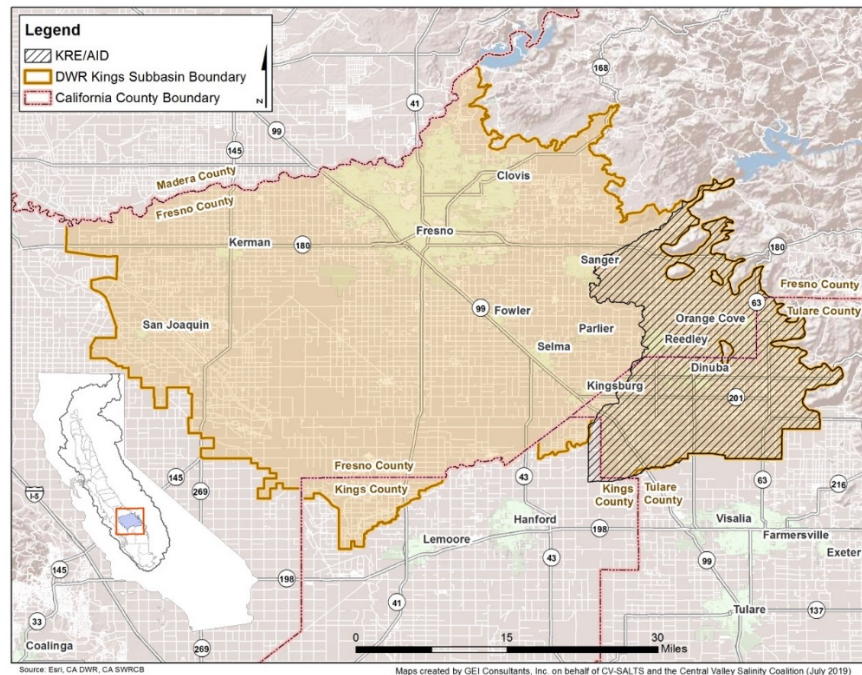


Management Zone Pilot Study

Draft Preliminary Management Zone Proposal for Kings River East/Alta Irrigation District



Prepared for:

Kings River East/Alta Irrigation District Management Zone
Steering Committee

On Behalf of:

Kings River Conservation District
Central Valley Salinity Coalition
Central Valley Salinity Alternatives for Long-term
Sustainability (CV-SALTS)

Prepared by:



February 2020

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Acronyms

Acronym	Definition
AID	Alta Irrigation District
A/R Difference	Difference Between Nitrogen Applied and Nitrogen Removed
A/R Ratio	Ratio of Nitrogen Applied to Nitrogen Removed
Basin Plans	Water Quality Control Plans for the Sacramento River and San Joaquin River Basins and the Tulare Lake Basin
BPA	Basin Plan Amendment
CDP	Census Designated Place
Central Valley Water Board	Central Valley Regional Water Quality Control Board
CETHP	California Environmental Health Tracking Program
CIWQS	California Integrated Water Quality System
Coalition	Kings River Water Quality Coalition
CVDRMP	Central Valley Dairy Representative Monitoring Program
CVHM2	Central Valley Hydrologic Model 2.0
CV-SALTS	Central Valley Salinity Alternatives for Long-term Sustainability
CVSC	Central Valley Salinity Coalition
CSD	Community Services District
CWS	Community Water System
DAC	Disadvantaged Community
DDW	Division of Drinking Water
DUC	Disadvantaged Unincorporated Community
DWR	California Department of Water Resources
KRE	Kings River East
KRE/AID	Kings River East GSA/Alta Irrigation District
KRWQC	Kings River Water Quality Coalition
GAMA	Groundwater Ambient Monitoring and Assessment
GIS	Geographic Information Systems
GQMP	Groundwater Quality Management Plan
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HCM	Hydrologic Conceptual Model
ID	Irrigation District
ILRP	Irrigated Lands Regulatory Program
INMP	Irrigation and Nitrogen Management Plan
INMPSR	Irrigation and Nitrogen Management Plan Summary Report
IX	Ion Exchange
LSWS	Local Small Water System
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
MHI	Median Household Income
MPEP	Management Practices Evaluation Program

Acronym	Definition
N	Nitrogen
NMP	Nutrient Management Plan
NO ₃ -N	Nitrate as Nitrogen
NPDES	National Pollutant Discharge Elimination System
NRCS	California Natural Resource Conservation Service
NWIS	National Water Information System
NTC	Notice to Comply
OAL	Office of Administrative Law
PWS	Public Water System
RO	Reverse Osmosis
SDAC	Severely Disadvantaged Communities
SDWIS	Safe Drinking Water Information System
SGMA	Sustainable Groundwater Management Act
SNMP	Salt and Nitrate Management Plan
sq. mi	square mile
SSWS	State Small Water System
State Water Board	State Water Resources Control Board
TDS	Total Dissolved Solids
USGS	United States Geological Survey
WCR	Well Completion Report
WD	Water District
WDR	Waste Discharge Requirements
WMP	Waste Management Plan
WSA	Water Service Area
WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant

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Background and Purpose

1.1 Nitrate Control Program

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) adopted Amendments to the Water Quality Control Plans for the Sacramento River and San Joaquin River Basins and the Tulare Lake Basin (Basin Plans) to Incorporate a Central Valley-wide Salt and Nitrate Control Program (Resolution R5-2018-0034) on May 31, 2018 (Central Valley Water Board 2018). The State Water Resources Control Board (State Water Board) and the Office of Administrative Law (OAL) approved these amendments to the Central Valley Water Board Basin Plans (Central Valley Water Board 2015, 2016) on October 16, 2019 (Resolution 2019-0057) and January 15, 2020 (OAL Matter Number: 2019-1203-03), respectively. The portions of these Basin Plan amendments (BPA) that established the Nitrate Control Program became effective January 17, 2020. The program is designed to achieve the following management goals:

- Goal 1 – Ensure a Safe Drinking Water Supply;
- Goal 2 – Achieve Balanced Nitrate Loadings; and,
- Goal 3 – Implement Managed Aquifer Restoration to the extent reasonable, feasible and practicable.

The schedule for implementation of the Nitrate Control Program in Central Valley is based on the priority designation of Central Valley Region groundwater basins/subbasins. These groundwater basins/subbasins, which are designated as Priority 1, Priority 2 or “Remaining Areas” (not prioritized at this time), are prioritized based on existing ambient nitrate concentrations in the upper portion of the groundwater basin/subbasin. The Nitrate Control Program designates the Kings Groundwater Subbasin as a Priority 1 basin (see Figure N-1 and Table N-1, Central Valley Water Board 2018).

1.2 Notice to Comply

The Central Valley Water Board sent out a Notice to Comply (NTC) to permitted discharges in Priority 1 groundwater basins/subbasins on _____. Following receipt of the NTC, permitted dischargers must choose between two compliance pathways to meet requirements of the Nitrate Control Program:

- *Path A: Individual Permitting Approach* – This is the default permitting compliance pathway. Under this approach the permittee must comply with all Nitrate Control Program requirements as an individual discharger or as a third-party group subject to a General Order that chooses to be permitted under this approach.

- *Path B: Management Zone Approach* – Permitted dischargers that select Path B work cooperatively with other dischargers and local stakeholders to implement all requirements of the Nitrate Control Program. A Management Zone is defined as (Central Valley Water Board 2018):

A discrete and generally hydrologically contiguous area for which permitted discharger(s) participating in the management zone collectively work to meet the goals of the SNMP [Salt and Nitrate Management Plan] and for which regulatory compliance is evaluated based on the permittees collective impact, including any alternative compliance programs, on a defined portion of the aquifer. Where Management Zones cross groundwater basin or sub-basin boundaries, regulatory compliance is assessed separately for each basin or sub-basin. Management Zones must be approved by the Central Valley Water Board

Establishment of a Management Zone creates a collective approach to nitrate management that maximizes resources and provides a more integrated approach to developing local solutions to achieve the goals of the Program. **Figure 1-1** summarizes the intent and purpose for establishment of a Management Zone (Central Valley Water Board 2018).

**Figure 1-1. Intent and Purpose of a Management Zone
(adapted from Table N-4 in the Nitrate Control Program)**

- Defined area that serves as a discrete regulatory compliance unit for complying with the Nitrate Control Program for multiple permittees.
- Basis for the establishment of local management plans to manage nitrate within the Management Zone's boundary.
- Participants work collectively to implement SNMP management goals: (1) safe drinking water, (2) achieving balance, and (3) restoring groundwater basins/sub-basins (to the extent reasonable, feasible and practicable) across the Management Zone.
- Where groundwater within the Management Zone boundary, and groundwater impacted by those permittees within the Management Zone boundary, is being used as a drinking water supply, and where those drinking water supplies are impacted by nitrates and exceed or are likely to exceed nitrate drinking water standards in the foreseeable future, Management Zone participants will ensure the provision of safe drinking water to all residents in the area adversely affected by those dischargers of nitrates from those that are participating in the Management Zone.
- Ensure the provision of safe drinking water for the Management Zone through stakeholder coordination and cooperation.
- Work towards better resource management through appropriate allocation of resources.
- Central Valley Water Board imposes reasonable provisions collectively for the Management Zone, and its permittee participants, that recognize the need to prioritize nitrate management activities over time for compliance with the Nitrate Control Program and the SNMP's Management Goals.

The Central Valley Water Board sent out a NTC to permitted dischargers in the Kings Groundwater Subbasin on _____, 2020. This NTC activated the following schedule of deliverables for permitted dischargers that elected to comply under Path B – Management Zone Approach in the Kings Groundwater Subbasin (see Table N-5.B, Summary Schedule for Implementation; Central Valley Water Board 2018):

- Submit a Preliminary Management Zone Proposal to the Central Valley Water Board (including an Early Action Plan) by _____, 2020.
- Implement the Early Action Plan no later than _____, 2020, unless the Central Valley Water Board objects to the Plan.
- Submit a Final Management Zone Proposal within 180 days of the receipt of comments from the Central Valley Water Board on the Preliminary Management Zone Proposal.
- Submit a Management Zone Implementation Plan within 180 days after the Final Management Zone Proposal is accepted by the Central Valley Water Board’s Executive Officer.

This document represents the Preliminary Management Zone Proposal for the management of nitrate within the Kings River East GSA/Alta Irrigation District (KRE/AID) Management Zone. This Proposal fulfills the requirements of the Nitrate Control Program as summarized in Central Valley Water Board (2018). **Figure 1-2** summarizes these requirements and where they are addressed in this Proposal.

1.3 Management Zone Formation

This Section describes the basis for the establishment of this proposed Management Zone, including: (a) the proposed boundary; (b) technical and regulatory justification for the proposed boundary; and (c) the preliminary organizational structure of the Management Zone.

1.3.1 Proposed Management Zone

The boundary of the KRE/AID Management Zone is the combined boundaries of the Kings River East (KRE) Groundwater Sustainability Agency (GSA) and Alta Irrigation District (AID) (**Figure 1-3**). The proposed boundary combines the institutional entity of AID with the regional collaboration management entity of the KRE GSA. With the exception of a small area in the southwest portion of the AID, the entire AID lies within the GSA boundary and is the primary water management agency within the proposed Management Zone. Many of the stakeholders involved with the KRE GSA or AID would also be potential participants in the proposed Management Zone.

**Figure 1-2. Preliminary Management Zone Proposal Requirements
(Central Valley Water Board 2018)**

- Proposed preliminary boundaries of the Management Zone area (*Section 1.3.1*);
- Identification of Initial Participants/Dischargers (*Section 1.5*);
- Identification of other dischargers and stakeholders in the Management Zone area that the initiating group is in contact with regarding participation in the Management Zone (*Section 4.1*);
- Initial assessment of groundwater conditions based on readily available existing data and information (*Section 3.0*);
- Identification/summary of current treatment and control efforts, or management practices (*Section 5.0*);
- Initial identification of public water supplies or domestic wells within the Management Zone area with nitrate concentrations exceeding the water quality objective (*Early Action Plan, Attachment H*);
- An Early Action Plan to address drinking water needs for those that rely on public water supply or domestic wells with nitrate levels exceeding the water quality objective (*Summary in Section 6.0; complete Early Action Plan in Attachment H*);
- Documentation of process utilized to identify affected residents and the outreach utilized to ensure that they are given the opportunity to participate in development of an Early Action Plan (*Section 1.3 in the Early Action Plan, Attachment H*);
- Identification of areas within or adjacent to the Management Zone that overlap with other management areas/activities (*Section 2.2*);
- Any constituents of concern that the individual discharger/group of dischargers intend to address besides nitrate (not required but is an option available) (*not included in this Proposal*);
- Proposed timeline for (*Section 7.0*):
 - Identifying additional participants;
 - Further defining boundary areas;
 - Developing proposed governance and funding structure for administration of the Management Zone;
 - Additional evaluation of groundwater conditions across the Management Zone boundary area, if necessary; and,
 - Preparing and submitting a Final Management Zone Proposal and a Management Zone Implementation Plan.

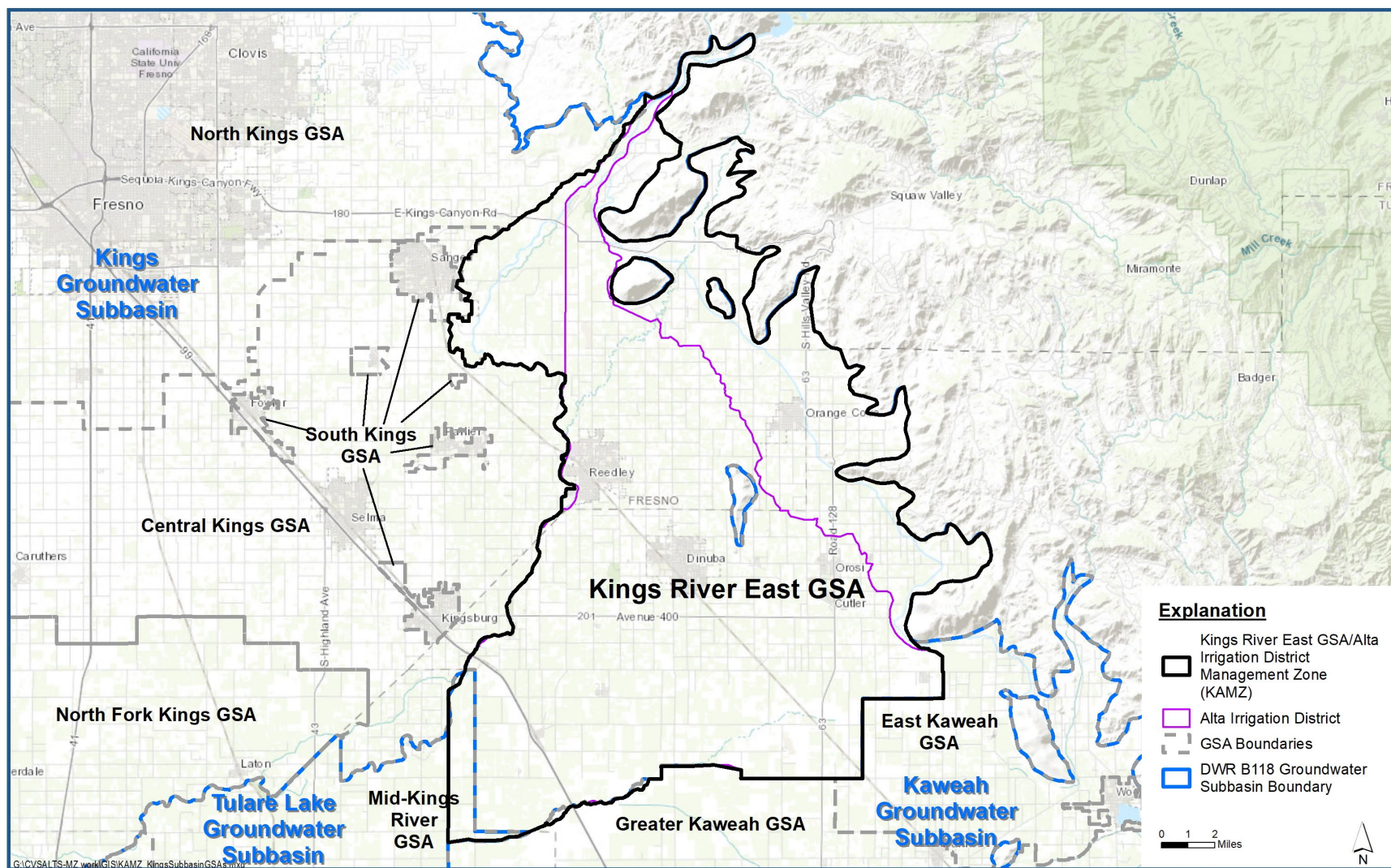


Figure 1-3. Proposed KRE/AID Management Zone Boundary

1.3.2 Consistency with Required Management Zone Characteristics

The Nitrate Control Program establishes the following characteristics to describe a Management Zone (Table N-4 in Central Valley Water Board 2018):

- A defined area which incorporates a portion of a large groundwater basin(s)/subbasin(s);
- Encompasses all groundwater for those permittees that discharge nitrate to said groundwater that have selected to comply with the Nitrate Control Program through participation in the defined Management Zone.
- Voluntarily proposed by those regulated permittees located within the proposed Management Zone boundary that have decided to work collectively and collaboratively to comply with the Nitrate Control Program

As described below, the proposed KRE/AID Management Zone is consistent with these three general characteristics.

Defined Portion of a Large Groundwater Basin/Subbasin

This Management Zone boundary coincides with the KRE GSA boundary which is an existing groundwater management area for the purposes of implementation of the California Sustainable Groundwater Management Act (SGMA). In addition, at the surface, the proposed boundary encompasses the portion of the Kings Groundwater subbasin that lies to the east of the Kings River. These two hydrologic features establish a well-defined water management area.

Encompasses Groundwater Potentially Impacted by Management Zone Participants

All dischargers participating in this proposed Management Zone are located within the Management Zone boundary (See Section 4.1.1) and do not discharge outside of the Management Zone boundary. In addition, as noted above, with the exception of a small area in the southwest portion of the AID (see Figure 1-3), the entire AID, the primary water management agency in the area, lies within the proposed Management Zone boundary. This institutional feature may facilitate implementation of the management goals of the Nitrate Control Program.

Voluntarily Proposed by Permitted Dischargers

This Preliminary Management Zone Proposal was voluntarily prepared by the permitted dischargers identified in Section 1.5 below. Development of this Preliminary Management Zone proposal, including the Early Action Plan, occurred through an open, public stakeholder process (see Section 1.4.2 in this document and Section 1.3 in Attachment H – Early Action Plan)..

1.3.3 Existing Management Zone Organization

[Placeholder: Description of existing governance and funding at the time of submittal of this proposal]

1.4 Process to Establish Proposed Management Zone

[Placeholder: Following sections have been drafted in anticipation of what will describe the overall process to develop this Proposal; text may require revision prior to submittal of the final Preliminary Management Zone Proposal]

1.4.1 Development of Preliminary Management Zone Proposal

The KRE/AID Preliminary Management Zone Proposal was developed in a two-step process. The first step was implemented as a Pilot Study prior to the effective date of the Nitrate Control Program and prior to Central Valley Water Board sending out a NTC to permitted dischargers. This Pilot Study and related Pilot Study in the Turlock Groundwater Subbasin were funded under a State Water Board Grant (Resolution 2017-0061) that included funds to develop Management Zone template documents to facilitate implementation of the pending Nitrate Control Program in the Central Valley Region. The Kings River Water Quality Coalition (KRWCA or “Coalition”), the recipient of the grant, worked collaboratively with the Central Valley Salinity Coalition (CVSC) and Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) to implement the Pilot Study. The deliverables from this grant-funded project provided the first drafts of the Preliminary Management Zone Proposal and Early Action Plans for the proposed KRE/AID Management Zone. Following completion of the Pilot Study, the stakeholders initiated the second step of the process. This step focused on continued refinement of the grant deliverables to produce this Final Preliminary Management Zone Proposal with an Early Action Plan.

1.4.2 Public Participation

The KRE/AID Preliminary Management Zone Proposal was developed through collaborative discussion among both permitted dischargers and non-dischargers. The Management Zone conducted outreach throughout the process to encourage stakeholder and local community participation. Public participation efforts included:

- Direct outreach to permitted dischargers that received a NTC with the Nitrate Control Program (see Section 4.1 for additional information).
- Regular email communication to stakeholders on the Management Zone participant outreach list (see Section 4.2 for additional information).
- Regular information postings on the Management Zone website at: <http://kingsriverwqc.org/cv-salts/>

- Opportunity to provide comment on drafts of the Preliminary Management Zone Proposal and Early Action Plan and documented responses to comments.
- Local community outreach to support development of the Early Action Plan (see Section 1.3 in the Early Action Plan, Attachment H).
- *[Insert additional activities as needed]*

Attachments F and G provides additional information regarding outreach and meetings held to develop this Proposal (e.g., meeting agendas, meeting notes and record of attendance).

1.5 Initial List of Participants in the Proposed Management Zone

This Preliminary Management Zone Proposal was voluntarily prepared by the following permitted dischargers, which have elected to comply with the Nitrate Control Program through Path B – Management Zone Approach:

- Growers regulated under General Order R5-2013-0120-07 (as further amended) under the Irrigated Lands Regulatory Program (ILRP) within the proposed Management Zone area (see Attachment A-1).
- Dairies regulated under General Order R5-2013-0122 and included in Attachment A-2.
- *[Placeholder to insert others as identified]*

2. Characterization of Proposed Management Zone

The subsections below describe the area encompassed by the proposed Management Zone, including general geographic and hydrologic characteristics, jurisdictions located within the planning area and key planning agencies and utilities. **Table 2-1** describes several key data sources for the Management Zone.

2.1 Geography

The eastern edge of the proposed Management Zone aligns with the edge of the alluvial boundary and the edge of the Sierra Nevada foothills. The Kings River enters the proposed Management Zone in the narrow, northernmost section (**Figure 2-1**). Flow into the Management Zone from the Kings River is regulated by the Pine Flat Dam on Pine Flat Reservoir, which is located just outside of the Management Zone. The Kings River travels southwest through the northern portion of the Management Zone, flows south and east forming part of the western edge of the Management Zone boundary, flows south past the western side of Reedley, before then turning southwest towards Kingsburg and eventually flowing out of the Management Zone near its southwestern corner (Figure 2-2). Other natural surface water features associated with the Management Zone include: Wahtoke Lake in the northern portion of the Management Zone; Cottonwood Creek which enters and ends near the Management Zone's southern border (Figure 2-2). In addition to these natural waterways: (a) AID operates 250 miles of open canals and 75 miles of pipelines to supply Kings River water to its district users; and (b) the Friant-Kern Canal runs northwest-southeast near the eastern edge of the Management Zone.

The proposed Management Zone lies within the San Joaquin Valley Groundwater Basin and the Kings Subbasin (Groundwater Basin Number 5-22.08) (DWR 2016) (**Figure 2-2**). While the California Department of Water Resources (DWR) updated the basin boundaries in 2016 a more recent updated basin boundary Geographical Information System (GIS) coverage that contains approved basin boundary modifications became available in February 2019.¹ Recent boundary revisions were based on the following requests:

- Kings River Conservation District – Modify the boundary to correct small segments that divide various local jurisdictions in the south and southeast.

