NEW SOURCE DEVELOPMENT

DISADVANTAGED COMMUNITIES WATER STUDY
TULARE LAKE BASIN

DRAFT PILOT STUDY

JULY 31, 2013

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DISADVANTAGED COMMUNITIES WATER STUDY FOR THE TULARE LAKE BASIN

JULY 31, 2013
DRAFT

Prepared for:

County of Tulare

Prepared by:

Provost & Pritchard Consulting Group
Visalia, California

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ABBREVIATIONS

AF	Acre-Feet
CDBG	Community Development Block Grant
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CFS	Cubic Feet per Second
CPUC	California Public Utilities Commission
CSA	County Service Area
CSD	Community Services District
CVP	Central Valley Project
CWC	Community Water Center
CWD	County Water District
CWS	Community Water System
DAC	Disadvantaged Community
DBCP	Dibromochloropropane
DWR	Department of Water Resources
DWSAP	Drinking Water Source Assessment & Protection
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GIS	Geographic Information Systems
IRWM	Integrated Regional Water Management
JPA	Joint Powers Authority
LAFCO	Local Agency Formation Commission
LPA	Local Primacy Agency
MCL	Maximum Contaminant Level
MHI	Median Household Income
MOU	Memorandum of Understanding
MSR	Municipal Service Review
MWC	Mutual Water Company
NCWS	Non-Community Water System
NTNC	Non-Transient Non-Community Water System
PPM	Parts Per Million
PPSAG	Pilot Project Stakeholder Advisory Group
PUC	Public Utilities Commission
PUD	Public Utility District
PWS	Public Water System
RCAC	Rural Community Assistance Corporation
RMA	Resource Management Agency
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SDAC	Severely Disadvantaged Community
SDWA	Safe Drinking Water Act
SOAC	Stakeholder Oversight Advisory Committee
SRF	State Revolving Fund (Safe Drinking Water)
SSWS	State Small Water System

SWP	State Water Project
SWRCB	State Water Resources Control Board
SWS	Small Water System
TCP	1,2,3-Trichloropropane
TLB	Tulare Lake Basin
TMF	Technical Managerial & Financial
TNC	Transient Non-Community Water System
USDA	United States Department of Agriculture
WDR	Waste Discharge Requirements

1 EXECUTIVE SUMMARY

Summary of pilot study

Approximately 370 of the 533 small communities identified within the Tulare Lake Basin are disadvantaged or severely disadvantaged. These communities face challenges from a variety of issues related to their water and sewer systems. Source water issues include insufficient supply and poor water quality. Wastewater challenges may include reliance on septic systems that may be failing or potentially contaminating the groundwater, failing or insufficient sewer collection systems, or wastewater treatment systems that are not capable of meeting current waste discharge requirements. Some communities also lack the technical, managerial and financial (TMF) resources to operate and maintain the systems. This report has been prepared to identify existing potable water source challenges and potential solutions that can be considered which may alleviate some of the ongoing problems for these communities.

Disadvantaged communities may often have limiting characteristics beyond income level, such as inability to achieve economy of scale for infrastructure, small or non-existent reserve funds, limited pool of persons in community leadership roles, lack of equipment, and a limited ability to hire paid staff or consultants.

Description of Problem

An initial task for the study was to organize a Stakeholder Oversight Advisory Committee (SOAC). The details of the SOAC, the purpose of the committee, and actions performed are described in the main body of the Final Report. The SOAC identified four pilot study topics for the Consultant Group as a culmination of meetings that took place from October, 2011 to July, 2012.

The four pilot study topics include:

1) Management/Non-Infrastructure Solutions to reduce costs and improve efficiency
2) Technical solutions to improve efficiency / reduce O&M
3) New Source Development, and
4) Individual Household Solutions

The four pilot studies are not mutually exclusive. Communities pursuing improvement in a specific pilot study topic will likely utilize information prepared in one or more of the other pilot studies.

The specific priority issue that the New Sources Development pilot study aims to address is summarized as follows:

> Poor Water Quality - *Existing contamination of drinking water source (acute and chronic contaminants), increasing groundwater pollution, new and emerging contaminants, problems with secondary contaminants (i.e. taste, color, smell, etc.), and health impacts.*

New Source Development

- Physical Consolidation – Both water and waste water facilities
- Exchanges/contracting for surface water or other source
- Regional Drinking Water (or Wastewater?) Treatment Plant

Potential alternatives for water supply solutions may include:

- Physical consolidation
- Exchanges or contracting for surface water, or another source
- Regional Facility
- New well(s)
- Treatment of existing sources
- Recharge of a local area
- Metering (water conservation)
- Restrict potable water deliveries from agricultural or large turf irrigation

Implementation Process

Demonstration Projects

Pilot Projects

Funding Opportunities

State regulators and funders can begin encouraging these partnerships by providing educational material as well as funding opportunities. Several existing funding opportunities and proposed drinking water legislation are presented in this report. Some of the traditional drinking water funding programs include Safe Drinking Water Revolving Fund (SRF), Proposition 50, Proposition 84, Department of Water Resources (DWR) Integrated Regional Water Management Act (IRWM), Community Development Block Grant Program (CDBG), and United States Department of Agriculture (USDA) Rural Development.

Sustainability of Program

Obstacles and Barriers

Summary of findings

Recommendations

2 INTRODUCTION

The Tulare County Administrative office contracted with Provost & Pritchard to prepare a plan to address the drinking water and wastewater needs of rural, disadvantaged communities in the Tulare Lake Basin. The project is funded by a Department of Water Resources (DWR) $2 million grant, appropriated through Senate Bill SBxx1, Perata, (Refer to Appendix A) and $1.8 million of this funding is available for professional services for the project. The overall plan may include recommendations for planning, infrastructure, and other water management actions, as well as specific recommendations for regional drinking water treatment facilities, regional wastewater treatment facilities, conjunctive use sites and groundwater recharge, groundwater for surface water exchanges, related infrastructure, project sustainability, and cost-sharing mechanisms. The plan is intended to identify projects and programs that will create long-term reliability, while optimizing the on-going operation and maintenance (O&M) and management costs for small water and wastewater systems. Community water systems, wastewater systems, and schools that provide their own drinking water or are served by a local water system, and rural communities with a high density of contaminated private wells will be included in the study.

The Tulare Lake Basin is generally rural in nature and much of the population is disbursed throughout the area. The area is characterized by a significant agricultural economy, many small communities spread throughout the area, groundwater with several constituents (such as arsenic, nitrates, and uranium) that exceed regulatory limits in many instances, and communities with little or no reserve funds.

The Tulare Lake Basin area has been the subject of several studies in recent years. The Kings Basin Authority Disadvantaged Community Pilot Project Study was commissioned to study the Kings Basin area, which overlaps much of the Tulare Lake Basin Study area. The State Water Resources Control Board commissioned the preparation of the report titled “Addressing Nitrate in California’s Drinking Water”. The University of California was contracted to prepare the report with a focus on nitrates in the groundwater of the Tulare Lake Basin and a portion of Salinas Valley. The report found that “nitrate contamination is widespread and increasing”. The State Water Resources Control Board was required to submit a report in response to Assembly Bill 2222. The report is titled “Communities that Rely on Contaminated Groundwater”.

In addition to groundwater quality, the general depth to groundwater in the Tulare Lake Basin continues to decline. In 2009, the United States Geologic Survey (USGS) performed a comprehensive evaluation of groundwater supplies in the Central Valley (USGS, 2009). The Central Valley was divided into four regions: Sacramento, Delta and Eastside Streams, San Joaquin Basin, and Tulare Basin. The USGS found that the Tulare Basin has the highest rate of groundwater overdraft of any region. Fifty seven percent of groundwater pumping in the Central Valley occurs in the Tulare Basin. Groundwater storage in the Tulare Basin has declined at a steady rate between 1962

and 2004. The total loss in storage was estimated to be 68 million acre-feet, which equates to an overdraft of about 1.6 million acre-feet/year.

The California Department of Water Resources (DWR, 2003) has identified hydrologic regions and groundwater basins throughout the State of California. The Tulare Lake Hydrologic Region includes the Tulare Lake Basin and some adjacent foothill and mountain areas. The Central Valley portion of the Tulare Hydrologic Region has similar boundaries to the DAC study. According to DWR, most of the groundwater basins in this area are in a 'critical condition of overdraft'. DWR provides the following definition of critical overdraft:

"*A basin is subject to critical conditions of overdraft when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social or economic impacts*". (p 98 of DWR Bulletin 118 – Update 2003)

The deeper groundwater has impacts that may include higher pumping costs and different constituents to be evaluated for treatment prior to distribution as a potable water source.

An initial task for the study was to organize a Stakeholder Oversight Advisory Committee (SOAC). The details of the SOAC, the purpose of the committee, and actions performed are described in the main body of the Final Report. The SOAC identified four pilot study topics for the Consultant Group as a culmination of meetings that took place from October, 2011 to July, 2012.

The four pilot study topics include:

1) Management/Non-Infrastructure Solutions to reduce costs and improve efficiency
2) Technical solutions to improve efficiency / reduce O&M
3) New Source Development, and
4) Individual Household Solutions

The overall report reflects comments and information received as a result of outreach to various federal, state, and local agencies as well as community stakeholders, including representatives of disadvantaged communities. The overall report includes pilot study work related to Management/Non Infrastructure Solutions, New Source Development, Technical Solutions, and Individual Household Solutions) as individual communities may benefit from a combination of solutions for their water or wastewater challenges. The four pilot studies are not mutually exclusive. Communities pursuing improvement in a specific pilot study topic will likely utilize information prepared in one or more of the other pilot studies.

The specific priority issue that the New Sources Development pilot study aims to address is summarized as follows:

Poor Water Quality - *Existing contamination of drinking water source (acute and chronic contaminants), increasing groundwater pollution, new and emerging contaminants, problems with secondary contaminants (i.e. taste, color, smell, etc.), and health impacts.*

New Source Development

- Physical Consolidation – water or wastewater facilities
- Exchanges/contracting for surface water or other source
- Regional Drinking Water (or Wastewater) Treatment Facilities

Potential alternatives for water supply solutions may include:

- Physical consolidation
- Exchanges or contracting for surface water, or another source
- Regional Facility
- New well(s)
- Treatment of existing sources
- Recharge of a local area
- Metering (water conservation)
- Restrict potable water deliveries from agricultural or large turf irrigation

This report is prepared to describe the New Source Development Pilot Study, which is an appendix of the Tulare County Disadvantaged Community Water Study for the Tulare Lake Basin (Grant Agreement No. 4600009132, see Appendix B). This report will summarize the current status of water sources, water quality, and, to a limited degree, wastewater system challenges in Disadvantaged Communities throughout the Tulare Lake Basin. The report will identify recent solutions, summarize potential solutions, recommend pilot projects for further study, and develop potential solutions that may be applied regionally to communities with common settings and issues. This report may reference and be used in conjunction with the three other pilot study reports (Management/Non Infrastructure Solutions, Technical Solutions, and Individual Household Solutions) as individual communities may benefit from a combination of solutions for their water or wastewater challenges.

Disadvantaged communities within the Tulare Lake Basin are identified by County in Exhibits 1, 2, 3, and 4. In addition, the disadvantaged communities are listed in Tables 1, 2, 3, and 4 in order of population. Each community within the Tulare Lake Basin study area faces unique challenges. However, there are some common themes that challenge many communities in the study area. This report identifies some common themes so that some of the recommendations that are identified may be of use to as many communities as possible.

Integrated Regional Water Management (IRWM) Planning Groups within the Tulare Lake Basin area are identified in Exhibit 5. It is noted that the Upper Kings Basin Integrated Regional Water Management Authority (Upper Kings Basin IRWMA) is preparing a Disadvantaged Community water study for the Upper Kings Basin during

the same timeframe as the Tulare Basin Study. The purpose of the Upper Kings Basin IRWMA study is to investigate potential solutions for disadvantaged communities that may be integrated into Integrated Regional Water Management Authority planning efforts for the region. The boundaries of the Upper Kings Basin study and the Tulare Basin study overlap. The two studies, however, do not focus on the same problem for specific communities so that more communities may be assisted.

There are approximately 370 disadvantaged communities (DACs) within the Tulare Lake Basin study area. A Disadvantaged Community (DAC) is defined as a community whose median household income is 80 percent or less of the statewide median household income. The estimated population within these 370 communities is about 284,000. There are currently 267 communities classified as DACs that have not consolidated into another community water system, with an estimated population of 210,000. The water systems of the DACs within the Tulare Lake Basin study area include publicly owned systems, privately owned systems, and locations where each home is served by a private well (no system). The water and sewer systems in these unincorporated communities throughout the Tulare Lake Basin vary in size, from those with individual water wells and onsite septic tank systems, to community systems serving more than 2,000 connections. Approximately 155 of the 370 communities in the area are classified as severely disadvantaged communities (SDACs). A Severely Disadvantaged Community (SDAC) is defined as a community whose median household income is 60 percent or less of the statewide median household income. The water systems within these communities face numerous challenges, including those related to the quality of their water and/or the number of supply sources available. The water quality primary MCL exceedances reported include coliform bacteria, arsenic, nitrate, uranium, fluoride, DBCP, perchlorate, PCB, and disinfection by-products such as trihalomethanes. Based on the database information collected[1] and analyzed, common contaminants include coliform, arsenic, nitrate, and uranium.

According to data derived from databases of the California Department of Public Health (CDPH) approximately 117 out of the 370 DACs in the region reported at least one water quality exceedance between 2008 and 2010. A breakdown of the water quality exceedances by contaminant is presented in the Technical Solutions Pilot Study Report. Limited reliable water supply is also a concern within the study area, since many communities only have a single source of water supply. The communities with the various water supply and quality issues are illustrated in Exhibits 17 through 20.

Information that was prepared or provided by others was relied upon to develop and analyze the types of problems and non-compliance that exist, as well as to develop potential solutions. A database has been compiled to collect data from PolicyLink, CDPH, Self Help Enterprises, County of Fresno, County of Tulare, County of Kings, and Regional Water Quality Control Board (RWQCB) which has been reviewed to evaluate

[1] Database information that was collected and analyzed for this report originated from multiple sources, including CDPH, SWRCB, DWR, County of Tulare, Carolina Balazs (UC Berkeley), Community Water Center, Self Help Enterprises. Refer to Section 13 Bibliography References.

the pollutant water quality and supply source issues in the Study Area. The information is acknowledged to not be complete and the specifics of each community and system are in a continuous state of change. However, the database may be updated as changes or corrections are identified. Specifically, and most importantly, the study identified data that may be necessary to identify where solutions recommended from the pilot could be replicated. The data collection and analysis provided a means to define the water supply challenges faced by many disadvantaged communities within the Tulare Basin. Several common themes applied to many of the disadvantaged communities. The themes identified are discussed in Chapter 4 of this report.

In addition to the source water issues faced by DACs in the Study Area, many communities also face issues with their wastewater systems. Wastewater challenges experienced by DACs may include reliance on septic systems that may be failing or potentially contaminating the groundwater, failing or insufficient sewer collection systems, or wastewater treatment and disposal facilities that are not capable of meeting the limitations set forth in the facility's Waste Discharge Requirements (WDRs). Wastewater treatment technologies may be discussed in the Technical Solutions Pilot Project, and individual septic system considerations may be addressed in the Individual Households Pilot Project. However, several of the solutions presented in the Management and Non Infrastructure Pilot Project Study report could benefit both water and wastewater systems. A brief review of regulatory failures for the Tulare Lake Basin Study Area was conducted to determine if improvements to the wastewater systems could have a positive impact on the source waters of DACs. No specific regulatory failures were identified that would have an impact to potentially correct a source water issue experienced by Disadvantaged Communities. It is noted, however, that improvements to community sanitary sewer collection systems, community treatment systems, and on-site systems are likely to have a positive impact to groundwater quality in the immediate vicinity.

This report includes a description of potential alternatives that may be considered for water supply challenges faced by Disadvantaged Communities. Many Disadvantaged Communities within the study area have proceeded with solving some of the water supply challenges in recent years. In addition, there are many Disadvantaged Communities that have initiated actions toward solving some of the water supply challenges. Brief descriptions of the water supply problems, community descriptions, obstacles faced, capital costs, operational costs, and timelines for several of these projects (referred to as Demonstration Projects) are included for review. The successful completion of the demonstration projects provides insight into the decisions, time frame, and costs associated with addressing the water supply challenges. The Demonstration Projects are described in Chapter 6 of this report.

A primary effort of the Pilot Study is to assist Stakeholder Groups (which may include community representatives, water board members, other stakeholders with expertise and/or interest in the issues for each pilot) to help drive recommendations and new demonstration projects for each pilot. The stakeholder groups will strive to include representatives from the different community scenarios (as appropriate).

Based on the demonstration projects and other information gathered in the study process, general Decision Trees are prepared that may be useful guides for communities narrow down to viable solutions. Each community is unique. However there are decisions that will be required of each community to be able to make progress toward addressing the water supply and/or water quality issues. Decision trees are prepared based on the experiences of the demonstration projects, the pilot study efforts, and other anticipated decisions. The Decision trees branch to one or more of the other pilot study projects. Decision trees are included in Chapter 10 of this report.

Several recommendations for future tasks or actions that extend beyond the scope of this report are also identified. Recommendations may include additional work associated with the identified pilot study communities, an update to the database where gaps of information remain, and update of information associated with the database, or legislation directed to assistance of disadvantaged communities.

Tulare Lake Basin Disadvantaged Community Water Study

TULARE COUNTY
Communities

DAC and SDAC Communities

Legend

- Tulare Lake Basin
- County
- DAC or SDAC Community
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 1

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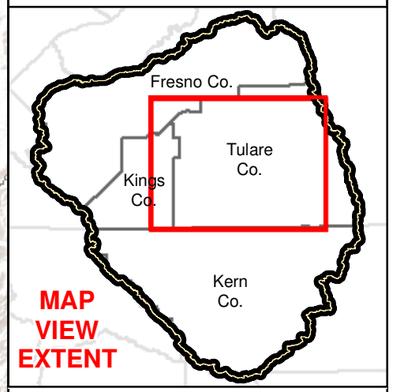

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286 W. Cromwell Ave.
Fresno, CA 93711-6162
(559) 449-2700

Sources: USGS, ESRI, TANA, AND

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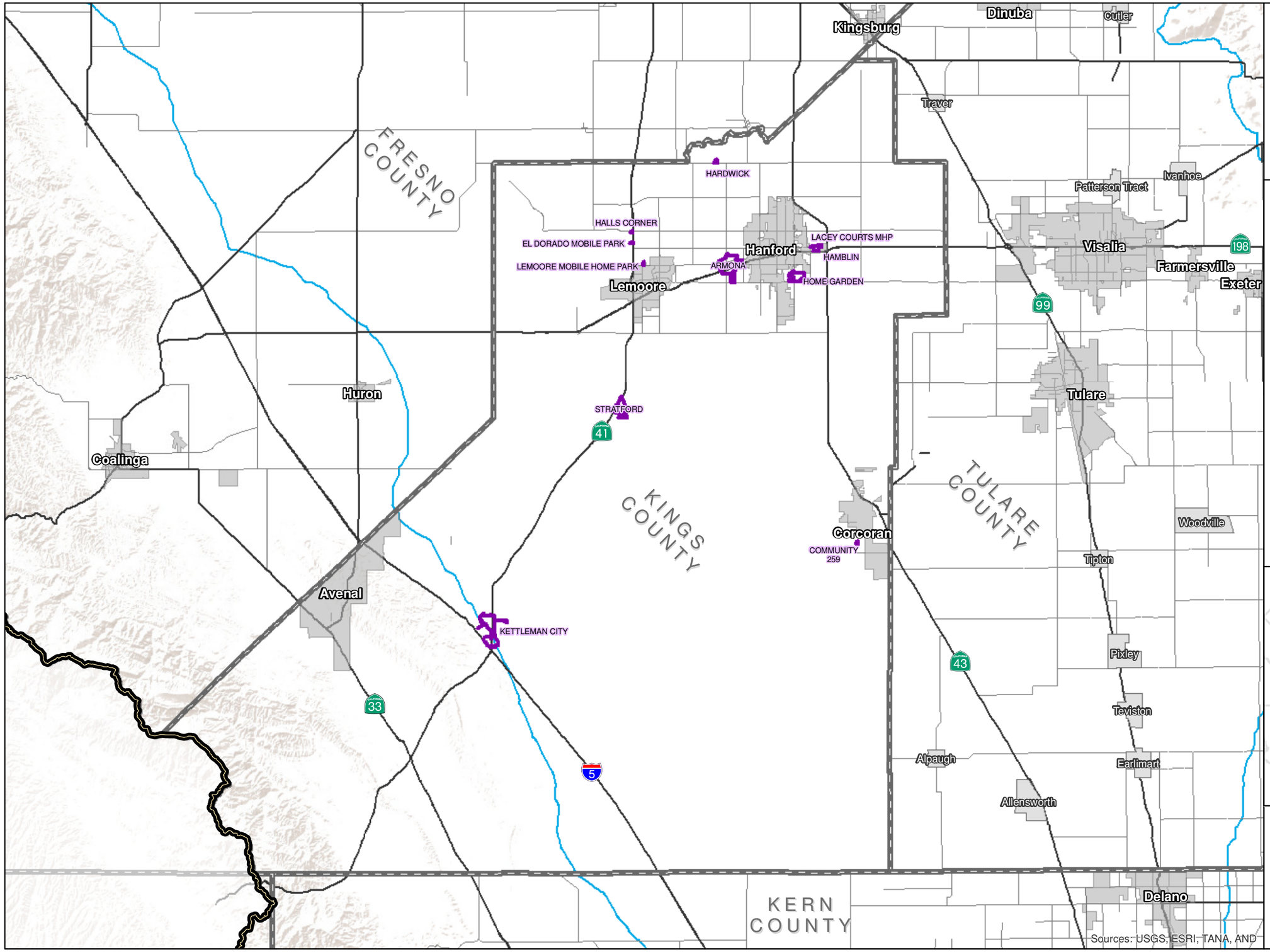
Tulare Lake Basin Disadvantaged Community Water Study

KINGS COUNTY
Communities

DAC and SDAC Communities



Sources: USGS, ESRI, TANA, AND

Legend

- Tulare Lake Basin
- County
- DAC or SDAC Community
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 2

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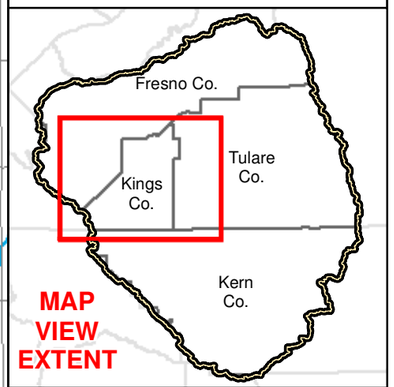

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Tulare Lake Basin Disadvantaged Community Water Study

FRESNO COUNTY
Communities

DAC and SDAC Communities

Legend

- Tulare Lake Basin
- County
- DAC or SDAC Community
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 3

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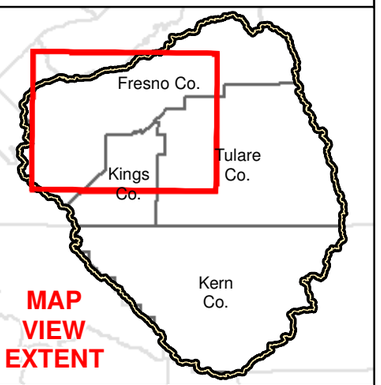

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Sources: USGS, ESRI, TANA, AND

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Tulare Lake Basin Disadvantaged Community Water Study

KERN COUNTY
Communities

DAC and SDAC Communities

KINGS CO. | TULARE CO.

