DRAFT

MODESTO SUBBASIN GROUNDWATER SUSTAINABILITY PLAN (GSP)

STANISLAUS AND TUOLUMNE RIVERS GROUNDWATER BASIN ASSOCIATION GROUNDWATER SUSTAINABILITY AGENCY (STRGBA GSA) and TUOLUMNE GSA

January 9, 2020

TODD GROUNDWATER

2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
510.747.6920
www.toddgroundwater.com

SIGNATURE PAGE

First Author Name, Credentials

First Author Title

Second Author Name, Credentials

Second Author Title

Third Author Name, Credentials

Third Author Title

ACKNOWLEDGMENTS

Funding for this project has been provided in full or in part from the Water Quality, Supply, and Infrastructure Improvement Act of 2014 and through an agreement with the State Department of Water Resources.

Table of Contents

List of Tables

List of Figures

Appendices

Acronyms

AF	acre-feet
AFY	acre-feet per year
AWMP	Agricultural Water Management Plan
CASGEM	California Ambient Statewide Groundwater Elevation Monitoring Program
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CPD	Comprehensive Planning Districts
CVRWQCB	Regional Water Quality Control Board, Central Valley Region
DMMs	Demand Management Measures
DWR	Department of Water Resources, State of California
DBCP	Dibromochloropropane
DTSC	Department of Toxic Substances Control
ESJWQC	East San Joaquin Water Quality Coalition
EWMP	Efficient Water Management Practices
FMMP	Farmland Mapping and Monitoring Program
GDE	Groundwater dependent ecosystem
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GMP	Groundwater Monitoring Program

ILRP	Irrigated Lands Regulatory Program
M&I	Municipal & Industrial
MID	Modesto Irrigation District
MOU	Memorandum of Understanding
MRWTP	Modesto Regional Water Treatment Plant
NMP	Nitrogen Management Plan
NPDES	National Pollution Discharge Elimination System
OID	Oakdale Irrigation District
PCE	Tetrachloroethylene
PEIR	Stanislaus County Programmatic Environmental Impact Report
RWS	Rural Water System
SCHM	Stanislaus County Hydrologic Model
SGMA	Sustainable Groundwater Management Act
SSJID	South San Joaquin Irrigation District
STRGBA	Stanislaus and Tuolumne Rivers Groundwater Basin Association
TAC	Technical Advisory Committee
TCP	Trichloropropane
TRRP	Tuolumne River Regional Park
USGS	U.S. Geological Survey
UWMP	Urban Water Management Plan
WDR	Waste Discharge Requirements

1. ADMINISTRATIVE INFORMATION

1.1. AGENCY INFORMATION

This Groundwater Sustainability Plan (GSP) addresses the Modesto Subbasin (5-22.02) located in the northern San Joaquin Valley Groundwater Basin. The GSP is being prepared jointly by the Stanislaus and Tuolumne Rivers Groundwater Basin Association Groundwater Sustainability Agency (STRGBA GSA) and the Tuolumne Groundwater Sustainability Agency (Tuolumne GSA). Collectively, these two GSAs have been deemed exclusive GSAs and cover the entire Subbasin. The Modesto Subbasin boundaries and service areas of the STRGBA GSA and Tuolumne GSA are shown on **Figure 1-1**.

Service area boundaries for the two GSAs are aligned with Subbasin boundaries and are defined on the north and south by the Stanislaus River and the Tuolumne River, respectively. The STRGBA GSA is bounded on the west by the San Joaquin River. The eastern STRGBA GSA boundary is defined by the boundary between Stanislaus County and Tuolumne County, and also represents the western boundary of the Tuolumne GSA. The STRGBA GSA covers approximately 99.5 percent of the Modesto Subbasin. The Tuolumne GSA is composed of five areas covering approximately 1,000 acres (approximately 0.5 percent) of the Modesto Subbasin that extend into Tuolumne County (**Figure 1-1**).

The Modesto Subbasin has been designated as a High-Priority basin by the Department of Water Resources (DWR) with implications under the Sustainable Groundwater Management Act (SGMA). In compliance with SGMA deadlines, the Modesto Subbasin GSP will be completed, adopted, and submitted to DWR by January 31, 2022. Both GSAs will adopt the GSP and share in GSP implementation.

1.1.1. Stanislaus and Tuolumne Rivers Groundwater Basin Association Groundwater Sustainability Agency (STRGBA GSA)

In April 1994, six agencies in the Modesto Groundwater Subbasin executed a Memorandum of Understanding (MOU) to establish the Stanislaus and Tuolumne Rivers Groundwater Basin Association (STRGBA). In 2015, the MOU was revised to include the City of Waterford. STRGBA has historically been the primary entity responsible for coordinating, planning, and management of the shared groundwater resources in the Modesto Subbasin.

The STRGBA agencies entered into an MOU to form the STRGBA groundwater sustainability agency (GSA) and filed a Notice of Intent with DWR on February 16, 2017. The STRGBA GSA includes seven local agencies:

- City of Modesto
- City of Oakdale
- City of Riverbank
- City of Waterford

- Modesto Irrigation District (MID)
- Oakdale Irrigation District (OID)
- Stanislaus County

Some STRGBA GSA members also serve areas outside of the Subbasin. Oakdale Irrigation District overlies portions of the Eastern San Joaquin Subbasin and participates in that subbasin GSP as the Oakdale Irrigation District Eastern San Joaquin Subbasin GSA. The City of Modesto provides water to communities within the Turlock Subbasin and participates as a member agency of the West Turlock Subbasin GSA (WTSGSA). The City of Waterford also has service areas in both the Modesto and Turlock subbasins and is an Associate Member of the WTSGSA. Stanislaus County spans portions of three subbasins in addition to the Modesto Subbasin including the Eastern San Joaquin Subbasin, the Turlock Subbasin, and the Delta-Mendota Subbasin; as such, the County is a member of multiple GSAs and participates in multiple GSPs. These cross-basin relationships provide a cooperative and coordinated approach to GSP development in the northern San Joaquin Valley.

Representatives of the STRGBA GSA member agencies have formed a Technical Advisory Committee (TAC) to assist the GSAs in preparation of the GSP. All TAC meetings are public meetings held in accordance with the Ralph M. Brown Act (California Government Code sections 54950 et seq.).

1.1.2. Tuolumne Groundwater Sustainability Agency

The Tuolumne GSA was formed on May 16, 2017 by adoption of County of Tuolumne Resolution No. 63-17 for the approximately 1,000-acre portion of the Modesto Subbasin that is within Tuolumne County. The Tuolumne GSA is cooperating with the STRGBA GSA on the development of one GSP for the entire Modesto Subbasin through a cooperation agreement with Stanislaus County.

1.2. Organization and Management Structure for Plan Development

On May 14, 2018, the STRGBA GSA notified DWR of their intent to prepare a GSP for the Modesto Subbasin. The preparation of the GSP is being coordinated and overseen by the STRGBA GSA and the Tuolumne GSA. Periodic TAC meetings allow coordination with the technical consulting team and activities in adjacent subbasins, several of which are on an expedited schedule due to the DWR designation as Critically-Overdrafted Basins.

The City of Modesto, a STRGBA GSA member agency, has taken the lead on securing grant funding to cover a portion of the GSP preparation costs and is the administrator for a DWR grant under the Sustainable Groundwater Planning Grant Program funded by Proposition 1. The Grant Agreement was executed on August 14, 2018.

Although GSP development is occurring through a joint GSA effort, a Plan Manager has been authorized as the point of contact between the GSAs and DWR as required by SGMA. The

Plan Manager is the authorized representative appointed through a coordination agreement or other agreement, who has been delegated authority for submitting the Plan to DWR. Contact information for the Plan Manager is provided in the Cover Letter and repeated below:

John B. Davids, P.E.
Modesto Irrigation District
1231 Eleventh Street, Modesto, CA 95354
(209) 526-7564
John.Davids@mid.org

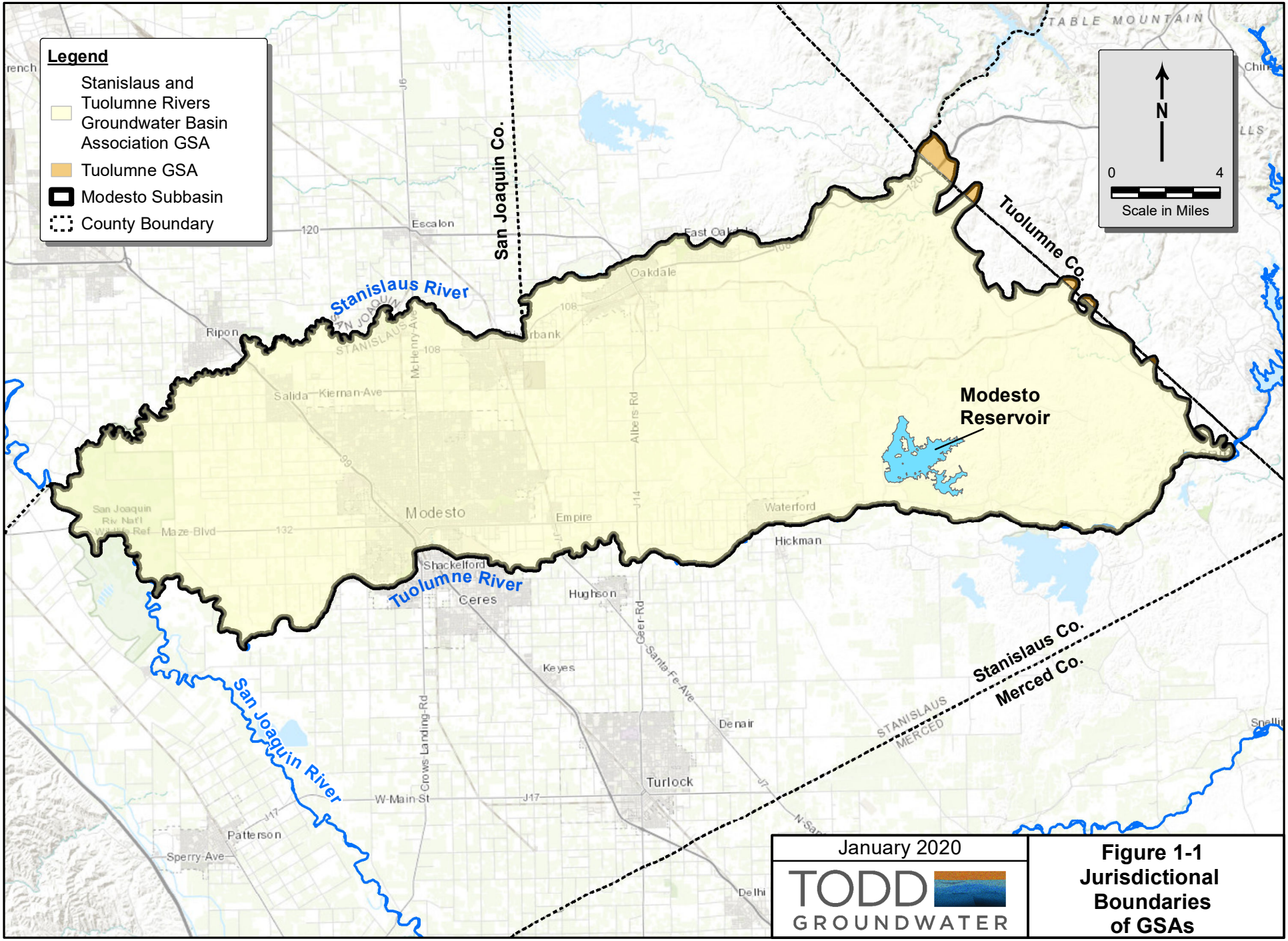
1.3. IMPLEMENTATION OF THE GSP

1.3.1. GSP Implementation Costs

To be completed after GSP is completed.

1.3.2. Financial Plan for Implementing the GSP

To be completed after GSP is completed.


Legend
Stanislaus and Tuolumne Rivers Groundwater Basin Association GSA
Tuolumne GSA
Modesto Subbasin
County Boundary
N
0
4
Scale in Miles
San Joaquin Co.
Tuolumne Co.
Stanislaus Co.
Merced Co.
Stanislaus River
Tuolumne River
San Joaquin River
Modesto Reservoir
Ripon
Escalon
Oakdale
Salida
Modesto
Empire
Waterford
Hickman
Shackelford
Ceres
Hughson
Keyes
Denair
Turlock
Patterson
Delhi
Sperry Ave
W Main St
Maze Blvd
Kiernan Ave
Albers Rd
Crows Landing Rd
Geer Rd
Santa Fe Ave
McHenry Ave
TABLE MOUNTAIN
STANISLAUS
MERCED
January 2020
TODD GROUNDWATER
Figure 1-1
Jurisdictional Boundaries of GSAs

2. PLAN AREA

The Modesto Subbasin covers 245,253 acres (about 383 square miles) of the larger San Joaquin Valley Groundwater Basin, as defined by DWR (5-22.02) in the 2019 basin prioritization. The San Joaquin Valley Groundwater Basin is defined on the west by the Coast Ranges, on the south by the San Emigdio and Tehachapi mountains, on the east by the Sierra Nevada, and on the north by the Sacramento-San Joaquin Delta and Sacramento Valley. The Modesto Subbasin is in the northern portion of the San Joaquin Valley and is bounded on the north by the Stanislaus River, on the south by the Tuolumne River, and on the west by the San Joaquin River (**Figure 2-1**). The eastern basin boundary is defined by crystalline basement rocks of the Sierra Nevada Foothills (DWR, 2006).

The Modesto Subbasin is hydraulically connected with surrounding subbasins along shared river boundaries (**Figure 2-1**). Adjacent subbasins include the Turlock Subbasin south of the Tuolumne River, the Delta-Mendota Subbasin west of the San Joaquin River, and the Eastern San Joaquin Subbasin north of the Stanislaus River. Of these subbasins, Delta-Mendota and Eastern San Joaquin are listed by DWR as being in critical overdraft. As such, these subbasins are required to prepare GSPs on an expedited schedule and to submit complete GSPs to DWR by January 31, 2020. Although the Modesto Subbasin GSP has a submittal date of January 31, 2022 – two years after the critically-overdrafted basins deadline – the Modesto Subbasin is coordinating with its neighbors through meetings and shared analyses.

2.1. AGENCIES AND JURISDICTIONAL BOUNDARIES

The Modesto Subbasin contains irrigation districts, municipalities, and portions of two counties. The jurisdictional boundaries of these agencies are shown on **Figure 2-2**. Note that these agencies are member agencies of one (or more) GSAs.

Two irrigation districts, Modesto Irrigation District (MID) and Oakdale Irrigation District (OID), provide surface water supply to the Modesto Subbasin, primarily for agricultural irrigation. MID also delivers surface water from the Tuolumne River to the Modesto Regional Water Treatment Plant for treatment and delivery to the City of Modesto. MID covers most of the western half of the Subbasin with its service areas bounded by the Stanislaus River to the north, the San Joaquin River to the west and the Tuolumne River to the south. The OID service area covers a portion of the central and eastern Subbasin (**Figure 2-2**). Approximately 60 percent of the OID service area is in the Modesto Subbasin with 40 percent in the Eastern San Joaquin Subbasin to the north (Bookman-Edmonston, 2005).

The Modesto Subbasin contains four municipalities and additional urban communities. Three municipalities are entirely within the boundaries of the Subbasin and include Oakdale, Riverbank, and Waterford. Most of the City of Modesto lies within the Modesto Subbasin, but the southern portion extends into the Turlock Subbasin. Waterford and Modesto are within the irrigation service area boundary of MID; Oakdale is within the service area

boundary of OID. Riverbank straddles both irrigation districts. Additional urban communities include Del Rio, Salida, Empire and West Modesto (**Figure 2-2**).

Portions of the Subbasin not located within an irrigation district are within the jurisdiction of Stanislaus County. As shown on **Figure 2-2**, these Stanislaus County areas occur mostly in the eastern Subbasin and along the Stanislaus, Tuolumne and San Joaquin rivers. These Stanislaus County areas represent approximately 22 percent of the Subbasin.

Approximately 1,000 acres of the Subbasin extends into Tuolumne County and is covered by the Tuolumne Groundwater Sustainability Agency (Tuolumne GSA). The Tuolumne GSA is cooperating in the Modesto Groundwater Subbasin GSP through a cooperation agreement with Stanislaus County; the County also represents the Tuolumne GSA during GSA and TAC meetings.

Additional jurisdictional boundaries, including Federal or State land and/or other agencies with water management responsibilities were identified using the DWR Water Management Planning Tool (2019). As shown on **Figure 2-3**, the Subbasin contains California Department of Fish & Wildlife (CDFW) lands and easements, Federal Lands, and California Conservation Easements, as listed below:

- CDFW owned and operated lands and conservation easement: the Tuolumne River Restoration Center, adjacent to the Tuolumne River in the eastern Subbasin.
- Federal Land (data from the Bureau of Land Management) along the Tuolumne River, the San Joaquin River National Wildlife Refuge, and the Riverbank Army Ammunition Plant.
- California Conservation Easements, including: San Joaquin River National Wildlife Refuge, Wetlands Reserve Program, Menghetti Farm, Ulm Farms Inc, and the Emergency Watershed Protection Program Floodplain Easement.

No other state or federal agencies with jurisdictional lands in the Subbasin are documented in the DWR Water Management Planning Tool. In addition, no tribal lands are documented in the DWR Water Management Planning Tool or are known to exist in the Modesto Subbasin.

2.2. EXISTING LAND USE

Figure 2-4 illustrates land use in the Modesto Subbasin based on a 2017 Stanislaus County land use map. As shown by the map, the Modesto Subbasin is largely agricultural, with the major crop types including almonds and other deciduous trees, corn, grains, pasture, vines, citrus, and truck crops. In 2017, approximately 64 percent of the Subbasin is defined as irrigated agriculture (Stanislaus Land Use dataset, 2017), covering about 157,911 acres.

About 13 percent of the basin is classified as urban (approximately 30,564 acres), which includes the cities of Modesto, Oakdale, Riverbank and Waterford. The remaining 23 percent of the Subbasin (about 56,777 acres) consists of non-agriculture, non-irrigated agriculture (e.g., rangeland), undeveloped land, and surface water. Most of the undeveloped land is in the eastern portion of Modesto Subbasin (**Figure 2-4**).

Figure 2-5 illustrates the Prime Farmland in the Subbasin in 2016 as designated by the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP). The FMMP map shows that most of the Subbasin is composed of Prime Irrigated Farmland and Unique Farmland. Unique Farmland consists of lesser quality soils used for the production of the State's leading agricultural crops. As described in **Section 2.6**, many of the land use planning agencies in the Subbasin have goals and policies for the preservation of these land uses. Other land uses identified by the FMMP in the Subbasin include urban, confined animal agriculture, non-irrigated grazing land, rural residential, vacant/disturbed land, nonagricultural/natural vegetation and semi-agricultural and rural commercial land.

Figure 2-6 illustrates previous land use from 1996, as mapped by DWR. In 1996, approximately 46 percent of the Subbasin is defined as irrigated agriculture, covering about 111,946 acres. A comparison of 1996 and 2017 land uses (**Figure 2-4**) shows that a significant amount of pasture has been converted to deciduous/almond and other crops over the last 20 years. In addition, irrigated acreage increased from 1996 to 2017 by approximately 45,965 acres, or 18.7 percent of the Subbasin. Most of this increase occurred in the eastern Subbasin outside of MID and OID jurisdiction, where groundwater is the primary source of water supply.

Figure 2-7 is a chart illustrating the number of wells drilled by year in the Modesto Subbasin based on information from the DWR Well Completion Report database. The database indicates approximately 5,800 wells drilled in the Modesto Subbasin, about 4,000 of which have completion dates and were drilled from 1948 to August 2018. As shown on the figure, only a few wells were drilled each year before the mid-1950s and less than 40 wells per year were drilled before the 1970s. Well drilling increased significantly in the 1970s, with the number of wells fluctuating between about 50 to over 100 wells per year. A significant increase in well drilling occurred during the most recent drought, with 145 wells drilled in 2013 and 209 wells drilled in 2014. The number of wells drilled dropped significantly in 2015 through 2018. The timing of the Stanislaus County Groundwater Ordinance (discussed in **Section 2.6.1.3**) may also have influenced well drilling activity over the last several years.

Figure 2-8 shows the locations of the drilled wells. The upper panel of this figure shows the wells that were drilled before 2000 (i.e., from 1948 to 1999) and the lower panel shows the wells that were drilled from 2000 to August 2018. These figures illustrate an increase in the number of wells drilled in the eastern Subbasin since 2000, outside of MID or OID irrigation service areas.

2.3. WATER SOURCES AND USE

The two primary sources of water used in the Modesto Subbasin are surface water, from the Stanislaus and Tuolumne rivers, and Subbasin groundwater. No sources of imported water are available in the Subbasin.

Urban Water Management Plans (UWMPs) and Agricultural Water Management Plans (AWMPs), document surface water and groundwater use in the Subbasin. These plans include descriptions of local surface water and groundwater models, including the Stanislaus County Hydrologic Model (SCHM), and data provided by local agencies for the GSP. UWMPs are available for Modesto (2015), Modesto and Modesto Irrigation District (2010), Oakdale (2015), Riverbank (2015) and Waterford (2005). AWMPs are available for MID (2015) and OID (2015). A summary of the information on surface water and groundwater use from these planning documents is provided below.

2.3.1. Surface Water

Surface water facilities and conveyance infrastructure across the Subbasin are illustrated on **Figure 2-9**. As shown on the figure, the Subbasin contains a web of lined and unlined canals and pipelines to facilitate surface water conveyance. The Hetch Hetchy Aqueduct crosses the northern half of the Subbasin as part of a 167-mile project that conveys water from Hetch Hetchy Reservoir to the City and County of San Francisco and other municipalities.

