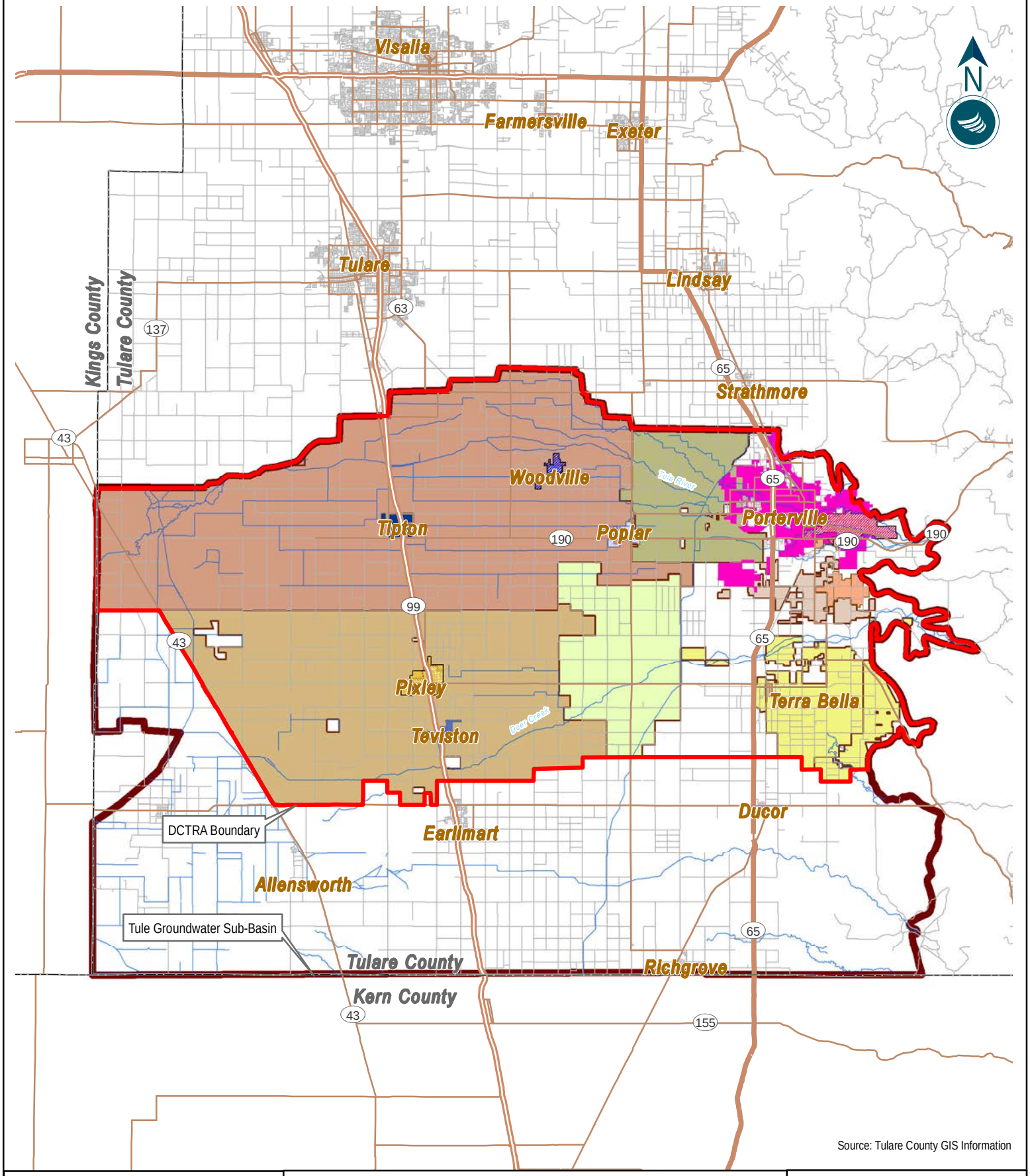
C. Soil Permeability Map

D. 2011 Groundwater Flow Direction Map

E. DCTRA Surface Water Distribution and Recharge Basins

F. DCTRA Land Use Map

G. DCTRA Well Location Map



0 1.25 2.5 5 Miles

4CREEKS
2929 W. Main St., Ste. A
Visalia, California 93291
(559) 802-3052

Legend

- County Boundary
- DCTRA Boundary (289,448 Ac.)