¹ <https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118>. The actual GIS file was accessed online in February 2019: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/Bulletin-118-Groundwater-Basin-Boundary-GIS-Data---v6_1.zip?la=en&hash=D947E7AC9E03D122CC5D707369E581DF41320E50

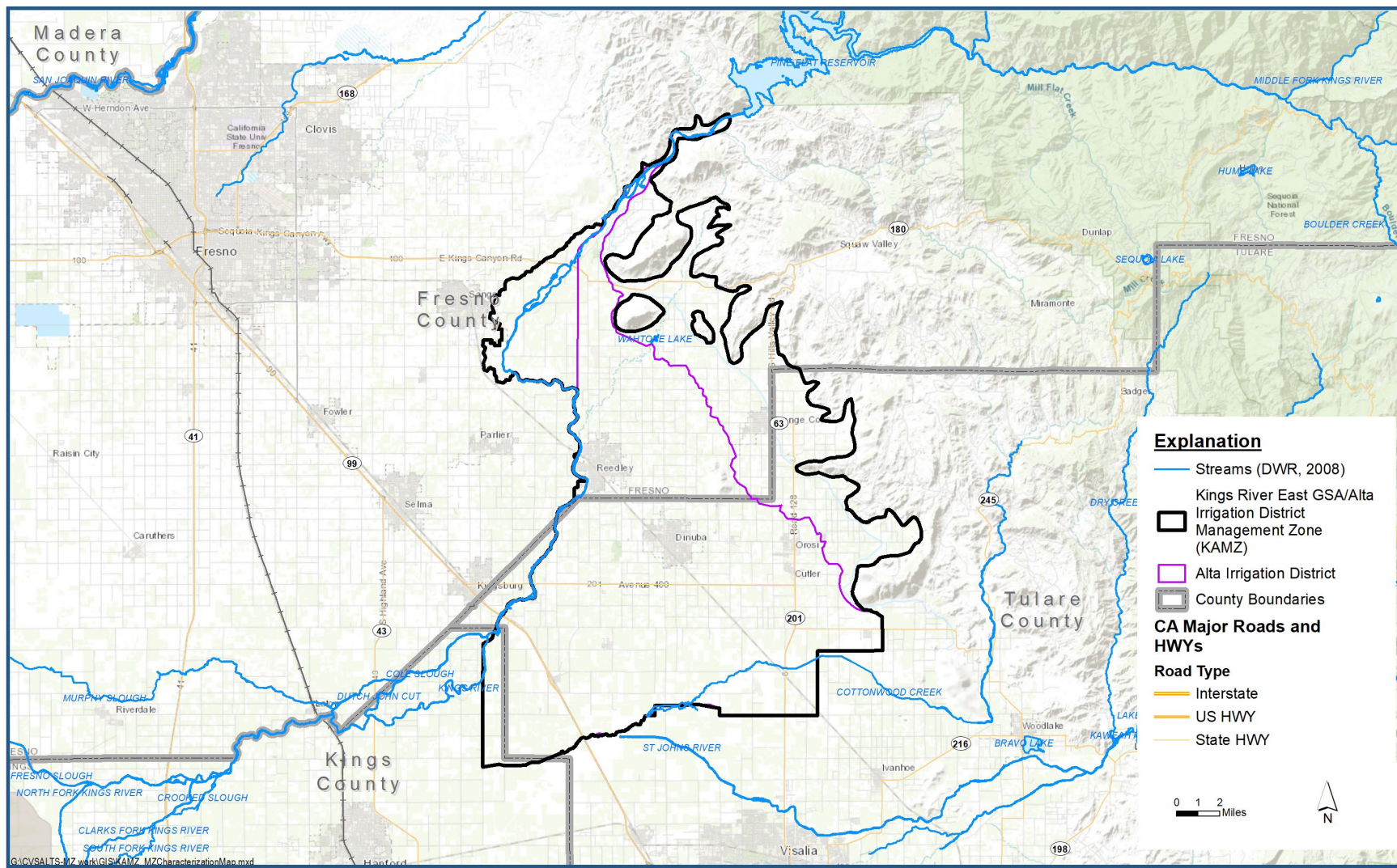


Figure 2-1. Surface Water Characteristics of the Proposed Management Zone

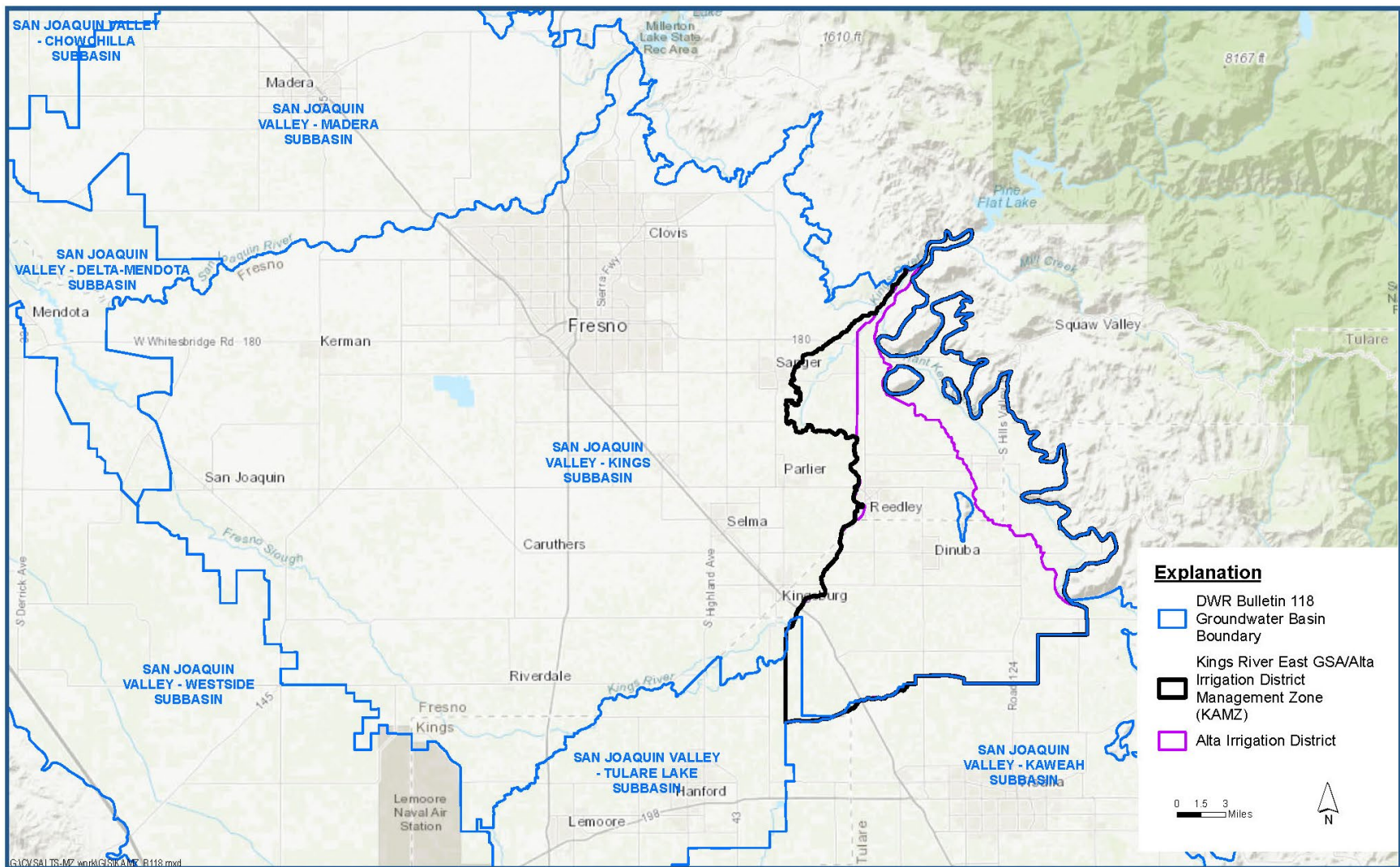


Figure 2-2. Groundwater Subbasins within and adjacent to the Proposed Management Zone

Table 2-1 Key Data Sources to Characterize Proposed Management Zone

Boundary Type	Source for Boundary Data	Comments
Groundwater Sustainability Agency	<ul style="list-style-type: none"> DWR Map Viewer: https://sgma.water.ca.gov/webgis/index.jsp?appid=gasmaster&rz=true Individual GSA links for finding “Interested Parties”: https://sgma.water.ca.gov/portal/gsa/all 	GSA boundaries, and also a list of GSA “Interested Parties”
Groundwater Basin/Subbasin	<ul style="list-style-type: none"> DWR Bulletin 118: https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118 Basin Boundary GIS file: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/Bulletin-118-Groundwater-Basin-Boundary-GIS-Data---v6_1.zip?la=en&hash=D947E7AC9E03D122CC5D707369E581DF41320E50 DWR Basin Boundary Modification Map Viewer: https://sgma.water.ca.gov/basinmod/modrequest/map.jsessionid=658C11952F60F610812069F4F5860BCD 	DWR Bulletin 118 basin and subbasin boundaries, including basin boundary modification
Water Districts	DWR by request from the Geology and Groundwater Investigations Section, or here: https://gis.water.ca.gov/arcgis/rest/services/Boundaries/i03_WaterDistricts/MapServer	Irrigation Districts, water districts, community service areas, and community service districts
Public Water Supply Systems	California Environmental Health Tracking Program (CEHTP): https://trackingcalifornia.org/water-systems/water-systems-landing	Division of Drinking Water
State Small Water Supply Systems (SSWS)	By request from County Environmental Health Departments (Fresno, Kings and Tulare Counties)	Boundary data is typically not available for SSWS (usually just an address)
Disadvantaged Communities (DACs)/ Disadvantaged Unincorporated Communities (DUCs)	<ul style="list-style-type: none"> DACs boundaries available from DWR: https://gis.water.ca.gov/app/dacs/ DUCs boundaries available from PolicyLink by request (https://www.policylink.org/) 	DUC boundaries only available for portions of the San Joaquin Valley

- Madera County – Modify boundary along its northern border to provide an updated representation of the Madera County boundary.
- San Luis & Delta-Mendota Water Authority – Modify the boundary to accommodate bifurcated jurisdictional entities along the northwestern border.

Water users in the proposed Management Zone use both surface water and groundwater to meet the water demands of the area; users rely more heavily on groundwater during periods of drought. The reliance on groundwater has resulted in a decline in groundwater levels from the early 1900s when the distance from the ground surface to the groundwater table averaged less than 10 feet (AID 2010). The area is dependent on the highly variable snowpack that occurs in the Sierra Nevada Mountain Range to the east. Irrigation water demands are met by

conjunctive use of groundwater and surface water supplies, but all domestic water demands are met by groundwater.

2.2 Jurisdictions

The proposed Management Zone includes portions of southern Fresno County, northern Tulare County and a very small area within Kings County (see Figure 2-2). Key communities within each of these areas include:

- Fresno County: Reedley and Orange Cove (incorporated)
- Tulare County: Dinuba (incorporated) and Orosi, Cutler, and Traver (unincorporated)

2.3 Groundwater Sustainability Agencies

GSAs, established under SGMA, are comprised of water users in the area. GSAs are required to list interested parties, including irrigation districts, public water supply systems, coalitions, etc. that are involved with the management of groundwater resources in the area. As required by SGMA, GSAs are required to prepare Groundwater Sustainability Plans (GSP) which requires each GSA to develop its own Hydrogeologic Conceptual Model (HCM), determine groundwater conditions in the area (including water quality), and estimate water budget components including annual groundwater pumping. Each of these GSP elements is useful with regards to the management of nitrate.

DWR, which oversees the development of GSPs for GSAs in the State of California, has established a web-based Portal for GSA documentation.² GSAs are located within and around the proposed Management Zone include (**Figure 2-3**):

- Within the proposed Management Zone, there is one exclusive GSA, the KRE GSA³
- Adjacent to the Kings River East GSA, there are six GSAs:
 - North Kings GSA – To the northwest in the Kings Subbasin
 - Central Kings GSA – To the west in the Kings Subbasin
 - South Kings GSA – Bordering a small portion of the western border in the Kings Subbasin
 - Mid-Kings River GSA – To the southwest in the Tulare Lake Subbasin
 - Greater Kaweah GSA – To the south in the Kaweah Subbasin
 - East Kaweah GSA – To the southeast in the Kaweah Subbasin

² GSA boundaries: <https://sgma.water.ca.gov/webgis/index.jsp?appid=gasmaster&rz=true>

³ <https://sgma.water.ca.gov/portal/gsa/print/225>

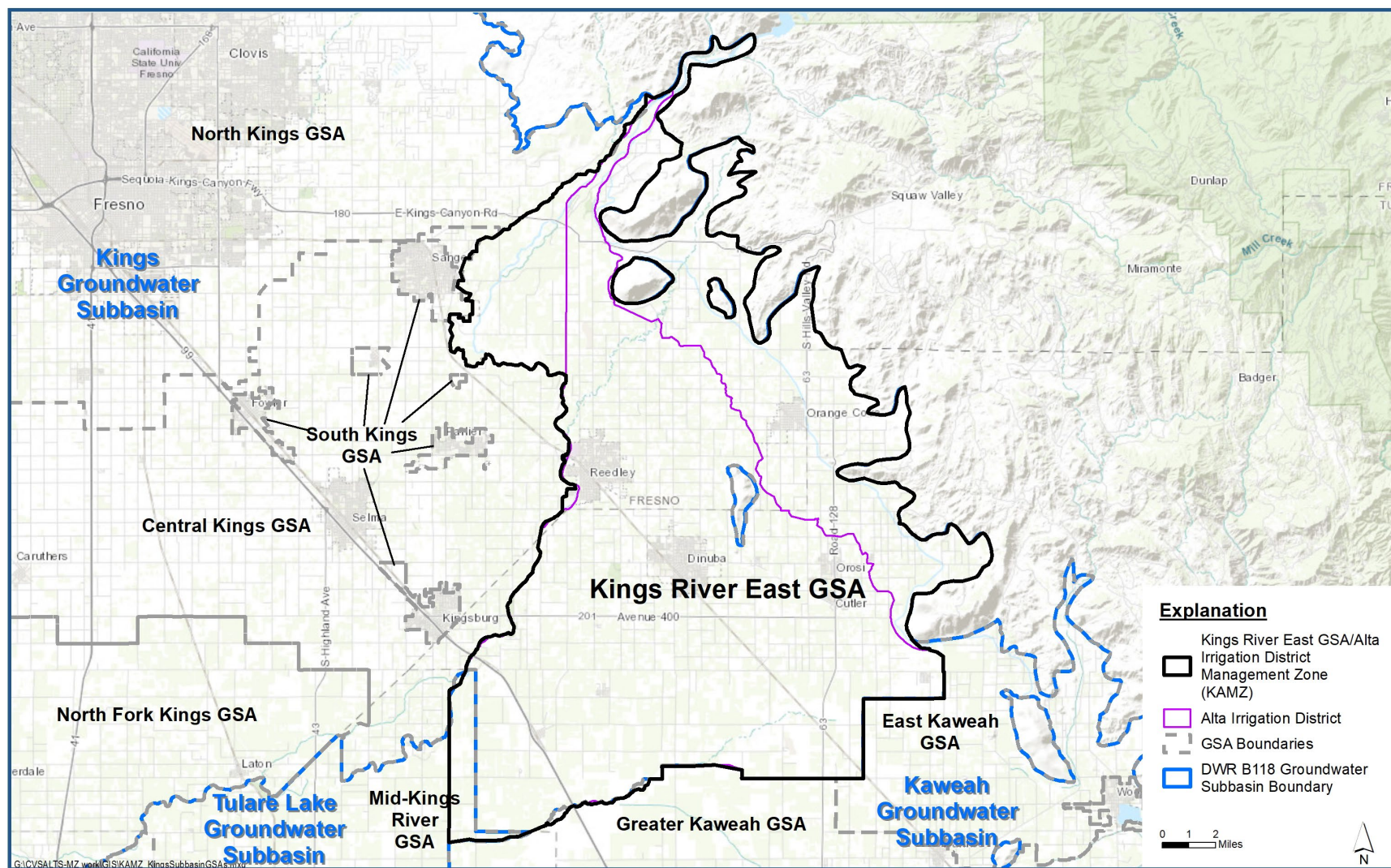


Figure 2-3. Location of Groundwater Sustainability Agencies Relative to Proposed KRE/AID Management Zone

Attachment B to this Preliminary Management Zone Proposal provides a summary of resource management agencies associated with the development of GSAs in and around the proposed Management Zone.

2.4 Water Management Entities

Water management-related districts include irrigation districts (ID), water districts (WD), water service areas (WSA), and community service districts (CSD). The following water management-related districts are located in the proposed Management Zone (**Figure 2-4**): AID, City of Dinuba WSA, City of Orange Cove, City of Reedley WSA, Cutler Public Utilities District, Hills Valley ID, Kaweah Delta Water Conservation District, Kings County WD, Kings River WD, Orange Cove ID, Sultana Community CSD, and Tri-Valley WD.

2.5 Drinking Water Systems

Table 2-2 summarizes how residential water systems are classified in California. Systems are categorized by use, connections and duration of service over a period of a year. Residential water systems are distinguished by the total number of service connections, e.g., Local Small Water Systems (LSWS) serve 2 to 4 household connections, SSWSs serve 5 to 14 household connections, and residential Public Water Systems (PWS) serve more than 14 household connections. The following subsections provide additional information regarding each of these types of water systems within the proposed Management Zone. Residential PWS are termed Community Systems. The PWS designation also includes non-residential water systems, such as Transient Non-Community Systems (rest stops, retailers, gas stations, markets, parks, etc.), and Non-Transient Non-Community Systems (churches, schools, non-retail companies, etc.).

2.5.1 Public Water Systems

PWS are defined as systems that provide drinking water to: (1) at least 15 households for Community systems; or (2) at least 25 people 60 days or more per year for non-Community systems (see Table 2-2). PWS, which are regulated by the State Water Resources Control Board (State Water Board) Division of Drinking Water (DDW), are required to submit water samples of their raw and delivered water for a broad suite of regulated constituents on various schedules that depend on the constituent and the source water context. All PWS data on water quality, source locations, service areas, and historical data are publicly available on the State Water Board website.⁴

⁴ <https://data.ca.gov/dataset/drinking-water-public-water-system-information>

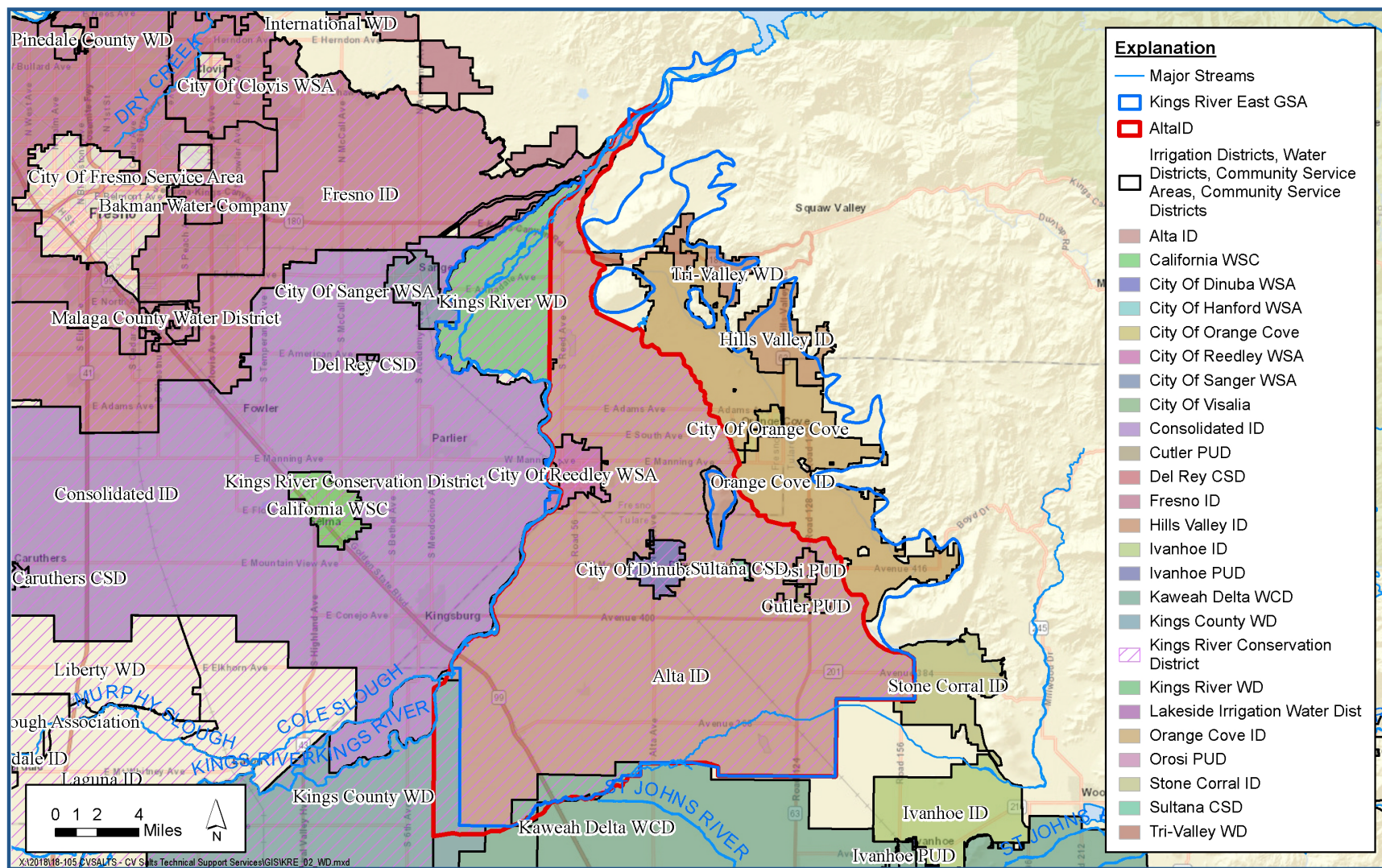


Table 2-2. Classification of Drinking Water Systems by Constituency, Connections, and Duration of Service per Year (adapted from Boyle et al. 2012)

Duration of Service	Connections:		< 5	5 +	< 15	15 +	< 200	200 +	
	Persons Served:		< 25			25+			
N/A	Small Water System (SWS) ¹	Classification Defined By	Connections						
< 60 days/year	Local Small Water System		Connections & (persons, duration)						
< 60 days/year	State Small Water System			Connections & (persons, duration)					
≥ 60 days/year	Community Public Water System ²						Connections or (persons, duration)		

¹ Classification as a SWS does not preclude classification as any of the other types. SWS may be regulated by DDW or by Local Primary Agency county.

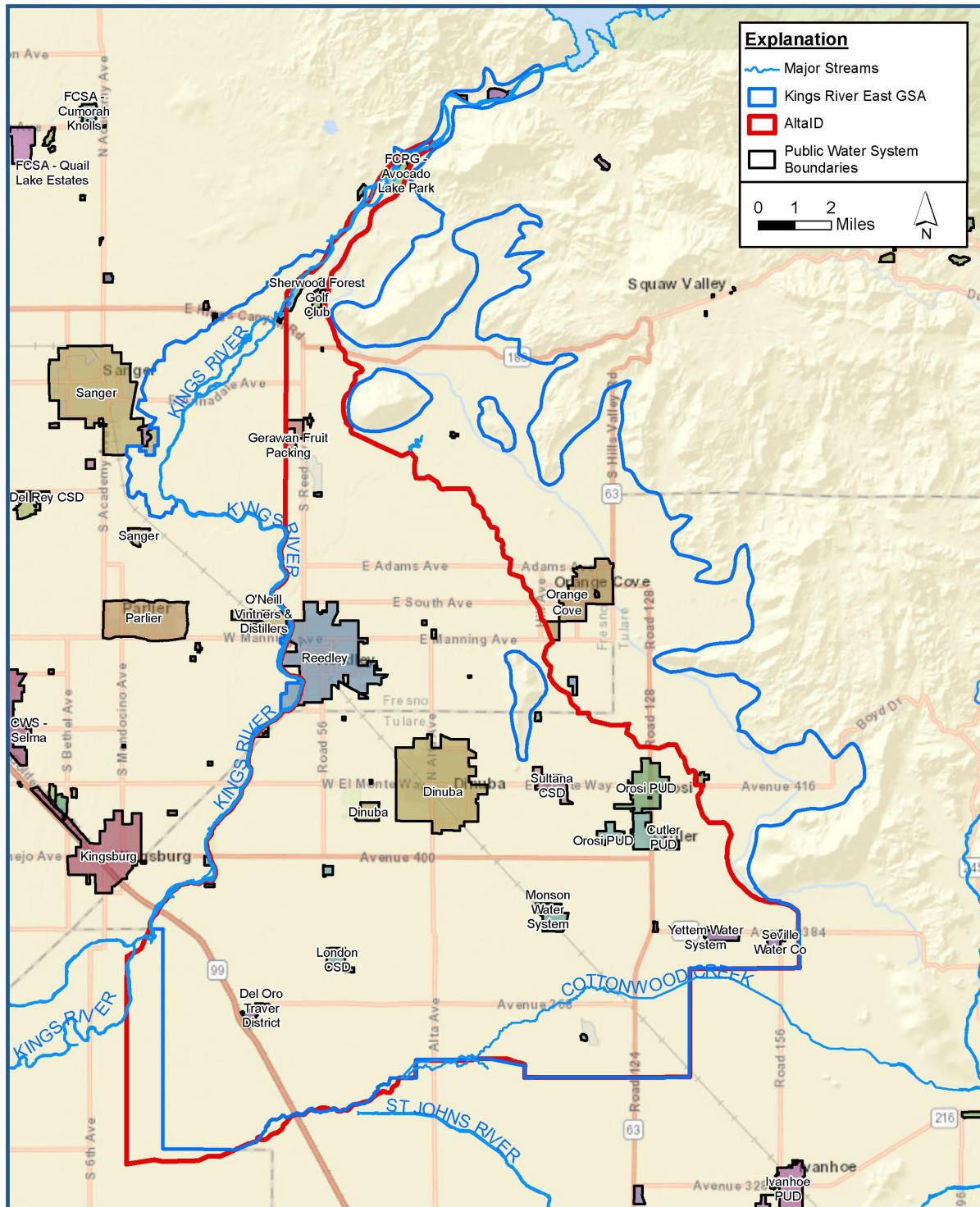
² A PWS is a system for the provision of water for human consumption that has 15 or more service connections OR regularly serves at least 25 individuals at least 60 days per year.

The California Environmental health Tracking Program (CEHTP) maintains a dataset of PWS boundaries in California.⁵ These data are provided to CEHTP by the water systems. Some quality control measures are observed by CEHTP, but the data do contain errors, including boundary errors, e.g., overlapping, misplaced boundaries or duplicated boundaries. The data are hosted as a shapefile with attributes for the PWS ID, system name, the number of connections and number of persons served, and the water system type.

The PWS ID and system name are reliable except in the few cases where system boundaries are entirely mis-located. When the connections and population served numbers are compared with those same datapoints in the Safe Drinking Water Information System (SDWIS) database maintained by the State Water Board's DDW, these values appear to either be lacking quality control procedures or are not updated. It is unclear if these numbers are reported by the systems or added by CEHTP based on other data. However, many PWS are wholesalers, thus some populations may inadvertently be counted twice.

Figure 2-5 provides the locations of PWS boundaries within the proposed Management Zone. A few unexplained overlaps are present; these overlaps are most likely the result of overlap between wholesalers and retail water purveyors.

⁵ <https://trackingcalifornia.org/water-systems/water-systems-landing>



2.5.2 State Small Water Systems

SSWS are defined as systems serving at least five but not more than 14 residential households. Typically, SSWSs are regulated by county environmental health departments; regulatory oversight of these systems varies by county. Typically, counties require submission of water quality samples annually (at most) for a smaller set of constituents than monitored by a PWS.

SSWS data are public; however, most counties in the state do not have these data compiled in any easily accessible format (many counties require a fee for data retrieval for these systems). Typically, a county will have hard-copy files of the original permit filed for the SSWS, and an annual record of water quality data collected for compliance with county regulations (although such data collection may be sporadic and only for a few constituents). The permit typically includes information on the construction of the water source (well) and the street where service is provided. Most counties do not have maps of SSWS service areas; in most cases, the only way to locate the service area of a SSWS is to use the address recorded on the permit. Some SSWS are included in the PWS boundary data maintained by CEHTP, described above, but this is irregular.

Fresno, Kings and Tulare Counties were contacted to obtain SSWS data for the proposed Management Zone Area. The following information has been obtained to date:

- The Fresno County provided a list of 23 SSWSs located in the County. Fresno County also has a website that includes a utility for gathering available images of documents related to SSWSs, which may include water quality, well construction and service area data.⁶
- Kings County Environmental Health provided a list of seven SSWS and available electronic documents related to each system. These documents included some water quality data, locations of wells, and construction information for most of the wells.
- Tulare County Environmental Health provided addresses of well locations for 30 SSWSs; 25 of those systems had nitrate measurements: one of those systems is located within the Management Zone (Quintero Water System); one is located approximately one mile outside of the Management Zone boundary (Kingsburg Flats). Tulare County information also includes numbers of people and connections served by each SSWS.

In order to determine if a SSWS is within the Management Zone boundary, the addresses need to be geocoded or plotted on a map. After attempting to geocode the addresses of the water systems (some addresses were incomplete and must be estimated) provided by each County, it was possible to locate only a total of three systems within the Management Zone

⁶ <https://www.co.fresno.ca.us/departments/public-health/environmental-health>

(Table 2-3). Where available, the Counties provided water quality test results, including nitrate test results, as available.

Table 2-3. State Small Water Systems Located within the Proposed Management Zone

County	Small Water System Name	Address
Fresno County	Rio Vista Mobile Home Park	25385 E Trimmer Springs Rd Sanger
Tulare County	Kingsburg Community MWC	39309 Holly Oaks Ln, Kingsburg
	Quintero WS	13547 Ave, Cutler

2.5.3 Local Small Water Systems

LSWS include residential systems serving two to four households. LSWSs are typically permitted by county Environmental Health Departments. Most counties regulate LSWS as if they were simply private wells – that is, they are unregulated except for the requirements associated with the drilling permit. Typically, no information is available to identify the difference between a single-household well and one used for a LSWS. No water quality data are typically collected on an ongoing basis from an LSWS and domestic wells, though some counties do collect a water quality sample at the time the well is drilled.