OID diverts water from the Stanislaus River under pre-1914 water rights shared equally with the South San Joaquin Irrigation District (SSJID), located north of the Stanislaus River in the Eastern San Joaquin Subbasin. The adjudicated diversion rate from the Stanislaus River is 1,816.6 cubic feet per second (cfs). In 1988, after the construction of New Melones Dam upstream of Goodwin Dam, OID and SSJID entered into an operational agreement with USBR that provides the districts a combined supply of 600,000 acre-feet (AF) of water annually (Davids Engineering Inc., 2016).

OID diverts water at the Goodwin Dam into the South Main Canal, which serves agricultural irrigation water throughout OID south of the river in the Modesto Subbasin. OID also diverts water into the Joint Main Canal, for use north of the river in the Eastern San Joaquin Subbasin. Water flows from these canals through a system of unlined earthen ditches, concrete-lined canals, low-head pipelines and gates. Irrigation tailwater is reclaimed by OID using reclamation pumps or discharged to other landowners or irrigation districts via drainage canals.

MID diverts water from the Tuolumne River for agricultural irrigation and municipal supply. The mean annual MID diversion from the Tuolumne River is approximately 294,000 AF, based on the average hydrologic period from 2003 to 2012. Approximately twenty percent of this amount (67,000 AF) is currently delivered to the Modesto Regional Water Treatment Plant (MRWTP) for treatment and delivery to the City of Modesto (Provost and Pritchard,

2015).

New Don Pedro Reservoir, built in 1971 and located northeast of La Grange in the Sierra Nevada foothills, is jointly owned by MID and TID and has a maximum storage capacity of 2,030,000 AF. MID's share of water stored in New Don Pedro Reservoir is approximately 543,000 AF. La Grange Diversion Dam, constructed in 1893, is used to divert water from the Tuolumne River into the MID Upper Main Canal. Diversions flow through the Upper Main Canal to the Modesto Reservoir for temporary storage and irrigation deliveries and for delivery to the water treatment plant and then on to the City of Modesto. The Modesto Reservoir, owned and operated by MID, was built in 1911 and has a storage capacity of 28,000 AF.

MID distributes Tuolumne River water and groundwater via a network of facilities, including 15 miles of unlined canals, 147 miles of lined canals, 42 miles of pipelines and 39 miles of drains (Provost and Pritchard, 2015). In 2012, approximately 66,500 acres of land were irrigated within MID, 57,000 acres of which received surface water from MID (Provost and Pritchard, 2015).

2.3.2. Groundwater

Groundwater in the Modesto Subbasin is extracted primarily for agricultural irrigation, municipal, and domestic potable water supply. Based on the Stanislaus County Hydrologic Model (SCHM), groundwater pumping in the Subbasin for Water Year 2015 was estimated at 222,730 AFY. Approximately 77 percent was pumped for agricultural irrigation (170,892 AFY), 20.1 percent for municipal uses (45,968 AFY) and 2.6 percent for rural domestic use (5,870 AFY) (JJ&A, 2017).

MID pumps groundwater from approximately 100 production and drainage wells to supplement surface water supply and to help control the high water table in the western Subbasin. Groundwater pumping supplements reduced supply from the Tuolumne River during consecutive dry years and to serve areas where it is more difficult to deliver adequate amounts of surface water (Provost and Pritchard, 2015).

OID pumps groundwater from 13 deep wells in the Modesto Subbasin to supplement surface water deliveries from the Stanislaus River. OID also provides domestic water from District owned wells for its rural water system (RWS) and serves as the trustee of six improvement districts that get water from deep wells that are individually owned by each improvement district.

The cities of Modesto, Oakdale, Riverbank and Waterford pump groundwater for water supply. There are approximately 150 active supply wells in these four cities.

There are a number of small community water supply systems located throughout the Subbasin that are operated by the respective community and regulated by Stanislaus County. **Figure 2-10** illustrates the public water systems within Modesto Subbasin that are

mapped by the California Environmental Health Tracking Program. The mapped systems include irrigation districts (MID and OID), municipal systems (Modesto, Oakdale, Riverbank and Waterford), and smaller, non-municipal and non-district systems. The municipal systems are outlined in black on **Figure 2-10**. There are approximately 77 systems within Modesto Subbasin that are not municipal or irrigation districts, illustrated by the burgundy shaded areas on **Figure 2-10** (some systems are so small that they appear as only a dot). A summary of these non-municipal and non-irrigation systems is provided on **Table 2-1**. Approximately 56 of these systems are very small, with 10 or less service connections, and almost all (71) have less than 50 service connections.

Groundwater extraction occurs throughout the Subbasin as indicated by the density of wells shown on **Figure 2-11**. This map, illustrating the number of production wells drilled per square mile, was developed from DWR's Well Completion Report Map Application. Production wells include water supply wells[1] designated as irrigation, public, municipal, and industrial on well completion reports. The highest density of production wells occurs in the western Subbasin, particularly north and west of Modesto. DWR's 2018 basin prioritization indicates that there+ are about 4,000 production wells in the Subbasin.

Figure 2-12 illustrates the density of public supply wells in the Subbasin. Similar to **Figure 2-11**, this map was developed from DWR's Well Completion Report Application and includes water supply wells designated as public on well completion reports and is therefore a subset of the wells on **Figure 2-11**. The highest densities generally coincide within municipalities and urban centers. Public supply well densities associated with small community water systems are also indicated. Based on data received for the GSP, there are approximately 150 municipal public supply wells in the Subbasin; these are shown on **Figure 2-13**.

The density of domestic wells is illustrated on **Figure 2-14**. Domestic wells are present throughout the Subbasin, but the highest density occurs in the central region of the Subbasin, along the Stanislaus and Tuolumne rivers, and west of Modesto.

During the recent drought, some domestic wells in the Subbasin were reported to be dry or suffered structural failure because of declining water levels. **Figure 2-15** shows domestic wells reported as dry or failed from 2014 through 2017 in Stanislaus County. According to Stanislaus County, most of these wells were less than 100 feet deep and more than 50 years old. As part of their Dry Well Program, the County assisted well owners with storage tanks and new well installations.

[1] DWR's definitions of water supply wells are provided in DWR's *How to Fill Out a Well Completion Report* pamphlet, updated in March 2007.

Table 2-1 Public Water Systems in the Modesto Subbasin

Water System Name	Number of Service Connections
WATERFORD-RIVER POINTE	317
RIVERVIEW MOBILE HOME ESTATES	175
MODESTO MOBILE HOME PARK	150
PARK HEIGHTS MUTUAL WATER CO	95
DEL RIO EAST HOA WATER SYSTEM	55
OLIVE LANE MOBILEHOME PARK	51
LAZY B MOBILEHOME PARK	49
MORNINGSIDE MOBILEHOME PARK	49
MAZE BLVD MOBILEHOME PARK	40
WATERFORD SPORTSMEN'S CLUB	40
LONE PINE MHP	32
OASIS INVESTMENTS	31
STERLING INDUSTRIAL	30
A & M INDUSTRIES INC	25
RIVERBANK LRA	22
KIERNAN BUSINESS CENTER	20
TURLOCK STATE RECREATION AREA	19
LIBITZKY	15
MCHENRY BUSINESS PARK	15
TULLY MOBILE ESTATES	15
FEE WATER SYSTEM	12
CARDOZA WATER SYSTEM	10
CHARITY WAY WATER SYSTEM	10
GREGORI HIGH SCHOOL	9
HART- RANSOM UNION SCHOOL & DISTRICT	9
BLOOMINGCAMP WATER SYSTEM	7
FRAZIER NUT FARMS, INC.	7
SHILOH SCHOOL DISTRICT	7
COVENANT GROVE CHURCH	6
BURCHELL NURSERY, INC	5
MESA ELEMENTARY SCHOOL	5
STORER TRANSPORTATION	5
STRATOS WAY WATER COMPANY, INC	5
THE COUNTRY MARKET	5
LOS INDIOS WATER SYSTEM	4
MID VALLEY AG	4
THE FRUIT YARD RESTAURANT	4
JEHOVAH'S WITNESS SIERRA VISTA CONG	3
KIERNAN/MCHENRY WATER COMPANY, INC	3
LA GRANGE PARK-OHV	3

Table 2-1 (*continued*)

Water System Name	Number of Service Connections
ROBERTS FERRY NUT CO, INC (WS)	3
SALIDA HULLING ASSOCIATION WATER SYSTEI	3
5033 PENTECOST	2
AT&T WATER SYSTEM	2
BRETHREN HERITAGE SCHOOL, INC	2
EL RINCON & YOSEMITE HACIENDA MARKET	2
FISHER NUT	2
FOSTER FARMS-ELLENWOOD HATCHERY	2
GROVER LANDSCAPE WATER SYSTEM	2
LIBERTY BAPTIST CHURCH	2
OAKDALE GOLF & COUNTRY CLUB (EH)	2
ONE STOP WS	2
PARADISE SCHOOL	2
RATTO BROS, INC	2
ROBERTS FERRY SCHOOL CAFETERIA	2
STANISLAUS REGIONAL WATER AUTHORITY	2
WOOD COLONY CHRISTIAN SCHOOL	2
BECKLEY LYONS WATER SYSTEM	1
BEL PASSI BASEBALL	1
DEEVON WATER CO	1
ELKS LODGE 1282	1
FLOYD OVERHOLTZER WATER SYSTEM	1
FOX GROVE FISHING ACCESS	1
KNIGHTS FERRY RECREATION AREA	1
MABLE AVE BAPTIST CHURCH	1
MCHENRY GOLF CENTER	1
MODESTO CHRISTIAN CENTER (WATERSYSTEM	1
NINO'S PLACE WATER SYSTEM	1
OLIVEIRA WATER SYSTEM	1
PENTECOST PROPERTIES WATER SYSTEM	1
RAINBOW SPORTS COMPLEX	1
RAM NAAM MANDALI CHURCH OF MODESTO	1
SCONZA CANDY COMPANY	1
SHILOH-PARADISE BASEBALL FOR YOUTH	1
SMART STOP FOOD MART (EH)	1
STANISLAUS UNION SCHOOL DIST	1
SUNRISE ROCK & REDI-MIX	1

Notes:

1. Does not include municipal and irrigation district systems.
2. Source: California Environmental Health Tracking Program, Water System Map Viewer.

2.4. WATER RESOURCES MONITORING PROGRAMS

Numerous monitoring programs that could support GSP development have been implemented in the Modesto Subbasin. These and other existing monitoring networks and protocols will be considered for improvements and/or adoption as part of the GSP monitoring network. GSP monitoring networks will be designed to:

- Evaluate sustainability indicators in each management area
- Address identified data gaps
- Monitor for minimum thresholds in each management area to avoid undesirable results
- Track interim milestones and measurable objectives to demonstrate progress on reaching sustainability goals for the Subbasin.

2.4.1. CASGEM Monitoring Program

The California Ambient Statewide Groundwater Elevation Monitoring (CASGEM) Program, administered by DWR, has compiled groundwater elevation data from designated monitoring entities since 2009. Data are used to track seasonal and long-term groundwater elevation trends in groundwater basins statewide. In addition to designated CASGEM wells, groundwater elevation data from other wells are also compiled into the system on a voluntary basis. Data are available for review online at the DWR CASGEM website (https://water.ca.gov/Programs/Groundwater-Management/Groundwater-Elevation-Monitoring--CASGEM).

The Stanislaus and Tuolumne Rivers Groundwater Basin Association (STRGBA) serves as the CASGEM Monitoring Entity for the Modesto Subbasin. Since 1994, STRGBA has coordinated groundwater planning and management in the Subbasin. As part of the CASGEM program, STRGBA measures water levels in 56 Subbasin wells. The monitoring network consists of wells owned by MID, OID, and the U. S. Geological Survey (USGS).

The current CASGEM online database contains approximately 2,400 unique water level measurements from the 56 Modesto Subbasin wells, spanning from November 1991 to October 2019. These wells are measured semi-annually to capture seasonal variation, typically once in February/March (seasonal high elevations) and once in October/November (seasonal low elevations) of each year. Information supplied by the CASGEM database includes local and state well numbers, latitude and longitude of the well, a unique CASGEM ID and station number, well use, ground surface elevation, depth to water, and calculated groundwater elevation.

Figure 2-16 illustrates the locations of the CASGEM monitoring wells and DWR Water Data Library wells that have been recently monitored (2015 to present). This figure includes 71 wells monitored by DWR and included in the DWR Water Data Library. The CASGEM wells

are a subset of the DWR Water Data Library wells. As shown, the monitored wells are almost all located west of Modesto Reservoir.

2.4.2. Public Water Suppliers Groundwater Monitoring Programs

Public water suppliers in the Modesto Subbasin have implemented water level and water quality monitoring programs for their service areas. Water levels are monitored in production wells either monthly or quarterly. The City of Modesto is in the process of designing and constructing five sets of multi-completion monitoring wells for water quality and water level monitoring.

Each municipality also monitors groundwater quality for its supply wells in compliance with State requirements. Water quality monitoring requirements for public water systems are set by Title 22, Chapter 15, of the California Code of Regulations (CCR). Groundwater quality monitoring data are also compiled by local regulatory agencies for sites associated with groundwater contamination. Various municipalities have identified constituents of concern over time including nitrate, arsenic, uranium, trichloropropane (TCP), tetrachloroethylene (PCE), and dibromochloropropane (DBCP). Some of these data sets are maintained on the State Water Resources Control Board web-based database, referred to as GeoTracker.

A summary of the groundwater monitoring programs conducted by the public water suppliers is provided on the following table.

Table 2-2 Groundwater Monitoring Programs by Public Water Suppliers

Agency	Monitoring Programs	
	Groundwater Levels	Groundwater Quality
City of Oakdale	Monthly water level monitoring conducted in most production wells.	State-required sampling in production wells.
City of Riverbank	Quarterly water level monitoring conducted in all production wells.	State-required sampling in production wells. Additional water quality sampling in production wells for local constituents of concern.
City of Waterford	Monthly water level monitoring conducted in production wells	State-required sampling in production wells.
City of Modesto	Ongoing water level monitoring program in monitoring wells (numbers and frequency vary with time).	State-required sampling in production wells. Additional water quality sampling in monitoring wells for local constituents of concern.

2.4.3. Agricultural Water Suppliers Monitoring Programs

Agricultural water suppliers conduct surface water and groundwater monitoring programs in the Subbasin. Such programs implemented by MID and OID are summarized below.

2.4.3.1. Modesto Irrigation District (MID)

MID measures water levels in approximately 50 deep irrigation wells and approximately 50 shallow drainage wells on a semi-annual basis, in February and November. On behalf of STRGBA, MID also measures water levels within their district as part of the CASGEM program.

MID monitors water quality as part of several programs:

- Modesto Reservoir: Daily monitoring of water quality in Modesto Reservoir for domestic water quality standards.
- Surface and Subsurface Drainage: Monitor surface water and groundwater in compliance with the aquatic herbicide general permit.
- NPDES permit: Monitoring program in compliance with a statewide general NPDES permit for discharge of aquatic herbicides.
- Irrigated Lands Regulatory Program: Water quality monitoring in compliance with the Irrigated Lands Regulatory Program as a member of the East San Joaquin Water Quality Coalition. Program is administered by the Central Valley Regional Water Quality Control Board (CVRWQCB). (see also **Section 2.4.4**).
- UC Davis Water Quality Study: The MID Domestic Water Treatment Plant, in conjunction with UC Davis, conducted water quality monitoring to identify constituents of greatest concern for water treatment.

2.4.3.2. Oakdale Irrigation District (OID)

OID measures water levels in a total of 12 OID and private wells within the district in the Modesto Subbasin on a semi-annual basis, in spring and fall. OID provides water levels to STRGBA, which serves as the CASGEM reporting agency.

- Irrigated Lands Regulatory Program: Water quality monitoring in compliance with the CVRWQCB Irrigated Lands Regulatory Program as a member of the East San Joaquin Water Quality Coalition (discussed in more detail below in **Section 2.4.4**).
- District water quality: OID measures electrical conductivity in 12 deep wells and 8 private wells as part of the groundwater monitoring program (GMP) developed in the Integrated Regional Groundwater Management Plan (Bookman-Edmonston, 2005).
- NPDES permit: Monitoring program in compliance with a statewide general NPDES permit for discharge of aquatic herbicides.

2.4.4. Irrigated Lands Regulatory Programs

The Irrigated Lands Regulatory Program (ILRP) requires monitoring and reporting in compliance with the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands, a program administered by the CVRWQCB.

The East San Joaquin Water Quality Coalition (ESJWQC) is a group of agricultural interests and growers that formed to represent dischargers who own or operate irrigated lands east of the San Joaquin River in Madera, Merced, Stanislaus, Tuolumne, and Mariposa counties. The ESJWQC files reports in compliance with Central Valley Water Board requirements (ESJWQC, 2019). The ESJWQC monitoring program samples for a wide array of constituents in drains and canals. The sampling program and monitoring stations are dynamic, with sampling stations and constituents changing frequently, as the program rotates throughout the watershed. In the Modesto Subbasin, both MID and OID are members of the coalition for the lands that they own.

In December 2012, a new Waste Discharge Requirements (WDR) order for the ESJWQC was approved by the CVRWQCB that expanded the monitoring to include groundwater under the ILRP. The program ensured that surface water monitoring would continue but focused on a management approach rather than strict enforcement of water quality standards. A Nitrogen Management Plan (NMP) was implemented, which requires growers to document how much nitrogen is added and removed from irrigated lands. These numbers are reported to the CVRWQCB annually.

2.5. WATER RESOURCES MANAGEMENT PROGRAMS

As demonstrated from the monitoring programs described above, Modesto Subbasin agencies are actively managing surface water and groundwater conjunctively. Water management programs in the Modesto Subbasin have been documented in various planning documents prepared both separately by local water agencies and collaboratively through cooperative groups of agencies. Key water resources management programs in the Subbasin are summarized below.

2.5.1. Groundwater Management Plan

In April 1994, six agencies within the Modesto Subbasin formed the Stanislaus and Tuolumne Rivers Groundwater Basin Association (STRGBA) to manage groundwater. In 2003, STRGBA began preparing an Integrated Regional Groundwater Management Plan (GWMP) in compliance with the Groundwater Management Planning Act of 2002 (SB 1938) and the Integrated Regional Water Management Planning Act of 2002 (SB 1672) (Bookman-Edmonston, 2005). The GWMP describes several actions to protect groundwater resources that are implemented by STRGBA member agencies (Bookman-Edmonston, 2005). The following is a summary of these actions.

- Identification and Management of Wellhead Protection Areas: The purpose is to protect groundwater used for public supply, by protecting the area around a public supply well, or a recharge area that contributes water to a public supply well, to prevent water quality impacts.
- Regulation of the Migration of Contaminated Groundwater: STRGBA coordinates with responsible parties and regulatory agencies to keep STRGBA members informed of the status of known groundwater contamination.
- Identification of Well Construction Policies: Stanislaus County Department of Environmental Resources administers the well permitting program in the unincorporated areas of the Subbasin. STRGBA member agencies are required by State law to adopt the State Model Well Ordinance as a minimum standard for well construction.
- Administration of Well Abandonment and Destruction Programs: Unused wells must be properly abandoned to prevent the migration of contaminants.
- Mitigation of Overdraft Conditions: Reduce dependency on groundwater, by providing surface water to areas previously dependent on groundwater, and by encouraging growers to use surface water for irrigation, when available, instead of groundwater.
- Replenishment of Groundwater Extracted by Water Producers: Protect and manage the major recharge areas within the Subbasin.
- Construction and Operation of Recharge, Storage, Conservation, Water Recycling and Extraction Projects: Local agencies will encourage cooperation and sharing of information between the agencies to promote water management projects.
- Control of Saline Water Intrusion: STRGBA coordinates with member agencies to monitor groundwater quality to ensure that saline water from the San Joaquin River or the saline water associated with groundwater from the western San Joaquin Valley does not migrate into the Subbasin.

2.5.2. Urban Water Management Plans

The Urban Water Management Planning Act requires water suppliers that provide over 3,000 AFY or have over 3,000 connections to submit an Urban Water Management Plan (UWMP) to the State every five years. 2015 UWMPs are available for two cities in the Modesto Subbasin: Modesto (2015) and Riverbank (2015). The City of Modesto owned and operated Waterford's water system until July 1, 2015, and therefore Waterford's system is covered under the Modesto 2015 UWMP. Oakdale completed a 2010 UWMP Update (MCR Engineering, 2015) and has a Draft 2015 UWMP awaiting adoption. Modesto and MID completed a joint UWMP in 2010 (West Yost Associates, 2011).

The 2015 UWMPs for the cities of Modesto (West Yost Associates, 2016) and Riverbank (KSN Inc., 2016) are consistent with the Urban Water Management Planning Act as amended by SB X7-7 in 2009 and provide evaluations of water demand and water supply into the future. Each describes the service area, water system, historical and projected water use, and water supply sources, and provides a comparison of projected water supplies to water demands during normal, single-dry, and multiple-dry years in five-year increments from 2020 to 2035. Both cities indicate the availability of water supply to meet water demand into the future. Riverbank, which relies exclusively on groundwater, plans to meet future demands with groundwater. The City of Modesto, which relies on groundwater and treated surface water from MID, plans to continue to use these two sources of water to meet future demands. Each UWMP describes constraints (e.g., legal, environmental, water quality) on water supplies.

As required by SB X7-7, the UWMPs present each city's 2015 and 2020 water use targets, verify compliance with the interim 2015 water use target, and describe implementation plans for meeting the 2020 water use target. Recognizing the importance of water conservation, the UWMPs describe the six Demand Management Measures (DMMs) in compliance with SB X7-7. These DMMs include water waste prevention ordinances, metering, conservation pricing, public education and outreach, programs to assess and manage distribution system real loss, and water conservation program coordination and staffing support. The cities each implement additional water conservation programs, as follows.

- Modesto has three additional DMMs, including residential conservation programs; commercial, industrial, institutional conservation programs; and large landscape irrigation conservation programs.
- Riverbank has several additional DMMs:
    - Water survey programs for single-family residential and multi-family residential customers
    - Large landscape conservation programs and incentives
    - High efficiency washing machine rebate program
    - High efficiency toilet replacement
    - Residential plumbing retrofit
    - Conservation programs for commercial, industrial and institutional accounts

Oakdale's 2010 UWMP (MCR Engineering, 2015) identifies fourteen similar demand management measures. As stated in the 2010 UWMP, Oakdale was implementing or partially implementing five of the demand management measures (MCR Engineering, 2015).