KERN COUNTY

Rodriguez Camp
Idlewild
RIVERKERN
Kernville
FRONTIER TRAIL HOMEOWNERS ASSOC, INC.
BURLANDO HEIGHTS
SIERRA MEADOWS
RIVERNOOK MHP
ALTA SIERRA
SPLIT MOUNTAIN
COMMUNITY 362
GLENNVILLE
WOODY
SIERRA BELLA
Wofford Heights
COUNTRYWOOD
PINEBROOK
OAK KNOLLS MUTUAL WATER COMPANY
SOUTH FORK WOMAN S CLUB, INC.
Onyx
RAINBIRD VALLEY
Lake Isabella
PARADISE COVE LODGE
TRADEWINDS
VALLEY ESTATES
LONG CANYON
BEHILLVIEW VISACRES
LAKELAND
COMMUNITY 2751
MOUNTAIN MESA
Weldon
COMMUNITY 392
ERSKINE CREEK WC
REEDER TRACT
CANYON MEADOWS
LAKEVIEW RANCHOS
LOWER BODFISH
Bodfish
UPPER BODFISH
CYPRESS CANYON
HAVILAH
COMMUNITY 421
COMMUNITY 477
COMMUNITY 478
AGBAYANI VILLAGE
Delano
POND
McFarland
Wasco
LOST HILLS
Lost Hills
POPLAR AVE COMMUNITY
Mexican Colony
Shafter
COMMUNITY 493
Oildale
OILDALE
BUTTONWILLOW
Buttonwillow
COMMUNITY 427
MIRASOL COMPANY WATER SYSTEM
CALDERS CORNER
Rosedale
Greenacres
EAST NILES
CASA LOMA WATER CO, INC.
VICTORY MWC
WINI MUTUAL WATER COMPANY
Bakersfield
ATHAL
DE RANCHO Y MOBILE VILLA WATER
GREENFIELD COUNTY WD
Fuller Acres
FULLER ACRES
PANAMA ROAD PROPERTY OWNERS ASSOCIATION
Greenfield
Lamont
LAMONT
EL ADOBE POA, INC
Weedpatch
Edmundson Acres
ARVIN
Arvin
VALLEY VIEW ESTATES
KEENE
EL RITA
Bear Valley Springs
Golden Hills
Tehachapi
Stallion Springs
McKittrick
Tupman
Derby Acres
VALLEY ACRES
Dustin Acres
Fellows
Ford City
WEST KERN CWD
South Taft
Taft
BONANZA FARMS
OPAL FRY AND SON
METTLER
Mettler
Maricopa
Pine Mountain Club
Lake of the Woods
LAKE OF THE WOODS
FRAZIER PARK
Frazier Park
LEBEC
Lebec

Sources: USGS, ESRI, TANA, AND

Legend

- Tulare Lake Basin
- County
- DAC or SDAC Community
- City
- Community (Non-Incorporated)
- Major Road
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Exhibit 4

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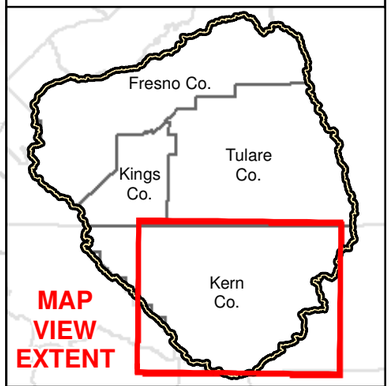

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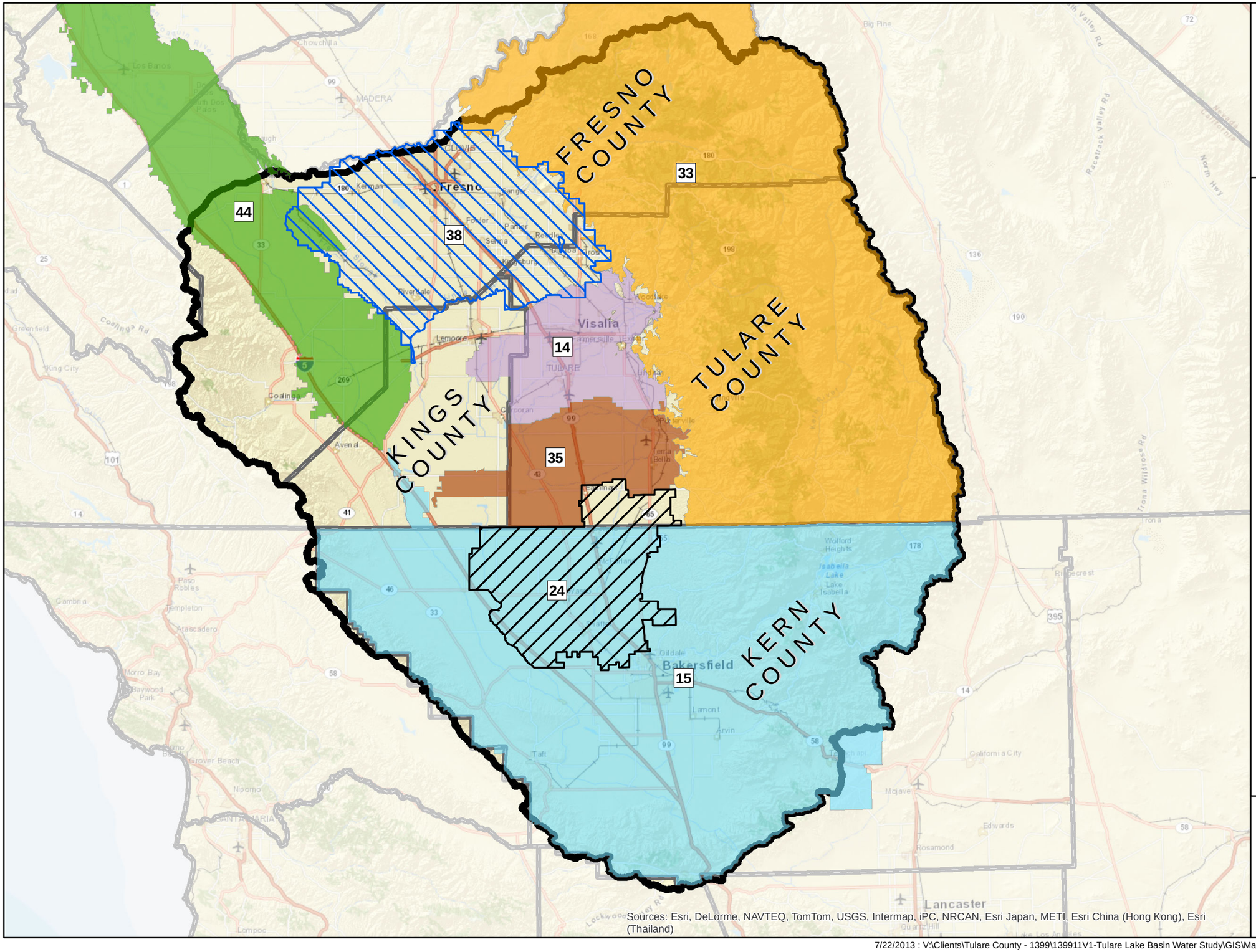
Tulare Lake Basin Disadvantaged Community Water Study

STUDY AREA

IRWM Planning Groups



Sources: Esri, DeLorme, NAVTEQ, TomTom, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand)

Legend

- Tulare Lake Basin
- County

IRWM Planning Groups

- (24) Poso Creek
- (38) Upper Kings Basin Water Forum
- (14) Kaweah River Basin*
- (15) Kern County
- (33) Southern Sierra
- (35) Tule*
- (44) Westside - San Joaquin

Exhibit 5

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3 GOAL

A goal of the Pilot Project process and report is to provide useful information and tools for the following audiences:

- Local user / consumer
- Local provider
- Agencies of Jurisdiction (regulatory, funding, land use, etc.)
- Legislature

3.1 Consumer Perspective

The impact to the consumer is critical when alternatives to address water supply challenges are evaluated. Impacts may include:

  - The cost of receiving the service. The costs may be in the form of initial capital costs and in monthly service charges
  - Restrictions regarding the use of water
  - The water service provider may change from the existing circumstances
  - Standard procedures and policies regarding uncollected accounts may change
- Level of funding/affordability/willingness to pay

3.2 Provider Perspective

- Provider Perspective – annual revenue versus expenses
- Leadership issues
- Governance issues

3.3 Agency Perspective

- Agency Perspective – does the solution meet water quality/demand objectives

3.3.1 County Level

- Consideration of impacts to Land use control/zoning/building permit
- Consideration of County Environmental Health Departments regarding individual well and on-site sanitary sewer facilities

3.3.2 Regulatory Agencies (CDPH/DWR/RWQCB/EPA)

- Permitting requirements for new systems
- Guidelines/directives to correct violations
- Sustainability – require a means to sustain the facilities prior to allowing construction
- Identification of impacts to DACs when new regulatory requirements are imposed

3.3.3 Funding Agencies

- Impacts regarding funding assistance and requirements to receive funding assistance
- Assistance with funding applications

3.4 Legislative Perspective

- Identification of the new for new legislation to facilitate funding assistance opportunities
- Identification of impacts to DACs when new regulatory requirements are imposed

The information presented in the report will include descriptions of actual community efforts toward solving water supply challenges. The descriptions may include the difficult decisions that were made, the consequences of the solutions, and the results of the projects.

The information may also include recommendations for other communities to consider regarding:

a) steps toward solving remaining existing water supply challenges,
b) identifying obstacles interfering with solving remaining water supply challenges, and
c) steps toward preventing or mitigating future water supply challenges.

4 DEFINITION OF CHALLENGES ASSOCIATED WITH WATER SUPPLY

Definition of Challenges Associated with Water Supply

According to data derived from databases of the California Department of Public Health (CDPH) approximately 117 out of the 370 DACs in the region reported at least one water quality exceedance between 2008 and 2010. A breakdown of the water quality exceedances by contaminant is presented in the Technical Solutions Pilot Study Report. Limited reliable water supply is also a concern within the study area, since many communities only have a single source of water supply. The communities with the various water supply and quality issues are illustrated in Exhibits 18 through 21.

Information that was prepared or provided by others was relied upon to develop and analyze the types of problems and non-compliance that exist, as well as to develop potential solutions. A database has been compiled to collect data from PolicyLink, CDPH, Self Help Enterprises, County of Fresno, County of Tulare, County of Kings, and Regional Water Quality Control Board (RWQCB) which has been reviewed to evaluate the pollutant water quality and supply source issues in the Study Area. The information is acknowledged to not be complete and the specifics of each community and system are in a continuous state of change. However, the database may be updated as changes or corrections are identified. Specifically, and most importantly, the study identified data that may be necessary to identify where solutions recommended from the pilot could be replicated. The data collection and analysis provided a means to define the water supply challenges faced by many disadvantaged communities within the Tulare Basin. Several common themes applied to many of the disadvantaged communities.

Unknown Water Supply Source Identified

Based on information available for this study, the water source for many communities was not identified. It is recommended that the water supply source is defined for each disadvantaged community so that if there are water sources that may not provide water in sufficient quality or of appropriate quality for use by the community, an opportunity to develop a plan for corrective actions may be made available. It is noted that an unknown source of water supply does not necessarily correlate to a problem with the water supply source, The communities that have an unknown source of water are listed in Table 5, which is broken down by County and includes population and connection estimates. The information is presented by population within each County (highest to lowest). It is noted that several disadvantaged communities are not applicable to the New Source Pilot Study (ie. Mayfair, Calwa, others) because these communities are already served by a viable community water system. The geographical location

of the communities with an unknown water supply source is shown in Exhibits 6, 7, 8, and 9.

Recommended task – investigate all of the "Unknown Sources" to clean up the loose ends. Some of this clean up will be done within the Pilot Study and some will be left to the future. There should be a column for those communities that require investigation to get to a point where the table either does not exist or only shows those communities where water supply is not applicable.

Review of the information gathered for the study area indicates that insufficient water supply is a challenge faced by many disadvantaged communities. Insufficient water supply may be represented in several scenarios.

Scenario 1

Many communities in the Tulare Lake Basin Study area may face the challenge of insufficient water supply. The communities may have an insufficient number of wells or sources, an insufficient capacity of the sources to meet maximum day and fire flow demands, unchecked water use, or declining groundwater levels. The existing well(s) may be aging and in imminent need of replacement.

Pursuant to Title 22 Chapter 14 Article 3 Section 64215 (Appendix C), small water systems must demonstrate to the local health officer that sufficient water is available from the water system's sources and distribution storage facilities to supply a minimum of three gallons per minute for at least 24 hours for each service connection served by the system.

Pursuant to Title 22, Chapter 16, Article 2, Section 64554 (Appendix C), Community water systems using only groundwater shall have a minimum of two approved sources before being granted an initial permit. The system shall be capable of meeting maximum daily demand with the highest-capacity source off line.

Single Water Supply Source

Based on information available, communities with only one source of water supply are listed in Table 6, thereby rendering them in jeopardy of insufficient supply. The capacity of the source is not known in many instances. Table 6 is broken down by County and includes population and connection estimates per County. The information is presented by population within each County (highest to lowest). It is noted that communities that utilize surface water may have a single source of supply (ie. communities served by Westlands WD M&I connections such as Fresno County Service Area No. 49 near the community of Five Points). These cases may not necessarily describe a circumstance of insufficient water supply sources. Depending on the reliability of the surface water supply, the community may have groundwater sources or backup surface

water reservoirs as either backup or primary sources during defined periods when the surface water is not available.

For example, the Friant-Kern Canal is taken out of service every three years from November through January for maintenance purposes. Those communities that rely on the Friant-Kern Canal for water supply must also have alternative backup sources of water supply. In addition, the surface water supply may only satisfy a portion of the water demand of a community. Alternative water supply sources would be required in such an instance.

The geographical location of the communities with a single source of water supply is shown in Exhibits 10, 11, 12, and 13. The Exhibits are separated by County.

The total population of DACs in the study area with a single source of water is summarized below.

Tulare Lake Basin Study Area
Summary of DACs with a Single Source of Water Supply

	Number of DAC Systems		Connections		Population	
County	Publicly Owned	Privately Owned	Publicly Owned	Privately Owned	Publicly Owned	Privately Owned
Tulare	4	32	368	1,426	1,224	4,685
Kings	0	3	0	99	0	215
Fresno	2	33	110	1,063	738	3,821
Kern	0	18	0	937	0	2,855
Total	6	86	478	3,525	1,962	11,576

Recommended task – It is recommended that the database continue to be updated as continuing investigations of the water supply sources of disadvantaged communities proceed. Action plans may be identified for those communities with a "Single Water Supply Source", as appropriate.

Based on information available, the adequacy of the existing sources may also be of concern. However, little information has been available relative to the capacity of the water supply sources and the relative demands of the communities.

Recommended task – Continue to supplement the database to include community demands and the relative capacity of water supply sources to identify communities with insufficient water supply sources.

Scenario 2

Many communities in the Tulare Lake Basin Study area may face the challenge of unsuitable water quality. The communities may have wells that are too shallow and susceptible to contaminants, may have multiple contaminants in the water supply, or may not have the resources to construct or maintain treatment facilities.

It is noted that maximum contaminant levels (MCLs) for constituents periodically become more stringent (ie. the MCL for arsenic was reduced from 50 ppb to 10 ppb). In addition, there are emerging constituents for which MCLs may be identified in the future (ie. 123 TCP). Therefore, a community water system may be in compliance today and then may exceed the regulations in the future even if the delivered water quality remains constant.

Title 22, Chapter 15 identifies the water quality sampling requirements and maximum contaminant levels to be achieved by public water systems. In addition, Title 22, Chapter 15 defines economic feasibility criteria for centralized water treatment. Further, Title 22, Chapter 15 defines parameters for Point of Use Treatment.

Water quality is a limiting factor on the adequacy of supply for several communities. Based on the information available, the regulated communities identified in Exhibits 10, 11, 12, and 13 have raw water supply characteristics that have exceeded the primary drinking water standards for either arsenic, nitrate, coliform, or uranium between 2008 and 2010. Some of these communities have treatment facilities that mitigate the constituents. The communities identified in Exhibits 14, 15, 16, and 17 have delivered water supply characteristics that have exceeded the primary drinking water standards for either arsenic, nitrate, coliform, or uranium between 2008 and 2010.

Table 7 includes the disadvantaged communities that have exceeded primary drinking water standards. The table is broken down by County and includes population and connection estimates per County. The information is presented by population within each County (highest to lowest). In addition, the table identifies publicly owned systems and privately owned systems. The table below summarizes the information from Table 7.

Tulare Lake Basin Study Area
Summary of Regulated DACs with a Delivered Water Quality Concern (2008 through 2010)

	Number of DAC Systems		Connections		Population	
County	Publicly Owned	Privately Owned	Publicly Owned	Privately Owned	Publicly Owned	Privately Owned
Tulare	5	13	2,613	1,442	10,342	5,555
Kings	2	1	1,629	21	4,989	50
Fresno	2	7	1,602	259	5,103	817
Kern	3	5	11,117	8,362	40,898	28,183
Total	12	26	16,961	10,084	61,332	34,605

Note that the East Niles CSD (Kern County) addressed the water quality concerns in 2009. There may be other communities that have since addressed the issue and therefore we would need to footnote the Table.

Water Supply and Water Quality

Several communities face the challenge of insufficient water supply and inadequate water quality. Those disadvantaged communities facing a severe water supply or water quality concern are identified in Exhibits 18, 19, 20, and 21. These same communities are listed in Table 8. It is acknowledged that other communities also suffer with water quantity or quality concerns, as identified previously.

Tulare Lake Basin Study Area
Summary of Regulated DACs with a Severe Water Supply and Water Quality Concern

	Number of DAC Systems		Connections		Population	
County	Publicly Owned	Privately Owned	Publicly Owned	Privately Owned	Publicly Owned	Privately Owned
Tulare	6	12	3,271	1,172	13,102	4,322
Kings	4	1	2,190	2	7,704	50
Fresno	3	4	1,928	87	5,923	377
Kern	4	6	13,146	1,183	47,190	4,408
Total	17	23	20,535	2,463	73,919	9,157

Note that the East Niles CSD (Kern County) addressed the water quality concerns in 2009. There may be other communities that have since addressed the issue and therefore we would need to footnote the Table.

Additional Challenges

In addition to the basic challenge of sufficient potable water supply (quality and quantity), several of the communities have characteristics that may increase the challenges they face. One of the complicating factors faced by communities in the Tulare Basin is that of geographic isolation.

Communities may also face challenges that could include management of the system, cost of the system, the specific operation and management of treatment, or other topics. Many of the subjects listed in the Technical, Managerial, and Financial report (Appendix D) required by the California Department of Public Health in applications for financial assistance may be referenced to gain an understanding of the ability of a community to address water supply challenges. The other pilot project studies that are being prepared in parallel to the topic of water supply may also address some of these challenges. There are opportunities for combining resources with the other projects to address issues more comprehensively.

