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- Attachment B Groundwater Sustainability Agencies within and Adjacent to the Proposed Turlock Management Zone
- Attachment C Example Notice to Comply Letters
- Attachment D List of Permitted Dairies, Confined Bovine Feeding Operations and Poultry Farms within the Proposed Management Zone
- Attachment E Letter Sent to Permitted Dairies, Permitted Dairies, Confined Bovine Feeding Operations and Poultry Farms within the Proposed Management Zone
- Attachment F Outreach Conducted with Permitted Dischargers with Individual WDR
- Attachment G Public Meeting Records for Development of Preliminary Management Zone Proposal
- Attachment H Early Action Plan

## Acronyms

Acronym	Definition
AR Difference	Difference Between Nitrogen Applied and Nitrogen Removed
AR 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	East San Joaquin 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
CWD	Community Water District
CWS	Community Water System
DAC	Disadvantaged Community
DDW	Division of Drinking Water
DUC	Disadvantaged Unincorporated Community
DWR	California Department of Water Resources
ESJWQC	East San Joaquin Water Quality Coalition
GAMA	Groundwater Ambient Monitoring and Assessment
GAR	Groundwater Quality Assessment Report
GIS	Geographic Information Systems
GQMP	Groundwater Quality Management Plan
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HCM	Hydrologic Conceptual Model
ILRP	Irrigated Lands Regulatory Program
INMP	Irrigation and Nitrogen Management Plan
INMPSR	Irrigation and Nitrogen Management Plan Summary Report
IX	Ion Exchange
KRWQC	Kings River Water Quality Coalition
LSWS	Local Small Water System
MAGPI	Merced Area Groundwater Pool Interests
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
MHI	Median Household Income
MPEP	Management Practice Evaluation Program

Acronym	Definition
N	Nitrogen
NMP	Nutrient Management Plan
NO <sub>3</sub> -N	Nitrate as Nitrogen
NRCS	California Natural Resource Conservation Service
NTC	Notice to Comply
NWIS	National Water Information System
OAL	Office of Administrative Law
POU	Point of Use
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
WDR	Waste Discharge Requirements
WMP	Waste Management Plan
WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant

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## Background and Purpose

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### 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 2019-00\_\_) and \_\_\_\_\_ (OAL Matter Number: \_\_\_\_\_), respectively. The portions of these Basin Plan amendments (BPA) that established the Nitrate Control Program became effective upon OAL approval. 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 where 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 Turlock Groundwater Subbasin as a Priority 1 subbasin (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 were required to choose between two compliance pathways to meet the 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 (where 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 Turlock 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 Turlock 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 proposed Turlock 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 proposed boundary for the Turlock Management Zone is the boundary coincident with the California Department of Water Resources (DWR) Bulletin 118 groundwater subbasin boundary for the Turlock Groundwater Subbasin (DWR 2003) (**Figure 1-3**). This subbasin lies within the San Joaquin Valley Groundwater Basin and the Turlock Subbasin (Groundwater Basin Number 5-22.03) (DWR 2006). DWR periodically updates groundwater basin boundaries. A review of the most recent updates to the DWR groundwater basin boundaries finds that the Turlock Subbasin boundary remains the same as established by DWR. Potential modifications to neighboring subbasins based on recent requests to DWR (Merced Subbasin to the south, and Delta-Mendota Subbasin to the west) will not affect the border of the existing Turlock Subbasin.

**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 Turlock 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 Turlock Management Zone is consistent with these three general characteristics:

#### *Defined Portion of a Large Groundwater Basin/Subbasin*

The Turlock Groundwater Subbasin is itself a hydrologic boundary, consistent with the requirement that a Management Zone be a discrete and generally hydrologically contiguous area. As noted above, this hydrologic boundary coincides with Turlock Groundwater Subbasin boundary established in DWR Bulletin 118 (DWR 2003, 2006).

#### *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.

#### *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 Turlock 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 Kings 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 (KRWQC), 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 Turlock 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 Early Action Plan.

### **1.4.2 Public Participation**

The Turlock 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: <https://www.esjcoalition.org/cvSalts/>
- 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 (see Attachment A for Letters of Participation):

- Growers regulated under General Order R5-2012-0116 (as amended), under the Irrigated Lands Regulatory Program (ILRP) within the Eastern San Joaquin River Watershed (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

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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 boundary of the Turlock Subbasin and Management Zone aligns with the edge of the alluvial boundary and the edge of the Sierra Nevada foothills. The Management Zone, which lies between the Tuolumne and Merced Rivers, is bounded on the west by the San Joaquin River. The Management Zone encompasses approximately 542 square miles (sq. mi.) (347,000 acres) within portions of both Stanislaus and Merced Counties. **Figure 2-1** illustrates surface water bodies in and around the Management Zone. Key lentic surface water features identifiable on maps include:

- Turlock Lake, located in the northeastern part;
- Dawson Lake, located along the northeastern edge; and
- Brush Lake located along the northwestern edge (this waterbody is actually an old cutoff oxbow along the San Joaquin River that only contains water when the river floods; much of it is now farmed).

Beyond the eastern boundary of the subbasin, the Don Pedro Reservoir on the Tuolumne River stores surface water for irrigation. The Turlock Irrigation District operates 250 miles of gravity-fed canals and laterals to supply surface water to its district users. Merced Irrigation District also provides surface water to a small area of land (slightly more than 5,000 acres) within the subbasin.

Water users in the proposed Management Zone use both surface water and groundwater to meet the water demands of the area. M&I water and domestic water within the Management Zone are all supplied by groundwater. The Turlock and Merced Irrigation Districts supply irrigation water, mostly to the western part and also a small area of the southeastern part, of the Management Zone. Some growers within the irrigation districts' boundaries have their own private irrigation wells that they use in lieu of, or in addition to, any water supplied by the two irrigation districts. Groundwater is relied on more heavily during drought periods, when surface water supplies are reduced. All agricultural demand outside of the two irrigation districts' boundaries as well as on some dairies and other agricultural facilities is met by groundwater.

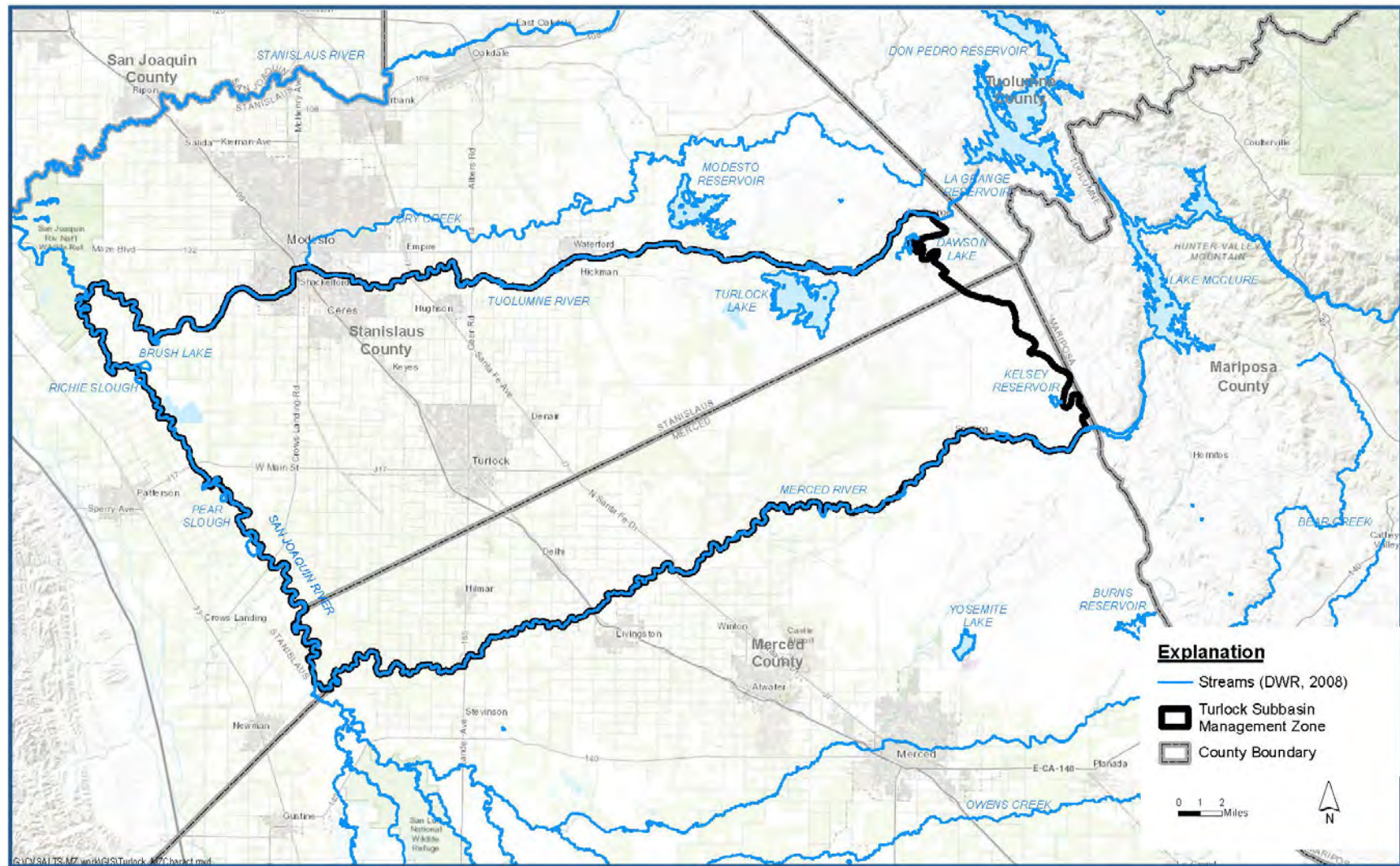


Figure 2-1. Surface Water Characteristics of the Proposed Management Zone

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

Boundary Type	Source for Boundary Data	Comments
Groundwater Sustainability Agency (GSA)	<ul style="list-style-type: none"> <li>DWR Map Viewer: <a href="https://sgma.water.ca.gov/webgis/index.jsp?appid=gasmaster&amp;rz=true">https://sgma.water.ca.gov/webgis/index.jsp?appid=gasmaster&amp;rz=true</a></li> <li>Individual GSA links for finding “Interested Parties”: <a href="https://sgma.water.ca.gov/portal/gsa/all">https://sgma.water.ca.gov/portal/gsa/all</a></li> </ul>	GSA boundaries, and also a list of GSA “Interested Parties”
Groundwater Basin/Subbasin	<ul style="list-style-type: none"> <li>DWR Bulletin 118: <a href="https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118">https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118</a></li> <li>Basin Boundary Geographic Information System (GIS) file: <a href="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&amp;hash=D947E7AC9E03D122CC5D707369E581DF41320E50">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&amp;hash=D947E7AC9E03D122CC5D707369E581DF41320E50</a></li> <li>DWR Basin Boundary Modification Map Viewer: <a href="https://sgma.water.ca.gov/basinmod/modrequest/map;jsessionid=658C11952F60F610812069F4F5860BCD">https://sgma.water.ca.gov/basinmod/modrequest/map;jsessionid=658C11952F60F610812069F4F5860BCD</a></li> </ul>	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: <a href="https://gis.water.ca.gov/arcgis/rest/services/Boundaries/i03_WaterDistricts/MapServer">https://gis.water.ca.gov/arcgis/rest/services/Boundaries/i03_WaterDistricts/MapServer</a>	Irrigation Districts, water districts, community service areas, and community service districts
Public Water Supply Systems	California Environmental Health Tracking Program: <a href="https://trackingcalifornia.org/water-systems/water-systems-landing">https://trackingcalifornia.org/water-systems/water-systems-landing</a>	Division of Drinking Water
State Small Water Supply Systems	By request from county Environmental Health Departments (Merced and Stanislaus Counties)	Boundary data is typically not available for SSWS (usually just an address)
Disadvantaged Communities (DAC)/Disadvantaged Unincorporated Communities (DUC)	<ul style="list-style-type: none"> <li>DACs boundaries available from DWR: <a href="https://gis.water.ca.gov/app/dacs/">https://gis.water.ca.gov/app/dacs/</a></li> <li>DUCs boundaries available from PolicyLink by request (<a href="https://www.policylink.org/">https://www.policylink.org/</a>)</li> </ul>	DUC boundaries only available for portions of the San Joaquin Valley

## 2.2 Jurisdictions

The Management Zone includes the southern portion of Stanislaus County and the northern portion of Merced County (see Figure 2-2). Primary communities within each County include:

- Stanislaus County: Ceres, Hughson, Turlock (incorporated); Denair (unincorporated)
- Merced County: Ballico, Delhi, Hilmar (unincorporated)

## 2.3 Groundwater Sustainability Agencies

Groundwater Sustainability Agencies (GSAs), established under the Sustainable Groundwater Management Act (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 the 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 each GSA in the State of California, has established a web-based Portal for GSA documentation.<sup>1</sup> Two GSAs are located within the proposed Turlock Management Zone (**Figure 2-2**):

- East Turlock Subbasin GSA<sup>2</sup> – Member agencies include: Eastside Water District, Merced County, Stanislaus County, Ballico-Cortez Water District and Merced Irrigation District.
- West Turlock Subbasin GSA<sup>3</sup> - Member agencies include the Cities of Turlock, Ceres, Hughson and Modesto, Stanislaus and Merced Counties; Denair Community Services District; Delhi and Hilmar County Water Districts, and the Turlock Irrigation District. Associate members include the City of Waterford, Stevinson Water District and Keyes Community Services District.

Adjacent to the Turlock Groundwater Subbasin, there are seven other GSAs (see Figure 2-3): Patterson Irrigation District GSA; San Joaquin River Exchange Contractors Water Authority GSA; Stanislaus and Tuolumne Rivers Groundwater Basin Association GSA; Northwestern Delta-Mendota GSA; Merced Subbasin GSA; Merced Irrigation-Urban GSA; West Stanislaus Irrigation District GSA.

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.

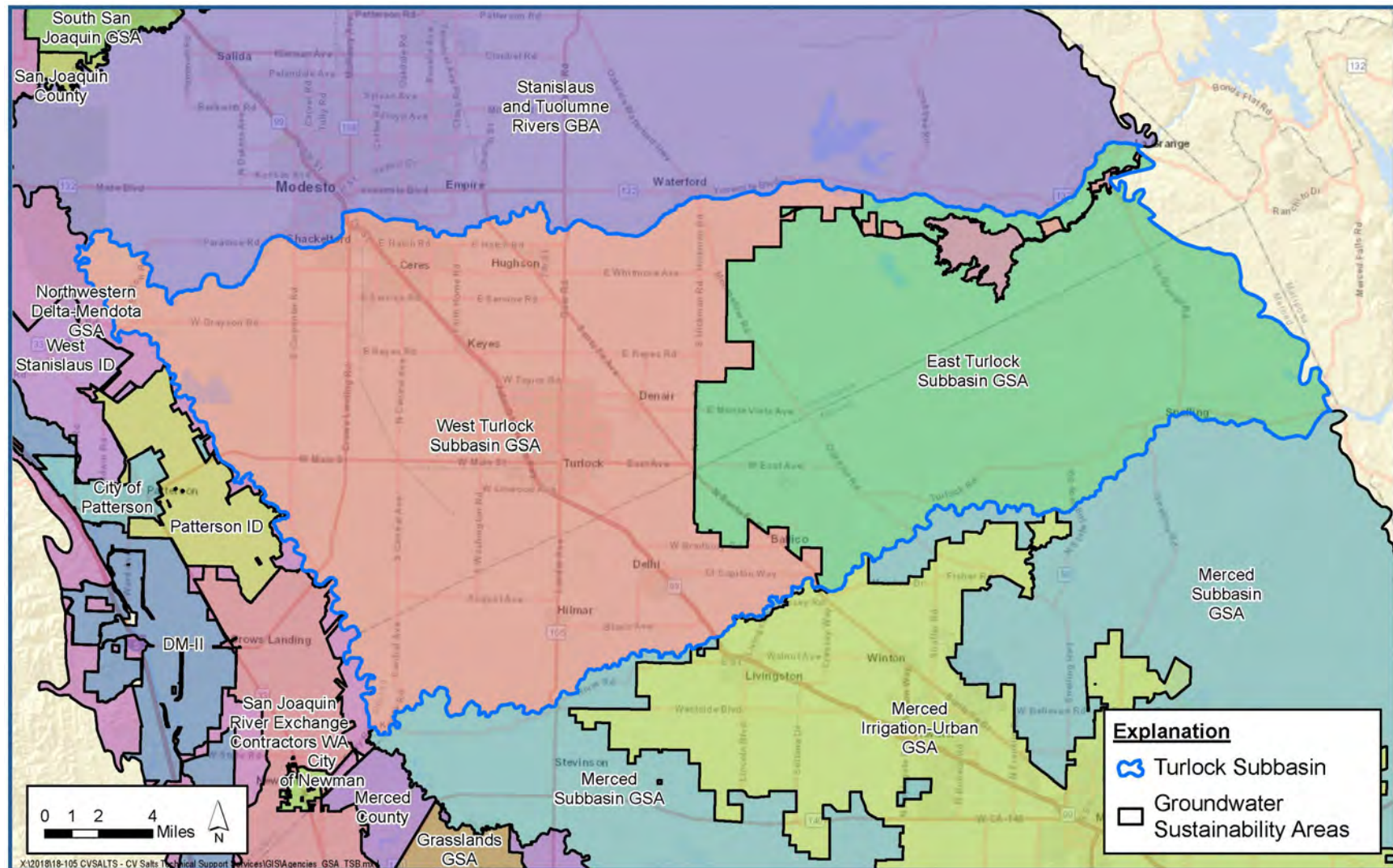
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<sup>1</sup> GSA boundaries: <https://sgma.water.ca.gov/webgis/index.jsp?appid=gasmaster&rz=true>

<sup>2</sup> <https://sgma.water.ca.gov/portal/gsa/print/238>

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







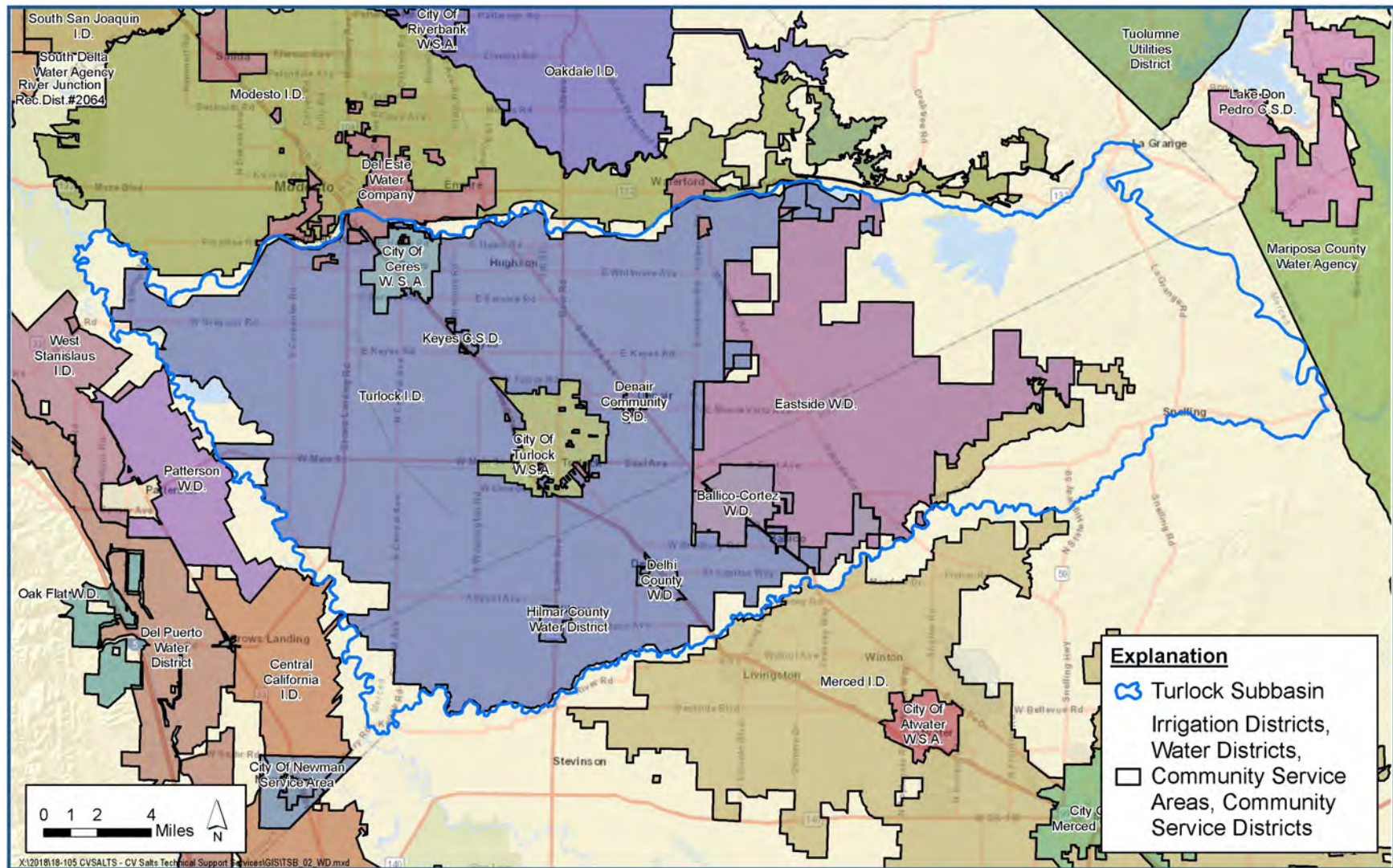


Figure 2-3. Water Management Entities Located within and adjacent to the Proposed Management Zone.