Within the proposed Management Zone area, the following groundwater well information was developed through coordination with the counties:

- *Fresno County* - Fresno County Environmental Health tracks domestic and LSWS wells and has been conducting a water quality survey on these wells for several years. Fresno was able to provide a list of all the wells in the portion of Fresno County within the proposed Management Zone, with nitrate results for many of these wells. The dataset provided included 2,570 Domestic Private wells, which include wells serving an LSWS. The database included the APN of the well location. For some locations a notation was included that the County has a copy of the Well Completion Report (WCR), however, construction information is only available by individual review of the WCRs, which has not been done to develop this Management Zone proposal.
- *Kings County* – The County does not collect water quality data for domestic wells or LSWS wells. The County Community Development Agency archives well permits in a pdf electronic format, and WCRs (also as pdf) if those are provided to the County by the well drillers. WCRs are required to be submitted, but the extent of compliance is poorly understood.
- *Tulare County* - Tulare GIS provided a large database of well and groundwater-related information. These data include information about domestic and LSWS wells; however, at this time is not possible to distinguish among these data types.

2.6 Disadvantaged Communities and Disadvantaged Unincorporated Communities

DACs and DUCs include many areas of the state that have poor access to regulated drinking water supplies, and the neighborhoods these areas comprise tend to include many households without adequate financial resources to treat their residential domestic supply well water, or even to test for contaminants.

DACs are defined as those areas of the state with Median Household Income (MHI) below 80% of the statewide MHI. These areas are further categorized as Severely Disadvantaged Communities (SDAC) if the local MHI is below 60% of the statewide MHI. DWR, which maintains several databases of DAC Boundaries based on the most recent census,⁷ provides three different scales of analysis for DACs:

- *DAC Tracts* – Census Tracts are the largest census areas compiled below the county level. County boundaries are contiguous with Tract boundaries. Tracts consist of groups of Block Groups.
- *DAC Block Groups* – Block Groups are next scale smaller than Tracts. Tract boundaries are contiguous with Block Group boundaries. Block Groups consist of groups of Blocks.
- *DAC Places* – Census Places, or Census Designated Places (CDP) are not contiguous with other Census boundaries and may consist of groups of complete or partial Blocks or Block Groups. CDPs are typically unincorporated residential neighborhoods; but, unincorporated status is not a requirement for place designation. CDPs are legacy designations, with locally known names. Some are distinct from nearby incorporated areas due to geographic boundaries such as rivers, roads, or topography. DAC Places are typically a more accurate representation of neighborhoods with qualifying MHIs rather than Tracts or Block Groups. DWR does not provide an assessment of DAC status at the Block level.

DUCs are areas that meet the above-defined MHI criteria (80% of statewide MHI). PolicyLink (2013) provides the best available information on DUCs located in the Management Zone area. These locations were developed primarily through the use of Census data, but neighborhoods were also characterized and individually delineated based on parcel density, more detailed income from counties and state agencies, and with input from local resources. Each DUC is designated as one of the following:

- *Island* – Neighborhood within a city or other incorporated area that has been left out of that incorporated jurisdiction
- *Fringe* – Neighborhood on the outskirts of an incorporated area
- *Legacy* – Neighborhood located well outside the boundaries of any incorporated area.

⁷ DWR's boundary files for DACs: <https://gis.water.ca.gov/app/dacs/>

Many of the DUCs identified by PolicyLink overlap with DAC Places identified by DWR (see above) because many CDPs are unincorporated areas that also meet the criteria used by PolicyLink in their study.

Table 2-4 lists and **Figure 2-6** illustrates the locations of the 17 DACs and eight DUCs in the proposed Management Zone. Many of the DUCs identified by PolicyLink overlap with DACs identified by DWR. An investigation of these populations must determine which coverage is more appropriate for each community identified as an overlapping feature. These overlaps occur since many of the CDPs are unincorporated and meet the criteria used by PolicyLink in their study. **Table 2-5** summarizes the characteristics of DACs and DUCs in the Management Zone area. Combined, non-overlapping DAC and DUC areas comprise approximately 10.3% of Management Zone (20,296 acres or 31.7 square miles [sq. mi.]).

2.7 Land Use

Table 2-6 and **Figure 2-7** provide the land use characteristics of the proposed Management Zone associated with agricultural activity. Land use in the eastern portion of the Management Zone is predominantly classified as citrus and subtropical crops. The predominate crop shifts to more deciduous fruits and nuts to the west and more field crops to the south.

Besides the nonpoint sources of nitrate loading that can occur due to agricultural land uses, septic systems are also a smaller but potential source of localized nitrate loading. The amount of nitrate loading from septic systems is variable, dependent on the rate of denitrification. Denitrification occurs in the soil column below the septic leachfield, with more denitrification occurring where more carbon is available and where clayey or heavy soils slow the downward flow of water (creating larger anaerobic zones that increase denitrification). Conversely, in soils below the septic leachfield where there is less carbon available and there exists sandy, faster soils, the water travels downward more quickly (creating a thin anaerobic zone), which results in lower denitrification rates, and therefore more nitrate potentially reaching the water table.

No current dataset exists that reports the fate of sewage from households. The most recent dataset was from the 1990 Census, which is now almost 30 years old. For the proposed Management Zone, the density of septic systems was estimated using the number of household data from the most recent 2010 census block spatial coverage. The census block coverage was used by erasing areas within City boundaries (CalTrans dataset) or community water system (CWS) service areas (CEHTP dataset). The proportion of area erased was used to reduce the number of households associated with the census block that is likely hooked up to a sewer system. The remaining households outside city and CWS service areas were assumed to have septic systems. **Figure 2-8** illustrates the estimated location and density of septic systems by assigning random locations within remaining census blocks (i.e., areas not served by a sewer system) with the restriction that no septic system can be within 100 feet of another septic system (per California Code).

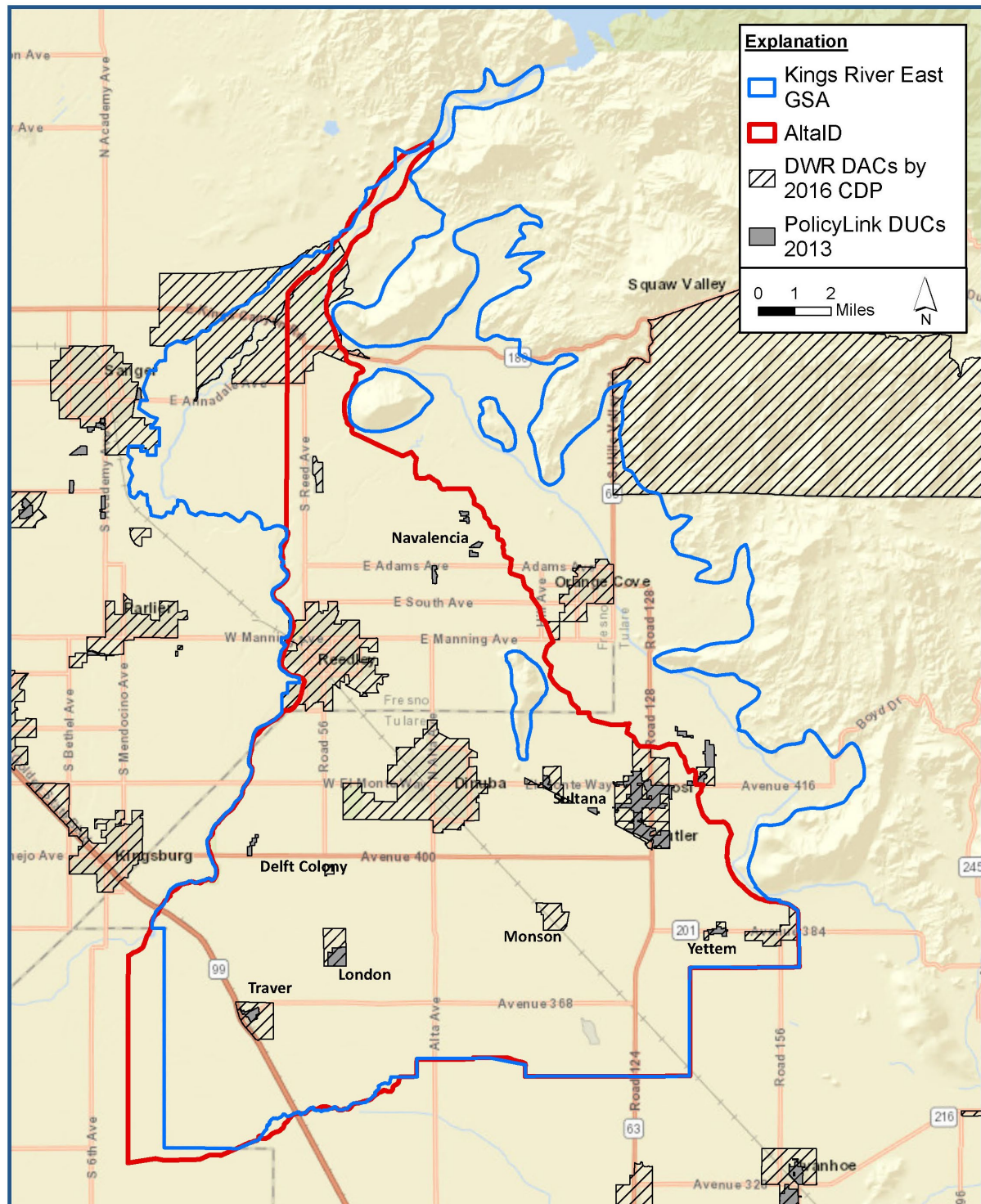


Figure 2-6. Location of DACs and DUCs within and adjacent to the Proposed Management Zone.

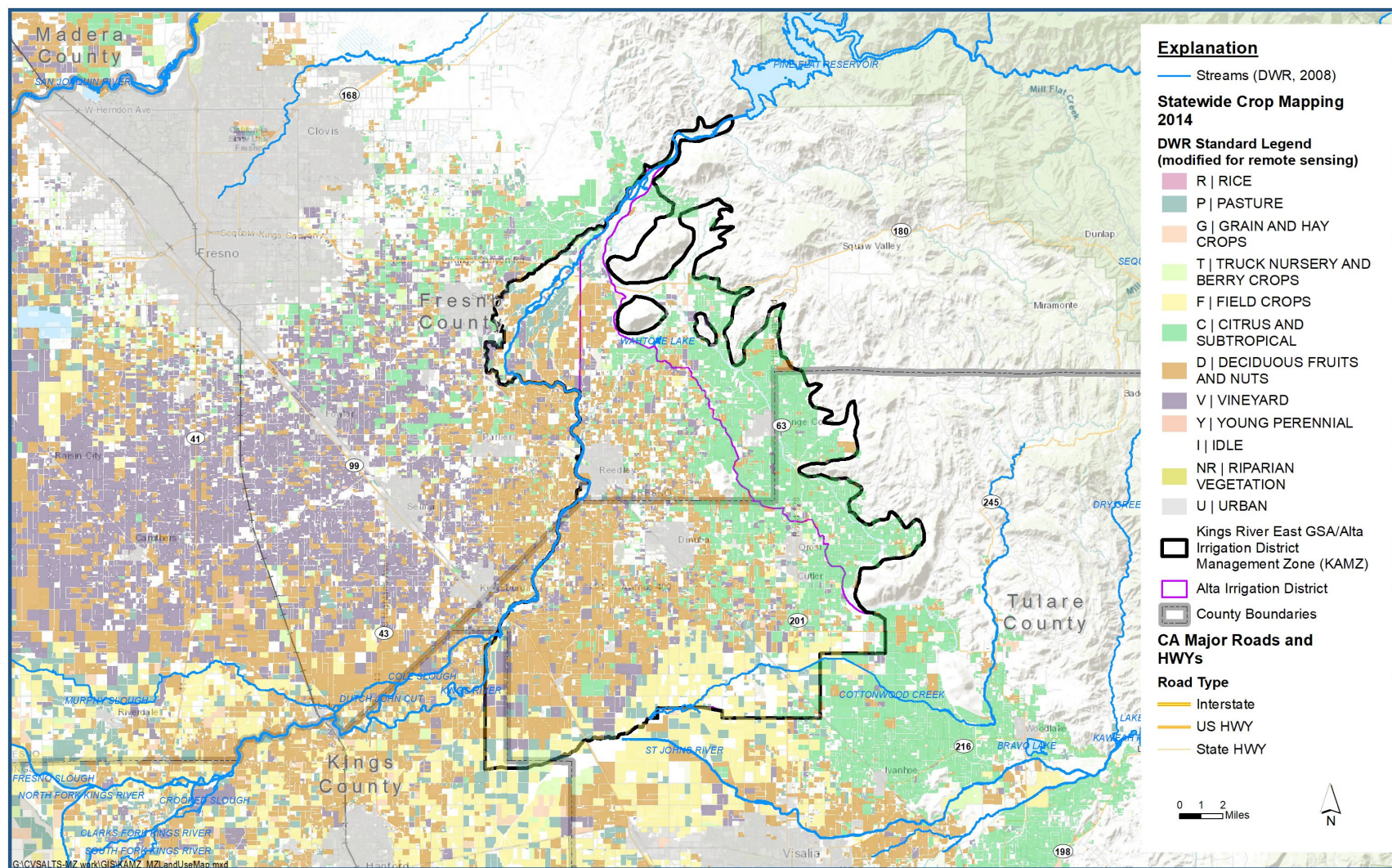


Figure 2-7. Agricultural Land Use in the Proposed Management Zone (Note: Far eastern portion is unmapped).

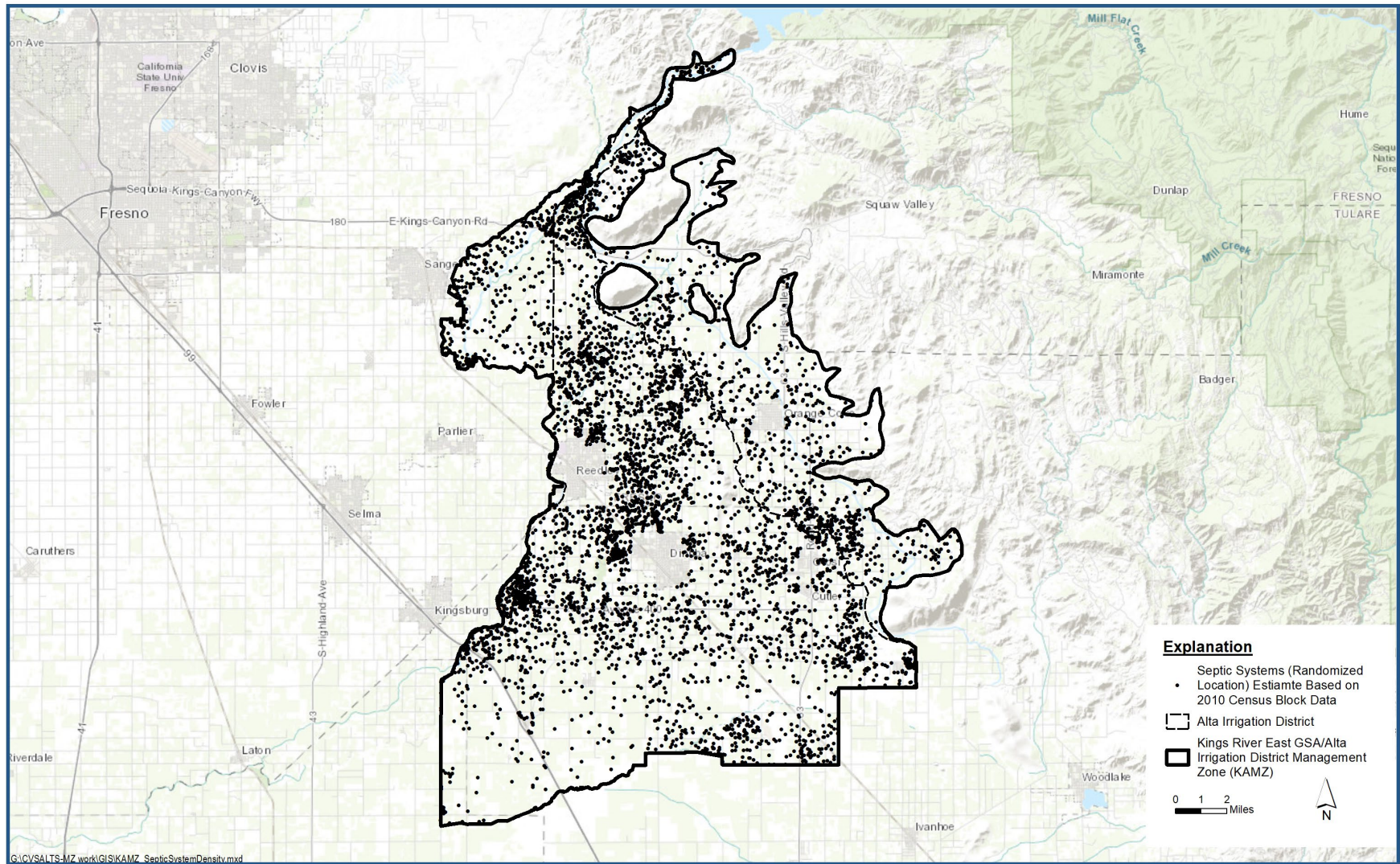


Figure 2-8. Estimated Locations of Septic Systems within the Proposed Management Zone

Table 2-4. Population of DACs and DUCs located in the Proposed Management Zone

Community	DWR DAC Populations by 2010 CDP	DUC Population (PolicyLink 2013)
Centerville CDP	450	
Cutler	5,175	
Delft Colony	103	77
Dinuba	23,465	
East Orosi	785	782
London	2,084	1,855
Minkler	1,293	
Monson	294	
Navelencia		145
Orange Cove	9,566	
Orosi	7,711	11,951
Reedley	25,273	
Sanger	24,741	
Seville	586	
Squaw Valley	3,187	
Sultana	1,099	624
Traver	747	633
Yetter	353	195
Total Population	106,912	16,262

Table 2-5. DAC and DUC Characteristics in the Proposed Management Zone

Category	No. of Locales	Acres (sq. mi.)	Estimated Population
DACS	17	19,935 (31.1)	78,814
DUCs	14	1,518 (2.4)	16,262
DACs (without overlap)	17	18,779 (29.3)	71,948
Total (without overlaps)	31	20,296 (31.7)	88,210

Table 2-6. Land Use Summary for Proposed Management Zone (land use designations based on DWR 2014)

Land Use Designation	Area (sq. mi.)	Area (acres)	Percent of Total Management Zone Area
CITRUS AND SUBTROPICAL	67.93	43,476	22.06%
Citrus	65.27	41,774	21.20%
Miscellaneous Subtropical Fruits	0.03	17	0.01%
Olives	2.63	1,684	0.85%
DECIDUOUS FRUITS AND NUTS	70.94	45,399	23.03%
Almonds	5.69	3,643	1.85%
Apples	0.19	123	0.06%
Cherries	2.68	1,717	0.87%
Kiwis	1.44	921	0.47%
Miscellaneous Deciduous	1.32	847	0.43%
Peaches/Nectarines	37.59	24,058	12.21%
Pears	0.12	74	0.04%
Pistachios	1.50	958	0.49%
Plums, Prunes and Apricots	15.50	9,919	5.03%
Pomegranates	2.19	1,404	0.71%
Walnuts	2.71	1,735	0.88%
FIELD CROPS	20.29	12,988	6.59%
Beans (Dry)	0.52	333	0.17%
Corn, Sorghum and Sudan	19.14	12,252	6.22%
Cotton	0.51	326	0.17%
Miscellaneous Field Crops	0.12	77	0.04%
GRAIN AND HAY CROPS	1.75	1,120	0.57%
Miscellaneous Grain and Hay	1.12	714	0.36%
Wheat	0.63	406	0.21%
IDLE	15.41	9,863	5.00%
Idle	15.41	9,863	5.00%
PASTURE	15.32	9,803	4.97%
Alfalfa and Alfalfa Mixtures	10.03	6,420	3.26%
Miscellaneous Grasses	0.26	167	0.08%
Mixed Pasture	5.02	3,216	1.63%
TRUCK NURSERY AND BERRY CROPS	3.33	2,131	1.08%
Bush Berries	1.13	723	0.37%
Flowers, Nursery and Christmas Tree Farms	0.07	47	0.02%
Melons, Squash and Cucumbers	0.52	331	0.17%
Miscellaneous Truck Crops	0.87	555	0.28%
Onions and Garlic	0.07	48	0.02%
Peppers	0.03	20	0.01%
Strawberries	0.02	12	0.01%
Tomatoes	0.62	395	0.20%

Table 2-6. Land Use Summary for Proposed Management Zone (land use designations based on DWR 2014)

Land Use Designation	Area (sq. mi.)	Area (acres)	Percent of Total Management Zone Area
URBAN	11.11	7,108	3.61%
Urban	11.11	7,108	3.61%
VINEYARD	21.65	13,854	7.03%
Grapes	21.65	13,854	7.03%
YOUNG PERENNIAL	0.57	363	0.18%
Young Perennials	0.57	363	0.18%
Grand Total	228.29	146,105	74.13%
Unmapped Total	79.66	50,984	25.87%
Total KAMZ Area	307.95	197,089	100.00%

3. Initial Assessment of Groundwater Conditions

The initial assessment of nitrate groundwater conditions for the Preliminary Management Zone Proposal is based on readily available existing data and information. Where possible, information from the Central Valley SNMP (CV-SALTS 2016a) was used and updated with more recent groundwater quality data from publicly available sources. Key data sources for this assessment included:

- Supplemental information on groundwater within the proposed KRE/AID Management Zone was obtained via DWR's Bulletin 118 (DWR 2003). This document provides an overview of groundwater conditions (both groundwater levels and groundwater quality) in specific subbasins. Bulletin 118 also contains descriptions of groundwater basins and subbasins in California, with many descriptions updated from their 2003 descriptions in 2016 (DWR 2016). DWR also released their statewide Groundwater Basin Prioritization in 2014 and 2015,⁸ which contains basic information on each groundwater basin including population, population growth, total number of public supply wells, groundwater volume, percent of total water supply supplied by groundwater, irrigated acreage, and other comments on groundwater levels or quality specific to aquifers within the basin.
- The KRE GSA, which overlays most of this proposed Management Zone is actively working on the development of its GSP,⁹ which is due to DWR on or before January 31, 2020. The GSP will contain additional hydrogeological information including cross sections, description of the distribution of groundwater pumping (spatially and vertically), groundwater flow directions (possibly with more information on the northeastern and southeastern portions of the Management Zone where DWR does not currently have groundwater elevation contour data), and any additional non-public groundwater quality data.
- CV-SALTS technical findings, which included projects from areas within this proposed Management Zone:
 - High-resolution mapping analysis of nitrate and total dissolved solids (TDS) groundwater quality in the Central Valley Region (CV-SALTS 2016c). The high resolution mapping of salt and nitrate was completed for the Upper, Lower, and Production Zones of the groundwater system, which are defined in the documentation. Ambient TDS and nitrate conditions are provided, as well as assimilative capacity, groundwater quality trends, and predicted conditions (after 10, 20, and 50 years). The CV-SALTS high resolution dataset utilizes groundwater quality data from 2000-2016.
 - Conceptual management zone study (AID Management Zone Archetype Study), which was developed and implemented in a collaborative setting with local stakeholders, served as an example and “proof of concept” to help test, on a spatially refined basis, the

⁸ https://water.ca.gov/LegacyFiles/groundwater/casgem/pdfs/lists/PubRel_BasinRank_by_HR_5-18-15.pdf

⁹ The KREGSA GSP outline is available on the Kings River East GSA's website: <https://kingsrivereast.org/wp-content/uploads/2019/01/kregsa-gsp-outline.pdf>, accessed June 2019.

application of selected policies, data analysis methods, and salt and nitrate management approaches under consideration by CV-SALTS (CV-SALTS 2016b).

- Through CV-SALTS a Nitrate Implementation Measures Study was conducted to identify potential nitrate management controls (e.g., pump, treat, and serve, or pump, treat, and re-inject) that could be deployed to improve water quality (CV-SALTS 2016d). At the same time the AID Management Zone Archetype Study (CV-SALTS 2016b) evaluated a number of management scenarios and the potential benefits to water quality within the AID area. To better understand the types of nitrate control measures that would be necessary to meet implement a management aquifer restoration program (i.e., improve water quality so that it meets the 10 milligrams/liter (mg/L) nitrate maximum contaminant level [MCL]), the Aggressive Restoration Modeling Scenario Study was completed within a portion of the proposed Management Zone area to link nitrate management scenarios with selected nitrate management controls and on-farm winter recharge to determine how groundwater quality was affected (CV-SALTS 2016e).

Table 3-1 summarizes sources of data reviewed and accessed to complete this Initial Assessment of Groundwater Conditions.

3.1 Hydrogeology

The proposed Management Zone is located in the eastern part of the Kings Subbasin of the San Joaquin Groundwater Basin. DWR's Bulletin 118 describes the Kings Subbasin as lying between the San Joaquin River to the north; the eastern contact of the alluvium with the metasedimentary, metavolcanics, and granitic rocks of the Sierra Nevada foothills; and jurisdictional boundaries to the south and west, including the Tulare/Kings County line, the Kings River, and the Westlands Water District. According to the Bulletin 118 description, the Kings Subbasin receives 7 to 10 inches of average annual precipitation, increasing eastward (DWR 2006).

The primary hydrogeologic units in the Kings Subbasin consist of unconsolidated continental deposits of Tertiary and Quaternary age, overlain by a younger series of deposits of Quaternary age. In the Management Zone area, most of the surface geology consists of continental deposits and younger alluvium, whose thickness pinches out steeply to the east toward the Sierra Nevada foothills where the basement complex forms a border between the alluvium.

Figure 3-1 shows the surficial geology and cross section location map; **Figure 3-2** illustrates a general depiction of the hydrogeologic units in map and cross-sectional forms for the eastern portion of the Kings Subbasin (adapted from Muir 1977; Brown and Caldwell & WRIME 2006). The Corcoran Clay (E-Clay) is also an important feature in the Kings Subbasin, and is generally present on the west side of the subbasin, west of the Management Zone area.

