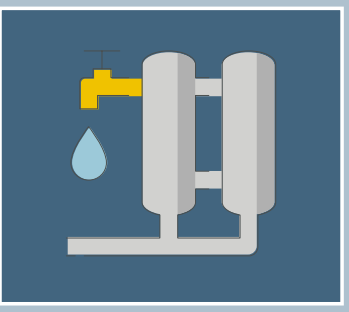
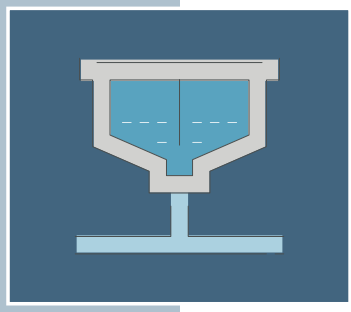
KINGS PRIORITY 1 MANAGEMENT ZONE IMPLEMENTATION PLAN

September 2023





PREPARED FOR

KINGS WATER ALLIANCE

PREPARED BY

Luhdorff & Scalmanini Consulting Engineers

GEI Consultants

SEPTEMBER 5, 2023

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Meaning
A/R Ratio	Ratio of Nitrogen Applied to Nitrogen Removed
APN	Assessor's Parcel Number
ASR	Aquifer Storage and Recovery
Basin Plans	Water Quality Control Plans for the Sacramento River and San Joaquin River Basins and the Tulare Lake Basin
BCC	Binational of Central California
BMP	Best Management Practices
BQAP	Bovine Quality Assurance Program
CAFO	Concentrated Animal Feeding Operation
CCR	Consumer Confidence Report
CDFA	California Department of Food and Agriculture
CDQAP	California Dairy Quality Assurance Program
Central Valley Water Board	Central Valley Regional Water Quality Control Board
CEP	Communication and Engagement Plan
CMP	Camp
Coalition	East San Joaquin Water Quality Coalition
CVDRMP	Central Valley Dairy Representative Monitoring Program
CV-SALTS	Central Valley Salinity Alternatives for Long-term Sustainability
CVSC	Central Valley Salinity Coalition
CWD	Chowchilla Water District
CWS	Community Water System
DAC	Disadvantaged Community
DBDP	Dibromochloropropane
DDW	Division of Drinking Water
DMS	Data Management System
DPR	Department of Pesticide Regulation

Acronym	Meaning
DWR	California Department of Water Resources
DWSAPP	Drinking Water Source Assessment Protection Program
DWW	Drinking Water Watch
E/P	Evaporation/Percolation
EAP	Early Action Plan
EDB	Ethylene Dibromide
ELAP	Environmental Laboratory Accreditation Program
EPA	Environmental Protection Agency
ESJWQC	East San Joaquin Water Quality Coalition
FAQs	Frequently Asked Questions
FEMA	Federal Emergency Management Agency
FMZP	Final Management Zone Proposal
GAMA	Groundwater Ambient Monitoring and Assessment
GIS	Geographic Information Systems
gpd	gallons per day
GQMP	Groundwater Quality Management Plan
GQTM	Groundwater Quality Trend Monitoring
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWE	Groundwater Elevation
GWPT	Groundwater Protection Targets
GWPV	Groundwater Protection Values
GWQ	Groundwater Quality
GWTM	Groundwater Quality Trend Monitoring
H/M	Hotel/Motel
HOA	Homeowners Association
HR	Highway Rest Area
HR2W	Human Right to Water
HVA	High Vulnerability Area
ID	Identification
IFA	Initial Focus Areas
ILRP	Irrigated Lands Regulatory Program
IND/AG	Industrial/Agricultural
INMP	Irrigation and Nitrogen Management Plan
INST	Institution
LAA	Land Application Area
LAMPs	Local Agency Management Programs
lbs	pounds
LPA	Local Primary Agencies
LPO	Limited Population Operations
LSWS	Local Small Water System
LT	Long-Term Drinking Water Solutions Workplan
LTDWS	Long-Term Drinking Water Solutions

Acronym	Meaning
LTO	Limited Time Operations
MAR	Managed Aquifer Recharge
MCL	Maximum Contaminant Level
MD	Maintenance District
MDD	Maximum Day Demand
MED	Medical Facility
mg/L	milligrams per liter
mg/L/yr	Milligram per liter per year
mg/L-N	milligrams per liter as nitrogen
mgd	million gallons per day
MHI	Median Household Income
MHP	Mobile Home Park
Milestones	Nitrate Reduction Goals
MNAA	Manure Nitrogen Available for Application
MOA	Memorandum of Agreement
MRIP	Manure Recycling and Innovative Products
MUN	Municipal and Domestic Supply
MZ	Management Zone
MZIP	Management Zone Implementation Plan
N	Nitrogen
NCP	Nitrate Control Program
NDAC	Non-Disadvantage Community
NGO	Non-governmental Organization
NL	Nitrogen Loading Methodology
NMP	Nutrient Management Plan
NO3N ARM	Aquifer Risk individual contaminants results for Nitrate
NOI	Notice of Intent
NRP	Nitrate Reduction Program
NTC	Notice to Comply
NTNC	Non-Transient Non-Community Water System
NWIS	National Water Information System
O&M	Operations & Maintenance
OAL	Office of Administrative Law
OES	Office of Emergency Services
OSWCR	Online System for Well Completion Reports
OWTS	Onsite Wastewater Treatment System
PLSS	Public Land Survey System
PMAs	Projects and Management Actions
PMZP	Preliminary Management Zone Proposal
POTW	Publicly Owned Treatment Works
POU	Point of Use
PQAP	Poultry Quality Assurance Program
PWS	Public Water System

Acronym	Meaning
PWSID	Public Water System Identification Number
QA/QC	Quality Assurance Quality Control
QAPP	Quality Assurance Project Plan
REC	Recreation Area
RES	Residential Area
REST	Restaurant
RW	Recycled Water
SAFER	Safe and Affordable Funding for Equity and Resilience
SAMP	Surveillance and Monitoring Program
SCHL	School
SDAC	Severely Disadvantaged Communities
SDWIS	Safe Drinking Water Information System
SERV	Service Station
SGMA	Sustainable Groundwater Management Act
SHE	Self-Help Enterprises
SNMP	Salt and Nitrate Management Plan
SOX	State Compliance Achieved
SRES	Secondary Residence
SSWS	State Small Water System
State Water Board/SWRCB	State Water Resources Control Board
Strategy	Modesto and Turlock Community Engagement Strategy
TCP	Trichloropropane
TNC	Transient Non-Community Water System
TTWD	Triangle T Water District
UCANR	University of California Agricultural and Natural Resources
UNK	Unknown
USGS	United States Geological Survey
VWC	Valley Water Collaborative
WCR	Well Completion Report
WDR	Waste Discharge Requirements
WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant

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The Priority 1 Management Zone representatives coordinated efforts to develop the information and methodologies to comply with the Central Valley Region Nitrate Control Program requirements and prepare Management Zone Implementation Plans for their respective Management Zones. The technical team, Luhdorff & Scalmanini, Consulting Engineers and GEI, appreciates the dedication and commitment of the Management Zone leaders along with their governing boards and industry leaders for timely input, review, and approval of the technical information and milestones established to achieve the management goals set forth in the Nitrate Control Program. We also thank the State Water Resources Control Board, the Central Valley Regional Water Quality Control Board, the Environmental Justice organizations, stakeholders, and others for their recognition of the complex tasks involved in creating these Management Zone Implementation Plans, which provide the foundation necessary for developing additional data and information with which to increase public outreach and engagement during implementation of the Management Zone Implementation Plans, improve nitrogen management by all sectors, identify long-term drinking water solutions, and achieve the Nitrate Control Program goals.

Additional acknowledgements are provided below.

Appendix NL-1: Nitrogen Loading Methodology for Irrigated Agriculture

The Priority 1 Management Zones would like to acknowledge the input from Kenneth Miller (Formation Environmental) for his review of the methodology developed for irrigated agriculture nitrogen loading in the Management Zones.

Appendix NL-2: Nitrogen Loading Methodology for Dairy and Bovine Facilities

The Priority 1 Management Zones would like to acknowledge the role that J.P. Cativiela (Central Valley Dairy Representative Monitoring Program [CVDRMP]) and Till Angermann (Technical Program Manager for CVDRMP) played in developing the methodology for nitrogen loading associated with dairy and bovine facilities.

Appendix NL-3: Nitrogen Loading Methodology for Poultry Facilities

The Priority 1 Management Zones would like to acknowledge the input from David Belt (Foster Farms) for his review of the methodology developed for poultry nitrogen loading in the Management Zones.

Appendix NRP-1: Irrigated Lands Nitrate Reduction Program

The Priority 1 Management Zones would like to acknowledge the input from Theresa A Dunham (Kahn, Soares & Conway, LLP) in developing the irrigated lands nitrate reduction program.

Appendix NRP-2a: Nitrate Reduction Program for Dairies

The Priority 1 Management Zones would like to acknowledge the input from J.P. Cativiela (CVDRMP), Till Angermann (Technical Program Manager for CVDRMP), and Theresa A Dunham (Kahn, Soares & Conway, LLP) in developing the dairy nitrate reduction program.

Appendix NRP-2b: Nitrate Reduction Program for Bovine Facilities

The Priority 1 Management Zones would like to acknowledge the input from J.P. Cativiela (CVDRMP), Till Angermann (Technical Program Manager for CVDRMP), and Theresa A Dunham (Kahn, Soares & Conway, LLP) in developing the bovine nitrate reduction program.

Appendix NRP-3: Nitrate Reduction Program for Poultry Facilities

The Priority 1 Management Zones would like to acknowledge the input from David Belt (Foster Farms) for his review of the poultry nitrate reduction program.

EXECUTIVE SUMMARY

Section 1

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) adopted amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins and the Water Quality Control Plan for the Tulare Lake Basin (Basin Plans) to incorporate a Salt and Nitrate Control Program. The Nitrate Control Program is designed to achieve the following three management goals in the Central Valley Region:

- Goal 1 – Ensure a safe drinking water supply;
- Goal 2 – Reduce salt and nitrate loading so that ongoing discharges neither threaten to degrade high quality waters absent appropriate findings by the Central Valley Board nor cause or contribute to exceedances of water quality objectives; and,
- Goal 3 – Implement long-term, managed restoration of impaired water bodies.

Permitted dischargers may choose to comply with the Nitrate Control Program through the establishment of a nitrate Management Zone, which allows dischargers to work collectively together to meet these three management goals. The Central Valley Water Board sent the Notice to Comply (NTC) with the Nitrate Control Program to dischargers in the Kings Groundwater Subbasin on May 29, 2020. Most recipients of the NTC began working immediately to establish the Kings Management Zone (Figure ES-1). A Preliminary Management Zone Proposal (PMZP) with Early Action Plan (EAP) to provide safe drinking water to residents with wells contaminated by nitrate was submitted in March 2021 and implementation of the EAP began in May 2021. The Final Management Zone Proposal (FMZP), submitted in August 2022, was accepted by the Central Valley Water Board in February 2023. Along with its acceptance of the FMZP, the Central Valley Water Board required submittal of this Management Zone Implementation Plan (MZIP) by September 5, 2023.

The Kings Water Alliance (KWA) governs the implementation of the Nitrate Control Program in the Kings Management Zone. Established November 17, 2020, the KWA is a non-profit, public benefit California corporation. The KWA is under the direction of a Board of Directors. Participants in the Kings Management Zone include representatives from multiple Sectors of permitted dischargers, including irrigated agriculture growers, milk cow dairies, confined bovine feeding operations, poultry operations, and Non-Chapter 15 Program facilities. Through an executed Management Zone Participation Agreement, these dischargers have committed to work collectively in the Management Zone to meet the requirements of the Nitrate Control Program.

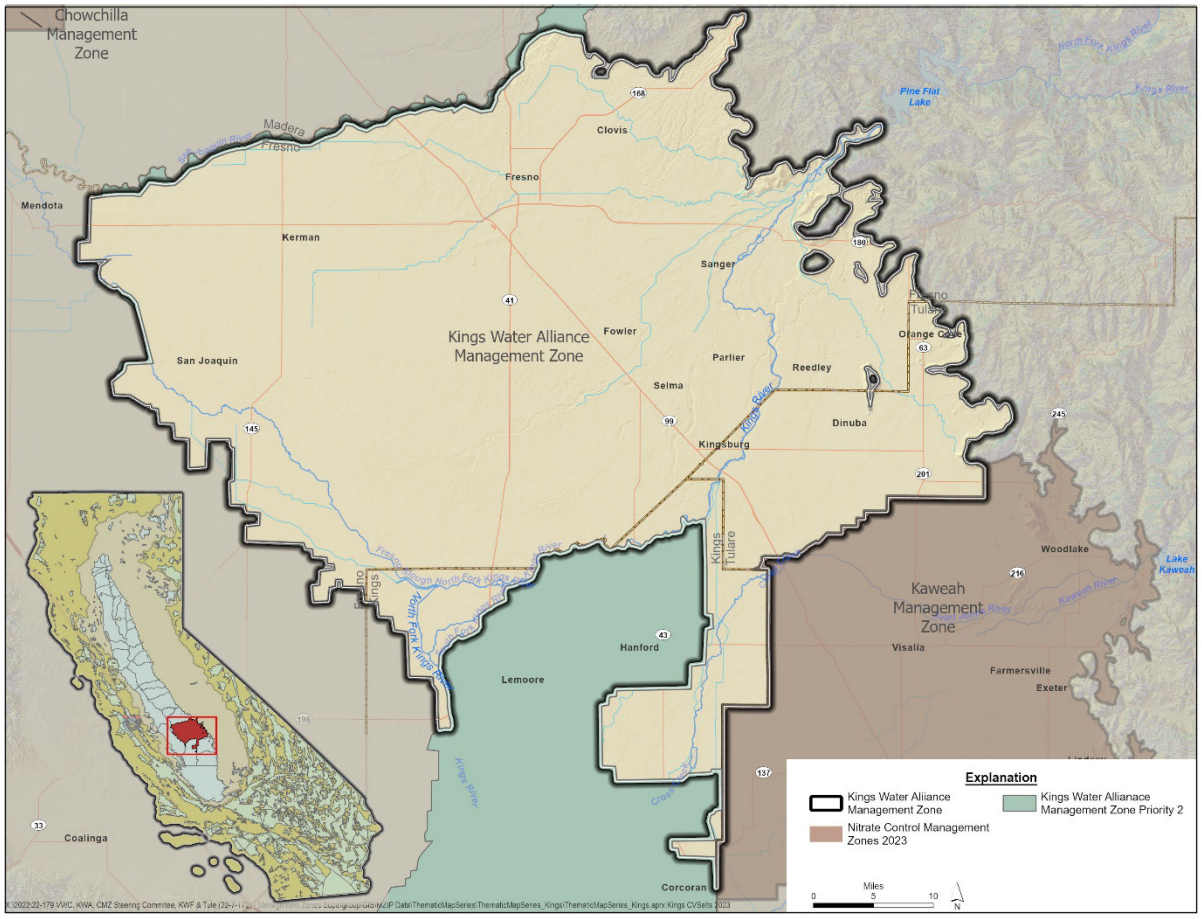


Figure ES-1. Kings Management Zone

The final goal of the Nitrate Control Program is for permitted dischargers participating in the Management Zone to cease causing or contributing to exceedances of the nitrate water quality objective in the underlying groundwater. Per the Basin Plans, a Management Zone may request Exceptions to meeting the nitrate water quality objective on behalf of all participating permitted dischargers. Under a Nitrate Control Program-approved Exception, all discharges of nitrate must cease causing or contributing to exceedances of water quality objectives in the underlying groundwater within a term that is as short as practicable for each discharger or category of dischargers participating in the Management Zone but in no case is longer than 35 years. The Nitrate Control Program requires submittal of an Alternative Compliance Project as part of a request for Exceptions to the nitrate water quality objective. For permitted dischargers participating in this Management Zone, this MZIP serves as the Alternative Compliance Project to support the request for an Exception.