City/Communities

- Porterville (9,064 Ac.)
- Pixley PUD (896 Ac.)
- Porter Vista PUD (1,743 Ac.)
- Woodville PUD (348 Ac.)
- Poplar CSD (410 Ac.)
- Teviston CSD (199 Ac.)
- Tipton CSD (692 Ac.)

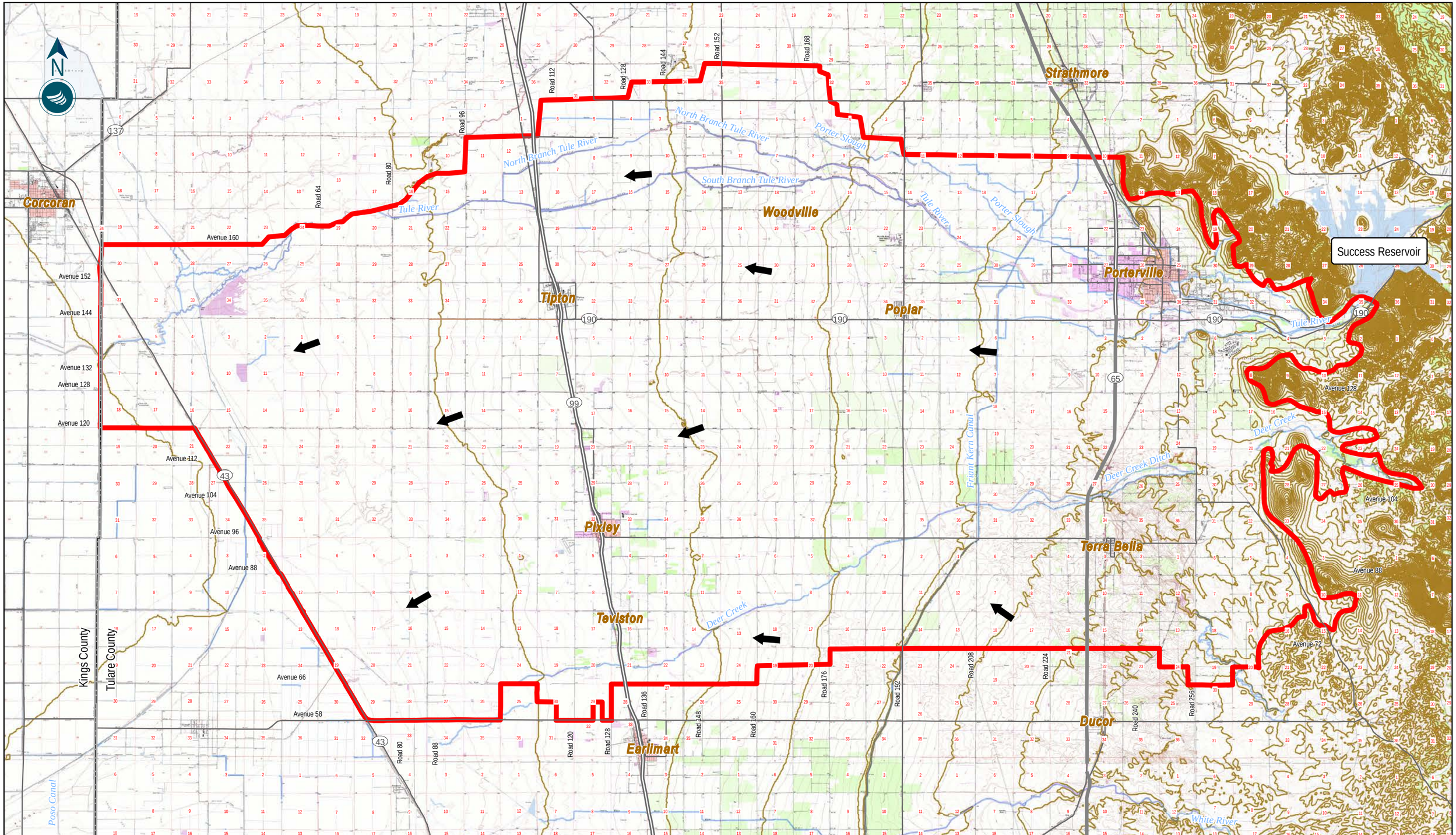
Member Districts

- Lower Tule River ID (103,034 Ac.)
- Pixley ID (69,014 Ac.)
- Porterville ID (16,997 Ac.)
- Saucelito ID (19,702 Ac.)
- Tea Pot Dome WD (3,481 Ac.)