2.5.3. Agricultural Water Management Plans

Agricultural Water Management Plans (AWMPs) were prepared in 2015 in accordance with the Water Conservation Act of 2009 (SB X7-7) by two irrigation districts within the Modesto

Subbasin: MID (Provost and Pritchard, 2015) and OID (Davids Engineering, 2016). The following is a summary of the water resources management programs described in these AWMPs.

The MID and OID 2015 AWMPs each describe the same Efficient Water Management Practices (EWMPs) in conformance with the California Code. These include two critical EWMPs that are mandatory for all agricultural water suppliers, and additional or conditional EWMPs, which are required if technically feasible and locally cost effective. The two mandatory EWMPs are to accurately measure the volume of water delivered to customers and to adopt a pricing structure based, at least partially, on the quantity of water delivered. MID and OID each describe the same thirteen additional EWMPs that are being implemented, as follows:

- Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not harm crops or soils.
- Facilitate financing of capital improvements for on-farm irrigation systems.
- Implement an incentive pricing structure that promotes one or more of the following goals: (A) More efficient water use at farm level, (B) Conjunctive use of groundwater, (C) Appropriate increase of groundwater recharge, (D) Reduction in problem drainage, (E) Improved management of environmental resources, (F) Effective management of all water sources throughout the year by adjusting seasonal pricing structures based on current conditions.
- Expand line or pipe distribution systems and construct regulatory reservoirs to increase distribution system flexibility and capacity, decrease maintenance and reduce seepage.
- Increase flexibility in water ordering by, and delivery to, water customers within operational limits.
- Construct and operate supplier spill and tailwater recovery systems
- Increase planned conjunctive use of surface water and groundwater within the supplier service area.
- Automate canal control structures.
- Facilitate or promote customer pump testing and evaluation.
- Designate a water conservation coordinator who will develop and implement the water management plan and prepare progress report.
- Provide for the availability of water management services to water users.
- Evaluate the policies of agencies that provide the supplier with water to identify the potential for institutional changes to allow more flexible water deliveries and storage.
- Evaluate and improve the efficiencies of the supplier's pumps.

In addition to these, MID is implementing an EWMP to facilitate alternative land use for lands with exceptionally high water duties or whose irrigation contributes to significant problems, such as drainage problems.

2.5.4. Additional Plan Elements

The California Water Code contains a checklist for preparation of GSPs, which provide groundwater management elements that may be applicable for incorporation into the Modesto Subbasin GSP. Most management programs relevant to this checklist are described in the previous sections; programs are summarized below for each topic to ensure that the additional plan elements listed in the GSP regulations (Section 354.8 (g)) have been considered.

(a) *Control of saline water intrusion*: saline water intrusion is not applicable because this is not a coastal Subbasin. However, as summarized in **Section 2.5.1**, the Integrated Groundwater Management Plan (Bookman-Edmonston, 2005) describes STGRBA's efforts to prevent saline groundwater from migrating into the Subbasin from the San Joaquin River and from the west side of the San Joaquin Valley.

(b) *Wellhead protection areas and recharge areas*: as described in **Section 2.5.1**.

(c) *Migration of contaminated groundwater*. As described in **Section 2.5.1**, STRGBA GSA will coordinate with responsible parties and regulatory agencies to keep STRGBA GSA member agencies informed of the status of known groundwater contamination. The oversight regulatory agencies may include the State Water Resources Control Board, the State Department of Toxic Substances Control (DTSC), or the County Department of Environmental Health.

(d) *A well abandonment and well destruction program*: As described in **Section 2.5.1**, the Integrated Regional Groundwater Management Plan (Bookman-Edmonston, 2005), states that the unused wells must be properly abandoned to prevent the migration of contaminants.

(e) *Replenishment of groundwater extractions*: As described in **Section 2.5.1**, the Integrated Regional Groundwater Management Plan (Bookman-Edmonston, 2005), the major recharge areas in the Subbasin will be protected and managed. In 2007, a recharge characterization for STRGBA was completed to define recharge areas by evaluating physical characteristics and anthropogenic conditions (WRIME, 2007).

(f) *Activities implementing, opportunities for, and removing impediments to, conjunctive use or underground storage*. Conjunctive use is an active groundwater management strategy being implemented by the City of Modesto, MID and OID. In addition, maximizing groundwater recharge is a goal or policy identified by many agencies with land use planning responsibility in the Subbasin (see **Section 2.6** below).

(g) *Well construction policies*. Stanislaus County has a well permitting program in accordance with the State Water Code that ensures proper well construction (see **Section 2.6.2** below).

(h) *Measures addressing groundwater contamination cleanup, groundwater recharge, in-lieu use, diversions to storage, conservation, water recycling, conveyance, and extraction projects*. As discussed above, most of these are addressed in the Integrated Regional GWMP (Bookman-Edmonston, 2005). Water conservation measures are provided in the UWMPs and AWMPs, as described in **Sections 2.5.2 and 2.5.3**.

(i) *Efficient water management practices, as defined in Section 10902, for the delivery of water and water conservation methods to improve the efficiency of water use*. Efficient water practices are provided in the UWMPs and AWMPs, as described in **Sections 2.5.2 and 2.5.3**.

(j) *Efforts to develop relationships with state and federal regulatory agencies*. These relationships are developed and coordinated in a variety of ways including coordination with CDFW on river issues, working with regulatory agencies regarding environmental sites within the City, oversight of the County for small community water system provision of water, among other activities (see also **Section 2.5.1**).

(k) *Processes to review land use plans and efforts to coordinate with land use planning agencies to assess activities that potentially create risks to groundwater quality or quantity.* As described in **Section 2.6** below, agencies within the Subbasin are conducting land use planning to ensure water supply availability and groundwater protection.

(l) *Impacts on groundwater dependent ecosystems (GDEs).* Groundwater elevation data collected as part of the groundwater level monitoring programs described in **Section 2.4** will be used to analyze the interconnectedness of surface water and groundwater and potential impacts on groundwater dependent ecosystems (GDEs). Additional analysis will incorporate results from the Modesto Subbasin integrated surface water- groundwater model, currently being revised.

The GSP will incorporate existing water resource management programs summarized above. In addition, goals, policies, and implementation measures in several General Plans in the Subbasin address aspects of water resource management programs, as discussed in the following section.

2.6. LAND USE PLANNING AND ELEMENTS

General Plans, Groundwater Ordinances, and information from other land use planning activities were compiled for review and consideration during GSP preparation and for coordination during GSP implementation. This section includes a summary of those plans and well permitting programs being implemented in the Modesto Subbasin.

2.6.1. Summary of General Plans and Groundwater Ordinances

Four cities and one county (including urban communities in the unincorporated areas) share land use planning responsibilities and authorities for the Modesto Subbasin. Most of the General Plans prepared by these entities contain goals and policies relating to water supplies, water use, and water resources. Land use designations, assumptions on growth, preservation of agricultural lands, or protection of environmental resources are examples of land use planning that could result in changes in water use over the planning horizon.

As part of GSP preparation, General Plans for Stanislaus County and the cities of Modesto, Oakdale, Riverbank and Waterford were reviewed. City and urban community boundaries and the Stanislaus County line are shown on **Figure 2-2**. Selected goals, policies, implementation measures, and issues from the General Plans are highlighted in the following sections with a focus on water resources and management.

2.6.1.1. Stanislaus County General Plan

In August 2016, Stanislaus County adopted its 2015 Comprehensive General Plan Update (County of Stanislaus, 2016). The General Plan area covers the entire County, which overlies portions of four groundwater subbasins, including the Modesto Subbasin as shown on **Figure 2-2**. Although the protection of natural resources in the County is a thread throughout the General Plan, a key goal with respect to water resources is contained in the Conservation/Open Space Element. That goal, along with associated policies and implementation measures are summarized in **Table 2-3**.

Table 2-3 Selected Stanislaus County General Plan Goals and Policies – Chapter Three: Conservation/Open Space Element		
Goal	**Policy**	**Implementation Measures**
Goal One. Encourage the protection and preservation of natural and scenic areas throughout the County	**Policy Three:** Areas of sensitive wildlife habitat and plant life (e.g., vernal pools, riparian habitats, flyways and other waterfowl habitats, etc.) including those habitats and plant species listed by state or federal agencies shall be protected from development and/or disturbance.	**1.** Review all development requests to ensure that sensitive areas (e.g., riparian habitats, vernal pools, rare plants, flyways, etc.) are left undisturbed or that mitigation measures acceptable to appropriate state and federal agencies are included in the project. **2.** In known sensitive areas, the State Department of Fish and Wildlife shall be notified as required by the California Native Plant Protection Act; the U.S. Fish and Wildlife Service also shall be notified. **3.** All discretionary projects that will potentially impact riparian habitat and/or vernal pools or other sensitive areas shall include mitigation measures for protecting that habitat. **4**. All discretionary projects within an adopted Airport Influence Area (AIA) that have the potential to create habitat, habitat conservation, or species protection shall be reviewed by the Airport Land Use Commission. **5.** Implementation of this policy shall not be extended to the level of an unconstitutional "taking" of property. **6**. Any ground disturbing activities on lands previously undisturbed that will potentially impact riparian habitat and/or vernal pools or other sensitive areas shall include mitigation measures for protecting that habitat, as required by the State Department of Fish and Wildlife.
Goal Two. Conserve water resources and protect water quality in the County	**Policy Five:** Protect groundwater aquifers and recharge areas, particularly those critical for the replenishment of reservoirs and aquifers.	**1**. Review proposals for urbanization in groundwater recharge areas to maximize recharge, prevent water quality degradation, and to not exacerbate groundwater overdraft. Areas susceptible to overdraft shall include a hydrogeological analysis and mitigation measures. Wastewater treatment may be required in areas susceptible to deterioration of groundwater quality. **2**. Department of Environmental Resources shall identify and require control of pollutants stored, handled, or disposed at the site. Groundwater monitoring programs will be adopted where hydrogeological assessment indicate the likely potential for groundwater deterioration. **3**. Stanislaus County shall discourage the use of dry wells for street drainage in urban areas to avoid contaminants reaching aquifers with beneficial uses. Storm water disposal systems shall be designed not to pollute receiving surface groundwater but integrated into an area-wide groundwater recharge program when feasible. **4**. Encourage new development to incorporate water conservation measures to minimize adverse impacts on water supplies. **5**. Continue to implement landscape provisions of the Zoning Ordinance, which encourage drought-tolerant landscaping and water-conserving irrigation methods. **6**. Encourage new urban development to be served by community wastewater treatment facilities and water systems rather than by package treatment plants or private septic tanks and wells.
	Policy Six: Preserve natural vegetation to protect waterways from bank erosion and siltation.	**1**. Development proposals and mining activities including, or in the vicinity of, waterways and/or wetlands shall be closely reviewed to minimize destruction of riparian habitat and vegetation. This includes referral to the US Army Corps of Engineers, US Fish and Wildlife Service, CA Depart. of Fish and Wildlife, and the CA Depart. of Conservation. **2**. Continue to encourage best management practices for agriculture and coordinate with soil and water conservation efforts of Stanislaus County Farm Bureau, Resource Conservation Districts, the US Soil Conservation Service, and local irrigation districts.
	Policy Seven: New development that does not derive domestic water from pre-existing domestic and public water supply systems shall be required to have a documented water supply that does not adversely impact Stanislaus County water resources.	**1**. Proposals for development to be served by new water supply systems shall be referred to appropriate water districts, irrigation district, community services district, the State Water Resources Board and any other appropriate agencies for review and comments. **2**. Review all development request to ensure a sufficient water supply to meet short and long-term water needs of the project without adversely impacting the quality and quantity of existing local water resources.
	Policy Eight: The county shall support efforts to develop and implement water management strategies.	**1**. The County will pursue state and federal funding options to improve water management resources in the County. **2.** The Department of Environmental Resources should continue to monitor groundwater quality for public water systems under the department's supervision and oversee investigations of soil and groundwater contamination. **3**. The County will coordinate with water purveyors, private landowners, and other water resource agencies in the region on data collection for groundwater conditions and in the development of a groundwater usage tracking system, including well location/construction mapping and groundwater level monitoring to guide future policy development. **4**. The County shall promote efforts to increase reliability of groundwater supplies through water resource management tools (surface water protection, conservation, public education, and expanded opportunities for conjunctive use of groundwater, surface water, and appropriately treated wastewater and stormwater reuse opportunities). **5.** The County will support and facilitate the formation of integrated, comprehensive county-wide regional water resources management plans, which incorporates existing water management plans and identifies and plans for management within the gaps between existing water management plans. **6**. The County will cooperate with other pertinent agencies, including cities and water district, in the preparation and adoption of a groundwater sustainability plan pursuant to SGMA and any subsequent legislation. The County will use its regulatory authority to implement the requirements of the groundwater sustainability plan. **7**. The County will obtain technical information and develop the planning/policies to improve groundwater recharge opportunities and groundwater conditions in the County. **8**. As information becomes available, the County will adopt General Plan changes to protect recharge areas and manage land use changes that have an impact on groundwater use and quality.

Table 2-3 Selected Stanislaus County General Plan Goals and Policies – Chapter Three: Conservation/Open Space Element (continued)		
Goal	**Policy**	**Implementation Measures**
	Policy Nine: The County will investigate additional sources of water for domestic use.	1. The County will work with irrigation and water districts, community services districts, municipal and private water providers in developing surface water and other potential water sources for domestic use.
Chapter Seven: Agricultural Element		
Goal One. Strengthen the agricultural sector of our economy.	**Policy 1.22:** The County shall encourage regional coordination of planning and development activities for the entire Central Valley.	**1.** The County shall participate in regional efforts to address long-range planning, infrastructure, conservation, and economic development issues facing the Central Valley.
Goal Two. Conserve our agricultural lands for agricultural uses.	**Policy 2.15:** In order to mitigate the conversion of agricultural land resulting from a discretionary project requiring a General Plan or Community Plan amendment from "Agriculture" to a residential land use designation, the County shall require the replacement of agricultural land at a 1:1 ratio with agricultural land of equal quality located in Stanislaus County.	**1.**Mitigation shall be applied consistent with the Farmland Mitigation Program Guidelines
Goal Three. Protect the natural resources that sustain our agricultural industry.	**Policy 3.4:** The County shall encourage the conservation of water for both agricultural, rural domestic, and urban uses.	**1.** The County shall encourage water conservation by farmers by providing information on irrigation methods and best management practices and coordinating with conservation efforts of the Farm Bureau, Resource Conservation Districts, Natural Resource Conservation Service, and irrigation districts. **2.** The County shall encourage urban water conservation and coordinate with conservation efforts of cities, local water districts and irrigation districts that deliver domestic water. **3.** The County shall continue to implement adopted landscape and irrigation standards designed to reduce water consumption in the landscape environment. **4.** The County shall work with local irrigation districts to preserve water rights and ensure that water saved through conservation may be stored and used locally, rather than "appropriated" and moved to metropolitan areas outside of Stanislaus County. **5.** The County shall encourage the development and use of appropriately treated water (reclaimed wastewater and stormwater) for both agricultural and urban irrigation.
	Policy 3.5: The County will continue to protect the quality of water necessary for crop production and marketing.	**1.** The County shall continue to require analysis of groundwater impacts in Environmental Impact Reports for proposed developments. **2.** The County shall investigate and adopt appropriate regulations to protect water quality.
	Policy 3.6: The County will continue to protect local groundwater for agricultural, rural domestic, and urban use in Stanislaus County.	**1.** The County shall implement the existing groundwater ordinance to ensure the sustainable supply and quality of local groundwater.

Table 2-3 Selected Stanislaus County General Plan Goals and Policies – Chapter One: Land Use Element		
Goal	**Policy**	**Implementation Measures**
Goal One. Provide for diverse land use needs by designating patterns which are responsive to the physical characteristics of the land as well as to environmental, economic, and social concerns of the residents of Stanislaus County**.**	**Policy 7:** Riparian habitat along the rivers and natural waterways of Stanislaus County shall, to the extent possible, be protected.	**1.** All requests for development which require discretionary approval and include lands adjacent to or within riparian habitat shall include measures for protecting that habitat to the extent that such protection does not pose threats to proposed site uses, such as airports.
Goal Four. Ensure that an effective level of public service is provided in unincorporated areas.	**Policy 24:** Future growth shall not exceed the capabilities/capacity of the provider of services such as sewer, water, public safety, solid waste management, road systems, schools, health care facilities, etc.	**2**. Development within a public water district and/or waste water district shall connect to the public water system and/or the waste water treatment facility; except where capacity is limited or connection to existing infrastructure is limiting and an alternative is approved by the County's Department of Environmental Resources. For development outside a water and/or waste water district, it shall meet the standards of the Stanislaus County Primary and Secondary Sewage Treatment Initiative (Measure X) and domestic water. **9**. The County will coordinate development with existing irrigation, water, utility, and transportation systems by referring projects to appropriate agencies and organizations for review and comment.
Goal Six. Promote and protect healthy living environments	Policy 29: Support the development of a built environment that is responsive to decreasing air and water pollution, reducing the consumption of natural resources and energy, increasing the reliability of local water supplies, and reduces vehicle miles traveled by facilitating alternative modes of transportation, and promoting active living (integration of physical activities, such as biking and walking, into everyday routines) opportunities.	1. County development standards shall be evaluated and revised, as necessary, to facilitate development incorporating the following (or similar) design features: • Alternative modes of transportation such as bicycle lanes, pedestrian paths, and facilities for public transit; • Alternative modes of storm water management (that mimic the functions of nature); and • Pedestrian friendly environments through appropriate setback, landscape, and wall/fencing standards.

Although most of the County's population growth (96.8 percent) from 2000 to 2010 occurred in the incorporated areas, population increases in the 1990s created pressure to convert agricultural lands to non-agricultural use. In response to these conditions, county voters passed the *30-Year Land Use Restriction Initiative* (Measure E) in 2008. This measure requires that voters approve any future re-designation or re-zoning of agricultural or open space land use to residential use.

In addition, Stanislaus County has implemented a *Right-to-Farm Ordinance*. The County's ordinance establishes mechanisms designed to protect normal agricultural operations from pressures that can be created by urban neighbors. The County has also developed a *Farmland Mitigation Program* that requires any loss of farmland to residential development to be mitigated by the permanent protection of an equal amount of farmland. Agricultural Conservation easements granted in perpetuity are used as a means of minimizing farmland loss. Based on communications with the California Farmland Trust in October 2018, Agricultural Conservation easements continue to be granted and there are four parcels in Modesto, ranging from approximately 55 to 96 acres in size, with easements.

Notwithstanding the ongoing preservation of agricultural lands, the Stanislaus Council of Governments is projecting a population increase of 21.3 percent in the unincorporated areas by 2035 (from 110,236 to 133,753).

2.6.1.2. Stanislaus County Community Plans

The 2015 Update of the Stanislaus County General Plan includes Community Plans for two urban communities in the Modesto Subbasin including Del Rio and Salida (location on **Figure 2-2**).

Del Rio is a small community of approximately 2.1 square miles located north of the City of Modesto along the Stanislaus River. Del Rio is a mixed residential, recreational and agricultural community. Water is provided to portions of the community by the City of Modesto, while other areas are reliant on groundwater from private wells. Future development, which will require environmental review, would include low-density residential, natural open recreational space, and potential expansion of the Del Rio County Club golf course. Agricultural use would be confined to the southern portion of the community.

Salida is a small community of approximately 4,600 acres northwest of the City of Modesto along Highway 99. The community plan includes the existing community of Salida and an amendment area. The amendment area includes the Salida Area Planning, Road Improvement, Economic Development, and Farmland Protection Initiative approved by the Board of Supervisors in August 2007. Approximately one-third of the planned amended area is for industrial, one-third is for residential (low-density, medium density, and medium high-density), and one-third is for a business park, commercial and agriculture. Water is provided by the City of Modesto. Future development will require environmental review and an evaluation of water/sewer services.

2.6.1.3. Stanislaus County Groundwater Ordinance

In November 2014, Stanislaus County adopted a Groundwater Ordinance[2] to promote sustainable groundwater extraction in the unincorporated portions of Stanislaus County. The ordinance prohibits groundwater extractions that are unsustainable and prohibits exports of groundwater from the County. The ordinance references undesirable results as defined by SGMA and requires periodic reporting of groundwater information to the County Department of Environmental Resources that is "reasonably necessary to monitor the existing condition of groundwater resources within the County…". The ordinance allows for well permits to be issued on a discretionary basis; applications for non-exempt wells must include substantial evidence that they will not withdraw groundwater unsustainably as defined in the ordinance. To comply with the ordinance, the County has developed its Discretionary Well Permitting and Management Program, described below in **Section 2.6.2**.

2.6.1.4. City of Modesto General Plan

The City of Modesto adopted its Urban Area General Plan in October 2008 to provide a planning horizon through 2025 (City of Modesto, 2008). Most of the City is located in the Modesto Subbasin, but a small portion is located south of the Tuolumne River in the Turlock Subbasin. The City of Modesto has established 23 comprehensive planning districts (CPD). Two of these, Whitmore/Carpenter CPD and Fairview CPD, are in the Turlock Subbasin, while the remaining 21 CPDs are in the Modesto Subbasin. The CPDs in the Modesto Subbasin include residential, commercial, business park, mixed use, and open space land uses, with a total of approximately 42,000 acres, 174,000 dwelling units and 277,000 jobs.

The General Plan for the City of Modesto identifies water as the most critical natural resource in California. Water supply in Modesto is from City owned and operated wells and treated surface water purchased from MID. There are some private wells within City limits in parks and golf courses, and for industrial and agricultural uses. The General Plan has a water goal, wastewater goal and storm drainage goal. The policies to achieve these goals are summarized in **Table 2-4**.

The City of Modesto approved a Draft General Plan Amendment in March 2018. **Table 2-4** will be updated after the General Plan is adopted.