Section 2

Several analyses were performed to help characterize nitrate conditions in groundwater in the Management Zone. The Nitrate Control Program requires an understanding of nitrate contamination in

the groundwater and how nitrate levels have impacted or can potentially impact drinking water supplies. This MZIP section characterizes nitrate conditions through an analysis of ambient nitrate concentrations for different aquifer depth zones, utilizing established groundwater horizons developed by the Central Valley Salinity Coalition. Trend analyses of nitrate concentrations were also performed to better characterize and understand how nitrate levels have changed historically and recently. The MZIP relies on publicly available groundwater nitrate data, including well test results from the Management Zone domestic well testing program and the Irrigated Lands Regulatory Program.

Groundwater elevations and movement are discussed to inform consideration of areas outside the Management Zone that may be impacted by nitrogen discharges within the Management Zone. An analysis of groundwater gradients and flow directions is coupled with ambient nitrate concentration levels to identify potential areas where the Management Zone may be contributing to elevated nitrate levels outside the Management Zone.

This MZIP also describes public water systems, including systems that are out of compliance with the State's Division of Drinking Water due to nitrate exceedances in their water source. An analysis of public water supply well capture zones occurred to assess the potential risk to a particular public water system due to the system's proximity to current or future nitrate exceedances. The identification of disadvantaged and severely disadvantaged communities is included in the analysis of public water systems.

Ambient nitrate concentration mapping in the Upper Zone (the portion of the groundwater aquifer where most domestic wells produce water from) is used to estimate the number of potentially impacted domestic wells and the population of residents within the Management Zone affected by nitrate conditions.

Section 3

The Nitrate Control Program required the establishment of an EAP for proposed Management Zones, defined as a plan that identifies community outreach activities and an implementation schedule that will ensure access to safe drinking water for those dependent on groundwater wells exceeding the nitrate drinking water standard of 10 milligrams per liter nitrate as nitrogen (mg/L-N). Since May 8, 2021, the Kings Management Zone's EAP has been providing local residents with well tests for nitrate and replacement water where needed.

Under this MZIP, the Kings Management Zone will continue to implement the EAP as its Emergency & Interim Drinking Water Program. This Program provides an immediate solution for those currently experiencing unsafe levels of nitrate in their drinking water source. Any eligible residence located in the Kings Management Zone may request to have its domestic well tested for nitrate. The KWA will send a representative to test the well at no cost to the resident. Results from the well test, which may also include analysis for other contaminants, determines the next steps. For example, if nitrate levels are unsafe the KWA will work with the resident to provide a safe source of drinking water, typically through home delivery of bottled water. The Emergency & Interim Drinking Water Program will continue without interruption while the Management Zone implements its Long-term Drinking Water Program (as described in this MZIP) that will establish permanent solutions to provide safe drinking water to residents in the Management Zone. Further, as part of this program, the Kings Management Zone through the KWA,

is in the process of applying for funding from the State Water Resources Control Board's Safe and Affordable Funding for Equity and Resilience (SAFER) to test wells for other contaminants besides nitrate. Where other contaminants are located, the Kings Management Zone will continue to use its available SAFER funds to provide residents with a safe source of drinking water.

Section 4

One of the most important duties of the Management Zone is to help facilitate long-term drinking water solutions for residents impacted by nitrate in their groundwater supply. Areas within the Management Zone boundary with the most urgent need for long-term drinking water solutions were identified using a science-based approach together with local knowledge of the communities and areas within the Management Zone. Key criteria, including disadvantaged and severely disadvantaged community (DAC/SDAC) status and the density of domestic wells and population of residents in areas of elevated nitrate levels (above 7.5 mg/L as N), were used to establish Initial Focus Areas.

Each Initial Focus Area is described, including any local knowledge, the density of domestic wells and population, and DAC/SDAC status based on household income. Public water systems within a distance of three miles of each Initial Focus Area were evaluated. The MZIP includes information about the system type, compliance status, Safe and Affordable Funding for Equity and Resilience (SAFER) status (e.g., Failing, At-Risk, Not At-Risk, Not Assessed), and any available information about nitrate exceedances or other violations reported by the State's Division of Drinking Water. The number of domestic wells and population of residents within a buffer area of one- and three-miles from community public water systems is included to consider potential options to address nitrate-impaired drinking water associated with individual domestic wells within the Initial Focus Area.

The Management Zone recognizes the importance and essential nature of meaningful public outreach and engagement to address the needs of the communities impacted by elevated nitrate. Therefore, the Management Zone plans to conduct outreach activities to solicit input from residents within the Initial Focus Areas throughout the process of identifying and facilitating long-term drinking water solutions. Public outreach activities will be performed to obtain local input on potential solution projects. The milestones and schedule associated with drinking water solutions is also provided in this section of the MZIP.

As a companion to this section of the MZIP, the Management Zone also provides an Interim and Long-Term Drinking Water Solutions Workplan (Appendix LT-2), which contains information about the roles and responsibilities of the Management Zone in identifying and facilitating long-term drinking water solutions to assist nitrate-impacted residents. Information about potential drinking water solutions and implementation challenges is also provided for: (a) traditional solutions; (b) watershed/indirect solutions; and (c) non-traditional solutions. The appendix also describes the framework for next steps to take regarding Initial Focus Areas, milestones, and the schedule for addressing long-term drinking water solutions in the Initial Focus Areas (and other areas), outreach and coordination activities, potential funding options, and steps for implementing long-term drinking water solution projects.

Section 5

The Nitrate Control Program requires that the MZIP include a Nitrate Reduction Program that establishes a plan to reduce nitrate loading so that ongoing permitted discharges do not cause or contribute to

exceedances of water quality objectives within the Management Zone. This MZIP includes Sector-specific Nitrate Reduction Programs for the following permitted dischargers: irrigated agriculture growers, dairy and bovine facilities, poultry facilities, and Non-15 Program facilities. In addition, this MZIP also considers other sources of nitrogen, including septic systems, turfgrass, and leaky sewer systems in urban areas. In addition to the preparation of Sector-specific Nitrate Reduction Programs, this MZIP also includes a preliminary estimate of current nitrogen loading by each of the key Sectors and development of a compliance assessment approach to track progress by the Management Zone to meet nitrate reduction goals.

The MZIP provides a preliminary estimate of nitrogen loading currently occurring in the Management Zone by each of the key Sectors. These estimates, which are based on the best information available at this time, report nitrogen loading rates in pounds/acre/year (lbs/ac/yr) on a Management Zone township basis for irrigated agriculture, Management Zone basis for dairy and bovine facilities, and on an individual facility basis for Non-15 Program and some poultry facilities. The MZIP also includes estimated nitrogen loading rates for septic systems and urban sources of nitrogen based on mapped data for non-urban (unsewered) and urban areas.

The main MZIP document presents summaries of the Nitrate Reduction Programs to be implemented by each Sector in the Priority 1 Management Zones. The complete, detailed Programs are provided in the MZIP's appendices. To be consistent with the Nitrate Control Program regulations, each of the Nitrate Reduction Programs is structured using the following terminology: (a) milestones, which are the long-term goals to demonstrate progress in meeting nitrate reduction goals specific to the sector; (b) interim milestones, which are the specific nitrate management activities to be implemented to facilitate compliance with the nitrate reduction goals or milestones; and (c) interim deadlines, which is the schedule for implementation of interim milestones, generally presented in 10-year phases of two five-year periods.

The MZIP, which is the Alternative Compliance Project for the Management Zone, requests sector-specific Exceptions from the nitrate water quality objective. The specified milestone completion dates represent the number of years from the MZIP effective date, which may be the date that MZIP requirements are (a) approved by the Central Valley Water Board; (b) incorporated into a General Order or WDR; or (c) required to be implemented through a Central Valley Water Board Order, whichever comes first. Finally, and as detailed in the complete Nitrate Reduction Plans, the MZIP summarizes the Interim Milestones (i.e., nitrate reduction activities) to be implemented by permitted dischargers within each sector, primarily during the first 10 years of MZIP implementation. More detailed descriptions of these interim milestones and the schedule to complete them are provide in the sector-specific Nitrate Reduction Programs in the MZIP appendices.

The Nitrate Reduction Programs are designed to demonstrate how the Management Zone plans to reduce nitrate loading to groundwater so that ongoing discharges from permitted discharges do not cause or contribute to exceedances of the nitrate water quality objective within the Management Zone. To evaluate progress over time, the Management Zone will implement a compliance assessment approach that relies on the use of Groundwater Protection Targets (GWPTs) at a township level scale (36 square miles). Use of townships as the scale to evaluate compliance with the Nitrate Control Program, which builds on the Irrigated Lands Regulatory Program's (ILRPs) existing compliance assessment approach and is consistent with the purpose and intent of a Management Zone to provide a means for dischargers to work collectively to manage nitrate. Accordingly, the MZIP includes a process to establish Management

Zone-based Groundwater Protection Values (GWPVs) and GWPTs and use them to inform permitted dischargers of what is required to comply with Nitrate Control Program goals as a sector or as an individually permitted facility. This process includes its own interim milestones to be completed in a timely manner to support MZIP implementation.

Section 6

The Nitrate Control Program requires the MZIP to, "include a plan for establishing a managed aquifer restoration program to restore nitrate levels to concentrations at or below the water quality objectives to the extent it is reasonable, feasible and practicable to do so." Given the Management Zone's interest in maintaining or improving groundwater quality through various restoration approaches and the interest of Groundwater Sustainability Agencies to address similar objectives pursuant to the Sustainable Groundwater Management Act (SGMA) through Groundwater Sustainability Plan implementation, the opportunity exists to coordinate activities that may support efforts to meet the restoration goal of the Nitrate Control Program. Projects or management actions that maintain or improve groundwater quality may include (but are not limited to):

1) Controlling nitrogen sources to reduce the amount of nitrogen discharged to the land surface that may potentially affect groundwater quality.

2) Augmenting sources of water distributed across or injected into the groundwater system to recharge the system with high quality (low nitrate) source water, and

3) Extracting existing groundwater (including nitrate-impaired groundwater) for beneficial uses (e.g., for nonpotable uses such as pump and fertilize) thereby reducing the nitrate mass in the groundwater system and ultimately improving groundwater quality.

Collaboration between the Management Zones, Groundwater Sustainability Agencies, and other local entities will facilitate strategies to accomplish maintaining or improving groundwater quality. As noted in the Nitrate Control Program, not all portions of the nitrate-impaired groundwater system within the Management Zone will necessarily be restored reasonably and feasibly, or at least not all areas would be restored on the same time scale. Accordingly, it is worthwhile for the Management Zone, together with Groundwater Sustainability Agencies and other entities along with outreach to stakeholders, to optimize strategies that result in the highest benefit to the public by prioritizing Management Zone (and subbasin) restoration efforts.

The MZIP preliminarily identifies current or planned groundwater-related recharge projects, which were identified during the development of Groundwater Sustainability Plans or are SGMA-related projects initiated later through Department of Water Resources funding opportunities. Additionally, two Governor's Executive Orders for floodwater diversion created streamlined permitting processes to help expedite groundwater recharge during water year 2023.

The progress and effects of restoration activities (groundwater recharge or other projects and management actions) on improving groundwater quality will be assessed by the Management Zone by tracking projects and management actions implemented and assessed through the Management Zone's Surveillance and Monitoring Program (see MZIP Section 7).

Section 7

The Nitrate Control Program requires that the MZIP include a Surveillance and Monitoring Program. Specifically, the MZIP must include:

"A water quality surveillance and monitoring program that is adequate to ensure that the plan when implemented is achieving the expected progress towards attainment of management goals. All or parts of the surveillance and monitoring program may be coordinated or be part of a valley-wide and/or regional groundwater monitoring, if appropriate."

There are many different monitoring programs already being conducted within the Management Zone (and throughout the Central Valley). The Surveillance and Monitoring Program approach for the Management Zone aims to utilize existing long-term programs that may be tailored specifically to meet the needs of the MZIP.

The Central Valley Salinity Coalition, the lead entity responsible for implementing the Central Valley Region Surveillance and Monitoring Program, submitted the Central Valley Region Salt and Nitrate Control Program, Surveillance and Monitoring Program Workplan, and Quality Assurance Project Plan (QAPP) (dated February 11, 2023) to the Central Valley Water Board. On March 23, 2023, the Central Valley Water Board approved the Surveillance and Monitoring Program (SAMP) Workplan, indicating it "adequately addresses the Salt and Nitrate Control Program requirements in both of the Central Valley Water Board Basin Plans." The approved Central Valley Region SAMP provides many components that achieve the required objectives for the MZIP SAMP. Accordingly, the MZIP presents a two-pronged approach (regional and Management Zone-specific) to meet the MZIP SAMP objectives.

1. Central Valley Region SAMP (see Appendix SAMP): The Management Zone will utilize subbasin scale information already being addressed by the Central Valley Region SAMP to track and report on groundwater quality trends and conditions at the regional scale.

2. Management Zone-Specific SAMP: The Management Zone will use a subset of the monitoring well network included in the Central Valley Region SAMP to further track and assess expected progress towards the attainment of management goals, including nitrate reduction and long-term managed aquifer restoration to maintain or improve groundwater quality conditions at the Management Zone scale. The Management Zone monitoring network includes wells that have been vetted for use in robust monitoring programs administered by the U.S. Geological Survey/State Water Board Groundwater Ambient Monitoring and Assessment Program (GAMA) and the agricultural coalitions as part of the Irrigated Lands Regulatory Program (ILRP) Groundwater Quality Trend Monitoring (GQTM) Program (i.e., wells with known well construction information) and also have some prior monitoring history, which will facilitate assessment of local groundwater quality trends.

Since the GAMA and GQTM monitoring programs are still quite young and may not immediately provide sufficient time-series records to be used alone during the first five years of Management Zone implementation. Accordingly, the Management Zone SAMP includes review and tracking of nitrate trends in State Water Board Division of Drinking Water wells that have a historical monitoring record and have exhibited increasing trends in nitrate concentrations. As additional data become available for the GAMA

and GQTM wells, these wells would be the focus for reviewing and tracking trends in the Management Zone and assessing progress in achieving overall Nitrate Control Program goals.

Future nitrate trend analyses will also incorporate and utilize data and analyses resulting from monitoring conducted for other programs, including SGMA compliance (i.e., Groundwater Sustainability Plan monitoring networks) and Nitrate Control Program Management Zone implementation.

Since the Management Zone SAMP's purpose focuses on assessing whether the Management Zone Implementation Plan, "when implemented is achieving the expected progress towards attainment of management goals," the Five-Year Exceptions Status Report cycle provides a reasonable interval for assessing changes in groundwater quality conditions in response to implementation of Sector-based Nitrate Reduction Programs. Because the first 10 years of implementation of the MZIP involve improved data collection and Sector-specific efforts to initiate activities to achieve reductions in nitrate loading, and since changes in groundwater quality are anticipated to occur slowly, SAMP reporting would occur in the Management Zone Exceptions Status Reports at five-year intervals. Additionally, following the first Central Valley Region SAMP Groundwater Assessment Report submittal and approval (submittal due date November 30, 2031), the Management Zone Five-Year/Ten-Year Exceptions Status Reports would include a summary of any additional nitrate groundwater quality findings relevant to the Management Zone area and attaining Nitrate Control Program goals.