## 2.4 Water Management Entities

There are several irrigation districts, water districts, community service areas, and community service districts (listed below) that manage and distribute water within the MZ. These entities distribute water for irrigation, drinking, or other purposes. Water management-related districts include irrigation districts, water districts, community service areas, and community service districts. Figure 2-3 illustrates the location of these various management areas within and adjacent to the proposed Management Zone:

- Ballico-Cortez Water District,
- Ballico Community Service District,
- City of Ceres W.S.A.,
- City of Turlock W.S.A.,
- [Former] Del Este Water Company,
- Delhi County Water District,
- Denair Community Service District,
- Eastside Water District,
- Hilmar County Water District,
- Keyes Community Service District,
- Merced Irrigation District, and
- Turlock Irrigation District.

The Turlock Irrigation District and the Eastside Water District cover the majority of the Management Zone area. In addition, there are several private water systems serving mobile home parks, and other small local entities.

## 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, State Small Water Systems (SSWS) 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.).

**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) <sup>1</sup>	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 (PWS) <sup>2</sup>						Connections or (persons, duration)		

<sup>1</sup> 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.

<sup>2</sup> 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.

### 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 California's 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.<sup>4</sup>

The California Environmental Health Tracking Program (CEHTP) maintains a dataset of PWS boundaries in California.<sup>5</sup> 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

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

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



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 2-4** 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.

### **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.

Merced and Stanislaus County Environmental Health Departments were contacted to obtain available SSWS address data for the Management Zone area. In order to determine if the SSWS is within the Management Zone boundary, the addresses need to be geocoded or plotted on a map. A list of 18 SSWS was provided by Merced County, and a list of 17 SSWS was provided by Stanislaus County. After attempting to geocode the addresses of these water systems (some addresses were incomplete and must be estimated), a total of 16 of the 35 systems in the County databases were determined to be located within the proposed Management Zone (**Table 2-3**). The Counties provided water quality test results, including nitrate test results, as available.

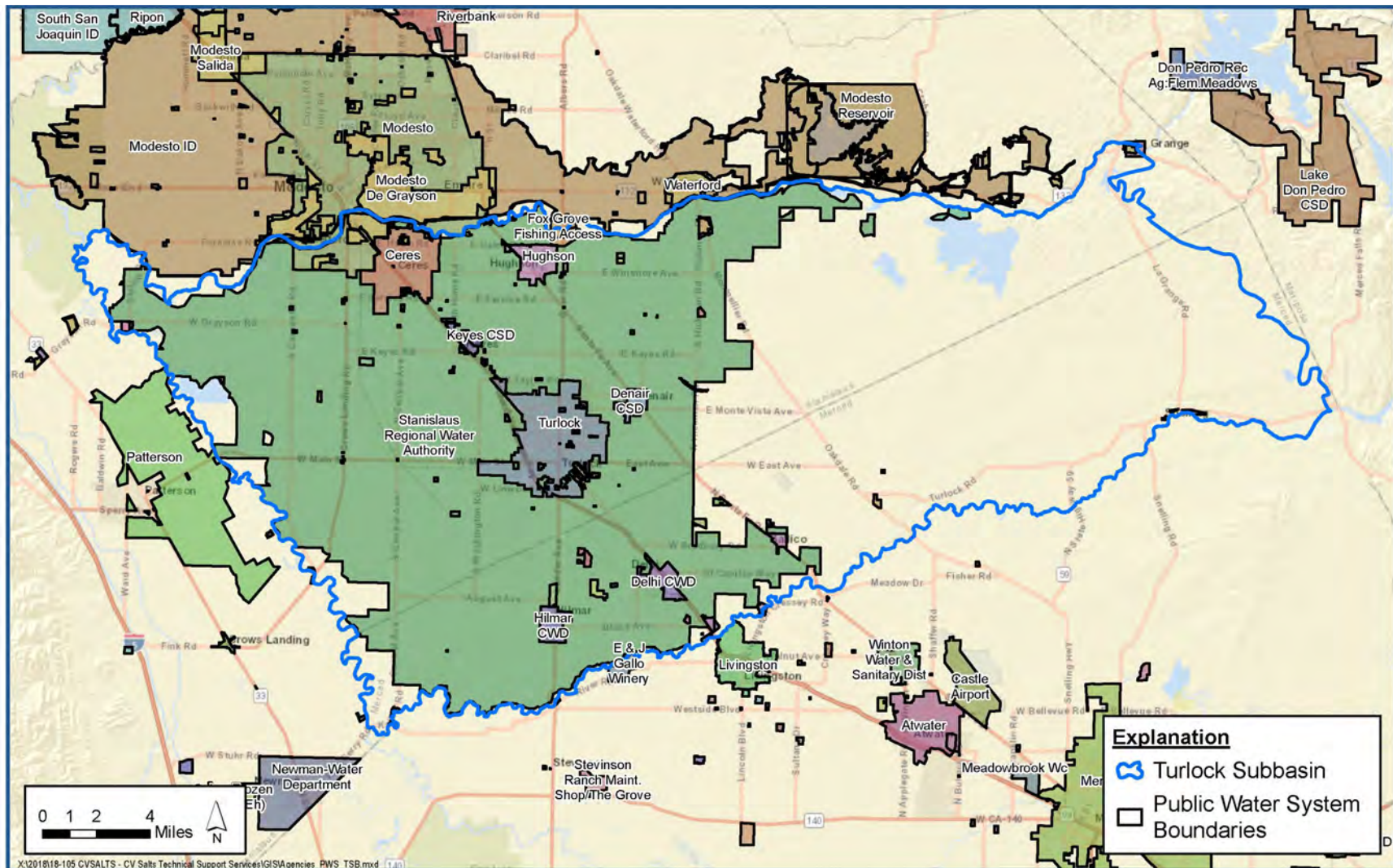


Figure 2-4. Public Water System Boundaries within and adjacent to the Proposed Management Zone.

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

County	Small Water System Name	Address
<b>Merced County</b>	Boland's Mobile Home Park	15874 N Hwy 59, Snelling
	Fiorini Ranch	11017 N Palm Ave., Delhi
	Sierra Vista Dairy	22426 E. Monte Vista Ave., Denair
	Vista Livestock Company	22323 E. Monte Vista Ave., Denair
<b>Stanislaus County</b>	Ledbetter WS	2337 Don Pedro Road, Ceres
	River Rd Mutual	2935 River Road, Modesto
	El Rancho 4411 Esmar	4411 Esmar Road, Ceres
	Pioneer Village MHP	867 Santa Fe Avenue, Hughson
	Shiloh River Resort	2724 Shiloh Road, Modesto
	Davis Ct	4621 Swanson Road, Denair
	Shasta Motel WS	1580 South 1st Street, Turlock
	Frances Dea WS	3824 El Camino Avenue, Ceres
	B & C Zachariah WS	2222 Herndon Road, Ceres
	Miller Apts	4318 Central Avenue, Ceres
	Rohde Apts	5024 Rohde Road, Ceres
	Cardoza WS	1237 Emerald Way, Turlock

### **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. Some counties do not maintain their LSWS and domestic well data at their Environmental Health Office; other offices at the county may have these data, such as Community Development Offices, Public Works Offices, or Building Departments.

Merced and Stanislaus County Environmental Health Departments were contacted to obtain available LSWS data for the Management Zone area. Findings include:

- *Merced County* – Merced County Environmental Health provided domestic and LSWS information, including nitrate measurements for 3,178 wells in the County (one nitrate

sample taken at the time of well installation). Based on the data, it is not possible to distinguish between LSWS and single-household domestic wells.

- *Stanislaus County* - Stanislaus County does not track data for LSWS or domestic wells. Well permits are maintained as hard copies, and could be reviewed individually to identify domestic wells, but there is currently no way to determine which of those wells serve multiple households.

## **2.6 Disadvantaged Communities and Disadvantaged Unincorporated Communities**

Disadvantaged Communities (DACs) and Disadvantaged Unincorporated Communities (DUCs) include many areas of the state that have poor access to regulated drinking water supplies. The neighborhoods in these areas 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,<sup>6</sup> 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* – Census Block Groups are the 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 proposed

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<sup>6</sup> DWR's boundary files for DACs: <https://gis.water.ca.gov/app/dacs/>

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.

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 2-5** illustrates the locations of the 17 DACs and 13 DUCs in the proposed Management Zone. These communities are located primarily near the largest population centers and include much of the municipal PWS service areas. **Table 2-5** summarizes the characteristics of DACs and DUCs in the Management Zone area. Combined, non-overlapping DAC and DUC areas comprise approximately 10.9% of Management Zone (37,981 acres or 59.3 sq. mi).

## **2.7 Land Use**

**Table 2-6** and **Figure 2-6** provide the land use characteristics of the proposed Management Zone associated with agricultural activity. The land use in the eastern portion of the Management Zone is predominantly classified as deciduous fruits and nuts. To the west agricultural activity shifts to an increased use of field crops. The most eastern portion of the Management Zone is unmapped for land use. Almonds are the most common crop in the Management Zone, comprising almost 32% of the total area.

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.



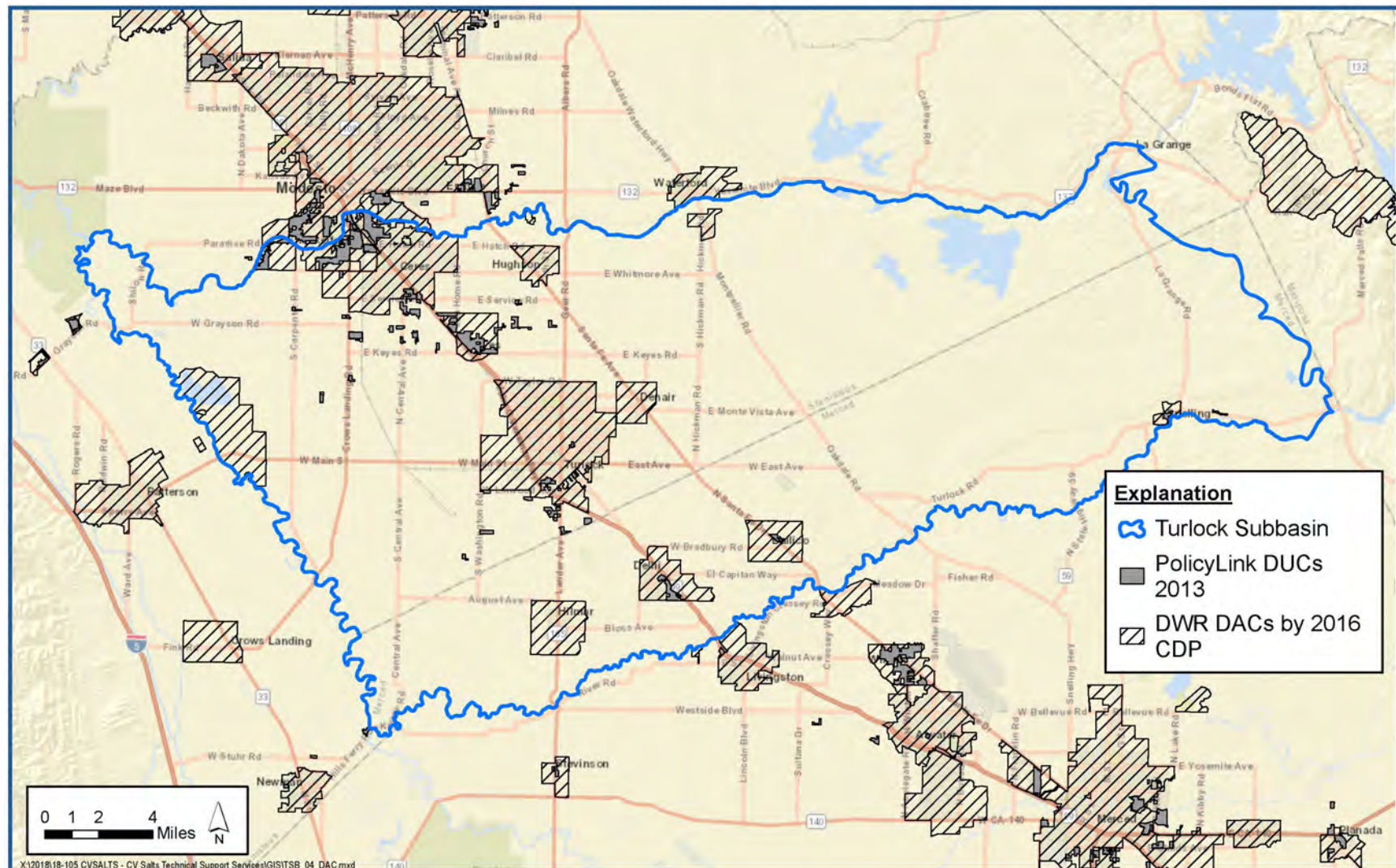


Figure 2-5. Location of DACs and DUCs within and adjacent to the Proposed Management Zone.



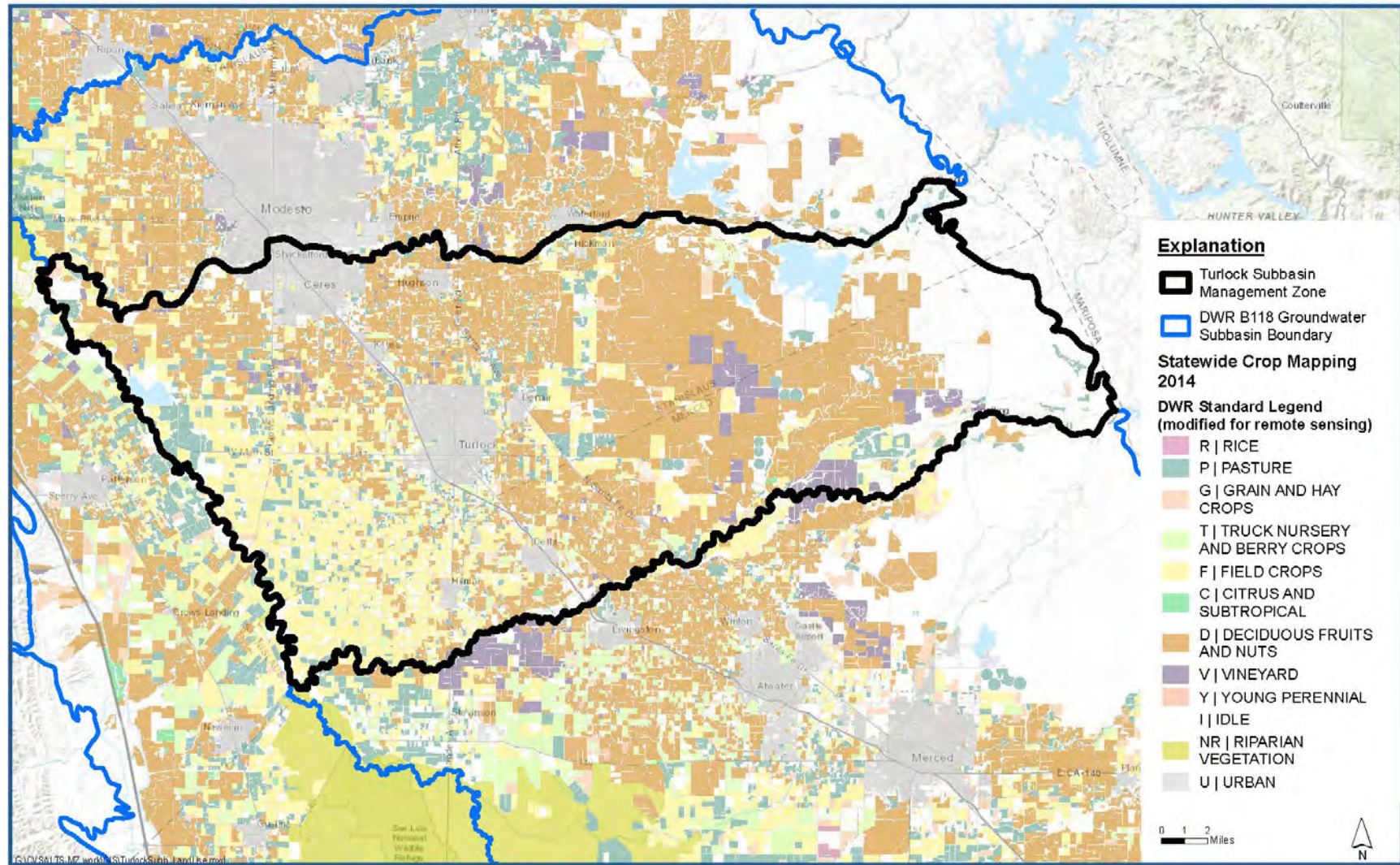


Figure 2-6. Agricultural Land Use in the Proposed Management Zone (Note: Far eastern portion is unmapped).

**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)
Ballico	318	180
Bret Harte	5,315	--
Bystrom	3,865	6,365
Ceres	47,231	869
Chemurgic	--	91
Cowan	481	
Delhi	10,968	1,306
Denair	4,771	--
Harp	--	749
Hatch	--	129
Hickman	497	--
Hilmar-Irwin	5,250	--
Hughson	7,160	60
Keyes	7,338	5,446
Modesto <sup>1</sup>	44,411	--
Monterey Park Tract	338	--
Parklawn	1,150	--
Riverdale Park	1,056	1,040
Shackelford	--	9,152
Snelling	131	219
Turlock	71,166	1,339
<b>Total Population</b>	<b>211,446</b>	<b>26,945</b>

<sup>1</sup> The City of Modesto comprises a large area north of the Turlock Subbasin, but there are smaller areas that are within the northern boundary of the subbasin, as well as a larger area adjacent to the subbasin's western border. The total population of the Modesto DAC was listed as 208,512, with no distinction of the various separate areas' populations. The areas of the Modesto DAC that lie within the proposed Turlock Management Zone make up about 21% of the total Modesto DAC area. The population listed in this table represents 21% of the total Modesto DAC population provided by DWR, using an equal weighting approach. This may overestimate the population, as the western area is likely not as populated as the main urban area of Modesto.