[2] Chapter 9.37, County Code.

Table 2-4. Selected City of Modesto General Plan Goals and Policies -Community Services and Facilities	
Goal	**Policy**
General Water Goal Ensure a consistent, reliable, high-quality water supply for the City of Modesto and its customers.	**Water Policies—Baseline Developed Area** a. During review of all proposed development, the City shall require, as a condition of approval, that all developments reduce their potable water demand. The City should refer to Table 5-1 in the Joint Urban Water Management Plan for potential techniques to reduce potable water demand, as well as those identified in the City's current UWMP. b. The City's Public Works Director may require water infrastructure master plans for the public infrastructure or when otherwise pertinent to provision of service at adopted service levels for the specific plan areas or other projects depending on site issues and location. c. Individual development projects, including lot splits, are subject to review by the City's Public Works Director for adequate water supply. d. According to state law (Senate Bill 1087 of 2005), no provider of water services may deny or condition the approval of an application for services, or reduce the amount of the services applied for, if the proposed development includes housing affordable to lower income households, except upon making specific findings in accordance with SB 1087. e. All new connections to the public water system shall have meters installed. In addition, on or before January 1, 2025, all existing municipal and industrial service connections shall have water meters installed. On or before January 1, 2010, the City shall charge all customers with water meters based on the volume of water delivered. f. The City of Modesto shall prepare and adopt an Urban Water Management Plan every five years in accordance with Water Code Section 10621. g. The City shall implement the Demand Measurement and Conservation Measures identified in the City's adopted Urban Water Management Plan. h. The City of Modesto shall prepare and maintain a Water Master Plan. The Water Master Plan shall be updated, as needed, to incorporate changes in growth projections, water supplies, and demands. i. The City of Modesto should continue to pursue additional potential water supply alternatives available to the City to accommodate growth and meet future demand in both normal and dry years. j. The City of Modesto will encourage the optimum beneficial use of water resources within the City. The City shall strive to maintain an adequate supply of high-quality water for urban uses. At a minimum, potable water supplies (including well water) delivered to water customers shall conform to the primary maximum contaminant levels as defined in the California Code of Regulations, Title 22, Section 64431-64444. k. The City of Modesto will strive to stabilize groundwater levels and eliminate groundwater overdraft, as part of a conjunctive groundwater–surface water management program. The City shall view regional water resources, such as groundwater, surface water, and recycled wastewater, as an integrated hydrologic system when developing water management programs. l. The City of Modesto will be the sole provider of municipal and industrial water services to the area within the City's Sphere of Influence, with the exception of private wells. The City will cooperate with the overlying agricultural water providers, MID and TID, and with adjacent municipal and industrial providers for the mutually beneficial management of the limited water resources. The City will also take into consideration its public trust duty with regard to environmental uses of water resources. m. The City will provide water service within the original Del Este service area. n. Water facilities will be constructed, operated, maintained, and replaced in a manner that will provide the best possible service to the public. The City shall ensure that infrastructure is installed before or concurrently with development. The City will take a comprehensive approach to financing, using a blend of special taxes, benefit assessments, and other methods to ensure that infrastructure installation occurs in a timely manner. o. The City will continue to establish guidelines, policies, and programs to implement water conservation to the maximum extent feasible. Funding for large conservation rebate or exchange programs should be in place. The City shall strive to maximize the utilization of water resources when developing and implementing its Economic Development Strategy. p. The City of Modesto shall participate in the development of a TID Surface Water Supply Project (SWSP). q. The City of Modesto shall implement Local Basin Management Objectives (BMOs) discussed in the Integrated Regional Groundwater Management Plan that relate to the specific approaches to water management goals including groundwater supply, groundwater quality, and protection against inelastic land surface subsidence. r. The City of Modesto shall support the Regional BMOs discussed in the Integrated Regional Groundwater Management Plan. s. The City of Modesto should develop and implement a water recycling program to reduce the demands for new water supplies in the City and basin. *This section addresses the requirements of Government Code Section 66455.3 for proposed residential subdivisions of over 500 dwellings.* t. For projects within the City's water service area, a copy of any project application shall be sent to the City Public Works Department within 5 days of the application being accepted as complete for processing by the City of Modesto. u. When approving a proposed residential subdivision of over 500 dwelling units, the City of Modesto must include a condition requiring a sufficient water supply to be available. Proof of availability of water supply depends upon several factors.

Table 2-4. Selected City of Modesto General Plan Goals and Policies -Community Services and Facilities, continued	
Goal	**Policy**
	This section addresses the requirements of Senate Bills 221 and 610 of 2001 that establish the requirement for public water systems to prepare water supply assessments for projects as follows: v. A project means any of the following (consistent with Water Code Section 10912): a proposed residential development of more than 500 dwelling units; a proposed shopping center or business establishment employing more than 1,000 persons or having more than 250,000 square feet of floor space; a proposed hotel or motel, or both, having more than 500 rooms; a proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area; a mixed-use project that includes one or more of the projects identified above; or a project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project. w. The City shall consider adopting more specific or restrictive standards for the definition of a project within its water service area. x. For projects requiring an environmental impact report, negative declaration, or mitigated negative declaration under CEQA, the City, as the retail water supplier, shall prepare a Water Supply Assessment (WSA) that complies with the requirements of SB 610 and SB 221 in evaluating the sufficiency of water supply to serve the project, and include the findings of the WSA in the CEQA document. *This section addresses the requirements of Senate Bill 2095 of 2000 (Government Code Section 65601 et seq.) that relate to the mandated use of recycled water for landscaping purposes as follows:* y. Any local public or private entity that produces recycled water and determines that within 10 years it will provide recycled water within the boundaries of the City of Modesto must notify the City of that fact. Within 180 days of receipt of the notice, the City of Modesto shall adopt and enforce a specified recycled water ordinance. The recycled water ordinance must comply with the recycled water policies detailed in the City of Modesto's Urban Water Management Plan.
	Water Policies—Planned Urbanizing Area a. All of the Water Policies for the Baseline Developed Area apply within the Planned Urbanizing Area. b. The City of Modesto shall coordinate land development projects with the expansion of water treatment and supply facilities.
General Wastewater Goal The objective of the City's wastewater system is to meet increasingly strict wastewater regulations in a cost-effective manner. As demand for water increases in California, reclaiming wastewater could create opportunities to optimize the region's water resources. Similar opportunities exist for the beneficial reuse of biosolids and digester gas, and other residuals of wastewater treatment.	**Wastewater Policies—Baseline Developed Area** a. To protect public health and the environment, the City's wastewater treatment facilities will conform to standards for wastewater and biosolids treatment and disposal, as established by the Central Valley Regional Water Quality Control Board, in compliance with the Federal Clean Water Act, the State Porter-Cologne Act, and their implementing regulations, current and future. b. The City shall support the near-term expansion of the wastewater treatment and disposal capacity of the Jennings Road Secondary Treatment Plant. c. The City shall support both wastewater collection and treatment system improvements and associated costs needed to serve the City's existing and future customers. d. Wastewater facilities will be constructed, operated, maintained, and replaced in a manner that will provide the best possible service to the public as required by federal and state laws and regulations. In developing implementation plans, consideration shall be given to rehabilitation of essential existing facilities, expansion to meet current excess demand, and the timely expansion for future demand. e. If available, the City shall provide wastewater services within the sewer service agreement area. f. The City of Modesto shall continue to support, develop, and research future water reclamation opportunities as a water resource. g. The City's wastewater system capacity will be allocated to existing and future residential, commercial, and industrial customers. Discharges from environmental cleanup sites may be issued conditional discharge permits subject to the availability of excess treatment capacity. In accordance with federal and state regulations, all discharges to the wastewater system may not, or may not threaten to, upset, interfere, or pass through the wastewater system. h. The City Engineer may require wastewater infrastructure master plans for the specific public infrastructure or when otherwise pertinent to provision of service at adopted service levels for the specific plan areas or other projects depending on site issues and location. i. Individual development projects, including lot splits, are subject to review by the City's Public Works Director for adequate wastewater collection service. j. Within the entire General Plan boundary and sewer service areas, the City shall avoid increasing the burden on existing septic systems that results from the addition of new plumbing fixtures. k. Subject to the approval of the Stanislaus Local Agency Formation Commission, the City of Modesto will be the sole provider of wastewater services to the area within the City's Sphere of Influence and sewer service area. l. Prior to annexation, the City must find that adequate wastewater treatment and disposal capacity can be provided for the proposed annexation. m. The City will encourage the regional beneficial reuse of reclaimed water. The City is committed to development of a full reclamation program in the long term. The City will comply with Title 22 standards for use of reclaimed water and criteria contained in the California Department of Public Health (CDPH) "Purple Book." n. The City shall strive to use land application of biosolids as the most environmentally beneficial reuse of this resource, rather than the disposal options of landfilling or incineration. o. The City shall develop methods to discontinue the current practice of using the sanitary system to temporarily drain stormwater runoff. p. The City shall establish odor buffer zones around primary and secondary wastewater plants, thereby minimizing the likelihood of odors impacting new residential or commercial development. q. The City shall utilize source control and demand management among its tools for accomplishing the most cost-effective wastewater management, protective of public health and the environment. r. The City shall establish 10th percentile river flows as the baseline condition for design to minimize risks of exceeding Waste Discharge Requirements (WDR) and National Pollution Discharge Elimination System (NPDES) permit requirements. s. According to state law (Senate Bill 1087 of 2004), no provider of wastewater services may deny or condition the approval of an application for services, or reduce the amount of the services applied for, if the proposed development includes housing affordable to lower income households, except upon making specific findings in accordance with SB 1087.

Table 2-4. Selected City of Modesto General Plan Goals and Policies -Community Services and Facilities, continued	
Goal	**Policy**
	Wastewater Policies—Planned Urbanizing Area a. All of the Wastewater policies for the Baseline Developed Area apply within the Planned Urbanizing Area. b. The City of Modesto will require each new development project to be served with public sanitary sewers. Utilities located in private streets shall be part of the public sewerage system and shall be connected to a sewer lateral. c. The City of Modesto will coordinate land development proposals with the expansion of wastewater facilities.
General Storm Drainage Goal The City should have an operating storm drainage system that protects people and property from flood damage and that protects the environment.	**Stormwater Drainage Policies—Baseline Developed Area** a. One-third of the Baseline Developed Area is served by "rock wells." New rock wells shall be allowed only under very limited circumstances. New storm drainage in the Baseline Developed Area shall be by means of positive storm drainage systems unless otherwise approved by the City Engineer. The new storm drainage facilities shall consider the drainage facility requirements presented in Table 9-1 of the Final Master Environmental Impact Report and the SDMP. This policy applies to both positive storm drainage systems and to new rock wells (which are generally discouraged) in the Baseline Developed Area. b. MID shall be consulted during the preparation of drainage studies required by this General Plan. c. The City shall prevent water pollution from urban storm runoff as established by the Central Valley Regional Water Quality Control Board Basin Plan for surface discharges and the Environmental Protection Agency for underground injection. d. Stormwater drainage facilities shall be constructed, operated, maintained, and replaced in a manner that will provide the best possible service to the public, as required by federal and state laws and regulations. In developing implementation plans, consideration shall be given to rehabilitation of existing facilities, remediation of developed areas with inadequate levels of drainage service, and the timely expansion of the system for future development. e. The City shall update and maintain its Storm Drainage Master Plan to cover the entire area within the City's Sphere of Influence. The City of Modesto shall adopt the Storm Drainage Master Plan, in consultation with Stanislaus County, MID, and TID, to address the projected cumulative flows that would be discharged to MID and TID facilities from the urbanized drainage areas. The master drainage program should include the procedures for planning, evaluation, and design of necessary stormwater drainage facilities to ensure that facilities are capable of accommodating the additional flows. The master drainage program should include capital improvement, operations, and maintenance-financing plans necessary to ensure that facilities are constructed in a timely fashion to reduce the impacts from potential flooding problems. f. New development shall comply with City requirements for conveyance, retention, and detention. New development shall include onsite storage of stormwater as necessary. Rock wells shall not be allowed for new development except at infill areas smaller than three acres where no other feasible alternative is available. g. The City Engineer may require stormwater drainage infrastructure master plans for the public infrastructure or when otherwise pertinent to provision of service at adopted service levels for the specific plan areas or other projects depending on site issues and location. h. Construction activities shall comply with the requirements of the City's Stormwater Management Plan under its municipal NPDES stormwater permit, and the State Water Resources Control Board's General Permit for Discharges of Storm Water Associated with Construction Activity. i. For developments within a mapped 100-year floodplain, studies shall be prepared that demonstrate how the development will comply with both the construction and postconstruction programs under the City's municipal NPDES permit. Developments in these areas shall not lead to increased erosion or releases of other contaminants that would cause violations of the City's municipal NPDES permit. j. The City shall ensure that new development complies with the City of Modesto's *Stormwater Management Program: Guidance Manual for New Development Stormwater Quality Control Measures*.
	Stormwater Drainage Policies—Planned Urbanizing Area a. All of the Stormwater Drainage policies for the Baseline Developed Area apply within the Planned Urbanizing Area. b. The City of Modesto shall require each new development area to be served with positive storm drainage systems. A positive storm drainage system may be comprised of catch basins, pipelines, channels, recharge/detention basins, and pumping facilities that discharge stormwater to surface waters. New detention basins must typically include new technologies in their design that allow for full, healthy, and sustainable landscaping. The City of Modesto *Design Standards for Dual Use Flood Control / Recreation Facilities* manual is the guiding document for the development of these facilities. The positive storm drainage facilities shall consider the requirements presented in Table 9-1 of the Final Master Environmental Impact Report and the SDMP. c. The City of Modesto shall require positive storm drainage facilities in the Planned Urbanizing Area. Recharge shall be typically accomplished at recharge/detention basins, designed to be in compliance with applicable federal and state water quality regulations for both groundwater and surface water. d. Where feasible, dual-use flood control/recreation facilities shall be developed (dual-use facilities) as part of the storm drainage system. Dual-use facilities maximize efficient use of land and funds by satisfying needs for water quality, flood control, recreation, and aesthetics within a single consolidated facility. e. Dual-use facilities shall be designed and constructed in accordance with the standards in the City of Modesto *Design Standards for Dual Use Flood Control/Recreation Facilities* manual and the Open Space and Parks/Planned Urbanizing Area Policy e. f. New developments shall be required to implement an appropriate selection of permanent pollution control measures in accordance with the City's implementation policies for the municipal NPDES stormwater permit. Permanent erosion control measures such as seeding and planting vegetation for new cut-and-fill slopes, directing runoff through vegetation, or otherwise reducing the off-site discharge of particulates and sediment are the most effective method of controlling off-site discharges of urban pollutants.

2.6.1.5. City of Oakdale General Plan

The City of Oakdale is a small community spanning six square miles along the Stanislaus River in the northern region of the Modesto Subbasin (**Figure 2-2**). Oakdale adopted its 2030 General Plan (ESA, 2013) and anticipates an increase in population from approximately 21,000 in 2011 to 35,000 in 2030. This population growth is expected to require an increase in demand for residential, industrial, public/semi-public, retail and office development. Oakdale is completely reliant on groundwater for its water supply. The City is surrounded by agricultural lands consisting mostly of orchards. Water resource goals and policies from the Oakdale General Plan are summarized in **Table 2-5**.

Table 2-5 Selected City of Oakdale General Plan Goals and Policies

Goal	Policy
Goal PF-1 A sustainable supply of water delivered through an efficient infrastructure system to meet existing and future needs.	
Water Service Policies	
	PF-1.1 Reliable Supply and Distribution. Maintain a reliable supply of high quality water and a cost-effective distribution system to meet normal and emergency demands in both wet and dry years.
	PF-1.2 Urban Water Management Plan. Regularly review and update the City's Urban Water Management Plan and other water master planning and capital improvement tools to ensure adequate water supply, infrastructure, maintenance, rehabilitation, funding and conservation measures.
	PF 1.3 New Development. Require new development to demonstrate the availability of adequate water supply (either existing water supply or provision of new water sources) and infrastructure in accordance with city plans and standards. Ensure that new development constructs, dedicates and/or pays its fair share contribution to the water supply, treatment, storage, and distribution system necessary to serve the demands created by the development.
	PF 1.4 Existing OID Facilities. Coordinate with OID on the potential abandonment, relocation and/or reuse of existing facilities and easements within the City where appropriate.
	PF-1.5 Water Well Use. Discourage the use of private wells for domestic water use when connection to the City's water system is feasible.
	PF-1.6 Groundwater. Monitor and protect the quality and quantity of groundwater.
	PF-1.7 Groundwater Recharge. Preserve areas that provide important groundwater recharge capabilities such as undeveloped open space and natural drainage areas.

	PF-1.8 Regional Coordination. Continue to coordinate with other jurisdictions and agencies in preparing, and regularly reviewing and updating regional groundwater management plans to ensure acceptable groundwater quality and to minimize the potential for aquifer overdraft.
	PF-1.9 Surface Water. Work with the Oakdale Irrigation District to explore the potential use of surface water as future demands for groundwater increase.
	PF-1.10 Drinking Water Standards. Continue to provide domestic water that meets or exceeds state and federal drinking water standards by providing well water treatment, when necessary.
	PF-1.11 Energy Efficiency. Employ best practices to maintain the highest possible energy efficiency in the water infrastructure system to reduce costs and greenhouse gas emissions.
Water Conservation Policies	
	PF-1.12 Water Conservation Programs. Implement the City's water conservation program, and amend the program as appropriate to reflect evolving technologies and best practices, consistent with the Oakdale Climate Action Plan.
	PF-1.13 Building and Site Design. Require new development to incorporate water saving techniques such as water efficient fixtures, drought-tolerant landscaping, on-site stormwater capture and re-use, and on-site commercial/industrial water reuse in accordance with state and other relevant standards.
	PF-1.14 Recycled Water. Explore opportunities to use recycled water in the city.
	PF-1.15 Water Education. Educate residents and businesses about the importance of water conservation and associated techniques and programs.
Goal NR-4: Water Resources and Quality	
Water Resource Protection Policies	
	NR-4.1 Stanislaus River. Protect surface water resources in Oakdale, including the Stanislaus River.

	NR-4.2 Groundwater Management Plan. Continue to work with applicable agencies to prepare, regularly review, update, and implement regional groundwater management plans to ensure the sustainability of groundwater quality and quantity.
	NR-4.3 Natural Open Space Areas. Preserve areas that provide important groundwater recharge, stormwater management, and water quality benefits such as undeveloped open spaces, natural habitat, riparian corridors, wetlands, and other drainage areas.
WATER QUALITY PROTECTION POLICIES	
	NR-4.4 National Pollution Discharge Elimination System. Regulate construction and operational activities to incorporate stormwater protection measures and best management practices in accordance with the City's National Pollution Discharge Elimination System (NPDES) permit.
	NR-4.5 Industrial, Agricultural, and Septic System Discharge. Regulate discharge from industrial users, use of agricultural chemicals (i.e., pesticides) and use of septic systems in accordance with local and State regulations to protect the City's natural water bodies.
	NR-4.6 Regulation of Runoff. Protect Oakdale's water resources from contamination by regulating stormwater collection and conveyance to ensure pollutants in runoff have been reduced to the maximum extent practicable.
	NR-4.7 New Development. Require new development to protect the quality of surface and groundwater bodies and natural drainage systems through site design, stormwater treatment, low impact development measures, and best management practices.
	NR-4.8 Regional Coordination. Coordinate and collaborate with agencies in the region and watershed to address water quality issues.
	NR-4.9 Education. Educate the public about practices and programs to minimize surface water and groundwater pollution.

2.6.1.6. City of Riverbank General Plan

The City of Riverbank updated its General Plan with a vision from 2005 to 2025 (City of Riverbank, 2009). Riverbank is small community located north of the City of Modesto along the Stanislaus River with a population of approximately 22,000 in 2008. The 2025 vision preserves the small-town character while anticipating population growth to approximately

52,500. Land use changes under the 2005-2025 Riverbank General Plan include residential, open space, commercial, industrial, multi-use recreation, mixed use, parks and civic. Water resources goals and policies from the Riverbank General Plan are summarized in **Table 2-6**.