As stated previously, there also are pollutants within the drinking water for which regulatory limits have not yet been established. 1,2,3 TCP is an example of a pollutant that is expected to be associated with a regulatory limit in the future. The impact to DACs within the Tulare Basin Study Area is yet to be determined.

Tulare Lake Basin Disadvantaged Community Water Study

TULARE COUNTY
Communities

DAC and SDAC Communities
With Unknown Water Source

Legend

- Tulare Lake Basin
- Other DAC or SDAC
- County
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 6

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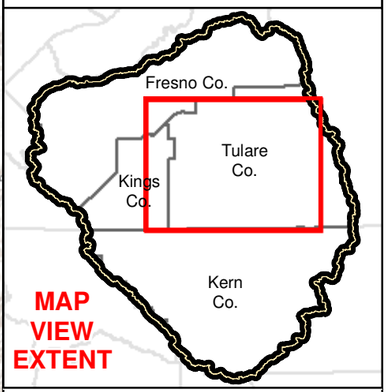

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Fowler
Parlier
Reedley
Orange Cove
Selma
Dinuba
Orosi
Cutler
Kingsburg
FRESNO COUNTY
ELDERWOOD
Traver
Woodlake
Ivanhoe
Patterson Tract
SOUTH LEMON COVE
TULARE COUNTY
Hanford
Visalia
Farmersville
Exeter
COMMUNITY 290
COMMUNITY 292
COMMUNITY 415
COMMUNITY 421
Lindsay
Tulare
KINGS COUNTY
WAUKENA
Strathmore
Springville
Corcoran
Woodville
Porterville
Tipton
COMMUNITY 330
Pixley
Terra Bella
COMMUNITY 340
Teviston
COMMUNITY 342
TRICO OIL ACRES COLONIA
Ducor
Alpaugh
Earlimart
Allensworth
POSEY
Delano

Sources: USGS, ESRI, TANA, AND

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Tulare Lake Basin Disadvantaged Community Water Study

KINGS COUNTY
Communities

DAC and SDAC Communities
With Unknown Water Source

Legend

- Tulare Lake Basin
- Unknown Water Source
- County
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 7

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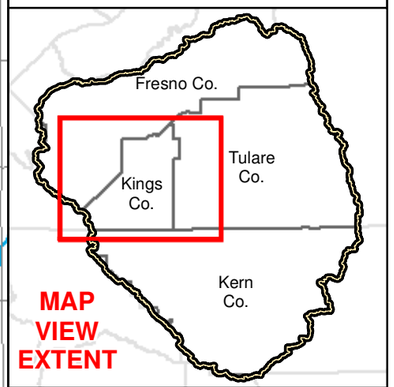

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Sources: USGS, ESRI, TANA, AND

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Tulare Lake Basin Disadvantaged Community Water Study

FRESNO COUNTY
Communities

DAC and SDAC Communities
With Unknown Water Source

Legend

- Tulare Lake Basin
- Unknown Water Source
- County
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 8

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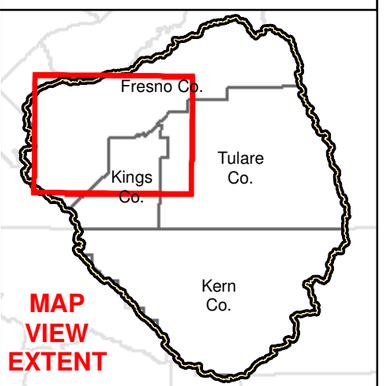

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Sources: USGS, ESRI, TANA, AND

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Tulare Lake Basin Disadvantaged Community Water Study

KERN COUNTY
Communities

DAC and SDAC Communities
With Unknown Water Source

Legend

- Tulare Lake Basin
- Unknown Water Source
- County
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 9

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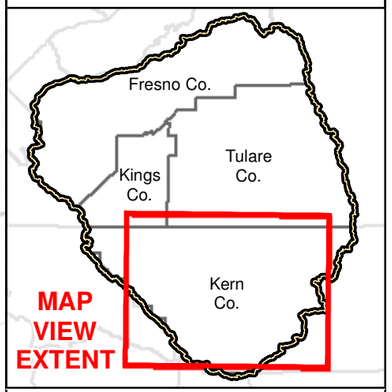

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Sources: USGS, ESRI, TANA, AND

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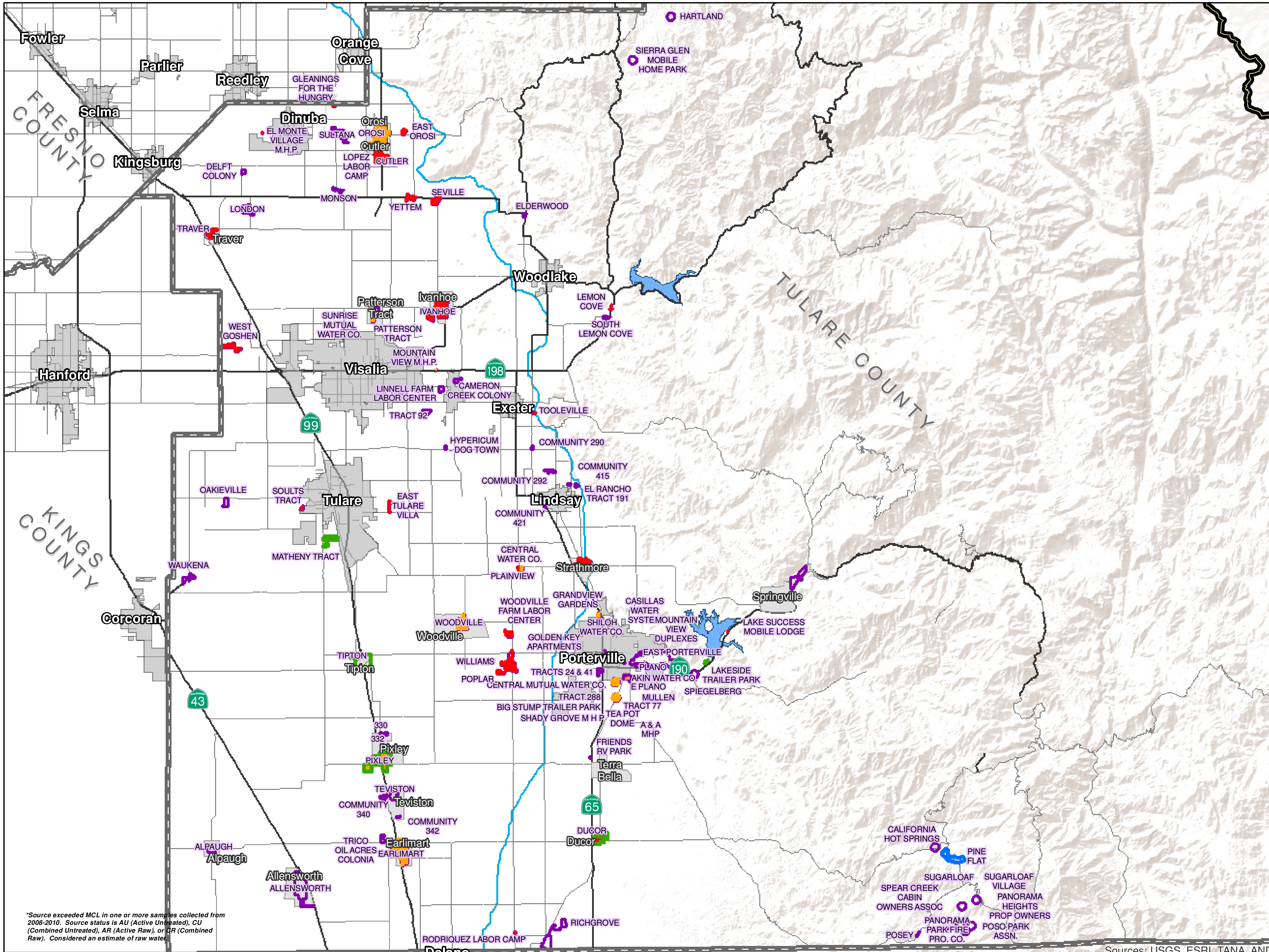
Fowler
Parlier
Reedley
Orange Cove
GLEANINGS FOR THE HUNGRY
Selma
Dinuba
Orosi
EAST OROSI
EL MONTE VILLAGE M.H.P.
SULTANA
OROSI
Cutler
LOPEZ LABOR CAMP
CUTLER
FRESNO COUNTY
Kingsburg
DELFT COLONY
MONSON
SEVILLE
YETTEM
ELDERWOOD
LONDON
TRAVER
Traver
HARTLAND
SIERRA GLEN MOBILE HOME PARK
Woodlake
LEMON COVE
SOUTH LEMON COVE
Patterson Tract
Ivanhoe
IVANHOE
SUNRISE MUTUAL WATER CO.
PATTERSON TRACT
WEST GOSHEN
MOUNTAIN VIEW M.H.P.
Hanford
Visalia
198
LINNELL FARM LABOR CENTER
CAMERON CREEK COLONY
Exeter
TOOLEVILLE
TRACT 92
99
HYPERICUM DOG TOWN
COMMUNITY 290
COMMUNITY 415
COMMUNITY 292
EL RANCHO TRACT 191
OAKIEVILLE
SOULTS TRACT
Tulare
EAST TULARE VILLA
Lindsay
COMMUNITY 421
KINGS COUNTY
MATHENY TRACT
CENTRAL WATER CO.
Strathmore
PLAINVIEW
WAUKENA
TULARE COUNTY
Springville
GRANDVIEW GARDENS
WOODVILLE FARM LABOR CENTER
CASILLAS WATER SYSTEM
MOUNTAIN VIEW DUPLEXES
SHILOH WATER CO.
LAKE SUCCESS MOBILE LODGE
Corcoran
WOODVILLE
Woodville
GOLDEN KEY APARTMENTS
TIPTON
Tipton
WILLIAMS
Porterville
EAST PORTERVILLE
PLANO
190
LAKESIDE TRAILER PARK
TRACTS 24 & 41
POPLAR
CENTRAL MUTUAL WATER CO.
AKIN WATER CO.
E PLANO
SPIEGELBERG
43
TRACT 288
MULLEN
TRACT 77
BIG STUMP TRAILER PARK
SHADY GROVE M H P
TEA POT DOME
A & A MHP
330
332
Pixley
PIXLEY
FRIENDS RV PARK
Terra Bella
TEVISTON
Teviston
COMMUNITY 340
COMMUNITY 342
65
DUCOR
Ducor
CALIFORNIA HOT SPRINGS
PINE FLAT
ALPAUGH
Alpaugh
TRICO OIL ACRES COLONIA
Earlimart
EARLIMART
Allensworth
ALLENSWORTH
SUGARLOAF
SUGARLOAF VILLAGE
SPEAR CREEK CABIN OWNERS ASSOC
PANORAMA HEIGHTS PROP OWNERS
PANORAMA PARK FIRE PRO. CO.
POSO PARK ASSN.
POSEY
RICHGROVE
RODRIQUEZ LABOR CAMP
Delano
*Source exceeded MCL in one or more samples collected from 2008-2010. Source status is AU (Active Untreated), CU (Combined Untreated), AR (Active Raw), or CR (Combined Raw). Considered an estimate of raw water.
Sources: USGS, ESRI, TANA, AND

Tulare Lake Basin Disadvantaged Community Water Study

TULARE COUNTY Communities

DAC and SDAC Communities
*Raw Water Quality Issues

Legend

- Tulare Lake Basin
- County
- DAC or SDAC Not Identified With WQ Issue
- Uranium (Source Max Value >=20 pC/l)
- Arsenic (Source Max Value >=10 ug/l)
- Nitrate as NO3 (Source Max Value >= 45 mg/l)
- Nitrate as NO3 (Source Max Value >= 22.5 < 45 mg/l)
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 10

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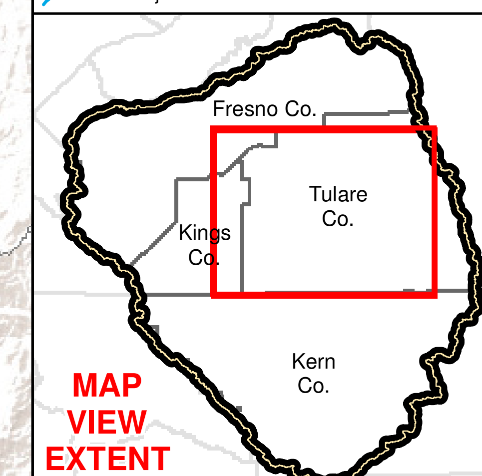

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Tulare Lake Basin Disadvantaged Community Water Study

KINGS COUNTY Communities

DAC and SDAC Communities
*Raw Water Quality Issues

Legend

- Tulare Lake Basin
- County
- DAC or SDAC Not Identified With WQ Issue
- Arsenic (Source Max Value >=10 ug/l)
- Uranium (Source Max Value >=20 pC/l)
- Nitrate as NO3 (Source Max Value >= 45 mg/l)
- Nitrate as NO3 (Source Max Value >= 22.5 < 45 mg/l)
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 11

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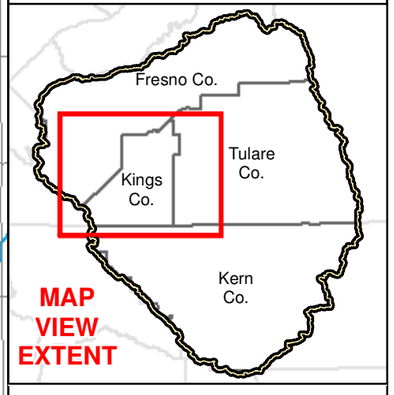

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Kingsburg
Dinuba
Cutler
Traver
HARDWICK
HALLS CORNER
EL DORADO MOBILE PARK
LEMOORE MOBILE HOME PARK
ARMONA
Hanford
LACEY COURTS MHP
HAMBLIN
HOME GARDEN
Lemoore
Patterson Tract
Ivanhoe
Visalia
Farmersville
Exeter
198
99
Tulare
Huron
STRATFORD
Coalinga
FRESNO COUNTY
KINGS COUNTY
TULARE COUNTY
41
Corcoran
COMMUNITY 259
Woodville
Tipton
Pixley
43
Teviston
Alpaugh
Earlimart
Allensworth
Avenal
KETTLEMAN CITY
33
5
Delano
KERN COUNTY

*Source exceeded MCL in one or more samples collected from 2008-2010. Source status is AU (Active Untreated), CU (Combined Untreated), AR (Active Raw), or CR (Combined Raw). Considered an estimate of raw water.

Sources: USGS, ESRI, TANA, AND

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Tulare Lake Basin Disadvantaged Community Water Study

FRESNO COUNTY Communities

DAC and SDAC Communities
*Raw Water Quality Issues

Legend

- Tulare Lake Basin
- County
- DAC or SDAC Not Identified With WQ Issue
- Uranium (Source Max Value >=20 pC/l)
- Arsenic (Source Max Value >=10 ug/l)
- Nitrate as NO3 (Source Max Value >= 45 mg/l)
- Nitrate as NO3 (Source Max Value >= 22.5 < 45 mg/l)
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 12

DRAFT

MAP VIEW EXTENT

Fresno Co.
Kings Co.
Tulare Co.
Kern Co.

0 2 4 6 Miles

*Source exceeded MCL in one or more samples collected from 2008-2010. Source status is AU (Active Untreated), CU (Combined Untreated), AR (Active Raw), or CR (Combined Raw). Considered an estimate of raw water.

Sources: USGS, ESRI, TANA, AND

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Tulare Lake Basin Disadvantaged Community Water Study

KERN COUNTY Communities

DAC and SDAC Communities
*Raw Water Quality Issues

KINGS CO. | TULARE CO. | KERN COUNTY

Rodriguez Camp
Idlewild
RIVERKERN
COMMUNITY 477
COMMUNITY 478
AGBAYANI VILLAGE
Delano
POND
McFarland
WOODY
GLENNVILLE
155
65
FRONTIER TRAIL HOMEOWNERS ASSOC, INC.
Kernville
BURLANDO HEIGHTS
SIERRA MEADOWS
RIVERNOOK MHP
ALTA SIERRA
SPLIT MOUNTAIN
COMMUNITY 362
SIERRA BELLA
Wofford Heights
COUNTRYWOOD
PINEBROOK
OAK KNOLLS MUTUAL WATER COMPANY
SOUTH FORK WOMAN S CLUB, INC.
RAINBIRD VALLEY
Onyx
Lake Isabella
PARADISE COVE LODGE
TRADEWINDS
VALLEY ESTATES
LONG CANYON
BEHILLVIEW VISACRES
LAKELAND
COMMUNITY 2751
MOUNTAIN MESA
Weldon
COMMUNITY 392
ERSKINE CREEK WC
REEDER TRACT
CANYON MEADOWS
LAKEVIEW RANCHOS
LOWER BODFISH
Bodfish
UPPER BODFISH
CYPRESS CANYON
HAVILAH
LOST HILLS
Lost Hills
5
46
Wasco
99
33
POPLAR AVE COMMUNITY
Mexican Colony
Shafter
COMMUNITY 493
Oildale
OILDALE
Bakersfield
COMMUNITY 421
BUTTONWILLOW
Buttonwillow
COMMUNITY 427
58
MIRASOL COMPANY WATER SYSTEM
Rosedale
Greenacres
CALDERS CORNER
EAST NILES
CASA LOMA WATER CO, INC.
VICTORY MWC
WINI MUTUAL WATER COMPANY
V.R. S TRAILER PARK
ATHAL
DE RANCHO Y MOBILE VILLA WATER
GREENFIELD COUNTY WD
Fuller Acres
FULLER ACRES
PANAMA ROAD PROPERTY OWNERS ASSOCIATION
Greenfield
Lamont
LAMONT
EL ADOBE POA, INC
Weedpatch
Edmundson Acres
ARVIN
Arvin
McKittrick
Tupman
Derby Acres
Dustin Acres
Valley Acres
Fellows
Ford City
South Taft
Taft
BONANZA FARMS
OPAL FRY AND SON
METTLER
Mettler
Maricopa
VALLEY VIEW ESTATES
58
KEENE
EL RITA
Bear Valley Springs
Golden Hills
Tehachapi
Stallion Springs
5
Pine Mountain Club
Lake of the Woods
LAKE OF THE WOODS
FRAZIER PARK
Frazier Park
LEBEC
Lebec

*Source exceeded MCL in one or more samples collected from 2008-2010. Source status is AU (Active Untreated), CU (Combined Untreated), AR (Active Raw), or CR (Combined Raw). Considered an estimate of raw water.

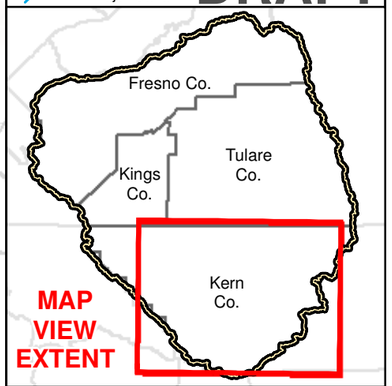
Sources: USGS, ESRI, TANA, AND

Legend

- Tulare Lake Basin
- County
- DAC or SDAC Not Identified With WQ Issue
- Uranium (Source Max Value >=20 pC/l)
- Arsenic (Source Max Value >=10 ug/l)
- Nitrate as NO3 (Source Max Value >= 45 mg/l)
- Nitrate as NO3 (Source Max Value >= 22.5 < 45 mg/l)
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 13

DRAFT



0 2 4 6 Miles

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Tulare Lake Basin Disadvantaged Community Water Study

TULARE COUNTY Communities

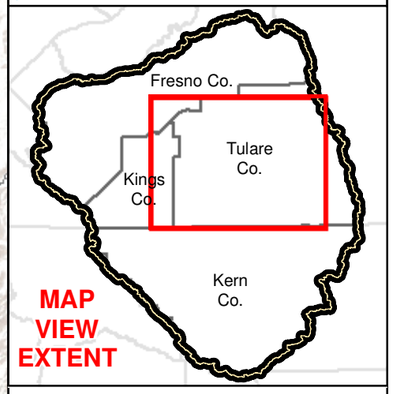
DAC and SDAC Communities
*Delivered Water Quality Issues

Legend

- Tulare Lake Basin
- County
- DAC or SDAC Not Identified With WQ Issue
- Uranium (Source Max Value >=20 pC/l)
- Arsenic (Source Max Value >=10 ug/l)
- Nitrate as NO3 (Source Max Value >= 45 mg/l)
- Nitrate as NO3 (Source Max Value >= 22.5 < 45 mg/l)
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 14

DRAFT



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Fowler
Parlier
Reedley
Orange Cove
Selma
Dinuba
Kingsburg
Hanford
Visalia
Tulare
Corcoran
Woodlake
Lindsay
Strathmore
Porterville
Exeter
Ivanhoe
Patterson Tract
Pixley
Terra Bella
Teviston
Earlimart
Alpaugh
Allensworth
Delano
Springville
Woodville
Ducor
Richgrove

HARTLAND
SIERRA GLEN MOBILE HOME PARK
GLEANINGS FOR THE HUNGRY
EL MONTE VILLAGE M.H.P.
SULTANA
OROSI
EAST OROSI
CUTLER
LOPEZ LABOR CAMP
DELFT COLONY
MONSON
YETTEM
SEVILLE
LONDON
TRAVER
ELDERWOOD
LEMON COVE
SOUTH LEMON COVE
SUNRISE MUTUAL WATER CO.
PATTERSON TRACT
WEST GOSHEN
MOUNTAIN VIEW M.H.P.
LINNELL FARM LABOR CENTER
CAMERON CREEK COLONY
TRACT 92
TOOLEVILLE
HYPERICUM DOG TOWN
COMMUNITY 290
COMMUNITY 415
COMMUNITY 292
EL RANCHO TRACT 191
COMMUNITY 421
OAKIEVILLE
SOULTS TRACT
EAST TULARE VILLA
MATHENY TRACT
CENTRAL WATER CO.
PLAINVIEW
WAUKENA
WOODVILLE FARM LABOR CENTER
GRANDVIEW GARDENS
CASILLAS WATER SYSTE
SHILOH WATER CO.
MOUNTAIN VIEW DUPLEXES
LAKE SUCCESS MOBILE LODGE
GOLDEN KEY APARTMENTS
EAST PORTERVILLE
WILLIAMS
TRACTS 24 & 41
PLANO
AKIN WATER CO.
E PLANO
LAKESIDE TRAILER PARK
SPIEGELBERG
POPLAR
CENTRAL MUTUAL WATER CO.
TRACT 288
MULLEN TRACT 77
BIG STUMP TRAILER PARK
SHADY GROVE M H P
TEA POT DOME
A & A MHP
FRIENDS RV PARK
TIPTON
330
332
PIXLEY
TEVISTON
COMMUNITY 340
COMMUNITY 342
TRICO OIL ACRES COLONIA
EARLIMART
ALPAUGH
RODRIQUEZ LABOR CAMP
CALIFORNIA HOT SPRINGS
PINE FLAT
SUGARLOAF
SUGARLOAF VILLAGE
SPEAR CREEK CABIN OWNERS ASSOC
PANORAMA HEIGHTS PROP OWNERS
PANORAMA PARK FIRE PRO. CO.
POSO PARK ASSN.
POSEY

FRESNO COUNTY
KINGS COUNTY
TULARE COUNTY

99
198
43
190
65

*Source exceeded MCL in one or more samples collected from 2008-2010. Source status is AU (Active Untreated), CU (Combined Untreated), AT (Active Treated), or CT (Combined Treated). Considered an estimate of delivered water.