Table 3-1. Data Sources Accessed to Develop Initial Assessment of Groundwater Conditions in the Proposed Management Zone

Data Source	Link
General Groundwater Conditions	
DWR Bulletin 118 overview of basin/subbasin conditions (groundwater levels and groundwater quality)	https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118
DWR's Groundwater Sustainability Basin Prioritization	https://water.ca.gov/LegacyFiles/groundwater/casgem/pdfs/lists/PubRel_BasinRank_by_HR_5-18-15.pdf
Individual GSA's Hydrogeologic Conceptual Model, via request to the GSA Point of Contact	https://sgma.water.ca.gov/portal/gsa/all
CV-SALTS High Resolution Salt and Nitrate Mapping for Region 5	https://www.cvsalinity.org/committees/technical-advisory/conceptual-model-developments/171-updated-groundwater-quality-analysis-for-central-valley.html
Other CV-SALTS Studies within the proposed Management Zone area	<ul style="list-style-type: none"> Nitrate Implementation Measures Study: https://www.cvsalinity.org/docs/committee-document/technical-advisory-docs/implementation-planning/3275-20160331-nims-report-rev1/file.html AID Management Zone Archetype Study: https://www.cvsalinity.org/docs/committee-document/technical-advisory-docs/conceptual-model-development/3335-aid-management-zone-report-final-may-2016-072916/file.html Aggressive Restoration Scenario Study: https://www.cvsalinity.org/docs/ceqa/ceqa-documents/3525-final-tm-aggressive-restoration-scenario-09292016.html
Publicly Available Groundwater Quality Data Sources	
GeoTracker GAMA	http://geotracker.waterboards.ca.gov/gama/gamamap/public/
DWR Water Data Library	http://wdl.water.ca.gov/waterdatalibrary/waterquality/index.cfm
USGS National Water Information System	https://waterdata.usgs.gov/nwis/qw)
GeoTracker Regulated Facilities	http://geotracker.waterboards.ca.gov/ and http://geotracker.waterboards.ca.gov/datadownload
Division of Drinking Water	https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/EDTlibrary.html)
County-Specific Data Available by Request	
Fresno County state small water systems and domestic/local small water systems (water quality data)	https://www.co.fresno.ca.us/departments/public-health/environmental-health
Kings County state small water systems (water quality data)	https://www.countyofkings.com/departments/health-welfare/environmental-health-services-1 https://www.countyofkings.com/departments/community-development-agency
Tulare County state small water systems (water quality data)	https://tularecountyeh.org/eh/ https://tularecounty.ca.gov/tcict/index.cfm/information-services/geographic-information-system-gis/

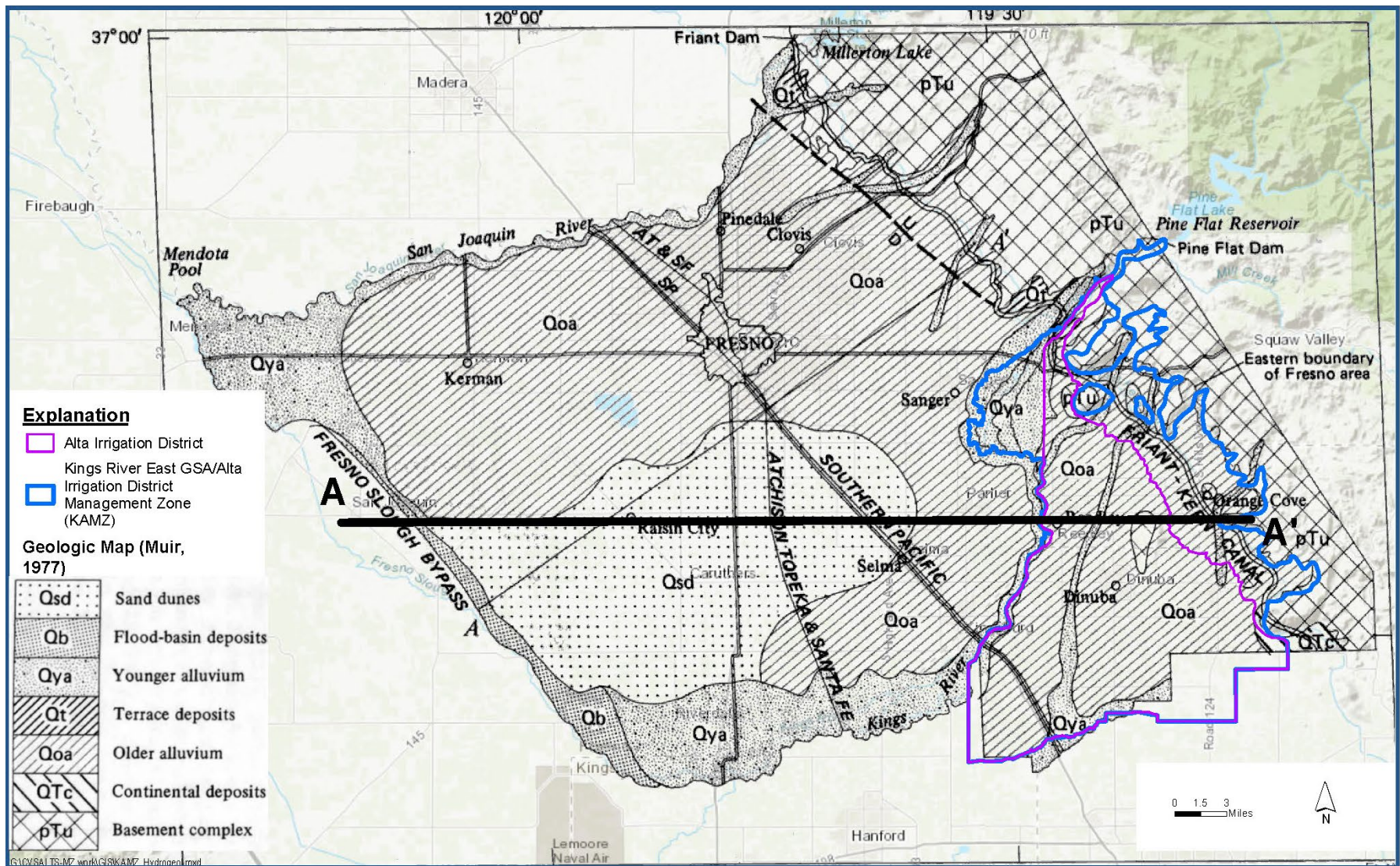
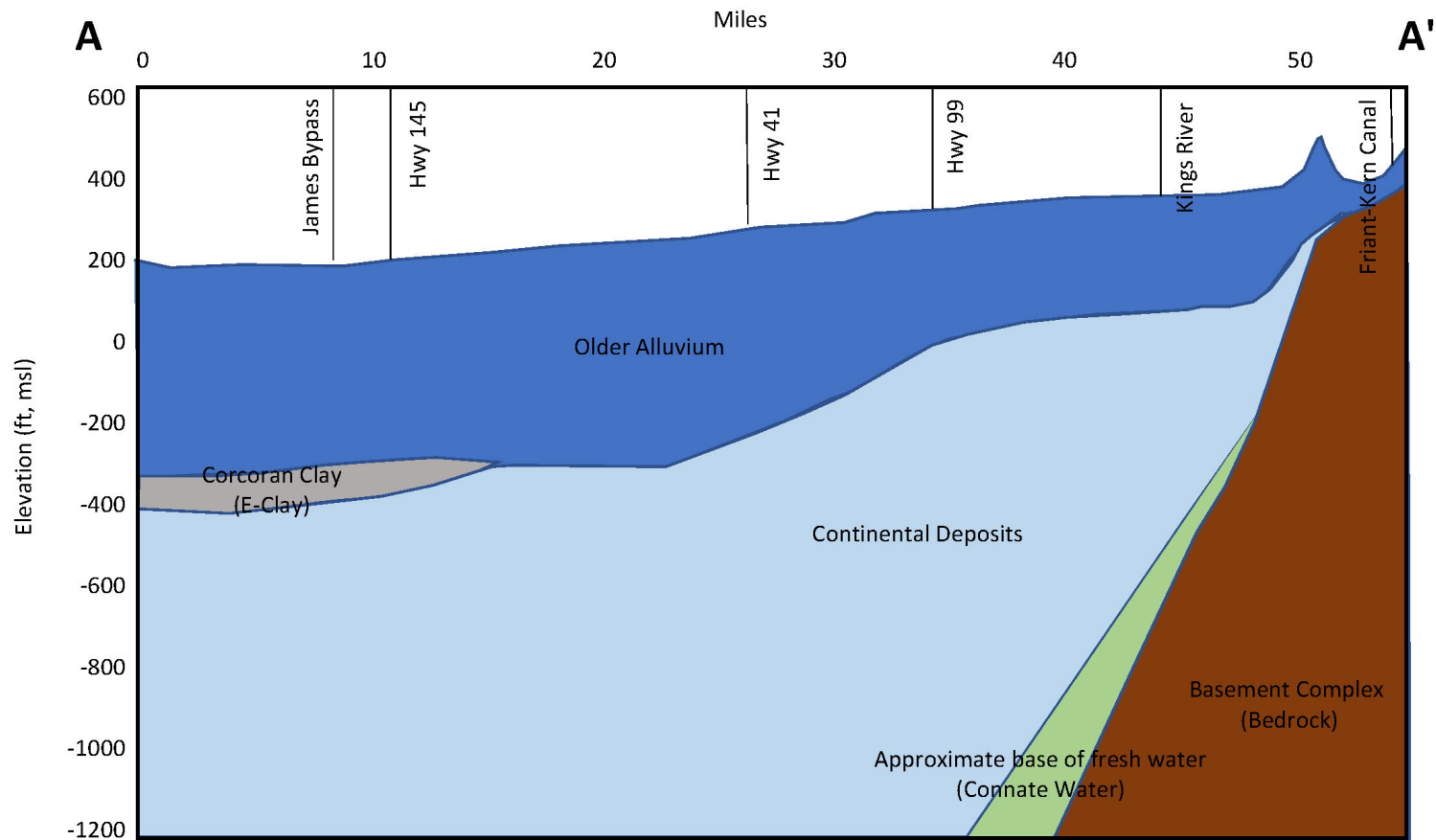


Figure 3-1. Fresno Area/Kings Subbasin Area Surficial Geology and Cross Section Location



Adapted from Muir, 1977 and Brown and Caldwell & WRIME, 2006.

Figure 3-2. Conceptual Hydrogeologic West-East Cross Section of the Kings Subbasin

3.2 Groundwater Elevations and Flow

Regional groundwater flows generally from the Sierra Nevada foothills to the west and south, following the regional dip of basement rock and sedimentary units. Contours of equal groundwater elevation are available from DWR for Spring 2018 (**Figure 3-3**).¹⁰ This map shows groundwater entering the proposed Management Zone from the eastern border and flowing mostly southwest. Groundwater levels are highest in the east and lowest in the southwest. The Kings River East GSA is in the process of developing their own description of groundwater levels in the Management Zone area of the Kings Subbasin, which could be used to supplement this section.

3.3 Upper Zone Delineation

The Upper Zone refers to the upper portion of the groundwater aquifer system used for determining ambient nitrate conditions in the Management Zone. The depth of the Upper Zone includes the depth from the bottom of the vadose zone to the top of the Lower Zone.

The depth of the Upper Zone is based on well construction information, as possible, and other comparable information that provide the best available indication of well depth. The determination of the Upper Zone depth gives the highest weight to domestic well depths (**Table 3-2** for more explanation). Where the Corcoran Clay (or E-Clay) is present, the Upper Zone does not extend below the Corcoran Clay.

Table 3-2. Basis for Determining Depth of the Upper Zone

Date Layer	Weights for Establishing Bottom of Upper Zone
Domestic Wells Bottom Perforations	40%
Farm Virtual Wells Top Perforations	10%
Urban PWS Top Perforations	20%
Rural PWS Top Perforations	20%
DDW Systems Top Perforations	10%
Total	100%

CV-SALTS (2016c) determined the boundaries of the Upper and Lower Zones throughout the Central Valley Floor through high resolution nitrate and TDS mapping using GIS spatial analyses of several layers of data. Well construction data were used in combination with depth to water contours and characteristics of the Corcoran Clay, including the extent, depth, and thickness of this significant clay member. Data for the development of the Upper and Lower Zones originated from:

- DWR depth to groundwater contours;
- Depth to groundwater from Groundwater Quality Assessment Reports;
- State Water Board's DDW database of location and construction information for public water systems;

¹⁰ Groundwater contour data is available through DWR's Groundwater Information Center Interactive Map Application website: <https://gis.water.ca.gov/app/gicima/>

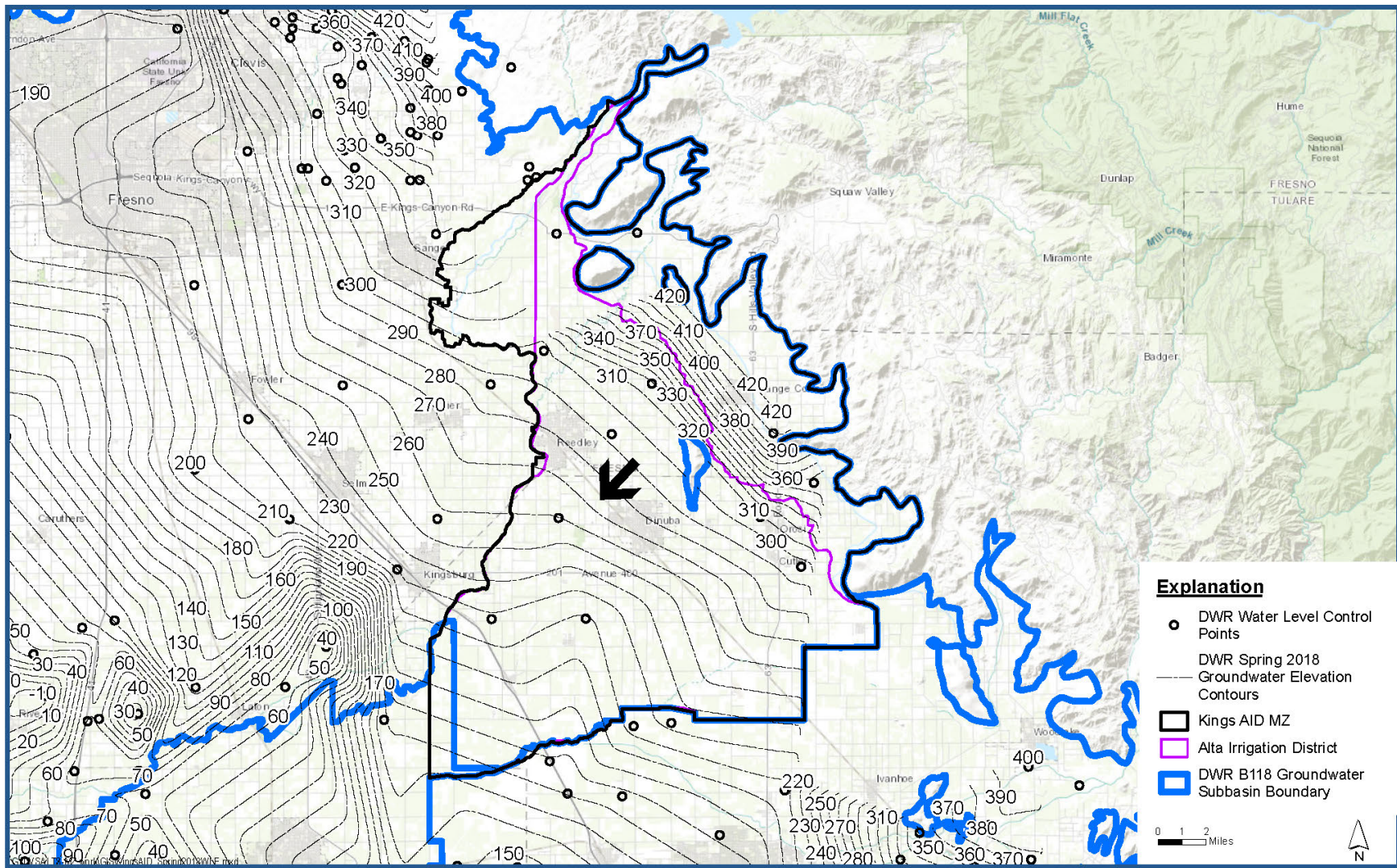


Figure 3-3. Spring 2018 Groundwater Elevation Contours for the Proposed Management Zone and Adjacent Areas.

- US Geological Survey (USGS) California Central Valley Hydrologic Model 2.0 (CVHM2; in progress):
 - Modeled virtual farm well construction for agricultural pumping
 - Actual rural public well water system well construction information
 - Actual urban public well water system well construction information
 - Texture database of driller’s logs, including domestic well construction information
 - Corcoran Clay depth, thickness, and extent

The above data were used to create interpolated layers over the Central Valley Floor of different well types and their perforation depths. The well construction layers were then combined in a weighting process to estimate where pumping occurs for the predominant well types. The weights provided in Table 3-2 were then used for calculating the depth to the bottom of the Upper Zone. **Figure 3-4** shows the depth to the bottom of the Upper Zone in the proposed Management Zone, as delineated in previous CV-SALTS efforts. Generally, the depth to the bottom of the Upper Zone is between 84 and 230 feet below ground surface in the Management Zone.

3.4 Nitrate Water Quality

Table 3-3 summarizes the groundwater quality data that were readily available for use to develop this Preliminary Management Zone Proposal. These data included data previously developed for CV-SALTS and additional data obtained in 2019. Nitrate measurements and well data were compiled for the Management Zone from the data sources listed in Table 3-3. Nitrate data were summarized by data source, depth, and recent nitrate exceedances.

Table 3-4 provides a summary of wells with nitrate measurements in the proposed Management Zone by well source. A total of 645 wells have nitrate data in the Management Zone, most of them (488 wells, or about 76%) have nitrate measurements since January 2000, and slightly more than half of those wells with recent (post-2000) nitrate measurements have nitrate concentrations that exceed the MCL of 10 mg/L as N.

New wells added to the database since the original database was established through CV-SALTS (2016c) were categorized into an appropriate depth category (Upper Zone, Lower Zone, Upper/Lower, Below Lower, and Unknown). CV-SALTS (2016c) produced GIS coverages of the depths to the bottom of the Upper and Lower Zones (e.g., see Figure 3-4). Depth information (well depth or top of screen depth and screen length) from the new dataset were used to categorize individual wells into their appropriate depth category. Wells without construction or depth information were categorized based on their well type:

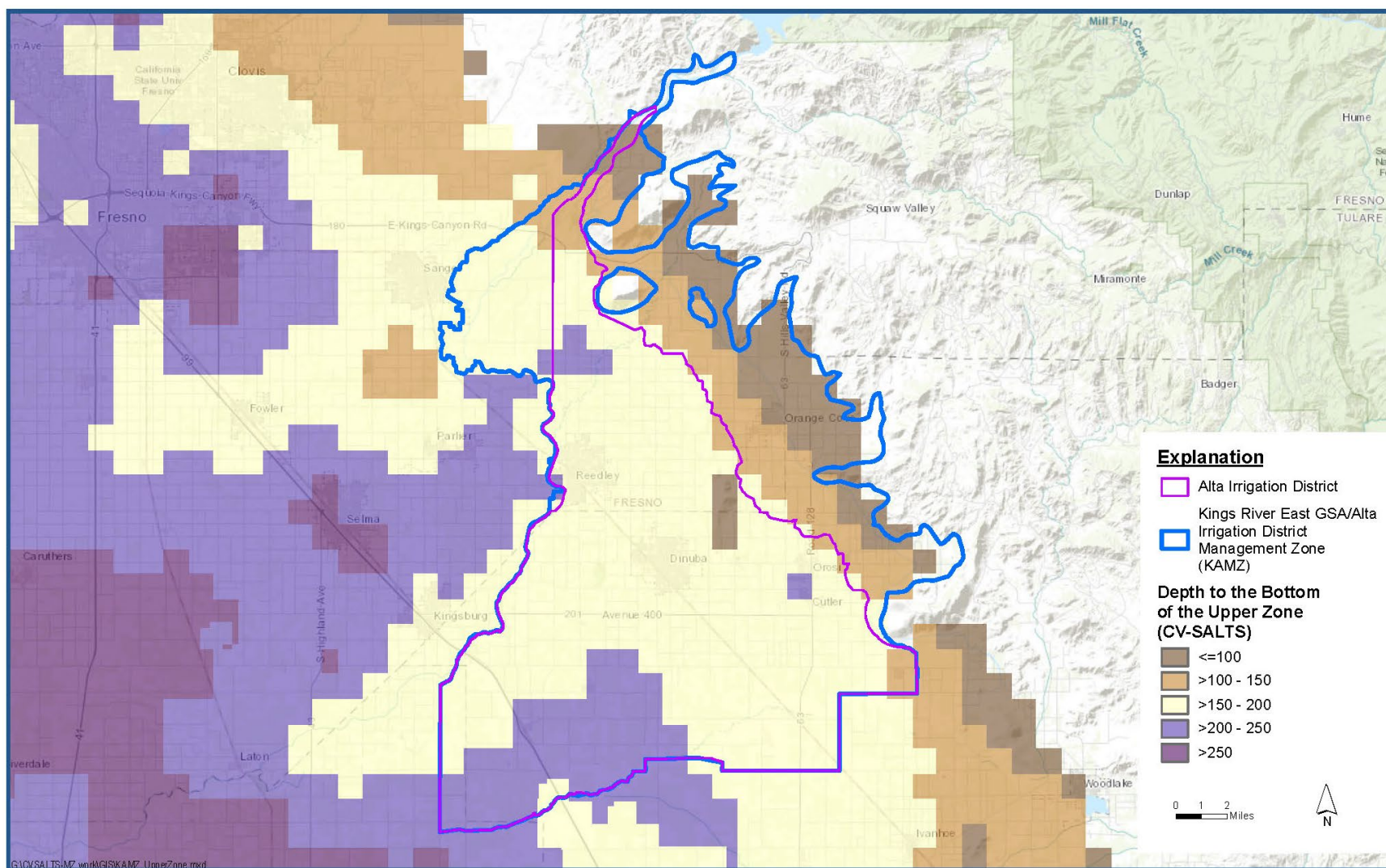


Figure 3-4. Depth to the Bottom of the Upper Zone of the Groundwater Underlying the Proposed Management Zone

Table 3-3. Groundwater Quality Data Sources

Data Category	Data Sources
The Phase II CV-SALTS Conceptual Model nitrate groundwater database developed for the High Resolution Mapping project (CVSALTS 2016c)	<ul style="list-style-type: none"> • Former California Department of Public Health (CDPH), now DDW • DWR • Central Valley Water Board Waste Discharge Requirements (WDR) data per the Dairy General Order • Central Valley Water Board Regulated Sites • State Water Board/USGS Groundwater Ambient Monitoring and Assessment Program (GAMA) • USGS
Geotracker GAMA ¹¹ (Note: Not all entities had nitrate data from within the proposed Management Zone)	<ul style="list-style-type: none"> • Department of Pesticide Regulation • DWR • GAMA – Domestic Wells; Special Studies, and Priority Basin Projects • Local Groundwater Projects • Monitoring Wells (Central Valley Water Board Regulated Sites) • DDW Public Water System Wells (Actual Locations) • USGS National Water Information System (NWIS)
State Small Water Systems	Fresno and Tulare Counties
Domestic Well Permit Sample Data	Fresno County
Tulare County Regional Geodatabase	Geodatabase received from GIS Analyst Mike Hickey at the County of Tulare office in February 2019; contains domestic and dairy (domestic/animal/irrigation) well data in the proposed Management Zone

Table 3-4. Summary of Wells with Nitrate Data by Source (All Well Depths)

Source	All Well Depth Categories		
	Wells with Nitrate Data	Wells with Post-2000 Nitrate Data	Wells with Post-2000 Nitrate MCL Exceedance
DDW	210	198	63
Dairy	75	75	59
DWR	124	0	0
GeoTracker Regulated Facilities	18	18	12
Fresno County Domestic	46	46	20
GAMA	54	54	38
Tulare County Domestic/Dairy	75	75	49
State Smalls	1	1	1
USGS	42	21	8
Total	645	488	250

¹¹ <https://geotracker.waterboards.ca.gov/gama/gamamap/public/>, accessed in February 2019)

- Municipal wells were categorized using the DWR GIS coverage of well completion report statistics, which identifies the mean total depth of municipal wells in each township/range-section. The mean municipal well depth was assigned to the municipal well with no depth information posted in Geotracker GAMA and compared to the CV-SALTS depth to the bottom of the Upper and Lower Zones in order to estimate its depth category.
- Domestic wells were placed in the Upper Zone;
- State Water Board Regulated Site monitoring wells were placed in the Upper Zone; and
- Wells with an Unknown well type were placed in the “Unknown” depth category.

Of the entire dataset of 645 available wells in the proposed Management Zone with a nitrate measurement, many of the wells (250 wells, or about 39%) are completed in the Upper Zone (**Figure 3-5**). There are more Upper Zone wells in the central and southern part of the Management Zone, with fewer Upper Zone wells located in the northeastern and southwestern parts of the Management Zone. Deeper wells are prevalent closer to the communities of Reedley, Dinuba, Cutler, and Orosi.

There are fewer wells with nitrate data available and more wells without well types and well depth/construction information in the northern portion of the MZ. **Table 3-5** identifies the number of wells in each depth category with nitrate data, with recent data (post-2000) and with recent nitrate concentrations that exceed 10 mg/L as N. Wells categorized into the Upper Zone constitute about 39% of the total wells with nitrate data (250 wells out of 645), with most (238 wells, or 95%) of those Upper Zone wells having post-2000 nitrate measurements, and slightly more than half (140 wells, or 59%) of those Upper Zone wells with recent data that have nitrate above the MCL.

Figure 3-6 shows Upper Zone wells with recent (post-2000) nitrate measurements divided into two categories: (1) wells with all post-2000 nitrate measurements at or below the MCL of 10 mg/L as N; and (2) wells with at least one nitrate measurement exceeding the MCL of 10 mg/L as N. Upper Zone wells with recent nitrate data are sparse in the northeastern portion of the Management Zone. Upper Zone wells with measured nitrate above the MCL are scattered throughout the Management Zone, with most located in the central and southern portions of the area.

The high resolution CV-SALTS spatial analysis (CVSALTS 2016c) of nitrate in the Upper Zone was updated for this Preliminary Management Zone Proposal using the updated Upper Zone post-2000 nitrate dataset developed and described above. This update included the following steps:

- Temporal declustering: Annual average nitrate concentrations were calculated for each well for the years 2000-2018; those annual averages were then averaged to yield one average nitrate concentration representing recent conditions.