Table 2-6. Selected City of Riverbank General Plan Goals, Policies, and Implementation Strategies		
Goal	**Policy**	**Implementation Strategies**
Goal DESIGN-19 Water Quality is Protected Throughout the Development Process and Occupation of the Site	**19.1** The City will establish site design criteria for allowing natural hydrological systems to function with minimum or no modification. **19.2** The City will promote the use of rain gardens, open ditches or swales, and pervious driveways and parking areas in site design to maximize infiltration of storm water and minimize runoff into environmentally critical areas. **19.3** The City will promote inclusion of passive rainwater collection systems in site and architectural design for non-potable water (gray-water) storage and use, thereby saving potable (drinking) water for ingestion.	
Goal CONS-4 Preserve Habitat Associated with the Stanislaus River While Increasing Public Access	**4.1** Approved projects, plans, and subdivisions shall avoid conversion of habitat within the existing Stanislaus River riparian corridor, including Great Valley Mixed Riparian Forest, Great Valley Willow Scrub, and Riparian Scrub areas, and shall preserve an open space buffer along the Stanislaus River and associated riparian areas. The open space buffer shall be designed to avoid impacts to habitat and special status species in the riparian corridor, as specified in Policy CONS 5.1, Policy CONS 5.2, Policy CONS 5.3, and Policy CONS 5.6, based on project specific biological resource assessment. The precise size of buffer from the river and associated riparian corridor is to be determined by site specific analysis. The riparian corridor preservation and open space buffer shall be provided through a permanent covenant, such as a conservation easement and shall also include an ongoing maintenance agreement with a land trust or other qualified nonprofit organization. The preservation of the riparian corridor and ongoing maintenance agreement is required prior to City approval of any subdivision of property or development project located in areas outside City limits as of January 1, 2007 (see Figure CONS-1). Low impact recreation could be allowed in this buffer area to the extent that impacts to these sensitive habitats are avoided or fully mitigated by demonstrating no net loss of habitat functions or value. Urban development shall not be allowed in this buffer area. **4.2** Approved projects, plans, and subdivisions shall provide for collection, conveyance, treatment, detention, and other stormwater management measures in a way that does not decrease water quality or alter hydrology in the Stanislaus River or associated groundwater recharge areas.	**1.** Development projects and subdivisions will be consistent with, and implement land use planning and greenhouse gas emission reduction measures developed pursuant to the regional Sustainable Community Strategy (per SB 375 of 2008), and consistent with Countywide and regional agricultural preservation planning, to the maximum extent feasible. In determining feasibility, there is a recognized need to balance the importance of agricultural resource conservation with other needs of Riverbank, such as State defined affordable housing, air quality, noise, water usage, and other public resources and services.
Goal CONS-6 Maintain or Increase Surface and Groundwater Quality Supply	**6.1** The City will require that waterways, floodplains, watersheds, and groundwater recharge areas are maintained in their natural condition, wherever feasible. **6.2** The City will coordinate with appropriate regional, state, and federal agencies to address local sources of groundwater and soil contamination, including underground storage tanks, septic tanks, agriculture, and industrial uses. **6.3** Approved projects, plans, and subdivisions in new growth areas shall incorporate natural drainage system design that emphasizes infiltration and decentralized treatment (rather than traditional piped approaches that quickly convey stormwater to large centralized treatment facilities). **6.4** The City will encourage the use of permeable surfaces for hardscape. Impervious surfaces such as driveways, streets, and parking lots will be minimized so that land is available for a natural drainage system to absorb stormwater, reduce polluted urban runoff, recharge groundwater, and reduce flooding. **6.5** City street standards and parking requirements will balance the needs of transportation with the full range of community planning issues, including water quality, storm drainage, air quality, and other considerations. **6.6** The City will encourage the use of recycled water for appropriate use, including but not limited to outdoor irrigation, toilet flushing, fire hydrants, and commercial and industrial processes. **6.7** The City will require mitigation measures, in coordination with the Regional Water Quality Control Board, as a part of approved projects, plans, and subdivisions to address the quality and quantity of urban runoff, including that attributable to soil erosion.	**3.** The City will update the water, wastewater, and stormwater drainage master plans at least every five years to ensure the appropriate level of service is maintained as the City grows, and to ensure that appropriate projects are include in capital improvements planning and can be funded. The City will cooperate with local irrigation districts and public agencies to explore feasible surface water supplies or conjunctive use opportunities.

Table 2-6. Selected City of Riverbank General Plan Goals, Policies, and Implementation Strategies, continued		
Goal	**Policy**	**Implementation Strategies**
Goal PUBLIC-2 Adequate Supply of Quality Water to Serve Existing and Future Project Development Needs	**2.1** The City will require that water supply, treatment, and delivery meet or exceed local, State, and federal standards. **2.2** The City will manage and enhance the City's water supply and facilities to accommodate existing and planned development, as identified in the City's Water Master Plan, Urban Water Management Plan, and Groundwater Source Efficiency Report. **2.3** New developments shall incorporate water conservation techniques to reduce water demand in new growth areas, including the use of reclaimed water for landscaping and irrigation. **2.4** The City will condition approval of new developments on demonstrating the availability of adequate water supply and infrastructure, including multiple dry years, as addressed in the City's Water Master Plan, Urban Water Management Plan, and Groundwater Source Efficiency Report. **2.5** The City will not induce urban development by providing provide water services in areas outside the Planning Area or areas not planned for urban development, such as areas designated for agriculture or open space.	**3.** The City will update the water, wastewater, and stormwater drainage master plans at least every five years to ensure the appropriate level of service is maintained as the City grows, and to ensure that appropriate projects are include in capital improvements planning and can be funded. The City will cooperate with local irrigation districts and public agencies to explore feasible surface water supplies or conjunctive use opportunities.
Goal PUBLIC-4 Storm Drainage Systems that Protect Public Safety, reserve Natural Resources, and Prevent Erosion and Flood Potential	**4.1** The City will maintain and improve, as necessary, existing public storm basins and flood control facilities, as identified in the Stormwater Master Plan. **4.2** The City will coordinate with County and Regional agencies, as well as the railroad, in the maintenance and improvement of storm drainage facilities to protect the City's residents, property, and structures from flood hazards. **4.3** The City will consider a variety of means for floodplain management, depending on the context, which may include development, improvement, and maintenance of structural flood control facilities; land use policy and zoning to prohibit incompatible urban development within the floodplain; erosion control techniques; set backs from flood-prone areas; and other measures, as circumstances dictate. **4.4** The City will identify areas, such as wetlands, low-lying natural runoff areas, and pervious surfaces and percolation ponds, for natural storm water collection and filtration, in concert with the City's existing and future drainage infrastructure, to help reduce the amount of runoff and encourage groundwater recharge. **4.5** New development shall be designed to control surface runoff discharges to comply with the National Pollutant Discharge Elimination System Permit and the receiving water limitations assigned by the Regional Water Quality Control Board. **4.6** The City will establish and new development shall implement nonpoint source pollution control measures and programs designed to reduce and control the discharge of pollutants into the City's storm drains and river. **4.7** The City will require minimization of the amount of new impervious surfaces and directly connected impervious surfaces in areas of new development and redevelopment and, where feasible, maximize onsite infiltration of stormwater runoff. **4.8** The City will encourage pollution prevention methods, supplemented by pollutant source controls and treatment. Use small collection strategies located at, or as close to possible to the source (i.e., the point where water initially meets the ground) to minimize the transport or urban runoff and pollutants off-site. **4.9** The City will require the preservation and, where possible, will encourage that creation or restoration of areas that provide important water quality benefits, such as riparian corridors, wetlands, and buffer zones. **4.10** The City will limit disturbances of natural water bodies and natural drainage systems cause by development, including roads, highways, and bridges. **4.11** The City will require that new development avoid development in areas that are particularly susceptible to erosion and sediment loss; or, will require that these areas are identified and protected from erosion and sediment loss. **4.12** The City will encourage and/or require the use of open, vegetated swales, stormwater cascades, and small wetland ponds instead of pipes and vaults, as a part of urban development proposed outside current City limits to mitigate stormwater impacts. **4.13** The City will enforce a no-net-runoff policy for areas proposed for development outside the current City limits.	**1.** The City will coordinate with area reclamation districts, Stanislaus County, the City of Modesto, and other agencies and jurisdictions for planning and coordinating drainage programs and policies on an areawide and regional basis.

2.6.1.7. City of Waterford General Plan

Waterford is a small community covering approximately 2.4 square miles along the Tuolumne River with a population of approximately 8,000 (**Figure 2-2**). In 2017, the City of Waterford updated its General Plan with a vision towards 2025, to plan for future growth that could double, triple or even quadruple its population over the next 20 to 30 years (Waterford Planning Department, 2007). The General Plan anticipates the need for future residential development and recognizes the need to accommodate business and industry.

Waterford is completely reliant on groundwater for water supply. Waterford currently owns and operates its water system, but before July 1, 2015, the City of Modesto provided water service to Waterford. Several policies in the General Plan address water, including Preserve and Enhance Water Quality, Promote Water Conservation Throughout the Planning Area and Use of Sustainable or "Green" Building Principals to Promote Water Conservation. Selected goals, policies and implementing actions in Waterford's General Plan are summarized on **Table 2-7**.

Table 2-7. Selected City of Waterford General Plan Goals, Policies, and Implementing Actions		
Goal	**Policy**	**Implementing Actions**
Public Services and Facilities •Adequate Public Services and Facilities to Meet the Needs of the City's Residents •Cost-Effective Public Service Delivery Systems and Facilities •Public Services and Facilities Standards that are Applied Uniformly Throughout the City	**PF-1.3** Establish and Maintain a Program for Cost Effective Expansion of Municipal Services and Facilities to Meet Future Community Growth Needs. **PF-1.5** Assure that Expansion of the City Results in the Enhancement of Municipal Services and Facilities with in Waterford Without Increasing Costs to The Existing City.	**PF-1.3.a** The City shall prepare and maintain master plans for the provision of sewer, water, storm drainage, streets and roadways and other public facilities and infrastructure for the service of the existing City and for the planned expansion of the City boundaries. **PF-1.5.j** Extension of infrastructure to newly annexed areas shall utilize the City's master plans for sewer, streets, storm drain, water and other infrastructure.
Urban Design •A Rural Community with a Unique Identity. •A Well Defined Urban Center. •An Integrated Community-Well Connected.	**UD-10** Maintain and Enhance the Unique Community Appearance of Waterford.	**UD-10d.** Encourage the development of methods to require acceptable levels of landscaping for new development and for landscaping maintenance in highly visible areas of the community. Landscape designs shall incorporate water conservation and low maintenance features.
Open Space for the Preservation of Natural Resources •OS-Maintain Waterford's Biological Resources. •OS-Maintain a High-Quality, Expanding Urban Forest •OS-Preserve Scenic Corridors and Resources •OS-Improve and Enhance Water Quality	**OS-A-1a** Identify, and recognize as significant, wetland habitats which meet the appropriate legal definition of federal and state law. **OS-A-2** Preserve and Enhance Tuolumne River and Dry Creek in Their Natural State Throughout the Planning Area. **OS-A-2c** Encourage alternatives to concrete channeling of existing natural drainage courses as part of any flood control project and support more natural flood control methods. **OS-A-5** Preserve and Enhance Water Quality.	**OS-A-5a.** Utilize storm water retention basins and other "Best Management Practices" to improve the quality of storm water discharged into the region's natural surface water system. **OS-A-5b** Monitor known sources of groundwater contamination within the City and its future expansion area. **OS-A-5c.** Periodically monitor the quality of surface water in the surface water system within the City and implement programs to minimize or eliminate sources of pollution. **OS-A-5d** Monitor ground water in areas in and around the City using septic system waste water disposal systems.
Conservation of Resources •OS-Conserve Water Resources •OS-Preserve and Protect Soil Resources	**OS-E-1** Promote Water Conservation Throughout the Planning Area.	**OS-E-1a Develop and enforce water conservation policies and standards.** The City should consider adoption of a water conservation ordinance. **OS-E-1b Develop a Water Efficient Landscaping and Irrigation Ordinance.** Promote the conservation of water and the preservation of water quality by requiring drought tolerant plant material in landscaping and the retention of existing natural vegetation on new development projects. **OS-E-1c Provide leadership in conserving urban water resources.** City buildings and facilities should be equipped with water saving devices whenever practical. Municipal parks and playgrounds should employ water conservation techniques such as mulching, drip irrigation and other appropriate technologies. **OS-E-1d Encourage public water conservation efforts.** Through established public information systems in the community, the City should promote water conservation by providing information on water savings from low-flow fixtures and the value of insulating hot water lines in water re-circulating systems. Other conservation techniques can be addressed, such as the use of non-potable water for landscape irrigation purposes (water re-use, MID water, etc.).
Sustainable Design •SD-Sustainable "Green" Buildings City of Waterford. •SD- Application of "Green" or High Performance Building Technology	**SD-5.2** Use of Sustainable or "Green" Building Principals to promote Water Conservation.	**SD-5.2a. Manage Site Water** Create on-site small scale water features as part of landscape design that can serve as onsite storm water detention and minimize storm-water runoff during peak winter storm periods. **SD-5.2b. Use Gray Water Systems** Design landscape areas to make maximum use of treated wastewater or "purple pipe" systems. **SD-5.2c. Conserve Building Water Consumption** Use low flow water fixtures throughout the building.

2.6.1.8. Tuolumne River Regional Park Master Plan

The Tuolumne River Regional Park (TRRP) Master Plan was developed in December 2001 for the Joint Powers Authority including the City of Modesto, City of Ceres and Stanislaus County (EDAW, Inc., 2001). The overall goals of the TRRP are to:

- Create a park where the recreational experience is oriented towards and compatible with the Tuolumne River, its water, natural resources, and processes.
- Provide a park that is a source of pride for the citizens of Stanislaus County and reflects and accommodates the County's diverse peoples and cultures.

2.6.2. Stanislaus County Discretionary Well Permitting and Management Program

Well permitting processes have been established by Stanislaus County to implement county-wide groundwater ordinances that prevent export and overdraft and to ensure proper well construction and abandonment for the protection of groundwater resources. These processes are summarized below. Cities maintain control of well permitting within their city limits.

To implement the 2014 Stanislaus County Groundwater Ordinance (described above in **Section 2.6.1.3**), the County has developed its Discretionary Well Permitting and Management Program to prevent the unsustainable extraction from new wells subject to the Stanislaus County Groundwater Ordinance. The objectives of the Program, as stated in the County Programmatic Environmental Impact Report for the Program (PEIR), are as follows:

- Avoid or minimize potential adverse environmental impacts from the unsustainable extraction of groundwater resources, including, but not limited to, increased groundwater overdraft, land subsidence, uncontrolled movement of inferior quality groundwater, the lowering of groundwater levels, and increased groundwater degradation (Stanislaus County Code § 9.37.020 (4)); and

- Avoid or minimize potential adverse economic impacts from the unsustainable extraction of groundwater resources, including, but not limited to, loss of arable land, a decline in property values, increased pumping costs due to the lowering of groundwater levels, increased groundwater quality treatment costs, and replacement of wells due to declining groundwater levels, replacement of damaged wells, conveyance infrastructure, roads, bridges and other appurtenances, structures, or facilities due to land subsidence (Stanislaus County Code § 9.37.020 (5)). (Stanislaus County, March 2018).

The County program is designed to work cooperatively with SGMA and incorporates authorities and requirements provided under this GSP. In brief, the Program involves a

discretionary well permitting process in non-exempt areas[3] of the County for all non-de minimis extraction in compliance with the Ordinance. After GSP adoption, the discretionary well permit program will apply to the installation of any new well or regulation of groundwater extraction from any existing well if the County reasonably concludes that a new or existing well is not in compliance with the GSP. The program includes a permit renewal process in five-year increments that coincides with the five-year GSP updates required by the GSP regulations.

The Well Application review process, along with an application package and required mitigation measures, can be downloaded from the Stanislaus County website at: http://www.stancounty.com/er/pdf/application-packet.pdf.

2.6.3. How the General Plans and the GSP Affect the Other

In general, the General Plans reviewed in this section are accommodating population growth in the Subbasin, while preserving other beneficial uses of water by agriculture and the environment, which will result in increased water demands in the Subbasin. However, most of the plans recognize the need for water conservation, alternative supplies, and resource management. Many, especially the more recent plans, acknowledge the need for sustainable groundwater management. Ordinances for Stanislaus County incorporate the GSP planning process and SGMA requirements into specific programs, as described above.

All of the agencies with land use planning responsibilities and authorities are also STRGBA GSA member agencies. In addition, three member agencies (i.e., City of Modesto, OID, and Stanislaus County) are members of GSAs in neighboring subbasins which will help to ensure a high level of coordination in the GSP process.

[3] Exempt areas include incorporated areas and areas within the service area of a public water agency in compliance with a Groundwater Management Plan or GSP.

References

Bookman-Edmonston, 2005, Integrated Regional Groundwater Management Plan for the Modesto Subbasin, Stanislaus and Tuolumne Rivers Groundwater Basin Association, June.

CH2M Hill, 2005, OID Water Resources Plan, Summary Report, November.

City of Modesto, 2008, City of Modesto Urban Area General Plan, October 14.

City of Riverbank, 2009, City of Riverbank General Plan, 2002-2025.

Davids Engineering, Inc., 2016, Agricultural Water Management Plan, Oakdale Irrigation District, March.

California Department of Water Resources (DWR), 2006, San Joaquin Valley Groundwater Basin, Modesto Subbasin, California's Groundwater Bulletin 118, groundwater basin descriptions, updated January 20, 2006.

East San Joaquin Water Quality Coalition (ESJWQC), 2019, https://www.esjcoalition.org/background.asp, accessed 2019.

EDAW, Inc., 2011, Master Plan, Tuolumne River Regional Park, prepared for the Joint Powers Authority: City of Modesto, City of Ceres, Stanislaus County, December.

ESA, 2013, Oakdale 2030 General Plan, prepared for The City of Oakdale, Adopted August 8.

Jacobson James & Associates, Inc (JJ&A), 2017, Technical Memorandum, Stanislaus County Hydrologic Model: Development and Forecast Modeling, Stanislaus County, December 20.

KSN Inc., 2016, City of Riverbank 2015 Urban Water Management Plan, Final, October 17.

MCR Engineering, 2015, City of Oakdale Urban Water Management Plan, 2010 Update, July.

Provost and Pritchard Consulting Group (Provost and Pritchard), 2015, Agricultural Water Management Plan, 2015 Update, for the Modesto Irrigation District, December.

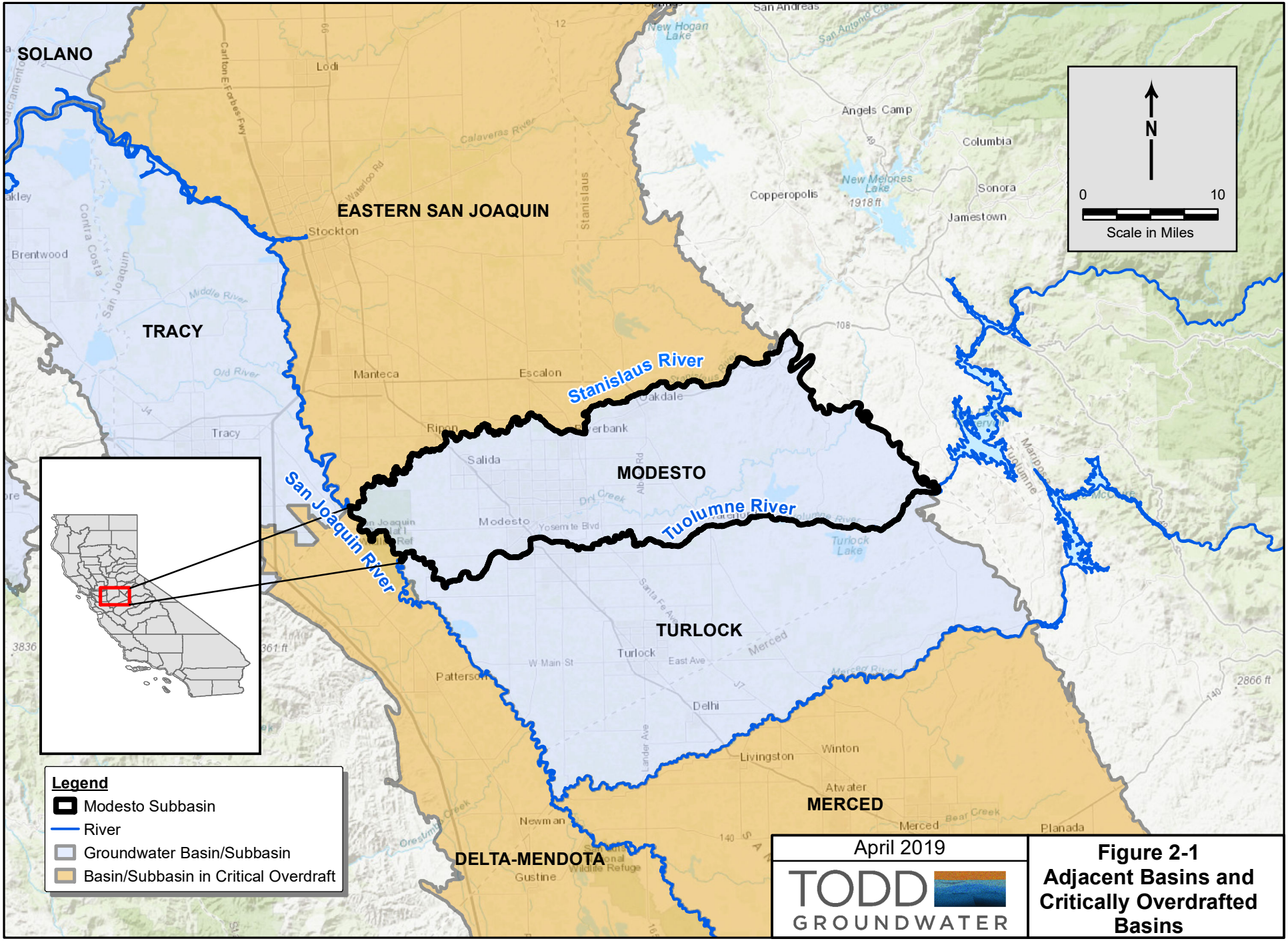
Stanislaus County, 2016, Stanislaus County General Plan, 2015, Adopted August 23.