Sources: USGS, ESRI, TANA, AND

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Tulare Lake Basin Disadvantaged Community Water Study

KINGS COUNTY Communities

DAC and SDAC Communities
*Delivered Water Quality Issues

Legend

- Tulare Lake Basin
- County
- DAC or SDAC Not Identified With WQ Issue
- Uranium (Source Max Value >=20 pC/l)
- Arsenic (Source Max Value >=10 ug/l)
- Nitrate as NO3 (Source Max Value >= 45 mg/l)
- Nitrate as NO3 (Source Max Value >= 22.5 < 45 mg/l)
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 15

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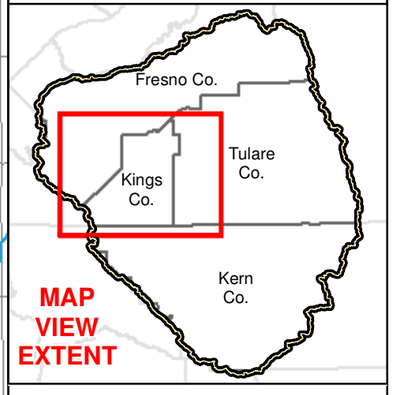

0 2 4 6 Miles

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Kingsburg
Dinuba
Cutler
Traver
HARDWICK
HALLS CORNER
EL DORADO MOBILE PARK
LEMOORE MOBILE HOME PARK
ARMONA
Hanford
LACEY COURTS MHP
HAMBLIN
HOME GARDEN
Lemoore
Patterson Tract
Ivanhoe
Visalia
Farmersville
Exeter
198
99
Tulare
Huron
STRATFORD
Coalinga
FRESNO COUNTY
KINGS COUNTY
TULARE COUNTY
41
Corcoran
COMMUNITY 259
Woodville
Tipton
Avenal
KETTLEMAN CITY
33
43
Pixley
Teviston
Alpaugh
Earlimart
Allensworth
5
Delano
KERN COUNTY

*Source exceeded MCL in one or more samples collected from 2008-2010. Source status is AU (Active Untreated), CU (Combined Untreated), AT (Active Treated), or CT (Combined Treated). Considered an estimate of delivered water.

Sources: USGS, ESRI, TANA, AND

Tulare Lake Basin Disadvantaged Community Water Study

FRESNO COUNTY Communities

DAC and SDAC Communities
*Delivered Water Quality Issues

Legend

- Tulare Lake Basin
- County
- DAC or SDAC Not Identified With WQ Issue
- Uranium (Source Max Value >=20 pC/l)
- Arsenic (Source Max Value >=10 ug/l)
- Nitrate as NO3 (Source Max Value >= 45 mg/l)
- Nitrate as NO3 (Source Max Value >= 22.5 < 45 mg/l)
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 16

DRAFT

MAP VIEW EXTENT

0 2 4 6 Miles

*Source exceeded MCL in one or more samples collected from 2008-2010. Source status is AU (Active Untreated), CU (Combined Untreated), AT (Active Treated), or CT (Combined Treated). Considered an estimate of delivered water.

Sources: USGS, ESRI, TANA, AND

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Tulare Lake Basin Disadvantaged Community Water Study

KERN COUNTY Communities

DAC and SDAC Communities
Water Districts and Recharge Projects

KINGS CO. | TULARE CO. | KERN COUNTY

Legend

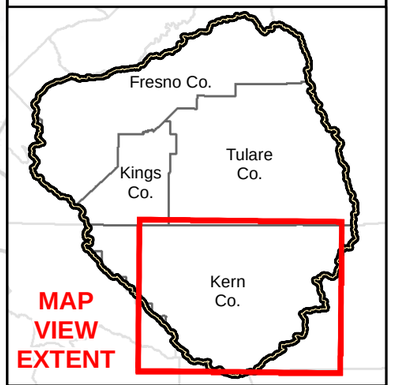
- Recharge Site
- Tulare Lake Basin
- County
- City
- Community (Non-Incorporated)

DAC or SDAC Community

- Groundwater (or Unknown) Source
- Groundwater and Surface Water Source
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 17

DRAFT



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Sources: USGS, ESRI, TANA, AND

Tulare Lake Basin Disadvantaged Community Water Study

TULARE COUNTY Communities

DAC and SDAC Communities With A Single Active Water Source Or *Water Quality Issues

Legend

- Tulare Lake Basin
- County
- *Source Exceeded MCL for either Arsenic, Uranium, Nitrate or Half Nitrate (2008-10)
- 1 Active Water Source Identified
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 18

*Source exceeded MCL in one or more samples collected from 2008-2010. Source status is AU (Active Untreated), CU (Combined Untreated), AT (Active Treated), or CT (Combined Treated). Considered as delivered water.

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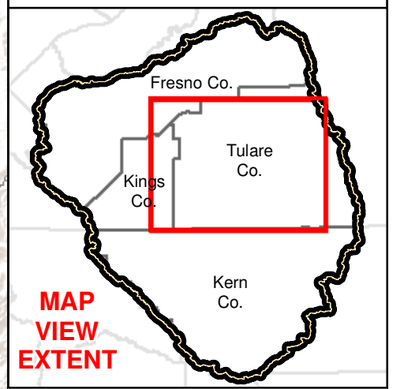

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Sources: USGS, ESRI, TANA, AND

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Tulare Lake Basin Disadvantaged Community Water Study

KINGS COUNTY Communities

DAC and SDAC Communities
With A Single Active Water Source
Or *Water Quality Issues

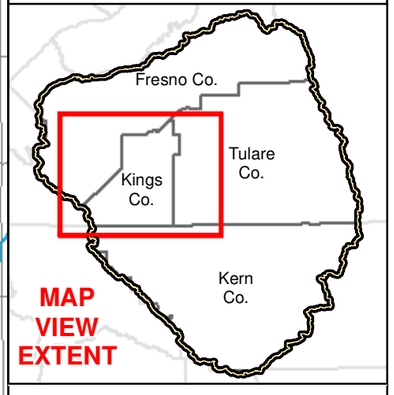
Legend

- Tulare Lake Basin
- County
- *Source Exceeded MCL for either Arsenic, Uranium, Nitrate or Half Nitrate (2008-10)
- 1 Active Water Source Identified
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 19

*Source exceeded MCL in one or more samples collected from 2008-2010. Source status is AU (Active Untreated), CU (Combined Untreated), AT (Active Treated), or CT (Combined Treated). Considered as delivered water.

DRAFT



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Sources: USGS, ESRI, TANA, AND

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Tulare Lake Basin Disadvantaged Community Water Study

FRESNO COUNTY Communities

DAC and SDAC Communities
With A Single Active Water Source
Or *Water Quality Issues

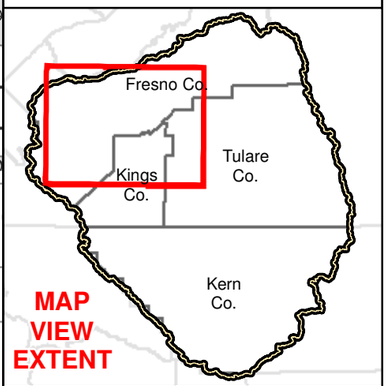
Legend

- Tulare Lake Basin
- County
- *Source Exceeded MCL for either Arsenic, Uranium, Nitrate or Half Nitrate (2008-10)
- 1 Active Water Source Identified
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 20

*Source exceeded MCL in one or more samples collected from 2008-2010. Source status is AU (Active Untreated), CU (Combined Untreated), AT (Active Treated), or CT (Combined Treated). Considered as delivered water.

DRAFT



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Clovis
Old Fig Garden
Tarpey Village
Biola
SUNSET WEST MHP
GREEN ACRES MOBILE HOME ESTATE
Fresno
Mayfair
THREE PALMS MHP
WATERTEK-METROPOLITAN
DOYAL'S MOBILE HOME PARK
Mendota
BAR 20 PARTNER
Kerman
DOUBLE L MOBILE RANCH PARK
Sunnyside
RIVERBEND MOBILE HOME & RV PARK
Minkler
West Park
Calwa
SUNNYSIDE CONVALESCENT HOSP
Sanger
KINGS PARK APARTMENTS
COIT GINNING COMPANY
PILIBOS BROTHERS RANCH
ELM COURT
Malaga
MALAGA
Easton
SHADY LAKES MHP
Del Rey
Tranquillity
Fowler
Orange Cove
San Joaquin
FRED RAU DAIRY
Raisin City
RAISIN CITY
Bowles
TRACT 1199 WATER SYSTEM
Parlier
Reedley
GEORGE COX WATER SYSTEM
RUBYS VALLEY CARE HOME
Selma
SUMNER PECK RANCH
Caruthers
CARUTHERS
Dinuba
Sultana
Orosi
East Orosi
Cutler
VIKING TAILER PARK
Kingsburg
Delft Colony
HOULDING FARMS
Three Rocks
Cantua Creek
Monson
Yettem
Seville
London
SAN ANDREAS FARMS
STEVE MARKS CATTLE COMPANY
ZONNEVELD DAIRY
Traver
LINDA VISTA FARMS
Lanare
LANARE
Riverdale
RIVERDALE
Laton
BRITZ/COLUSA
BRITZ/FIVE POINTS SYSTEM
Hardwick
Patterson Tract
Ivanhoe
FIVE STAR RANCH
FARMING D
Grangeville
West Goshen
Goshen
Visalia
HARRIS FARMS CAMP C #501-523
Hanford
Armona
Linnell Camp
TERRA LINDA FARMS
Home Garden
HARRIS FARMS SOUTH #101-144
Lemoore
Lemoore Station
PAPPAS & CO (FARM HOUSING)
Huron
Tulare
East Tulare Villa
Stratford
Matheny
Coalinga
SOMMERVILLE RV PARK
Waukena
Corcoran
Avenal
Woodville

FRESNO COUNTY
KINGS COUNTY
TULARE COUNTY

Sources: USGS, ESRI, TANA, AND

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Tulare Lake Basin Disadvantaged Community Water Study

KERN COUNTY Communities

DAC and SDAC Communities
With A Single Active Water Source
Or *Water Quality Issues

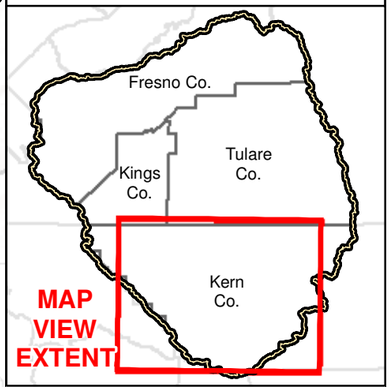
Legend

- Tulare Lake Basin
- County
- *Source Exceeded MCL for either Arsenic, Uranium, Nitrate or Half Nitrate (2008-10)
- 1 Active Water Source Identified
- City
- Community (Non-Incorporated)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 21

*Source exceeded MCL in one or more samples collected from 2008-2010. Source status is AU (Active Untreated), CU (Combined Untreated), AT (Active Treated), or CT (Combined Treated). Considered as delivered water.

DRAFT



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Fresno, CA 93711-6162
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KINGS COUNTY
TULARE COUNTY
KERN COUNTY
Rodriguez Camp
Richgrove
Idlewild
Panorama Heights
Posey
AGBAYANI VILLAGE
Delano
POND
McFarland
GLENNVILLE
Kernville
SIERRA MEADOWS
Wofford Heights
SOUTH FORK WOMANS CLUB, INC.
Mountain Mesa
BELLA VISTA
Weldon
PARADISE COVE LODGE
KERNVALE
Lake Isabella
LAKEVIEW RANCHOS
CLARK STREET COMMUNITY WELL
CANYON MEADOWS
Bodfish
Lost Hills
LOST HILLS
Wasco
POPLAR AVE COMMUNITY
Smith Corner
Cherokee Strip
Shafter
OILDALE
Oildale
ROUND MOUNTAIN
EAST NILES
Buttonwillow
MIRASOL COMPANY WATER SYSTEM
Rosedale
Greenacres
Bakersfield
VICTORY MWC
V.R. S TRAILER PARK
DE RANCHO Y MOBILE VILLA WATER
WINI MUTUAL WATER COMPANY
Fuller Acres
McKittrick
Tupman
PANAMA ROAD PROPERTY OWNERS ASSOCIATION
Greenfield
Lamont
VALLEY VIEW ESTATES
Derby Acres
Weedpatch
Edmundson Acres
Dustin Acres
Valley Acres
Arvin
ARVIN
Bear Valley Springs
Golden Hills
Tehachapi
Fellows
Ford City
South Taft
Taft
Stallion Springs
OPAL FRY AND SON
METTLER
Mettler
Maricopa
Pine Mountain Club
Lake of the Woods
LAKE OF THE WOODS
Frazier Park
LEBEC
Lebec
Sources: USGS, ESRI, TANA, AND

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5 POTENTIAL ALTERNATIVES FOR NEW SOURCE DEVELOPMENT

Disadvantaged communities may have the option to investigate several different alternatives regarding new source development. The alternatives may include:

- Physical Consolidation,
- Exchanges/contracting for surface water,
- Recharge of Local Area,
- Regional Facility,
- New Water Supply Well,
- Water Treatment Facility (existing or new well),
- Conservation, and
- Restrict Potable Water Deliveries from Agricultural or Large Turf Irrigation
- Mitigate a source of contamination such as on-site systems

This chapter and subsequent chapters in this report include guidance regarding the issues to be considered for the various alternatives. Draft flowcharts, or "decision trees" are included that may serve to assist disadvantaged communities consider viable alternatives to solve the unique challenges they may face.

The other Pilot Studies and the alternatives identified therein will overlap with the alternatives identified below. For example, Physical Consolidation of water systems may be evaluated in parallel with Management or Non Infrastructure alternatives. Similarly, water quality issues that may require treatment would overlap with the Technical Solutions Pilot Study. Considerations of water quality, such as nitrate, for communities without a community sanitary sewer system may overlap with alternatives presented in the Individual Household Pilot Study.

5.1 Physical Consolidation

Physical consolidation of a water system to a neighboring water system may be a viable alternative to address water supply or water quality concerns. Physical consolidation involves connection of distribution pipelines or water service pipelines between the two systems. Typically, the system with water supply or water quality problems benefits from connection to the system that has sufficient capacity or water quality that satisfies regulatory requirements. Physical consolidation of a private system to a publicly owned community system (such as the Lacey Courts Mobile Home Park) may be accomplished with the extension of a water service to the property. The private well would be required to be destroyed and the property would typically be required to annex to the publicly owned community system.

Physical consolidation of a small community water system to a larger community water system may require the complete reconstruction of the smaller system distribution system to satisfy current distribution system standards. Physical consolidation typically results in the dissolution of the ownership or management of the smaller system. The

requirements associated with operation and maintenance of the water system is retained by the larger community system.

Considerations for an evaluation include:

- Distance between water systems
    - Physical consolidation of water systems may be limited by the capital costs associated with constructing the physical facilities (pipelines, storage, pumping) that may be required to accomplish the consolidation. The capital cost associated with consolidation may exceed the costs associated with improving the individual system to satisfy water supply and water quality requirements.

- Viable route for connecting infrastructure
    - Physical consolidation may be limited by geographical or property constraints. Water systems may be within proximity, however may be separated by a river, private property, political bodies (ie. County boundaries), or other challenges that may impact a viable route to connect the systems.

- Capital cost of improvements
    - Capital cost of improvements is a key consideration of many infrastructure projects. Cost effectiveness is a key consideration for any funding agency or private entity that would provide the capital to construct the improvements.

- Water Supply and redundancy of water supply
    - Physical consolidation must provide satisfactory water supply and water quality for the DAC. Typically, a larger system will have sufficient redundancy of water supply sources and a means to fund and maintain necessary treatment facilities.

- Condition of existing infrastructure
    - Physical consolidation to a larger water system may include the requirement that the distribution system of the smaller system be upgraded or replaced to meet current standards. For example, if the water distribution system of a smaller system is characterized by small, leaking water mains, the distribution system may need to be replaced to the standards of the larger system to ensure that all customers of the final water system have a consistent level of service.

- Monthly water service charges
    - Water service charges are a key financial consideration. Customers of the system that would be consolidated into the larger system would be required to pay the same water service charges as all other customers of the larger system. It is possible that the DAC system has not updated water service charges to the level necessary to meet current requirements

for a system to meet the present regulatory requirements. A review of the current and necessary modifications to water service charges would be required in any evaluation.

- Politics – willingness of both entities to allow the consolidation
    - Physical consolidation requires the agreement of both parties to the action. Each entity may have reasons to support the consolidation. Similarly, each entity may have concerns regarding the consolidation.

- Water quality of each community water system
    - The typical scenario for physical consolidation is that the larger system has a water quality that satisfies current regulatory requirements. If the water quality of the larger system does not meet requirements, the additional improvements necessary for water quality upgrades, and the shared responsibility for costs associated with those upgrades would be a consideration for both water systems.

- Governance structure and representation considerations
    - Governance structure and representation may be a significant concern of the DAC, as physical consolidation to a larger system may require the dissolution of the current governance structure of the DAC.

- Regulatory Compliance
    - Any improvements, expansions, or modifications to community water systems require conformance with the appropriate regulatory requirements. Consideration of any alternatives must include consultation and coordination with the appropriate regulatory agencies (ie. CDPH, RWQCB, County Environmental Health Departments, etc.).

Examples of community water systems that have physically consolidated, or are preparing for physical consolidation, are identified in the Demonstration Projects chapter of this report.

5.2 Exchanges/contracting for surface water

There may be opportunities for a community to contract for the delivery of a surface water supply from another entity. The surface supply will require water treatment and may have limitations regarding the reliability of the supply. Table 16 identifies existing DACs that receive a surface water supply. It is noted that the Westlands Water District provides water to many DACs, as shown in Exhibit 22.

Considerations for an evaluation include:

- Availability of a defined surface water supply
    - Surface water supplies must be purchased. A key consideration is the availability of surface water for sale.

- Reliability of the defined surface water supply
    - In addition to the issue of availability of a surface water supply for sale, surface water sources have limitations regarding the reliability of the surface water supply to be available for delivery. The subject of surface water reliability is one that is complicated and dependent upon each individual surface water source. The specifics of each unique source would require consideration and is beyond the scope of this report.

- Cost of the defined surface water supply
    - As with any commodity, the cost of a surface water supply is defined by the owner of the supply and the marketplace. The cost of a surface water supply should be reviewed in comparison to other alternatives.

- Surface water quality and associated water treatment requirements
    - As with groundwater, surface water quality is variable and would require specific water treatment considerations to perform and evaluation of the alternative. Water treatment facilities would be constructed and operated in conjunction with water storage and pumping facilities because treatment facility operations do not coincide with water demand cycles of the community. Treatment considerations would overlap to the Technical Solutions pilot study.

- Distance and viable route between water system and source
    - The distance between the surface water supply and the water system would be a factor to consider and will impact the capital cost of conveyance facilities. Conveyance facilities may also have certain losses of water supply associated with them, which need to be considered.