Section 8

Although almost every section of the MZIP contains an element of outreach and engagement, Section 8 provides a summary of outreach and engagement activities in three parts: first, a summary of outreach activities performed during development of the Preliminary and Final Management Zone Proposals; second, a summary of outreach activities performed during the compressed time period (about 6 months) for the development of the MZIP; and lastly, a summary of planned outreach activities mainly associated with long-term drinking water solutions and implementation of the Nitrate Reduction Program.

Section 9

The MZIP will be implemented in ten-year phases with each ten-year phase including two five-year parts. This overall ten-year phased framework was chosen purposefully to align implementation of the Nitrate Reduction Program with the five- and ten-year reporting requirements associated with the authorization and reauthorization of Exceptions from the nitrate water quality objective. Some implementation activities begin immediately upon submittal of the MZIP (e.g., Emergency and Interim Drinking Water Program); others will begin by the beginning of 2024 (e.g., initial activities to begin work in the Initial Focus Areas and outreach to Management Zone participants regarding MZIP content). Other activities may not begin until the MZIP becomes effective through action by the Central Valley Water Board. Following is a brief description of key elements of the MZIP implementation schedule:

Emergency & Interim Drinking Water Program

The Emergency & Interim Drinking Water Program is a continuation of the implementation of the Management Zone's existing EAP, which has been providing free well tests for nitrate to residents and, where needed, replacement safe drinking water to households since May 2021. Key interim milestones in this MZIP include:

- Continuing to promote and operate multiple water fill stations in the Kings Management Zone;
- Continuing to implement the existing outreach program to keep residents informed of the opportunity to have a free well test and receive replacement water if the well is nitrate contaminated;
- Conducting well testing and working with residents to obtain replacement water where needed; and
- Submitting program reporting metrics on a regular basis.

Long-term Drinking Water Solutions Program

The Long-term Drinking Water Program includes interim milestones to be implemented within each of the Management Zone's Initial Focus Areas over a five-year period, including extensive community outreach to discuss potential long-term solutions for each area, identification of potential alternatives for further evaluation, preparation of a feasibility analysis to identify a preferred alternative solution(s) and facilitating efforts to implement the preferred alternative. By the end of the fifth year of MZIP implementation, the Management Zone will identify new areas to target for identification of long-term permanent drinking water solutions. Once identified, the Management Zone will implement the above-described interim milestones in these new areas. This iterative process will continue across the Management Zone as long as needed to identify permanent solutions to drinking water in nitrate-contaminated areas. While this process is ongoing, the Emergency & Interim Drinking Water Program will continue to be implemented.

Nitrate Reduction Program

The permitted dischargers participating in the Management Zone will implement their respective Nitrate Reduction Programs to meet the required interim milestones established to meet the long-term nitrate reduction goals for the Sector. The specific schedule for completion of these interim milestones is provided within each Nitrate Reduction Program (see MZIP appendices).

Other MZIP Programmatic Elements

In addition to the key MZIP program elements summarized above, the MZIP includes additional interim milestones to be directed by the Management Zone to address other Nitrate Control Program requirements, including:

- Facilitating implementation of the Nitrate Reduction Program for septic systems through coordination with entities responsible for implementation of the State's Onsite Wastewater Treatment Systems (OWTS) program;
- Completing the steps required to develop and implement the Management Zone's compliance assessment program;
- Conducting the Management Zone's surveillance and monitoring program; and
- Administering the Management Zone, including, but not limited to, management of the Management Zone program; oversight of overall MZIP implementation, as needed coordination with other Priority 1 Management Zones; communication with Management Zone participants regarding compliance with program requirements; and overseeing MZIP reporting requirements.

Management Zone Reporting

The Management Zone will submit reports to the Central Valley Water Board to fulfill Nitrate Control Program reporting requirements, apprise Central Valley Water Board staff on the status of MZIP implementation activities, and document progress in meeting Nitrate Control Program goals. Four types of reports will be prepared during MZIP implementation (Figure ES-2):

- Periodic Emergency & Interim Drinking Water Reports;
- Annual Progress Reports to provide a brief summary of the status of implementation of the key program elements of the MZIP (Emergency & Interim Drinking Water Report, Long-term Drinking Water Solutions Program and Nitrate Reduction Program);
- Five-year Exceptions Status Reports to provide a status report summarizing compliance with the terms and conditions of the authorized Exceptions, including status of the Long-term Drinking Water Solutions Program; and
- Ten-year Exceptions Status & Technology Assessment Report that reassesses available BMPs and treatment technologies to manage nitrate and status report summarizing compliance with the terms and conditions of the authorized Exceptions, including status of the Long-term Drinking Water Solutions Program.

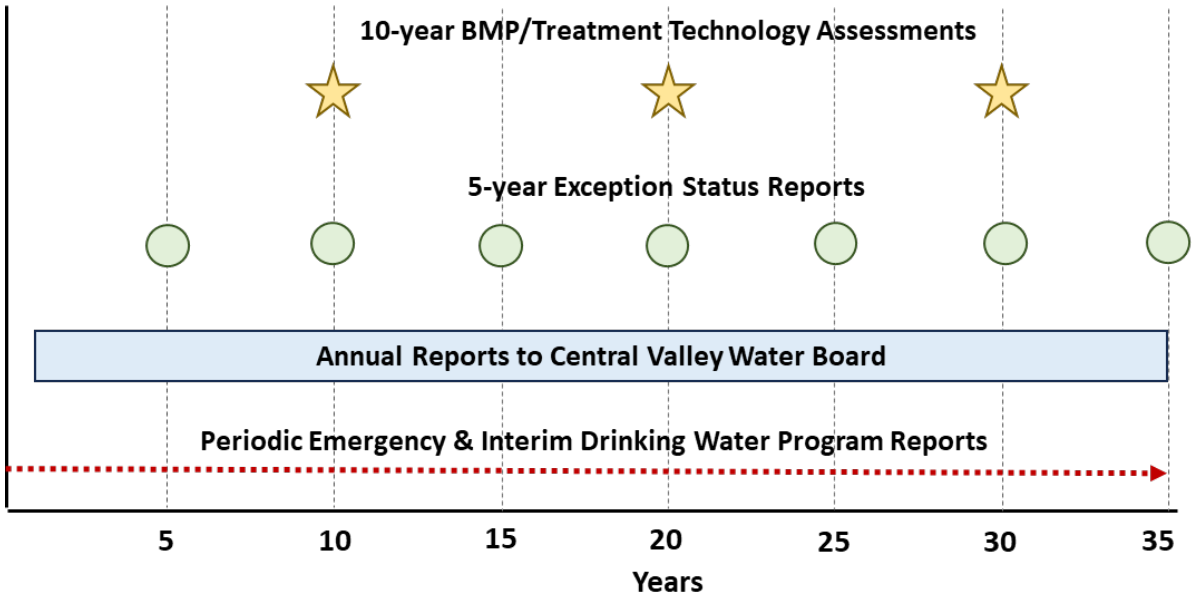


Figure ES-2. General Schedule for Submittal of MZIP Reports

RESUMEN EJECUTIVO

Sección 1

La Junta Regional de Control de Calidad del Agua del Valle Central (Junta de Agua del Valle Central) adoptó enmiendas al Plan de Control de Calidad del Agua para las Cuencas de los Ríos Sacramento y San Joaquín y al Plan de Control de Calidad del Agua para la Cuenca del Lago Tulare (Planes de Cuenca) para incorporar un Programa de Control de Sal y Nitratos. El Programa de Control de Nitratos está diseñado para lograr los siguientes tres objetivos de gestión en la Región del Valle Central:

- Meta 1 – Garantizar un suministro de agua potable segura;
- Meta 2: Reducir la carga de sal y nitratos para que las descargas en curso no amenacen con degradar aguas de alta calidad en ausencia de conclusiones apropiadas por parte de la Junta del Valle Central ni causen o contribuyan a exceder los objetivos de calidad del agua; y,
- Meta 3: Implementar la restauración gestionada a largo plazo de cuerpos de agua deteriorados.

Los descargadores autorizados pueden optar por cumplir con el Programa de Control de Nitratos mediante el establecimiento de una Zona de Manejo de Nitratos, que permite a los descargadores de trabajar colectivamente para cumplir con estos tres objetivos de gestión. La Junta de Agua del Valle Central envió el Aviso de Cumplimiento (NTC) con el Programa de Control de Nitratos a los descargadores en la Subcuenca de Agua Subterránea de Kings el 29 de mayo de 2020. La mayoría de los destinatarios del NTC comenzaron a trabajar de inmediato para establecer la Zona de Manejo de Kings (Figura ES-1). En marzo de 2021 se presentó una Propuesta Preliminar de Zona de Manejo (PMZP) con un Plan de Acción Temprana (EAP) para proporcionar agua potable a los residentes con pozos contaminados por nitrato y la implementación del EAP comenzó en mayo de 2021. La Propuesta Final de Zona de Manejo (FMZP), presentado en agosto de 2022, fue aceptado por la Junta de Agua del Valle Central en febrero de 2023. Junto con su aceptación del FMZP, la Junta de Agua del Valle Central requirió la presentación de este Plan de Implementación de la Zona de Manejo (MZIP) antes del 5 de septiembre de 2023.

La Alianza de Agua de Kings (KWA, en inglés) gobierna la implementación del Programa de Control de Nitratos en la Zona de Manejo de Kings. Establecida el 17 de noviembre de 2020, KWA es una corporación de California de beneficio público y sin fines de lucro. La KWA está bajo la dirección de una junta directiva. Los participantes en la Zona de Manejo de Kings incluyen representantes de múltiples sectores de descargadores autorizados, incluidos agricultores que usan riego, lecherías de vacas lecheras, operaciones de alimentación bovina confinadas, operaciones avícolas e instalaciones que no pertenecen al Programa del Capítulo 15. A través de un Acuerdo de Participación en la Zona de Manejo ejecutado, estos descargadores se han comprometido a trabajar colectivamente en la Zona de Manejo para cumplir con los requisitos del Programa de Control de Nitratos.

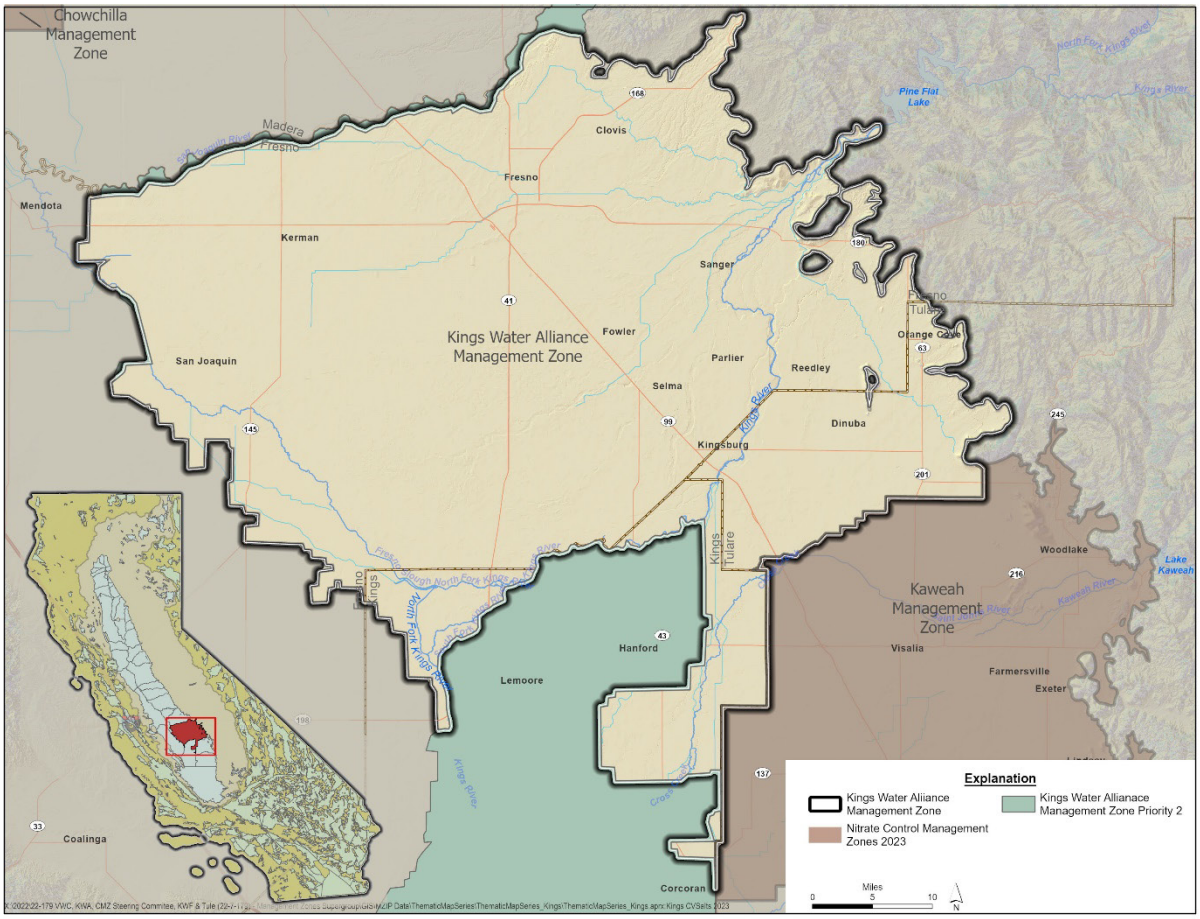


Figura ES-1. Zona de gestión de Kings

El objetivo final del Programa de Control de Nitratos es que los descargadores autorizados que participan en la Zona de Manejo dejen de causar o contribuir a exceder el objetivo de calidad del agua de nitratos en el agua subterránea subyacente. Según los Planes de Cuenca, una Zona de Gestión puede solicitar Excepciones para cumplir con el objetivo de calidad del agua de nitratos en nombre de todos los descargadores autorizados participantes. Según una excepción aprobada por el Programa de Control de Nitratos, todas las descargas de nitratos deben dejar de causar o contribuir a exceder los objetivos de calidad del agua en el agua subterránea subyacente dentro de un plazo que sea lo más corto posible para cada descargador o categoría de descargadores que participan en la Zona de Manejo, pero en ningún caso puede pasar de 35 años. El Programa de Control de Nitratos requiere la presentación de un Proyecto de Cumplimiento Alternativo como parte de una solicitud de Excepciones al objetivo de calidad del agua con nitratos. Para los descargadores autorizados que participan en esta Zona de Manejo, este MZIP sirve como Proyecto de Cumplimiento Alternativo para respaldar la solicitud de una Excepción.

Sección 2

Se realizaron varios análisis para ayudar a caracterizar las condiciones de nitrato en el agua subterránea en la Zona de Manejo. El Programa de Control de Nitratos requiere comprender la contaminación causada por nitratos en el agua subterránea y cómo los niveles de nitratos han impactado o pueden impactar potencialmente los suministros de agua potable. Esta sección de MZIP caracteriza las condiciones de nitrato a través de un análisis de las concentraciones ambientales de nitrato para diferentes zonas de profundidad del acuífero, utilizando horizontes de agua subterránea establecidos desarrollados por la Coalición de Salinidad del Valle Central. También se realizaron análisis de tendencias de las concentraciones de nitrato para caracterizar y comprender mejor cómo han cambiado los niveles de nitrato en el pasado y recientemente. El MZIP se basa en datos de nitrato de aguas subterráneas que son públicos, incluidos los resultados de las pruebas de pozos del programa de pruebas de pozos domésticos de la Zona de Gestión y el Programa Regulador de Tierras bajo Riego.