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

Category	No. of Locales	Acres (sq. mi.)	Estimated Population
DACS	22 locales	36,851 (57.6)	211,344
DUCs	44 locales	2,925 (4.6)	26,945
DACs without overlap	22 locales	35,056 (54.8)	62,125
Total without overlaps	66 locales	37,981 (59.3)	89,070



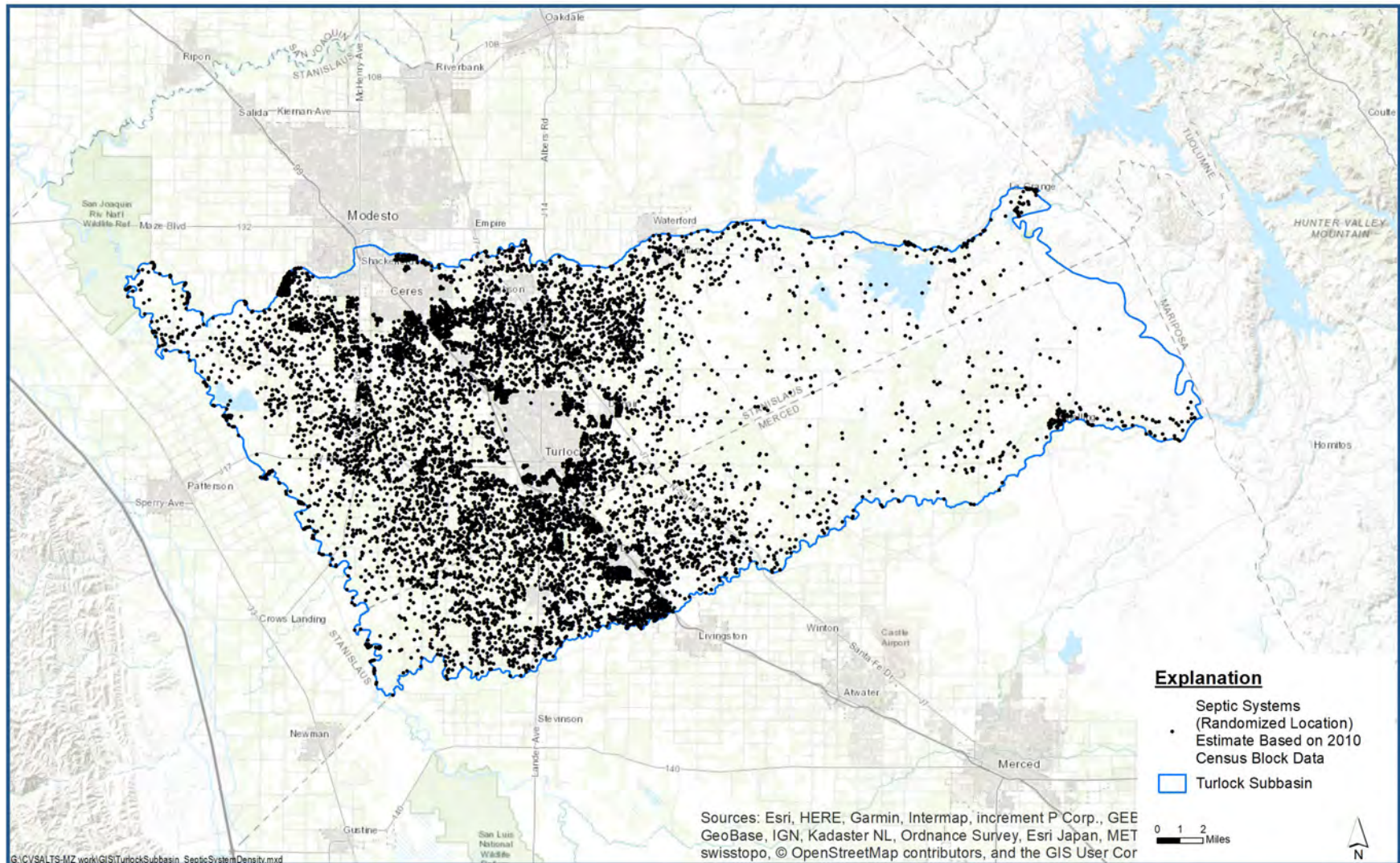
**Table 2-6. Land Use Summary for Proposed Turlock Management Zone (land use designations based on DWR 2014)**

Land Use Designation	Area (sq. mi.)	Area (acres)	Percent of Total Management Zone Area
<b>CITRUS AND SUBTROPICAL</b>	<b>0.37</b>	<b>239</b>	<b>0.07%</b>
Citrus	0.04	28	0.01%
Olives	0.33	211	0.06%
<b>DECIDUOUS FRUITS AND NUTS</b>	<b>193.37</b>	<b>123,758</b>	<b>35.54%</b>
Almonds	171.57	109,803	31.54%
Apples	0.84	538	0.15%
Cherries	1.27	810	0.23%
Kiwis	0.13	86	0.02%
Miscellaneous Deciduous	0.50	321	0.09%
Peaches/Nectarines	6.18	3,958	1.14%
Pears	0.03	18	0.01%
Pistachios	0.13	84	0.02%
Plums, Prunes and Apricots	0.43	273	0.08%
Pomegranates	0.04	26	0.01%
Walnuts	12.25	7,841	2.25%
<b>FIELD CROPS</b>	<b>88.02</b>	<b>56,334</b>	<b>16.18%</b>
Beans (Dry)	0.44	285	0.08%
Corn, Sorghum and Sudan	87.58	56,050	16.10%
<b>GRAIN AND HAY CROPS</b>	<b>6.15</b>	<b>3,934</b>	<b>1.13%</b>
Miscellaneous Grain and Hay	4.35	2,782	0.80%
Wheat	1.80	1,153	0.33%
<b>IDLE</b>	<b>8.58</b>	<b>5,490</b>	<b>1.58%</b>
Idle	8.58	5,490	1.58%
<b>RIPARIAN VEGETATION</b>	<b>0.57</b>	<b>365</b>	<b>0.10%</b>
Managed Wetland	0.57	365	0.10%
<b>PASTURE</b>	<b>34.26</b>	<b>21,927</b>	<b>6.30%</b>
Alfalfa and Alfalfa Mixtures	18.08	11,570	3.32%
Miscellaneous Grasses	2.29	1,463	0.42%
Mixed Pasture	13.90	8,894	2.55%
<b>TRUCK NURSERY AND BERRY CROPS</b>	<b>7.92</b>	<b>5,067</b>	<b>1.46%</b>
Bush Berries	0.04	29	0.01%
Cole Crops	0.00	1	0.00%
Flowers, Nursery and Christmas Tree Farms	2.45	1,566	0.45%
Lettuce/Leafy Greens	0.33	212	0.06%
Melons, Squash and Cucumbers	0.52	333	0.10%
Miscellaneous Truck Crops	0.21	134	0.04%
Onions and Garlic	0.02	12	0.00%
Potatoes and Sweet Potatoes	4.32	2,766	0.79%
Strawberries	0.02	11	0.00%

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

Land Use Designation	Area (sq. mi.)	Area (acres)	Percent of Total Management Zone Area
Tomatoes	0.00	3	0.00%
<b>URBAN</b>	<b>31.59</b>	<b>20,220</b>	<b>5.81%</b>
Urban	31.59	20,220	5.81%
<b>VINEYARD</b>	<b>15.60</b>	<b>9,983</b>	<b>2.87%</b>
Grapes	15.60	9,983	2.87%
<b>YOUNG PERENNIAL</b>	<b>0.52</b>	<b>334</b>	<b>0.10%</b>
Young Perennials	0.52	334	0.10%
<b>Grand Total</b>	<b>386.96</b>	<b>247,652</b>	<b>71.13%</b>
<b>Unmapped Total</b>	<b>157.09</b>	<b>100,536</b>	<b>28.87%</b>
<b>Total Management Zone Area</b>	<b>544.04</b>	<b>348,187</b>	<b>100.00%</b>

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 2-7** 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 2-7. Estimated Locations of Septic Systems within the Proposed Management Zone.**

**Draft: November 8, 2019**

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### 3. Initial Assessment of Groundwater Conditions

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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 Turlock 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 including the Turlock Subbasin (DWR 2006). 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,<sup>7</sup> 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.
- GSAs are developing HCMs, which include details on groundwater conditions. The East and West Turlock GSAs are actively working within the proposed Management Zone (see Section 2.2.3).
- CV-SALTS completed a high-resolution mapping analysis of nitrate and total dissolved solids (TDS) groundwater quality in the Central Valley Region including within the proposed Management Zone (CV-SALTS 2016b). 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.

**Table 3-1** summarizes sources of data accessed to update the CV-SALTS nitrate groundwater dataset for completing the Initial Assessment of Groundwater Conditions for this Preliminary Management Zone Proposal.

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<sup>7</sup> [https://water.ca.gov/LegacyFiles/groundwater/casgem/pdfs/lists/PubRel\\_BasinRank\\_by\\_HR\\_5-18-15.pdf](https://water.ca.gov/LegacyFiles/groundwater/casgem/pdfs/lists/PubRel_BasinRank_by_HR_5-18-15.pdf)



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

Data Source	Link
<b>General Groundwater Conditions</b>	
DWR Bulletin 118 overview of basin/subbasin conditions (groundwater levels and groundwater quality)	<a href="https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118">https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118</a>
DWR's Groundwater Sustainability Basin Prioritization	<a href="https://water.ca.gov/LegacyFiles/groundwater/casgem/pdfs/lists/PubRel_BasinRank_by_HR_5-18-15.pdf">https://water.ca.gov/LegacyFiles/groundwater/casgem/pdfs/lists/PubRel_BasinRank_by_HR_5-18-15.pdf</a>
Individual GSA's Hydrogeologic Conceptual Model, via request to the GSA Point of Contact	<a href="https://sgma.water.ca.gov/portal/gsa/all">https://sgma.water.ca.gov/portal/gsa/all</a>
CV-SALTS High Resolution Salt and Nitrate Mapping for Region 5	<a href="https://www.cvsalinity.org/committees/technical-advisory/conceptual-model-developments/171-updated-groundwater-quality-analysis-for-central-valley.html">https://www.cvsalinity.org/committees/technical-advisory/conceptual-model-developments/171-updated-groundwater-quality-analysis-for-central-valley.html</a>
<b>Publicly Available Groundwater Quality Data Sources</b>	
GeoTracker GAMA	<a href="http://geotracker.waterboards.ca.gov/gama/gamamap/public/">http://geotracker.waterboards.ca.gov/gama/gamamap/public/</a>
DWR Water Data Library	<a href="http://wdl.water.ca.gov/waterdatalibrary/waterquality/index.cfm">http://wdl.water.ca.gov/waterdatalibrary/waterquality/index.cfm</a>
US Geological Survey National Water Information System	<a href="https://waterdata.usgs.gov/nwis/qw">https://waterdata.usgs.gov/nwis/qw</a>
GeoTracker Regulated Facilities	<a href="http://geotracker.waterboards.ca.gov/">http://geotracker.waterboards.ca.gov/</a> and <a href="http://geotracker.waterboards.ca.gov/datadownload">http://geotracker.waterboards.ca.gov/datadownload</a>
Division of Drinking Water	<a href="https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/EDTlibrary.html">https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/EDTlibrary.html</a>
<b>County-Specific Data Available by Request</b>	
Stanislaus County state small water systems and domestic/local small water systems (water quality data)	<a href="https://www.co.merced.ca.us/597/Environmental-Health">https://www.co.merced.ca.us/597/Environmental-Health</a>
Merced County state small water systems and domestic/local small water systems (water quality data)	<a href="http://www.stancounty.com/er/environmentalhealth/">http://www.stancounty.com/er/environmentalhealth/</a>

### 3.1 Hydrogeology

The Turlock Groundwater Subbasin GSAs were contacted for information regarding the development of their HCM, which is being developed to support the preparation of the Turlock Subbasin GSP that will be applicable to the two GSAs within the proposed Management Zone.<sup>8</sup> Information requested included hydrogeological information, description of the distribution of groundwater pumping (spatially and vertically), groundwater flow directions (with particular interest in the eastern portion of the Turlock Subbasin where DWR does not have groundwater elevation contour data), and any non-public groundwater quality data.

<sup>8</sup> Kevin Kauffman (Kevin Kauffman Consulting), point of contact for the East Turlock GSA, was contacted on February 26, 2019.

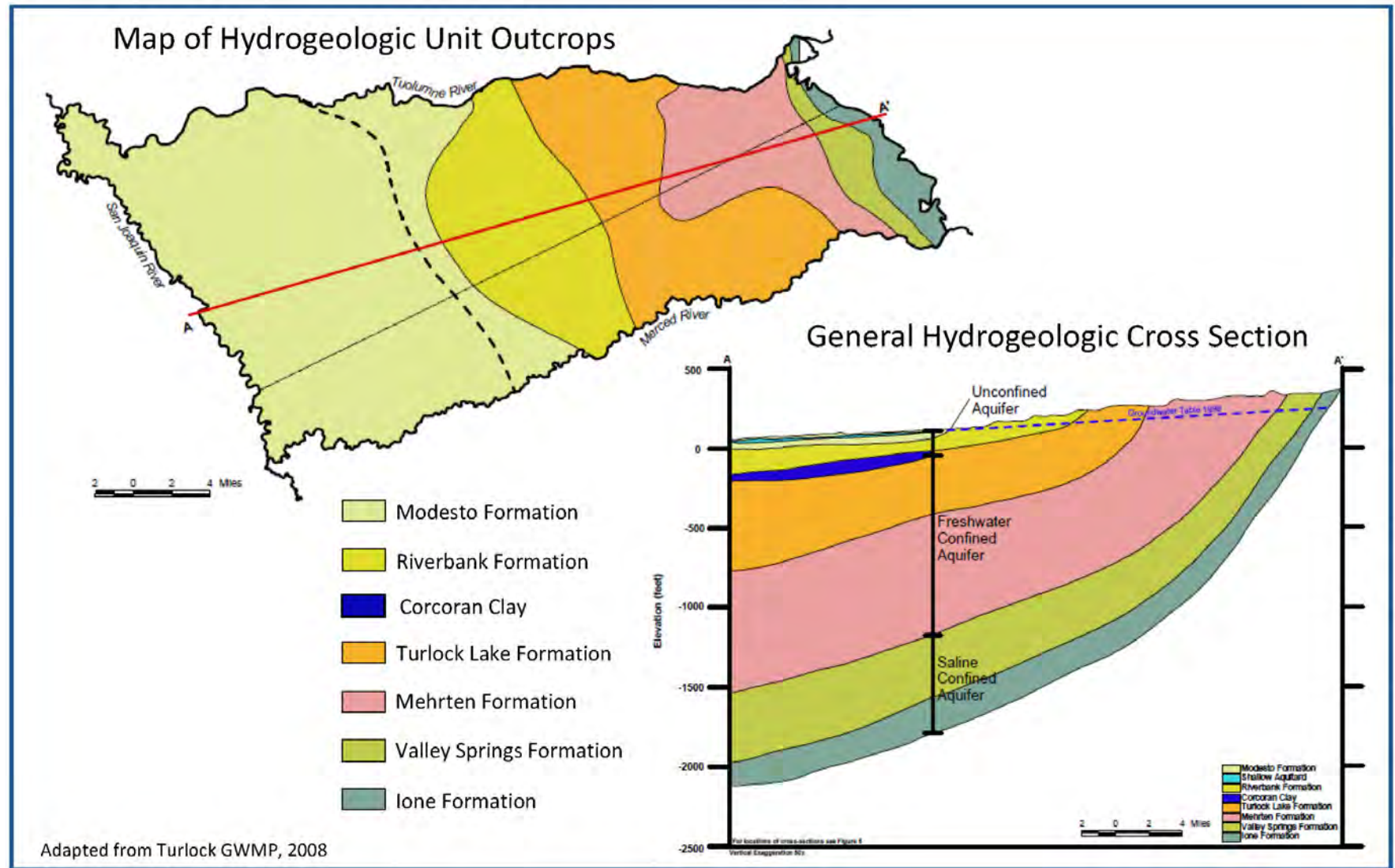
DWR's Bulletin 118 describes the Turlock Subbasin as located between the Tuolumne and Merced Rivers, and bounded by the San Joaquin River on the west and on the east by crystalline basement rock of the Sierra Nevada foothills (DWR 2006). The northern boundary of the Turlock Subbasin is shared with the Modesto Groundwater Subbasin; the western boundary shared with the Delta-Mendota Groundwater Subbasin; and the southern boundary with the Merced Groundwater Subbasin. The Turlock Subbasin receives 11 to 13 inches of average annual precipitation, increasing eastward, with 15 inches in the Sierran foothills (DWR 2006).

The primary hydrogeologic units in the Turlock Subbasin include both consolidated and unconsolidated sedimentary depositional materials. The consolidated deposits lie in the eastern portion of the subbasin and consist of the Ione Formation, Valley Springs Formation, and the Mehrten Formation (DWR 2006). These formations generally yield a low amount of water; although the Mehrten Formation is an important aquifer for water supply, consisting of up to 800 feet of sandstone, breccia, conglomerate, tuff siltstone, and claystone (DWR 2006).

The unconsolidated deposits are the primary water-bearing units in the subbasin and are present across the western portion of the subbasin. These continental deposits and older alluvial deposits consist of layers of sand, gravel, silt, and clay that increase in thickness away from the margins of the valley (the layers thin to the east). Continental deposits include the Turlock Lake Formation, North Merced Gravel, and Pleistocene non-marine sedimentary units. Soil survey data indicate the presence of numerous long, narrow coarser-textured, higher conductivity deposits resulting from modern and ancient stream channel depositional processes. **Figure 3-1** illustrates the hydrogeologic units in map and cross-sectional forms for the Turlock Subbasin (adapted from the Turlock Groundwater Management Plan 2008).

The Corcoran Clay, which is generally present in the western half of the Turlock Subbasin, is an important feature in the subbasin. Within the subbasin, the Corcoran Clay ranges in thickness from 20 to 40 feet on the eastern edge of its extent, to pockets of thicker areas up to 140 feet thick (west of Hilmar and west of the City of Turlock). The Corcoran Clay appears between approximately 100 to 200 feet below ground surface, where present (**Figure 3-2**).

A groundwater vulnerability assessment was completed as part of the East San Joaquin Water Quality Coalition's (ESJWQC or "Coalition") Groundwater Quality Assessment Report (GAR) (ESJWQC 2014). This assessment included the development of vulnerability mapping in portions of the Turlock Subbasin. The physical intrinsic vulnerability approach in this document considers land use and depends on the assumption that observed groundwater quality is the result of interactions between land use practices at the surface and the presence of physical hydrogeologic characteristics and processes occurring in the area. The presence of hydrogeologic characteristics that enable potential contaminants to reach groundwater more quickly make a location more vulnerable to groundwater contamination than a location with hydrogeologic characteristics that impede the ability of contaminants to reach groundwater or attenuate the contamination.