- Capital cost of improvements
    - Capital cost of improvements is a key consideration of many infrastructure projects. Cost effectiveness is a key consideration for any funding agency or private entity that would provide the capital to construct the improvements.

- Redundancy of water supply
    - Surface water supplies may not be available during all years or seasons, depending upon the source. The DAC should include the consideration of redundancy of water supply during the evaluation.

- Monthly water service charges (Operation and Maintenance)
    - Water service charges are a key financial consideration. Customers of the system that would be purchasing, conveying, treating, storing, pumping, and distributing a surface water supply would be required to be able to pay the water service charges necessary to support those activities. It is possible that the DAC system has not updated water service charges to the level necessary to meet current requirements for a system to meet the

present regulatory requirements. A review of the current and necessary modifications to water service charges would be required in any evaluation.

- Politics – willingness of both entities to enter into an agreement
    - Purchase of a water supply source requires the agreement of both parties to the action. Each entity may have reasons to support the consolidation. Similarly, each entity may have concerns regarding the consolidation.

- Regulatory Compliance
    - Any improvements, expansions, or modifications to community water systems require conformance with the appropriate regulatory requirements. Consideration of any alternatives must include consultation and coordination with the appropriate regulatory agencies (ie. CDPH, RWQCB, County Environmental Health Departments, etc.).

5.3 Recharge of Local Area

There may be opportunities for a community to contract for the delivery of a surface water supply from another entity for the purposes of recharging the groundwater of an area in need of supplemental water to mitigate declining groundwater levels.

As described previously, the entire Tulare Lake Basin Study Area is subject to declining groundwater levels. It is noted that there may be recharge sites that are not shown in the exhibits as there is not a comprehensive list of every site in the basin. However, the fact is that there exist recharge sites throughout the basin area. Further, the rivers, canals, and streams that exist in the Tulare Lake Basin serve as recharge facilities when they convey water. Exhibits 23 through 26 provide the location of many recharge sites.

Considerations for an evaluation include:

- Defined correlation between recharge and resulting impact to available potable water sources
    - An evaluation of the local geology and hydrogeology would be required to determine if there would be a quantifiable beneficial impact to recharge near a community water system. The evaluation would also need to identify potential environmental considerations that would result from such and activity.

- Availability of a defined surface water supply
    - Surface water supplies must be purchased. A key consideration is the availability of surface water for sale.

- Reliability of the defined surface water supply
    - In addition to the issue of availability of a surface water supply for sale, surface water sources have limitations regarding the reliability of the

surface water supply to be available for delivery. The subject of surface water reliability is one that is complicated and dependent upon each individual surface water source. The specifics of each unique source would require consideration and is beyond the scope of this report.

- Cost of the defined surface water supply
  - As with any commodity, the cost of a surface water supply is defined by the owner of the supply and the marketplace. The cost of a surface water supply should be reviewed in comparison to other alternatives.

- Availability of a recharge site
  - In addition to purchasing water to deliver for recharge, the recharge site must be available either through purchase or other contractual agreement with the owner of an existing recharge site.

- Surface water quality
  - As with groundwater, surface water quality is variable and may have impacts to the groundwater quality.

- Distance and viable route between water system and source
  - The distance between the surface water supply and the water system would be a factor to consider and will impact the capital cost of conveyance facilities. Conveyance facilities may also have certain losses of water supply associated with them, which need to be considered.

- Capital cost of improvements
  - Capital cost of improvements is a key consideration of many infrastructure projects. Cost effectiveness is a key consideration for any funding agency or private entity that would provide the capital to construct the improvements.

- Condition of existing delivery or basin infrastructure
  - The necessary conveyance and basin infrastructure, if existing. Would need to be evaluated to determine the potential to receive the additional water.

- Potential adverse impacts to neighboring properties
  - Groundwater recharge may have impacts to surrounding properties. Depending on the geology review and hydrogeologic analysis, the impact of recharge would be unknown. The use of the surrounding properties is important in the evaluation of positive or adverse impacts.

- Potential of developing a regional entity to coordinate acquisition and delivery of surface water for recharge purposes
  - A regional entity to coordinate acquisition and delivery of surface water would be a significant endeavor. The viability of several of the

considerations listed above (availability of supply, cost of conveyance, location of recharge site, potential benefit to the DAC water systems) would require study prior to creation of a regional entity. A review of political and environmental impacts would be significant in the evaluation of such an effort. A regional entity would likely extend beyond the considerations of individual DACs.

- Regulatory Compliance
    - Any improvements, expansions, or modifications to community water systems require conformance with the appropriate regulatory requirements. Consideration of any alternatives must include consultation and coordination with the appropriate regulatory agencies (ie. CDPH, RWQCB, County Environmental Health Departments, etc.).

5.4 Regional Facility (Water or Wastewater)

There may be opportunities for communities to combine resources and create a regional system for water supply. This alternative is similar to consolidation, however, it is likely that a new political entity would be created to own, operate, and maintain the regional facility.

An example of a regional system is the Selma Kingsburg Fowler County Sanitation District. This system is directed toward sanitary sewer collection, treatment, and disposal.

Considerations for an evaluation of a regional system include:

- Availability of water supply
    - A defined water supply source would be required as the potential of a regional system may be evaluated.

- Water quality
    - The water quality of the supply would require definition so that the associated treatment improvements may be defined.

- Water or wastewater treatment requirements
    - The quality of the water (or wastewater) to be treated may present several treatment alternatives. The Technical Solutions Pilot Study would overlap into this consideration.

- Type of new political body
    - A regional system would require the formation of a new political body that would own and operate the system. The interaction of the new political body with existing communities and political entities would need to be defined.

- Viable route for connecting infrastructure

- A regional facility would require connection to the individual communities or systems served. The location of the routes necessary to provide the associated services would need to be defined.

- Capital cost of improvements
  - Upon the definition of the regional system and connecting infrastructure, the analysis of capital cost as relating to benefits provided would be reviewed, in conjunction with the review of other alternatives, so that the appropriate cost effective alternative may be defined.

- Monthly water service charges (Operation and Maintenance)
  - Water service charges are a key financial consideration. Customers of the system that would be purchasing, conveying, treating, storing, pumping, and distributing the water supply would be required to be able to pay the water service charges necessary to support those activities. It is possible that the DAC system has not updated water service charges to the level necessary to meet current requirements for a system to meet the present regulatory requirements. A review of the current and necessary modifications to water service charges would be required in any evaluation.

Politics – willingness of both entities to enter into an agreement
  - Participation in a regional facility requires the agreement of all parties to the action. Each entity may have reasons to support the regional facility. Similarly, entities may have concerns regarding the regional facility.

- Regulatory Compliance
  - Any improvements, expansions, or modifications to community water systems require conformance with the appropriate regulatory requirements. Consideration of any alternatives must include consultation and coordination with the appropriate regulatory agencies (ie. CDPH, RWQCB, County Environmental Health Departments, etc.).

5.5 New Water Supply Well

There may be opportunities for communities to construct a new water supply well that could provide the quantity and quality required. A new water supply well could however require treatment. It is noted that Exhibits 10 through 13 identify raw water quality from water supply wells where water quality objectives for constituents such as arsenic, nitrate, and uranium are exceeded.

Examples of new water supply wells are identified in the Demonstration Projects portion of this report.

Considerations for an evaluation include:

- Availability of water supply
    - Groundwater levels in the Tulare Lake Basin continue to decline, thereby requiring wells to be deeper to obtain sufficient water.

- Raw Water quality
    - Raw groundwater quality is variable throughout the Tulare Lake Basin and is subject to change as groundwater levels fluctuate. Local geology and hydrogeology are critical to the evaluation of groundwater quality in any specific location. In addition, there may be emerging constituents of concern that are not presently subject to regulatory limitations.

- Identification of a Well Site(s)
    - Each specific location in the Tulare Lake Basin may require a specific hydrogeological evaluation to determine viable well site locations to optimize water supply and minimize water quality concerns. The alternative physical locations of potential wells may require acquisition of property and significant transmission facilities to deliver the water to the water system.

- Impact to or by existing wells in the vicinity
    - Siting of any new well requires the consideration of impacts to or impacts from existing wells in the vicinity.

- Water treatment requirements
    - Groundwater quality is variable and would require specific water treatment considerations to perform and evaluation of the alternative. Water treatment facilities would be constructed and operated in conjunction with water storage and pumping facilities because treatment facility operations do not coincide with water demand cycles of the community. Treatment considerations would overlap to the Technical Solutions pilot study.

- Capital cost of improvements
    - Capital cost of improvements is a key consideration of many infrastructure projects. Cost effectiveness is a key consideration for any funding agency or private entity that would provide the capital to construct the improvements.

- Monthly water service charges (Operation and Maintenance)
    - Water service charges are a key financial consideration. Customers of the system that would be purchasing, conveying, treating, storing, pumping, and distributing a new well would be required to be able to pay the water service charges necessary to support those activities. It is possible that the DAC system has not updated water service charges to the level necessary to meet current requirements for a system to meet the present regulatory requirements. A review of the current and necessary

modifications to water service charges would be required in any evaluation.

- Politics – willingness of entities to enter into an agreement
    - Construction of a new well may impact neighboring communities or entities. Identification of impacted parties is necessary to determine if agreements or other considerations are necessary.

- Regulatory Compliance
    - Any improvements, expansions, or modifications to community water systems require conformance with the appropriate regulatory requirements. Consideration of any alternatives must include consultation and coordination with the appropriate regulatory agencies (ie. CDPH, RWQCB, County Environmental Health Departments, etc.).

5.6 Water Treatment Facility on an Existing Water Supply Well

There may be opportunities for communities to construct a new water treatment facility to treat the water from an existing well. Treatment may also be performed by blending water from two different sources prior to distribution so that the final water meets regulatory requirements. It is noted that Exhibits 10 through 13 identify raw water quality from water supply wells where water quality objectives for constituents such as arsenic, nitrate, and uranium are exceeded.

Considerations for an evaluation include:

- Availability of water supply
    - Groundwater levels in the Tulare Lake Basin continue to decline, thereby requiring wells to be deeper to obtain sufficient water. The physical definition of the existing well as relating to groundwater levels would be evaluated to determine if water supply would be sustainable from the existing well.

- Raw Water quality
    - Raw groundwater quality is variable throughout the Tulare Lake Basin and is subject to change as groundwater levels fluctuate. Local geology and hydrogeology are critical to the evaluation of groundwater quality in any specific location. In addition, there may be emerging constituents of concern that are not presently subject to regulatory limitations.

- Water treatment requirements
    - Groundwater quality is variable and would require specific water treatment considerations to perform and evaluation of the alternative. Water treatment facilities would be constructed and operated in conjunction with water storage and pumping facilities because treatment facility operations do not coincide with water demand cycles of the community. Treatment facilities will have waste streams that would require proper handling.

Treatment considerations would overlap to the Technical Solutions pilot study.

- Age of the existing well and condition of existing well casing
    - The age and condition of the existing well would be a consideration in any evaluation of constructing treatment facilities for an existing well. If the age and condition of the existing well would not be expected to support the continued operation of a water treatment facility for the life cycle of the treatment facilities then the viability of the alternative may be in question.

- Capital cost of improvements
    - Capital cost of improvements is a key consideration of many infrastructure projects. Cost effectiveness is a key consideration for any funding agency or private entity that would provide the capital to construct the improvements.

- Monthly water service charges (Operation and Maintenance)
    - Water service charges are a key financial consideration. Customers of the system that would be purchasing, conveying, treating, storing, pumping, and distributing a new well would be required to be able to pay the water service charges necessary to support those activities. It is possible that the DAC system has not updated water service charges to the level necessary to meet current requirements for a system to meet the present regulatory requirements. A review of the current and necessary modifications to water service charges would be required in any evaluation.

- Politics – willingness of entities to enter into an agreement
    - Construction of a new treatment facility may impact neighboring communities or entities. Identification of impacted parties is necessary to determine if agreements or other considerations are necessary. There may be an overlap with Management Non-Infrastructure Pilot Study issues associated with an agreement between entities to share in costs associated with operation of treatment facilities.

- Regulatory Compliance
    - Any improvements, expansions, or modifications to community water systems require conformance with the appropriate regulatory requirements. Consideration of any alternatives must include consultation and coordination with the appropriate regulatory agencies (ie. CDPH, RWQCB, County Environmental Health Departments, etc.).

5.7 Conservation

There may be opportunities for communities to implement water conservation measures including the installation of water meters and implement the associated metered water rate schedule for all connections. Other water conservation measures could include

requiring low flow appliances within residences. Water conservation, as encouraged through water meters, rate schedule, and encouragement of other water conservation measures may result in water savings for a community. Each community is unique, however, a water savings of up to 20 percent is not unreasonable.

Considerations for an evaluation include:

- Availability of water supply
    - Conservation of water may essentially result in an increase of available water supply for the community. The increase of available water supply may be necessary to satisfy peak demands, redundancy of supply sources, or growth of the community.

- Access to water service lines where customer meters would be located
    - Construction of water meters is a common conservation alternative. The location of meters is typically required to be within public right of way or a public utility easement so that the system operator can read and maintain the meter. The location of existing water service lines is a critical issue in determining the viability of installing water meters. There have been instances where a water meter project requires the construction of new water mains and services in locations that are accessible to the water system entity.

- Public's willingness to implement voluntary conservation measures
    - Besides water meters, there are other conservation measures that may be implemented, such as low flow appliances and limitations to landscape irrigation. The willingness of the local residents to implement these voluntary measures may impact water conservation results.

- Establishment of an appropriate water rate schedule
    - A specific impact to the installation of water meters in a community is the establishment of a water rate schedule based on the amount of water used. Each community is unique and would require a unique rate schedule. The anticipated impact of the anticipated rate schedule compared to the existing rate schedule in the community would require evaluation.

- Capital cost of water conservation measures
    - The cost of any improvement project should be evaluated with respect to the relative benefits derived from it. The evaluation of the anticipated benefits for a water meter project would be a consideration prior to implementation.

- Politics
    - Residents of individual communities may have specific points of view regarding water meters as a means to measure and charge for water used

by each property. There would be a need to identify the individual community concerns regarding water meters prior to implementation of a project.

- Regulatory Compliance
  - Any improvements, expansions, or modifications to community water systems require conformance with the appropriate regulatory requirements. Consideration of any alternatives must include consultation and coordination with the appropriate regulatory agencies (ie. CDPH, RWQCB, County Environmental Health Departments, etc.).

5.8 Restrict potable water deliveries from agricultural or large turf irrigation

There may be opportunities for communities to encourage or require the restriction of potable water supply and delivery to non potable uses. Examples may be turf irrigation of schools or parks, or agricultural irrigation. If potable water use is to be separated from non-potable water use in a property, there must be a means to measure the relative use of each water source on that property.

Communities such as Armona CSD and Pixley PUD have schools within their boundaries that have installed shallow groundwater wells for the purpose of landscape irrigation. The heavy summer demands of large landscape areas may be significant for communities within the study area.

Considerations for an evaluation include:

- Availability of water supply
  - Conservation of potable water may essentially result in an increase of available water supply for the community. The increase of available water supply may be necessary to satisfy peak demands, redundancy of supply sources, or growth of the community.

- Dual Pipe Distribution System
  - If a water system has sufficient water supply to satisfy the requirements of the community, and may be able to limit the size of the treatment, storage, and pumping systems associated with the potable water demands, an alternative may include the installation of a dual pipe distribution system to allow for potable and non-potable water distribution. The costs of construction, operation, and maintenance would be critical in the evaluation of the alternative for any given community.

- Cross Connection control
  - Allowing potable and non-potable water use on the same property requires the implementation of cross connection control to ensure protection of the potable water system.

- Establishment of an appropriate water rate schedule
    - A specific impact to the installation of water meters in a community is the establishment of a water rate schedule based on the amount of water used. Each community is unique and would require a unique rate schedule. The anticipated impact of the anticipated rate schedule compared to the existing rate schedule in the community would require evaluation.

- Capital cost of improvements
    - The cost of any improvement project should be evaluated with respect to the relative benefits derived from it. The evaluation of the anticipated benefits for a potable water use limitation project would be a consideration prior to implementation.

- Politics
    - Residents of individual communities may have specific points of view regarding water meters as a means to measure and charge for water used by each property. There would be a need to identify the individual community concerns regarding a dual water system prior to implementation of a project.

- Regulatory Compliance
    - Any improvements, expansions, or modifications to community water systems require conformance with the appropriate regulatory requirements. Consideration of any alternatives must include consultation and coordination with the appropriate regulatory agencies (ie. CDPH, RWQCB, County Environmental Health Departments, etc.).

5.9 Mitigate a Source of Contamination such as On-Site Systems

There may be opportunities for communities to encourage or require the mitigation of sanitary sewer treatment and disposal systems that may have an adverse impact on source water quality. For example, Table 9 includes several demonstration projects that have the circumstance of elevated nitrate concentration in the water supply where the sanitary sewer methods utilized consist of on-site septic tanks and leach fields. The on-site systems may be the source of the elevated nitrate concentrations.

Considerations for an evaluation include:

- Hydrogeology
    - Confirmation of whether the on-site systems have a direct impact to potable water quality.

- Viability of a Community Sanitary Sewer System
    - If a community sanitary sewer system may be constructed the improved effluent quality and location of disposal may mitigate the influence on

water quality. Similarly, improvements to the on-site systems may result in mitigation of nitrate contributions to groundwater.

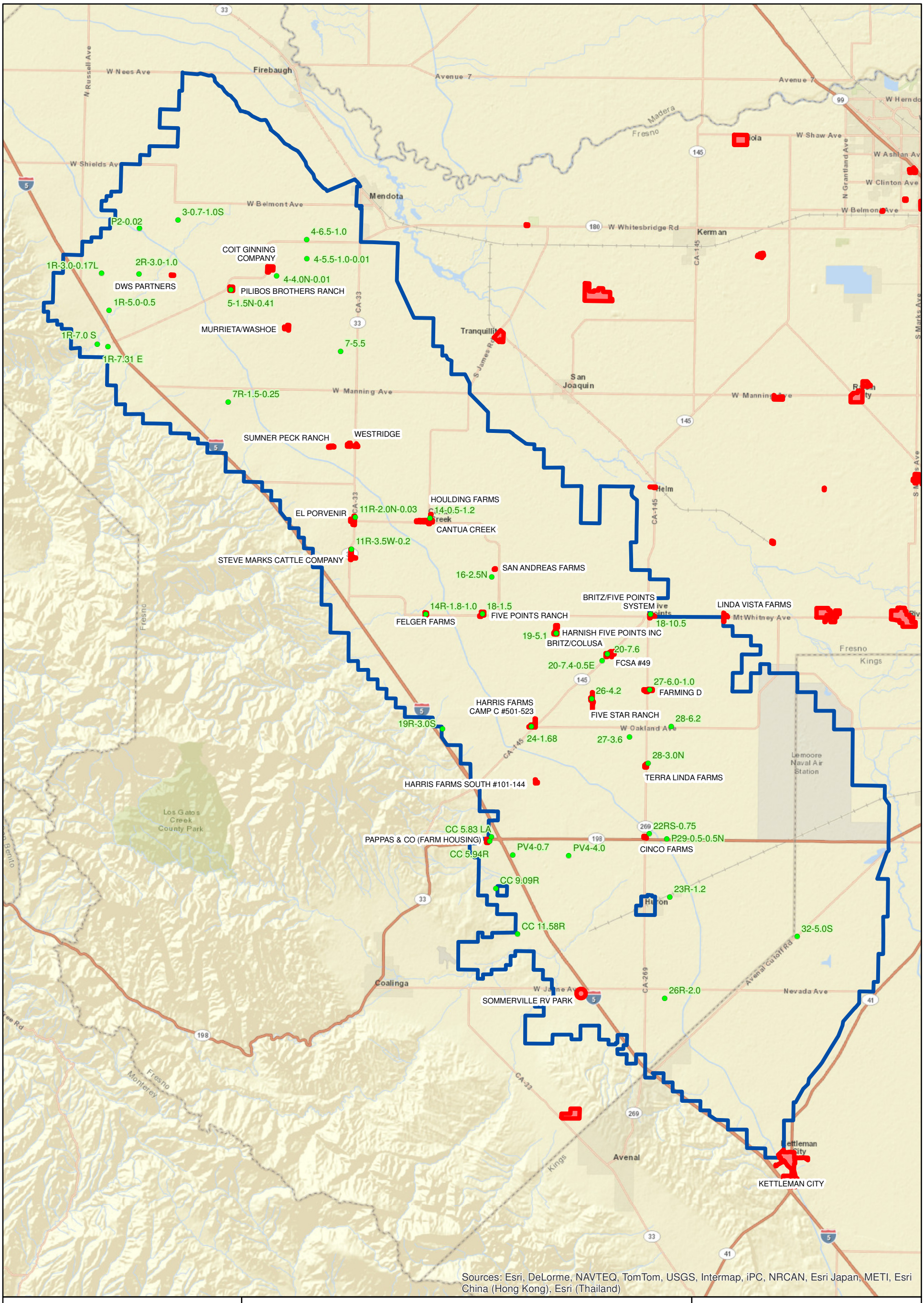
- Establishment of a Community Sewer System Management Entity
  - A community sanitary sewer system must be managed and owned by an entity. The entity may be a community services district, county service area, or other entity.