Se analizan las elevaciones y el movimiento del agua subterránea para informar la consideración de áreas fuera de la Zona de Manejo que pueden ser afectadas por descargas de nitrógeno dentro de la Zona de Manejo. Un análisis de los gradientes del agua subterránea y las direcciones del flujo se combina con los niveles de concentración de nitrato ambiental para identificar áreas potenciales donde la Zona de Manejo puede estar contribuyendo a niveles elevados de nitrato fuera de la Zona de Manejo.

Este MZIP también describe los sistemas públicos de agua, incluidos los sistemas que no cumplen con la División de Agua Potable del Estado debido a excesos de nitrato en su fuente de agua. Se realizó un análisis de las zonas de captura de pozos de suministro público para evaluar el riesgo potencial para cada sistema público de agua debido a la proximidad del sistema a excedentes de nitratos actuales o futuros. La identificación de comunidades desfavorecidas y severamente desfavorecidas se incluye en el análisis de los sistemas públicos de agua.

El mapeo de la concentración ambiental de nitrato en la Zona Superior (la porción del acuífero subterráneo de donde la mayoría de los pozos domésticos producen agua) se utiliza para estimar la cantidad de pozos domésticos potencialmente impactados y la población de residentes dentro de la Zona de Manejo afectados por las condiciones de nitrato.

Sección 3

El Programa de Control de Nitratos requirió el establecimiento de un EAP para las Zonas de Manejo propuestas, definido como un plan que identifica actividades de extensión comunitaria y un cronograma de implementación que garantiza el acceso al agua potable para aquellos que dependen de pozos de agua subterránea que exceden el estándar de nitrato para agua potable de 10 miligramos por litro de nitrato como nitrógeno (mg/LN). Desde el 8 de mayo de 2021, el EAP de la Zona de Gestión de Kings ha estado ofreciendo pruebas de pozos para detectar nitratos a los residentes locales y agua de reemplazo cuando es necesario.

Según este MZIP, la Zona de Gestión de Kings continuará implementando el EAP como su Programa Interino y de Emergencia de Agua Potable. Este programa ofrece una solución inmediata para quienes actualmente tienen niveles peligrosos de nitrato en su fuente de agua potable. Cualquier residencia elegible ubicada en la Zona de Gestión de Kings puede solicitar que se realice una prueba de nitrato en su pozo doméstico. El KWA enviará un representante para tomar la prueba del pozo sin ningún costo para el

residente. Los resultados de la prueba del pozo, que también pueden incluir análisis de otros contaminantes, determinan los próximos pasos. Por ejemplo, si los niveles de nitrato presentan un riesgo, el KWA trabajará con el residente para darle una fuente de agua potable segura, generalmente mediante la entrega a domicilio de agua embotellada. El Programa Interino y de Emergencia de Agua Potable continuará sin interrupción mientras la Zona de Manejo implementa su Programa de Agua Potable a Largo Plazo (como se describe en este MZIP) que establecerá soluciones permanentes para proporcionar agua potable segura a los residentes en la Zona de Manejo. Además, como parte de este programa, la Zona de Gestión de Kings a través del KWA, está en proceso de solicitar financiación de la Junta Estatal de Control de Recursos Hídricos, fondos del Financiamiento Seguro y Asequible para la Equidad y Resiliencia (SAFER, por sus siglas en inglés) para analizar los pozos para otros contaminantes además del nitrato. Donde se encuentren otros contaminantes, la Zona de Manejo de Kings continuará a usar fondos disponibles de SAFER para brindar a los residentes una fuente segura de agua potable.

Sección 4

Una de las tareas más importantes de la Zona de Gestión es ayudar a facilitar soluciones de agua potable a largo plazo para los residentes afectados por el nitrato en su suministro de agua subterránea. Las áreas dentro de los límites de la Zona de Manejo con la necesidad más urgente de soluciones de agua potable a largo plazo se identificaron utilizando un enfoque basado en la ciencia junto con el conocimiento local de las comunidades y áreas dentro de la Zona de Manejo. Para establecer las Áreas de Enfoque Iniciales se utilizaron criterios clave, incluido el estado de las comunidades desfavorecidas y severamente desfavorecidas (DAC/SDAC) y la densidad de pozos domésticos y la población de residentes en áreas con niveles elevados de nitrato (por encima de 7,5 mg/L como N).

Se describe cada área de enfoque inicial, incluido el conocimiento local, la densidad de los pozos domésticos y la población, y el estado del DAC/SDAC basado en los ingresos del hogar. Se evaluaron los sistemas públicos de agua dentro de una distancia de tres millas de cada Área de Enfoque Inicial. El MZIP incluye información sobre el tipo de sistema, el estado de cumplimiento, el estado del Financiamiento Seguro y Asequible para la Equidad y la Resiliencia (SAFER) (por ejemplo, Fallido, En Riesgo, No En Riesgo, No Evaluado) y cualquier información disponible sobre excedentes de nitratos o otras violaciones reportadas por la División de Agua Potable de la Junta Estatal del Agua. Se incluye el número de pozos domésticos y la población de residentes dentro de un área de amortiguamiento de una y tres millas de los sistemas públicos de agua comunitarios para considerar opciones potenciales para abordar el problema de agua potable con niveles elevados de nitratos asociada con pozos domésticos individuales dentro del Área de Enfoque Inicial.

La Zona de Gestión reconoce la importancia y la naturaleza esencial de una divulgación y participación pública significativa para abordar las necesidades de las comunidades afectadas por los niveles elevados de nitrato. Por lo tanto, la Zona de Gestión planea llevar a cabo actividades de divulgación para solicitar la opinión de los residentes dentro de las Áreas de Enfoque Inicial durante todo el proceso de identificación y facilitación de soluciones de agua potable a largo plazo. Se realizarán actividades de divulgación pública para obtener aportes locales sobre posibles proyectos de solución. Los hitos y el cronograma asociados con las soluciones de agua potable también se proporcionan en esta sección del MZIP.

Como complemento de esta sección del MZIP, la Zona de Gestión también proporciona un Plan de Trabajo Interino y a Largo Plazo para Soluciones de Agua Potable (Apéndice LT-2), que contiene información sobre las funciones y responsabilidades de la Zona de Gestión en identificar y facilitar de soluciones de agua potable a largo plazo para los residentes afectados por nitratos. También se proporciona información sobre posibles soluciones de agua potable y desafíos de implementación para: (a) soluciones tradicionales; (b) soluciones hidrográficas/indirectas; y (c) soluciones no tradicionales. El apéndice también describe el marco de los próximos pasos a seguir con respecto a las Áreas de Enfoque Inicial, los hitos y el cronograma para abordar soluciones de agua potable a largo plazo en las Áreas de Enfoque Inicial (y otras áreas), actividades de extensión y coordinación, posibles opciones de financiamiento y pasos para implementar proyectos de soluciones de agua potable a largo plazo.

Sección 5

El Programa de Control de Nitratos requiere que el MZIP incluya un Programa de Reducción de Nitratos que establezca un plan para reducir la carga de nitratos de modo que las descargas permitidas en curso no causen ni contribuyan a exceder los objetivos de calidad del agua dentro de la Zona de Manejo. Este MZIP incluye Programas de Reducción de Nitratos específicos a cada sector para los siguientes descargadores autorizados: agricultores que usan riego, instalaciones lecheras y bovinas, operaciones avícolas e instalaciones que no pertenecen al Programa 15. Además, este MZIP también considera otras fuentes de nitrógeno, incluidos sistemas sépticos, césped y sistemas de alcantarillado con fugas en áreas urbanas. Además de la preparación de programas de reducción de nitratos específicos a cada sector, este MZIP también incluye una estimación preliminar de la carga actual de nitrógeno de cada uno de los sectores clave y el desarrollo de un enfoque de evaluación del cumplimiento para seguir el progreso de la Zona de Manejo para cumplir con los objetivos de reducción de nitratos.

El MZIP proporciona una estimación preliminar de la carga de nitrógeno por cada uno de los sectores clave que ocurre actualmente en la Zona de Manejo. Estas estimaciones, que se basan en la mejor información disponible en este momento, informan las tasas de carga de nitrógeno en libras/acre/año (lbs/ac/año) según el municipio de la Zona de Manejo para la agricultura de regadío y la Zona de Manejo para las instalaciones lecheras y bovinas. y en instalaciones individuales para el Programa No-15 y algunas instalaciones avícolas. El MZIP también incluye tasas estimadas de carga de nitrógeno para sistemas sépticos y fuentes de nitrógeno urbanas basadas en datos mapeados para áreas urbanas y no urbanas (sin alcantarillado).

El documento principal del MZIP presenta resúmenes de los Programas de Reducción de Nitratos que implementará cada sector en las Zonas de Manejo de Prioridad 1. Los programas completos y detallados se proporcionan en los apéndices del MZIP. Para ser consistente con el Programa de Control de Nitratos, cada uno de los Programas de Reducción de Nitratos está estructurado utilizando la siguiente terminología: (a) hitos , que son las metas a largo plazo para demostrar el progreso en el cumplimiento de las metas de reducción de nitratos específicas del sector; (b) hitos provisionales, que son las actividades específicas de gestión de nitratos que se implementarán para facilitar el cumplimiento de las metas o hitos de reducción de nitratos; y (c) plazos provisionales, que es el cronograma para la implementación de hitos provisionales, generalmente presentado en fases de 10 años de dos períodos de cinco años.

El MZIP, que es el Proyecto de Cumplimiento Alternativo para la Zona de Manejo, solicita Excepciones sectoriales específicas al objetivo de calidad del agua con nitratos. Las fechas de finalización de los hitos

especificadas representan el número de años desde la fecha de entrada en vigor del MZIP, que puede ser la fecha en que los requisitos del MZIP (a) sean aprobados por la Junta de Agua del Valle Central; (b) sean incorporados a una Orden General o WDR; o (c) deben implementarse mediante una Orden de la Junta de Agua del Valle Central, lo que ocurra primero. Finalmente, y como se detalla en los Planes completos de reducción de nitratos, el MZIP resume los hitos provisionales (es decir, actividades de reducción de nitratos) que los descargadores autorizados dentro de cada sector deben implementar, principalmente durante los primeros 10 años de implementación del MZIP. Se proporcionan descripciones más detalladas de estos hitos provisionales y el cronograma para completarlos en los Programas de Reducción de Nitratos específicos a cada sector en los apéndices del MZIP.

Los Programas de Reducción de Nitratos están diseñados para demostrar cómo la Zona de Manejo planea reducir la carga de nitratos al agua subterránea para que las descargas continuas de descargas autorizadas no causen ni contribuyan a exceder el objetivo de calidad del agua de nitratos dentro de la Zona de Manejo. Para evaluar el progreso a lo largo del tiempo, la Zona de Gestión implementará un enfoque de evaluación de cumplimiento que se basa en el uso de Objetivos de Protección de Aguas Subterráneas (GWPT) a nivel de municipio (36 millas cuadradas). Uso de municipios como nivel para evaluar el cumplimiento del Programa de Control de Nitratos, es igual al enfoque de evaluación de cumplimiento existente del Programa Regulador de Tierras de Riego (ILRP) y es consistente con el propósito y la intención de una Zona de Manejo de proporcionar un medio para que los descargadores trabajen. colectivamente para gestionar el nitrato. En consecuencia, el MZIP incluye un proceso para establecer Valores de Protección de Aguas Subterráneas (GWPV en ingles) y Objetivos de Protección de Aguas Subterráneas (GWPT en ingles) basados en Zonas de Gestión y usarlos para informar a los descargadores autorizados sobre lo que se requiere para cumplir con los objetivos del Programa de Control de Nitratos como sector o como instalación permitida individualmente. Este proceso incluye sus propios hitos provisionales que deben completarse de manera oportuna para respaldar la implementación de MZIP.

Sección 6

El Programa de Control de Nitratos exige que el MZIP "incluya un plan para establecer un programa de restauración de acuíferos gestionado para restaurar los niveles de nitratos a concentraciones iguales o inferiores a los objetivos de calidad del agua en la medida en que sea razonable, factible y practicable hacerlo". Dado el interés de la Zona de Manejo en mantener o mejorar la calidad del agua subterránea a través de varios enfoques de restauración y el interés de las Agencias de Sostenibilidad del Agua Subterránea de abordar objetivos similares para segior la Ley de Manejo Sostenible del Agua Subterránea (SGMA) a través de la implementación del Plan de Sostenibilidad del Agua Subterránea, existe la oportunidad de coordinar actividades que puedan apoyar los esfuerzos para cumplir con la meta de restauración del Programa de Control de Nitratos. Los proyectos o acciones de gestión que mantienen o mejoran la calidad del agua subterránea pueden incluir (pero no se limitan a):

1) Controlar las fuentes de nitrógeno para reducir la cantidad de nitrógeno descargado a la superficie terrestre que potencialmente puede afectar la calidad del agua subterránea;

2) Aumentar las fuentes de agua distribuidas o inyectadas en el sistema de agua subterránea para recargar el sistema con agua de fuente de alta calidad (baja en nitratos), y

3) Extraer el agua subterránea existente (incluidas las aguas subterráneas deterioradas por nitratos) para usos beneficiosos (por ejemplo, para usos no potables como bombear y

fertilizar), reduciendo así la masa de nitrato en el sistema de agua subterránea y, en última instancia, mejorando la calidad del agua subterránea.

La colaboración entre las Zonas de Gestión, las Agencias de Sostenibilidad del Agua Subterránea y otras entidades locales facilitará estrategias para lograr mantener o mejorar la calidad del agua subterránea. Como se señala en el Programa de Control de Nitratos, no todas las partes del sistema de aguas subterráneas deterioradas por nitratos dentro de la Zona de Manejo necesariamente serán restauradas de manera razonable y factible, o al menos no todas las áreas se restaurarán en la misma escala de tiempo. En consecuencia, vale la pena que la Zona de Manejo, junto con las Agencias de Sostenibilidad de Aguas Subterráneas y otras entidades junto con la divulgación a las partes interesadas, optimicen estrategias que resulten en el mayor beneficio para el público al priorizar los esfuerzos de restauración de la Zona de Manejo (y la subcuenca).

El MZIP identifica de manera preliminar proyectos de recarga relacionados con aguas subterráneas actuales o planificados, que fueron identificados durante el desarrollo de Planes de Sostenibilidad de Aguas Subterráneas o son proyectos relacionados con SGMA iniciados posteriormente a través de oportunidades de financiamiento del Departamento de Recursos Hídricos. Además, dos Órdenes Ejecutivas del Gobernador para el desvío de aguas de inundaciones crearon procesos de obtención de permisos simplificados para ayudar a acelerar la recarga de aguas subterráneas durante el año hidrológico 2023.

El progreso y los efectos de las actividades de restauración (recarga de aguas subterráneas u otros proyectos y acciones de gestión) en la mejora de la calidad del agua subterránea serán evaluados por la Zona de Gestión mediante el seguimiento de los proyectos y acciones de gestión implementados y evaluados a través del Programa de Vigilancia y Monitoreo de la Zona de Gestión (consulte la Sección 7 del MZIP).

Sección 7

El Programa de Control de Nitratos requiere que el MZIP incluya un Programa de Vigilancia y Monitoreo. En concreto, el MZIP debe incluir:

> *"Un programa de vigilancia y monitoreo de la calidad del agua que sea adecuado para garantizar que el plan, cuando se implemente, logre el progreso esperado hacia el logro de las metas de gestión. Todo o parte del programa de vigilancia y monitoreo puede coordinarse o ser parte de un monitoreo de aguas subterráneas a nivel de todo el valle y/o regional, si corresponde".*

Ya se están llevando a cabo muchos programas de monitoreo diferentes dentro de la Zona de Manejo (y en todo el Valle Central). El enfoque del Programa de Vigilancia y Monitoreo para la Zona de Manejo tiene como objetivo utilizar programas existentes a largo plazo que pueden adaptarse específicamente para satisfacer las necesidades del MZIP.