- Terra Bella ID (15,053 Ac.)
- Vandalia ID (1,379 Ac.)

Attachment A

DCTRA Member Districts

Deer Creek Tule River Authority
Groundwater Management Plan



0 0.75 1.5 3 Miles

4CREEKS
2929 W. Main St., Ste. A
Visalia, California 93291
(559) 802-3052

Legend

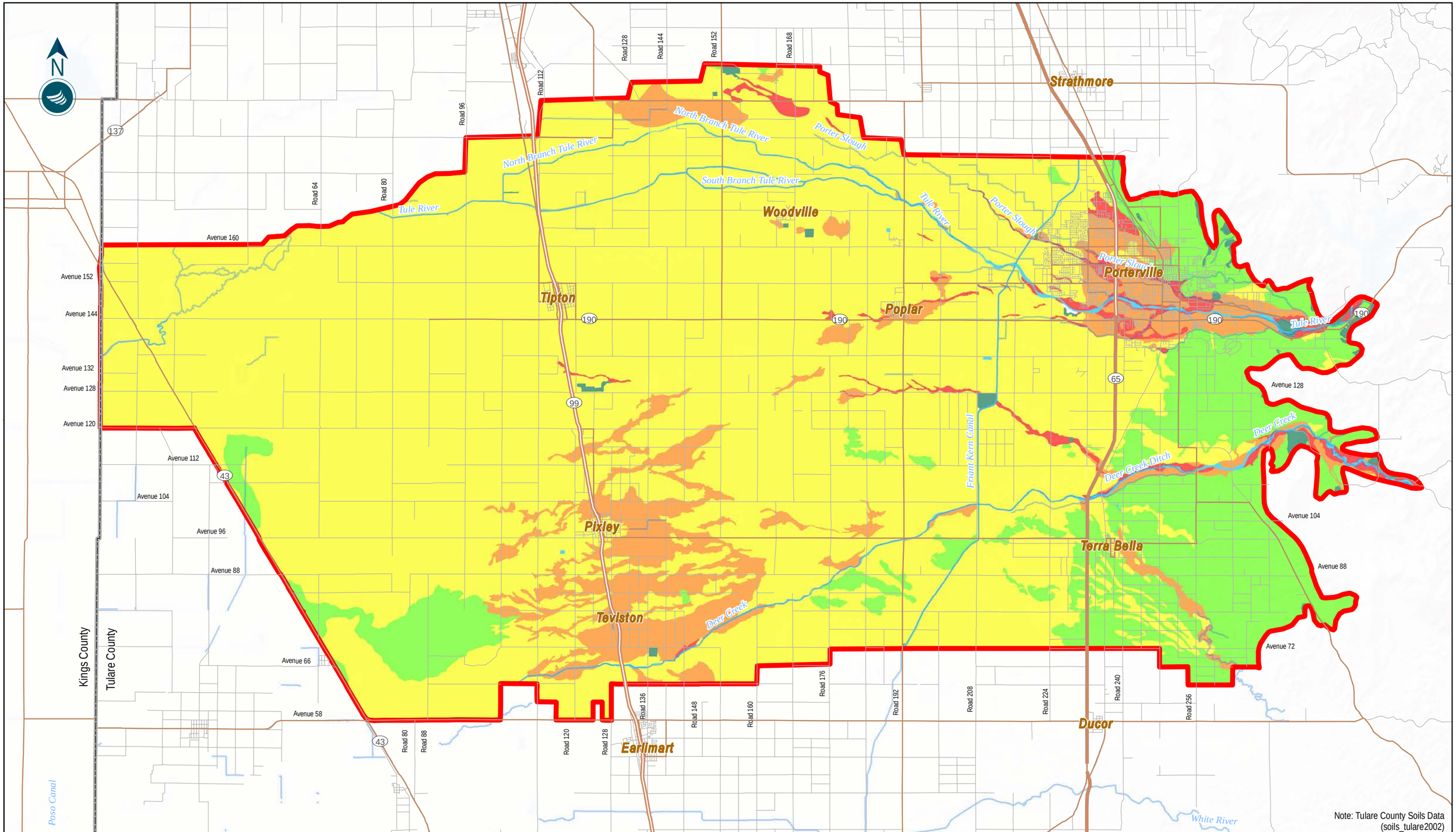
- DCTRA Boundary
- County Boundary
- General Direction of Ground Surface Gradient