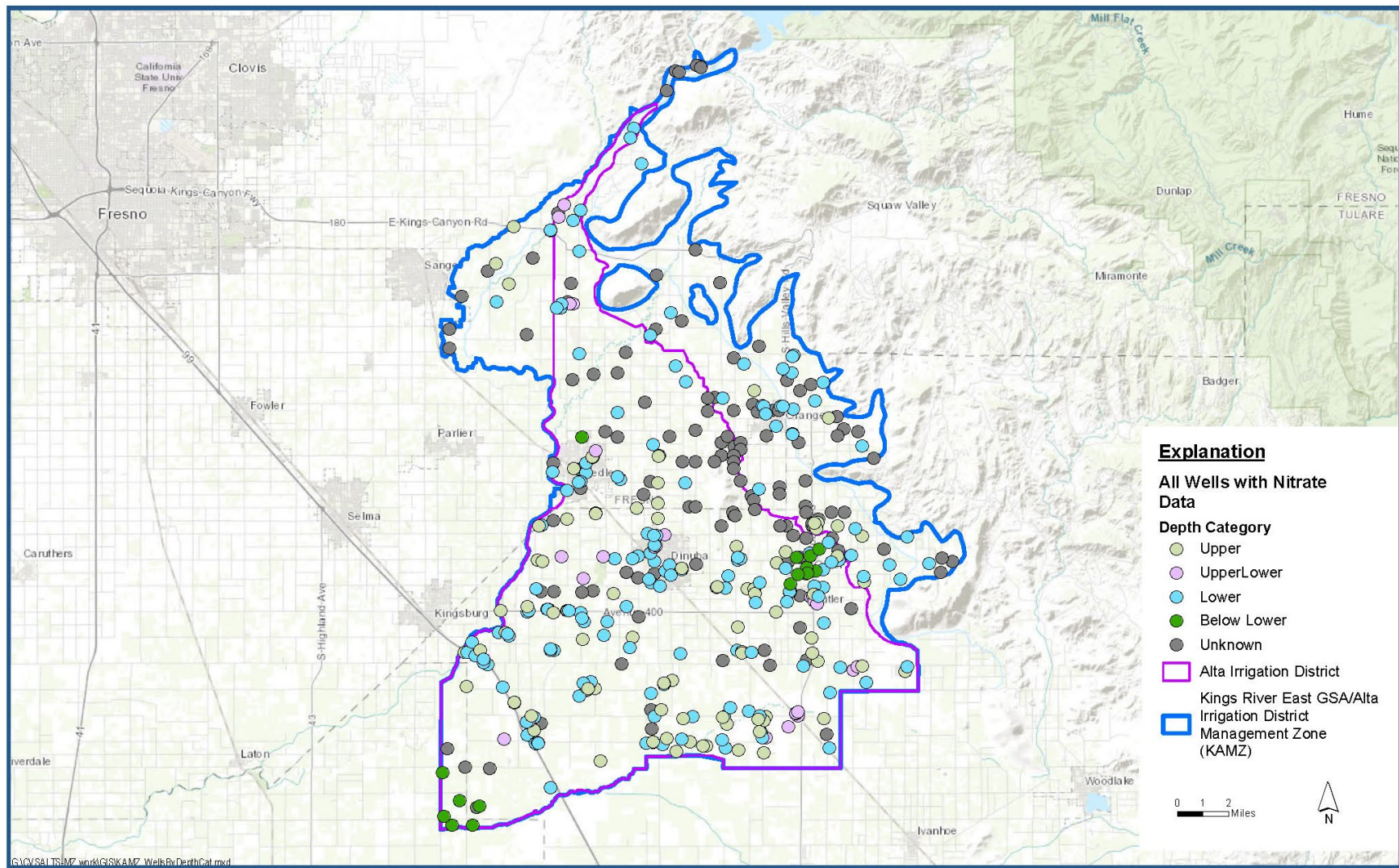


Figure 3-5. Wells with Nitrate Data within the Proposed Management Zone by Depth Category

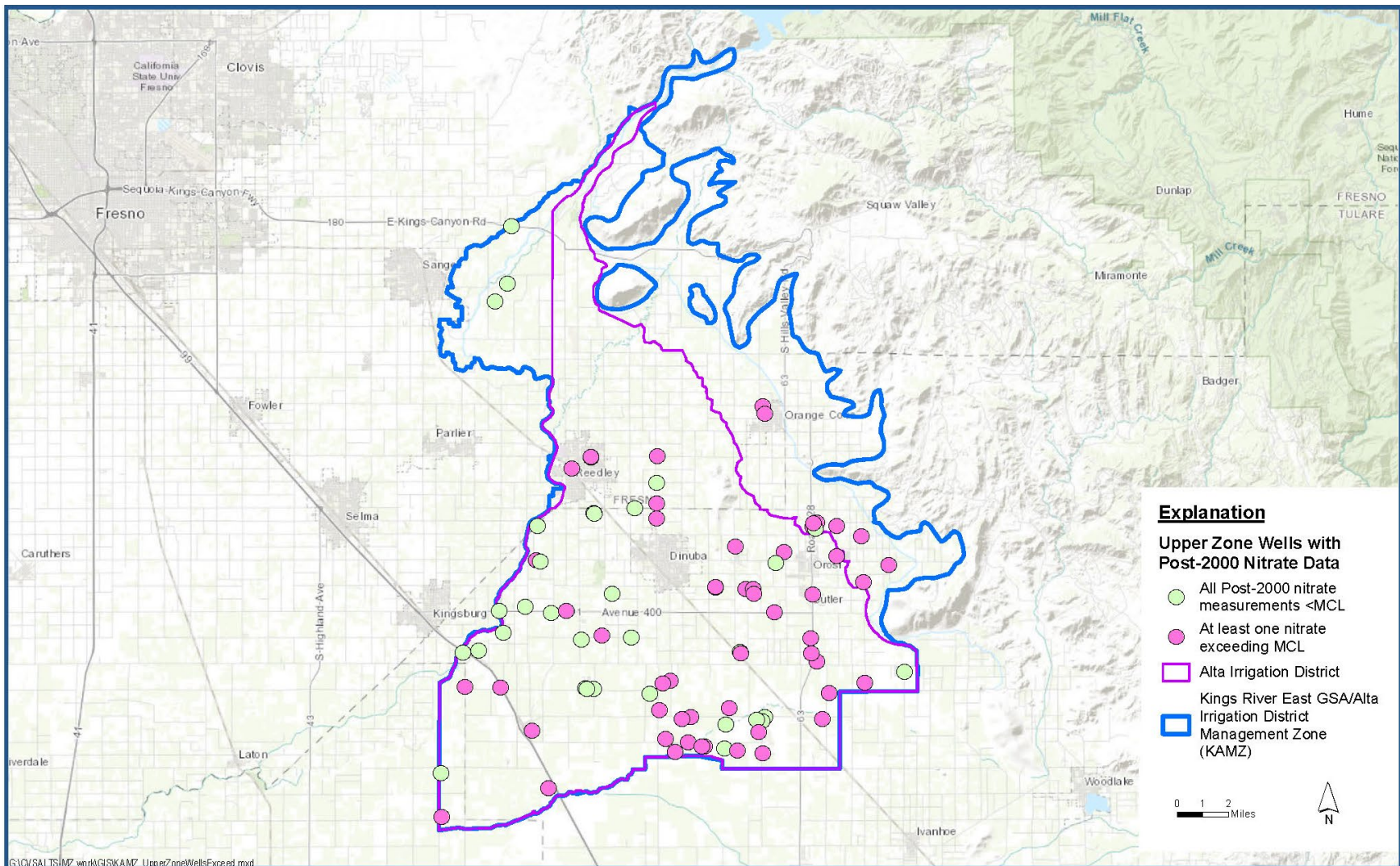


Figure 3-6. Upper Zone Wells with Nitrate Data and Nitrate MCL Exceedances

Table 3-5. Wells with Nitrate Measurements by Depth Category

Depth Category	All Wells with Nitrate Data	Wells with Post-2000 Nitrate Data	Wells with Post-2000 Nitrate ≥ 10 mg/L as N	Percent of Wells with Post-2000 Nitrate Data > MCL
Upper	250 (39%)	238	140	59%
Lower	199 (31%)	182	79	43%
Upper and Lower	45 (7%)	42	16	38%
Below Lower	16 (2%)	14	9	64%
Unknown	135 (21%)	12	6	50%
Total	645 (100%)	488	250	-

- Upper Zone wells outside the Management Zone and within a buffer zone of three miles around the Management Zone boundary were compiled and used in the updated high resolution analysis because nitrate occurrence does not cease at the border of the Management Zone.
- Geospatial interpolation of the well point data was performed (kriging) using a search radius of 1.5 miles.¹²
- Gap areas were shown to exist where post-2000 Upper Zone nitrate well data were insufficient to produce the spatial interpolation using the 1.5 mile search criterion.

Figure 3-7 illustrates the average post-2000 nitrate concentrations for all Upper Zone wells in the proposed Management Zone and control points in the three-mile buffer. This figure also shows the interpolated ambient Upper Zone post-2000 nitrate as well as the gap areas where insufficient Upper Zone nitrate data exist. High nitrate concentrations exist throughout the Management Zone, particularly in the central and southeastern portions. Insufficient recent Upper Zone nitrate data are available in the northeastern and southwestern areas of the proposed Management Zone.

In addition to the ambient post-2000 nitrate concentrations calculated for this proposed Management Zone, which use annual average well data available between 2000 and 2019, nitrate concentration trends for individual wells are provided in **Figure 3-8**. This trends analysis is readily available from the previous CV-SALTS High Resolution geospatial database¹³

¹² The 1.5 mile search radius was selected to refine the local ambient nitrate mapping for the proposed Management Zone and recognize the potential variability inherent in groundwater nitrate concentrations spatially. This search radius reduces the reliance on well data from farther away that may not represent local nitrate conditions.

¹³ CV-SALTS (2016b) provides trends in groundwater quality developed from individual wells' time series data for nitrate. All data for a particular well were used (including data prior to 2000). Only wells that had nitrate test post-2000 were shown in this analysis. Wells were tested for a statistically significant linear correlation between time and concentration. Wells that had statistically significant trends (correlation between time and concentration) at the 95%

representing nitrate data up to 2016 as available (CV-SALTS 2016b). Based on currently available data, most of the Upper Zone wells in the Management Zone have either no trend or insufficient data. The trend for Upper Zone wells in the Management Zone (with post-2000 nitrate measurements) range from a decrease in concentration of -3 mg/L nitrate as N per year to an increase in concentration of 0.9 mg/L nitrate as N per year. Due to the scarcity of trends data in the Management Zone itself, it is not possible to discuss spatial trends of nitrate in the Upper Zone.

To test if the ambient average post-2000 nitrate presented in Figure 3-7 is potentially underestimating conditions in the Upper Zone, the maximum post-2000 nitrate concentration is overlain atop the interpolated ambient Upper Zone nitrate in **Figure 3-9**. This map provides a comparison between the shaded colors representing the average annual post-2000 nitrate and the colored dots that represent the maximum measured nitrate in individual wells since 2000. The maximum post-2000 nitrate is presented for the Upper Zone wells in the Management Zone to verify that the identification of areas with potentially elevated nitrate is not underestimated from wells that may have more recently begun to exceed the MCL for nitrate. There is good agreement between the ambient post-2000 average-based interpolated Upper Zone nitrate to the maximum Upper Zone nitrate concentrations in individual wells.

Overall, the approach used to understand nitrate conditions for the Preliminary Management Zone Proposal is based on the best currently available nitrate data and serves to inform subsequent Management Zone implementation EAP efforts, including public outreach and additional well testing in areas where current data are more limited.

confidence level were selected and linear regression was performed on their time series. The magnitude of each well's trend in water quality is provided as the slope of the linear line fit to the data.

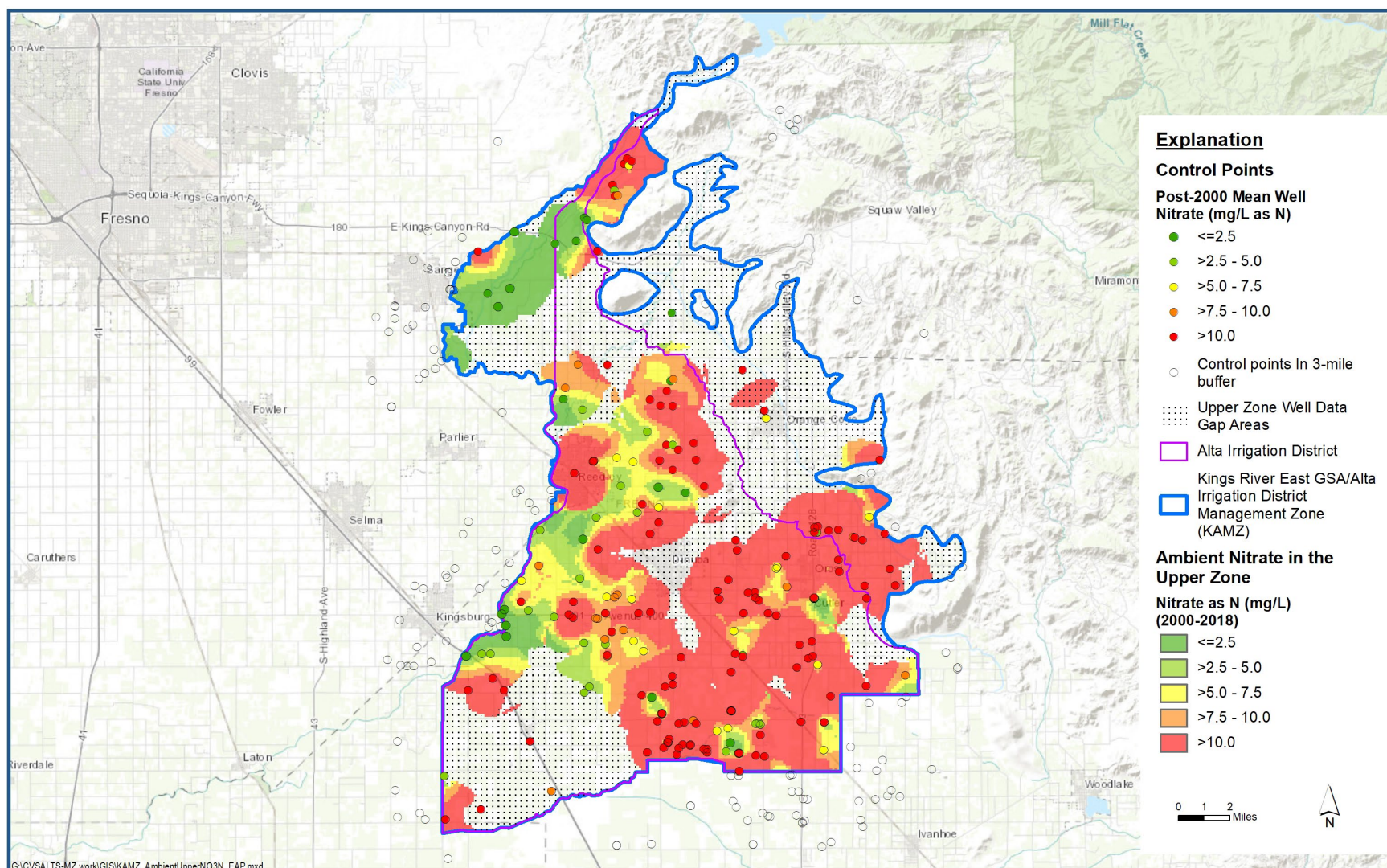


Figure 3-7. Ambient Post-2000 Nitrate Concentrations in the Upper Zone of Groundwater Underlying the Proposed Management Zone

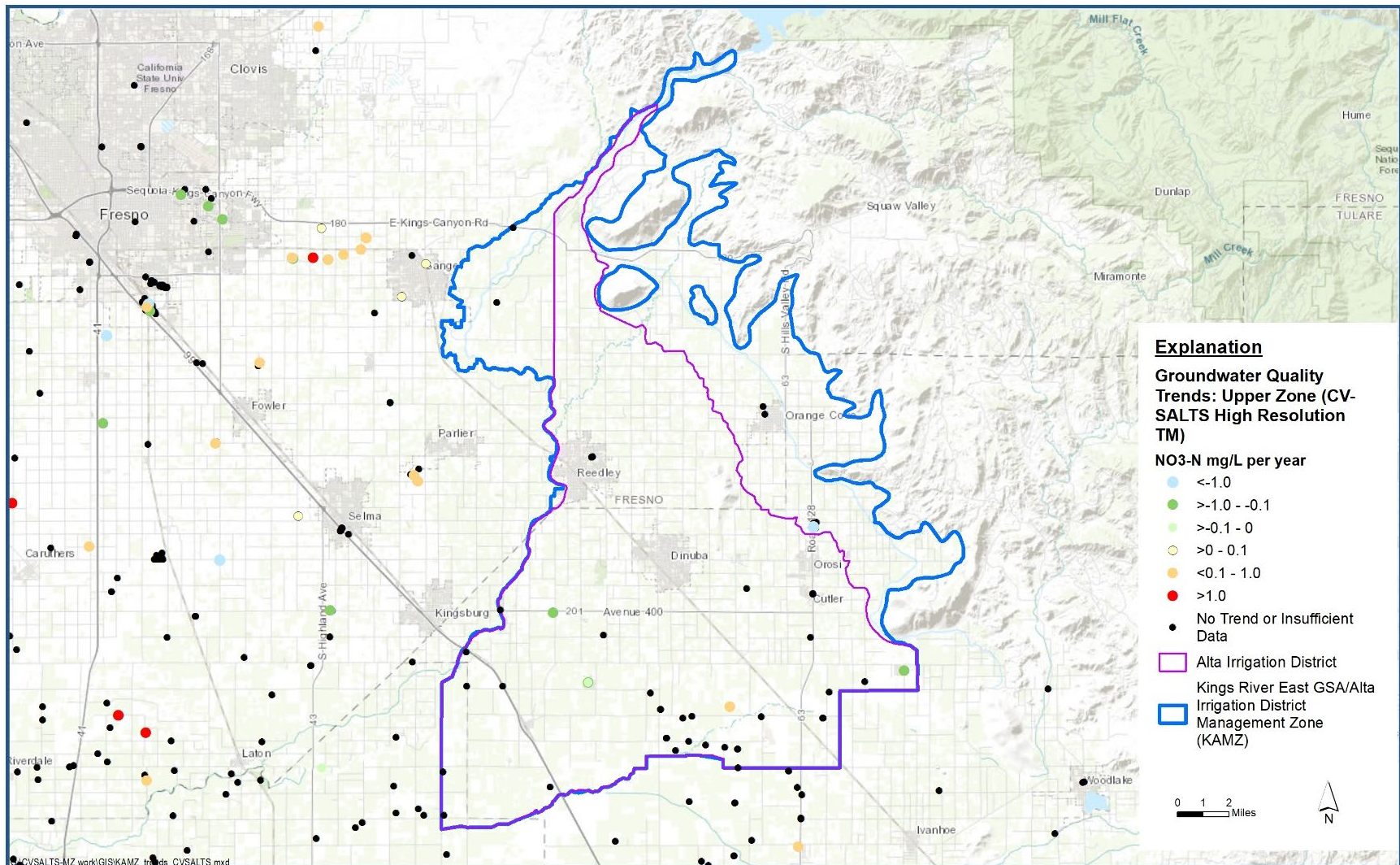


Figure 3-8. Groundwater Quality Trends for Nitrate in the Upper Zone of Groundwater Underlying the Proposed Management Zone

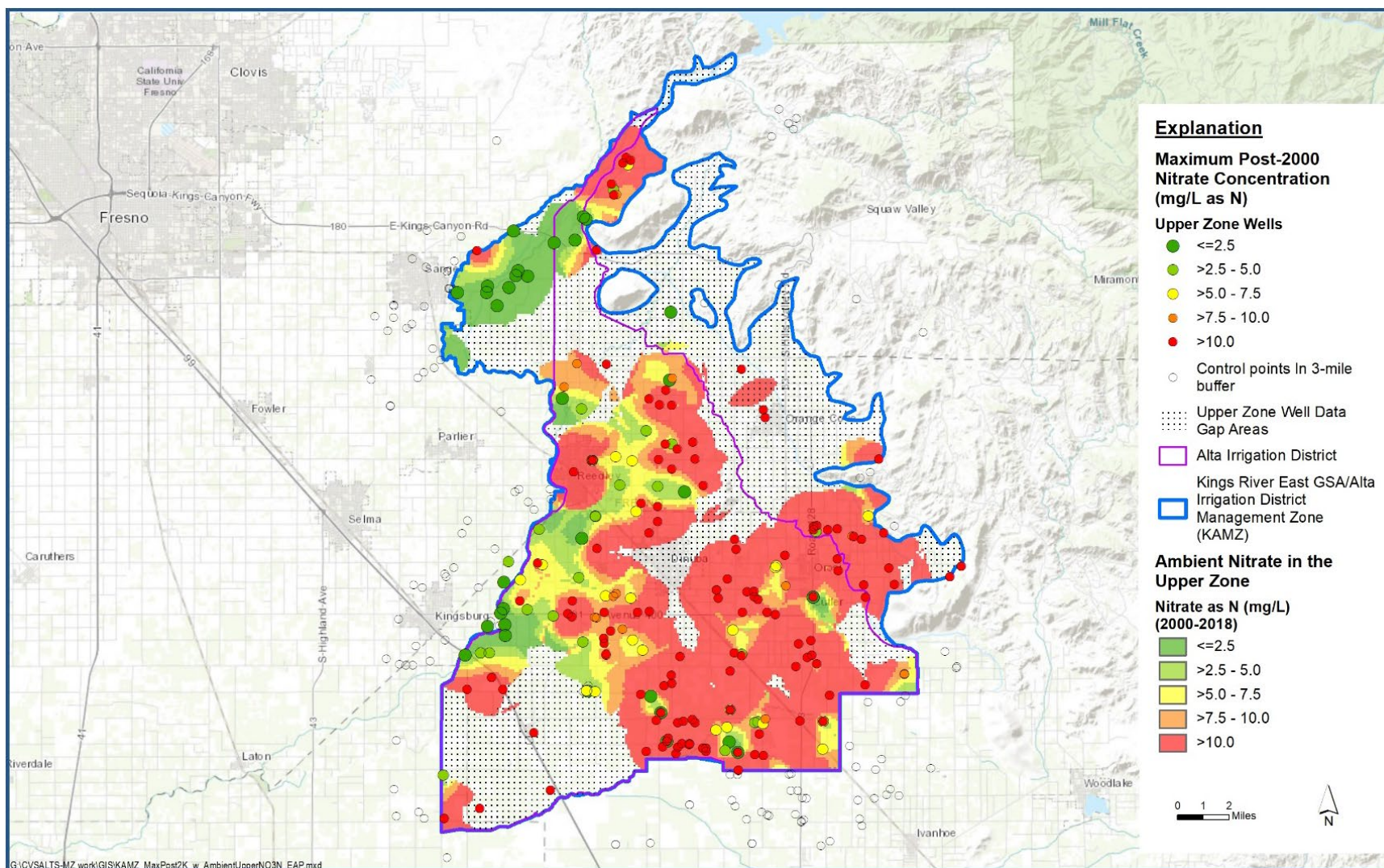


Figure 3-9. Maximum Post-2000 Nitrate in the Upper Zone with Ambient Groundwater Underlying the Proposed Management Zone

4. Management Zone Participants

Management Zone participants may include both permitted dischargers subject to the NTC with the Nitrate Control Program and non-dischargers that are working collaboratively with the permitted dischargers to facilitate implementation of the management goals of the Program. Participation by non-dischargers is also an important component of the implementation of the Early Action Plan developed as part of this Preliminary Management Zone Proposal (see Section 6 and Attachment H). The following sections summarize participation by both permitted dischargers and non-dischargers in the KRE/AID Management Zone.

4.1 Permitted Discharger Participation

4.1.1 *Permitted Dischargers Located in the Proposed Management Zone*

The Central Valley Water Board sent a NTC with the Nitrate Control Program to permitted dischargers in the Kings Groundwater Subbasin on _____, 2020 (Attachment C provides examples of the NTC letter). To facilitate coordination with NTC letter recipients, the Management Zone developed a preliminary list of permitted dischargers from a query of the California Integrated Water Quality System Project (CIWQS) database.¹⁴ This preliminary list was refined collaboratively with Central Water Board staff.

Table 4-1 summarizes the permitted dischargers located in the proposed Management Zone. For dischargers categorized as dairies, confined bovine feeding operations and poultry farms, this table summarizes the number of dischargers permitted within these facility types. Attachment D provides a detailed list of the individual dischargers for each of these facility categories based on the CIWQS database. Growers permitted under the ILRP received notice through the NTC sent to the KRWQC. **Figure 4-1** illustrates the location of each individually permitted discharger listed in Table 4-1 (map numbers in Figure 4-1 correspond to the map numbers provided in the first column in Table 4-1) and the location of facilities permitted under the dairy, confined bovine feeding operations and poultry farm General Order WDRs.

¹⁴ Webpage to obtain facilities reports:
https://www.waterboards.ca.gov/water_issues/programs/ciwqs/publicreports.html; this database was last accessed on _____.

Table 4-1. Permitted Dischargers in the Kings River East/Alta Irrigation District Management Zone¹ (See Figure 4-1 for locations)

Map ID	Facility Name	Facility Type	Permittee	County	Permit Type	WDR No. (NPDES No.)	Expires
--	Milk Cow Dairies		28 Facilities (see Attachment X)		WDR	R5-2013-0122	10/2/2018
--	Confined Bovine Feeding Operations		5 Facilities (see Attachment X)		WDR	R5-2017-0058	
--	Poultry Operations		18 Facilities (see Attachment X)		WDR	R5-2016-0087	
--	Irrigated Lands Regulatory Program		(No.TBD) Members of the Kings River Water Quality Coalition		WDR	R5--2013-0120-07 (as amended)	
1	Kings River Bridge Dewatering Project	Domestic Site NEC	CA Dept of Transportation Central Region Construction, Sanger, 93657	Fresno	Enrollee - WDR	R5-2013-0145	9/7/2022
2	Trinity Packing	Food Processing NEC	Trinity Packing Company Inc, 18700 East South Ave, Reedley, 93654	Fresno	WDR	98-130	6/1/2008
3	Bari Olive Oil Co Facility	Food Processor	Wiebe Farms Inc., 40063 Road 56, Dinuba, 93618	Tulare	Enrollee - WDR	R5-2009-0097	
4	Booth Ranches Citrus Packing Facility	Food Processor	Booth Ranches LLC, 12201 Ave 480, Orange Cove, 93646	Tulare	WDR	97-006	1/24/2007
5	Dinuba Packing Plant	Food Processor	Gillette Citrus Company, 10175 Anchor, Dinuba, 93618	Tulare	WDR	97-129	6/18/2007
6	East Orosi Packing House	Food Processor	Fancher Creek Packing, 41870 Fruitvale, Ave, Orosi, 93647	Tulare	WDR	85-167	6/24/1995
7	Family Tree Reedley Packing House	Food Processor	Family Tree, 41646 Rd 62, Reedley, 93618	Tulare	WDR	96-207	8/6/2011
8	Ito Packing Reedley Facility	Food Processor	ITO Packing Company Inc, 18697 South, Reedley, 93654	Fresno	WDR	01-157	6/14/2011
9	Nordman Reedley Distillery	Food Processor	Nordman of California, 4070 South Reed, Fresno, 93657	Fresno	WDR	93-115	8/3/2003
10	Sun-Maid Orange Cove Plant	Food Processor	Sun-Maid Growers of California, 9818 South Jacobs, Orange Cover 93646	Fresno	WDR	88-060	4/20/1998
11	Tri-County Citrus Orange Cove Packing House	Food Processor	Tri-County Citrus Packer, 12143 Ave 456, Orange Cove, 93646s	Tulare	WDR	94-075	3/21/2004
12	Visalia Citrus Processing Plant	Food Processor	Ventura Coastal, LLC, 12310 Ave 368, Visalia, 93291	Tulare	WDR	97-079	4/21/2012
13	Wawona Packing Co Facility	Food Processor	Wawona Packing Company LLC. 12133 Avenue 408, Cutler, 93615	Tulare	WDR	R5-2012-0042	6/12/2022
14	Dinuba Energy Cogeneration	Power Plant	Community Renewable Energy Services Inc, 6801 Ave 430, Dinuba, 93654	Tulare	WDR	95-045	2/23/2000

Table 4-1. Permitted Dischargers in the Kings River East/Alta Irrigation District Management Zone¹ (See Figure 4-1 for locations)

Map ID	Facility Name	Facility Type	Permittee	County	Permit Type	WDR No. (NPDES No.)	Expires
15	Ave 400 Pressure Betterment, Traver, Tulare County	Recycled Water Use Area	Southern California Gas Company, Ave 400, Dinuba, 93618	Tulare	Enrollee - Waiver	R5-2013-0145	2/7/2018
16	Cutler-Orosi WWTF	Wastewater Treatment Facility (WWTF)	Cutler-Orosi JT Powers WW Authority, 40401 Road 120, Cutler, 93615	Tulare	WDR/NPDES	R5-2018-0011 (CA0081485)	5/31/2022
17	Delft Colony WWTF	WWTF	Tulare County Resource Management Agency, Road 56 of Ave 384, Delft Colony, 93618	Tulare	WDR	88-097	6/22/1998
18	Dinuba WWTF	WWTF	Dinuba City, 6675 Ave 412, Dinuba, 93618	Tulare	WDR	95-200	8/14/2005
19	Kings River UESD OWTS	WWTF	Kings River Union Elementary School District, 3961 Avenue 400, Kingsburg, 93631	Tulare	Enrollee - WDR	97-010-DWQ	6/23/2023
20	London WWTF	WWTF	London CSD, Rd 60 at Ave 376, Dinuba, 93618	Tulare	WDR	R5-2017-0109	10/20/2027
21	Orange Cove WWTF	WWTF	Orange Cove City, 1805 Monson Ave, Orange Cove 93646	Fresno	WDR	R5-2004-0008	1/29/2014
22	Reedley WWTF	WWTF	Reedley City, 1701 West Huntsman, Reedley, 93654	Fresno	WDR	R5-2010-0120	12/9/2020
23	Riverbend Mobile Home Park	WWTF	RMHP, LLC, 17604 Kings Canyon Road, Sanger, 93657	Fresno	WDR	90-098	4/26/2020
24	Sequoia Field WWTF	WWTF	Tulare County Building Service & Park Dept, 36000 Rd 112, Visalia, 93291	Tulare	WDR	98-166	7/21/2008
25	Sherwood MHP WWTF	WWTF	Sherwood MHP, 339 Frankwood, Sanger, 93657	Fresno	WDR	94-223	8/2/2004
26	Teen Challenge of Southern California	WWTF	Smith Mountain LP, 42675 Road 44, Reedley, 93654	Fresno	Enrollee - WDR	97-010-DWQ	11/19/2018
27	Traver WWTF	WWTF	Tulare County Resource Management Agency, Road 44 at Avenue 36B, Traver, 93631	Tulare	WDR	88-098	6/22/1998
28	GSV Cutler Winery	Winery	Cutler Winery, 38558 Rd 128, Cutler, 93615	Tulare	WDR	R5-2015-0013	2/6/2025
29	The Wine Group Franzia Winery-Sanger	Winery	The Wine Group LLC, 2916 South Reed Ave, Sanger 93657	Fresno	WDR	R5-2014-0094	8/8/2024

¹ Source: CIWQS Database (see text); Central Valley Water Board.