La Coalición de Salinidad del Valle Central, la entidad principal responsable de implementar el Programa de Vigilancia y Monitoreo de la Región del Valle Central, presentó el Programa de Control de Sal y Nitratos de la Región del Valle Central, el Plan de Trabajo del Programa de Vigilancia y Monitoreo y el Plan del Proyecto de Garantía de Calidad (QAPP) (con fecha del 11 de febrero 2023) a la Junta de Agua del Valle Central. El 23 de marzo de 2023, la Junta de Agua del Valle Central aprobó el Plan de Trabajo del Programa

de Vigilancia y Monitoreo (SAMP), indicando que “aborda adecuadamente los requisitos del Programa de Control de Sal y Nitratos en ambos Planes de Cuenca de la Junta de Agua del Valle Central”. El SAMP aprobado de la Región del Valle Central proporciona muchos componentes que logran los objetivos requeridos para el SAMP MZIP. En consecuencia, el MZIP presenta un enfoque doble (regional y específico de la zona de gestión) para cumplir con los objetivos del MZIP SAMP.

1. SAMP de la Región del Valle Central (ver Apéndice SAMP): La Zona de Manejo utilizará información a nivel de subcuenca que ya está siendo abordada por el SAMP de la Región del Valle Central para monitorear e reportar sobre las tendencias y condiciones de la calidad del agua subterránea a nivel regional.

2. SAMP específico de la zona de gestión: La Zona de Gestión utilizará un subconjunto de la red de pozos de monitoreo incluida en el SAMP de la Región del Valle Central para seguir y evaluar el progreso esperado hacia el logro de los objetivos de gestión, incluida la reducción de nitratos y la restauración gestionada a largo plazo del acuífero para mantener o mejorar las condiciones de calidad del agua subterránea a nivel de la Zona de Manejo. La red de monitoreo de la Zona de Gestión incluye pozos que han sido examinados para su uso en programas de monitoreo sólidos administrados por el Servicio Geológico de EE. UU/Programa de Evaluación y Monitoreo Ambiental de Aguas Subterráneas (GAMA) de la Junta Estatal de Agua y las coaliciones agrícolas como parte del Programa de Monitoreo de Tendencias de la Calidad del Agua Subterránea (GQTM) del Programa Regulador de Tierras de Riego (ILRP) (es decir, pozos con información conocida sobre su construcción) y que también tienen algún historial de monitoreo previo, lo que facilitará la evaluación de las tendencias locales de la calidad del agua subterránea.

Dado que los programas de monitoreo GAMA y GQTM son todavía bastante recientes y es posible que no proporcionen de inmediato suficientes registros de series de tiempo para usarse solos durante los primeros cinco años de implementación de la Zona de Manejo. En consecuencia, el SAMP de la Zona de Gestión incluye la revisión y el seguimiento de las tendencias de los nitratos en los pozos de la División de Agua Potable de la Junta Estatal del Agua que tienen un registro de seguimiento histórico y han mostrado tendencias crecientes en las concentraciones de nitratos. A medida que haya datos adicionales disponibles para los pozos GAMA y GQTM, estos pozos serían el foco para revisar y monitorear las tendencias en la Zona de Manejo y evaluar el progreso en el logro de los objetivos generales del Programa de Control de Nitratos.

Los análisis futuros de tendencias de nitratos también incorporarán y utilizarán datos y análisis resultantes del monitoreo realizado para otros programas, incluido el cumplimiento de SGMA (es decir, redes de monitoreo del Plan de Sostenibilidad de Aguas Subterráneas) y la implementación de la Zona de Gestión del Programa de Control de Nitratos.

Dado que el propósito del SAMP de la Zona de Manejo se centra en evaluar si el Plan de Implementación de la Zona de Manejo, “cuando se implementa, logra el progreso esperado hacia el logro de las metas de manejo”, el ciclo del Informe de Estado de Excepciones de Cinco Años proporciona un intervalo razonable para evaluar los cambios en las condiciones de calidad del agua subterránea en respuesta a la implementación de Programas de Reducción de Nitratos sectoriales. Debido a que los primeros 10 años de implementación del MZIP implican una mejor recopilación de datos y esfuerzos sectoriales específicos para iniciar actividades para lograr reducciones en la carga de nitrato, y dado que se anticipa que los

cambios en la calidad del agua subterránea ocurrirán lentamente, los informes SAMP se producirían en los Informes de Estado de Excepciones de Zonas de Gestión a intervalos de cinco años. Además, luego de la presentación y aprobación del primer Informe de Evaluación de Agua Subterránea SAMP de la Región del Valle Central (fecha límite de presentación el 30 de noviembre de 2031), los Informes de Estado de Excepciones de Cinco y Diez Años de la Zona de Manejo incluirían un resumen de cualquier hallazgo adicional que sea relevante a la calidad del agua subterránea de nitrato al área de la Zona de Manejo y al alcance de las metas del Programa de Control de Nitratos.

Sección 8

Aunque casi todas las secciones del MZIP contienen un elemento de divulgación y participación, la Sección 8 proporciona un resumen de las actividades de divulgación y participación en tres partes: primero, un resumen de las actividades de divulgación realizadas durante el desarrollo de las Propuestas Preliminares y Finales de la Zona de Manejo; en segundo lugar, un resumen de las actividades de divulgación realizadas durante el período de tiempo comprimido (alrededor de seis meses) para el desarrollo del MZIP; y por último, un resumen de las actividades de divulgación planificadas asociadas principalmente con soluciones de agua potable a largo plazo y la implementación del Programa de Reducción de Nitratos.

Sección 9

El MZIP se implementará en fases de diez años y cada fase de diez años incluirá dos partes de cinco años. Este marco general por fases de diez años se eligió intencionalmente para alinear la implementación del Programa de Reducción de Nitratos con los requisitos de informes de cinco y diez años asociados con la autorización y reautorización de Excepciones del objetivo de calidad del agua con nitratos. Algunas actividades de implementación comienzan inmediatamente después de la presentación del MZIP (por ejemplo, el Programa Interino y de Emergencia de Agua Potable, que es una continuación de la implementación del EAP); otros comenzarán a principios de 2024 (por ejemplo, actividades iniciales para comenzar a trabajar en las Áreas de enfoque iniciales y divulgación a los participantes de la Zona de gestión con respecto al contenido de MZIP). Es posible que otras actividades no comiencen hasta que el MZIP entre en vigor mediante la acción de la Junta de Agua del Valle Central. A continuación se muestra una breve descripción de los elementos clave del cronograma de implementación de MZIP:

Programa de agua potable de emergencia y provisional

El Programa Interino y de Emergencia de Agua Potable es una continuación de la implementación del EAP existente de la Zona de Gestión, que ha estado ofreciendo pruebas de pozo gratuitas a los residentes para detectar nitratos y, cuando sea necesario, reemplazo de agua potable segura para los hogares desde mayo de 2021. Hitos provisionales clave en Este MZIP incluye:

- Continuar promoviendo y operando múltiples estaciones de llenado de agua en la Zona de Gestión de Kings;
- Continuar implementando el programa de extensión existente para mantener a los residentes informados sobre la oportunidad de realizar una prueba de pozo gratuita y recibir agua de reemplazo si el pozo está contaminado con nitratos;
- Realizar pruebas de pozos y trabajar con los residentes para obtener agua de reemplazo cuando sea necesario; y
- Presentar métricas de informes del programa de forma regular.

Programa de Soluciones de Agua Potable a Largo Plazo

El Programa de Agua Potable a Largo Plazo incluye hitos provisionales que se implementarán dentro de cada una de las Áreas de Enfoque Inicial de la Zona de Manejo durante un período de cinco años, incluido un alcance comunitario amplio para discutir posibles soluciones a largo plazo para cada área, la identificación de posibles alternativas que necesitan más evaluación, preparación de un análisis de viabilidad para identificar una solución alternativa preferida y facilitación de esfuerzos para implementar la alternativa preferida. Al final del quinto año de implementación de MZIP, la Zona de Gestión identificará nuevas áreas que necesitan identificar soluciones permanentes a largo plazo para el agua potable. Una vez identificada, la Zona de Gestión implementará los hitos provisionales descritos anteriormente en estas nuevas áreas. Este proceso iterativo continuará en toda la Zona de Gestión durante el tiempo que sea necesario para identificar soluciones permanentes al agua potable en áreas contaminadas con nitratos. Mientras este proceso esté en curso, se seguirá implementando el Programa Interino y de Emergencia de Agua Potable.

Programa de reducción de nitratos

Los descargadores autorizados que participan en la Zona de Manejo implementarán sus Programas de Reducción de Nitratos respectivos para cumplir con los requeridos hitos provisionales establecidos para cumplir con las metas de reducción de nitratos a largo plazo para el sector. El cronograma específico para completar estos hitos provisionales se encuentra dentro de cada Programa de Reducción de Nitratos (consulte los apéndices de MZIP).

Otros elementos programáticos de MZIP

Además de los elementos clave del programa MZIP resumidos anteriormente, el MZIP incluye hitos provisionales adicionales que serán dirigidos por la Zona de Manejo para abordar otros requisitos del Programa de Control de Nitratos, que incluyen:

- Facilitar la implementación del Programa de Reducción de Nitratos para sistemas sépticos a través de la coordinación con entidades responsables de la implementación del programa de Sistemas de Tratamiento de Aguas Residuales In Situ (OWTS) del Estado;
- Completar los pasos necesarios para desarrollar e implementar el programa de evaluación de cumplimiento de la Zona de Gestión;
- Realizar el programa de vigilancia y monitoreo de la Zona de Manejo; y
- Administrar la Zona de Gestión, incluida, entre otras, la gestión del programa de la Zona de Gestión; supervisión de la implementación general de MZIP, según sea necesario, coordinación con otras Zonas de Gestión de Prioridad 1; comunicación con los participantes de la Zona de Gestión con respecto al cumplimiento de los requisitos del programa; y supervisar los requisitos de informes de MZIP.

Informes de zona de gestión

La Zona de Manejo presentará informes a la Junta de Agua del Valle Central para cumplir con los requisitos de informes del Programa de Control de Nitratos, informar al personal de la Junta de Agua del Valle Central sobre el estado de las actividades de implementación de MZIP y documentar el progreso en el

cumplimiento de las metas del Programa de Control de Nitratos. Se prepararán cuatro tipos de informes durante la implementación de MZIP (Figura ES-2):

- Informes periódicos de emergencia y provisionales sobre el agua potable;
- Informes de progreso anuales para proporcionar un breve resumen del estado de implementación de los elementos clave del programa MZIP (Informe provisional y de emergencia sobre el agua potable, Programa de soluciones de agua potable a largo plazo y Programa de reducción de nitratos);
- Informes del estado de excepciones de cinco años para proporcionar un informe de estado que resuma el cumplimiento de los términos y condiciones de las excepciones autorizadas, incluido el estado del Programa de soluciones de agua potable a largo plazo; y
- Informe de evaluación de tecnología y estado de excepciones de diez años que reevalúa las BMP y tecnologías de tratamiento disponibles para gestionar el nitrato y un informe de estado que resume el cumplimiento de los términos y condiciones de las excepciones autorizadas, incluido el estado del Programa de soluciones de agua potable a largo plazo.

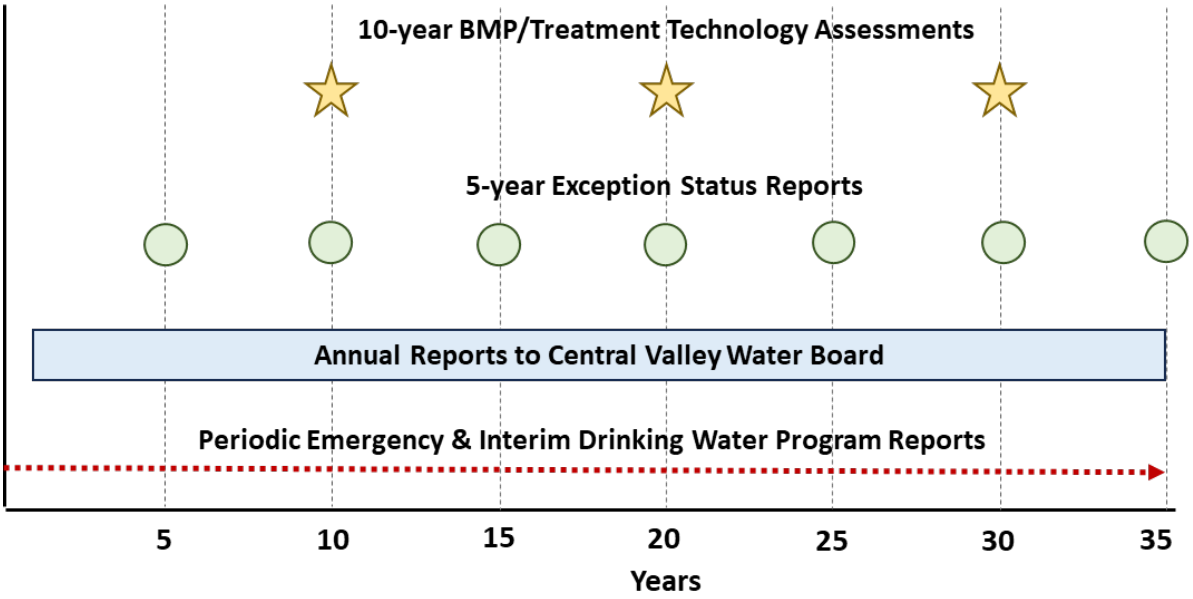


Figura ES-2. Calendario General de Presentación de Informes MZIP

SECTION 1.
Introduction

1.1. Nitrate Control Program

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) adopted amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins and the Water Quality Control Plan for the Tulare Lake Basin (Basin Plans) to incorporate a Salt and Nitrate Control Program (Resolution R5-2018-0034) on May 31, 2018. Following State Water Resources Control Board (State Water Board) action on October 16, 2019 (Resolution 2019-0057), the Nitrate Control Program became effective on January 17, 2020, upon approval by the Office of Administrative Law. The State Water Board's 2019 Resolution approving the Basin Plan amendments required targeted revisions to the Nitrate Control Program. The Central Valley Water Board adopted these revisions on December 10, 2020 (Resolution R5-2020-0057) with the State Water Board approving these revisions on June 1, 2021 (Resolution 2021-0019). The revisions were approved by the Office of Administrative Law on November 10, 2021.

The Nitrate Control Program is designed to achieve the following three management goals in the Central Valley Region:

- *Goal 1* – Ensure a safe drinking water supply;
- *Goal 2* – Reduce salt and nitrate loading so that ongoing discharges neither threaten to degrade high quality waters absent appropriate findings by the Central Valley Board nor cause or contribute to exceedances of water quality objectives; and,
- *Goal 3* – Implement long-term, managed restoration of impaired water bodies.

Permitted dischargers subject to the requirements of the Nitrate Control Program may choose between two compliance pathways:

- *Path A: Individual Approach* – The permittee or a third party group subject to a General Order must comply with all Nitrate Control Program requirements on its own.
- *Path B: Management Zone Approach* – Permitted dischargers work collectively with other dischargers (individual or third party group subject to a General Order) to form a Management Zone to comply with all requirements of the Nitrate Control Program.