USGS Quadrangle Maps

Cairns Corner
Tulare
Success Dam
Porterville
Woodville
Tipton
Taylor Weir
Corcoran
Fountain Springs
Ducor
Sausalito School
Pixley
Alpaugh

Attachment B
USGS Quadrangle Map

Deer Creek Tule River Authority
Groundwater Management Plan



Note: Tulare County Soils Data (soils_tulare2002)

4CREEKS
2929 W. Main St., Ste. A
Visalia, California 93291
(559) 802-3052

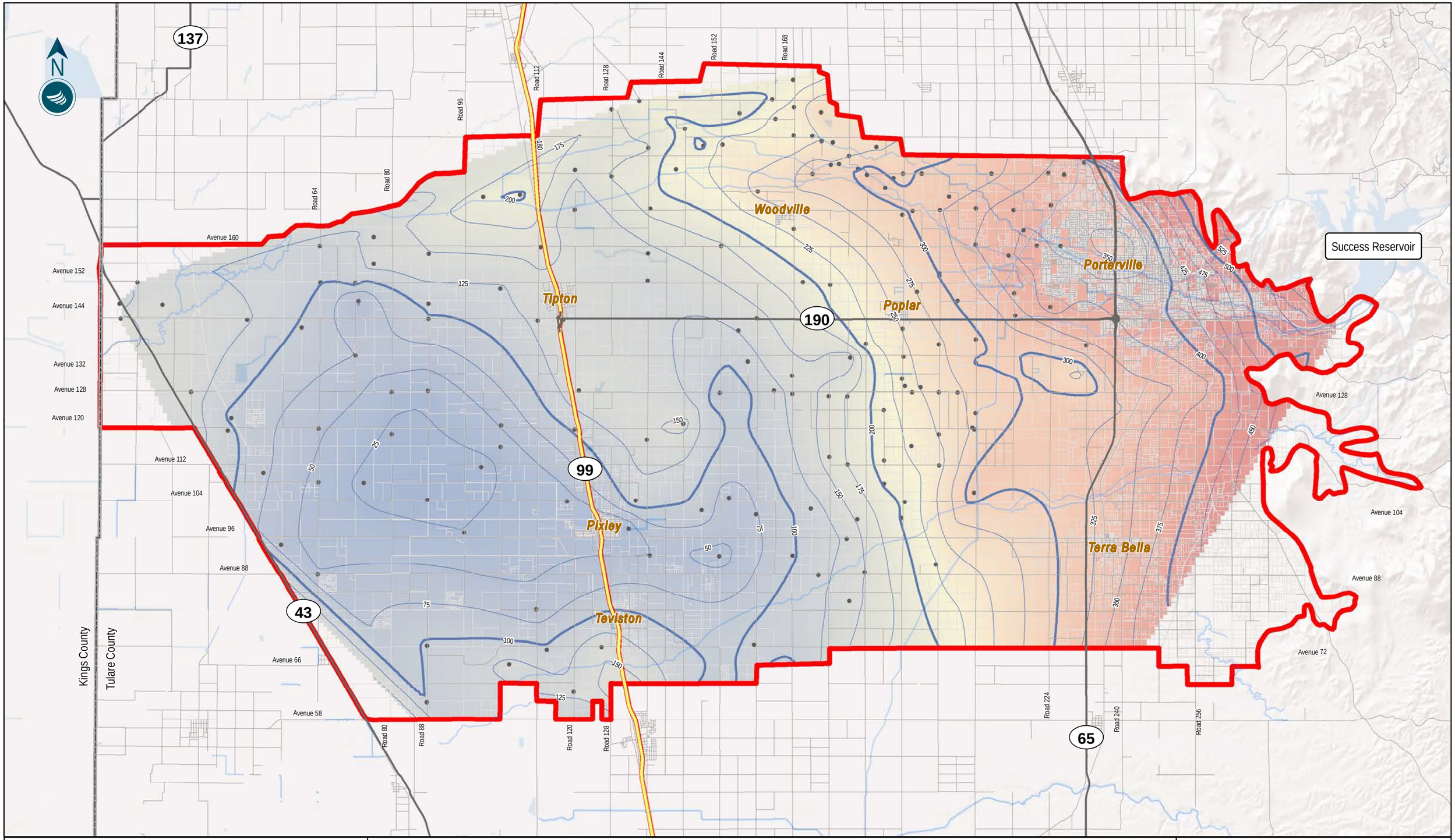
0 0.75 1.5 3 Miles

Legend

- Rock
- Slow
- Moderate
- Rapid
- Very Rapid
- Under Water

Attachment C
Soil Permeability Map

Deer Creek Tule River Authority
Groundwater Management Plan



0 0.75 1.5 3 Miles

2929 W. Main St., Ste. A
Visalia, California 93291
(559) 802-3052

Legend

- DCTRA Boundary
- Minor Contour (25' Interval)
- Major Contour (100' Interval)
- Well Locations