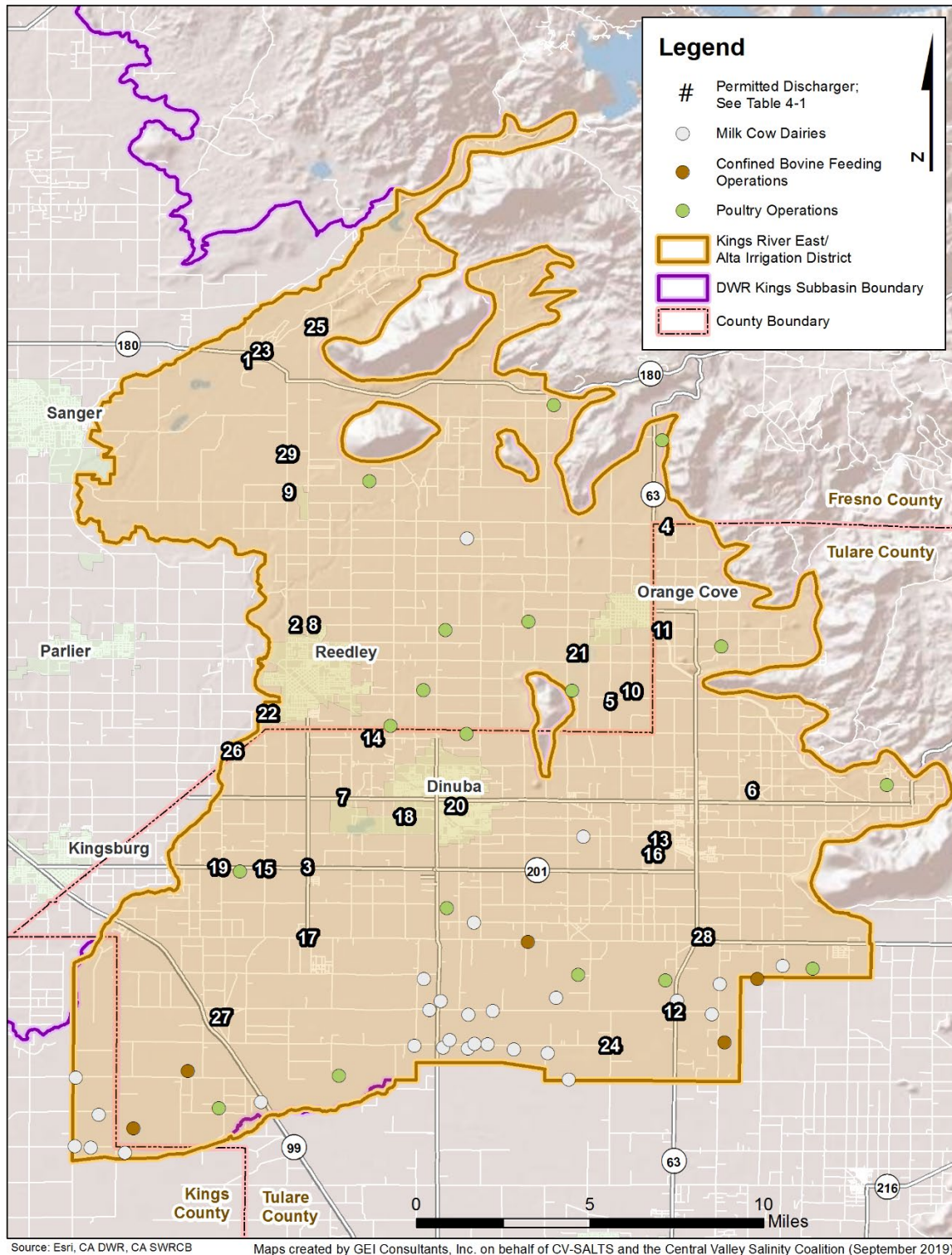


Figure 4-1. Location of Permitted Dischargers within the Proposed Management Zone (Refer to Table 4-1 to identify numbered facilities).

4.1.2 Outreach to Permitted Dischargers

[NOTE: Most elements of this process were carried out as part of the Pilot Study; however, some key elements have not yet been implemented as they are best implemented after a formal NTC is delivered to all permitted dischargers. Therefore, elements of the process described below will need to be implemented after a NTC is issued.]

4.1.2.1 Dairy, Confined Bovine Feeding Operations and Poultry General Orders

The Management Zone contacted dischargers permitted under the Dairy, Confined Bovine Feeding Operations (Non-Dairy), and Poultry General Orders that received a NTC with the Nitrate Control Program. This outreach was done through two mechanisms: (a) through entities and individual operators that represent the interests of many of these dischargers (**Table 4-2**) and through a direct mailout to each permitted discharger. *[NOTE: For the Pilot Study only (a) has been implemented; direct mailout (b) will occur after formal NTCs have been sent by the Central Valley Water Board)]*

Table 4-2. Representation of Permitted Dischargers Under a General Order During Development of Management Zone Proposal

General Order (as Amended)	Representation ¹⁵	Primary Contact
Dairies (R5-2013-0122)	Dairy Cares	J.P. Cativiela, jcativiela@cogentcc.com
	Milk Producers Council	Geoff Vanden Heuvel, geoff@milkproducers.org
	Central Valley Dairy Representative Monitoring Program (CVDRMP)	<i>[Insert Name]</i> , CVDRMP@gmail.com
	Individual Operators	See Table 4-4
Confined Bovine Feeding Operations (R5-2017-0058)	Dairy Cares	J.P. Cativiela, jcativiela@cogentcc.com
	Central Valley Dairy Representative Monitoring Program	<i>[Insert Name]</i> , CVDRMP@gmail.com
Poultry Operations (R5-2015-0087)	<i>TBD</i>	<i>TBD</i>
Irrigated Lands Regulatory Program (R5-2013-0120-07)	Kings River Water Quality Coalition	Charlotte Gallock, cgallock@krwd.org

This contact list for direct outreach to these permitted dischargers was initially developed from information in the CIWQS database and then reviewed with Central Valley Water Board staff to evaluate consistency with the list of recipients of the NTC. Information for the direct mailout to permitted dischargers was developed in collaboration with the entities

¹⁵ These entities represented their membership which may encompass many of the permitted dischargers subject to a General Order. Additional outreach to individual dischargers, i.e., non-members, was implemented as appropriate to ensure permitted dischargers subject to a NTC within the boundaries of the proposed Management Zone were aware of the Nitrate Control Program requirements and opportunity to participate in the Management Zone as the means to comply with the NTC.

included in Table 4-2. This information, which was sent as a hardcopy letter via regular mail, provided the following information to each discharger:

- Description of the NTC and the Nitrate Control Program;
- Potential compliance pathways available to the dischargers;
- Basis for the proposed KRE/AID Management Zone;
- Requirements to participate in the Management Zone as the elected compliance pathway;
- Options for how the permitted discharger may participate in the Management Zone; and
- Contact information to obtain additional information, if necessary.

The letter requested a response regarding interest in participating in the Management Zone. If no response was received within 30 days, one follow-up letter was sent. If no response was received after the second letter, the Management Zone assumed that the permitted discharger is not a participant in this Preliminary Management Zone Proposal. Attachment E provides the letter sent to permitted dischargers regarding this proposed Management Zone and their response regarding participation in this proposed Management Zone.

4.1.2.2 Irrigated Lands Regulatory Program General Orders

Growers in the proposed KRE/AID Management Zone that are members of the KRWQC are regulated under the ILRP General Order R5-2032-0120 (as amended). The Coalition, which received the NTC on behalf of all of its members, will comply with the Nitrate Control Program requirements as a participant in the proposed Management Zone. The Coalition conducted outreach with its own members during the development of this Preliminary Management Zone Proposal.

[Placeholder for paragraph to describe outreach to growers that are not members of the Coalition, if any]

4.1.2.3 Other Permitted Dischargers

For all other permitted dischargers in Table 4-1 (dischargers not subject to the General Orders or not represented by an entity in Table 4-2), the Management Zone implemented the following process to make a reasonable effort to contact the dischargers directly. Contact was initiated by telephone, where possible, and followed up with a mailed letter or an electronic email that provided information about the NTC, the proposed Management Zone, and options to respond to the Management Zone. Key sources for contact information were the Central Valley Water Board's mailing list (as was used to send the NTC) and the CIWQS database. If no response was received to the initial effort to make contact, the Management Zone made one final attempt to directly contact the permitted discharger with assistance from the Central Valley Water Board staff, where appropriate.

Through the above outreach process Management Zone representatives provided information and answered questions regarding the NTC, the Nitrate Control Program, potential compliance pathways, the basis for the proposed Management Zone and requirements to participate in the Management Zone as the elected compliance pathway. Each of the permitted dischargers was regularly invited via email (or letter if necessary) to participate in the open, public meetings held to develop this Preliminary Management Zone Proposal.

4.1.3 Permitted Dischargers Participating in Management Zone

Section 1.5 documents the permitted dischargers that are providing notice to the Central Valley Water Board of their intent to comply with the Nitrate Control Program under Path B – Management Zone through the submittal of this Preliminary Management Zone Proposal. These permitted dischargers acknowledge that if they later elect to withdraw from this Proposal, they are required to submit an initial assessment and Notice of Intent to comply with the Nitrate Control Program under Path A of the Nitrate Control Program within 30 days from withdrawing from this Proposal.

4.2 Non-Discharger/Local Stakeholder Participation

Achieving the goals of the Nitrate Control Program (see Section 1.1) will require collaboration with a wide range of entities within the Management Zone that have various roles in the management of land use planning, water and wastewater and community engagement. These entities may not receive the NTC with the Nitrate Control Program, but their participation in the Management Zone planning and implementation process is essential to Program success. Accordingly, the Nitrate Control Program encourages permitted dischargers to work collectively with local stakeholders (i.e., non-dischargers) within the proposed Management Zone area to meet the goals and requirements of the Program. This effort includes, but is not necessarily limited to, working with non-dischargers in the area to develop and implement the Early Action Plan (see Section 6). This section describes how the Management Zone identified and conducted outreach to non-dischargers or stakeholders within the area that may have interest in the development and implementation of the proposed Management Zone to meet the goals of the Nitrate Control Program, including Early Action Plan implementation.

4.2.1 Outreach to Non-Dischargers

Table 4-3 provides a list of key non-dischargers located within the proposed Management Zone Boundary that outreach was conducted to invite their participation in the process. This list was developed through the following process: (a) identification of key non-dischargers through local area knowledge; (b) inclusion of entities that directly requested to be included on the outreach list; (c) entities recommended by participants to be directly outreached to; and (d) identification of additional potentially interested entities through the Management Zone characterization process (see Section 2), e.g., specific county agencies, water districts

or community service districts. Unless the entity was already participating in the process, the Management Zone directly reached out to the entities in Table 4-3 to notify them of the plan to develop a Preliminary Management Proposal for the proposed KRE/AID Management Zone. In addition, regardless of the level of participation in the Proposal development process, unless an entity formally requested to be removed from the outreach list, the entity remained on the contact list throughout the development of this Proposal.

4.2.2 Participation in Management Zone Development

Table 4-4 identifies all entities/stakeholders that are currently on the outreach list for the proposed KRE/AID Management Zone, including permitted dischargers (denoted with an *). All of the entities/stakeholders receive regular communication about the development of this Preliminary Management Zone Proposal and are provided opportunity to comment on materials developed by the Management Zone and access supporting documentation provided on the KRE/AID Management Zone website (<http://kingsriverwqc.org/cv-salts/>). Many of these entities regularly participate in Management Zone meetings (see Attachment G for record of all meeting attendees).

*[NOTE: A number of these entities have been identified through development of Section 2 and contact has not yet been made (denoted by *TBD); additional outreach will need to be conducted during continued development of the Preliminary Management Zone Proposal]*

Table 4-3. Key Entities Targeted for Management Zone Outreach (*TBD indicates where additional outreach needed at this time; contact to be determined)

Non-Discharger Type	Entity	Contact
Water Management Entities	Alta Irrigation District	Chad Wegley: cw@altaid.org
	City of Dinuba Water Service Area	*TBD
	City of Orange Cove	*TBD
	City of Reedley Water Service Area	*TBD
	Cutler Public Utilities District	*TBD
	Hills Valley Irrigation District	*TBD
	Kaweah Delta Water Conservation District	*TBD
	Kings County Water District	*TBD
	Kings River Water District	*TBD
	Orange Cove Irrigation District	*TBD
	Sultana Community Services District	*TBD
	Tri-Valley Water District	*TBD
GSA within Management Zone	Kings River East GSA	Chad Wegley: cw@altaid.org
GSAs adjacent to Management Zone	North Kings GSA	*TBD – see Attachment B for identification of key contact information
	Central Kings GSA	
	South Kings GSA	
	Mid-Kings River GSA	
	Greater Kaweah GSA	
	East Kaweah GSA	
Industry, Trade and Non-Governmental Organizations	Dairy Cares	J.P. Cativiela: jcativiela@cogentcc.com
	Central Valley Dairy Regional Monitoring Program	*TBD
	Milk Producers Council	Geoff Vanden Heuvel, geoff@milkproducers.org
	California League of Food Producers	Rob Neenan: rob@clfp.com
	Central Valley Clean Water Association	Debbie Webster: eofficer@cvcwa.org
	Kaweah Basin Water Quality Association	Don Ikemiya: dikemiya@ppeng.com Sarah Rutherford: SRutherford@ppeng.com
	Clean Water Action	Jennifer Clary: jclary@cleanwater.org
	Self-Help Enterprises	Paul Boyer: PaulB@selfhelpenterprises.org Liesbet Olaerts: liesbeto@selfhelpenterprises.org Maria Herrera: mariah@selfhelpenterprises.org
	Community Water Center	Debi Ores: Deborah.ores@communitywatercenter.org

Table 4-3. Key Entities Targeted for Management Zone Outreach (*TBD indicates where additional outreach needed at this time; contact to be determined)

Non-Discharger Type	Entity	Contact
Fresno County	Board of Supervisors	*TBD
	Public Works and Planning Development	Bernard Jimenez: BJimenez@fresnocountyca.gov Roy Jimenez: RJJimenez@fresnocountyca.gov
	Water and Natural Resources	Glenn Allen: glallen@fresnocountyca.gov
	Department of Public Health	*TBD
Tulare County	Board of Supervisors/Water Commission	Carrie Monteiro: CMonteiro@co.tulare.ca.us Eddie Valero: evalero@co.tulare.ca.us Denise England: DEngland@co.tulare.ca.us
	Health and Human Service Agency	*TBD
	Resource Management Agency	Ross Miller: rmiller@co.tulare.ca.us
Fresno County Communities	Reedley (Incorporated)	Russ Robertson: russ.robertson@reedley.ca.gov
	Orange Cove (Incorporated)	*TBD
Tulare County Communities	Dinuba (Incorporated)	Mike Tietze: mtietze@formationenv.com
	Orosi (Unincorporated)	*TBD
	Cutler (Unincorporated)	*TBD
	Traver (Unincorporated)	*TBD
State and Local Small Water Systems		*TBD

Table 4-4. Entities/Stakeholders on the Management Zone Outreach Mailing List (* denotes an entity that is also a permitted discharger)

Entity/Stakeholder	Participant	Email
Alta Irrigation District / Kings River East GSA	Chad Wegley	cw@altaid.org
California League of Food Producers	Rob Neenan	rob@clfp.com
Catalyst Group	Mary Currie	Mary@catalystgroupca.com
Central Valley Clean Water Association	Debbie Webster	eoofficer@cvcwa.org
Central Valley Salinity Coalition	Daniel Cozad	dcozad@cvsalinity.org
Central Valley Water Board	Adam Laputz	Adam.laputz@waterboards.ca.gov
	Anne Littlejohn	Anne.Littlejohn@waterboards.ca.gov
	Walter Plachta	walter.plachta@waterboards.ca.gov
	Clay Rodgers	clay.rodgers@waterboards.ca.gov
City of Reedley*	Russ Robertson	russ.robertson@reedley.ca.gov
Clean Water Action	Jennifer Clary	jclary@cleanwater.org
Community Water Center	Debi Ores	deborah.ores@communitywatercenter.org
Dairy Cares	J.P. Cativiela	jcativiela@cogentcc.com
Formation Environmental (City of Dinuba)	Mike Tietze	mtietze@formationenv.com
Fresno County	Glenn Allen	glallen@fresnocountyca.gov
	Bernard Jimenez	BJimenez@fresnocountyca.gov
	Roy Jimenez	RJJimenez@fresnocountyca.gov
GEI Consultants	Richard Meyerhoff	rmeyerhoff@geiconsultants.com
Kings River Conservation District	Debra Dunn	ddunn@krcd.org
	Soua Lee	slee@krcd.org
Kings River Conservation District / Kings River Water Quality Coalition	Eric Athorp	eathorp@krcd.org
	Charlotte Gallock	cgallock@krcd.org
	Jarrett Winther	jwinther@krcd.org
Local Dairyman / Farmer*	David Cehrs	dcehrs@verizon.net
	Gerben Leyendekker	gerbenleyendekker@gmail.com
	Dan Visser	dutchvalleyfarming@gmail.com
Luhdorff & Scalmanini Consulting Engineers	Vicki Kretsinger	vkretsinger@lsce.com
Milk Producers Council	Geoff Vanden Heuvel	geoff@milkproducers.org
Provost & Pritchard w/Kaweah Basin Water Quality Association	Donald Ikemiya	dikemiya@ppeng.com
	Sarah Rutherford	SRutherford@ppeng.com
Self-Help Enterprises	Paul Boyer	PaulB@selfhelpenterprises.org

Table 4-4. Entities/Stakeholders on the Management Zone Outreach Mailing List (* denotes an entity that is also a permitted discharger)

Entity/Stakeholder	Participant	Email
	Maria Herrera	mariah@selfhelpenterprises.org
	Liesbet Olaerts	liesbeto@selfhelpenterprises.org
The Wine Group*	Joey Giordano	jgiordano@thewinegroup.com
	Kyle Schmidt	kyle.schmidt@thewinegroup.com
Tulare County	Denise England	DEngland@co.tulare.ca.us
Tulare County District 4 Supervisor	Carrie Monteiro	CMonteiro@co.tulare.ca.us
	Eddie Valero	evalero@co.tulare.ca.us
Tulare County Resource Management Agency*	Ross Miller	rmiller@co.tulare.ca.us
Tulare Lake Basin Water Storage District	Justin Mendes	jmendes@tlbwdsd.com

5. Current Nitrate Treatment and Control Efforts or Management Practices

The Nitrate Control Program requires that a Preliminary Management Zone Proposal identify or summarize current treatment and control efforts, or management practices being implemented by permitted dischargers that will participate in the proposed Management. Section 5.1 provides this information for each of the General Orders that apply to participating permitted dischargers in proposed KRE/AID Management Zone.

5.1 General Orders

The following subsections summarize the current nitrate treatment and control efforts and management practices that are applicable to permitted dischargers authorized to discharge under a General Order. This information only describes the minimum or baseline nitrate management requirements applicable to all permittees covered by the General Order. Individual permittees may implement additional site-specific treatment and control efforts or management practices.

5.1.1 *Irrigated Lands Regulatory Program*

General Order R5-2013-0120-07 (as further amended) establishes the current treatment and control efforts of members of the KRWCA, the entity responsible for the implementation of the ILRP within the proposed Management Zone. The ILRP groundwater program, which focuses on nitrate contamination, includes elements that address evaluation of current nitrate contamination, monitoring of groundwater quality, development and evaluation of management practices to reduce the leaching of nitrate to groundwater, metrics of grower performance that reflect their potential leaching of nitrogen (N) to groundwater, performance goals and measures used to evaluate grower progress in reducing leaching. The subsections below summarize the key reporting and monitoring elements associated with the protection of groundwater.

5.1.1.1 Groundwater Quality Assessment Report (GAR)

The GAR designates high/low vulnerability areas within the Coalition region where high vulnerability areas are land where groundwater contamination currently occurs or is likely to occur due to conditions that make pollution likely (e.g., sandy soils, shallow groundwater). The GAR, which must be submitted within one year of the receipt of the Notice of Applicability from the Central Valley Water Board Executive Officer, and every 5 years thereafter, must address the following objectives:

- Assess all available, applicable, and relevant data and information to determine the high and low vulnerability areas where discharges from irrigated lands may result in groundwater quality degradation;

- Establish priorities for implementation of monitoring and associated studies within high vulnerability areas;
- Provide a basis for establishing workplans to assess groundwater quality trends;
- Provide a basis for establishing workplans and priorities to evaluate the effectiveness of agricultural management practices and to protect groundwater quality; and
- Provide a basis for establishing groundwater quality management plans in high vulnerability areas and priorities for implementation of those plans.

5.1.1.2 Management Practices Evaluation Program (MPEP)

To meet the requirements of this Program, the Coalition must address the following six objectives:

- Determine the crop-specific coefficients for conversion of a measured crop yield to nitrogen removed.
- Determine acceptable ranges for the multi-year nitrogen applied/nitrogen removed ratios (A/R Ratio) by crop.
- Identify whether existing site-specific and/or commodity-specific management practices are protective of groundwater quality.
- Determine if newly implemented management practices are improving or may result in improving groundwater quality.
- Develop an estimate of the effect of Member's discharges of constituents of concern on groundwater quality.
- Utilize the results of evaluated management practices to improve the practices implemented on Member farms (not specifically evaluated, but having similar site conditions).

The Coalition is required to submit a MPEP Report no later than 6 years from the approval of the MPEP workplan. In addition, this program must address the following elements:

- Develop a Groundwater Protection Formula (July 1, 2020) - Purpose is to generate a value, expressed either as a nitrogen loading number or a concentration of nitrate in water reflecting the total applied nitrogen, total removed nitrogen, recharge conditions, and other relevant and scientifically supported variables that influence the potential average concentration of nitrate in water expected to reach groundwater, i.e., the potential leaching value.
- Calculate Groundwater Protection Values must be calculated for all townships by six months after approval of the Groundwater Protection Formula, based on the following:
 - For each irrigated parcel in a high vulnerability area, Coalition must calculate a potential leaching value using the approved groundwater protection formula; and
 - Values for all parcels are summed and reported on a township level.

- Develop Groundwater Protection Targets for each township – The purpose of this element is to set a desired target that is intended to achieve compliance with the Receiving Water Limitations for groundwater. These targets must be developed within one year after calculation of the values for each township.

5.1.1.3 Groundwater Quality Trend Monitoring

The Groundwater Quality Trend Monitoring Program addresses the following two objectives:

- Determine current water quality conditions of groundwater relevant to irrigated agriculture; and
- Develop long-term groundwater quality information that can be used to evaluate the regional effects (i.e., not site-specific effects) of irrigated agriculture and its practices.

The monitoring program must provide a rationale for the number and locations of wells that considers the following:

- Variety of commodities produced in the coalition region;
- Groundwater vulnerability; and
- Groundwater contributing significant recharge to urban and rural communities where groundwater is a significant source of drinking water.

5.1.1.4 Groundwater Quality Management Plan (GQMP)

- Development of a GQMP is triggered: (1) when there is a confirmed exceedance of a water quality objective or applicable water quality trigger limit in a groundwater well and irrigated agriculture may cause or contribute to the exceedance; (2) in an area determined to be high vulnerability as part of the GAR process (see Section 5.1.1.1); (3) the Basin Plan requires the development of a management plan for constituent(s) discharged by irrigated agriculture; or (4) the Executive Officer determines that irrigated agriculture may be causing or contributing to exceedances of water quality objectives or a trend of degradation of groundwater that may threaten applicable Basin Plan beneficial uses. The primary elements of a GQMP include:
 - Investigate potential irrigated agricultural sources of waste discharge to groundwater;
 - Review physical setting formation for the plan area such as the geologic factors and existing water quality data;
 - Develop a strategy with schedules and milestones to implement practices to ensure discharge from irrigated lands are meeting Groundwater Receiving Limitations;
 - Ensure that adequate feedback monitoring is conducted to allow for evaluation of GQMP effectiveness; and
 - Facilitate efficient board review of data collected on the progress of the GQMP.