- Establishment of an appropriate sewer rate schedule
  - A specific impact to the installation of community sanitary sewer system in a community is the establishment of a sewer rate schedule. Each community is unique and would require a unique rate schedule. The anticipated impact of the anticipated rate schedule compared to the existing costs in the community would require evaluation.

- Capital cost of improvements
  - The cost of any improvement project should be evaluated with respect to the relative benefits derived from it. The evaluation of the anticipated benefits for a community sanitary sewer system project would be a consideration prior to implementation.

- Politics
  - Residents of individual communities may have specific points of view regarding community sanitary sewer systems and the requirements of individual property owners to conform to the requirements of the community system. There would be a need to identify the individual community concerns prior to implementation of a project.

- Regulatory Compliance
  - Establishment or improvements to community sanitary sewer systems require conformance with the appropriate regulatory requirements. Consideration of any alternatives must include consultation and coordination with the appropriate regulatory agencies (ie. CDPH, RWQCB, County Environmental Health Departments, etc.).



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Fresno, CA 93711-6162
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Legend

- Delivery (M & I)
- Community
- Westlands WD

Exhibit 22

Tulare Lake Basin Disadvantaged Community Water Study

Location of DACs served by Westlands Water District

Tulare Lake Basin Disadvantaged Community Water Study

TULARE COUNTY Communities

DAC and SDAC Communities
Water Districts and Recharge Projects

Legend

- Recharge Site
- Tulare Lake Basin
- County
- City
- Community (Non-Incorporated)

DAC or SDAC Community

- Groundwater (or Unknown) Source
- Surface Water Source
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 23

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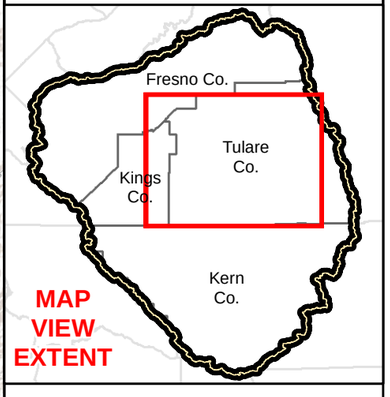

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Sources: USGS, ESRI, TANA, AND

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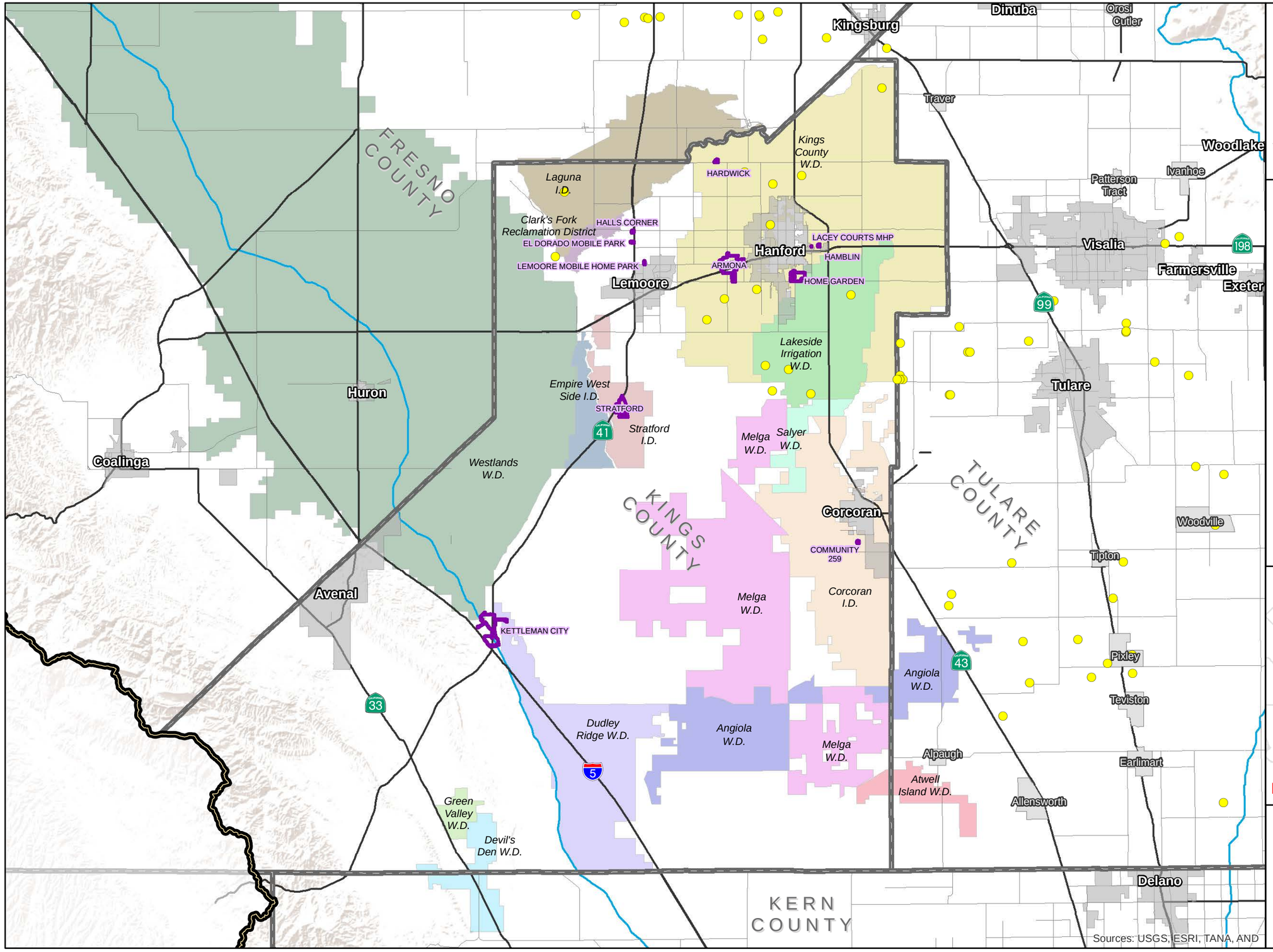
Tulare Lake Basin Disadvantaged Community Water Study

KINGS COUNTY Communities

DAC and SDAC Communities
Water Districts and Recharge Projects



Legend

- Recharge Site
- Tulare Lake Basin
- County
- City
- Community (Non-Incorporated)
- DAC or SDAC Community (Groundwater or Unknown Source)
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 24

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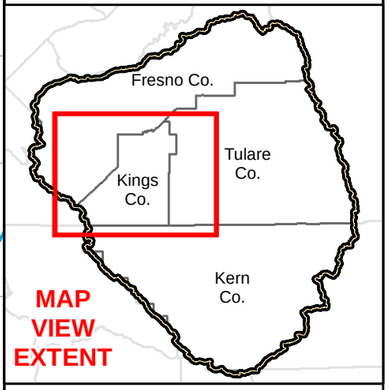

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Tulare Lake Basin Disadvantaged Community Water Study

FRESNO COUNTY Communities

DAC and SDAC Communities
Water Districts and Recharge Projects

Legend

- Recharge Site
- Tulare Lake Basin
- County
- City
- Community (Non-Incorporated)

DAC or SDAC Community

- Groundwater (or Unknown) Source
- Surface Water Source
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 25

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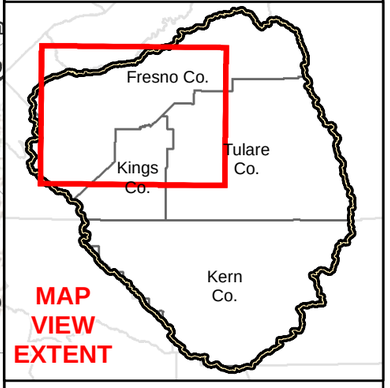

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Sources: USGS, ESRI, TANA, AND

Tulare Lake Basin Disadvantaged Community Water Study

KERN COUNTY Communities

DAC and SDAC Communities
Water Districts and Recharge Projects

KINGS CO. | TULARE CO. | KERN COUNTY

Legend

- Recharge Site
- Tulare Lake Basin
- County
- City
- Community (Non-Incorporated)

DAC or SDAC Community

- Groundwater (or Unknown) Source
- Groundwater and Surface Water Source
- Major Road
- Highway / Interstate
- Major Canal

Exhibit 26

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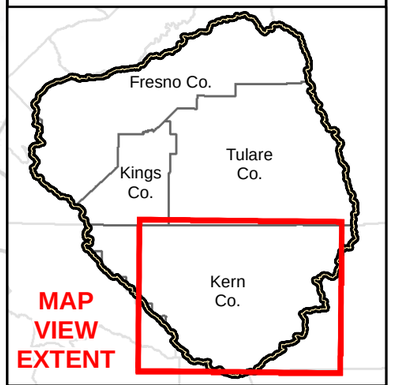

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Sources: USGS, ESRI, TANA, AND

6 DEMONSTRATION PROJECTS

Many disadvantaged communities within the Tulare Lake Basin have taken steps toward addressing water supply challenges. For the purposes of this report, the projects initiated or completed by the communities are defined as demonstration projects. A brief description of several demonstration projects is provided in this section of the report. The information may offer insight to other communities facing similar challenges. It is recognized that each community is unique and will have a unique pathway toward resolving water supply issues. The types of problems faced and the chosen solution are broken down into 3 categories – Physical Consolidation (Quality or Supply), New well (Quality or supply), and Other (treatment or consolidation and new well). A reiteration of the process each of the Demonstration Projects went through is not included in this report. The purpose of this report is to provide examples of real communities within the Tulare Lake Basin that have either successfully met the challenges of water supply or water quality issues, or communities that are in the process of meeting those challenges. Limited information regarding each example is provided to be able to identify key issues that may be common to other communities. In many cases, the individual communities prepared applications for funding assistance that include detailed information. This report limits the information regarding each community in an effort to not compromise any confidential information. The communities are identified so that if representatives of a DAC identifies some common themes with one of the Demonstration Projects, they may contact the identified community for additional information or advice.

It is noted that the Operations and Maintenance costs identified in the examples below are based on monthly user charges for the overall system for the community.

For the purposes of this report, the population for schools is assumed to be undefined due to too many variables that would contribute to the equivalent population. Schools have a student and faculty population for a portion of the weekdays, however, there are variables associated with cafeteria facilities, gymnasium facilities, landscape irrigation, vehicle maintenance facilities, or other.

In addition to the communities listed in this chapter, the Report to Legislature (Appendix F) includes a listing of many projects that were anticipated to receive funding assistance through Proposition 84 to address water supply and quality deficiencies.

For the purposes of this report, the annual operation and maintenance costs for the system are assumed to be the annualized monthly user charges.

6.1 Quality or Supply Problem: Solution – Physical Consolidation

6.1.1 Four Seasons Mobile Home Park

- Problem (quantity, quality)
  - Quantity (single well)
  - Arsenic exceeds the Federal limit of 10 ppb
- Number of Connections – 86
- Approximate Population – 129 (Assume 1.5 people per connection)
- Ownership – Private
- Alternatives considered
  - Abandonment of the Mobile Home Park
  - Treatment and storage for existing well
  - Construction of new water supply wells that may include treatment and storage
  - Consolidation with the City of Hanford
- Solution
  - Annex to the City of Hanford
  - Extend City of Hanford Water Main to property
  - Destroy existing well
- Location
  - Approximately ¼ mile west of the City of Hanford
- Decision Making Process
  - Owner of Mobile Home Park
  - City of Hanford
- Funding Source(s)
  - Proposition 84 (Feasibility Study Grant)
  - Proposition 84 (Construction Grant pending)
- Approximate Capital Cost (application, design, capital facilities) - approx $252,000 (Total project $4,852,000)
- Approximate Capital Cost per connection (population) – $2,930 ($1,954)
- Approximate Annual O&M Cost per connection - $262.66
- Challenges
  - Funding to construct improvements
  - Payment of debt service for potential loan(s)
  - Required improvements to the City of Hanford water system to allow the consolidation
  - Required the approval of the City of Hanford to allow the annexation
- Time Frame (identification of problem to completion of solution)
  - Initial Application (to SDWSRF) – January 2008
  - Feasibility Grant – July 2011(combined with three others)
  - Construction Grant - pending

6.1.2 Lacey Courts Mobile Home Park

- Problem (quantity, quality)

    - Quantity (single well)
    - Arsenic exceeds 10 ppb
- Number of Connections – 21
- Approximate Population – 50
- Ownership - Private
- Alternatives Considered
    - Abandonment of the Mobile Home Park
    - Treatment and storage for existing well
    - Construction of new water supply wells that may include treatment and storage
    - Consolidation with the City of Hanford
- Solution
    - Annex to the City of Hanford
    - Destroy existing well
- Location
    - Lacey Courts Mobile Home Park is surrounded by the City of Hanford
- Decision Making Process
    - Owner of Mobile Home Park
- Funding Source(s)
    - Proposition 84 (Feasibility Study Grant)
    - Proposition 84 (Construction Grant pending)
- Approximate Capital Cost (application, design, capital facilities) approx $59,000 ($4,852,000 total project)
- Approximate Capital Cost per connection (population) – $2,810 ($1,180)
- Approximate Annual O&M Cost per connection - $262.66
- Challenges
    - Funding to construct improvements
    - Payment of debt service for potential loan(s)
    - Required improvements to the City of Hanford water system to allow the consolidation
    - Required approval of the City of Hanford to allow annexation
- Time Frame (identification of problem to completion of solution)
    - Initial Application – July 2009
    - Feasibility Grant – July 2011
    - Construction Grant - pending

6.1.3 Hamblin Mutual Water Company

- Problem (quantity, quality)
    - Quantity (single well)
    - Arsenic exceeds 10 ppb
- Number of Connections – 40
- Approximate Population – 240
- Ownership - Private
- Alternatives Considered
    - Treatment and storage for existing well

    - Construction of new water supply wells that may include treatment and storage
    - Consolidation with the City of Hanford
- Solution
    - Annex to the City of Hanford
    - Destroy existing well
    - Install new distribution system, services and meters
    - Dissolve Mutual Water Company
- Location
    - Immediately surrounded by the City of Hanford
- Decision Making Process
    - Mutual Water Company
    - County of Kings
    - City of Hanford
- Funding Source(s)
    - Proposition 84 (Feasibility Study Grant)
    - Proposition 84 (Construction Grant pending)
- Approximate Capital Cost (application, design, capital facilities) $357,000 ($4,852,000 total project)
- Approximate Capital Cost per connection (population) – $8,925 ($1,488)
- Approximate Annual O&M Cost per connection - $262.66
- Challenges
    - Lack of funds to pursue solutions (no reserves)
    - Age of existing system
    - Required improvements (including a new well) to the City of Hanford water system to allow the consolidation
    - Required the owners of the Mutual Water Company to agree to dissolve the Company
    - Funding to construct improvements
    - Payment of debt service for potential loan(s)
- Time Frame (identification of problem to completion of solution)
    - Initial Application – July 2009
    - Feasibility Grant – July 2011
    - Construction Grant - pending

6.1.4 Lone Oak Subdivision

- Problem (quantity, quality)
    - Quantity (single well)
    - Nitrate and uranium exceed Federal levels
    - Unmetered connections
- Number of Connections – 42
- Approximate Population – 70
- Ownership - Private
- Solution
    - Annex to the City of Tulare

    - Extend water main to subdivision
    - Install new metered water services
    - Destroy existing well
    - Dissolve Mutual Water Company
- Location
    - Adjacent to the City of Tulare
- Decision Making Process
    - Mutual Water Company
    - Tulare County Redevelopment Agency
    - City of Tulare
- Funding Source(s)
    - Community Development Block Grant
- Approximate Capital Cost (application, design, capital facilities) $65,051.38
- Approximate Capital Cost per connection (population) – $1,548 ($929)
- Approximate Annual O&M Cost per connection - $288
- Challenges
    - Maintaining water supply during construction
- Time Frame (identification of problem to completion of solution)
    - Initial Funding Application Approval - 1999
    - Design - 2000
    - Complete Construction - 2001

6.1.5 El Rancho Subdivision, Kings County (Curtis Water Company)

- Problem (quantity, quality)
    - Quantity (2 inadequate wells)
    - Arsenic and Uranium
- Number of Connections – 142
- Approximate Population – 568 (Assume 4 per connection)
- Ownership - Private
- Solution
    - Annex to the City of Hanford
    - Destroy existing well and remove water tanks
    - Construct new water mains in the frontage of the residences
    - Construct new water services and meters in the frontage of the residences (water services were previously in the rear of the residences)
- Location
    - Immediately surrounded by the City of Hanford
- Decision Making Process
    - Owner of Curtis Water Company passed away
    - County of Kings
    - City of Hanford
- Funding Source(s)
    - Drinking Water State Revolving Fund
- Approximate Capital Cost (application, design, capital facilities) $1,050,000.
- Approximate Capital Cost per connection (population) – $7,395 ($1,849)

- Approximate Annual O&M Cost per connection - $262.66
- Challenges
  - Lack of funds to pursue solutions (no reserves)
  - Age of existing system
- Time Frame (identification of problem to completion of solution)
  - Initiate Funding Application 2000
  - Complete Construction 2005

6.1.6 Matheny Tract (Pratt Mutual Water Company)

- Problem (quantity, quality)
  - Nitrate and Arsenic above Federal levels
- Number of Connections – 323
- Approximate Population – 1,200
- Ownership - Private
- Solution
  - Consolidation with the City of Tulare
  - Destruction of existing water supply wells
- Location
  - South of Tulare, West of Highway 99
- Decision Making Process
  - Feasibility Study identified consolidation as best option
  - Old cracked, leaking pipelines
  - Matheny Tract
  - City of Tulare
  - County of Tulare
- Funding Source(s)
  - Proposition 84
  - State Revolving Fund
- Cost (application, design, capital, operations)
  - $407,278 Preliminary Engineering Report
  - $5,078,250 Construction
- Approximate Capital Cost (application, design, capital facilities) $5,485,528
- Approximate Capital Cost per connection (population) – $16,983.06 ($4,571.27)
- Approximate Annual O&M Cost per connection - $309.60
- Challenges
  - Connecting to 323 services on private property
  - Insufficient funds to cover private property connections
- Time Frame (identification of problem to completion of solution)
  - Preliminary Engineering Report completed in December 2006
  - Application for Construction Funding submitted – pending Construction Grant 2013

6.1.7 Kit Carson School with City of Hanford

- Problem (quantity, quality)

    - Water significantly above Federal Arsenic level of 10 ppb
    - Deep water levels
- Number of Connections – 1
- Approximate Population – not applicable
- Ownership - Public
- Location
    - East of Hanford – 2 miles east
- Decision Making Process
    - Drill new 1,250 foot well, still has 30 ppb arsenic
    - Connect to City of Hanford water supply
- Funding Source(s)
    - Proposition 84 (Feasibility Study for pipeline)
    - Proposition 84 (Construction of new pipeline)
- Cost (application, design, capital, operations)
- Approximate Capital Cost (application, design, capital facilities)
    - $849,150 Drill New Well
    - $146,668 Feasibility for new Pipeline
    - $2,106,000 Construction of Pipeline
- Approximate Capital Cost per connection (population) – Not Applicable
- Approximate O&M Cost per connection – Not Applicable
- Challenges
    - Outside City of Hanford Limits, new City Council approval
- Time Frame (identification of problem to completion of solution)
    - New well drilled in 2008 – failed to solve the problem
    - Waiting on Construction Funding, possibly 2013

6.2 Quality or Supply Problem: Solution – New Well (might include treatment)

6.2.1 Pioneer School

- Problem (quantity, quality)
    - Quantity 400 gpm
    - Arsenic exceeds the Federal limit of 10 ppb
- Number of Connections – 1
- Approximate Population – Not Applicable
- Solution
    - Construct new well, storage tank, no treatment
- Location
    - 14th Avenue and Grangeville
- Decision Making Process
    - School needing new water source
    - Pioneer School
- Funding Source(s)
    - Proposition 84
    - Drinking Water State Revolving Fund

    - Proposition 50
    - American Recovery and Reinvestment Act of 2009
- Approximate Capital Cost (application, design, capital facilities) $1,600,000
- Approximate Capital Cost per connection (population) – Not Applicable
- Approximate Annual O&M Cost per connection – Not Applicable
- Challenges
    - Proper water bearing zone with arsenic levels below Federal limits
    - Drilled well to 1,300 feet, screened from 900 – 980 feet for arsenic levels below federal limits
    - Proposition 84 funding frozen from 2008 to 2011
- Time Frame (identification of problem to completion of solution)
    - Initial work began in 2006
    - Construction complete April 2012

6.2.2 Caruthers Community Services District

- Problem (quantity, quality)
    - Arsenic exceeds 10 ppb in three of four wells
- Number of Connections – 674
- Approximate Population – 2,103
- Solution
    - Drill new water supply well
    - Construct Water Storage Tank
    - Construct Water Treatment Plant
    - Construct Transmission Main from an existing well to the Water Treatment Plant
    - Destroy two (2) existing water supply wells
- Location
    - Rural Fresno County near Mountain View and Marks Avenues
    - Approximately 9 miles from Riverdale, 10 miles from Easton
- Decision Making Process
    - Caruthers CSD Board of Directors
- Funding Source(s)
    - Proposition 84 (Feasibility Grant)
    - Proposition 84 (Construction Grant pending)
- Cost (application, design, capital, operations)
- Approximate Capital Cost (application, design, capital facilities) $5,097,850
- Approximate Capital Cost per connection (population) – $7,564 ($2,424)
- Approximate Annual O&M Cost per connection $396
- Challenges
    - The local groundwater is characterized by arsenic concentrations that exceed the Federal limit. In addition, the local groundwater contains uranium and vanadium. Identification of groundwater that does not require treatment was not successful. Water treatment is required, which will require a continued increase in Operation and Maintenance for the water system.