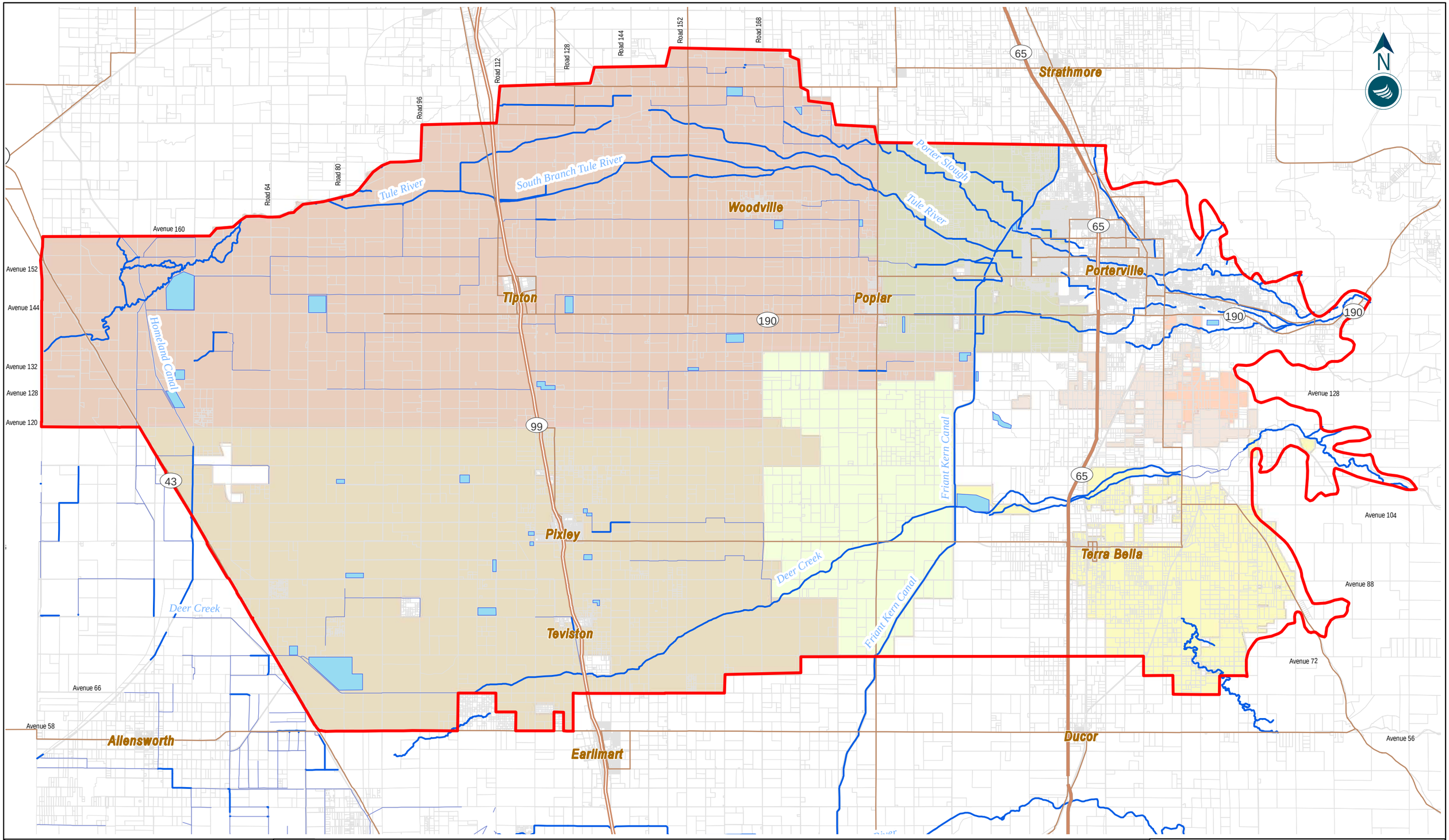
Gound Water Surface Elevation

- High : 709.7'
- Low : 13.2'

Note: Ground Elevations are based on the North American Vertical Datum of 1988 (NAVD88)