Implementation of the Nitrate Control Program is triggered when the Central Valley Water Board sends permitted dischargers a Notice to Comply (NTC) with the program. The timing of implementation of the Program varies by groundwater subbasin, based on the priority designation, i.e., Priority 1, Priority 2 or "Not Prioritized" (Central Valley Water Board 2020). The Nitrate Control Program identifies six Priority 1 groundwater subbasins in the Central Valley Region. From north to south, the Priority 1 subbasins include: Modesto, Turlock, Chowchilla, Kings, Kaweah and Tule. Eight additional groundwater subbasins have a Priority 2 designation; the remainder of groundwater subbasins in the Central Valley Region are not prioritized at this time (Central Valley Water Board 2020).

1.2. Kings Water Alliance Management Zone

The Central Valley Water Board sent the NTC with the Nitrate Control Program to Third Party groups and individually permitted dischargers in the Kings Subbasin on May 29, 2020. Most recipients of the NTC in the Kings Subbasin elected Path B as their approach to comply with the Nitrate Control Program and immediately began to work collectively on the development of the Kings Water Alliance (KWA) Management Zone. The first step in this process was the submittal of a Preliminary Management Zone Proposal (PMZP) and KWA Early Action Plan (EAP) to the Central Valley Water Board Executive Officer on March 8, 2021 (KWA 2021). The EAP, which established a well testing and interim water replacement program for the Kings Subbasin, was conditionally approved on May 7, 2021. Implementation of the KWA EAP began immediately on May 8, 2021.

Following Central Valley Water Board review and comment on the PMZP, a Final Management Zone Proposal (FMZP) for the Kings Subbasin was submitted to the Central Valley Water Board as required on August 29, 2022 (KWA 2022). On February 28, 2023, the Board accepted the FMZP, resulting in the establishment of the KWA Nitrate Management Zone (**Figure 1-1**). Along with its acceptance of the FMZP, the Central Valley Water Board requires submittal of a Management Zone Implementation Plan (MZIP) for the KWA Management Zone by September 5, 2023. The MZIP serves as the Alternative Compliance Project for the Management Zone (MZ) to meet the Nitrate Control Program's three management goals, as described above.

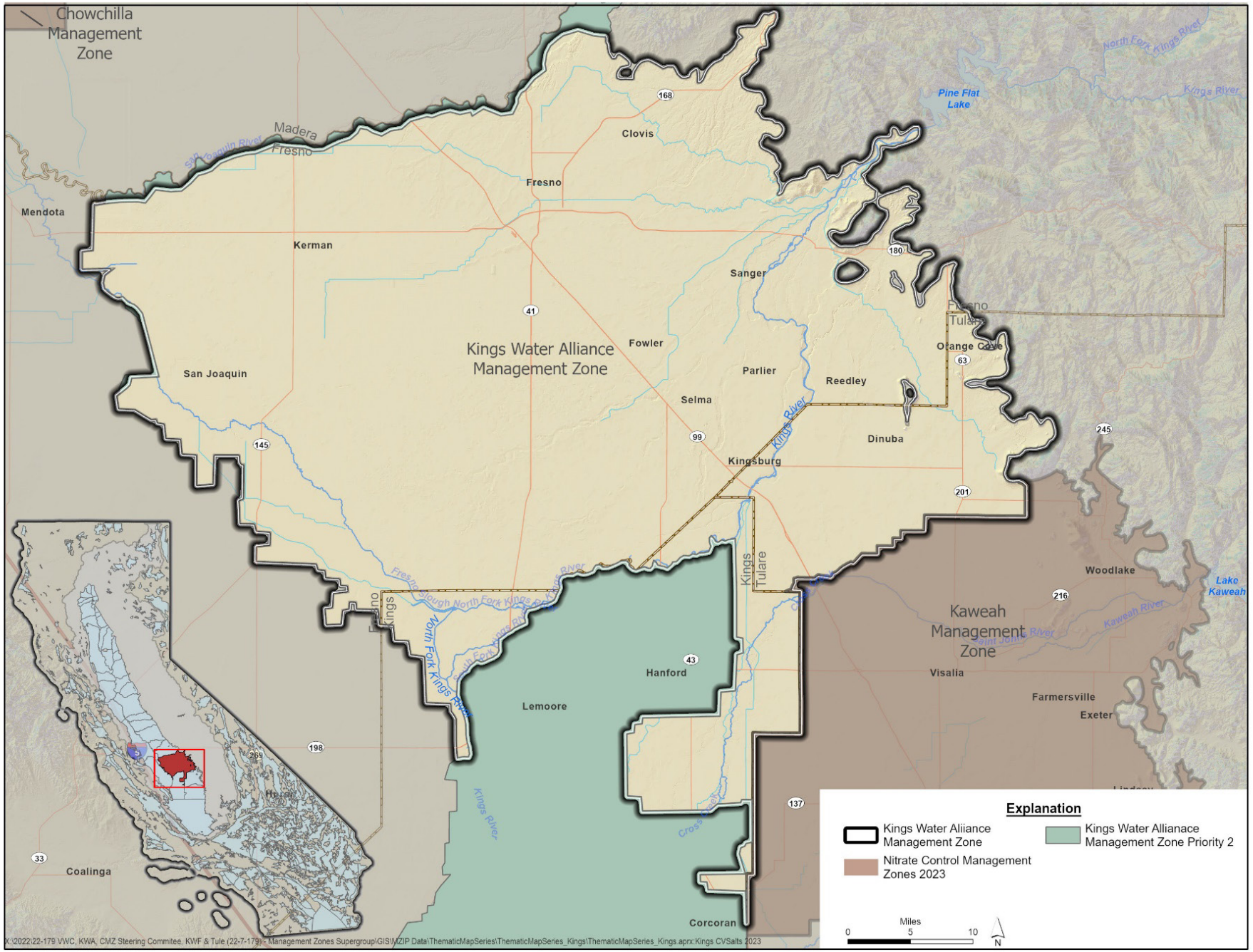


Figure 1-1. KWA Priority 1 Management Zone Boundary

1.3. KWA Management Zone Governance

The Management Zone is governed by the Kings Water Alliance, a non-profit public benefit corporation that filed for non-profit status on November 17, 2020. The Board of Directors currently has seven seats that can be expanded up to 11 as needed. The current Board members and seats they will hold are as follows:

- Kings River Water Quality Coalition (Irrigated Lands Regulatory Program [ILRP]) – Three representatives;
- Dairy and Confined Bovine Operations – Two representatives;
- Poultry Industry – One representative; and
- Wine Industry – One representative

1.4. KWA Management Zone Participants

This section identifies the types or sectors of permitted dischargers that are participating in the KWA Management Zone through Management Zone Participation Agreements (**see Appendix P-2**) and have committed to the implementation of the Nitrate Control Program requirements applicable to these dischargers and described herein. Participants include:

- Irrigated agriculture growers enrolled under Irrigated Lands Regulatory Program (ILRP) General Order R5-2013-0120 (as amended) (Waste Discharge Requirements General Order for Growers within the Tulare Lake Basin Area that are Members of the Third-Party Group).
- Milk cow dairies regulated under General Order R5-2013-0122 (as amended) (Reissued Waste Discharge Requirements General Order for Existing Milk Cow Dairies) (See **Appendix P-1** for list of facilities in the KWA Management Zone).
- Confined bovine feeding operations regulated under General Order R5-2017-0058 (Waste Discharge Requirements General Order for Confined Bovine Feeding Operations) (See **Appendix P-1** for list of facilities in the KWA Management Zone)
- Poultry facilities regulated under General Order R5-2016-0087 (as amended) (Waste Discharge Requirements General Order for Poultry Operations) (See **Appendix P-1** for list of facilities in the KWA Management Zone).
- Non-Chapter 15 Program ("Non-15 Program") facilities authorized to discharge under individual Waste Discharge Requirements (WDRs) (See **Appendix P-1** for list of facilities in the KWA Management Zone)

1.5. Management Zone Implementation Plan

Goal 2 of the Nitrate Control Program is for permitted dischargers participating in the Management Zone to cease causing or contributing to exceedances of the nitrate water quality objective in the underlying groundwater. A Management Zone may request an Exception to meeting the nitrate water quality objective on behalf of all participating permitted dischargers. Per the Basin Plan, an Exception is, "*A special authorization, adopted by the Central Valley Water Board through the normal public review and approval process, that allows a discharge or group of discharges to groundwater, subject to various conditions,*

without an obligation to comply with certain water quality objectives that would normally apply to the given discharge for the period of the exception."

Under a Nitrate Control Program-approved Exception, all discharges of nitrate must cease causing or contributing to exceedances of water quality objectives in the underlying groundwater within a term that is as short as practicable for each discharger or category of dischargers participating in the Management Zone but in no case is longer than 35 years. The Nitrate Control Program requires submittal of an Alternative Compliance Project as part of a request for an Exception to the nitrate water quality objective. For permitted dischargers participating in the KWA Management Zone, this MZIP serves as the Alternative Compliance Project to support a request for an Exception.

The Nitrate Control Program describes the requirements for establishment of an Alternative Compliance Project to support a Management Zone. **Table 1-1** summarizes these requirements and identifies where they have been addressed by this MZIP.

Table 1-1. Nitrate Control Program MZIP Requirements and Summary of Program Element		
MZIP Required Element	**Where Addressed by MZIP**	**General Description**
(i) Identify how emergency, interim and permanent drinking water needs for those affected by nitrates in the Management Zone area are being addressed, and how a drinking water supply that ultimately meets drinking water standards will be available to all drinking water users within the Management Zone boundary, and the timeline and milestones necessary for addressing such drinking water needs;	• Section 3 provides the Emergency & Interim Drinking Water Program. • Section 4 and supporting appendices describe the Long-term Drinking Water Solutions Program to provide permanent drinking water.	• EAP that provides replacement water to residents with nitrate-impacted domestic wells is the KWA Management Zone's Emergency & Interim Drinking Water Program. This program has been updated as needed and incorporated herein. • Program to identify, evaluate and implement permanent drinking water solutions in the Management Zone will be initiated first in areas identified in this MZIP as Initial Focus Areas. This program will expand to other areas of the Management Zone over the long-term.
(ii) Consider future impacts on public water systems from nitrate contamination and consult with the Central Valley Water Board and the Division of Drinking Water with respect to determining available solutions for addressing drinking water. The MZIPs shall also address the impact that potential solutions may have on operation and maintenance costs, particularly for disadvantaged communities;	Section 2.4 looks at future and current impacts to public water systems from nitrate contamination.	The location of public water systems and the capture zones for public water system supply wells are put into context with ambient nitrate concentration levels.
(iii) Show how the Management Zone plans to achieve balanced nitrate loadings within the Management Zone (to the extent reasonable, feasible and practicable);	Section 5 describes the Nitrate Reduction Program that will be implemented by each sector to meet the goals of the Nitrate Control Program.	MZIP includes Nitrate Reduction Programs specific to each of the following sectors: • Irrigated Agriculture • Dairies • Bovine Facilities • Poultry Facilities • Non-15 Program Permitted Dischargers • Septic Systems

Table 1-1. Nitrate Control Program MZIP Requirements and Summary of Program Element		
MZIP Required Element	**Where Addressed by MZIP**	**General Description**
(iv) Include a plan for establishing a managed aquifer restoration program to restore nitrate levels to concentrations at or below the water quality objectives to the extent it is reasonable, feasible and practicable to do so;	Section 6 describes the long-term aquifer restoration program to be implemented through the MZIP.	The Management Zone will coordinate with Sustainable Groundwater Management Act (SGMA) Groundwater Sustainability Plan (GSP) implementation, including recharge and restoration-related activities and consideration of strategies for pumping and using shallow nitrate-affected groundwater for non-potable beneficial uses.
(v) Include enforceable and quantifiable interim deadlines that focus on reducing nitrate in ongoing discharges and a proposed final compliance date for ongoing discharges of nitrate to cease causing or contributing to exceedances of the applicable water quality objective in the receiving water;	Section 5 introduces the Nitrate Reduction Programs planned for each key sector; Appendices NRP-1 through NRP-5 provide the detailed sector-based programs.	The Nitrate Reduction Programs for the six key sectors addressed by this MZIP include Nitrate Reduction Goals (Milestones) with interim milestones and schedules for implementation to meet the goals (see Appendices). In addition, each of these program includes a proposed final compliance for permittees within each sector.
(vi) Document collaboration with the community and/or users benefitting from any proposed short/long-term activities to provide safe drinking water;	• Section 3 describes outreach that is occurring, first as part of the EAP and now as part of the Emergency & Interim Drinking Water Program. • Section 4 and Appendix LT-2 describe outreach implemented under the long-term drinking water solutions program. • Section 8 summarizes the overall outreach program to be implemented under the MZIP.	Collaboration with the community will occur regularly through implementation of the emergency, interim and permanent drinking water programs. In addition, the Management Zone will continue to implement outreach activities to its participants to support Management Zone reporting and compliance needs.

Table 1-1. Nitrate Control Program MZIP Requirements and Summary of Program Element			
MZIP Required Element		**Where Addressed by MZIP**	**General Description**
(vii)	Include a residential sampling program designed to assist in identifying affected residents within portions of the Management Zone where nitrate concentrations in the groundwater may exceed 10 mg/l, and nitrate discharges from regulated sources that may impact groundwater. Such sampling shall occur only with the consent of the current resident, and the availability of such sampling shall be included in the Management Zone's outreach efforts to potentially affected residents. Affected residents do not include residents whose domestic consumption relies solely on a public water system that is already conducting sampling;	Section 3 presents the Emergency & Interim Drinking Water Program which includes the Management Zone's residential well sampling program. This program includes targeted outreach especially in areas where it is anticipated that nitrate levels are high in groundwater.	Since 2021, the KWA Management Zone has been implementing its EAP to provide opportunity for residents to have their domestic well sampled. Where appropriate, this program provides opportunities for re-sampling of domestic wells to ensure that wells remain safe for drinking. Under the MZIP, this residential well sampling (and re-sampling) program will continue to be implemented as part of the Emergency & Interim Drinking Water Program.
(viii)	Identify funding or cost-share agreements, or a process for developing such funding or cost-share agreements, to implement intermediate and long-term nitrate management projects/activities, which may include identification of local, state and federal funds that are available for such purposes;	Section 9.4 and Appendix LT-2 (Long-Term Drinking Water Solution Workplan).	MZIP includes a summary of potential funding opportunities to support long-term drinking water solutions.
(ix)	Identify nitrate management activities within a Management Zone which may be prioritized based on factors identified in the Central Valley Salt and Nitrate Management Plan (SNMP) (2016) and the results of the characterization of nitrate conditions. Prioritization provides the basis for allocating resources with resources directed to the highest water quality priorities first;	Section 5 (with referenced appendices) describes nitrate management activities to be implemented by each sector.	Only Non-15 Program facilities have been prioritized for implementation. Facilities with a greater potential to impact groundwater quality for nitrate have the highest priority for implementation of nitrate reduction activities. For other sectors (e.g., irrigated agriculture or dairies), nitrate reduction activities apply to all permittees within the Management zone at the same time.
(x)	Include a water quality characterization and identification of nitrate management measures that contains:	*[see below]*	*[see below]*

Table 1-1. Nitrate Control Program MZIP Requirements and Summary of Program Element		
MZIP Required Element	**Where Addressed by MZIP**	**General Description**
• Characterization of nitrate conditions within the proposed management zone, which will be used as the basis for demonstrating how nitrate will be managed within the Management Zone over short and long-term periods to meet management goals established in the Central Valley Region SNMP.	• Section 2.1 documents ambient nitrate water quality and nitrate water quality trends in groundwater. • Section 5.2 presents nitrogen loading methodologies for each sector and preliminary nitrogen loading analysis findings by sector.	Nitrate ambient water quality analysis updates findings previously reported in the PMZP and FMZP. MZIP updates and expands the water quality analysis by incorporating a nitrate water quality trend analysis. Methodology for water quality analyses and dataset source information are provided in Appendices GWQ-1 and GWQ-2. For each of the sectors of permitted dischargers (see above), a preliminary conservative estimate of nitrogen loading is provided. The methodologies for these preliminary loading analyses are provided in Appendices NL-1 through NL-5. Summaries are provided in Section 5.
• Short (≤ 20 years) and long-term (> 20 years) projects and/or planning activities that will be implemented within the Management Zone, and in particular within prioritized areas (if such areas are identified in the Implementation Plan) to make progress towards attaining each of the management goals identified by the Nitrate Control Program. Over time as water quality is managed in prioritized areas, updates to the plan may shift the priorities in the Management Zone.	• Section 5.3 provides an overview of the Nitrate Reduction Programs proposed for each sector. • Appendices NRP-1 through NRP-5 provide detailed program information.	Each sector's Nitrate Reduction Program includes Nitrate Reduction Goals (Milestones) with interim milestones for implementation to meet the goals. The schedule for implementation of the interim milestones focuses primarily on the first 10 to 20 years of MZIP implementation. These schedules and interim milestones will be updated or revised over time, as needed.
• Milestones related to achieving balanced nitrate loadings and managed aquifer restoration.	Section 5.4 summarizes the Nitrate Reduction Goals (Milestones) for each sector.	Details of each sector's Nitrate Reduction Program are provided in Appendices NRP-1 through NRP-5. These appendices provide the basis for the proposed Nitrate Reduction Goals.