**Figure 3-1. General Hydrogeologic Characteristics of the Turlock Groundwater Subbasin**



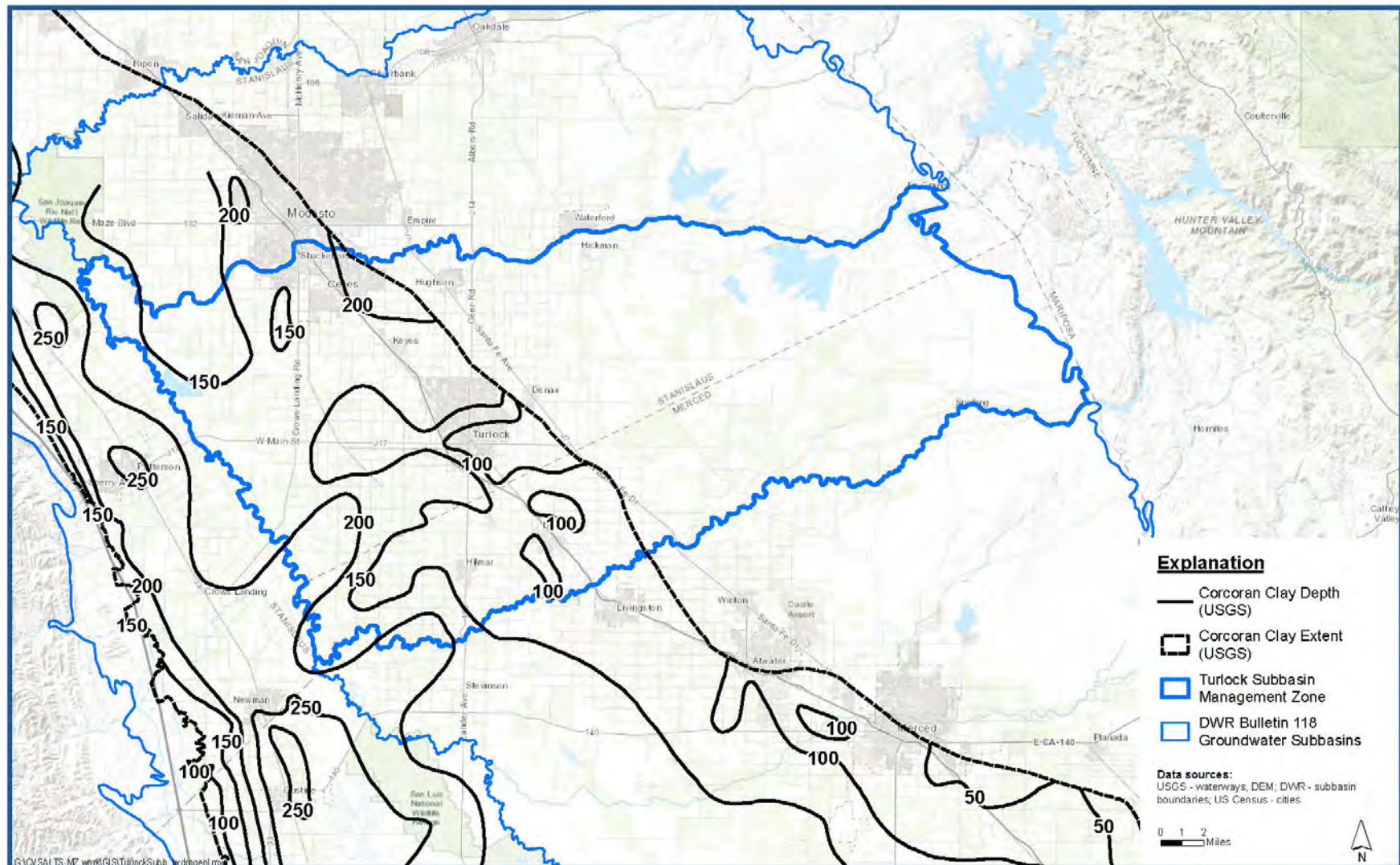


Figure 3-2. Location and Depth of the Corcoran Clay within the Turlock Groundwater Subbasin

Naturally-occurring concentrations of nitrate in groundwater are typically very low; therefore, observations of nitrate in the groundwater are considered to be primarily a function of contributing land uses at the surface and subsequent processes that transport nitrate through the subsurface into the groundwater. This makes nitrate a more useful indicator of influence from irrigated agriculture or other land uses than some other commonly available groundwater quality measures such as TDS or electrical conductivity and was therefore used for the vulnerability assessment. The 2014 GAR also provided a prioritization of the high vulnerability areas in the area covering the Turlock Subbasin based on several factors such as existing water quality, existing surface practices, etc. Areas were designated as high, moderate, or low priority to inform groundwater monitoring and management efforts (Figure 3-3).

## 3.2 Groundwater Elevations and Flow

Regional groundwater flows generally from the Sierra Nevada foothills to the southwest, following the regional dip of basement rock and sedimentary units. However, contours of equal groundwater elevation for Spring 2018 (Figure 3-4) show lower groundwater elevations northeast of the City of Turlock, which draw groundwater toward this area from outside the Turlock Subbasin in the north and south. In the western portion of the subbasin, groundwater levels are highest in the south, indicating groundwater movement within the western portion of the subbasin to the northwest. The Turlock GSAs are in the process of developing their own description of groundwater levels and conditions in the Turlock Subbasin. The development of these data may be used to supplement this Preliminary Management Zone Proposal in the future.

## 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, (where available), 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). 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%
<b>Total</b>	<b>100%</b>



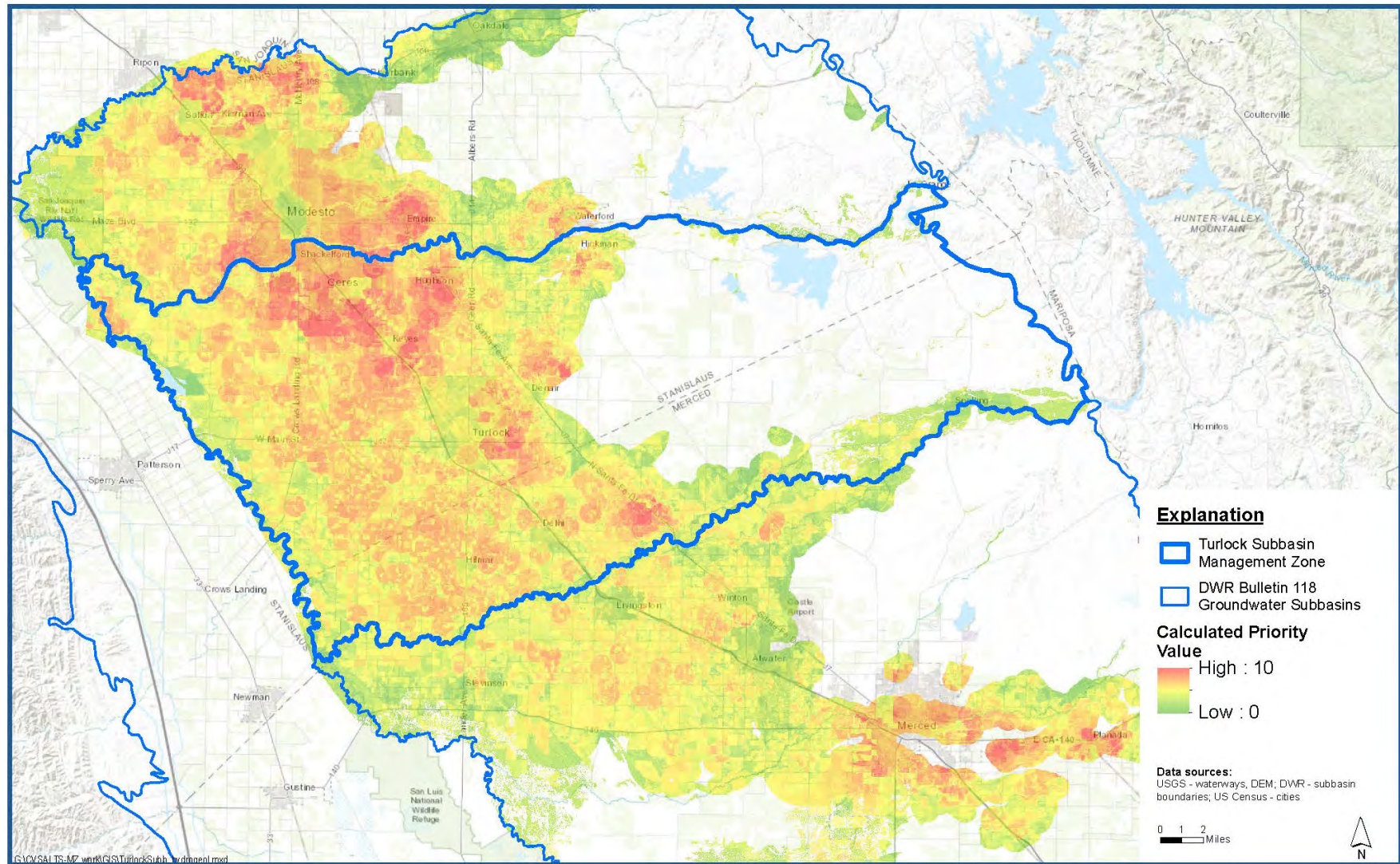


Figure 3-3. Nitrate High Vulnerability Map for the Turlock Groundwater Subbasin and Adjacent Areas (ESJWQC 2014).



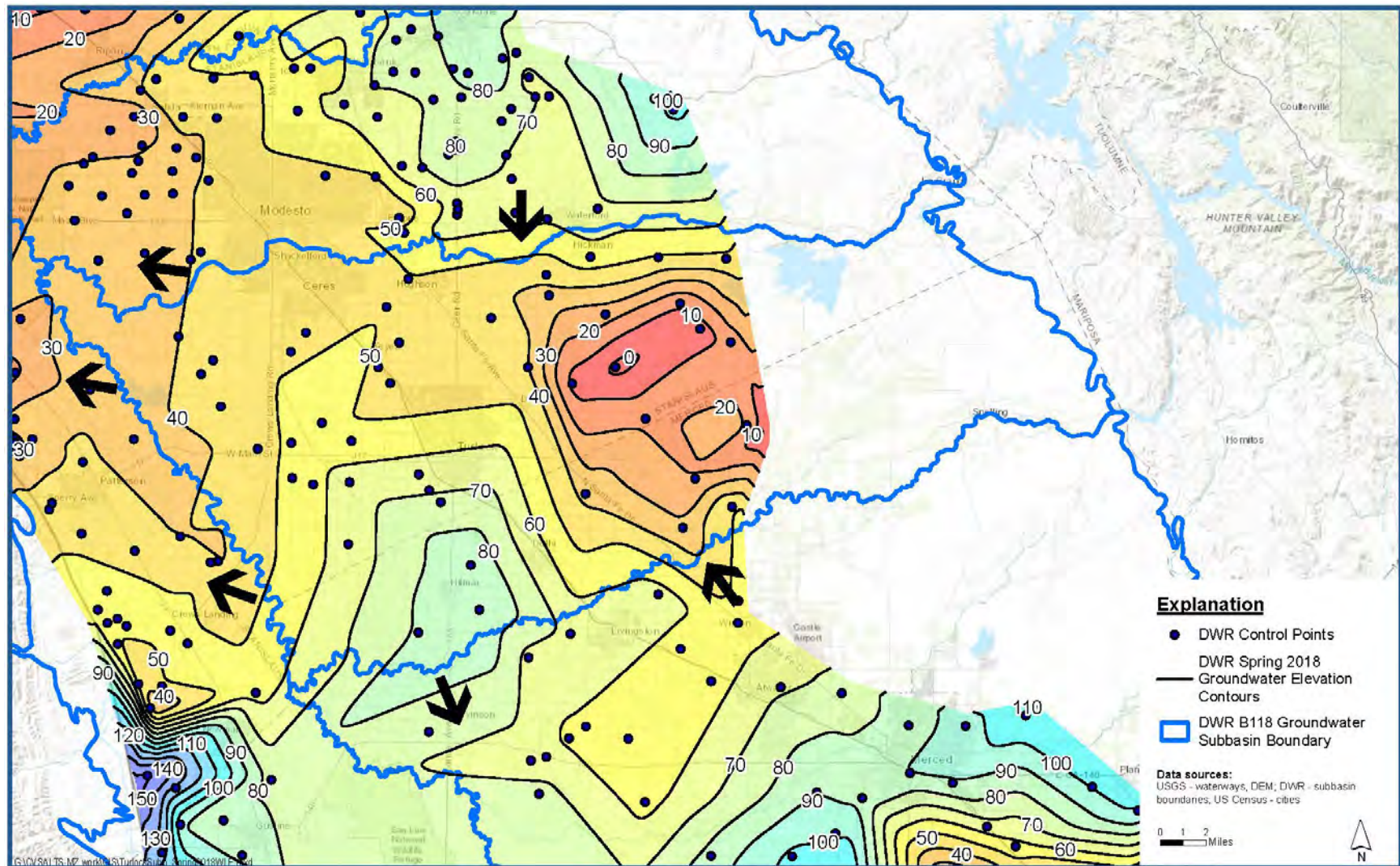


Figure 3-4. Spring 2018 Groundwater Elevation Contours for the for Turlock Groundwater Subbasin and Adjacent Areas

CV-SALTS (2016b) 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
- 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

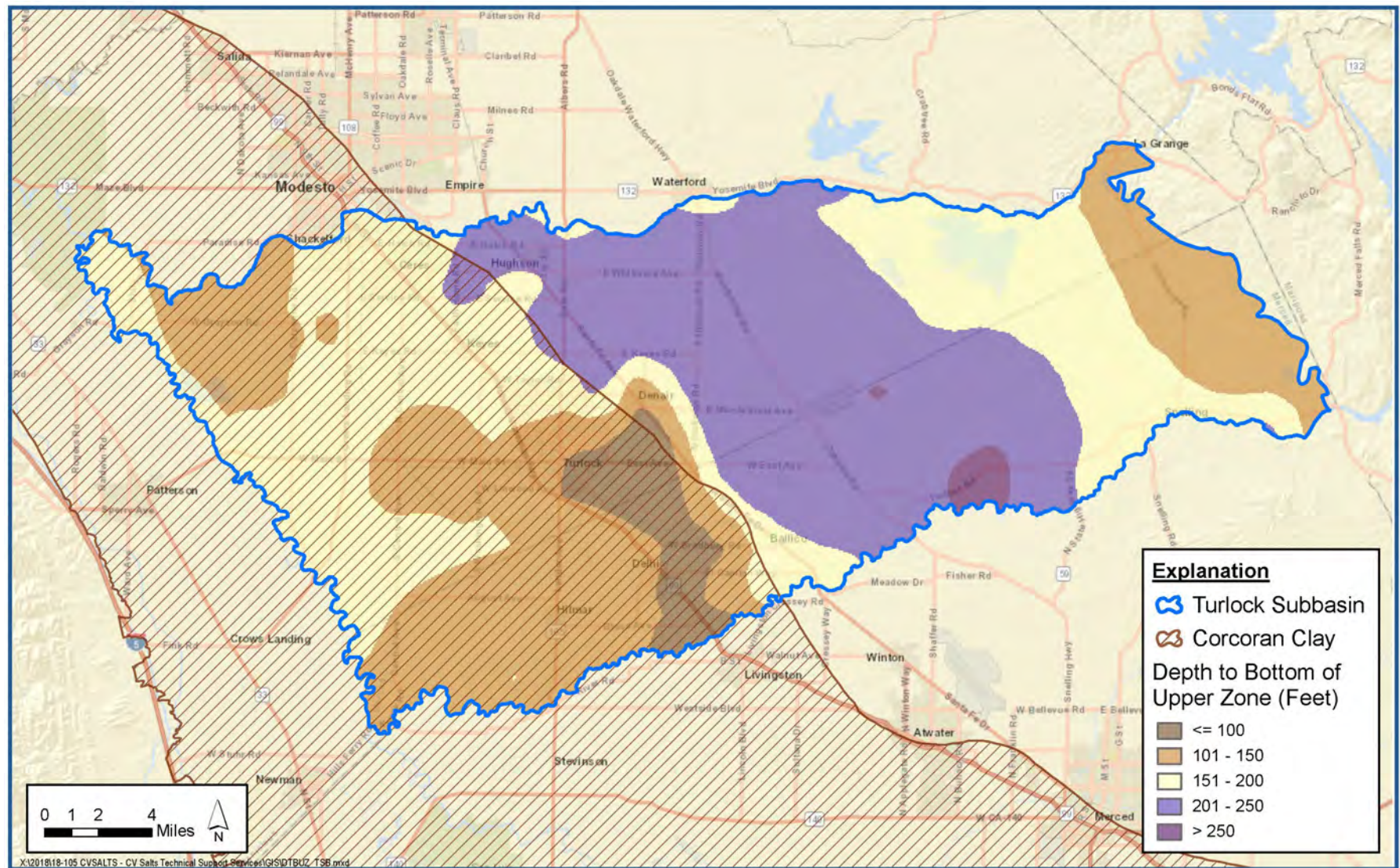
The above data were used to create interpolated layers over the Central Valley Floor of different well types and their perforation depths. The well construction layers were then combined in a weighting process to estimate where pumping occurs for the predominant well types. The weights provided in Table 3-2 were then used for calculating the depth to the bottom of the Upper Zone.

**Figure 3-5** shows the depth to the bottom of the Upper Zone in the proposed Management Zone, as previously delineated to support CV-SALTS analyses (e.g., CV-SALTS 2016b). Generally, the depth to the bottom of the Upper Zone is between 100 and 250 feet below ground surface in the Management Zone. The depth to the bottom of the Upper Zone is deepest to the east of the extent of the Corcoran Clay and shallower towards the eastern margin and southwestern area of 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 datasets include data previously developed for CV-SALTS and additional data obtained in 2019.





**Figure 3-5. 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 2016b)	<ul style="list-style-type: none"> <li>• Former California Department of Public Health (CDPH), now DDW</li> <li>• DWR</li> <li>• Central Valley Water Board Waste Discharge Requirements (WDR) data per the Dairy General Order</li> <li>• Central Valley Water Board Regulated Sites</li> <li>• State Water Board/USGS Groundwater Ambient Monitoring and Assessment Program (GAMA)</li> <li>• USGS</li> </ul>
Geotracker GAMA <sup>9</sup> (Note: Not all entities had nitrate data from within the proposed Management Zone)	<ul style="list-style-type: none"> <li>• Department of Pesticide Regulation</li> <li>• DWR</li> <li>• GAMA – Domestic Wells; Special Studies, and Priority Basin Projects</li> <li>• Local Groundwater Projects</li> <li>• Monitoring Wells (Central Valley Water Board Regulated Sites)</li> <li>• DDW Public Water System Wells (Actual Locations)</li> <li>• USGS National Water Information System (NWIS)</li> </ul>
State Small Water Systems	Merced and Stanislaus Counties
Domestic Well Permit Sample Data	Merced and Stanislaus Counties

Nitrate measurements and well data were compiled for the proposed 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 Management Zone by well source. A total of 1,839 wells have nitrate data in the Management Zone, most of them (1,588 wells, or about 86%) have nitrate measurements since January 2000, and slightly less than half of those wells with recent (post-2000) nitrate measurements have nitrate concentrations that exceed the primary maximum contaminant level (MCL) of 10 mg/L as N.

Wells were categorized into an appropriate depth category (Upper Zone, Lower Zone, Upper/Lower, Below Lower, and Unknown).<sup>10</sup> CV-SALTS (2016b) produced GIS coverages of the depths to the bottom of the Upper and Lower Zones (e.g., see Figure 3-5). Depth information (well depth or top of screen depth and screen length) from the new dataset was used to categorize individual wells into their appropriate depth category. Wells without construction or depth information were categorized based on their well type:

<sup>9</sup> <https://geotracker.waterboards.ca.gov/gama/gamamap/public/>, accessed in February 2019)

<sup>10</sup> See text and CV-SALTS 2016a and 2016b for a description of the development and assignment of Upper Zone delineations.

**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	336	299	78
Dairy	920	920	527
DWR	130	0	0
GeoTracker Regulated Facilities	69	69	37
Merced County Domestic/Local Small Water System	201	186	38
USGS	183	114	50
<b>Total</b>	<b>1,839</b>	<b>1,588</b>	<b>730</b>

- 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 listed as an Unknown well type were placed in the “Unknown” depth category.

Of the entire dataset of 1,839 wells in the proposed Management Zone with a nitrate measurement, most of the wells (1,234 wells, or about 67%) are completed in the Upper Zone (**Figure 3-6**). There is a high concentration of Upper Zone wells in the western portion of the Management Zone, and deeper wells prevalent along the Highway 99 corridor and the cities of southern Modesto, Turlock, and Delhi. There were fewer wells with nitrate data available in the eastern and northeastern portions of the Management Zone.

**Table 3-5** identifies the number of wells in each depth category with nitrate data, wells with recent (post-2000) data, and wells with recent nitrate concentrations that exceed the nitrate MCL of 10 mg/L as N. Of the wells categorized into the Upper Zone almost all (95%) have post-2000 nitrate measurements, and slightly less than half (49%) have measured nitrate above the MCL.