Attachment D
Groundwater Elevation Map
February 2011

Deer Creek Tule River Authority
Groundwater Management Plan



0 0.5 1 2 Miles

4CREEKS
2929 W. Main St., Ste. A
Visalia, California 93291
(559) 802-3052

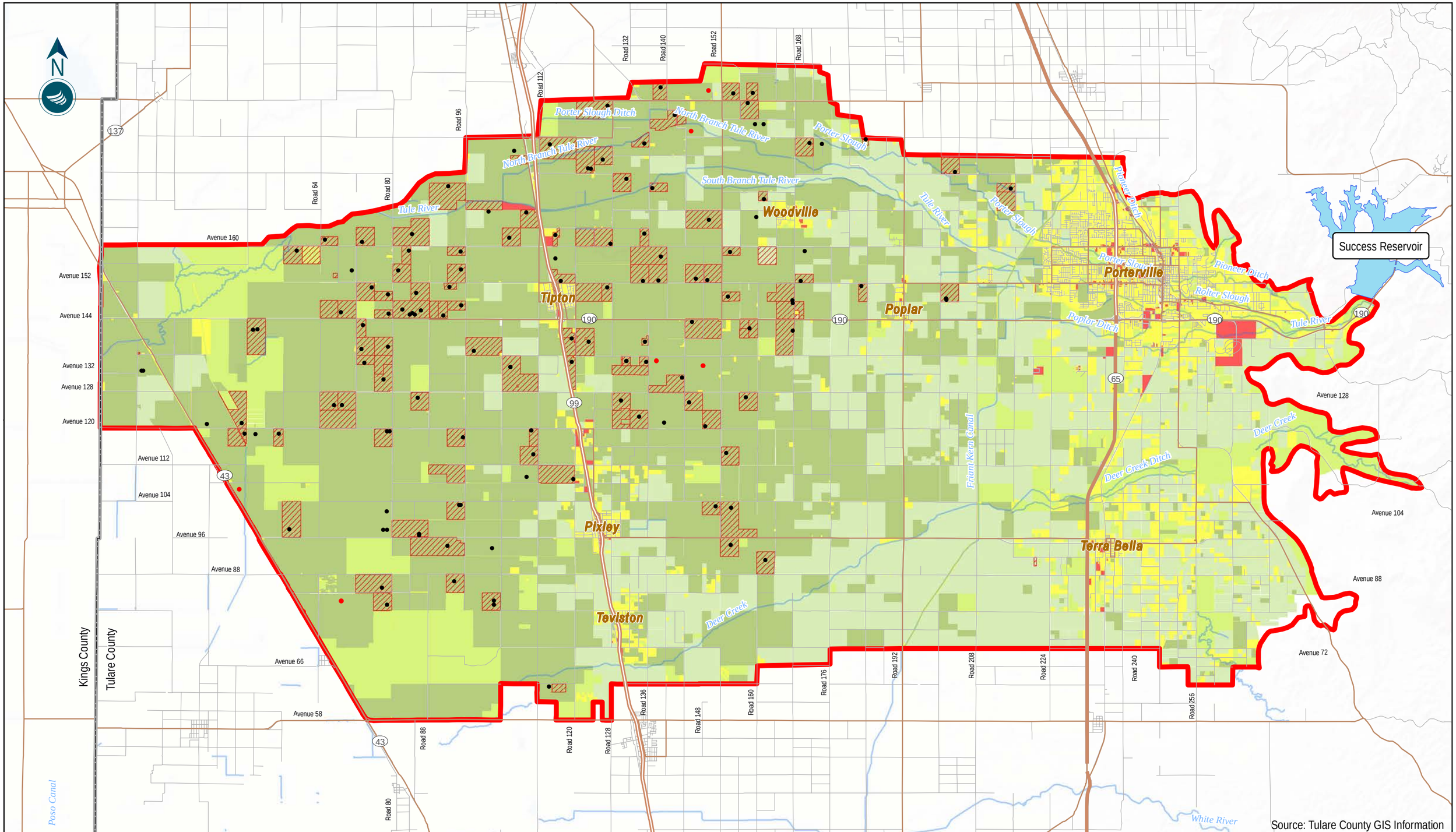
Legend

- Recharge Basins (2,082.8 ac)
- DCTRA Boundary
- Lower Tule River ID (103,034 Ac.)
- Pixley ID (69,014 Ac.)
- Porterville ID (16,997 Ac.)
- Saucelito ID (19,702 Ac.)
- Tea Pot Dome WD (3,481 Ac.)
- Terra Bella ID (15,053 Ac.)
- Vandalia ID (1,379 Ac.)
- Irrigation Canals
- Tule River (58.6 Miles)
- Deer Creek (39.6 Miles)
- Porter Slough (15.5 Miles)

Attachment E

DCTRA Recharge Basins
(LTRID & Pixley ID Distribution Systems)