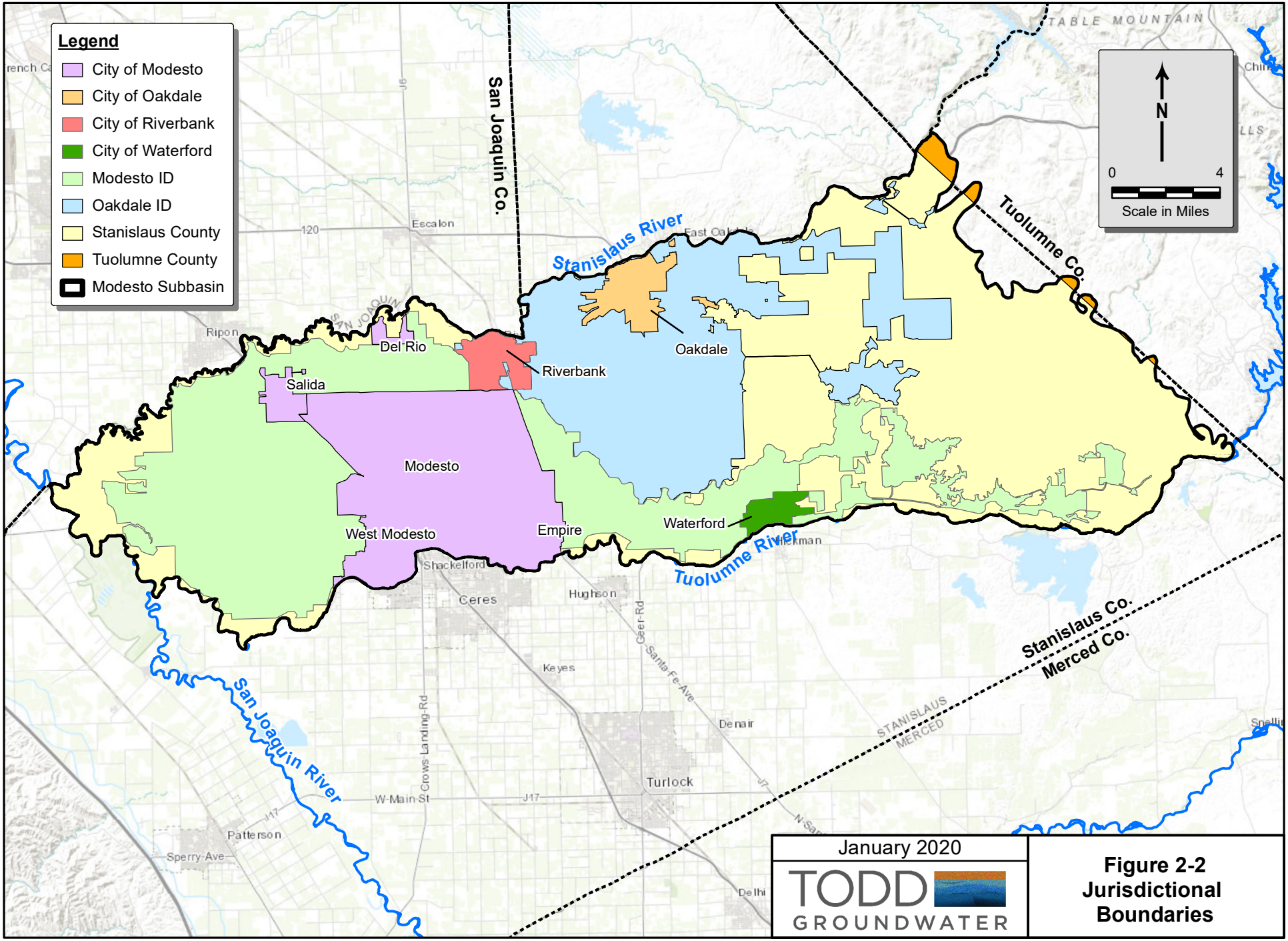
Waterford Planning Department, 2007, City of Waterford General Plan Update Vision 2025, June 21.

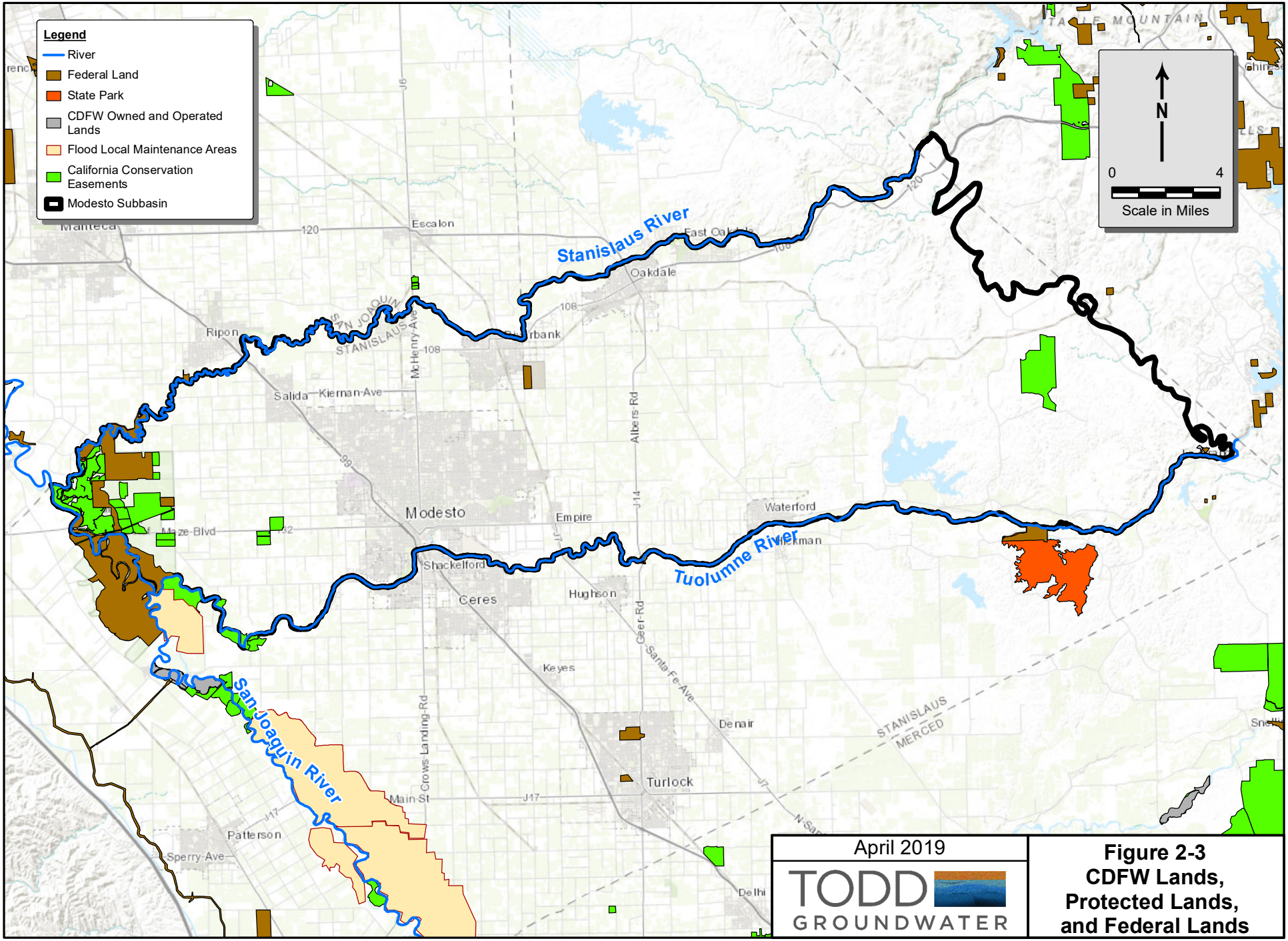
West Yost Associates, 2011, City of Modesto & Modesto Irrigation District Joint 2010 Urban Water Management Plan, May.

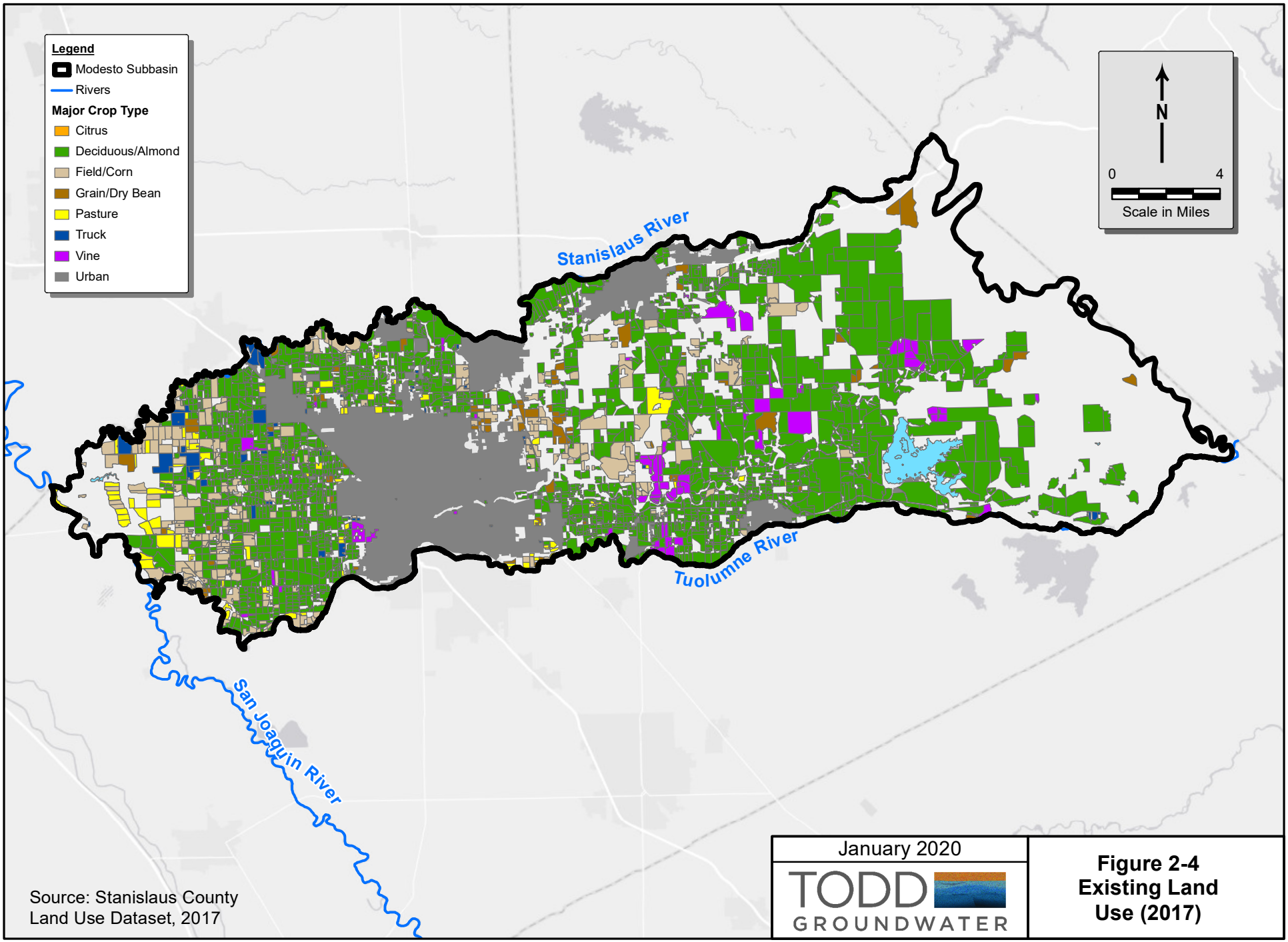
_____, 2016, Final 2015 Urban Water Management Plan, prepared for the City of Modesto, June.

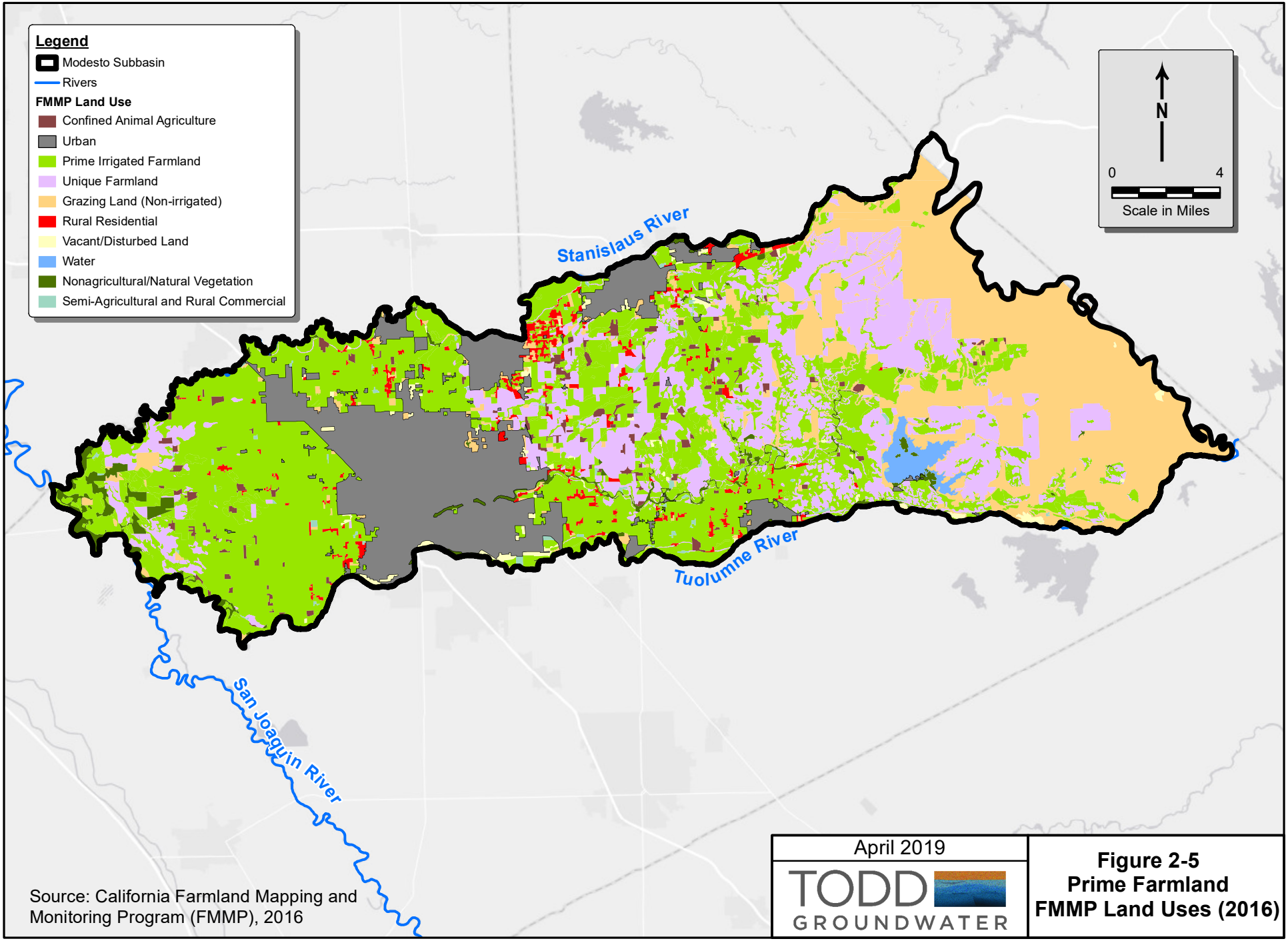
WRIME, 2007, Recharge Characterization for Stanislaus and Tuolumne Rivers Groundwater Basin Association, Memorandum, May 2.


SOLANO
EASTERN SAN JOAQUIN
TRACY
MODESTO
TURLOCK
MERCED
DELTA-MENDOTA
Stanislaus River
Tuolumne River
San Joaquin River
Lodi
Stockton
Manteca
Escalon
Ripon
Oakdale
Salida
Modesto
Tracy
Brentwood
Patterson
Turlock
Delhi
Livingston
Winton
Atwater
Merced
Planada
Newman
Gustine
Angels Camp
Columbia
Sonora
Copperopolis
Jamestown
New Hogan Lake
New Melones Lake
Turlock Lake
N
0
10
Scale in Miles
Legend
Modesto Subbasin
River
Groundwater Basin/Subbasin
Basin/Subbasin in Critical Overdraft
April 2019
TODD GROUNDWATER
Figure 2-1
Adjacent Basins and Critically Overdrafted Basins


Legend
City of Modesto
City of Oakdale
City of Riverbank
City of Waterford
Modesto ID
Oakdale ID
Stanislaus County
Tuolumne County
Modesto Subbasin
N
0
4
Scale in Miles
San Joaquin Co.
Tuolumne Co.
Stanislaus Co.
Merced Co.
Stanislaus River
Tuolumne River
San Joaquin River
Ripon
Escalon
Del Rio
Salida
Riverbank
Oakdale
Modesto
West Modesto
Empire
Waterford
Shackelford
Ceres
Hughson
Keyes
Denair
Turlock
Patterson
Delhi
Crows Landing Rd
Geer Rd
Santa Fe Ave
W Main St
Sperry Ave
J17
STANISLAUS
MERCED
TABLE MOUNTAIN
January 2020
TODD GROUNDWATER
Figure 2-2
Jurisdictional Boundaries


Legend
River
Federal Land
State Park
CDFW Owned and Operated Lands
Flood Local Maintenance Areas
California Conservation Easements
Modesto Subbasin
N
0
4
Scale in Miles
Stanislaus River
Tuolumne River
San Joaquin River
Modesto
Ceres
Turlock
Oakdale
Riverbank
Escalon
Manteca
Ripon
Salida
Empire
Waterford
Hughson
Keyes
Denair
Patterson
Delhi
Shackelford
Kiernan Ave
Albers Rd
McHenry Ave
Crows Landing Rd
Geer Rd
Santa Fe Ave
Main St
Sperry Ave
STANISLAUS
MERCED
April 2019
TODD GROUNDWATER
Figure 2-3
CDFW Lands,
Protected Lands,
and Federal Lands


Legend
Modesto Subbasin
Rivers
Major Crop Type
Citrus
Deciduous/Almond
Field/Corn
Grain/Dry Bean
Pasture
Truck
Vine
Urban
N
0
4
Scale in Miles
Stanislaus River
Tuolumne River
San Joaquin River
Source: Stanislaus County
Land Use Dataset, 2017
January 2020
TODD
GROUNDWATER
Figure 2-4
Existing Land
Use (2017)

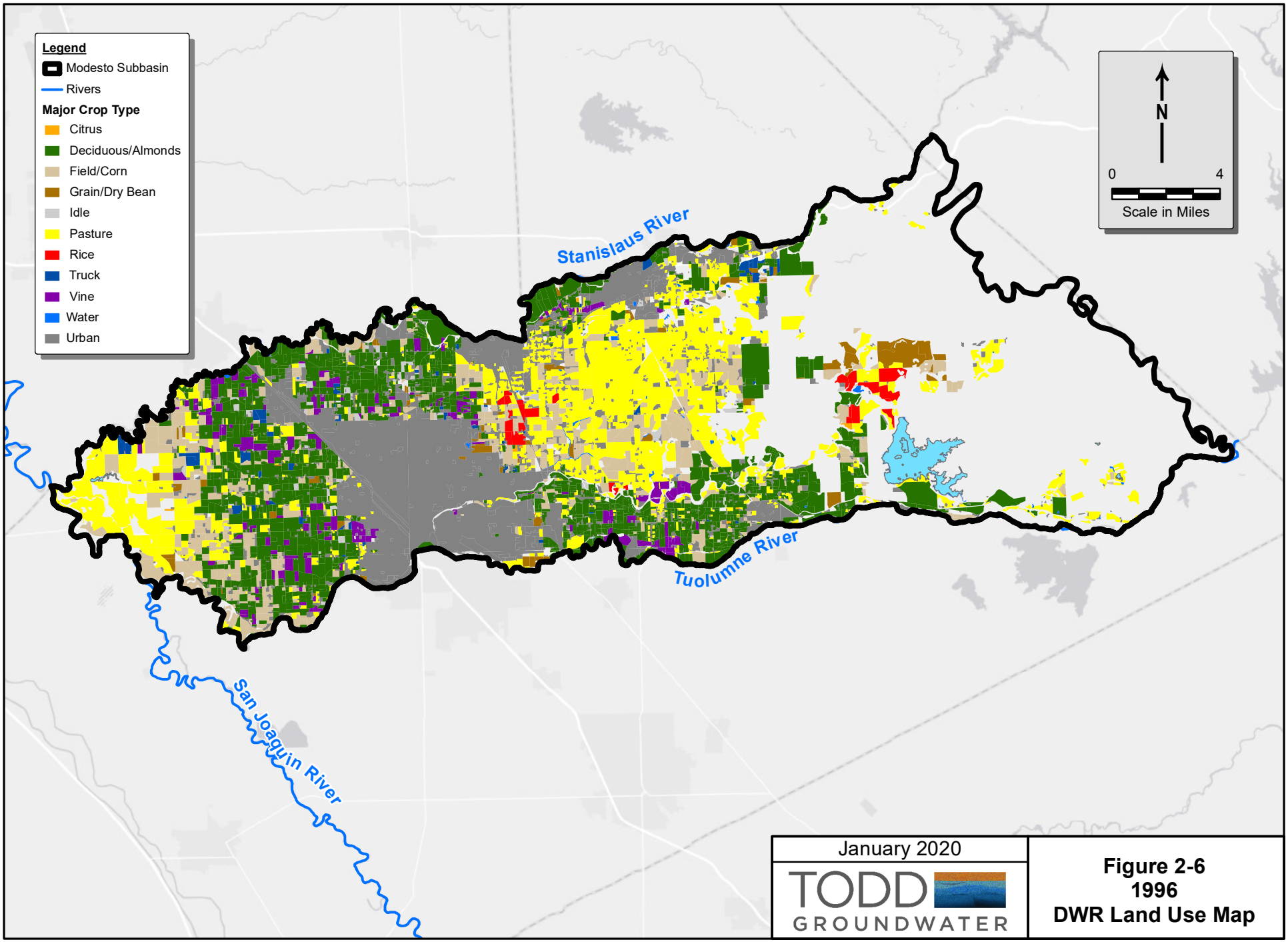


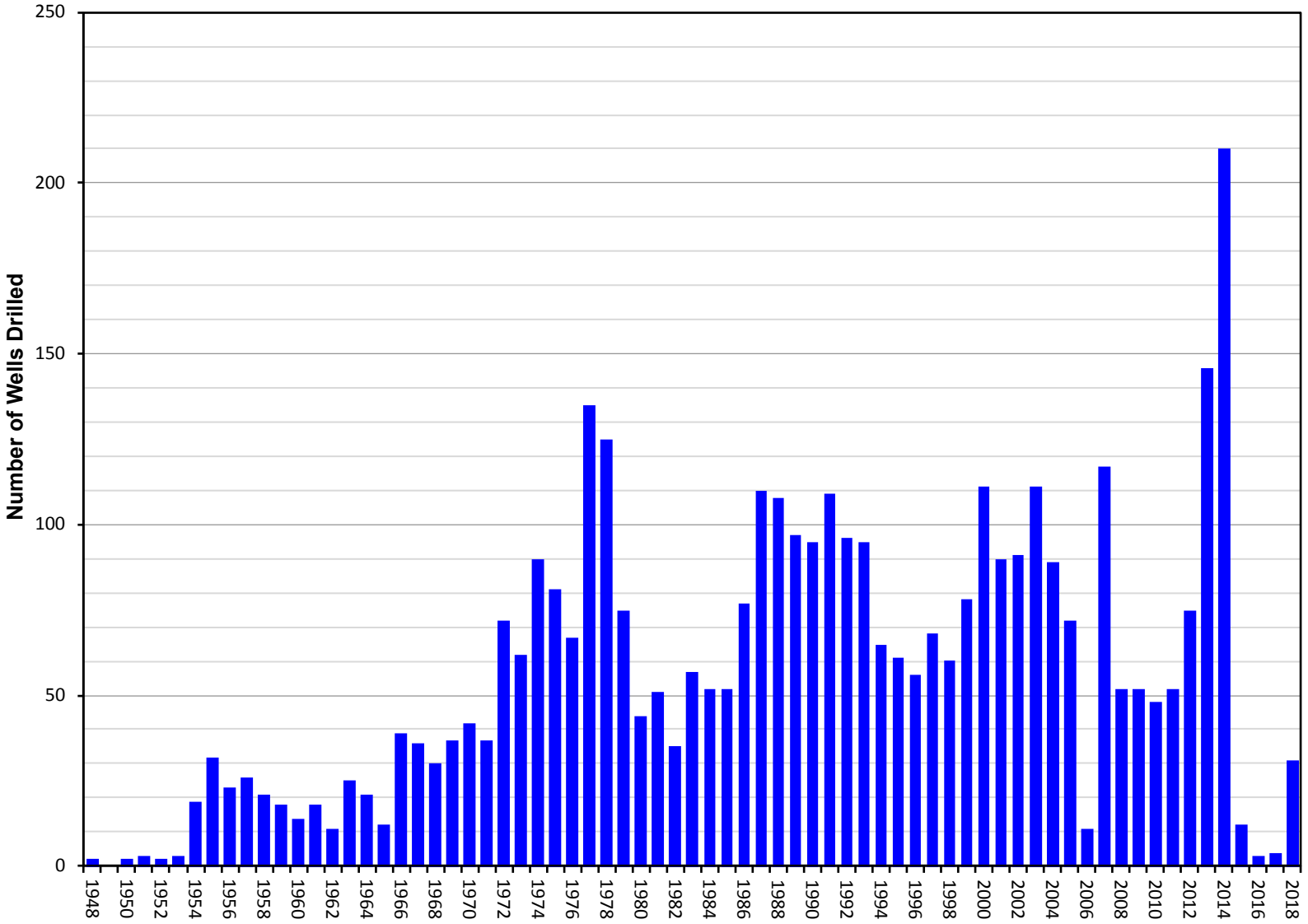
Source: California Farmland Mapping and Monitoring Program (FMMP), 2016