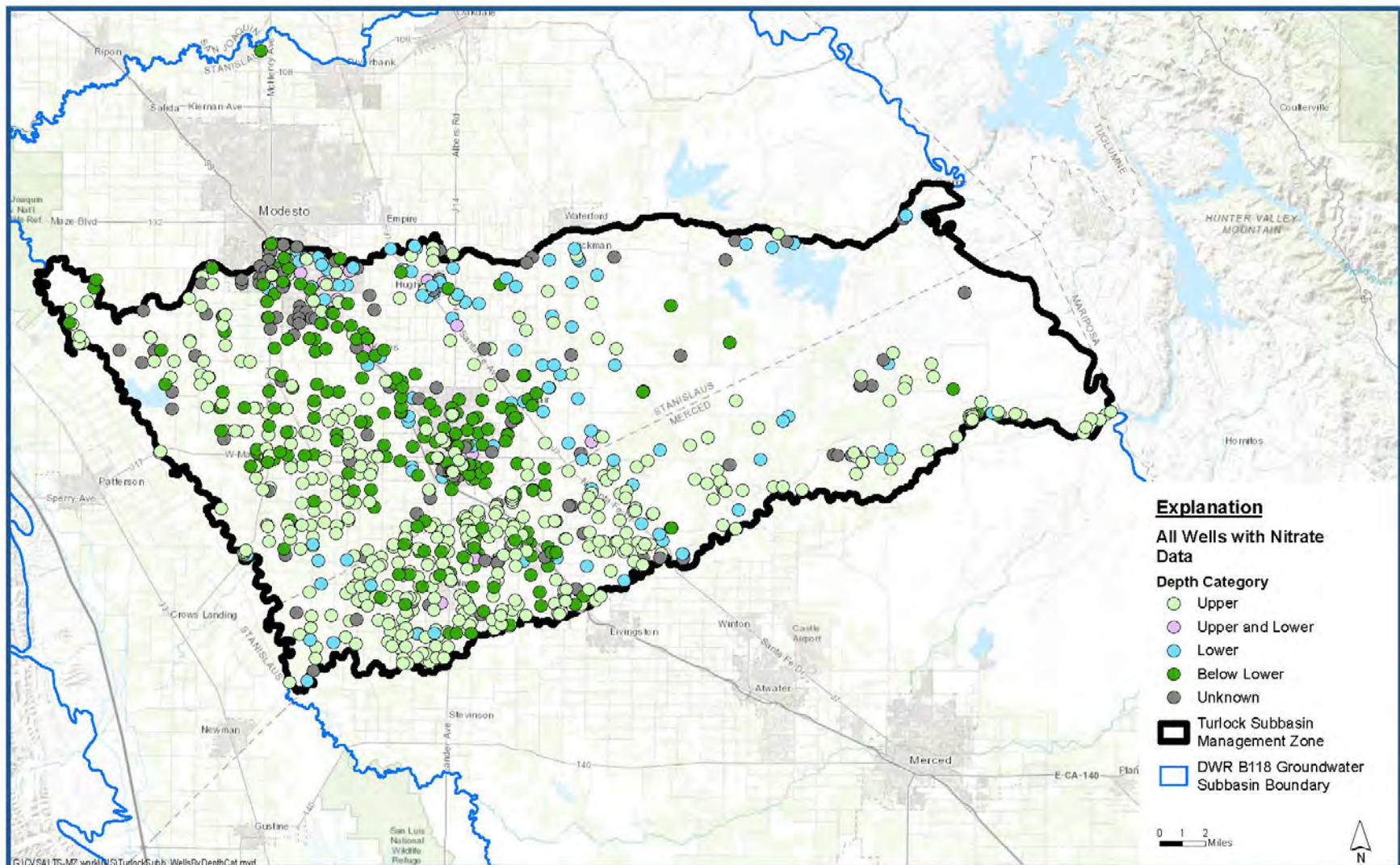


Figure 3-6. Wells with Nitrate Data within the Proposed Management Zone by Depth Category

**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 $\geq 10$ mg/L as N	Percent of Wells with Post-2000 Nitrate Data $\geq$ MCL
Upper	1,234 (67%)	1170	571	49%
Lower	177 (10%)	148	45	30%
Upper and Lower	18 (1%)	18	8	44%
Below Lower	273 (15%)	226	102	45%
Unknown	137 (7%)	26	4	15%
<b>Totals</b>	<b>1,839 (100%)</b>	<b>252</b>	<b>106</b>	<b>--</b>

**Figure 3-7** 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 eastern and northeastern areas of the Management Zone. Upper Zone wells with measured nitrate above the MCL are scattered throughout the Management Zone, with most located in the western portion of the Management Zone.

The high resolution CV-SALTS spatial analysis (CVSALTS 2016b) 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.
- 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.<sup>11</sup>
- 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.

<sup>11</sup> 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.



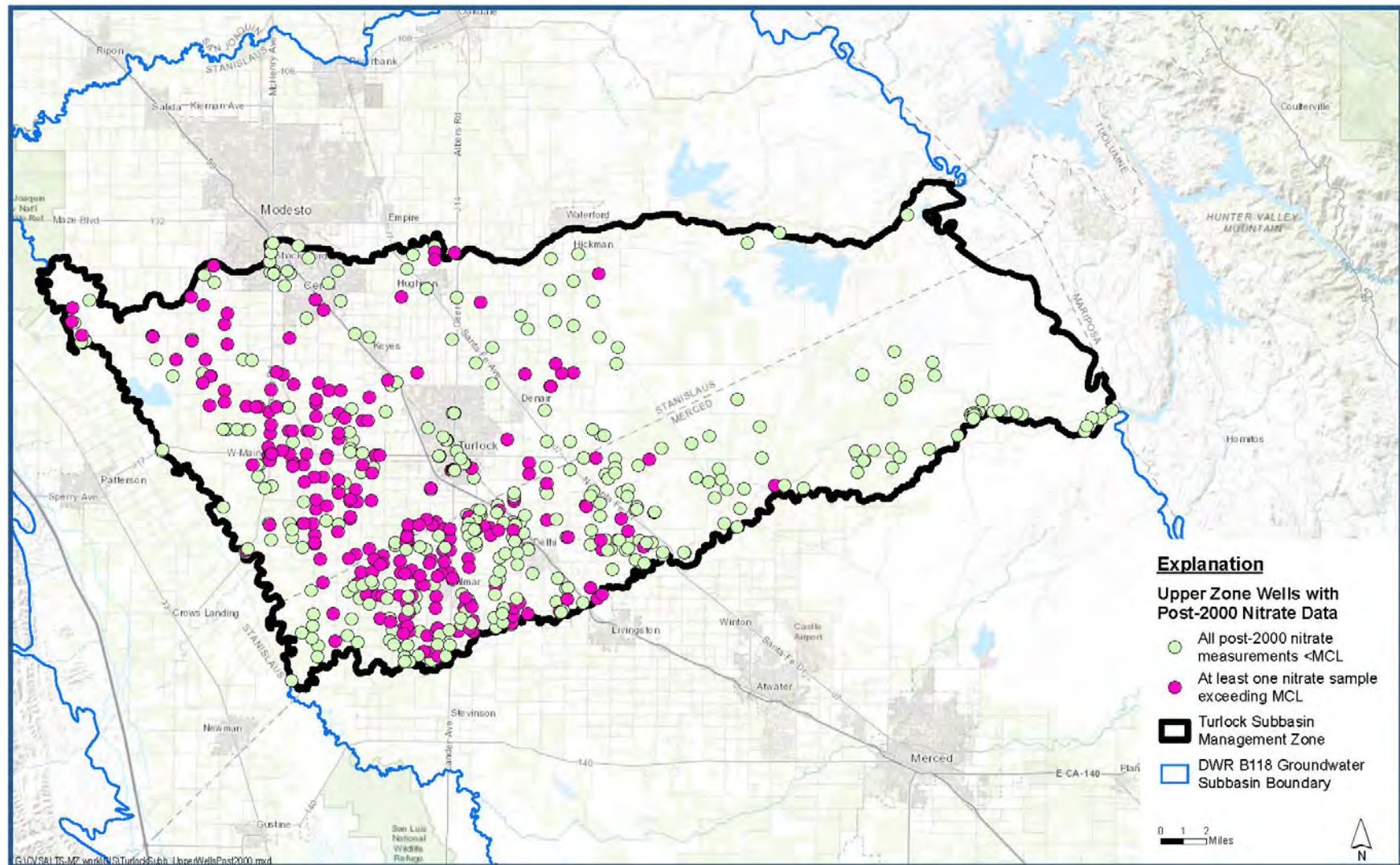


Figure 3-7. Upper Zone Wells with Nitrate Data and Nitrate MCL Exceedances

**Figure 3-8** illustrates the average post-2000 nitrate concentrations for all Upper Zone wells in the proposed Management Zone and control points in the 3-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 western half. Insufficient recent Upper Zone nitrate data are available in the eastern half of the Management Zone to fully assess the extent of potential nitrate contamination.

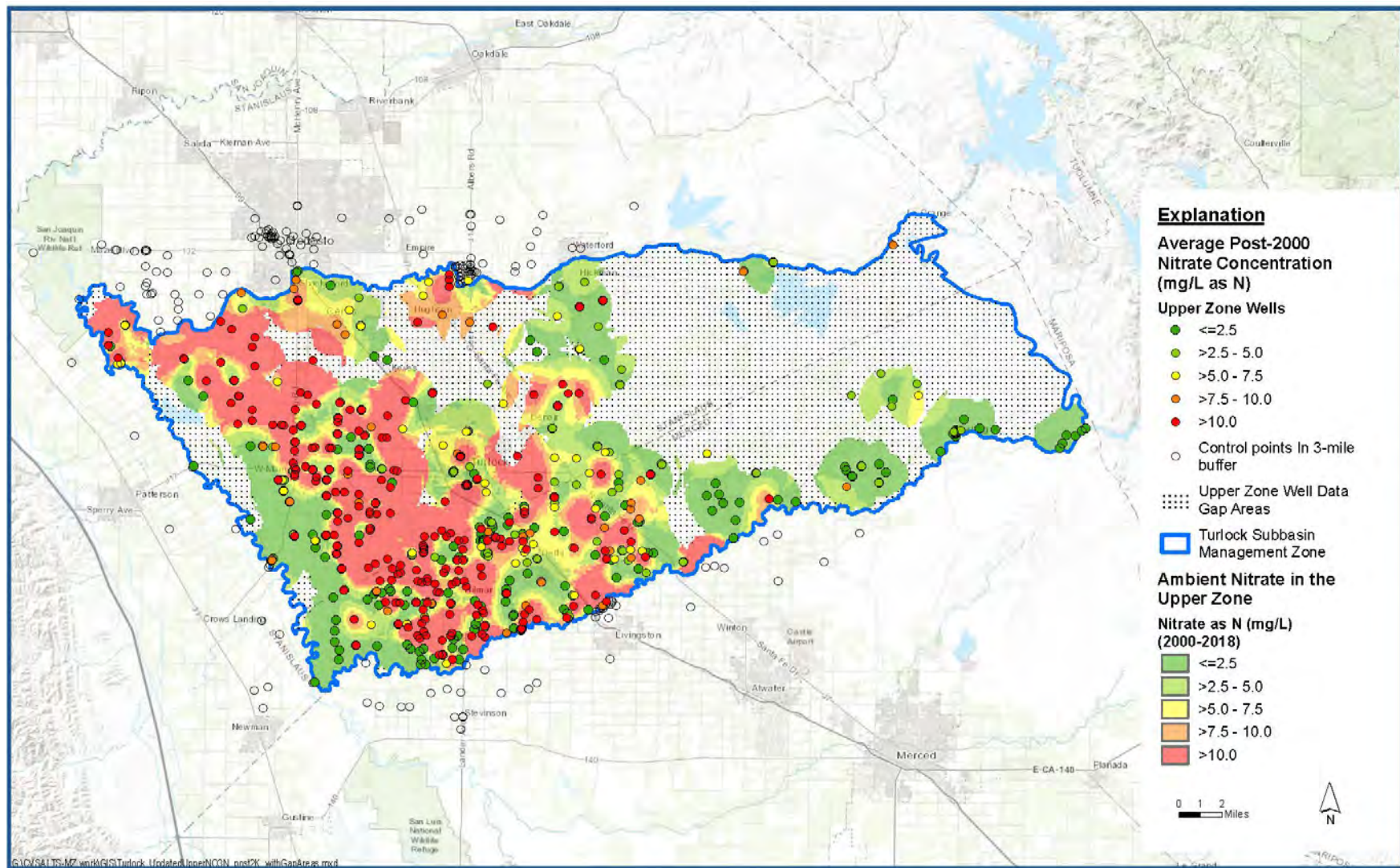
In addition to the ambient post-2000 nitrate concentrations calculated for this proposal, which uses annual average well data available between 2000 and 2019, nitrate concentration trends for individual wells are provided in **Figure 3-9**. This trends analysis is readily available from the previous CV-SALTS High Resolution geospatial database<sup>12</sup> representing data up to 2016 as available (CV-SALTS 2016). The majority of Upper Zone wells in the proposed Management Zone have either no trend or insufficient data to determine a nitrate trend. The trend for Upper Zone wells in the Management Zone (with post-2000 nitrate measurements) range from a decrease in concentration of -3.6 mg/L nitrate as N per year to an increase in concentration of 10 mg/L nitrate as N per year. Due to the abundance of Upper Zone wells in the Management Zone with either no significant trend or insufficient data to determine a trend, 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 3-8 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 3-10**. 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 concentration 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 nitrate MCL. 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, with a few exceptions. There are several individual wells that plot on top of or very close to another well with different maximum concentrations. This is a testament to the heterogeneity and variability inherent to groundwater quality conditions, as well as the availability of the dataset itself, that provide nitrate testing data for Upper Zone wells that have a maximum nitrate concentration exceeding the MCL adjacent to other wells that have no measured nitrate concentrations above the MCL.

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<sup>12</sup> CV-SALTS 2016 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 tests 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% 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.







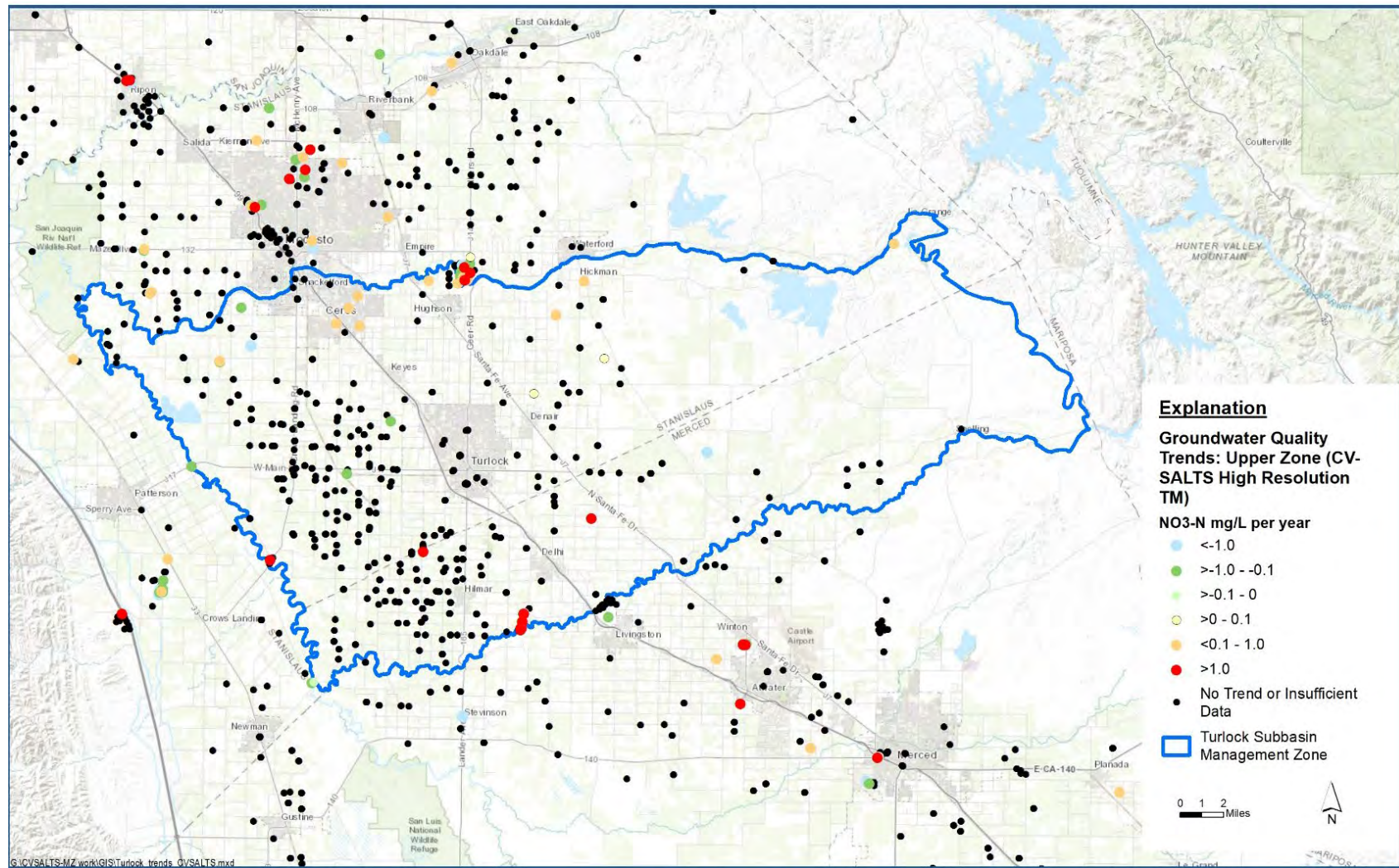


Figure 3-9. Groundwater Quality Trends for Nitrate in the Upper Zone of Groundwater Underlying the Proposed Management Zone



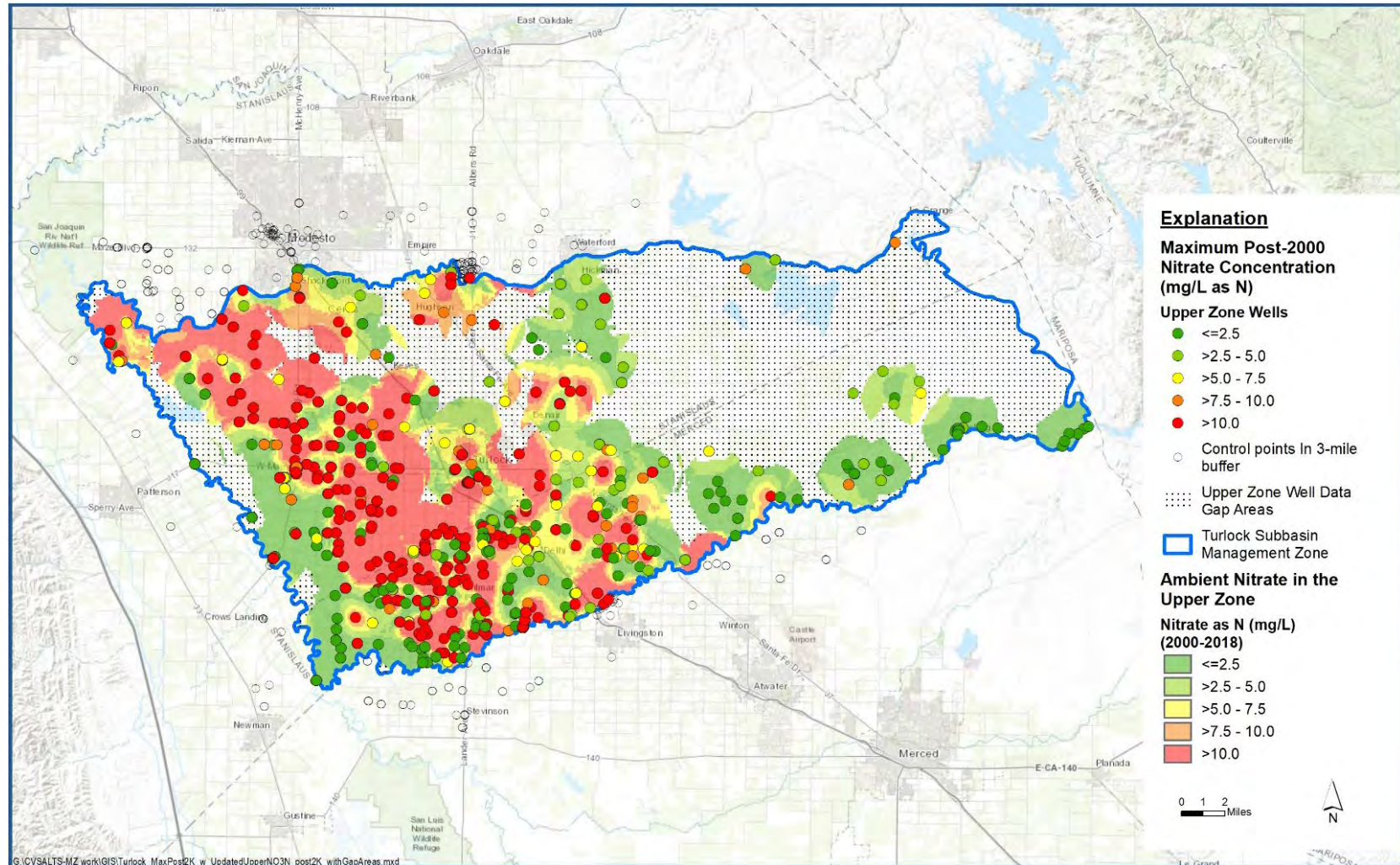


Figure 3-10. Maximum Post-2000 Nitrate in the Upper Zone with Ambient Groundwater Underlying the Proposed Management Zone

**Draft: November 8, 2019**

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.