- Time Frame (identification of problem to completion of solution)
  - Initial Funding Application - 2006
  - Feasibility Study (design) Complete – January 2012
  - Receive Construction Grant – March 2013

6.2.3 Armona CSD new well and water treatment facility

- Problem (quantity, quality)
  - Arsenic levels above Federal Limits
- Number of Connections – 1,255
- Approximate Population – 3,239
- Solution
  - New treatment plant to remove arsenic
  - Well with modified well head treatment
  - New well to be installed
- Location
  - Highway 198 between Hanford and Lemoore
- Decision Making Process
  - Test hole drilled showed arsenic levels above Federal Standard
  - Treatment next best option
- Funding Source(s)
  - Drinking Water State Revolving Fund
- Approximate Capital Cost (application, design, capital facilities) $6,000,000
- Approximate Capital Cost per connection (population) – $4,781 ($1,852)
- Approximate Annual O&M Cost per connection $456
- Challenges
  - Administrative Order from EPA Enforcement issued in October 2008
  - Availability of Funds has delayed the schedule
- Time Frame (identification of problem to completion of solution)
  - Initial work began in 2006
  - Construction pending in 2013

6.2.4 Riverdale PUD new well and water treatment facility

- Problem (quantity, quality)
  - Arsenic above Federal Standard
  - Color also an issue
- Number of Connections – 950
- Approximate Population – 2,900
- Solution
  - Treatment plant with existing well #1
  - Treatment plant with new well #2
- Location
  - Fresno County, 8 miles south of Caruthers, west of Highway 41
- Decision Making Process
  - Consolidation not an option
  - Existing Well #2 went dry

    - Treatment plant did not work
- Funding Source(s)
    - Proposition 84 (Treatment)
    - Drinking Water State Revolving Fund (Treatment)
    - USDA Rural Utility Service (New well)
- Approximate Capital Cost (application, design, capital facilities) $7,000,000
- Approximate Capital Cost per connection (population) – $7,368 ($2,414)
- Approximate Annual O&M Cost per connection - $480
- Challenges
    - Administrative Order from EPA Enforcement issued in October 2008
- Time Frame (identification of problem to completion of solution)
    - Initial work began in 2006
    - Construction anticipated in 2015

6.2.5 Richgrove CSD new well and storage (note that the Rodriguez Labor Camp intends to consolidate with Richgrove CSD for water supply)

- Problem (quantity, quality) borderline nitrate, DBCP and arsenic issues in District,
- Number of Connections – 520
- Approximate Population – 2,882
- Solution
    - Construct a new Water Supply Well approximately 3 miles outside of the District
    - Construct Transmission Main to the District
    - Construct Water Storage Tank
- Location
    - Tulare County
- Decision Making Process
    - Board of Directors
    - Tulare County LAFCo
    - Recommendations from Self Help Enterprises
- Funding Source(s)
    - CDBG (test well and design of improvements, $373,129)
    - Proposition 84 (Planning Grant, $100,000)
    - Proposition 84 (Construction Grant pending $4,150,974)
- Cost (application, design, capital, operations)
- Approximate Capital Cost (application, design, capital facilities) construction of $6,532,500
- Approximate Capital Cost per connection (population) – $12,560 ($2,270)
- Approximate Annual O&M Cost per connection $600
- Challenges
    - Identify potential locations for a new water supply well
    - Funding to construct a test well
- Time Frame (identification of problem to completion of solution)

6.2.6 Hardwick

- Problem (quantity, quality)
  - Uranium
  - One well working
  - 20 existing connections
  - Multiple private wells (at least 16)
- Number of Connections – existing (20), potential (39) (based on the assumption that the homes with existing private wells will abandon the private wells and connect to the community system)
- Approximate Population - 138
- Solution
  - Drill new well and zone testing
  - Upgrade distribution system
  - Add water storage facilities
- Location
  - Kings County
- Decision Making Process
  - Well head treatment expensive for disposal of uranium
  - Connection to Laton would require a river crossing and connection across two counties
  - Hardwick Water Company Board of Directors
- Funding Source(s)
  - USDA Rural Utility Services (replacement of distribution system)
  - Safe Drinking Water State Revolving Fund (new water supply well)
- Cost (application, design, capital, operations)
- Approximate Capital Cost (application, design, capital facilities) $1,484,800 (Pilot test well, Production Well Installation and piping upgrades)
- Approximate Capital Cost per connection (population) – $38,252 ($10,810)
- Approximate Annual O&M Cost per connection - $2,352
- Challenges
  - Removing Uranium is considered a Hazardous waste and regulated by the Nuclear Regulatory Commission
  - Shallow aquifers have high uranium levels; deeper aquifers may have high arsenic levels
  - Half the community is served water from private wells. Almost all have high levels of uranium. Once a new system is built, the owners of these properties will weigh benefits of connecting to new system.
- Time Frame (identification of problem to completion of solution)
  - Funding Application 2009 to CDPH
  - Feasibility Study Grant - funding agreement with CDPH executed December 2012 and planning work underway-
  - Construction - USDA preapplication and application will need to be prepared to fund replacement water distribution system. CDPH construction application to be submitted upon completion of planning phase.

6.2.7 Pixley Public Utility District

- Problem (quantity, quality)
  - Arsenic above Federal levels in three of four wells
  - Insufficient quantity for peak demands with the primary well out of service
- Number of Connections – 837
- Approximate Population – 3,300
- Solution
  - Construct three (3) new water supply wells
  - Destruction of three (3) existing contaminated water supply wells
- Location
  - South of Tulare, along Highway 99
- Decision Making Process
  - Feasibility Study identified construction of three new water supply wells as best option
- Funding Source(s)
  - Proposition 84
  - Drinking Water State Revolving Fund if necessary
- Cost (application, design, capital, operations) - $4,938,700
- Approximate Capital Cost (application, design, capital facilities)
  - $500,000 Feasibility Study Grant
  - $4,438,700 Construction
- Approximate Capital Cost per connection (population) – $1,745 ($6,173)
- Approximate Annual O&M Cost per connection - $540
- Challenges
  - Obtain three (3) new properties for water supply wells
  - Connection to aged and small water distribution facilities.
- Time Frame (identification of problem to completion of solution)
  - Feasibility Study Application submitted in October, 2011
  - Feasibility Study Grant obtained in August, 2012

6.2.8 Tranquillity ID new wells

- Problem (quantity, quality)
  - TID well above Federal Standard for Arsenic
- Number of Connections – 341
- Approximate Population – 1,064
- Solution
  - Convert two irrigation wells to drinking water wells with treatment for arsenic, iron and manganese
- Location
  - Between San Joaquin and Mendota in west Fresno County
- Decision Making Process
  - Tranquillity Irrigation District Board of Directors
  - Drilled new test well in 2010
  - High levels of Iron and Manganese
- Funding Source(s)

    - Drinking Water State Revolving Fund (Feasibility Study)
    - Proposition 84 (Design and Construction)
- Cost (application, design, capital, operations)
- Approximate Capital Cost (application, design, capital facilities) $5,005,100
- Approximate Capital Cost per connection (population) – $14,678 ($4,704)
- Approximate O&M Cost per connection $540
- Challenges
- Time Frame (identification of problem to completion of solution)
    - Grant application submittal in 2009 for test wells
    - April 2010 – Funding Agreement received
    - 2011 – Feasibility Study submitted
    - 2012 – Grant Application submitted for Construction
    - Construction planned upon receipt of Funding Agreement

6.2.9 Zonneveld Dairy Housing

- Problem (quantity, quality)
    - Nitrate and Arsenic above Federal levels
- Number of Connections – 34
- Approximate Population - 141
- Solution
    - Test well drilled showed levels above acceptable arsenic and nitrate health standards
    - A feasibility is presently being conducted to determine the appropriate solution
- Location
    - Southwest of Fowler, East of Highway 41
- Decision Making Process
    - Property Owner (Owner of Labor Housing)
    - Feasibility Study to identify point source or treatment consolidation
    - Drill new well without contamination not an option
- Funding Source(s)
    - Proposition 84
- Cost (application, design, capital, operations)
    - $500,000 Feasibility Study
    - Capital Cost to be determined
- Approximate Capital Cost (application, evaluation, design) $500,000 plus construction costs
- Approximate Capital Cost per connection (population) –TBD
- Approximate O&M Cost per connection - TBD
- Challenges
    - Insufficient funds to cover private property connections
- Time Frame (identification of problem to completion of solution)
    - Feasibility Study Application completed in 2011
    - Feasibility Study grant agreement negotiated in April 2013

6.2.10 Tract 92

- Problem (quantity, quality)
  - Coliform presence
  - Chlorination system failing
- Number of Connections – 93
- Approximate Population - 500
- Solution
  - Drill new well (for primary water source)
  - Partial Consolidation with the City of Visalia (for redundancy and emergency/fire flow supply)
  - Destruction of existing water supply wells including abandoned individual domestic wells
- Location
  - Between Visalia and FarmersvilleEast of Highway 99
  - Distance from Visalia – 1.1 miles
- Decision Making Process
  - Tract 92 CSD Board of Directors
  - California Water Service Company
  - Feasibility Study identified new well and partial consolidation as best option
  - Old cracked, leaking pipelines
- Funding Source(s)
  - Drinking Water State Revolving Fund (DWSRF)
  - Community Development Block Grant (CDBG)
- Cost (application, design, capital, operations)
  - $200,000 Feasibility Study
  - $2,941,000 Construction
- Approximate Capital Cost (application, design, capital facilities) - $3,441,000
- Approximate Capital Cost per connection (population) – $13,194 ($37,000)
- Approximate O&M Cost per connection - $468
- Challenges
  - Connecting to 93 services on private property
  - Insufficient funds to cover private property connections
  - Many abandoned individual domestic wells
- Time Frame (identification of problem to completion of solution)
  - Application for Prop 50 funding – June 2012
  - Feasibility Study initiated in 2012 with CDBG funding
  - Feasibility Study to be completed (including test well and design) in 2013-14 with DWSRF funding
  - Feasibility Study completed in 2012
  - Application for Construction Funding expected in 2014
  - Construction Funding – Expected 2015
- Other
  - The CSD will be required to raise its rates by about $7 per connection, per month, to receive 100% grant funding for planning through SRF. This

stipulation is due to the requirement that SRF grant funds can only be used for disadvantaged communities whose water rate already meets the Target Consumer Rate of 1.5% of the community's MHI.

6.2.11 Malaga County Water District

- Problem (quantity, quality)
  - Insufficient Source Quantity
  - Coliform presence
  - Nitrate
- Number of Connections – 472 (note that many connections are commercial/industrial)
- Approximate Population - 900
- Solution
  - Acquire a Well site
  - Construct a Test Hole
  - Construct a new water supply well and extend the water distribution system to connect to the site
  - Remove contaminated wells from the active system
- Location
  - Immediately south of Fresno
  - Near State Route 99 and Central Avenue
- Decision Making Process
  - Malaga County Water District
- Funding Source(s)
  - CDBG ($167,250)
  - Malaga County Water District
- Approximate Capital Cost (application, design, capital) $1,134,223
- Approximate Capital Cost per connection - $1,260
- Approximate O&M Cost per connection - $189.36 per year flat rate, $231.96 per year metered rate (3/4 inch service)
- Challenges
  - Acquisition of new well site
  - Obtain funding for construction of the production well
- Time Frame (identification of problem to completion of solution)
  - Application for CDBG funding – 2007
  - Complete Test Hole – 2010
  - Complete Construction of production well - March 2013

6.3 Quality or Supply Problem: Solution: Treatment Facilities and Consolidation of neighboring systems.

6.3.1 CSA 49

- Problem (quantity, quality)
  - Surface water treatment facilities that did not meet regulatory requirements

    - 42 Residences and Westside Elementary School
- Number of Connections – 43
- Approximate Population - 333
- Solution
    - Consolidate two surface water treatment plants into one plant
    - Managed by the County of Fresno (CSA 49)
    - Install new water storage tank
    - Replace water distribution mains
    - Install water meters
- Location
    - Approximately 35 miles Southwest of Fresno near Five Points along Highway 145
- Decision Making Process
    - Solution provided greatest benefit for the cost
    - Water meets current water quality standards
    - County of Fresno
    - Westside School District
    - Owner of Labor Housing
- Funding Source(s)
    - State Drinking Water State Revolving Fund ($1,884,431)
    - State Drinking Water Bond Law ($200,000)
    - Community Development Block Grant ($440,000)
    - Community funded ($40,000)
- Cost (application, design, capital, operations)
- Approximate Capital Cost (application, design, capital facilities) Total $2,564,431
- Approximate Capital Cost per connection (population) – $59,638 ($7,700)
- Approximate O&M Cost per connection
- Challenges
    - Properties separated from each other
- Time Frame (identification of problem to completion of solution)
    - November 2003 – Applied for grant funding
    - October 2008 – Awarded construction project
    - February 2012 – Notice of Completion

6.3.2 Rodriguez Labor Camp with Richgrove CSD

- Problem (quantity, quality) water exceeds Nitrate MCL by a factor of nearly 3
- Number of Connections – 35
- Approximate Population – 140 (using 4 per connection)
- Solution
    - Obtain water supply from Richgrove CSD
    - Richgrove CSD install new well and tank to connect to Rodriguez Labor Camp
- Location
    - Approximately 2.5 miles west of Richgrove on Road 192 near Avenue 8

- Decision Making Process
  - Rodriguez Labor Camp Owner
  - Richgrove CSD
- Funding Source(s)
  - Proposition 84 ($4,150,974 – total project)
  - CDBG ($373,129 – total project)
- Approximate Capital Cost (application, design, capital facilities) - $4,524,103
- Approximate Capital Cost per connection (population) – $129,260 ($32,315)
- Approximate O&M Cost per connection -
- Challenges
  - The existing water system must be operational during construction.
  - No records of existing water system
  - Required a contractual agreement between the Labor Camp and Richgrove CSD
- Time Frame (identification of problem to completion of solution)
  - Initiate Funding Application - _____
  - Complete Design – 2011
  - Complete Construction – pending Construction Grant

A more comprehensive list of Demonstration Projects, the status, and relative capital cost of the projects is included as Table 9. The Table lists the Demonstration Projects by County and by Category of water supply problem. The Table includes the population of the community and identifies whether the water system is privately owned or publicly owned. In addition the information is presented in Exhibit 27 as a geographical representation of the data.

The capital cost and estimated operation and maintenance costs for several Demonstration Projects that have either been completed, or for which the design of improvements is sufficient to provide a reliable capital and operational opinion of cost, are listed in Table 10. The projects are differentiated between Consolidation Projects and New Well Projects. Exhibit 28 includes information for consolidation projects and new water supply projects.
Included in the Appendix (Appendix F) is a copy of the Report to the Legislature Senate Bill X2 1. The Report includes a list of projects that had been awarded Proposition 84 funding in 2010-11. The status of the projects in the list may not have been verified for the purposes of this report. The projects may, however, supplement the demonstration projects described above.

Review of the information from the Demonstration Projects identified above reveal the following observations:

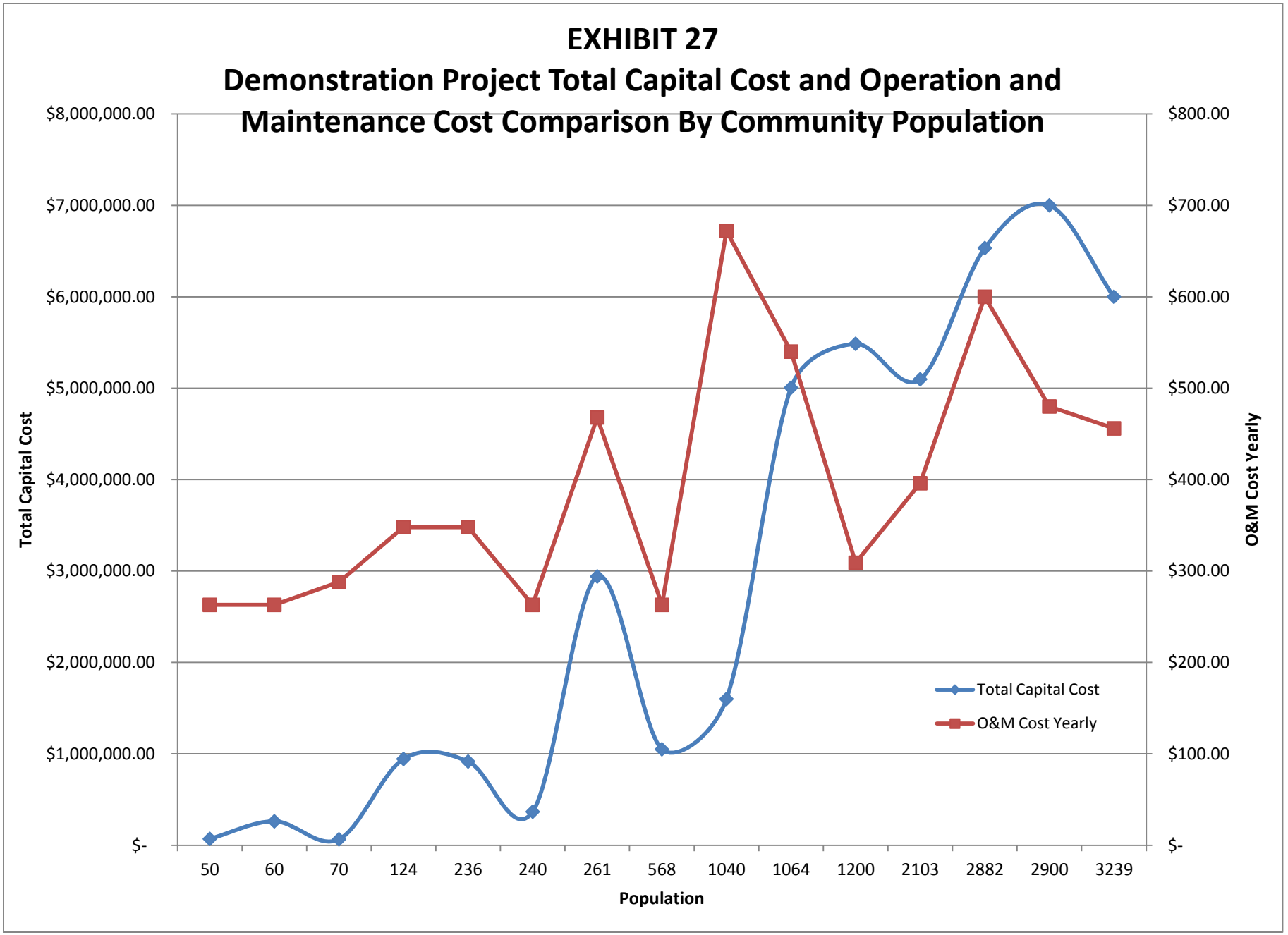
- Time frame: The time to move from identification of a problem to completion of a solution to the problem is often several years
- Costs: Costs associated with the solution of water supply problems includes Investigation and analysis reports, engineering reports, funding applications, legal costs associated with rates and identification of the

political body responsible for implementation of solutions, capital costs, replacement costs, and operation and maintenance costs.