April 2019

TODD GROUNDWATER

Figure 2-5
Prime Farmland
FMMP Land Uses (2016)


Legend
Modesto Subbasin
Rivers
Major Crop Type
Citrus
Deciduous/Almonds
Field/Corn
Grain/Dry Bean
Idle
Pasture
Rice
Truck
Vine
Water
Urban
N
0
4
Scale in Miles
Stanislaus River
Tuolumne River
San Joaquin River
January 2020
TODD GROUNDWATER
Figure 2-6
1996
DWR Land Use Map

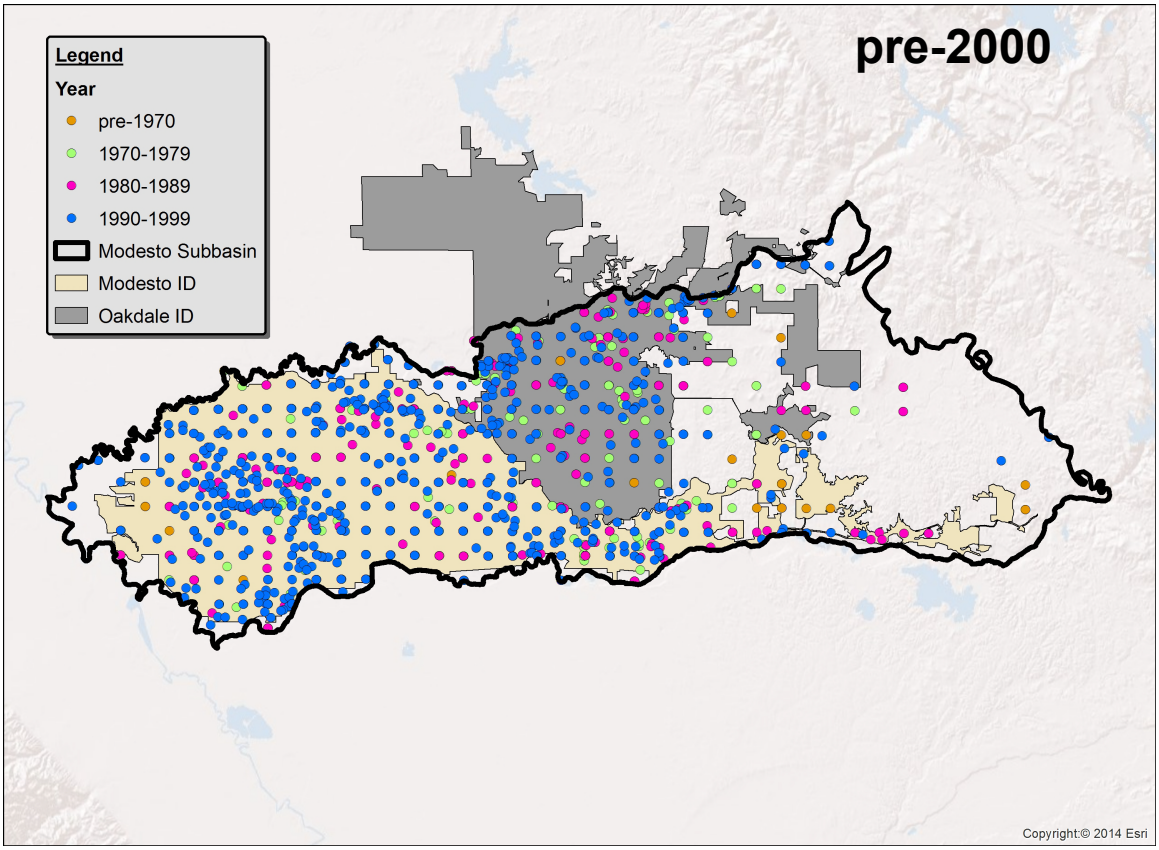


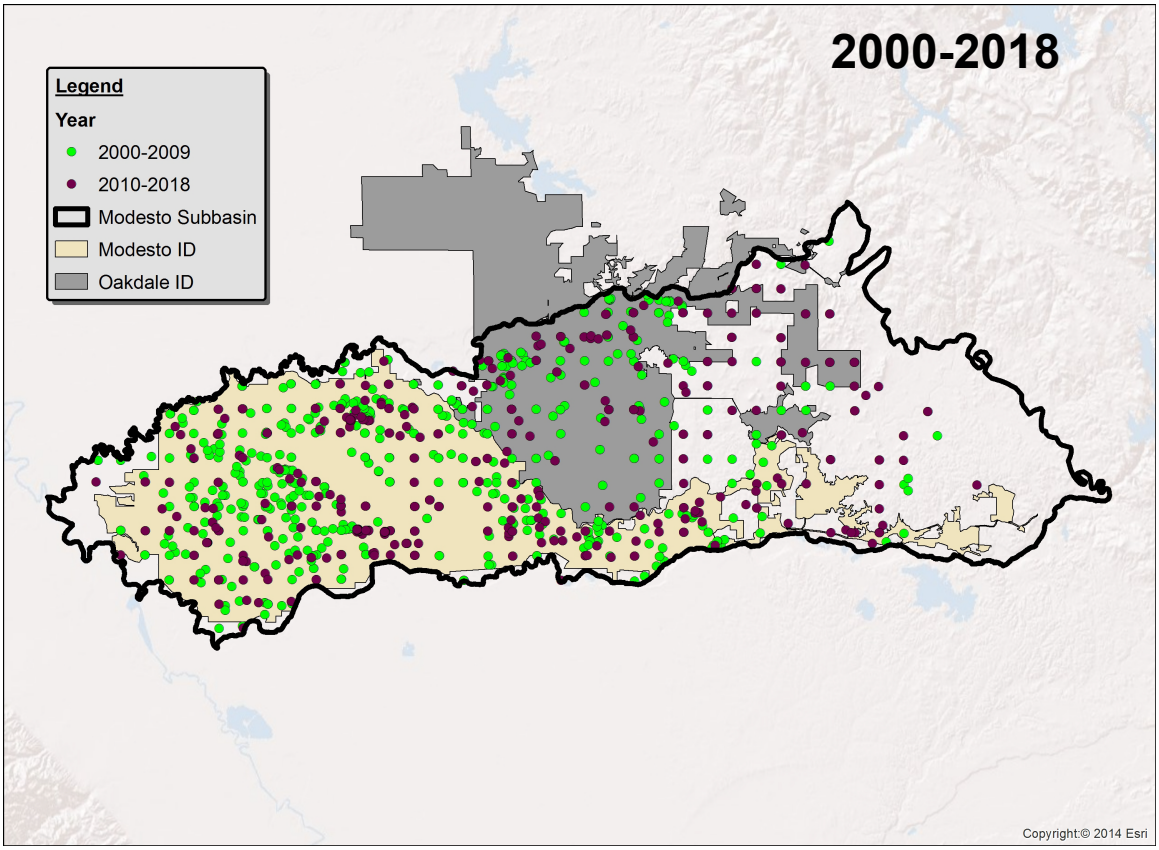
Source: DWR Well Completion Report Database

April 2019

TODD GROUNDWATER

Figure 2-7
Number of Wells Drilled in Modesto Subbasin



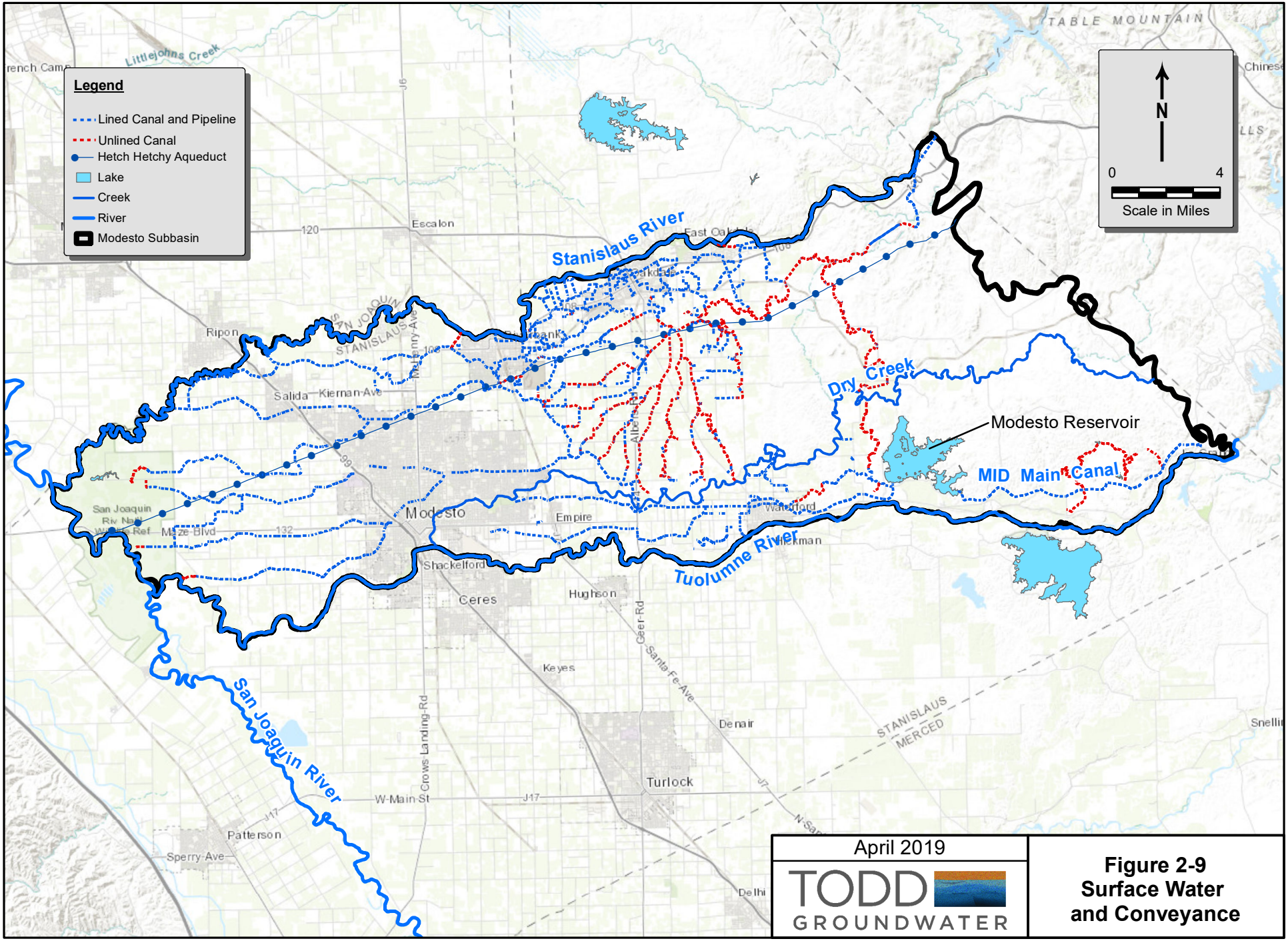


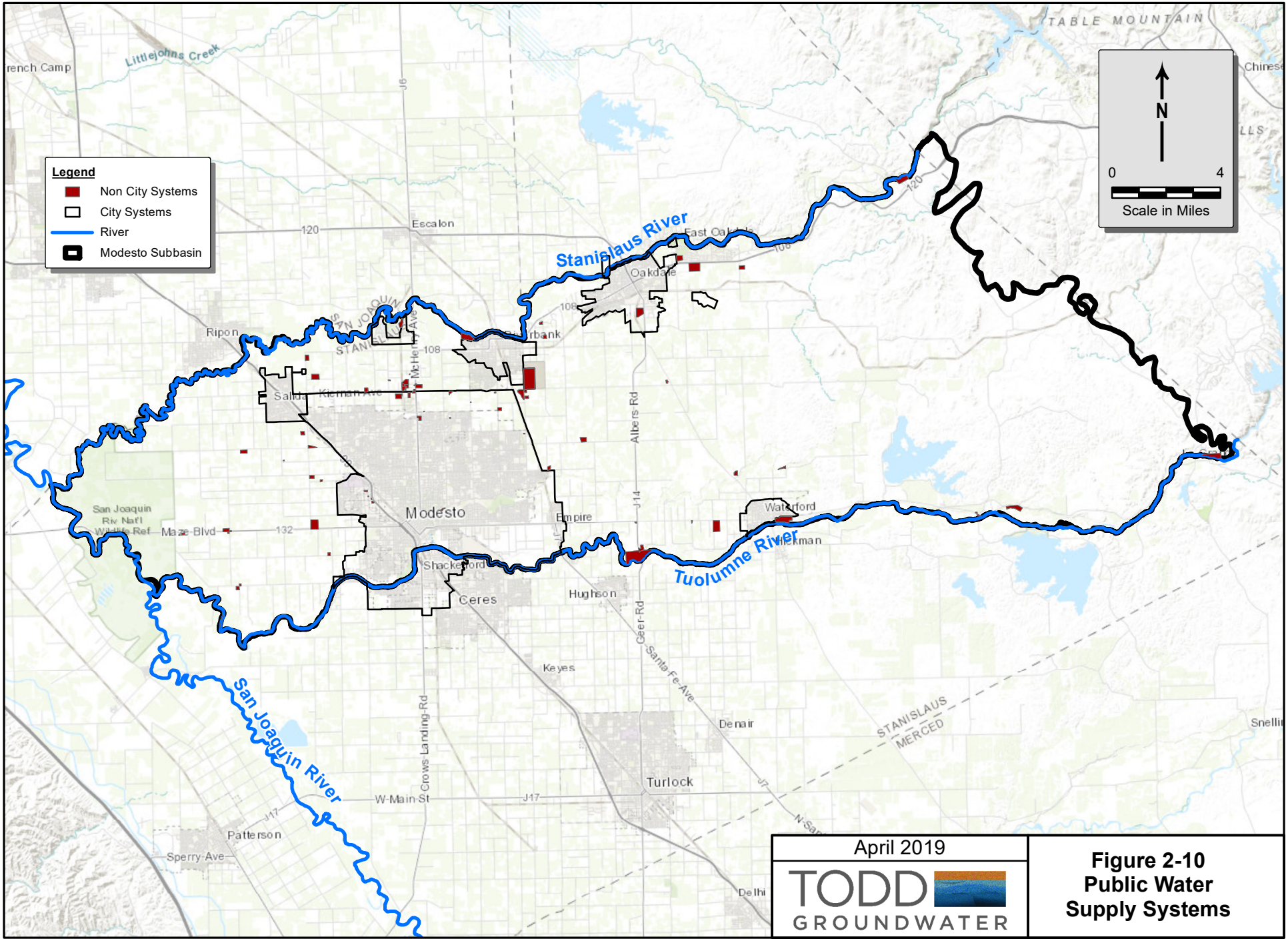
Source: DWR Well Completion Report Database