A GQMP must include a schedule and milestones for implementation of management practices. The schedule must identify the time needed to identify new management practices necessary to meet the receiving water limitations as well as a schedule for implementing the new practices

5.1.1.5 Grower Reporting Elements

Implementation of the General Order includes preparation of an annual Irrigation and Nitrogen Management Plan (INMP) and INMP Summary Report (INMPSR). The INMP remains on-farm and is not submitted to the Coalition; the INMPSR is submitted annually to the Coalition. Key reported elements include:

- All sources of nitrogen, including irrigation supply water, compost, manure, cover crops, and synthetic fertilizer.
- Total nitrogen removed:
 - Coalitions must publish crop coefficients (N-removed coefficients) for 95% of the crops in the coalition region by March 1, 2020.
 - Coalitions must publish crop coefficients (N-removed coefficients) for 99% of the crops in the coalition region by March 1, 2023.
 - For the remaining 1% of crops, it is acceptable to use estimated crop coefficients from similar crops.
- Previous year A/R Ratio.
- Multi-year A/R Ratio.
- Nitrogen applied – Nitrogen removed difference (A/R Difference).
- Data are reported at the following levels:
 - Individual field-level data (A/R Ratio or A/R Difference) by anonymous member identification (ID) - Each member is assigned a unique identifier that remains with the member for as long as they are a member.
 - Individual field-level A/R data by anonymous APN ID - Each parcel is assigned a unique identifier that remains with the parcel for as long as it is enrolled in the ILRP.
 - Township-level aggregated A/R data table.

All members of the Coalition in high or low vulnerability areas must complete a farm evaluation describing management practices implemented to protect groundwater quality once every five years. Key elements of the farm evaluation include:

- Crops grown and acreage;
- Location of farm;
- Drinking water wells associated with enrolled APNs;

- Identification of on-farm management practices;
- Identification of soil and erosion risk areas;
- Surface water discharge points from the property;
- Identification of any areas in management plans; and
- Location of all wells including abandoned wells and wellhead protection practices in place

5.1.2 Dairy Program

Dairy General Order R5-2013-0122 establishes the current treatment and control efforts of member dairies with respect to protecting groundwater from the impacts of nitrate. These requirements may be summarized as follows.

- Waste Management Plan (WMP) for the production area (Attachment B of the Dairy General Order) that addresses the following:
 - Sufficient storage capacity including all wastewater generated together with all precipitation on and drainage through manured areas, up to and including during a 25-year, 24-hour storm;
 - Adequate flood protection;
 - Proper design and construction of animal confinement areas, animal housing, manure and feed areas;
 - Operation and maintenance plan; and
 - No runoff of wastewater or contact rainwater.
- Nutrient Management Plan (NMP) and technical standards for nutrient management (Attachment C of the Dairy General Order) that includes the following:
 - Field-by-field nutrient (nitrogen, phosphorus, potassium and salt) budgets with application rates, timing, method of application;
 - Application-removal ratio of 1.4;
 - Specified sampling and analysis, including manure, irrigation water and harvested plant tissue; and
 - Wellhead protection, including setbacks and buffers.
- Maintain minimum freeboard of two feet in aboveground lagoons and one foot in belowground lagoons.
- Construction standards for new and reconstructed lagoons as follows:
 - Tier 1: A lagoon designed to consist of a double liner constructed with 60- mil high density polyethylene or material of equivalent durability with a leachate collection and

removal system (constructed in accordance with Section 20340 of title 27) between the two liners will be considered to be consistent with Resolution 68-16. Review for lagoons designed to this standard will be conducted in less than 30 days of receipt of a complete design plan package submitted to the Board.

- Tier 2: A lagoon designed in accordance with California Natural Resource Conservation Service (NRCS) Conservation Practice Standard 313 (as described in the Information Sheet) or equivalent and which the Discharger must demonstrate through submittal of technical reports that the alternative design is protective of groundwater quality.
 - Tier 1 and Tier 2: Required design report, construction quality assurance plan, operation and maintenance plan, post construction report
 - Tier 2, only: Required technical report and groundwater model that demonstrates the proposed lagoon is in compliance with applicable groundwater limitations, including calculations that demonstrate the amount and quality of seepage from the proposed lagoon and its effect on groundwater quality, and include proposed groundwater monitoring to evaluate the impact of lagoon seepage on groundwater quality.
- All dirt or unpaved corrals to be graded for positive drainage
 - Several provisions applicable to the production area for the purpose of minimizing infiltration, ensuring the containment of water that has come into contact with waste, and separation of wastewater from clean rainfall runoff, where necessary.

Recommendations for additional solutions and upgrades to protect groundwater quality were recently included in the permit's required Summary Representative Monitoring Report (submitted April 2019). These recommendations include:

- Annual determination of a manure nitrogen export target and comparison against actual manure exports with the objective to increase manure-N exports over time.
- Installation of liquid manure flow meters on all dairies.
- Improved sampling protocols for solid manure nitrogen content and nitrogen harvest removal.
- Nitrogen use efficiency education coupled with feedback to dairy farmers regarding their performance (e.g., nitrogen use efficiency and whole-farm nitrogen balance) compared to the industry

5.1.3 Confined Bovine Feeding Operations (Non-Dairy)

[Placeholder]

5.1.4 Poultry Program

[Placeholder]

5.2 Individual Permitted Dischargers

[Placeholder – this section will provide a summary of the current nitrate management requirements the WDR for each permitted discharger participating in the Management Zone.]

5.2.1 Permitted Discharger 1

5.2.2 Permitted Discharger 2

5.2.3 Etc.

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6. Early Action Plan Development

The Nitrate Control Program requires establishment of an Early Action Plan for the proposed Management Zone. An Early Action Plan identifies specific activities, and a schedule for implementing those activities, to ensure immediate access to safe drinking water for those who are dependent on groundwater from wells that exceed the primary MCL for nitrate. An Early Action Plan is required for the Management Zone if public water supply or domestic wells in the area of contribution exceed the water quality objective for nitrate.

The Early Action Plan is designed to provide access to drinking water in the short-term for areas within the Management Zone where groundwater used as a drinking water source has nitrate concentrations that exceed 10 mg/L nitrate as N. However, implementation of an Early Action Plan that addresses elevated nitrate concentrations in these wells by providing an alternative water supply does not create a presumption of liability for the cause of the elevated concentrations.

Figure 6-1 provides the specific requirements for development of an Early Action Plan, as established by the Nitrate Control Program. Attachment H to this Preliminary Management Zone Proposal provides the complete Early Action Plan for the proposed KRE/AID Management Zone that is consistent with these requirements. The sections below summarize the key elements associated with development and content of this plan.

**Figure 6-1. Early Action Plan Requirements for Management Zones
(Central Valley Water Board 2018)**

- A process to identify affected residents and the outreach utilized to ensure that impacted groundwater users are informed of and given the opportunity to participate in the development of proposed solutions;
- A process for coordinating with others that are not dischargers to address drinking water issues, which must include consideration of coordinating with affected communities, domestic well users and their representatives, the State Water Board's Division of Drinking Water, Local Planning Departments, Local County Health Officials, Sustainable Groundwater Management Agencies and others as appropriate;
- Specific actions and a schedule of implementation that is as short as practicable to address the immediate drinking water needs of those initially identified within the management zone, that are drinking groundwater that exceeds nitrate standards and that do not otherwise have interim replacement water that meets drinking water standards; and
- A funding mechanism for implementing the Early Action Plan, which may include seeking funding from Management Zone participants, and/or local, state and federal funds that are available for such purposes.

6.1 Development Approach

The Early Action Plan was developed as part of the overall stakeholder process implemented to develop the Preliminary Management Zone Proposal (see Section 1.4). The following sections describe how the Plan was developed, including the community outreach conducted to identify temporary water alternatives for inclusion in the Early Action Plan.

6.1.1 Identification of Public Water Supplies and Domestic Wells Potentially Exceeding Nitrate Water Quality Objective

6.1.1.1 Nitrate-impacted Areas

Section 3.4 above summarizes sources of nitrate groundwater quality data available for the proposed Management Zone (e.g., see Table 3-3) and describes how these data were used to assess existing nitrate water quality conditions. The Upper Zone average nitrate concentration data for wells in the Management Zone were used to produce a geospatial analysis of estimated average ambient groundwater quality conditions across the Management Zone (**Figure 6-2**).¹⁶ For the KRE/AID Management Zone, groundwater quality data for wells completed in the Upper Zone were attainable for the majority of the area, with only a few areas on the northeastern edges of the Management Zone that had less data compared to the central portion.

As illustrated in Figure 6-2, it is evident that there are several nitrate-impacted areas within the proposed Management Zone, here defined by average recent nitrate concentrations in the Upper Zone exceeding the MCL of 10 mg/L nitrate as N. The largest nitrate-impacted area occurs in the central to eastern portion of the Management Zone, stretching south and covering most of the southeast and southwest parts of the Management Zone. The northwest portion and a few pockets in the Management Zone exhibit lower concentrations of nitrate in the Upper Zone.

6.1.1.2 Potentially Impacted Public Supply Wells

Section 2.5 above describes how residential water systems are classified in the State of California and summarizes the types of water systems present within the proposed KRE/AID Management Zone. The following sections further develop this information by evaluating, to the extent data are available, the nitrate water quality characteristics associated with public supply wells within these water systems. Where appropriate, information may be summarized here and the reader will be directed to the Early Action Plan in Attachment H for more detailed information.

¹⁶ Note: Figure 6-2 provides the same information as was provided in Figure 3-8. The figures are repeated to simplify the presentation and flow of information.

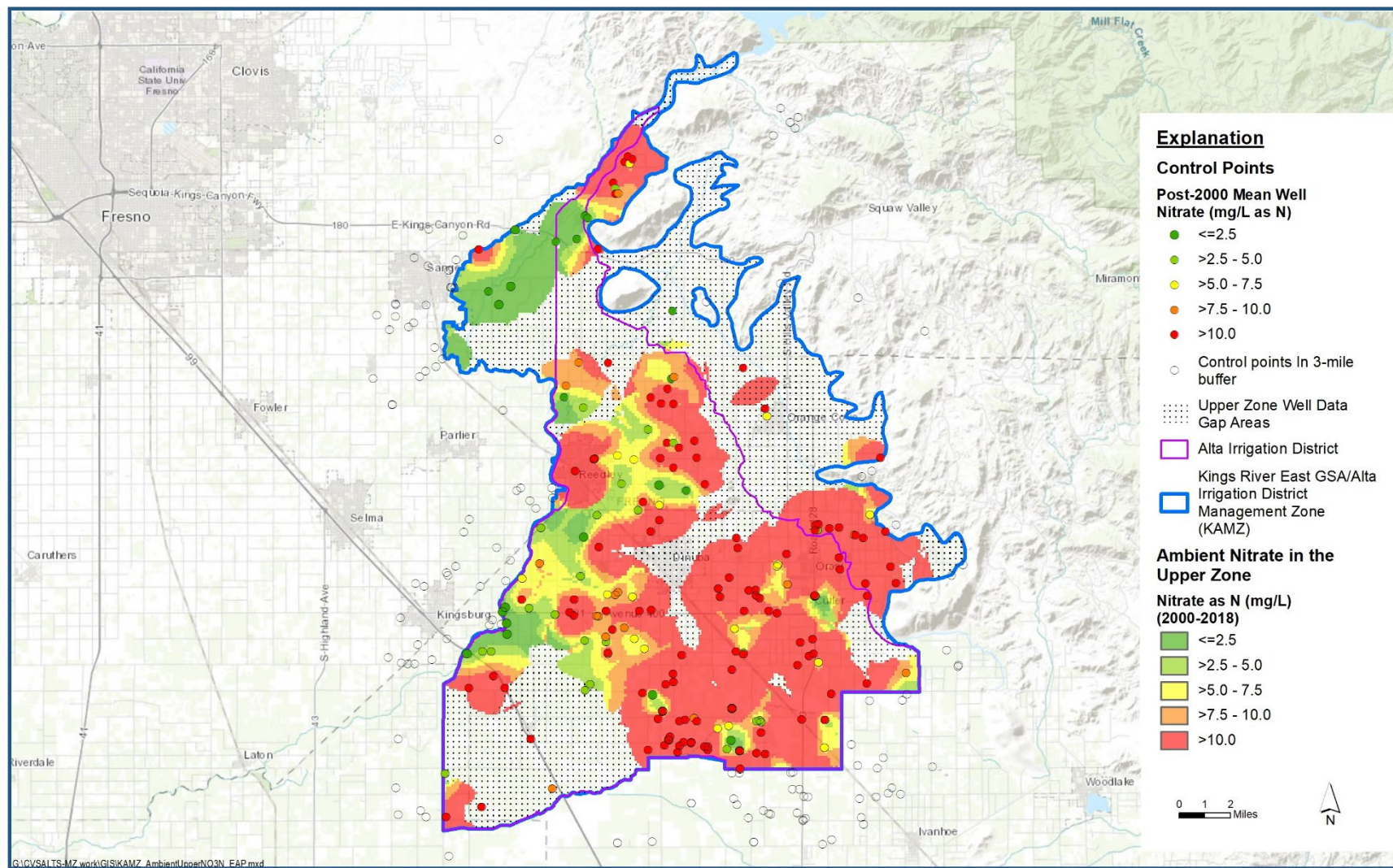


Figure 6-2. Ambient Post-2000 Nitrate Concentrations in the Upper Zone of the Proposed KRE/AID Management Zone

Public Supply Wells in the Management Zone

The State Water Board's Drinking Water Source and Water Systems identification documentation was downloaded from DDW to understand how many systems have active versus inactive wells that have nitrate (as N) at or exceeding the MCL. This documentation provides a status code for each well, as well as a population served and number of connections for each water system. Wells with any measurement of raw untreated water having nitrate at or exceeding the MCL were extracted from the database to determine if the wells are considered to be actively providing water to the water system or have been abandoned, destroyed, or inactive.

Based on DDW data for the proposed KRE/AID Management Zone, 60 public supply wells have met or exceeded the MCL for nitrate. Of those, 32 wells are considered "Active" (Active Raw, meaning the groundwater is sampled directly from the well; or Active Untreated, meaning the groundwater is sampled at a point between the well and a treatment system); the remainder are either inactive (21 wells), standby wells (1 wells), abandoned wells (1 well), destroyed wells (2 wells), or pending (unknown status, 3 wells).

Active wells that have concentrations at or exceeding the MCL are located mostly near Orange Cove, Cutler, Oroshi, Dinuba, and elsewhere in the southern half of the Management Zone (**Figure 6-3**). In some areas of the Management Zone, there are PWSs with no records of active public supply wells that are at or exceeding the nitrate MCL. These areas include: Reedley and London CSD.

Public Water System Delivered Water Treatment Status

Although there are many active wells that have been tested for nitrate with results indicating nitrate concentrations are at or exceeding the MCL of 10 mg/L as N, many PWSs have treatment facilities to remove nitrate prior to the water being delivered to consumers. Using the best information readily available, it is possible to find DDW sources of water for PWS that are categorized as "treated". This includes the following potential DDW-defined well status categories:

- *AT – Active Treated:* An active source which is sampled after any treatment.
- *CT – Combined Treated:* Combined sources which are treated.
- *DT – Distribution System Sample Point, Treated:* Sample point within the distribution system after treatment.
- *IT – Inactive Treated:* A source which is not in service for periods of one year or greater and which provides treated water to a system.
- *ST – Standby Treated:* A source which is used less than 15 calendar days per year, with periods not to exceed five consecutive days and which provides raw water which is sampled after treatment.

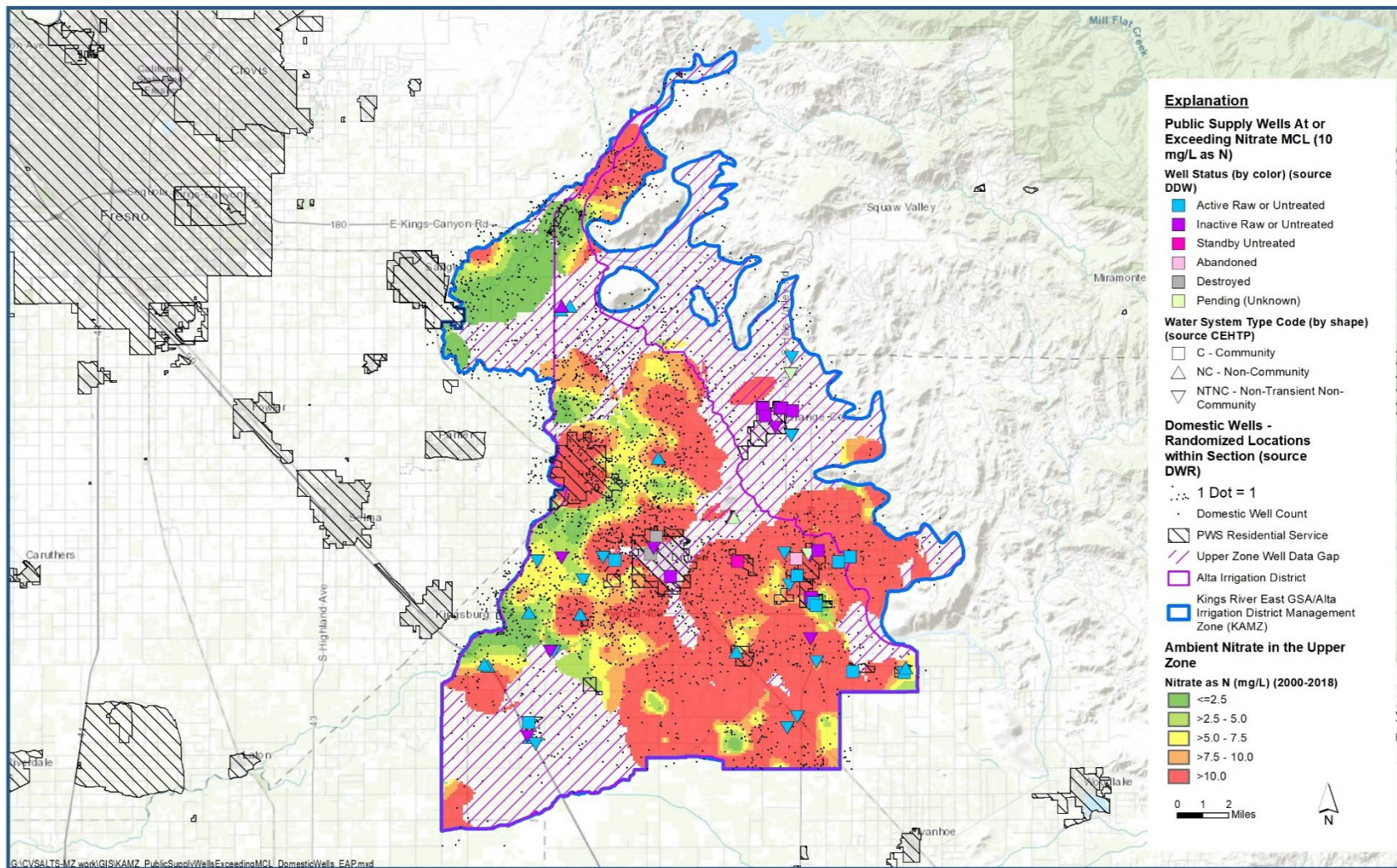


Figure 6-3. Potentially Impacted Public Water Supply Wells and All Domestic Wells in the Proposed KRE/AID Management Zone

Just because a water system has a treated source, this does not necessarily mean that the water system treats its water for nitrate (a treated source may mean chlorination prior to being distributed, or possible treatment for other contaminants such as organic chemicals). PWS typically treat elevated nitrate by using blending, reverse osmosis (RO; membrane technology), ion exchange (IX), or biological or chemical nitrate removal via denitrification (less common). Out of the 39 unique public water systems with potentially impacted water supply wells: (a) 27 have some form of water treatment, as gleaned from the DDW database of sources with one or more of the well statuses listed above; (b) 13 water systems provide nitrate sample results from their treated sources; and (c) seven water systems name the nitrate treatment (blending, RO, IX, etc.) in the source name reported to DDW. Out of the 13 water systems that provide nitrate sample results from treated sources, six of those water systems had nitrate samples from treated sources that still exceeded the nitrate MCL (greater than 10 mg/L as N).

Table 2-4 in the Early Action Plan (Attachment H) summarizes the water system treatment information that is available from DDW. **Figure 6-4** shows the public supply wells within the Management Zone that have met or exceeded the nitrate MCL, but it circles the water systems that have treated water sources (according to well status data from DDW). The color of the circle indicates whether the water system has had a nitrate sample from a treated source that exceeds the MCL (greater than 10 mg/L as N). If nitrate treatment was indicated in the DDW source name, the treatment method is listed on the map as well

6.1.1.3 Potentially Impacted Domestic Wells

Figure 6-5 illustrates the locations of potentially impacted domestic wells and areas of elevated nitrate (7.5 mg/L to 10 mg/L nitrate as N ($\text{NO}_3\text{-N}$), and > 10 mg/L $\text{NO}_3\text{-N}$). These areas were used along with DWR spatial coverage of domestic well counts compiled for each township/range-section. DWR provides the number of domestic wells in these one-mile by one-mile sections, based on the WCR records. It was assumed that any domestic wells within the boundaries of a PWS would not be used for drinking and were removed from this estimation of the number of potentially impacted domestic wells. There are approximately 532 domestic wells within the PWS residential service areas (this is based on DWR's section location assignment in the WCR records). It is unknown whether any of these wells are still being used even though they are potentially in a PWS area.

To estimate the number of wells potentially impacted by elevated nitrate, domestic wells were placed into six groups:

- *Group 1* - Groundwater in the Upper Zone with nitrate as N at or below 2.5 mg/L as N;
- *Group 2* - Groundwater in the Upper Zone with nitrate as N above 2.5 mg/L as N and at or below 5.0 mg/L as N;

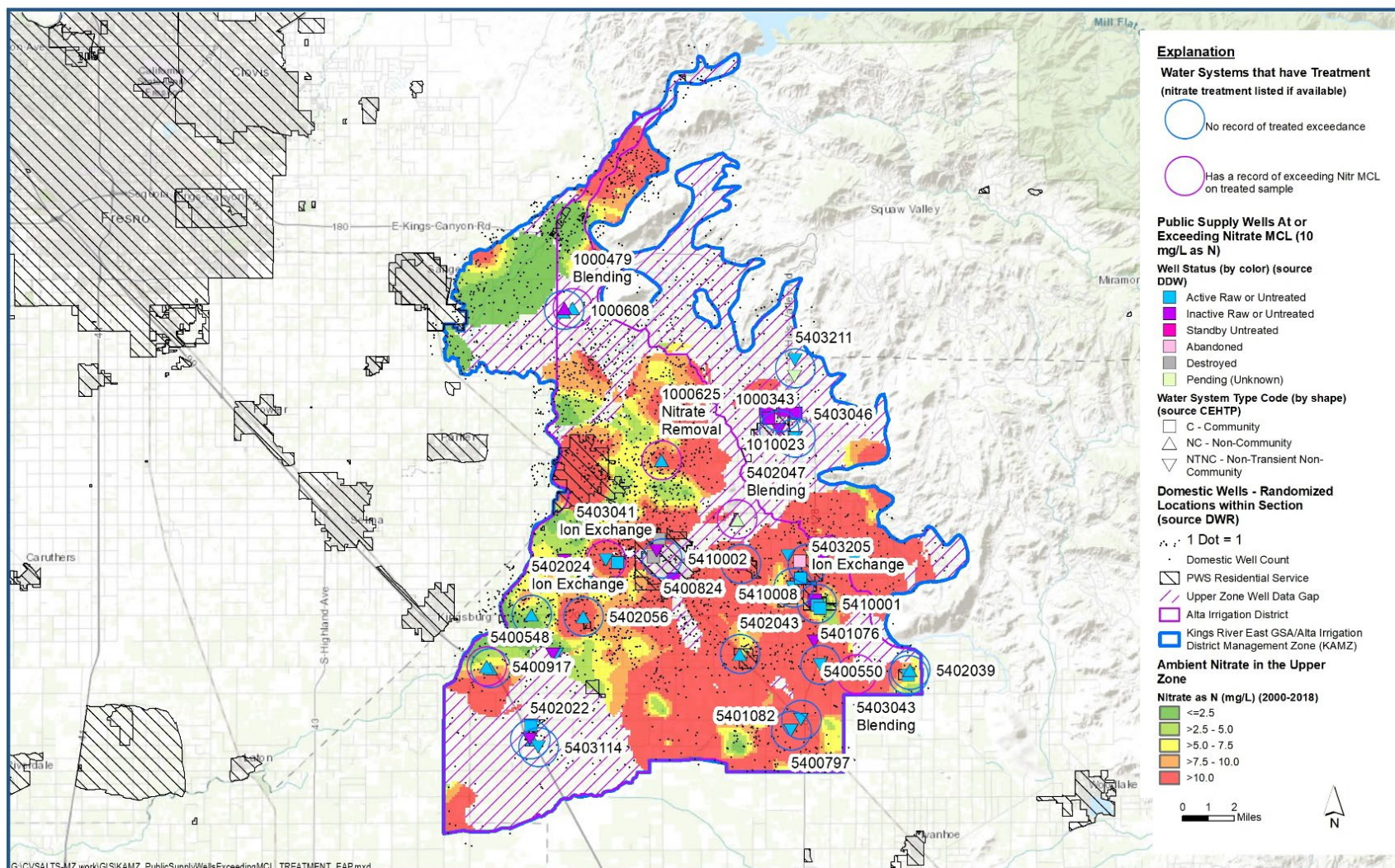


Figure 6-4. Treatment Status for Water Systems that have Wells with Nitrate-Impacted Samples

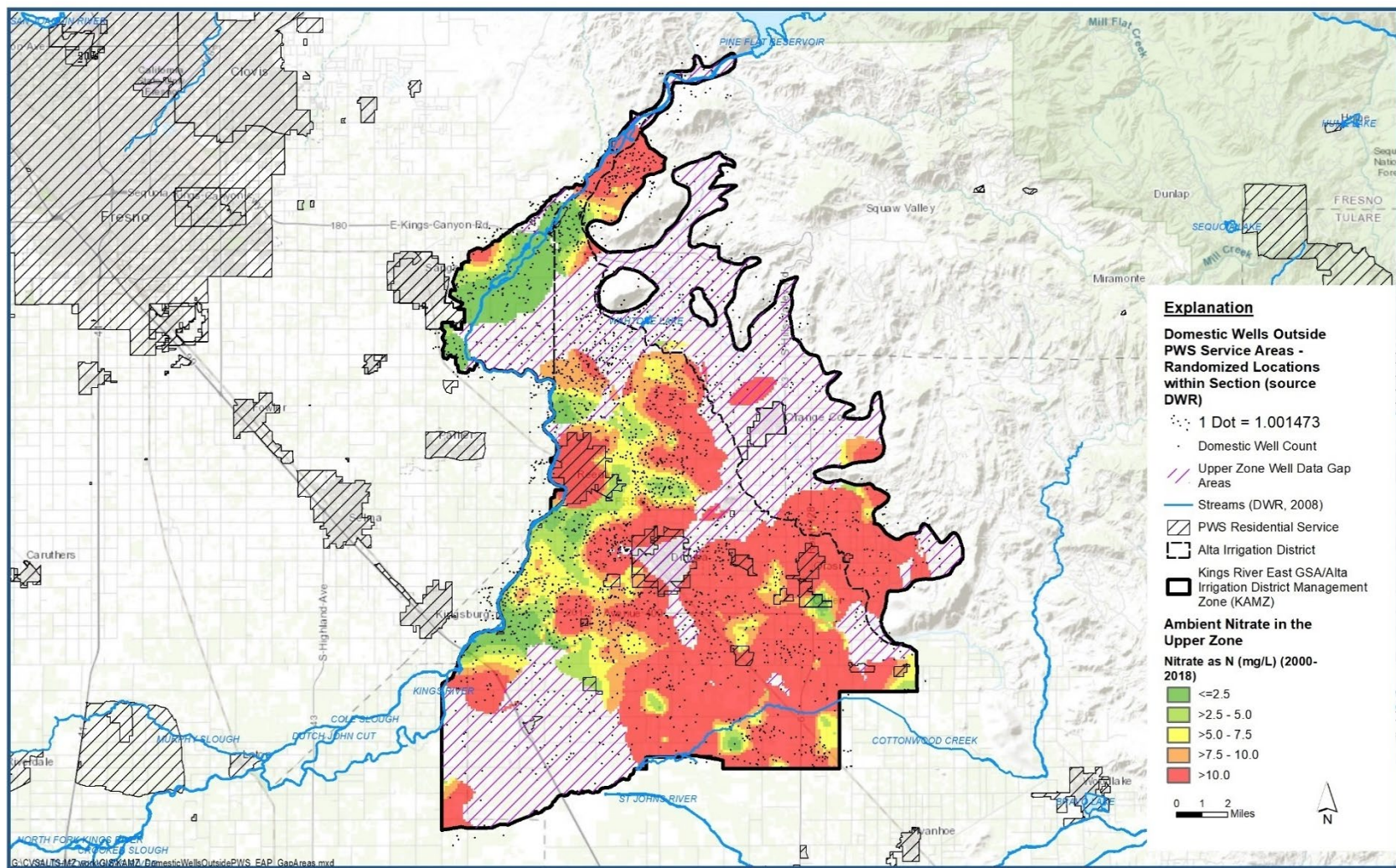


Figure 6-5. Domestic Wells Located Outside Public Water System Areas in the Proposed KRE/AID Management Zone

- *Group 3* - Groundwater in the Upper Zone with nitrate as N above 5.0 mg/L as N and at or below 7.5 mg/L as N;
- *Group 4* - Groundwater in the Upper Zone with nitrate as N above 7.5 and at or below the MCL of 10 mg/L;
- *Group 5* - Nitrate as N exceeding the MCL in the Upper Zone; and
- *Group 6* - Unknown category because the domestic well(s) are located where insufficient nitrate data exist in the Upper Zone to perform the spatial interpolation of ambient nitrate conditions.