## 4. Management Zone Participants

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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 Turlock 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 Turlock 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.<sup>13</sup> 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 within the proposed Management Zone 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 ESJWC. **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.

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<sup>13</sup> Webpage to obtain facilities reports:  
[https://www.waterboards.ca.gov/water\\_issues/programs/ciwqs/publicreports.html](https://www.waterboards.ca.gov/water_issues/programs/ciwqs/publicreports.html); this database was last accessed on \_\_\_\_\_.

**Table 4-1. Permitted Dischargers within the Proposed Management Zone<sup>1</sup> (see Figure 4-1 for locations)**

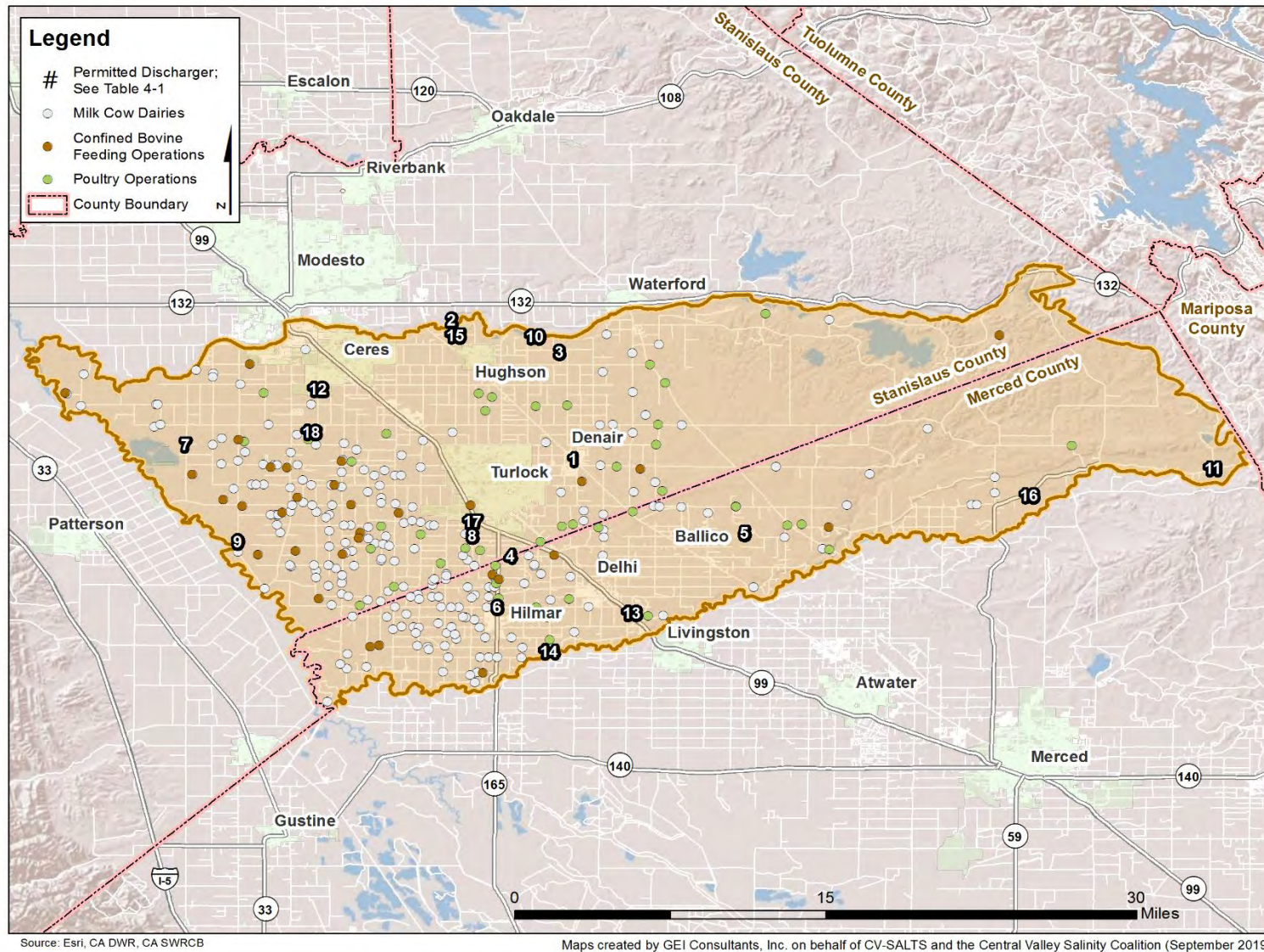
Map ID.	Facility Name	Facility Type	Permittee	Address	County	Permit Type	WDR No. (NPDES No.)	Expires
--	Dairies		229 Facilities (see Attachment D)		Merced/ Stanislaus	WDR	R5-2013-0122	10/2/2018
--	Confined Bovine Feeding Operations		31 Facilities (see Attachment D)		Merced/ Stanislaus	WDR	R5-2017-0058	
--	Poultry Operations		42 Facilities (see Attachment D)		Merced/ Stanislaus	WDR	R5-2016-0087	
--	Irrigated Lands Regulatory Program		1199 Members of the ESJWQC		Merced/ Stanislaus	WDR	R5--2012-0116-07 (as amended)	
--	Irrigated Lands Regulatory Program		50+ Non-Members of the ESJWQC		Merced/ Stanislaus	WDR	R5--2012-0116-07	
1	Burroughs Pond Sludge Discharge	Composting Facility	Burroughs, Ward	East Ave & Monte Vista Ave, Denair, 95316	Stanislaus	Enrollee - Waiver	R5-2008-0182	12/4/2013
2	Hughson Nut Company	Food Processing NEC	Hughson Nut Company	6049 Leedom Rd, Hughson, 95326	Stanislaus	WDR	98-012	1/19/2013
3	Hughson Nut, Inc.	Food Processing NEC	Hughson Nut, Inc.	1825 Verduga Rd, Hughson, 95326	Stanislaus	WDR	R5-2014-0059	3/27/2029
4	Clausen Slaughterhouse	Food Processor	Clausen Meat Packing Co. Inc	19455 Clausen, Turlock, 95381	Stanislaus	WDR	93-245	11/29/2008
5	Harris Woolf Almonds Facility	Food Processor	Harris Woolf California Almonds	11805 Newport Road St, Ballico, 95303	Merced	WDR	R5-2014-0066	6/6/2024
6	Hilmar Cheese Processing Plant	Food Processor	Hilmar Cheese Company	9001 Lander, Hilmar, 95324	Merced	WDR	R5-2010-0008	
7	Modesto WQCF WW Land Disposal	Recycled Water Use Area	Modesto City	7007 Jennings Rd, Modesto, 95358	Stanislaus	WDR	99-112	8/27/2019
8	Turlock Land Application Area	Recycled Water Use Area	Turlock City	Walnut Road, Turlock, 95380	Stanislaus	Enrollee - WDR	2016-0068-DDW	12/21/2020
9	Darling Ingredients, Inc. Rendering Plant	Rendering	Darling Ingredients, Inc.	11946 Carpenter Rd, Crows Landing, 95380	Stanislaus	WDR	R5-2012-0104	10/4/2022
10	Hughson Facility	Sand and Gravel Mining	Calaveras Materials Inc	1100 Lowe, Hughson, 95326	Stanislaus	WDR/ NPDES	R5-2002-0227 (CA0083411)	12/6/2012
11	Kelsey Ranch Reclamation Project	Sand and Gravel Mining	Merced River Mining & Reclamation Corp	7400 Merced Falls Rd, Snelling, 95369	Merced	WDR	94-036	2/21/2009
12	Ceres WWTP	Wastewater Treatment Facility	Ceres City	4200 Morgan, Ceres, 95307	Stanislaus	WDR	93-237	12/1/2003
13	Delhi WWTF	Wastewater Treatment Facility	Delhi CWD	15401 Pinewood St, Delhi, 95315	Merced	WDR	R5-2015-0053	4/17/2025



**Table 4-1. Permitted Dischargers within the Proposed Management Zone<sup>1</sup> (see Figure 4-1 for locations)**

Map ID.	Facility Name	Facility Type	Permittee	Address	County	Permit Type	WDR No. (NPDES No.)	Expires
14	Hilmar CWD WWTF	Wastewater Treatment Facility	Hilmar CWD	Nr Griffith & Williams, Hilmar, 95324	Merced	WDR	99-077	6/8/2009
15	Hughson WWTF	Wastewater Treatment Facility	Hughson City	6700 Leedom Rd, Hughson, 95326	Stanislaus	WDR	R5-2012-0003	2/2/2022
16	Snelling WWTF	Wastewater Treatment Facility	Snelling CSD	Hwy 59, Snelling, 95369	Merced	WDR	85-155	6/26/1995
17	Turlock Regional WQCF	Wastewater Treatment Facility	Turlock City	901 South Walnut Rd, Turlock, 95380	Stanislaus	Enrollee - WDR	2016-0068-DDW	12/21/2020
18	Bronco Winery	Winery	Bronco Wine Company	6342 Bystrum Rd, Ceres. 95307	Stanislaus	WDR	96-247	9/18/2006

<sup>1</sup> 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: Many elements of this process were carried out as part of the Pilot Study; however, some 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 (a) has been only partly implemented; part (b), i.e., direct mailout, 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 <sup>14</sup>	Primary Contact
Dairies (R5-2013-0122)	Dairy Cares	J.P. Cativiela, jcativiela@cogentcc.com
	United Western Dairymen	Paul Sousa, pauls@westernuniteddairymen.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 (R5-2012-0116)	East San Joaquin Water Quality Coalition	Parry Klassen, pklassen@gmail.com

The 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

<sup>14</sup> 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.

direct mailout to permitted dischargers was developed in collaboration with the entities 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 Turlock 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, including an invitation to participate in Management Zone meetings; 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 Turlock Management Zone that are members of the ESJWQC are regulated under the ILRP General Order R5-2012-0116 (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 proposed 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 to whom 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 Turlock 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 Turlock 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 Turlock Management Zone website (<https://www.esjcoalition.org/cvSalts/>). 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 Districts	Ballico Cortez Water District	*TBD
	Ballico Community Service District	*TBD
	City of Ceres Water Service Area	*TBD
	City of Turlock Water Service Area	*TBD
	Del Este Water Company	*TBD
	Delhi Community Water District	Leandro Maldonado: <a href="mailto:lmaldonado@delhicwd.org">lmaldonado@delhicwd.org</a>
	Denair Community Service District	David Odom: <a href="mailto:dodom@denaircsd.org">dodom@denaircsd.org</a> Richard Lindo: <a href="mailto:rlindo@denaircsd.org">rlindo@denaircsd.org</a>
	Eastside Water District	*TBD
	Hilmar County Water District	Curtis Jorrtisma: <a href="mailto:curtis@hilmarcwsd.org">curtis@hilmarcwsd.org</a>
	Keyes Community Service District	Mike Jones: <a href="mailto:mjones@keyescsd.org">mjones@keyescsd.org</a>
	Merced Irrigation District	*TBD
	Turlock Irrigation District	Debbie Liebersbach: <a href="mailto:dcliebersbach@tid.org">dcliebersbach@tid.org</a> Frank Leandro: <a href="mailto:fjleancro@tid.org">fjleancro@tid.org</a> Herbie Smart: <a href="mailto:hssmart@tid.org">hssmart@tid.org</a> Josh Weimer: <a href="mailto:jmweimer@tid.org">jmweimer@tid.org</a> Michael Niemi: <a href="mailto:mjniemi@tid.org">mjniemi@tid.org</a> Phil Govea: <a href="mailto:pdgovea@tid.org">pdgovea@tid.org</a>
GSAs within Management Zone	East Turlock GSA	Kevin Kauffman: <a href="mailto:kauffmankevin@comcast.net">kauffmankevin@comcast.net</a>
	West Turlock GSA	Michael Cooke: <a href="mailto:mcooke@turlock.ca.gov">mcooke@turlock.ca.gov</a>
GSAs adjacent to Management Zone	Patterson Irrigation District GSA	*TBD – see Attachment B for identification of key contact information
	San Joaquin River Exchange Contractors Water Authority GSA	
	Stanislaus and Tuolumne Rivers Groundwater Basin Association GSA	
	Northwestern Delta-Mendota GSA	
	Merced Subbasin GSA	
	Merced Irrigation-Urban GSA	
	West Stanislaus Irrigation District GSA	
Industry, Trade and Non-Governmental Organizations	Dairy Cares	J.P. Cativiela: <a href="mailto:jcativiela@cogentcc.com">jcativiela@cogentcc.com</a>
	Western United Dairymen	Paul Sousa: <a href="mailto:pauls@westernuniteddairymen.com">pauls@westernuniteddairymen.com</a>
	Central Valley Dairy Regional Monitoring Program	*TBD
	Milk Producers Council	*Geoff Vanden Heuvel, <a href="mailto:geoff@milkproducers.org">geoff@milkproducers.org</a>
	California League of Food Producers	Rob Neenan: <a href="mailto:rob@clfp.com">rob@clfp.com</a>

**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
	Central Valley Clean Water Association	Debbie Webster: <a href="mailto:eoofficer@cvcwa.org">eoofficer@cvcwa.org</a>
	Merced County Farm Bureau	Breanne Ramos: <a href="mailto:bramos@mercedfarmbureau.com">bramos@mercedfarmbureau.com</a>
	Hancock Farmland Services	Molly Saso: <a href="mailto:Msaso@hnrq.com">Msaso@hnrq.com</a> Samantha Lopes: <a href="mailto:slopes@hnrq.com">slopes@hnrq.com</a>
	Clean Water Action	Jennifer Clary: <a href="mailto:jclary@cleanwater.org">jclary@cleanwater.org</a>
	Self-Help Enterprises	Ilse Lopez-Narvaez: <a href="mailto:ilsen@selfhelpenterprises.org">ilsen@selfhelpenterprises.org</a> Liesbet Olaerts: <a href="mailto:liesbeto@selhelpenterprises.org">liesbeto@selhelpenterprises.org</a> Maria Herrera: <a href="mailto:mariah@selfhelpenterprises.org">mariah@selfhelpenterprises.org</a>
	Community Water Center	Debi Ores: <a href="mailto:Deborah.ores@communitywatercenter.org">Deborah.ores@communitywatercenter.org</a>
	American Rivers	Ayasha Massell: <a href="mailto:amassell@americanrivers.org">amassell@americanrivers.org</a> ; Lisa Hunt: <a href="mailto:lhunt@americanrivers.org">lhunt@americanrivers.org</a>
Merced County	Board of Supervisors	*TBD
	Planning and Community Development	*TBD
	Department of Public Health	*TBD
Stanislaus County	Board of Supervisors	*TBD
	Planning and Community Development	*TBD
	Health Services Agencies	*TBD
Stanislaus County Communities	Modesto (Incorporated)	Ben Koehler: <a href="mailto:bkoehler@modestogov.com">bkoehler@modestogov.com</a> Jim Alves: <a href="mailto:jalves@modestogov.com">jalves@modestogov.com</a> Laura Anhalt: <a href="mailto:lanhalt@modestogov.com">lanhalt@modestogov.com</a> Manuel Martinez: <a href="mailto:mmartinez@modestogov.com">mmartinez@modestogov.com</a> Miguel Alvarez: <a href="mailto:malvarez@modestogov.com">malvarez@modestogov.com</a> Robert Davalos: <a href="mailto:rdavalos@modestogov.com">rdavalos@modestogov.com</a> Sunny Kler: <a href="mailto:skler@modestogov.com">skler@modestogov.com</a> Thomas Sinclair: <a href="mailto:tsinclair@modestogov.com">tsinclair@modestogov.com</a>
	Ceres (Incorporated)	Karen Morgan: <a href="mailto:karen.morgan@ci.ceres.ca.us">karen.morgan@ci.ceres.ca.us</a>
	Hughson (Incorporated)	*TBD
	Turlock (Incorporated)	Michael Cooke: <a href="mailto:mcooke@turlock.ca.gov">mcooke@turlock.ca.gov</a>
	Denair (Unincorporated)	*TBD
Merced County Communities	Ballico (Unincorporated)	*TBD
	Delhi (Unincorporated)	*TBD
	Hilmar (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	Contact
American Rivers	Aysa Massell	<a href="mailto:amassell@americanrivers.org">amassell@americanrivers.org</a>
	Lisa Hunt	<a href="mailto:lhunt@americanrivers.org">lhunt@americanrivers.org</a>
Association of California Water Agencies Ag Committee Chair/ Grower	Bill Deidrich	<a href="mailto:agspray@sbcglobal.net">agspray@sbcglobal.net</a>
Bronco Wine Company*	Chris Mifsud	<a href="mailto:chris.mifsud@broncowine.com">chris.mifsud@broncowine.com</a>
	Paul Huckaba	<a href="mailto:paul.huckaba@broncowine.com">paul.huckaba@broncowine.com</a>
California League of Food Producers	Rob Neenan	<a href="mailto:rob@clfp.com">rob@clfp.com</a>
Catalyst	Charles Gardiner	<a href="mailto:charles@catalystgroupCA.com">charles@catalystgroupCA.com</a>
	Mary Currie	<a href="mailto:mary@catalystgroupca.com">mary@catalystgroupca.com</a>
Central Valley Clean Water Association	Debbie Webster	<a href="mailto:eoifficer@cvcwa.org">eoifficer@cvcwa.org</a>
Central Valley Salinity Coalition	Daniel Cozad	<a href="mailto:dcozad@cvsalinity.org">dcozad@cvsalinity.org</a>
	Tim Moore	<a href="mailto:tmoore@risk-sciences.com">tmoore@risk-sciences.com</a>
	David Corey	<a href="mailto:farmeratlaw@comcast.net">farmeratlaw@comcast.net</a>
Central Valley Water Board	Adam Laputz	<a href="mailto:Adam.Laputz@waterboards.ca.gov">Adam.Laputz@waterboards.ca.gov</a>
	Anne Littlejohn	<a href="mailto:Anne.Littlejohn@waterboards.ca.gov">Anne.Littlejohn@waterboards.ca.gov</a>
	Walt Plachta	<a href="mailto:Walter.Plachta@Waterboards.ca.gov">Walter.Plachta@Waterboards.ca.gov</a>
Chowchilla Water District	Douglas Welch	<a href="mailto:dwelch@cwdwater.com">dwelch@cwdwater.com</a>
	Brandon Tomlinson	<a href="mailto:btomlinson@cwdwater.com">btomlinson@cwdwater.com</a>
City of Ceres*	Karen Morgan	<a href="mailto:karen.morgan@ci.ceres.ca.us">karen.morgan@ci.ceres.ca.us</a>
City of Modesto*	Ben Koehler	<a href="mailto:bkoehler@modestogov.com">bkoehler@modestogov.com</a>
	Jim Alves	<a href="mailto:jalves@modestogov.com">jalves@modestogov.com</a>
	Laura Anhalt	<a href="mailto:lanhalt@modestogov.com">lanhalt@modestogov.com</a>
	Manuel Martinez	<a href="mailto:MMARTINEZ@modestogov.com">MMARTINEZ@modestogov.com</a>
	Miguel Alvarez	<a href="mailto:malvarez@modestogov.com">malvarez@modestogov.com</a>
	Robert Davalos	<a href="mailto:rdavalos@modestogov.com">rdavalos@modestogov.com</a>
	Sunny Kler	<a href="mailto:skler@modestogov.com">skler@modestogov.com</a>
	Thomas Sinclair	<a href="mailto:tsinclair@modestogov.com">tsinclair@modestogov.com</a>
City of Turlock"	Michael Cooke	<a href="mailto:MCooke@turlock.ca.us">MCooke@turlock.ca.us</a>
Clean Water Action	Jennifer Clary	<a href="mailto:jclary@cleanwater.org">jclary@cleanwater.org</a>
Coalition for Urban Rural Environmental Stewardship	Kayla Cathers	<a href="mailto:kayla.cathers@curesworks.org">kayla.cathers@curesworks.org</a>
Community Water Center	Debbie Ores	<a href="mailto:deborah.ores@communitywatercenter.org">deborah.ores@communitywatercenter.org</a>
Dairy Cares	J.P. Cativiela	<a href="mailto:jcativiela@cogentcc.com">jcativiela@cogentcc.com</a>
Delhi Community Water District*	Leandro Maldonado	<a href="mailto:lmaldonado@delhicwd.org">lmaldonado@delhicwd.org</a>
Denair Community Services District	David Odom	<a href="mailto:Dodom@denaircsd.org">Dodom@denaircsd.org</a>
	Richard Lindo	<a href="mailto:Rlindo@denaircsd.org">Rlindo@denaircsd.org</a>
East San Joaquin Water Quality Coalition Board	Al Rossini	<a href="mailto:rossiniag@hughes.net">rossiniag@hughes.net</a>
East San Joaquin Water Quality Coalition*	Parry Klassen	<a href="mailto:klassenparry@gmail.com">klassenparry@gmail.com</a>
East Turlock GSA	Kevin Kauffman	<a href="mailto:kauffmankevin@comcast.net">kauffmankevin@comcast.net</a>