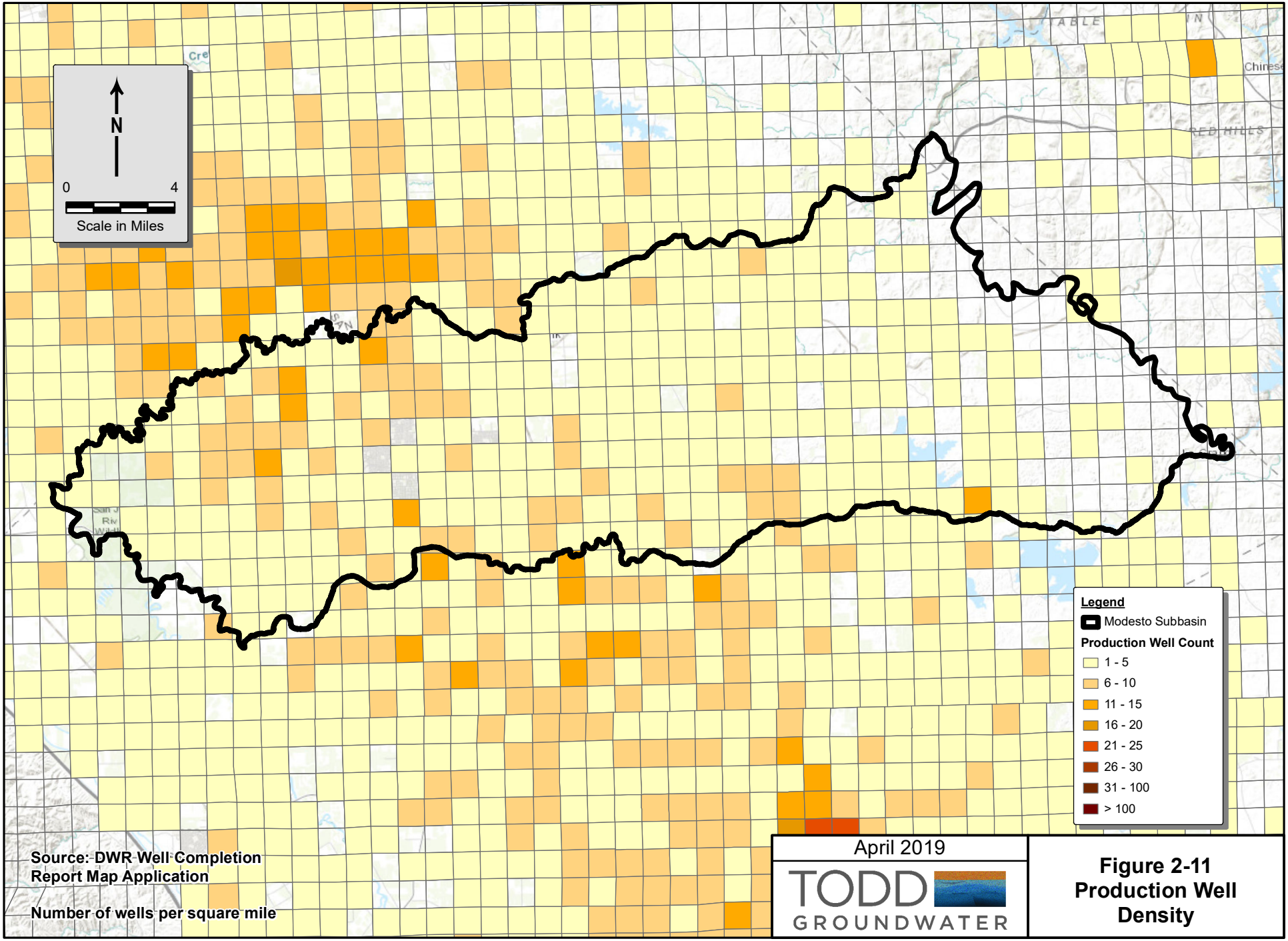
April 2019

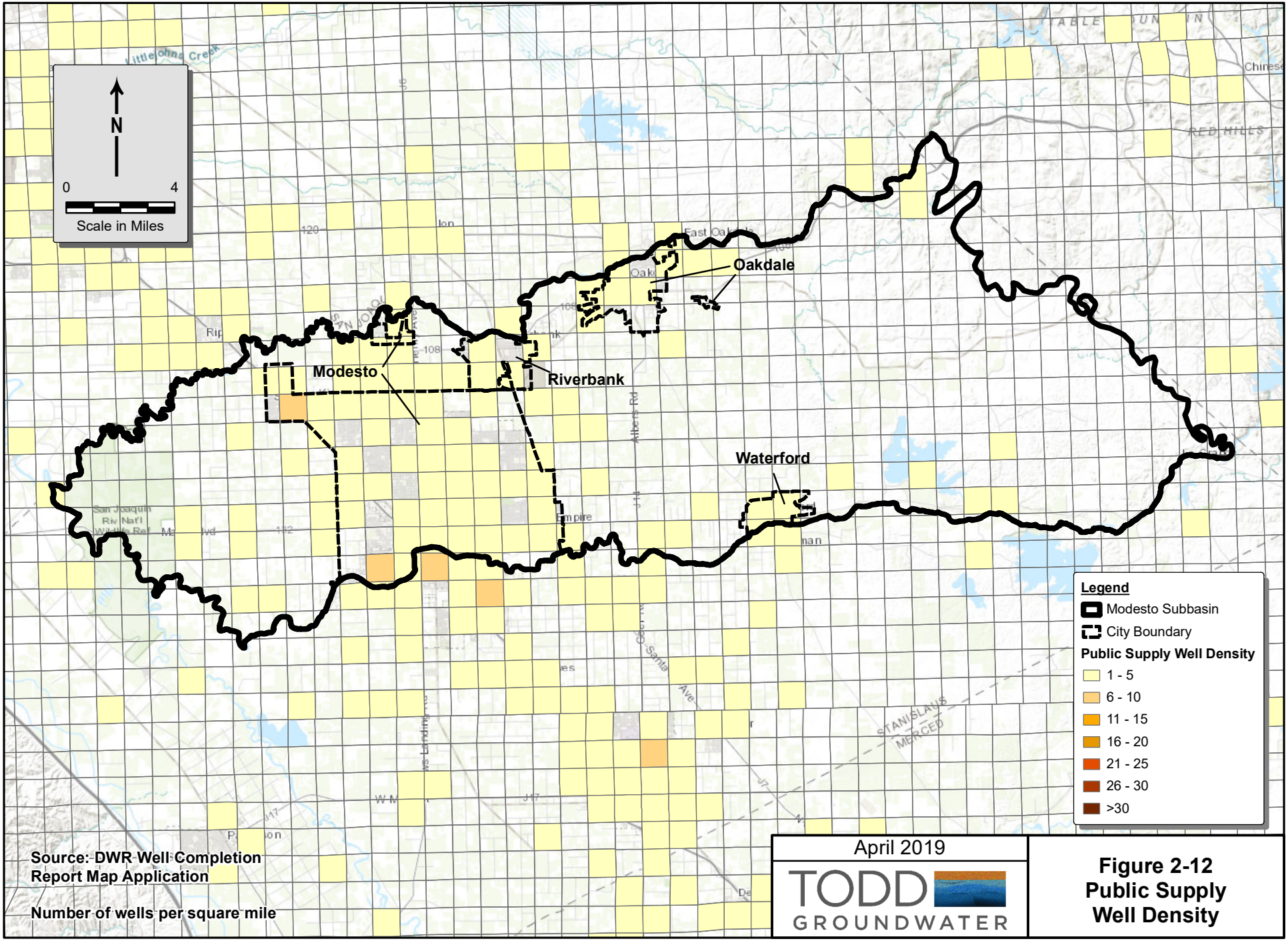
TODD GROUNDWATER

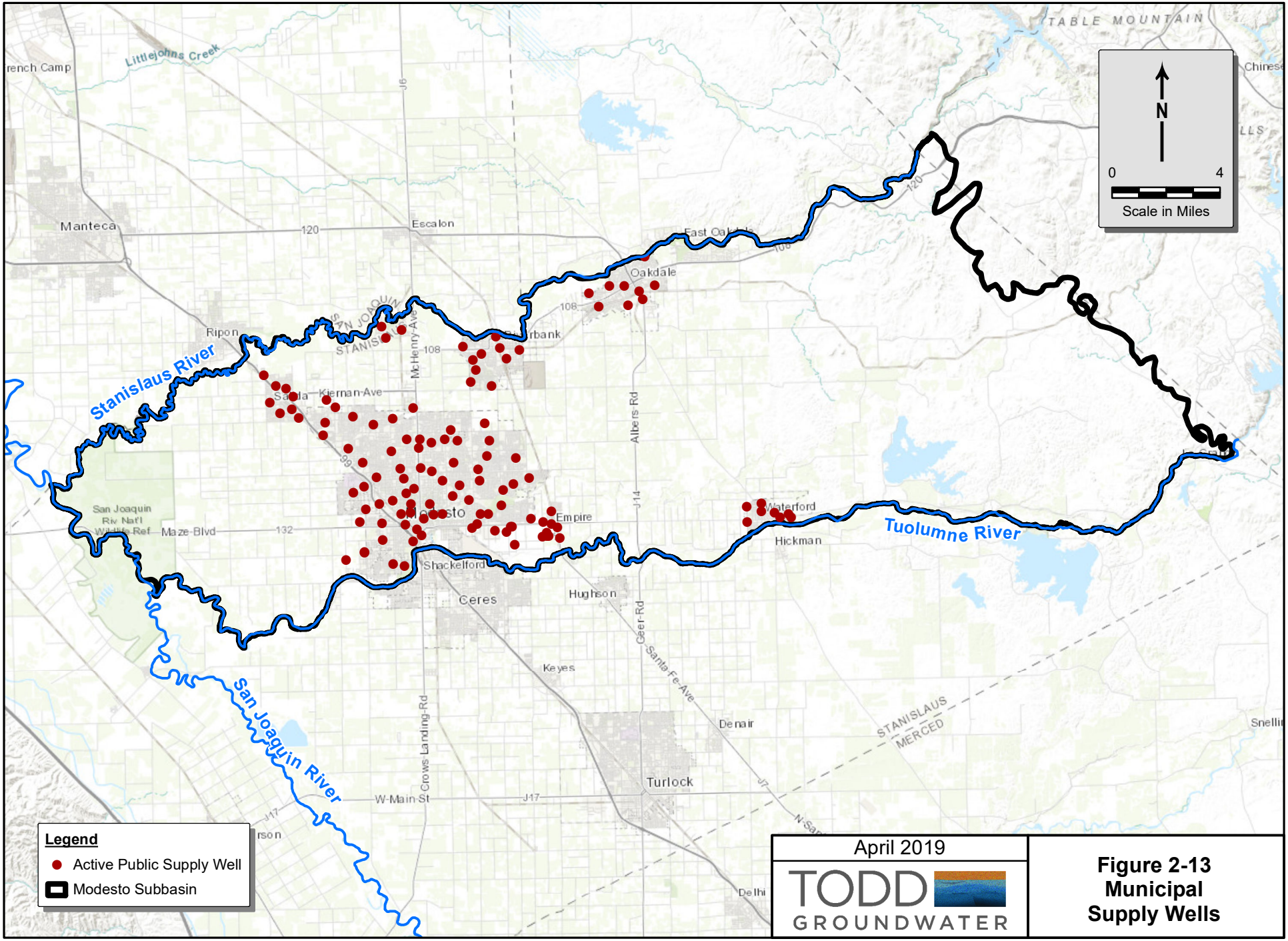
Figure 2-8
Modesto Subbasin Wells

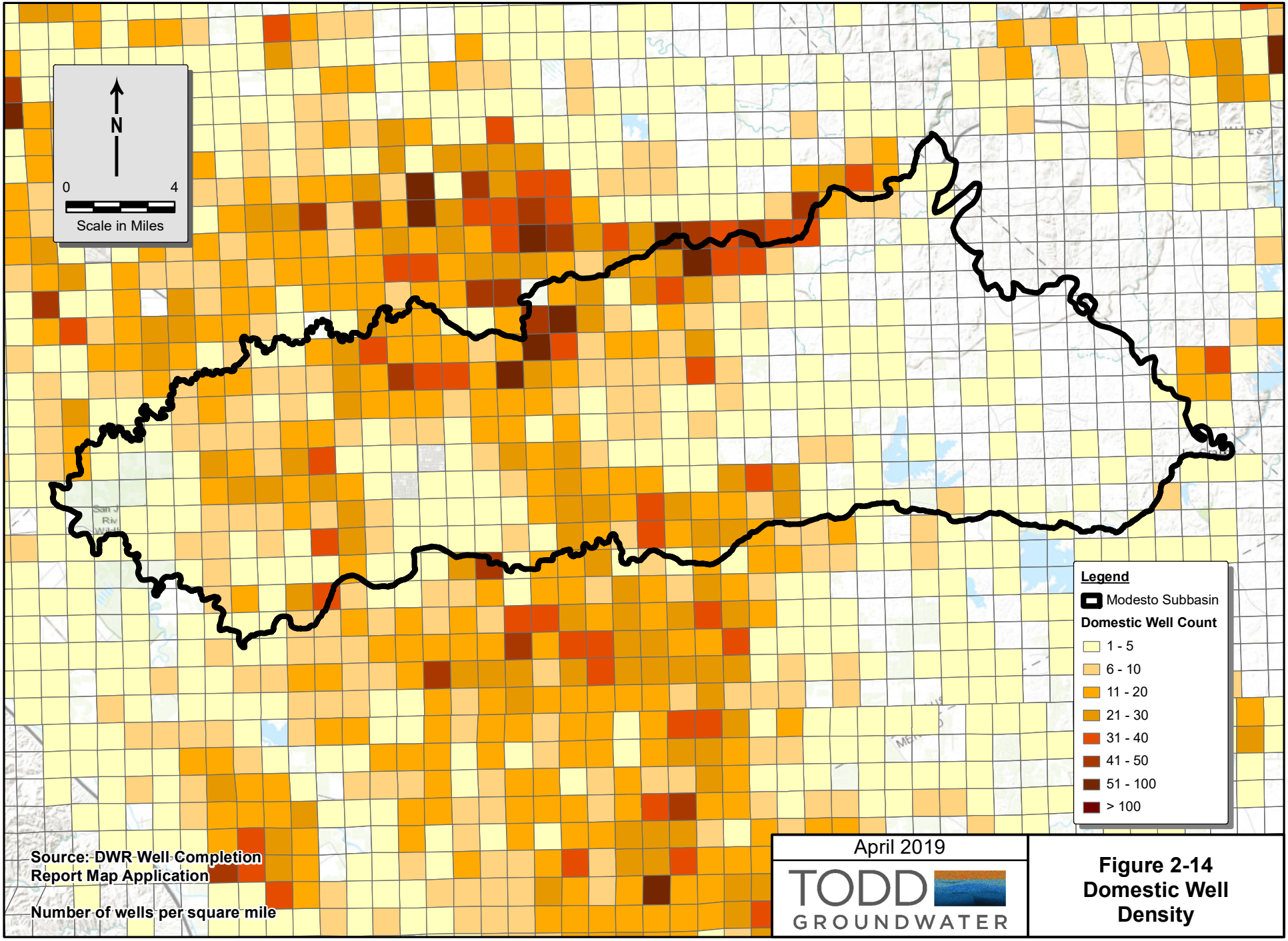

Legend
Lined Canal and Pipeline
Unlined Canal
Hetch Hetchy Aqueduct
Lake
Creek
River
Modesto Subbasin
N
0
4
Scale in Miles
Stanislaus River
Dry Creek
Modesto Reservoir
MID Main Canal
Tuolumne River
San Joaquin River
Littlejohns Creek
TABLE MOUNTAIN
Escalon
Ripon
Salida
Kiernan Ave
Modesto
Empire
Waterford
Hickman
Shackelford
Ceres
Hughson
Keyes
Denair
Turlock
Patterson
Sperry Ave
W Main St
Crows Landing Rd
Geer Rd
Santa Fe Ave
Delhi
STANISLAUS
MERCED
April 2019
TODD GROUNDWATER
Figure 2-9
Surface Water
and Conveyance

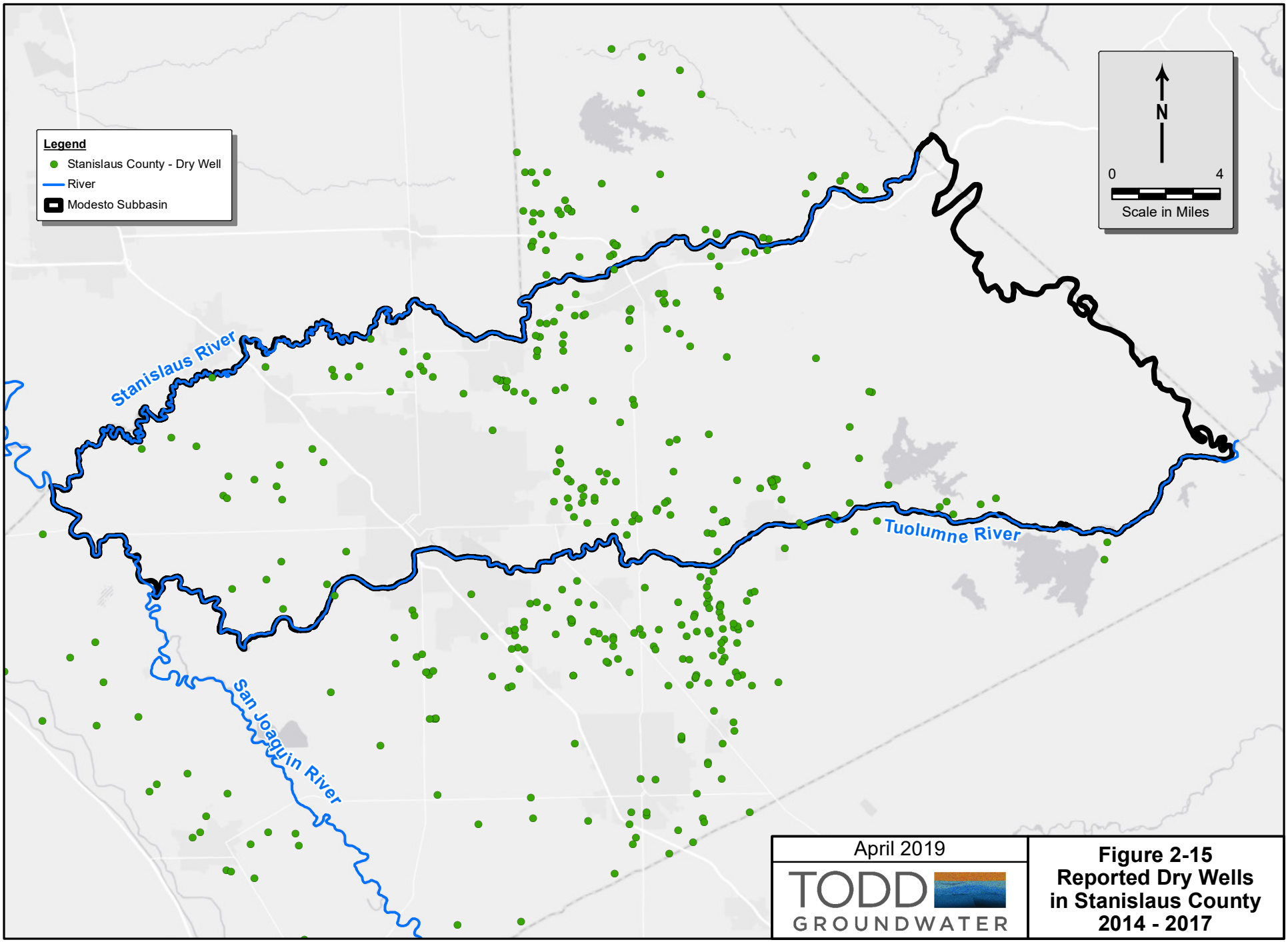

Legend
Non City Systems
City Systems
River
Modesto Subbasin
N
0
4
Scale in Miles
Stanislaus River
Tuolumne River
San Joaquin River
Modesto
Ceres
Turlock
Oakdale
Riverbank
Ripon
Salida
Empire
Waterford
Hughson
Keyes
Denair
Patterson
Escalon
Littlejohns Creek
TABLE MOUNTAIN
Albers Rd
Crows Landing Rd
Geer Rd
Santa Fe Ave
W Main St
Maze Blvd
Sperry Ave
Kiernan Ave
McHenry Ave
STANISLAUS
MERCED
April 2019
TODD GROUNDWATER
Figure 2-10
Public Water
Supply Systems


N
0
4
Scale in Miles
Legend
Modesto Subbasin
Production Well Count
1 - 5
6 - 10
11 - 15
16 - 20
21 - 25
26 - 30
31 - 100
> 100
Source: DWR Well Completion Report Map Application
Number of wells per square mile
April 2019
TODD GROUNDWATER
Figure 2-11
Production Well Density


N
0
4
Scale in Miles
Oakdale
Modesto
Riverbank
Waterford
Legend
Modesto Subbasin
City Boundary
Public Supply Well Density
1 - 5
6 - 10
11 - 15
16 - 20
21 - 25
26 - 30
>30
Source: DWR Well Completion Report Map Application
Number of wells per square mile
April 2019
TODD GROUNDWATER
Figure 2-12
Public Supply
Well Density


N
0
4
Scale in Miles
Legend
Active Public Supply Well
Modesto Subbasin
Stanislaus River
Tuolumne River
San Joaquin River
Littlejohns Creek
Manteca
Escalon
Ripon
Oakdale
Riverbank
Modesto
Empire
Waterford
Hickman
Shackelford
Ceres
Hughson
Keyes
Denair
Turlock
Delhi
Snelling
Santa Fe Ave
Crows Landing Rd
Albers Rd
Geer Rd
McHenry Ave
Kiernan Ave
Maze Blvd
W Main St
San Joaquin Riv Nat'l Wildlife Ref
TABLE MOUNTAIN
STANISLAUS
MERCED
April 2019
TODD GROUNDWATER
Figure 2-13
Municipal
Supply Wells


N
0
4
Scale in Miles
Legend
Modesto Subbasin
Domestic Well Count
1 - 5
6 - 10
11 - 20
21 - 30
31 - 40
41 - 50
51 - 100
> 100
Source: DWR Well Completion Report Map Application
Number of wells per square mile
April 2019
TODD GROUNDWATER
Figure 2-14
Domestic Well Density


Legend
Stanislaus County - Dry Well
River
Modesto Subbasin
N
0
4
Scale in Miles
Stanislaus River
Tuolumne River
San Joaquin River
April 2019
TODD GROUNDWATER
Figure 2-15
Reported Dry Wells
in Stanislaus County
2014 - 2017

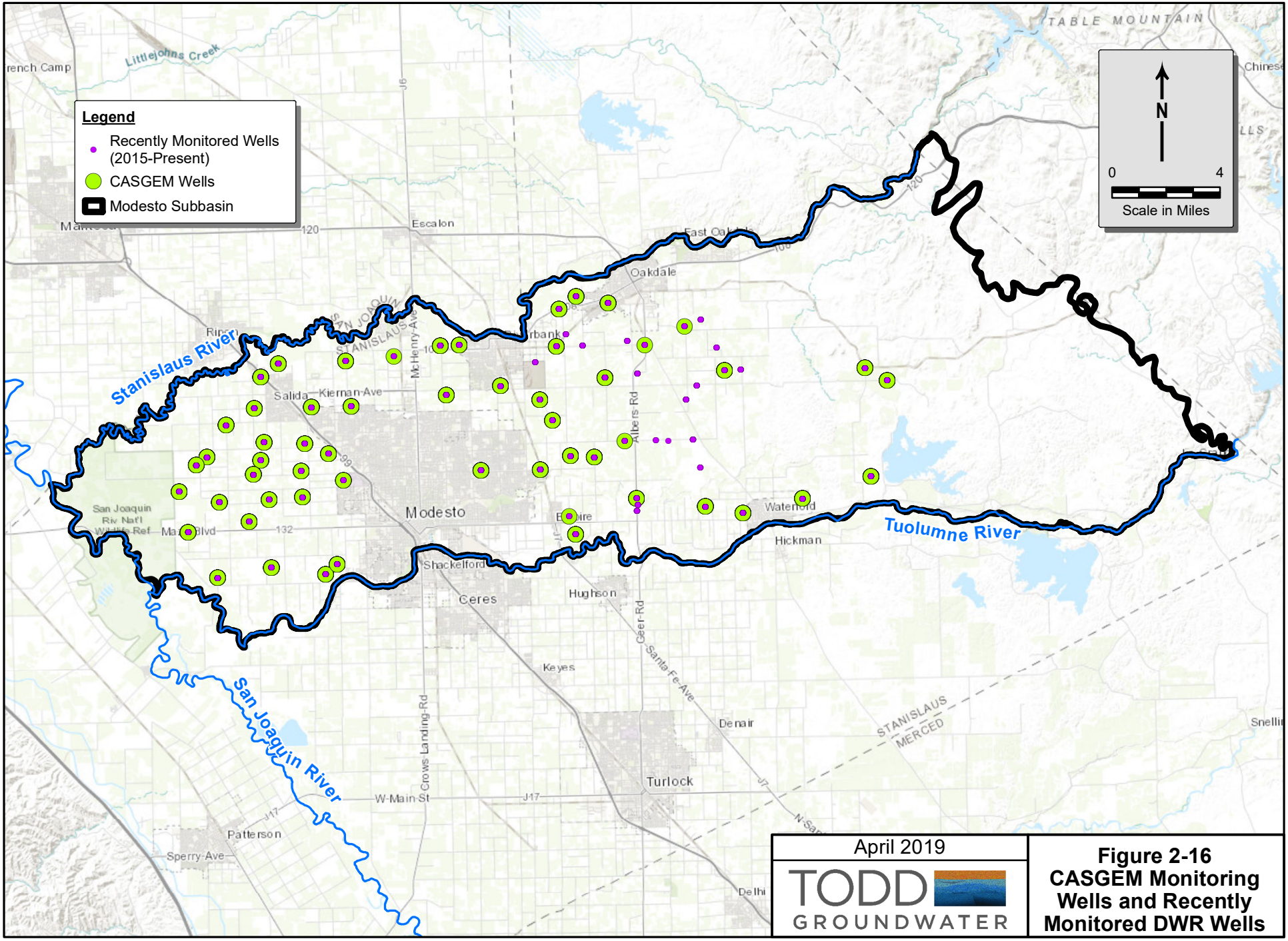


Figure 2-16
CASGEM Monitoring Wells and Recently Monitored DWR Wells