Table 1-1. Nitrate Control Program MZIP Requirements and Summary of Program Element		
MZIP Required Element	**Where Addressed by MZIP**	**General Description**
• A short and long-term schedule for implementation of nitrate management activities with interim milestones.	• Section 5.3 provides an overview of the Nitrate Reduction Programs proposed for each sector. • Appendices NRP-1 through NRP-5 provide detailed program information.	Each sector's Nitrate Reduction Program includes interim deadlines and/or interim milestones for implementation, primarily during the first 10 to 20 years of MZIP implementation. These implementation schedules and planned activities may be updated or revised over time.
• Identification of triggers for the implementation of alternative procedures or measures to be implemented if the interim milestones are not met.	Appendices NRP-1 through NRP-5 identify the alternative procedures to be implemented if permittees are not implementing the program as required by the MZIP.	Implementation of the Nitrate Reduction Program is primarily the responsibility of each discharger. Procedures are included in the Nitrate Reduction Programs that describe the process for how the Management Zones will address non-compliance by its participants.
• A water quality Surveillance and Monitoring Program (SAMP) that is adequate to ensure that the plan when implemented is achieving the expected progress towards attainment of management goals. All or parts of the surveillance and monitoring program may be coordinated or be part of a valley-wide and/or regional groundwater monitoring, if appropriate.	• Section 7 describes SAMP planned for implementation in the Management Zone. • Appendix SAMP provides the framework for the Management Zone SAMP implementation and the planned coordination with the Central Valley Region SAMP.	The KWA Management Zone SAMP is closely aligned with implementation of the Central Valley Region SAMP (CVSC 2023). Section 7 describes how coordination will occur between the Management Zone and entities responsible for implementation of the Central Valley Region SAMP.
• Consideration of areas outside of the Management Zone that may be impacted by discharges that occur within the Management Zone boundary areas.	Section 2.2 (Groundwater Elevation and Regional Flow Directions) addresses this topic.	MZIP relies on GSP and California Department of Water Resources (DWR) contour mapping of groundwater levels to determine regional flow directions and identify potential areas outside the Management Zone that may be impacted by discharges that occur from within the Management Zone.

Table 1-1. Nitrate Control Program MZIP Requirements and Summary of Program Element		
MZIP Required Element	**Where Addressed by MZIP**	**General Description**
(xi) Identify the responsibilities of each regulated discharger, or groups of regulated dischargers participating in the Management Zone, to manage nitrate within the Zone.	Sector-based Nitrate Reduction Programs (Appendices NRP-1 through NRP-5) and Section 9 identify roles and responsibilities.	Roles and responsibilities are identified in a number Sections and appendices. Section 9 compilation of interim milestones provides an overall summary of this information.
(xii) Include information necessary for obtaining an Exception as set forth in the Exceptions Policy, or information necessary for the Central Valley Water Board to grant use of assimilative capacity for Management Zones.	• Section 5.3 summarizes the Exceptions requested for each sector. • Appendices NRP-1 through NRP-5 provide more detailed information to support the request.	Proposed duration of the Exceptions requested for permittees in each sector varies. In addition, within some sectors the requested duration of the Exceptions may also vary depending on the nature of the discharge or type of permit

SECTION 2.
Management Zone Characterization Analyses

2.1. Groundwater Nitrate Quality

This section summarizes the nitrate conditions in groundwater within the Management Zone. More information about the technical procedures associated with groundwater nitrate quality data and analyses can be found in **Appendix GWQ-1** (Groundwater Nitrate Data: Analysis Methodology). The actual nitrate groundwater dataset specific to this Management Zone is provided in **Appendix GWQ-2** (publicly available online at www.cvsalinity.org).

2.1.1. Groundwater Nitrate Quality Data Acquisition and Compilation

Groundwater nitrate quality data were acquired through publicly available datasets and from implementation of the Management Zone's EAP well testing program, as described below.

2.1.1.1. Publicly Available Data

Groundwater quality data sources that were readily available for characterizing nitrate water quality in groundwater beneath and in the vicinity of the Management Zone include publicly available data obtained in May 2023. Groundwater nitrate data were collected and compiled from publicly available sources through the State Water Board's Groundwater Ambient Monitoring and Assessment Program (GAMA) groundwater information system for the Management Zone, including a 3-mile buffer around the border of the Management Zone. The sources of nitrate data from GAMA included:

- AGLAND (ILRP drinking water wells on grower parcels and groundwater quality trend monitoring (GQTM) wells);
- State Water Board Division of Drinking Water (DDW, which contains groundwater samples from public supply wells);
- DPR (Department of Pesticide Regulation);
- DWR (Department of Water Resources);
- EDF (regulated facilities monitoring site data, also known as GeoTracker, which includes Central Valley Dairy Representative Monitoring Program (CVDRMP) data);
- GAMA;
- LOCALGW (GAMA data from local water agencies and well owners);
- UCD CASTING (this source contains nitrate data from the University of California Davis nitrate study associated with the State Water Board SBX2 1 Report to the Legislature); and
- USGS (U.S. Geological Survey's National Water Information System, NWIS).

Groundwater quality data that were used for development of Groundwater Sustainability Plans should also be included in these public datasets through the GAMA interface; correspondingly, these data would be included in the Management Zone analyses.

All public data underwent a quality assurance quality control (QA/QC) process prior to being used for Management Zone analyses. This process includes standardizing the naming, formatting, and measurement units of groundwater nitrate data; removing duplicate entries; and marking questionable sample results that appear to be misreported (typically from incorrect measurement units reported or anomalous/incorrect entries). Statistical outliers were identified, and imputation was applied on left-censored data (see **Appendix GWQ-1** for more information about the identification of outliers and imputation for left-censored data). **Appendix GWQ-2** contains the actual nitrate groundwater dataset utilized in the analyses described below.

2.1.1.2. Management Zone-tested Domestic Well Data

During implementation of the Management Zone's Early Action Plan, many domestic wells were tested for nitrate concentrations. These test results augment the nitrate groundwater quality data used for the analyses described in the MZIP. Laboratory results for nitrate (as N) were combined with the publicly available dataset to complete the Management Zone-specific nitrate groundwater quality dataset used for characterizing ambient conditions and trends.

2.1.1.3. Groundwater Depth Zone Assignment

Wells were categorized into an appropriate depth category (Upper Zone, Lower Zone, Below Lower Zone, and Unknown).[1] Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) produced GIS coverages of the depths to the bottom of the Upper and Lower Zones (CV-SALTS 2016). Depth information (well depth or top of screen depth and screen length) from the publicly available nitrate groundwater 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:

- Municipal wells were categorized using the DWR GIS coverage of well completion report (WCR) statistics, which identifies the mean total depth of the municipal wells in each township/range-section. The mean municipal well depth was assigned to municipal wells with no depth information posted in GeoTracker GAMA and compared to the CV-SALTS depth to the bottom of the Upper and Lower Zones to estimate its depth category.
- Domestic wells were placed in the Upper Zone.
- Wells listed as an Unknown well type or without a WCR statistic associated with their well type and location were placed in the "Unknown" depth category.

2.1.2. Updated Ambient Nitrate Analysis

The high-resolution spatial analysis of nitrate in the Upper Zone presented in the PMZP was updated for this MZIP. A similar analysis was performed for lower aquifer zones (where sufficient data exist), using the updated nitrate dataset developed and described above. The Upper Zone remains the focus of the MZIP work, but analyses of deeper aquifer zones were completed to provide insight into conditions throughout the entire groundwater aquifer system as data are available. This update included the following steps:

[1] See CV-SALTS 2016 for a description of the development and assignment of Upper Zone delineations.

- Annual average nitrate concentrations were calculated for each well for the years 2010-2022 to yield one average nitrate concentration representing recent conditions.
- Wells with nitrate data outside the proposed 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 (kriging) of the well point data from each individual well depth category (Upper, Lower, and Below Lower Zones) was performed using a search radius of 1.5 miles.[2]
- Gap areas were shown to exist where post-2010 nitrate well data in a specific depth zone (Upper, Lower, and Below Lower Zones) were insufficient to produce the spatial interpolation using the 1.5-mile search criterion.

Figure 2-1 shows the interpolated ambient Upper Zone post-2010 nitrate as well as the gap areas where insufficient Upper Zone nitrate data exist (based on available data between January 2010 and December 2022). High nitrate concentrations exist in several locations throughout the Management Zone, particularly in the central and eastern areas. The majority of the Management Zone has sufficient control points (wells completed in the Upper Zone with post-2010 nitrate measurements) to provide a good understanding of groundwater nitrate conditions within the Management Zone. Insufficient recent nitrate data are available from the Upper Zone in small areas of the far northeastern edges and the western border of the Management Zone to fully assess the extent of potential nitrate contamination across those smaller parts of the Management Zone.

Figure 2-2 shows the interpolated ambient Post-2010 nitrate for wells completed in the Lower Zone; and **Figure 2-3** shows the interpolated ambient Post-2010 nitrate for wells completed below the Lower Zone (deemed in the "Below Lower Zone" category). There is much less coverage of recent nitrate concentrations in these lower aquifer zones to provide a complete understanding of recent ambient conditions throughout the Management Zone. Based on available data, nitrate concentrations in the Lower Zone appear to be typically less than 7.5 mg/L as N where data are available, with a few localized exceptions. Nitrate concentrations in the Below Lower Zone also have some localized areas of elevated nitrate scattered within the Management Zone.

To test if the ambient average post-2010 nitrate presented in **Figure 2-1** is potentially underestimating conditions in the Upper Zone, the maximum post-2010 nitrate concentration is overlain atop the interpolated ambient Upper Zone nitrate in **Figure 2-4**. This map provides a comparison between the shaded colors representing the average annual post-2010 nitrate and the colored dots that represent the maximum measured nitrate in individual wells since 2010. The maximum post-2010 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 drinking water standard. There is good agreement between the ambient post-2010 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

[2] 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.

to another well with different maximum concentrations despite the assumption that both wells are completed in the Upper Zone. This is a testament to the heterogeneity and variability inherent to groundwater quality conditions, as well as the availability of the dataset. Nitrate testing data for Upper Zone wells that have a maximum nitrate concentration exceeding 10 mg/L as N sometimes exist adjacent to other wells that have no measured nitrate concentrations above the standard. The Management Zone recognizes that some inherent uncertainty is associated with this analysis, and the recent ambient nitrate coverage is subject to change as additional Upper Zone groundwater nitrate data (and nitrate data for deeper depth zones as well) become available.