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

Entity/Stakeholder	Participant	Contact
GEI Consultants	Richard Meyerhoff	<a href="mailto:rmeyerhoff@geiconsultants.com">rmeyerhoff@geiconsultants.com</a>
Gioletti Dairy*	Justin Gioletti	<a href="mailto:giodairy@sbcglobal.net">giodairy@sbcglobal.net</a>
Grower*	Kole Upton	<a href="mailto:kupton@inreach.com">kupton@inreach.com</a>
	Larkin Harman	<a href="mailto:larkinh@aol.com">larkinh@aol.com</a>
	Ryan Honnette	<a href="mailto:ryan@cal-almond.com">ryan@cal-almond.com</a>
Hancock Farmland Services	Molly Saso	<a href="mailto:msaso@hnrq.com">msaso@hnrq.com</a>
	Samantha Lopes	<a href="mailto:slopes@hnrq.com">slopes@hnrq.com</a>
Hilmar Cheese Co.*	Kevin Vogt	<a href="mailto:kvogt@hilmarcheese.com">kvogt@hilmarcheese.com</a>
Hilmar CWD	Curtis Jorrtisma	<a href="mailto:curtis@hilmarcwg.org">curtis@hilmarcwg.org</a>
Hughson Nut*	Ty Angle	<a href="mailto:ty@hughsonnut.com">ty@hughsonnut.com</a>
Keyes Community Services District	Mike Jones	<a href="mailto:mjones@keyescsd.org">mjones@keyescsd.org</a>
Kings River Conservation District	Soua Lee	<a href="mailto:slee@krcd.org">slee@krcd.org</a>
Luhdorff & Scalmanini Consulting Engineers	Vicki Kretsinger	<a href="mailto:vkretsinger@lsce.com">vkretsinger@lsce.com</a>
Madera County	Jeannie Habben	<a href="mailto:jeanine.habben@maderacounty.com">jeanine.habben@maderacounty.com</a>
	Stephanie Anagnoson	<a href="mailto:stephanie.anagnoson@maderacounty.com">stephanie.anagnoson@maderacounty.com</a>
Madera Farm Bureau/East San Joaquin Water Quality Coalition Board	Christina Beckstead	<a href="mailto:cbeckstead@maderafb.com">cbeckstead@maderafb.com</a>
Merced County Farm Bureau	Breanne Ramos	<a href="mailto:bramos@mercedfarmbureau.org">bramos@mercedfarmbureau.org</a>
MLJ Environmental	Melissa Turner	<a href="mailto:mturner@mljenvironmental.com">mturner@mljenvironmental.com</a>
	Michael Johnson	<a href="mailto:mjohnson@mljenvironmental.com">mjohnson@mljenvironmental.com</a>
Raylin Dairy*	Ray Prock	<a href="mailto:rprockjr@gmail.com">rprockjr@gmail.com</a>
Self-Help Enterprises	Ilse Lopez-Narvaez	<a href="mailto:ilsen@selfhelpenterprises.org">ilsen@selfhelpenterprises.org</a>
	Liesbet Olaerts	<a href="mailto:liesbeto@selfhelpenterprises.org">liesbeto@selfhelpenterprises.org</a>
	Maria Herrera	<a href="mailto:mariah@selfhelpenterprises.org">mariah@selfhelpenterprises.org</a>
Somach Simmons & Dunn	Tess Dunham	<a href="mailto:tdunham@somachlaw.com">tdunham@somachlaw.com</a>
Stanislaus Food Products	Bill Hudelson	<a href="mailto:hud@stanislaus.com">hud@stanislaus.com</a>
Tailwater Systems	John Skardon	<a href="mailto:john@tailwatersystems.com">john@tailwatersystems.com</a>
Turlock Irrigation District	Debbie Liebersbach	<a href="mailto:dcliebersbach@tid.org">dcliebersbach@tid.org</a>
	Frank Leandro	<a href="mailto:fleandro@tid.org">fleandro@tid.org</a>
	Josh Weimer	<a href="mailto:jmweimer@tid.org">jmweimer@tid.org</a>
	Michael Niemi	<a href="mailto:mjniemi@TID.ORG">mjniemi@TID.ORG</a>
	Phil Govea	<a href="mailto:pdgovea@TID.ORG">pdgovea@TID.ORG</a>
	Herbie Smart	<a href="mailto:hssmart@TID.ORG">hssmart@TID.ORG</a>
Waterwise	Sarah Woolf	<a href="mailto:sarahwoolf@me.com">sarahwoolf@me.com</a>
Western United Dairyman	Paul Sousa	<a href="mailto:pauls@westernuniteddairymen.com">pauls@westernuniteddairymen.com</a>
Woodard & Curran	Natalie Cochran	<a href="mailto:ncochran@woodardcurran.com">ncochran@woodardcurran.com</a>



## **5. Current Nitrate Treatment and Control Efforts or Management Practices**

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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 Zone. Section 5.1 provides this information for each of the General Orders that apply to participating permitted dischargers in proposed Turlock Management Zone. Section 5.2 provides similar information for individual permitted dischargers.

### **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 R5-2012-0116-07 (as further amended) establishes the current treatment and control efforts of members of the ESJWQC, the entity responsible for the implementation of the ILRP within the proposed Turlock 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 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 (AR Difference).
- Data are reported at the following levels:
  - Individual field-level data (AR Ratio or AR 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 AR 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 AR data table.

All members of the Coalition in high vulnerability areas must complete an annual farm evaluation describing management practices implemented to protect groundwater quality. Members in low vulnerability areas provide this same information 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

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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 (10 mg/L nitrate as N). Implementation of the Early Action Plan to provide 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 Turlock 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**).<sup>15</sup> For this proposed Management Zone, groundwater quality data for wells completed in the Upper Zone were sparse in the eastern half of the subbasin; most of the wells completed in the Upper Zone with post-2000 nitrate data were located in the western half of the subbasin.

Figure 6-2 shows that several nitrate-impacted areas exist within Upper Zone in the Management Zone (defined as having average recent nitrate concentrations exceeding the MCL of 10 mg/L nitrate as N). The largest nitrate-impacted area is a north-northwest to south-southeast trending swath of land west of Highway 99 and east of the San Joaquin River. The south-central portion of the proposed Management Zone also contains a nitrate-impacted area, and smaller pockets of nitrate-impacted areas exist in the north-central portion of the Management 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 Turlock 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.

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<sup>15</sup> 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.

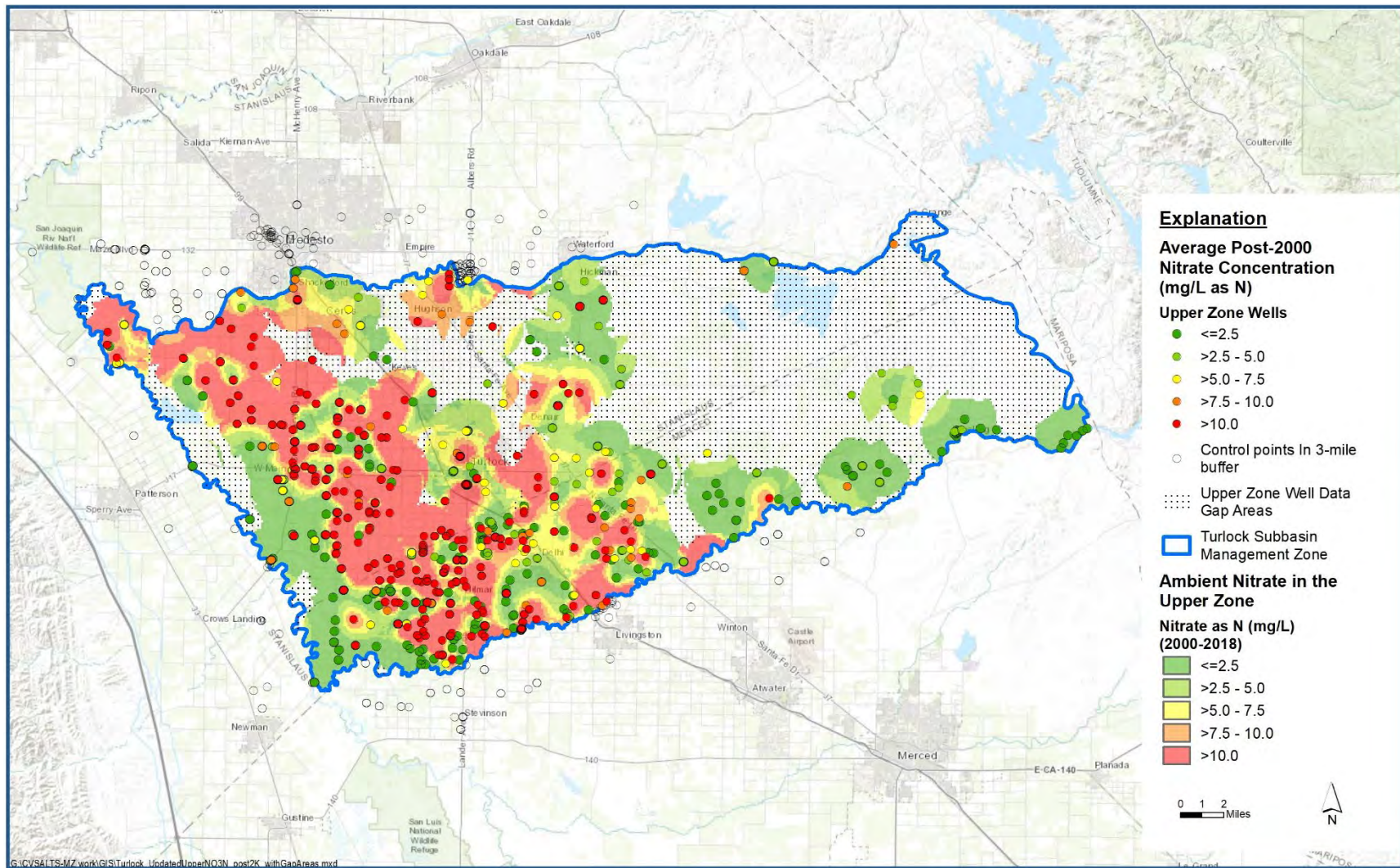


Figure 6-2. Ambient Post-2000 Nitrate Concentrations in the Upper Zone, Turlock Management Zone

### *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, 86 public supply wells in the proposed Management Zone have exceeded the MCL for nitrate (see Table 2-2 in the Early Action Plan, Attachment H). Of those, 50 wells are considered "Active" (Active Raw, i.e., groundwater is sampled directly from the well; or Active Untreated, i.e., groundwater is sampled at a point between the well and a treatment system); the remainder are either agricultural/irrigation wells (two wells that belong to the Cities of Modesto and Turlock), abandoned wells (four wells), destroyed wells (10 wells), or inactive wells (20 wells).

Active wells that have concentrations at or exceeding the MCL are located mostly within the large nitrate-impacted area in the western and central portion of the proposed Management Zone, including south Modesto, Ceres, Turlock, Keyes, and Delhi (**Figure 6-3**) (also see Table 2-3 in the Early Action Plan, Attachment H). 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: southern border of Waterford, Hickman and Hilmar areas, two Foster Farms areas south of Hickman and east of Turlock, and domestic wells near Monterey Park Tract 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 nitrate 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.



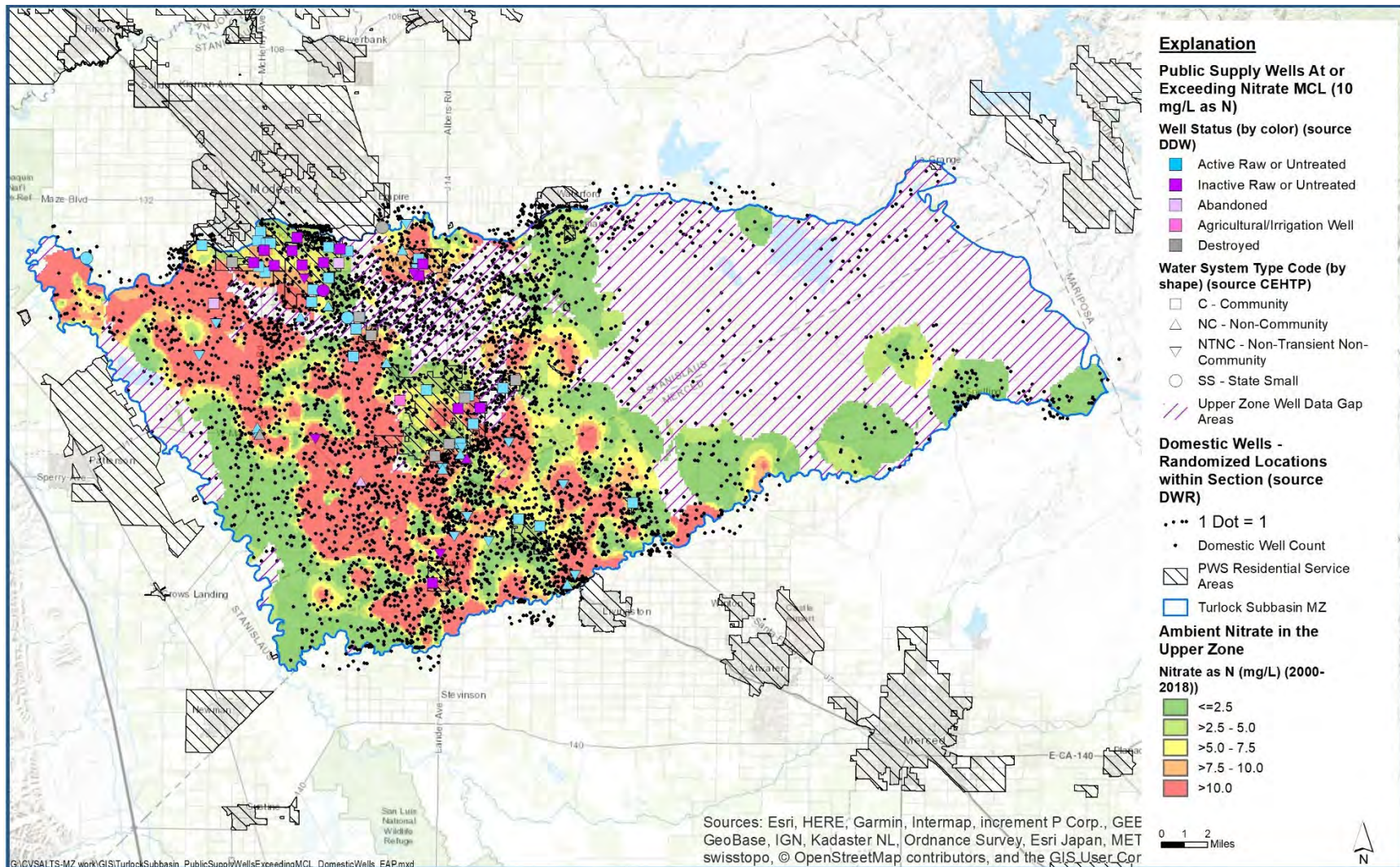


Figure 6-3. Potentially Impacted Public Water Supply Wells and All Domestic Wells, Turlock Management Zone

- *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.

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 52 unique PWS with potentially impacted water supply wells: (a) 22 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) 11 water systems provide nitrate sample results from their treated sources; and (c) eight water systems name the method that pertains to nitrate treatment (blending, RO, IX, etc.) in the source name reported to DDW. Out of the 11 water systems that provide nitrate sample results from treated sources, four 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** below shows the public supply wells within the proposed 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 NO<sub>3</sub>-N, and > 10 mg/L NO<sub>3</sub>-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 the estimation of the number of potentially impacted domestic wells. There are approximately 1,898 domestic wells within the PWS residential service areas (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.



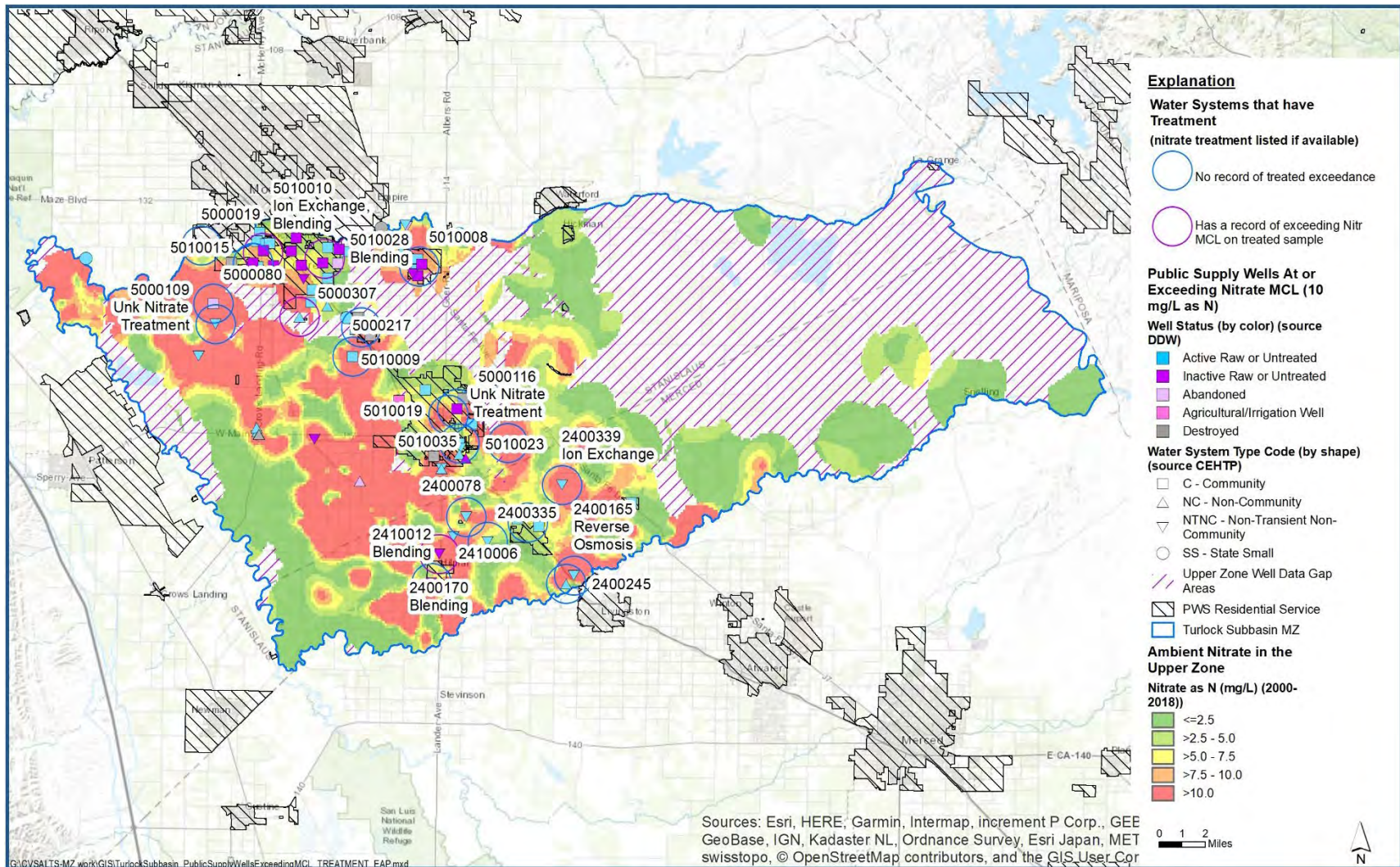


Figure 6-4. Treatment Status for Water Systems that have Wells with Nitrate-Impacted Samples