The total number of wells outside PWS boundaries was compared to the number of wells in each elevated nitrate category to provide an estimate of the percent of domestic wells potentially impacted by elevated nitrate in the groundwater. **Table 6-1** summarizes the results of this analysis.

To estimate the population potentially impacted by elevated nitrate in domestic wells, 2010 census block data were mapped and joined with the ambient Upper Zone nitrate concentrations occurring outside of PWS boundaries. The population was summed for all census blocks outside PWS boundaries and within the Management Zone for those areas with nitrate concentrations in the Upper Zone (using the six categories of nitrate concentration described above). Table 6-1 summarizes the results of this analysis.

Table 6-1. Summary of Domestic Wells and Population with Estimated Upper Zone Nitrate Area Categories Located Outside PWS Boundaries

Estimated Upper Zone Ambient Nitrate (2000-2018)	DWR Domestic Well Count by Township & Range-Section		2010 Census Block Analysis
	Domestic Well Count Outside of PWS Boundaries	% of Total Domestic Wells Outside PWS	Population Outside PWS Boundaries
Group 1: ≤ 2.5 mg/L NO₃ as N	324	11%	1,240
Group 2: $> 2.5 - 5.0$ mg/L NO₃ as N	125	4%	1,347
Group 3: $> 5.0 - 7.5$ mg/L NO₃ as N	452	16%	3,158
Group 4: Elevated Nitrate ($> 7.5-10$ NO₃ mg/L as N)	426	15%	2,115
Group 5: High Nitrate (> 10 mg/L NO₃ as N)	1,198	41%	11,190
Group 6: Unknown*	382	13%	2,518
Total (Outside PWS Boundaries)	2,907	100%	21,569

*Domestic wells or Census Blocks are located in a "Gap Area", where insufficient Upper Zone nitrate data exist to do a spatial interpolation of ambient nitrate conditions.

6.1.2 Community Outreach

Note: As of the date of publication of this report, the State Water Resources Control Board's Office of Public Participation was in the process of developing protocols for community outreach that may apply here. Permittees developing a Preliminary Management Zone Proposal should consult with the Regional Board to determine which outreach protocols may apply to development of the Early Action Plan.

The Nitrate Control Program requires that development of the Early Action Plan include outreach to potentially affected residents within the proposed Management Zone. This requirement includes documenting the process implemented to identify affected residents and the outreach utilized to ensure that affected residents are given the opportunity to participate in development of the Early Action Plan, including participation in the development of proposed solutions. Section 1.4 of this Preliminary Management Zone Proposal summarizes outreach activities that occurred to support formation of this Preliminary Management Zone Proposal. Section 1.3 in the Early Action Plan (Attachment H) describes additional outreach activities that occurred during development of the Early Action Plan and outreach activities planned for implementation once the Management Zone begins implementing the Early Action Plan.

6.2 Key Early Action Plan Elements

Attachment H provides the complete Early Action Plan that has been developed for the proposed Management Zone. The subsections below summarize the key elements of the Plan as they pertain to the Nitrate Control Program requirements (see Figure 6-1 for specific program requirements):

- *Process to identify affected residents* – Section 4 of the Early Action Plan describes the process the Management Zone will employ to identify potential residents within the Management Zone that may have a domestic well, or be connected to a public water supply system, that is providing water that has nitrates that exceed the nitrate water quality objective. The proposed Management Zone will implement a process that identifies any resident that is not connected to a public water system that provides drinking water that meets the nitrate water quality objective.
- *Outreach utilized to ensure that impacted groundwater users are informed of and given the opportunity to participate in the development of proposed solutions* – Section 1.4 of the Early Action Plan summarizes the outreach completed to provide opportunity for local stakeholders to participate in the development in the Early Action Plan. Community outreach will continue as part of Early Action Plan implementation (see below).
- *A process for coordinating with others that are not dischargers to address drinking water issues* – Many non-dischargers are already participating in the proposed Management Zone (see Section 4.2 of this Proposal). Section 5.2.3 of the Early Action Plan describes

the process that will be implemented to coordinate with non-dischargers as part of implementation of the Early Action Plan.

- *Specific actions to address the immediate drinking water needs of those initially identified within the Management Zone* – Section 5 of the Early Action Plan describes the specific actions that will be implemented by the Management Zone. Key actions include:
 - *Temporary Water Provisions Program* – The Early Action Plan addresses the requirement to provide an alternative source of safe drinking water through the following two mechanisms:
 - *Public Access Water Facility Program* – Facilities that may be used to obtain safe drinking water will be established in areas that have a high likelihood of having nitrate concentrations that exceed the nitrate water quality objective in the Upper Zone of the underlying groundwater in the Management Zone. These facilities will be open to all residents.
 - *Alternative Water Program* – Residents who are unable to access a public facility to obtain safe drinking water may request to participate in an alternative water program that provides safe drinking water either through delivery of bottled water to their residence or installation of a point-of-use treatment device in their home.
 - *Community Outreach Program* – A comprehensive outreach program will be implemented to keep Management Zone residents informed of the availability of public access water facilities in their areas and the opportunity to participate in the Alternative Water Program. The outreach program provides a forum for the community to continue to provide input into the development of proposed solutions to ensure a long-term source of safe drinking water is available to residents.
- *Schedule of implementation that is as short as practicable* – The actions summarized above are planned for completion within the first two years of Early Action Plan implementation (see Section 6.3 below and Section 6.1 in the Early Action Plan).
- *A funding mechanism for implementing the Early Action Plan* – Section 6.3 in the Early Action Plan describes the funding mechanism for implementation of the Plan.

6.3 Schedule for Implementation

Unless the Central Valley Water Board objects, the Management Zone will begin implementation of the Early Action Plan within 60 days of submittal of this Preliminary Management Zone Proposal or by _____, 2020. **Table 6-2** (which is the same as Table 6-1 in the Early Action Plan) provides the schedule for implementation of key tasks in the Plan. Most of the Plan's elements will be implemented within two years of the Plan's initiation date. By year three much of the activity will revolve around maintaining the program's key elements and monitoring and reporting program activity. The Early Action Plan includes an adaptive management element to provide a mechanism for modifying the program where needed to improve the Plan.

6.4 Early Action Plan Implementation Period

This Early Action Plan will remain in effect until it is superseded by an approved Management Zone Implementation Plan that will be developed for the KRE/AID Management Zone (as required by the Nitrate Control Program)

Table 6-2. EAP Implementation Schedule

EAP Element		Task	Schedule/Milestones
Resident Identification		Identify residences in area covered by EAP and develop mailing list to support outreach	Within 120 days of EAP effective date
Community Outreach Program	General Activities	Establish Management Zone Website	Within 120 days of EAP effective date
		Develop public notice mechanisms/outlets	
		Prepare informational materials to support community outreach activities	General materials – within 120 days of EAP effective date
			Targeted materials – as needed to support community outreach activities
	Non-Discharger Coordination & Outreach	Targeted outreach to key non-dischargers not participating in Management Zone	Within 30 days of EAP effective date
		General community outreach support	Ongoing as needed
	Community Outreach Meetings	Initial Community Outreach Meetings	Complete community outreach meetings at two locations within the Management Zone within six months of EAP effective date
		Second round of Community Outreach Meetings	Complete community outreach meetings at two locations within the Management Zone after two public access water facilities become operational
		Third round of Community Outreach Meetings	Complete community outreach meetings at two locations within the Management Zone when last planned public access water facility becomes operational
		Additional Community Outreach Meetings	As determined necessary
	Public Notice Activities	Community Outreach Meetings	Notice provided no later than 30 days prior to scheduled meeting
		Opening of a public access water facility	Within 30 days after each public access water facility becomes operational.
	Targeted Outreach	Mailout to residents within EAP area	See Temporary Water Delivery Program – Alternative Water Program below
Temporary Water Delivery Program – Public Access Water Facilities		Establish list of potential land/properties for locating a public access water facility within targeted areas	Within 30 days of EAP effective date
		Establish final list of locations and types of public access water facilities to be developed	Identify all locations within 90 days of EAP effective date
		Complete documentation necessary to establish facilities at each location (see text for requirements)	Complete documentation for each facility and seek necessary permits or approvals per the following milestones: <ul style="list-style-type: none"> Facilities 1 & 2: within 180 days of EAP effective date Facilities 3 & 4 within 360 days of EAP effective date

Table 6-2. EAP Implementation Schedule

EAP Element	Task	Schedule/Milestones
Temporary Water Delivery Program – Public Access Water Facilities (ctd)	Water Filling Station Implementation	<ul style="list-style-type: none"> Initiate installation of filling stations within of 90 days completing review and obtaining any other necessary permits/approvals. Establish final agreements with land/property owner to operate/maintain filling station – prior to station becoming operational
	Establish Vendor-supplied Water Facilities	Establish vendor and property owner agreements
	Notification Activities	Notify Central Valley Board - Within 30 days of a new facility becoming operational Notify Community – Within 30 days of a new facility becoming operational
Temporary Water Delivery Program – Alternative Water Program	Mail initial outreach packet to residents identified in Section 4 of EAP	Within 30 days prior to first public access water facility becoming operational
	Requests to test drinking water wells	Conduct tests within 30 days of request
	Issue all letters of confirmation or denial	Issue letter within 30 days of application if no water test required; within 60 days if water test is required
	Resolve all appeals to letters of denial	Complete review within 60 days of receipt of communication requesting review of denied application
	Establish third-party agreement with vendors to supply bottled water or install a POU treatment system	Within 30 days of mailout of outreach packet to residences
	Follow-up with residents participating in Alternative Water Program	Check in with each residence within 90 days after sending a letter of confirmation to verify alternative water services are being provided
	Follow-up outreach to residents identified in Section 4 of EAP	<ul style="list-style-type: none"> Send second outreach packets to residents no later than one year after initial outreach packet mailed out Send third outreach packet to residents no later than one year after sending out second outreach packet
Monitoring & Data Management	Gather monitoring data from all program activities	Compile and analyze data in a timely manner to support preparation of EAP Reports and evaluate need to modify program
Reporting	Prepare EAP status reports	Submit status reports within 30 days of the following: <ul style="list-style-type: none"> Six-months after the EAP effective date 1 year after the EAP effective date Annually after the Year 1 report until the EAP is no longer effective

7. Plan to Finalize Management Zone Proposal

7.1 Identification of Final Management Zone Participants

This section discusses how the proposed Management Zone will establish (a) a final list of Management Zone participants for inclusion in the Final Management Zone Proposal; and (b) work with new dischargers that may elect to participate in the Management Zone after submittal of the Final Management Zone Proposal

7.1.1 Identification of Additional Participants

This Preliminary Management Zone Proposal identifies the initial participants of this proposed Management Zone in Section 1.5. Permitted dischargers that are identified as an initial participant are presumed by the Central Valley Water Board to have elected to comply with the Nitrate Control Program through Path B – Management Zone Approach. Additional permitted dischargers may still elect to join this Management Zone. However, this decision must be made within 330 days after receiving the NTC.

Given that the Preliminary Management Zone Proposal must be submitted to the Central Valley Water Board no later than 270 days after the NTC, permitted dischargers within the proposed Management Zone boundary that have not yet decided whether to participate in the Management Zone may need to make a final decision within as few as 60 days after submittal of this Proposal.

To facilitate the identification of additional participants prior to the 330 day deadline and before submittal of the Final Management Zone Proposal, the following activities will be implemented after submittal of the Preliminary Management Zone Proposal to the Central Valley Water Board and during the public comment period on the Proposal:

- Central Valley Water Board will post the Proposal on its website and circulate the Proposal publicly through the California ListServ Management System.
- The Management Zone, in coordination with the Central Valley Water Board, will send individual notices (e.g., via letter or postcard) to permitted dischargers within the Management Zone boundary of the availability of the Proposal for review, information on how to participate, and the deadline for a final decision to participate in the Management Zone.¹⁷

Any permitted dischargers that decide to join the Management Zone prior to the 330 day regulatory deadline must submit a letter to the Management Zone and the Central Valley Water Board of the decision to join the Management Zone. Once notified, the Management Zone will

¹⁷ Note: This mailout is supplemental to the notices that the Management Zone has already sent to each individual discharger within the proposed KRE/AID Management Zone, as described in Section 4.1.2

work with the discharger to incorporate their permitted facility into the Final Management Zone Proposal.

7.1.2 *Withdrawal of a Permitted Discharger*

A permitted discharger identified as an initial participant in this Preliminary Management Zone Proposal may withdraw from this Proposal prior to submittal of the Final Management Zone Proposal. A permitted discharger that elects to withdraw from this Proposal must notify the Management Zone and Central Valley Water Board in writing. Upon receipt of a letter of withdrawal from a permitted discharger, the Management Zone will verify that the Central Valley Water Board has also received notification from the permittee.

7.1.3 *New Dischargers*

During Management Zone development, where a facility submits a Report of Waste Discharge to the Central Valley Water Board for a new or expanded discharge within the proposed Management Zone boundary, the facility may elect to comply with the Nitrate Control Program through participation in this Management Zone. In the event this occurs, the Central Valley Water Board will coordinate with the Management Zone to verify the permitted discharger is included in the Final Management Zone Proposal.

7.2 Non-Discharger Participation

Table 4-3 identifies non-dischargers that outreach was conducted with during the development of this Preliminary Management Zone Proposal. During development of a Final Management Zone Proposal, the Management Zone will continue to send outreach materials to these non-dischargers and encourage their participation in the Management Zone. Where recommended, e.g., through input from existing stakeholders, outreach will be conducted to other non-dischargers not currently identified in Table 4-3.

7.3 Boundary Refinement

During the process to develop a Final Management Zone Proposal the potential exists for participants to recommend refinement to the proposed Management Zone boundary. For example, refinements in the boundary may be requested to accommodate particular land and water users or dischargers that want to be included or excluded from the Management Zone. Prior to accepting any recommendations to modify the proposed Management Zone boundary contained herein and prior to submittal of the Final Management Zone Proposal, the Management Zone will coordinate with the Central Valley Water Board, adjacent proposed Management Zones (if any), and, others as appropriate. Any changes to the proposed Management Zone boundary in the Final Management Zone Proposal will be supported by appropriate documentation that provides the justification for the proposed modification.

7.4 Groundwater Assessment Updates

Section 3 provides a comprehensive initial assessment of nitrate conditions in the groundwater encompassed by this Preliminary Management Zone Proposal, especially within the Upper Zone. During preparation of the Final Management Zone Proposal the initial groundwater assessment will be updated as needed to support the final proposal and future development of the Management Zone Implementation Plan. Additional data that may be incorporated into the final Proposal include:

- Domestic well nitrate results that will become available through implementation of well testing under the ILRP.
- Well data that may become available through implementation of the Replacement Water Settlement Agreement (see Section 3.1 in Attachment H).
- Additional data identified through outreach activities or made available by additional Management Zone participants.
- Results of additional data collection from wells already incorporated in the initial assessment (if any become available).

7.5 Management Zone Governance & Funding

[Placeholder: (a) description of existing governance and funding at the time of submittal of this Preliminary Management Zone Proposal; and (b) discussion of activities and timeline to establish the governance/funding elements consistent with requirements of Final Management Zone Proposal submittal. This section will also reference the funding mechanism established in the Early Action Plan]

7.6 Submittal of Deliverables

The Central Valley Water Board will make this Preliminary Management Proposal available for public comment for at least 30 days after being publicly posted by the Board on its website and through the Lyris Management System. The Central Valley Water Board will provide comment on the Preliminary Management Zone Proposal after completion of this public comment process. Based on the outcome of this process the Management Zone will submit the following deliverables:

- The Final Management Zone Proposal will be submitted to the Central Valley Board no later than 180 days after receiving comments from the Central Valley Water Board on this Preliminary Management Zone Proposal. The Final Management Zone Proposal will include the following required elements:
 - Timeline for development of the Management Zone Implementation Plan;
 - Updated list of participants;

- Governance structure that, at a minimum, establishes the following: (a) roles and responsibilities of all participants; (b) identification of funding or cost-share agreements to implement short term nitrate management projects/activities, which may include local, state and federal funds that are available for such purposes; and (c) a mechanism to resolve disputes among participating dischargers;
 - Additional evaluation of groundwater conditions across Management Zone area, if necessary;
 - Identification of proposed approach for regulatory compliance (i.e., use of assimilative capacity and/or seeking approval of an exception for meeting nitrate water quality objectives);
 - Explanation of how the Management Zone intends to interact and/or coordinate with other similar efforts such as those underway pursuant to SGMA; and,
 - Documentation of actions taken to implement the Early Action Plan (consistent with the schedule included in the Early Action Plan included herein).
- The Management Zone Implementation Plan will be submitted to the Central Valley Water Board for approval no later than 180 days after the Final Management Zone Proposal is accepted by the Executive Officer of the Central Valley Water Board.

In addition to the above timeline for the next Management Zone deliverables, the Management Zone will begin implementation of the Early Action Plan within 60 days of submittal of this Preliminary Management Zone Proposal, unless the Central Valley Water Board objects.

8. References

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Attachment A - Notices of Participation from Permitted Dischargers within Proposed Management Zone

A-1: Growers Permitted under Irrigated Lands Regulatory Program General Order R5-2013-0120

A-2: Dairies Permitted under General Order R5-2013-0122

A-3: Confined Bovine Feeding Operations Permitted under General Order R5-2017-0158

A-4: Poultry Farms Permitted under General Order R5-2016-0087

A-5: Permitted Dischargers with Individual Waste Discharge Requirements

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Attachment B – Groundwater Sustainability Agencies within and Adjacent to the Proposed KRE/AID Management Zone

There are eight GSAs in the Kings Subbasin:

- Central Kings GSA
- James Irrigation District GSA
- Kings River East GSA
- McMullin Area GSA
- North Fork Kings GSA
- North Kings GSA
- South Kings GSA
- Tulare County GSA

Since the Proposed KRE/AID Management Zone is located along the southern border of the Kings Subbasin, there are a number of other GSAs near the Management Zone, including (See Figure 2-1):

- Kings River East GSA
- North Kings GSA
- Greater Kaweah GSA
- Mid-Kings River GSA
- East Kaweah GSA
- South Kings GSA
- Central Kings GSA

The following sections provide a brief summary of the most relevant GSAs within or adjacent to the proposed Management Zone, including points of contact, information about who makes up the GSA, and other interested parties that have been contacted by the GSAs.

Kings River East GSA

- *Point of Contact:* Chad Wegley, General Manager, Kings River East GSA, 289 North L Street, Dinuba, CA 93618, (559) 591-0800 cw@altaid.org, <https://kingsrivereast.org/>

- *Special Act District:* County of Tulare, County of Fresno, City of Dinuba, City of Reedley, City of Orange Cove, Alta Irrigation District, Orange Cove Irrigation District, Hills Valley Irrigation District, Tri-Valley Water District, Kings River Water District, Orosi Public Utility District, Cutler Public Utility District, London Community Services District, East Orosi Community Services District, and Sultana Community Services District
- *Other Interested Parties:* Tulare and Fresno County Farm Bureaus, Citrus Mutual, Kings River Conservation District, DWR, Community Water Center (advocates for environmental justice), Friant-Kern Canal of the Friant Division of the Central Valley Project, Bureau of Reclamation.

North Kings GSA

- *Point of Contact:* Gary Serrato, Executive Officer, North Kings GSA, 2907 S. Maple Street, Fresno, CA 93725, (559) 233-7161, northkingsgsa@gmail.com, <https://www.northkingsgsa.org/>
- *GSA Joint Powers Authority:* Fresno Irrigation District, County of Fresno, City of Fresno, City of Clovis, City of Kerman, Biola Community Services District, Garfield Water District, and International Water District.
 - Agency's Board of Directors entered a "Participation Agreement" with Bakman Water Company, and planned to enter into Participation Agreements with Fresno Metropolitan Flood Control District and California State University Fresno.
- *Other Interested Parties:* Malaga County Water District, Pinedale County Water District, Table Mountain Rancheria, Dumna Wo-Wah Tribal Government, Malaga, Calwa, Pinedale, Friant, and Fresno Metropolitan Flood Control District.

Greater Kaweah GSA

- *Point of Contact:* Eric Osterling, General Manager, Greater Kaweah GSA, 2975 N. Farmersville Blvd., Farmersville, CA 93223 (559) 302-9987, eosterling@greaterkaweahgsa.org, <http://greaterkaweahgsa.org/>
- *GSA Joint Powers Authority:* County of Tulare, Kaweah Delta Water Conservation District, Kings County Water District, Lakeside Irrigation Water District, and St. Johns Water District.
- *Other Interested Parties:* Cal Water (public water system), Kaweah Delta Water Conservation District

Mid-Kings River GSA

- *Point of Contact:* Dennis Mills, Secretary, Mid-Kings River GSA, 200 Campus Drive, Hanford, CA 93230, (559) 584-6412, kcwdh2o@sbcglobal.net, <http://www.midkingsrivergsa.org/index.html>

- *GSA Joint Powers Authority:* Kings County Water District, City of Hanford, and the County of Kings
- *Other Interested Parties:* Armona Community Services District, Home Garden Community Services District, Hardwick Water Company, Kings River-Hardwick Public Water System, Pioneer Public Water System, Hanford Christian Public Water System, Lemoore Naval Air Station, Santa Rosa Rancheria for the Tachi Yokut Tribe, Kings River Conservation District

East Kaweah GSA

- *Point of Contact:* Michael Hagman, Executive Director, East Kaweah GSA, P.O. Box 908, Lindsay, CA 93247, (559) 562-2534, mhagman@lindmoreid.com, <http://www.ekgsa.org/>
- *GSA Joint Powers Authority:* Lindmore Irrigation District, Lindsay-Strathmore Irrigation District, Exeter Irrigation District, Ivanhoe Irrigation District, Stone Corral Irrigation District, the City of Lindsay, County of Tulare, Stone Corral Irrigation District, Wutchumna Water Company
- *Other Interested Parties:* Pratt Mutual Water Company, Soult's Mutual Water Company, Mooney Grove Park, Cutler Park, Saputo Dairy Food USA, Mobile Home Parks, The Lakes, Bedel Mutual Water Company, City of Tulare, California Water Service Co., Tulare Irrigation District, Santa Rosa Rancheria Tachi-Yokut Tribe, Wukachee Tribe, and Kaweah Delta Water Conservation District.

South Kings GSA

- *Point of Contact:* David Peters, South Kings GSA, 952 Pollasky Ave, Clovis, CA 93612, (559) 299-1722, dpeters@peters-engineering.com, <http://www.southkingsgsa.org/index.html>
- *GSA Joint Powers Authority:* City of Fowler, City of Kingsburg, City of Parlier, and City of Sanger. MOU with Del Rey Community Services District and Caruthers Community Services District
- *Other Interested Parties:* Cal Water (Selma), County of Fresno, and Kings River Conservation District.

Central Kings GSA

- *Point of Contact:* Phillip Desatoff, General Manager, Central Kings GSA, 2255 Chandler Street, Selma, CA 93662, (559) 896-1660, pdesatoff@cidwater.com, <https://www.cidwater.com/>
- *Memorandum of Understanding:* Consolidated Irrigation District, the County of Kings, the County of Fresno, and the County of Tulare.
- *Other Interested Parties:* City of Selma, City of Sanger, City of Parlier, City of Kingsburg, City of Fowler, Del Rey Community Services District, Caruthers Community Services District, Cal Water, and Kings River Conservation District.

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Attachment C - Example Notice to Comply Letters

To be Inserted

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Attachment D - List of Permitted Dairies, Confined Bovine Feeding Operations and Poultry Farms within the Proposed Management Zone

To be inserted

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Attachment E - Letter Sent to Permitted Dairies, Permitted Dairies, Confined Bovine Feeding Operations and Poultry Farms within the Proposed Management Zone

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Attachment F - Outreach Conducted with Permitted Dischargers with an Individual WDR

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Attachment G - Public Meeting Records for Development of Preliminary Management Zone Proposal

To be Inserted

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Attachment H - Early Action Plan

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