Deer Creek Tule River Authority
Groundwater Management Plan



Source: Tulare County GIS Information

0 0.75 1.5 3 Miles

4CREEKS
2929 W. Main St., Ste. A
Visalia, California 93291
(559) 802-3052

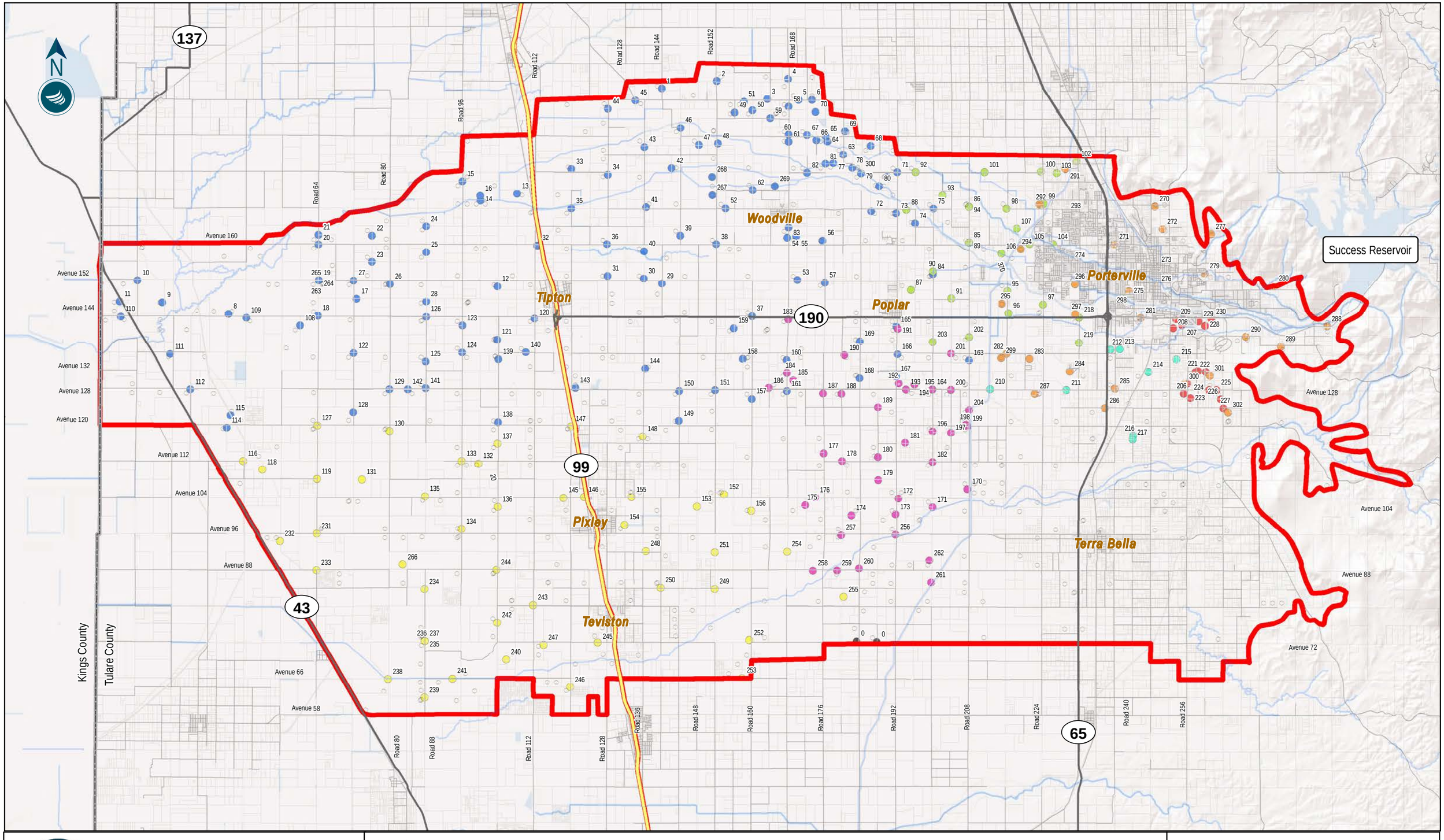
Legend

- DCTRA Boundary (289,448 ac.)
- County Boundary
- Tulare County Dairy Facility
- Residential (23,072.0 ac)
- Commercial/Industrial (1,546.7 ac)
- Ag-Permanent Crops (77,640.2 ac)
- Conservation/Recharge/Pasture (35,503.9 ac)
- Ag-Row Crops (138,282.0 ac)
- Dairy Milk Barn Location (136 Total)
- Feed Lot Locations

Attachment F

DCTRA Land Use Map

Deer Creek Tule River Authority
Groundwater Management Plan



0 0.75 1.5 3 Miles

4CREEKS
2929 W. Main St., Ste. A
Visalia, California 93291
(559) 802-3052

Legend

- DCTRA Boundary
- County Boundary
- Historical County Well Data
- DEID
- LTRID
- PID
- PIX ID
- SID
- TDWD
- TRA
- VID

Attachment G

DCTRA Well Location Map

Deer Creek Tule River Authority
Groundwater Management Plan