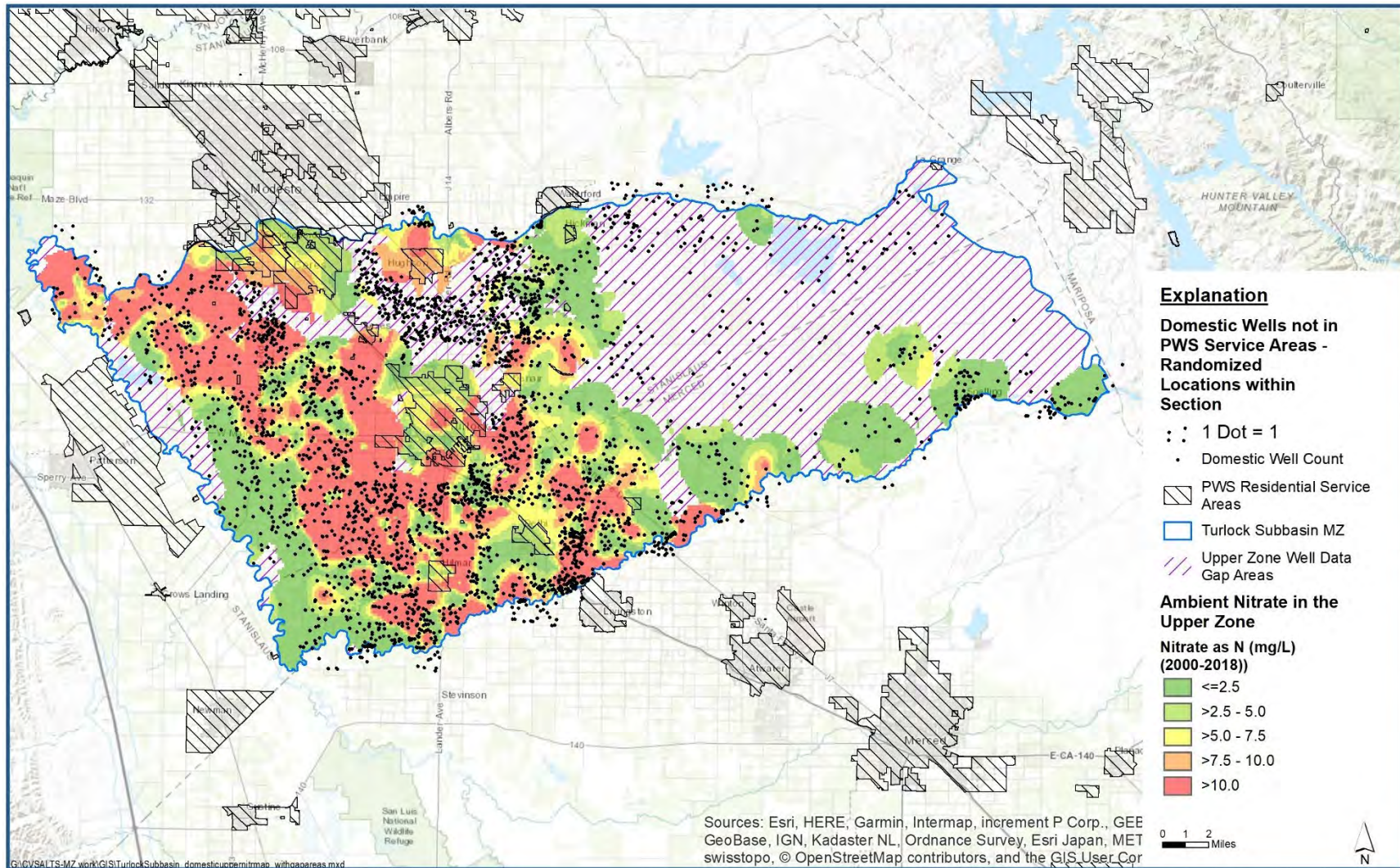


Figure 6-5. Domestic Wells Located Outside Public Water System Areas in the Turlock Management Zone

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;
- *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**)

**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
<b>Group 1: <math>\leq 2.5</math> mg/L NO<sub>3</sub> as N</b>	473	14%	10,447
<b>Group 2: <math>&gt; 2.5 - 5.0</math> mg/L NO<sub>3</sub> as N</b>	519	15%	15,638
<b>Group 3: <math>&gt; 5.0 - 7.5</math> mg/L NO<sub>3</sub> as N</b>	608	18%	6,898
<b>Group 4: Elevated Nitrate (<math>&gt; 7.5-10</math> NO<sub>3</sub> mg/L as N)</b>	394	12%	6,048
<b>Group 5: High Nitrate (<math>&gt; 10</math> mg/L NO<sub>3</sub> as N)</b>	1,017	30%	12,885
<b>Group 6: Unknown*</b>	406	12%	5,435
<b>Total (Outside PWS Boundaries)</b>	3,417	100%	57,351

\*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.



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 proposed 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.

### **6.1.2 Community Outreach**

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 for the proposed Turlock 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. Using County parcel data coupled with Google Earth images and GIS tools, the Early Action Plan describes the process that will be implemented to identify residences within the proposed Management Zone to target for direct outreach.
- *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 becomes 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 Plan'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 Plan where needed to improve or facilitate implementation.

## **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 Turlock 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 at least three community outreach meetings at varying locations within the Management Zone within six months of EAP effective date
		Second round of Community Outreach Meetings	Complete at least three community outreach meetings at varying locations within the Management Zone after two public access water facilities become operational
		Third round of Community Outreach Meetings	Complete at least three community outreach meetings at varying locations within the Management Zone after more than four public access water facilities become 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"> <li>Facilities 1 &amp; 2: within 180 days of EAP effective date</li> <li>Facilities 3, 4, 5 &amp; 6: within 360 days of EAP effective date</li> <li>Facilities 7 &amp; 8 (if needed) within 450 days of EAP effective date</li> <li>If more than 8 filling stations are needed, documentation for remaining facilities will be submitted within 540 days of EAP effective date</li> </ul>



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"> <li>Initiate installation of filling stations within of 90 days of completing review and obtaining any other necessary permits/approvals.</li> <li>Establish final agreements with land/property owner to operate/maintain filling station – prior to station becoming operational</li> </ul>
	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"> <li>Send second outreach packets to residents no later than one year after initial outreach packet mailed out</li> <li>Send third outreach packet to residents no later than one year after sending out second outreach packet</li> </ul>
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"> <li>Six-months after the EAP effective date</li> <li>1 year after the EAP effective date</li> <li>Annually after the Year 1 report until the EAP is no longer effective</li> </ul>

## **7. Plan to Finalize Management Zone Proposal**

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### **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:

- The 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.<sup>16</sup>

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

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<sup>16</sup> Note: This mailout is supplemental to the notices that the Management Zone has already sent to each individual discharger within the proposed Turlock 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.
- 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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Boyle, D., A. King, G. Kourakos, K. Lockhart, M. Mayzelle, G.E. Fogg, and T. Harter. 2012 *Groundwater Nitrate Occurrence*. Technical Report 4 in: Addressing Nitrate in California's Drinking Water with a Focus on Tulare Lake Basin and Salinas Valley Groundwater. Report prepared for the State Water Resources Control Board Report to the Legislature. Center for Watershed Sciences, University of California, Davis. <http://groundwaternitrate.ucdavis.edu/>

Central Valley Regional Water Quality Control Board (Central Valley Water Board). 2017. *Final Salt and Nitrate Management Plan for Central Valley Water Board Consideration*. January 2017. <https://www.cvsalinity.org/docs/central-valley-snmp/final-snmp.html>

Central Valley Water Board, 2018. *Amendments to the Water Quality Control Plans for the Sacramento River and San Joaquin River Basins and Tulare Lake Basin to Incorporate a Central Valley-wide Salt and Nitrate Control Program*. Draft Staff Report. May 2018. [https://www.waterboards.ca.gov/centralvalley/water\\_issues/salinity/#saltnitrate\\_cp\\_bpa](https://www.waterboards.ca.gov/centralvalley/water_issues/salinity/#saltnitrate_cp_bpa)

Central Valley Salinity Alternatives for Long-term Sustainability (CV-SALTS). 2013. *Central Valley Salinity Alternatives for Long-term Sustainability (CV-SALTS): Initial Concept Model Technical Services. Tasks 7 and 8 – Salt and Nitrate Analysis for the Central Valley Floor and a Focused Analysis of Modesto and Kings Subregions*. Report prepared by Larry Walker Associates, Luhdorff & Scalmanini Consulting Engineers, Kennedy/Jenks, PlanTierra, Systech Water Resources, and Carollo Engineers. December 3, 2013. <http://www.cvsalinity.org/index.php/committees/technical-advisory/conceptual-model-developments/102-initial-conceptual-model-icm.html>

CV-SALTS 2016. *Region 5: Updated Groundwater Quality Analysis and High Resolution Mapping for Central Valley Salt and Nitrate Management Plan*. Report prepared by Luhdorff & Scalmanini Consulting Engineers and Larry Walker Associates. June 2016 <https://www.cvsalinity.org/committees/technical-advisory/technical-projects-index.html>.

Department of Water Resources (DWR) California. 2003. *California's Groundwater*. DWR Bulletin 118. California Department of Water Resources. [https://water.ca.gov/LegacyFiles/pubs/groundwater/bulletin\\_118/california's\\_groundwater\\_bulletin\\_118\\_-\\_update\\_2003\\_/bulletin118\\_entire.pdf](https://water.ca.gov/LegacyFiles/pubs/groundwater/bulletin_118/california's_groundwater_bulletin_118_-_update_2003_/bulletin118_entire.pdf)

DWR. 2006. San Joaquin Valley Groundwater Basin: Turlock Subbasin, California's Groundwater Bulletin 118. January 20, 2006. [https://water.ca.gov/LegacyFiles/pubs/groundwater/bulletin\\_118/basindescriptions/5-22.03.pdf](https://water.ca.gov/LegacyFiles/pubs/groundwater/bulletin_118/basindescriptions/5-22.03.pdf)

DWR. 2016. California's Groundwater: Working Toward Sustainability. Bulletin 118, Interim Update 2016. December 22, 2016. <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/B118-Interim-Update-2016.pdf>

DWR 2014 Land Use Data.

East San Joaquin Water Quality Coalition (ESJWQC). 2014. East San Joaquin Water Quality Groundwater Quality Assessment Report. Prepared by Luhdorff & Scalmanini Consulting Engineers on behalf of the ESJWQC. January 2014 (as amended).  
[https://www.waterboards.ca.gov/centralvalley/water\\_issues/irrigated\\_lands/water\\_quality/coalitions\\_submittals/east\\_sanjoaquin/](https://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/water_quality/coalitions_submittals/east_sanjoaquin/)

PolicyLink. 2013. California Unincorporated: Mapping Disadvantaged Communities in the San Joaquin Valley. Prepared in partnership with the California Rural Legal Assistance, Inc. and California Rural Legal Assistance Foundation.  
[https://www.policylink.org/sites/default/files/CA%20UNINCORPORATED\\_FINAL.pdf](https://www.policylink.org/sites/default/files/CA%20UNINCORPORATED_FINAL.pdf)

Turlock Irrigation District. 2008. Turlock Groundwater Basin: Groundwater Management Plan. Prepared by the Turlock Groundwater Basin Association on behalf of the Turlock Irrigation District. March 18, 2008. [https://www.tid.org/wp-content/uploads/2017/06/TID2015AWMP-Attachments\\_Public\\_Review-2.pdf](https://www.tid.org/wp-content/uploads/2017/06/TID2015AWMP-Attachments_Public_Review-2.pdf)

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

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A-1: Growers Permitted under Irrigated Lands Regulatory Program General Order R5-2012-0116

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 Turlock Management Zone**

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There are two exclusive GSAs in the Turlock Subbasin:

- East Turlock Subbasin GSA
- West Turlock Subbasin GSA

Adjacent to the proposed Turlock Management Zone, there are seven other GSAs listed below (see Figure 2-2):

- Patterson Irrigation District GSA
- San Joaquin River Exchange Contractors Water Authority GSA
- Stanislaus and Tuolumne Rivers Groundwater Basin Association GSA
- Northwestern Delta-Mendota GSA
- Merced Subbasin GSA
- Merced Irrigation-Urban GSA
- West Stanislaus Irrigation District GSA

The following sections provide a brief summary of each GSA, including points of contact, information about who makes up the GSA, and other interested parties that have been contacted by the GSAs.

### **East Turlock Subbasin GSA**

- *Point of Contact:* Kevin Kauffman, Water Consultant, East Turlock Subbasin GSA PO Box 280, Denair, CA 95316, (209) 478-4940 [kauffmankevin@comcast.net](mailto:kauffmankevin@comcast.net)
- *GSA Joint Powers Authority:* Eastside Water District, Merced County, Stanislaus County, Ballico-Cortez Water District, and Merced Irrigation District
- *Other Interested Parties:* City of Turlock, Snelling Public Water System, Turlock Groundwater Basin Association

### **West Turlock Subbasin GSA**

- *Point of Contact:* Michael Cooke, Tech Advisory Committee – Chair, West Turlock Subbasin Groundwater Sustainability Agency, P.O. Box 949, Turlock, CA 95381, (209) 668-6045, [mcooke@turlock.ca.us](mailto:mcooke@turlock.ca.us)
- *GSA Joint Powers Authority:* City of Turlock, City of Ceres, City of Hughson, City of Modesto, Stanislaus County, Merced County, Denair Community Services District, Delhi Water District, Hilmar Water District, and the Turlock Irrigation District. Associate Members: City of Waterford, Stevinson Water District, and Keyes Community Services District
- *Other Interested Parties:* US Geological Survey, Federal Energy Regulatory Commission, US Army Corps of Engineers (Don Pedro Reservoir)

### **Patterson Irrigation District GSA**

- *Point of Contact:* Vince Lucchesi, General Manager, Patterson Irrigation District, P.O. Box 685, Patterson, CA 95363, 209-892-6233, [vlucchesi@pattersonid.org](mailto:vlucchesi@pattersonid.org), <http://pattersonid.org/>
- *Member Agency:* Patterson Irrigation District
- *Other Interested Parties:* City of Patterson, West Stanislaus Irrigation District, Del Puerto Water District, Stanislaus County, San Joaquin River Exchange Contractors Water Authority, Northern Delta Mendota Subbasin Group, San Luis Water Authority, and Delta Mendota Water Authority

### **San Joaquin River Exchange Contractors Water Authority GSA**

- *Point of Contact:* Steve Chedester, Executive Director, San Joaquin River Exchange Contractors Water Authority, 541 H Street, P.O. Box 2115, Los Banos, CA 93635, 209-827-8616, [stevechedester@sjrecwa.net](mailto:stevechedester@sjrecwa.net), <http://www.sjrecwa.net/>
- *GSA Joint Powers of Authority:* Central California Irrigation District and Firebaugh Canal Water District
- *Other Interested Parties:* City of Newman, City of Gustine, City of Los Banos, City of Dos Palos, City of Firebaugh, City of Mendota, South Dos Palos County Water District, Midway Community Services District, North Dos Palos Water District, Fresno County Service Areas 28A & 38, Crow's Landing Community Services District, Volta Community Services District, Santa Nella County Water District, Stanislaus County, Merced County, Fresno County, Madera County, US Fish & Wildlife Services (Grasslands Wildlife Management Area and San Luis National Wildlife Refuge), Census Designated Places of Crow's Landing, Santa Nella, Volta, Dos Palos, and South Dos Palos, and Broadview Water District

### **Stanislaus and Tuolumne Rivers Groundwater Basin Association GSA**

- *Point of Contact:* John Davids, Assistant General Manager, Stanislaus and Tuolumne Rivers Groundwater Basin Association, 1231 11th Street, Modesto, CA 95354, 209-529-7564, [john.davids@mid.org](mailto:john.davids@mid.org), [www.mid.org](http://www.mid.org)
- *Memorandum of Understanding Member Agencies:* City of Oakdale, City of Riverbank, City of Modesto, City of Waterford, Stanislaus County, Oakdale Irrigation District, and Modesto Irrigation District.
- *Other Interested Parties:* US Geological Survey, US Fish and Wildlife Service, US Army Corps of Engineers

### **Northwestern Delta-Mendota GSA**

- *Point of Contact:* Walter Ward, Water Resources Manager, Northwestern Delta-Mendota GSA, 3800 Cornucopia Way, Suite C, Modesto, CA 95358, (209) 525-6710, [wward@envres.org](mailto:wward@envres.org), [www.stancounty.com](http://www.stancounty.com)
- *Memorandum of Understanding Member Agencies:* County of Stanislaus, and County of Merced
- *Other Interested Parties:* Crows Landing Community Services District, El Solyo Water District, Eastin Water District, Blewett Mutual Water Company, White Lakes Mutual Water Company, CA Department of Fish and Wildlife (State Wildlife Area of China Island), US Department of Fish and Wildlife Services (San Joaquin River National Wildlife Refuge, San Luis National Wildlife Refuge Complex), and the Vernalis community.

### **Merced Subbasin GSA**

- *Point of Contact:* Lacey Kiriakou, Water Resources Coordinator, Merced Subbasin GSA, 2222 M Street, Merced, CA 95340, 209-385-7654, [lkiriakou@countyofmerced.com](mailto:lkiriakou@countyofmerced.com), [www.countyofmerced.com](http://www.countyofmerced.com)
- *GSA Joint Powers Authority:* County of Merced, County of Mariposa, Le Grand-Athlone Water District, Merquin County Water District, Plainsburg Irrigation District, and Stevinson Water District.
- *Other Interested Parties:* US Fish and Wildlife Service (Merced Wildlife Refuge), East Merced Resource Conservation District, Merced Irrigation District, Le Grand community, Planada community, El Nido community, Merced Area Groundwater Pool Interests (MAGPI)

**Merced Irrigation-Urban GSA**

- *Point of Contact:* Hicham Eltal, Deputy General Manager, Water, Merced Irrigation-Urban Groundwater Sustainability Agency, 744 W. 20th Street, Merced, CA 95340, 209-354-2854, [heltal@mercedid.org](mailto:heltal@mercedid.org), [www.mercedid.org](http://www.mercedid.org)
- *Memorandum of Understanding Member Agencies:* City of Merced, City of Atwater, City of Livingston, Planada Community Services District, Le Grand Community Services District, Winton Water and Sanitary District, and the Merced Irrigation District.
- *Other Interested Parties:* County of Merced, University of California Extension, US Department of Agriculture, East San Joaquin Water Quality Coalition, MAGPI, US Geological Survey, Federal Energy Regulatory Commission, US Army Corps of Engineers (New Exchequer Reservoir), and the US Bureau of Reclamation

**West Stanislaus Irrigation District GSA**

- *Point of Contact:* Robert Pierce, General Manager, West Stanislaus Irrigation District, 1800 E. West Stanislaus Rd., Westley, CA 95387, 209-894-3091, [bobby.pierce@weststanislausid.org](mailto:bobby.pierce@weststanislausid.org)
- *Member Agency:* West Stanislaus Irrigation District
- *Other Interested Parties:* City of Tracy, South Delta Water Agency, Byron-Bethany Irrigation District, San Joaquin County, Banta-Carbona Irrigation District, Del Puerto Water District, The West Side Irrigation District, City of Patterson, Patterson Irrigation District, Del Puerto Water District, Stanislaus County, Diablo Water District, City of Antioch, City of Brentwood, US Bureau of Reclamation, San Luis Water Authority, and Delta Mendota Water Authority.



## **Attachment C - Example Notice to Comply Letters**

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

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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**

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## Attachment H - Early Action Plan

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