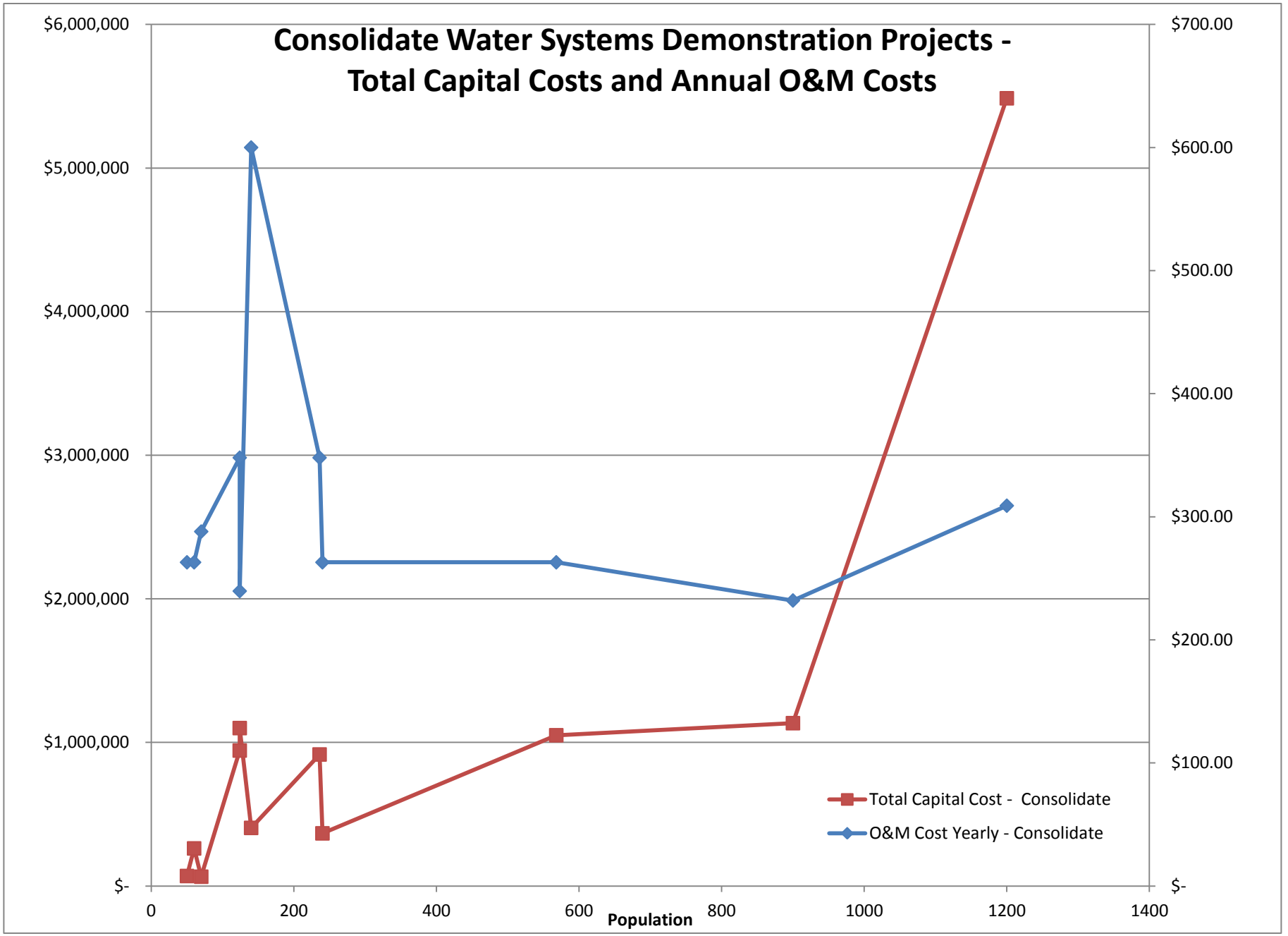
- Cost per connection: The cost of service per connection is likely to require initial increases and regular increases in the future.
- Rate impacts: The rates charged to customers are like to require initial increases and regular increases in the future.

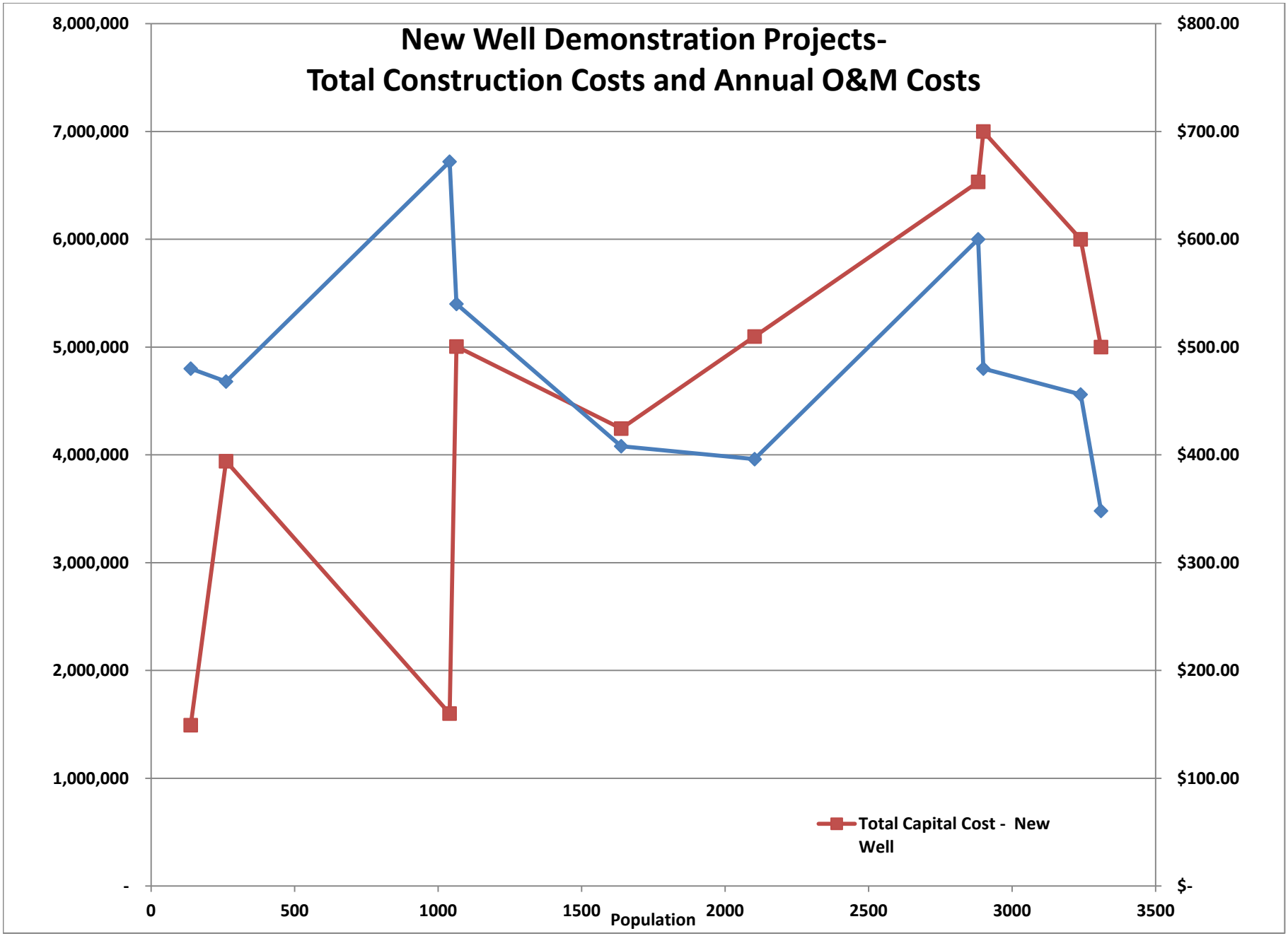
- Interaction with other agencies: Many of the projects required cooperation and coordination with other political or regulatory agencies. It is noted that the objectives of the various entities are not always the same.
- Responsibility of owners: Ultimately, the projects that succeed rely upon the owner of the water system to take responsibility for the issue. Until the owner(s) of the system take on the responsibility of the issue, the problem will not be resolved.
- Political resistance: It is noted that there may be political resistance against the recommended technical alternatives to solve the issue. For example, the resistance may be in the form of not wanting to dissolve the existing system and annex to an adjacent city. The resistance associated with a perceived loss of community identity is a real issue to be resolved in several instances.
- Funding – loan, grant: Funding assistance for the projects has been in the form of a) self funded, b) grant (Federal or State), c) loan (Federal or State), or d) a combination of the previous sources. It is noted that each source of funding contains rules, limitations, obligations, and procedures that must be adhered to. The various requirements associated with funding sources need to be fully understood by the DAC prior to proceeding toward obtaining the funding assistance.
- TMF compliance for sustainability: The test of a successful solution is whether it is sustainable. The Technical, Managerial, and Financial (TMF) Report topics (Appendix F) provide a viable guideline to determine if the community is prepared to proceed with a solution to the problem that may be sustained.

EXHIBIT 27
Demonstration Project Total Capital Cost and Operation and Maintenance Cost Comparison By Community Population



V:\Clients\Tulare County - 1399\139911V1-Tulare Lake Basin Water Study_DOCUMENTS\Task 4\Four Pilot Projects\New Sources\Additional Info\Demo Projects Comparison.xls


Consolidate Water Systems Demonstration Projects -
Total Capital Costs and Annual O&M Costs
$6,000,000
$5,000,000
$4,000,000
$3,000,000
$2,000,000
$1,000,000
$-
$700.00
$600.00
$500.00
$400.00
$300.00
$200.00
$100.00
$-
0
200
400
600
800
1000
1200
1400
Population
Total Capital Cost - Consolidate
O&M Cost Yearly - Consolidate


New Well Demonstration Projects-
Total Construction Costs and Annual O&M Costs
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
-
$800.00
$700.00
$600.00
$500.00
$400.00
$300.00
$200.00
$100.00
$-
0
500
1000
1500
2000
2500
3000
3500
Population
Total Capital Cost - New Well

Tulare Lake Basin Disadvantaged Community Water Study

DEMONSTRATION PROJECTS: NEW SOURCE

FRESNO COUNTY
TULARE COUNTY
KINGS COUNTY
KERN COUNTY

FAIRMONT SCHOOL
TRANQUILLITY
Malaga CWD
EL MONTE VILLAGE M.H.P.
LONDON CSD
CARUTHERS CSD
ZONNEVELD DAIRY
CUTLER PUD
LOVELL SCHOOL
RIVERDALE
SEVILLE & YETTEM
LANARE
PIONEER SCHOOL
LEMON COVE
HARDWICK
KIT CARSON SCHOOL
FCSA #49
TOOLEVILLE
FOUR SEASONS MHP
WEST GOSHEN
TONYVILLE
HAMBLIN
ARMONA CSD
LACEY COURTS MHP
CURTIS WC
EL RANCHO TRACT 191
TRACT 92 CSD
PAIGE-MOORE TRACT
LONE OAK TRACT
CENTRAL WATER CO.
MATHENY TRACT
BEVERLY-GRAND MUTUAL WATER
BURNETT ROAD
FAIRWAYS TRACT MUTUAL
PIXLEY PUD
AKIN WATER CO.
KETTLEMAN CITY
TEVISTON
DUCOR
ALPAUGH JPA
RICHGROVE CSD
ALLENSWORTH
RODRIQUEZ LABOR CAMP
R.S. MWC
SEMITROPIC SCHOOL
SEVENTH STANDARD MUTUAL
EAST NILES CSD
SON SHINE WS
LAMONT PUD
EDMUNDSON ACRES WATER SYSTEM
LAKESIDE SCHOOL
CSD OF ARVIN

Fresno
Visalia
Bakersfield
Lancaster

Sources: Esri, DeLorme, NAVTEQ, TomTom, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand)

Legend

- Tulare Lake Basin
- County
- Demonstration Project

Exhibit 28

DRAFT

0 5 10 15 Miles

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Fresno, CA 93711-6162
(559) 449-2700

7/26/2013 : V:\Clients\Tulare County - 1399\139911V1-Tulare Lake Basin Water Study\GIS\Map\Pilot New Sources\ReportDraft01-31-2013\demonstration_projects.mxd

7 FUNDING ALTERNATIVES

Funding alternatives that may be available to DACs would generally include grants, loans, and rate adjustments. Specific sources of funding assistance may include:

- State of California Bond Measures such as Proposition 50 and Proposition 84
- Safe Drinking Water State Revolving Fund (SDWSRF)
- Department of Water Resources (DWR)
- State Water Resources Control Board (SWRCB)
- USDA Rural Utilities
- Environmental Protection Agency (EPA)
- The Department of Housing and Urban Development (HUD) – Community Development Block Grant (CDBG) program
- Bureau of Reclamation
- California Infrastructure and Economic Development Bank

Each of the funding alternatives have qualifying requirements and specific application requirements. The community may qualify for the funding opportunity, or the community may need to coordinate the application through another entity such as a County or IRWMA.

Additional information on the funding sources listed above may be found through the California Financing Coordinating Committee (CFCC) at www.cfcc.ca.gov. The CFCC has available a Common Funding Inquiry Form that may be completed and submitted for review by all CFCC member agencies. The community would then receive feedback regarding potential funding assistance opportunities for the community and the specific needs identified. The CFCC conducts Funding Fairs each year to provide education regarding the various funding assistance programs, and to provide interested parties an opportunity to meet with representatives of specific funding agencies. Included in Appendix E is the 2013 Funding Fair Flyer, Agenda, and Handbook. The Funding Fair Handbook provides specific information for the various funding assistance sources.

Several of the funding sources have been identified in the Demonstration Projects discussion.

8 POTENTIAL PILOT PROJECTS

Potential pilot projects were prioritized by starting from the list of DACs identified in Table 8 and removing the DACs identified in Table 9 as those communities have already initiated the process of moving toward a solution of their water supply challenge. The resulting list of disadvantaged communities within each County that have a water supply challenge, and are not presently engaged in a working solution of the problem are listed in order of population in Tables 11, 12, 13, and 14. The list is based on the information available as described previously. As new or additional information is discovered, the list of pilot projects to be investigated may be amended. The remaining communities listed in Tables 11 through 14 were also reviewed with respect to whether the type of water supply challenge faced by the community is representative of that faced by other communities.

Prioritization considerations:

- Population:
  - Population was considered as it is appropriate to consider assisting in the resolution of a water system challenge that would impact the greater number of persons as a first priority
- system ownership (publicly owned or privately owned):
  - System ownership was considered as appropriate as public funds are deemed to be appropriate toward assisting public water systems prior to private (for profit) water systems. This consideration does not in any way place the importance of the persons using a private water system as any less important, however, the weight of responsibility toward resolving the water system problems may appropriately be the primary responsibility of the private owner of the water system,
- severity of the problem:
  - Water system challenges range in severity and the potential for detrimental impacts to the health and welfare of the persons relying upon the water system,
- ease of solution:
  - The relative ease of identifying a solution to the water system problem was also a consideration. It is deemed appropriate that a more complex problem may benefit from the resources available in this pilot study, compared to a problem that has a straight forward recommended alternative.

Develop Decision Trees to assist communities narrow in to the appropriate alternatives – each community, and its challenges, is unique.

Initial Recommendations for source, quality, remote, other

Stratford – Remote Community

Problem: Insufficient water supply, Insufficient water rate structure, No standby power, failing distribution system, high groundwater

Potential Solution Alternatives:

Ivanhoe

Problem:

Potentail Solution Alternatives:

Arvin

Problem: Water Quality impacting a large population

Potential Solution Alternatives: Treatment,

Ducor

Problem: Nitrate contamination of the potable water supply, on-site sanitary sewer facilities

Potential Solution Alternatives: on-site treatment, community sewer system, new water supply sources

<u>When each Pilot Study is selected, an outline for the Focused Pilot Projects would be prepared and include the following:</u>

- Problem Statement
  - Water supply problem
  - Population impacted
  -
- Timeline and cost
  - Outline the timeline for completion of the pilot project.
  - Spreadsheet of TOC, calendar, and cost
  - Need for additional consultants
- Data Gathering Needs
  - Outline what data is needed to for the pilot project and how it will be collected.
  - Identify what data is needed to determine other locations to apply the potential solutions
- Infrastructure Solutions
  - Discuss what infrastructure solutions should be considered to address the water problems identified and how they will be evaluated to determine efficacy and sustainability.
- Governance Alternatives
  - Discuss what governance options could be considered and how they will be evaluated. Governance options include:
    - Non-profit organization / private

        - Cooperative Agreements
        - Special district formation/re-formation
        - Dissolving of entities
- Regulatory requirements
- Financial Analysis
    - Evaluate affordability of the infrastructure and governance alternatives.
    - Revenue Sources
    - Estimated capital costs
    - Estimated Operation and Maintenance costs
    - Estimated Debt Service
- Community Leadership Development
    - Outline the tools / process that will be used to build leadership development in conjunction with the pilot.
- Policy Recommendations
    - Outline the topics and process that will be used to develop policy recommendations derived through the pilot.
    - Policy barriers/challenges
    - Policy recommendations (specific to agency and policy recommendation)
    - Opportunities for incentives
- Private versus Public ownership alternatives and responsibilities
- Estimated Implementation Budget
    - If appropriate, the final report of the pilot project would include a cost estimate of the cost of full project implementation.
- Application to other sites in the Study Area
- Obstacles or barriers and potential methods to overcome the obstacles or barriers
- A refinement to the draft Decision Trees as the process of evaluation of alternative solutions develops
- Recommendations
    - Summary results
    - Impact to consumer (cost per connection)
    - Impact to water system owner (revenues versus expenses)
    - Impact to regulatory agency(ies) – does the solution satisfy regulatory requirements?
    - Impact to Legislature – are there recommendations for legislation regarding funding assistance, land use planning, other?
    - Conclusions – applicability, next steps
    - Applicability to IRWMPs
    - Continued data collection – purpose, location of data
    - Continued reporting – why, to whom?
    - Funding assistance opportunities and process
    - Training
    - Other implementation/action (ie. rate structure modifications)

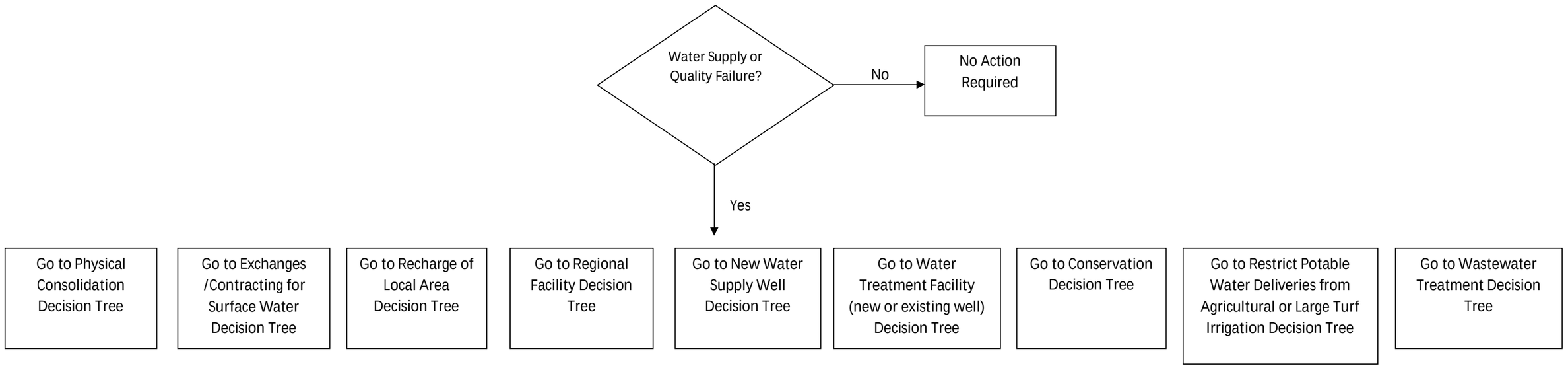
9 DECISION TREES

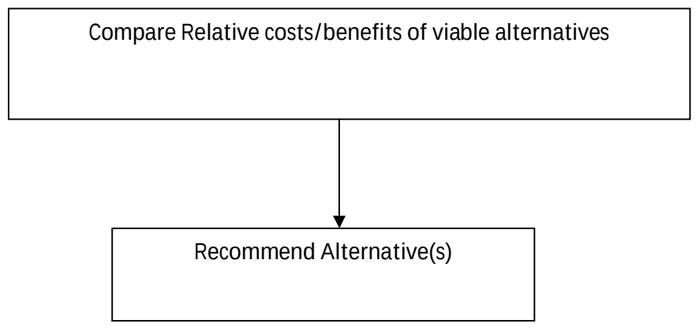
Decision Trees are flowcharts that are developed to assist the user in evaluation of alternative solutions to a problem. Issues to be considered are identified and depending upon the unique circumstances of the community, the user is assisted in reviewing viable alternatives. Similarly, alternative solutions that are not appropriate are actively discarded from further consideration.

Decision Trees

- Water Supply
- Water Quality
- Water Supply and Water Quality
- Water Supply, Water Quality, Remote

NEW SOURCES EVALUATION





10 SUMMARY

Summary of water supply challenges for DACs in the Tulare Lake Basin

Summary of common themes faced by DACs in the Tulare Lake Basin

Summary of viable alternatives and of DACs proceeding toward solution of the problems.

Summary of the pilot studies.

Quantification of issue, quantification of current and potential progress with respect to the population impacted, costs to address the issues and anticipated time frame for continued improvement.

11 RECOMMENDATIONS

Next Steps for Pilot Project Studies

Overall recommendations regarding New Sources for Disadvantaged Communities

Funding

Community Involvement

Legislative

Regulatory

Land Use

Investigate remaining unknown sources

Recommended task – investigate all of the "Unknown Sources" to clean up the loose ends. Some of this clean up will be done within the Pilot Study and some will be left to the future. There should be a column for those communities that require investigation to get to a point where the table either does not exist or only shows those communities where water supply is not applicable.

Investigate remaining single sources

Recommended task - Investigate the "Single Water Supply Source" list to confirm accuracy and to determine if any are supplied by surface water. The Surface Water supply may have (should have) redundancy accounted for within the treatment process, storage, etc.

Based on information available, the adequacy of the existing sources may also be of concern. However, little information has been available relative to the capacity of the water supply sources and the relative demands of the communities.

Recommended task – Review some County reports and CDPH reports to determine if there are some obvious deficiencies regarding water supply

APPENDIX

Appendix A Senate Bill SBxx1, Perata
Appendix B Grant Agreement No. 4600009132
Appendix C Title 22, Chapters 12, 14, 15, 16
Appendix D TMF Report Outline
Appendix E 2013 Funding Fair Flyer, Agenda, and Handbook
Appendix F Report to Legislature, Senate Bill X2 1, June 2011