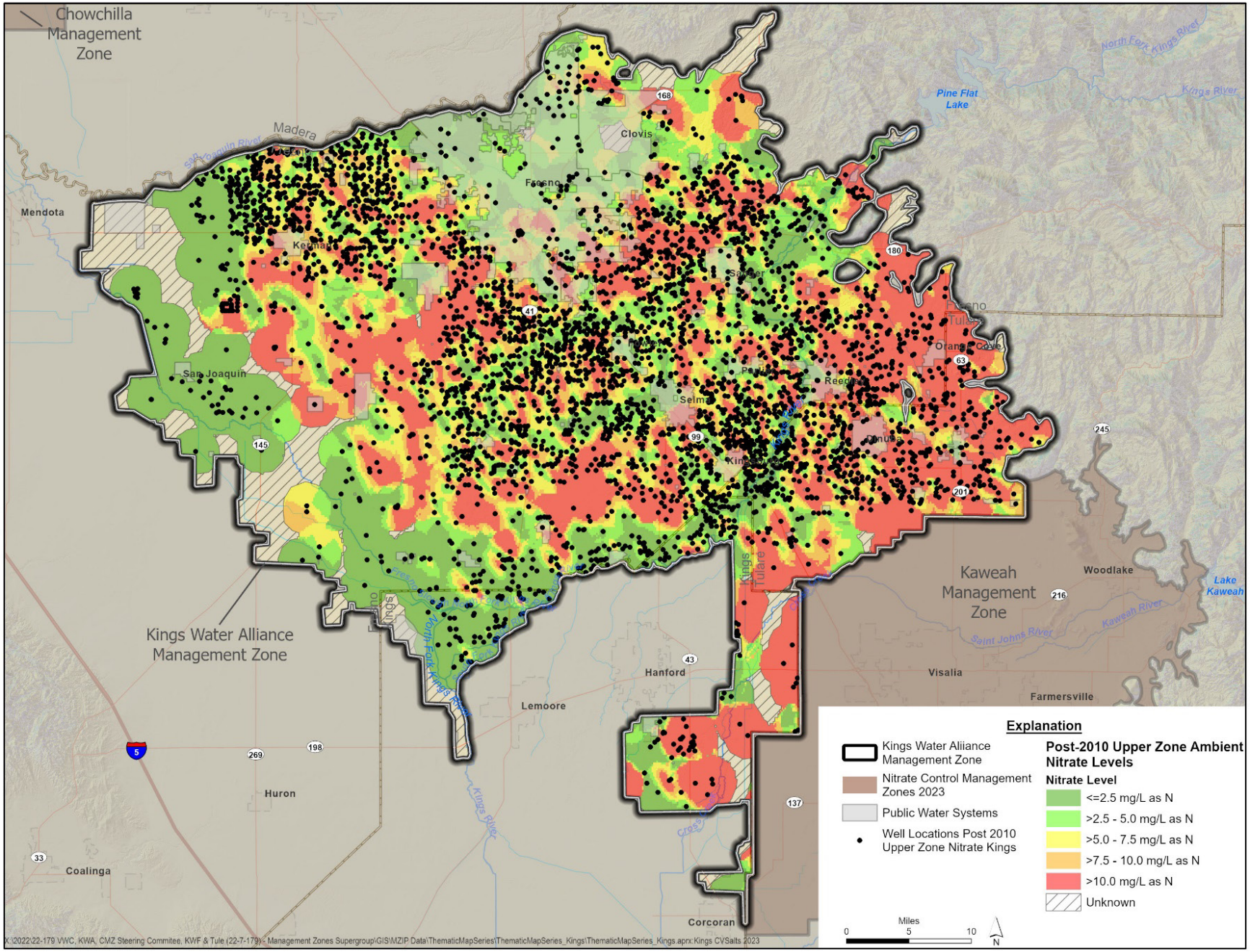


Figure 2-1. Upper Zone Ambient Post-2010 Nitrate Levels

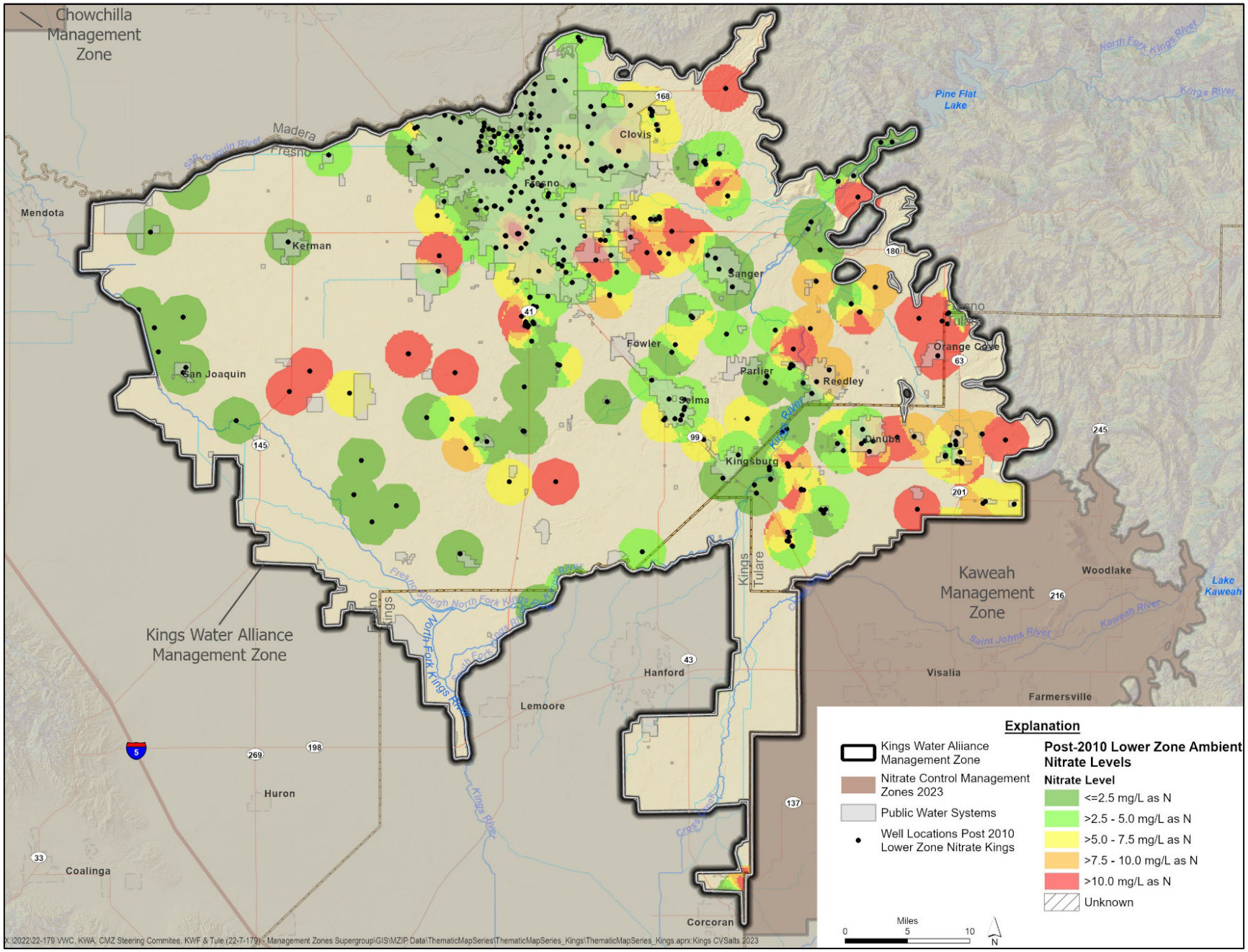


Figure 2-2. Lower Zone Ambient Post-2010 Nitrate Levels

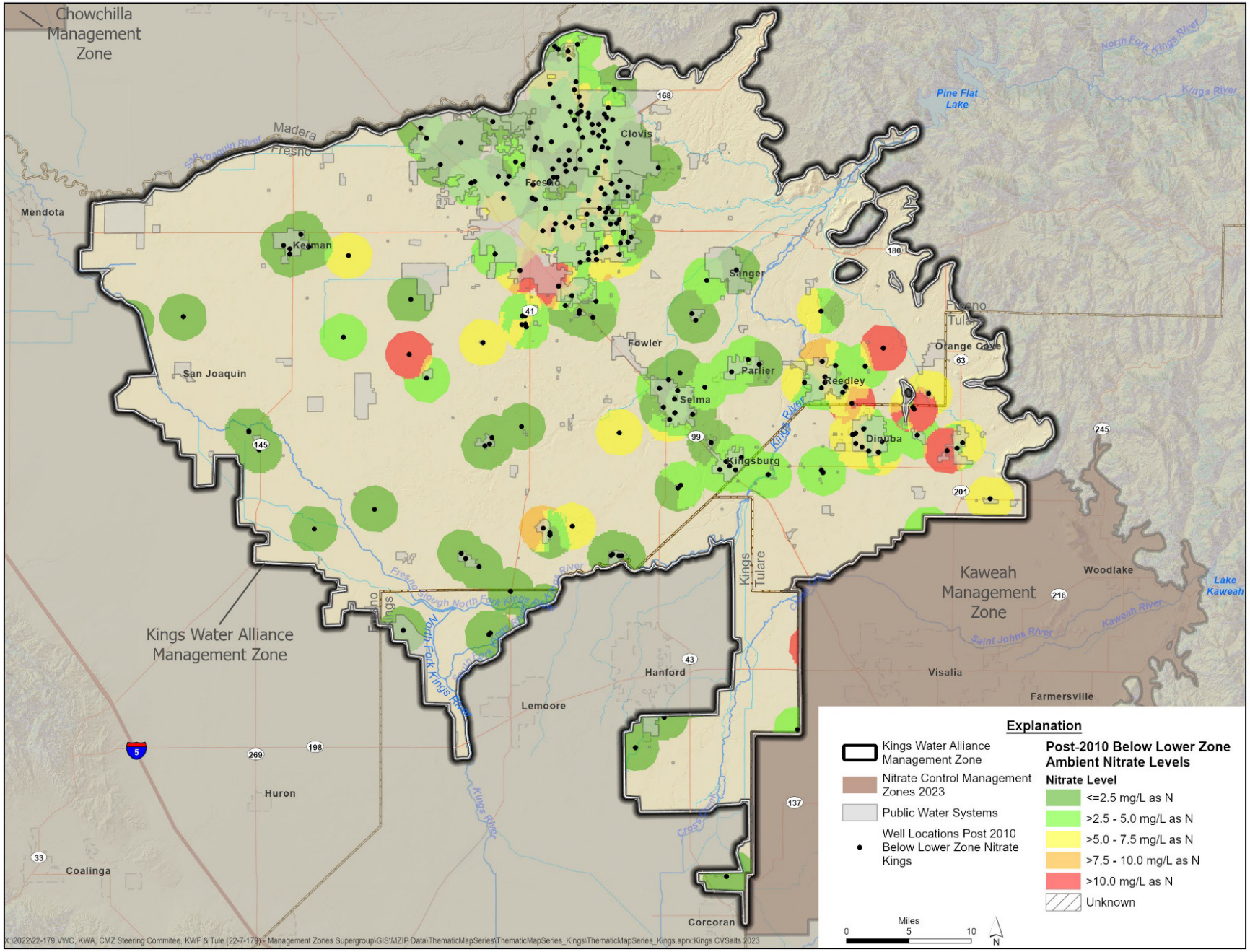


Figure 2-3. Below Lower Zone Ambient Post-2010 Nitrate Levels

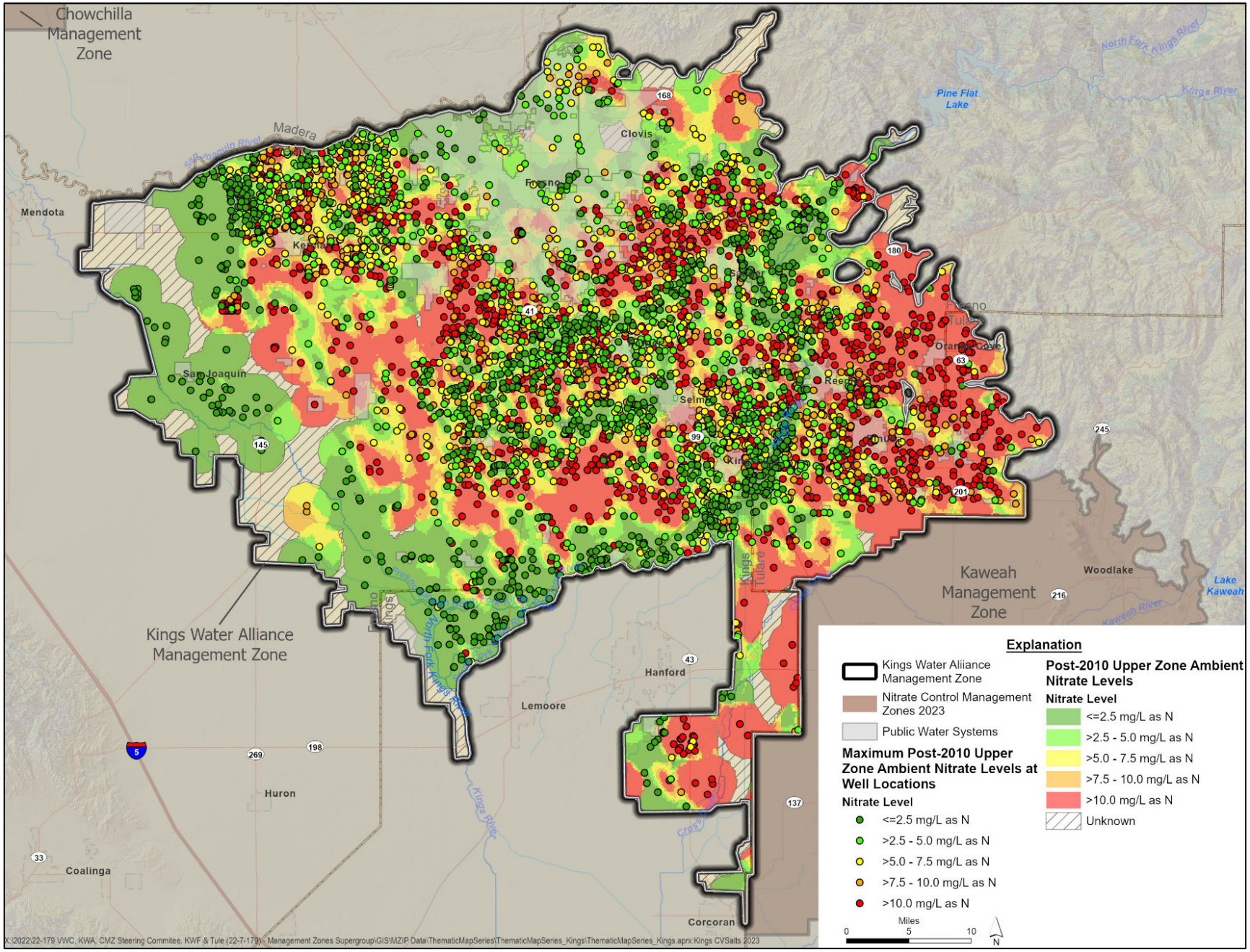


Figure 2-4. Maximum Nitrate Concentration with Upper Zone Ambient Post-2010 Nitrate Levels

2.1.3. Groundwater Nitrate Trends Analysis

This section describes the approach and results of the parametric and non-parametric trends analysis for nitrate in groundwater. More details regarding the methodology behind the trends analyses described in this section is provided in **Appendix GWQ-1** *(Groundwater Nitrate Data: Analysis Methodology).* Both parametric (i.e., linear) and non-parametric (i.e., Mann-Kendall) trends were analyzed in wells with five or more data points. Long-term (also referred to as historical) trends are analyzed over the full data record and require at least one measurement taken before 2000. Recent trends are analyzed only in data collected after 2000. The parametric trend analysis considers trends in wells with a slope hypothesis test p-value less than 0.05 and coefficient of determination (R^2) greater than 0.5. The non-parametric trend analysis requires a Mann-Kendall p-value less than 0.05.

Identified trends are categorized by magnitude of concentration change annually. The magnitude of change in concentration is equivalent to the best fitting linear slope for parametric trends and the Theil-Sen slope for non-parametric trends. Slopes are calculated for wells withs with statistically significant trends. Trends in nitrate that are changing more than 1 mg/L/yr (i.e 1/10th the MCL for nitrate annually) are considered “increasing” or “decreasing” depending on trend direction. Trends that are changing less than or equal to 1 mg/L/yr but more than 0.1 mg/L/yr are considered “slightly increasing” or “slightly decreasing”. Trends changing less than or equal to 0.1 mg/L/yr are considered “neutral” and represent small but statistically significant upward or downward changes in concentration. Parametric trends are summarized by depth zone, trend period, and trend magnitude in **Table 2-1a**. Non-parametric trends are summarized in **Table 2-1b**.

Wells with trend analysis results are mapped and symbolized with different colors denoting trend results and different shapes denoting well depth. Upper Zone wells are circles, Lower Zone wells are squares, Below Lower Zone wells are triangles, and wells in unknown depth zones are diamonds. Trends increasing at rates exceeding 1 mg/L/yr are red, and slightly increasing trends are orange. Neutral trends with rates less than or equal to 0.1 mg/L/yr are yellow. Decreasing trends are shades of green with darker shades representing rates exceeding 1 mg/L/yr. Trends not meeting minimum criteria are grey. Trends not meeting minimum criteria are not necessarily stable but do not meet conditions for statistical significance.

Long-term trends are analyzed only in wells with at least one data point prior to 2000. Long-term parametric and non-parametric trends are displayed in **Figures 2-5a** and **2-5b**. The recent trend analysis considers only measurements taken after 2000. Recent parametric and non-parametric trends are displayed in **Figures 2-6a** and 2-**6b**. Parametric and non-parametric trends are discussed specific to each depth zone below.

Table 2-1a. Results of Parametric Trend Analysis in KWA Management Zone								
Depth Zone	Trend Period	Total Wells with 5+ Data for Analysis	Insufficient Evidence of Linear Trend ($p > 0.05$ or $R2 < 0.5$)	Decreasing (> 1 mg/L/yr)	Decreasing (≤ 1 mg/L/yr)	Stable Trend (≤ 0.1 mg/L/yr change)	Slightly Increasing (≤ 1 mg/L/yr)	Increasing (> 1 mg/L/yr)
Upper	Long Term	167	121	0	12	11	22	1
	Recent	294	208	10	19	21	26	10
Lower	Long Term	182	148	0	8	13	13	0
	Recent	300	225	0	18	24	30	3
Below Lower	Long Term	111	88	0	3	14	6	0
	Recent	215	159	0	4	30	21	1
All Wells of Known Depth	Long Term	460	357	0	23	38	41	1
	Recent	809	592	10	41	75	77	14

Table 2-1b. Results of Non-Parametric Trend Analysis in KWA Management Zone								
Depth Zone	Trend Period	Total Wells with 5+ Data for Analysis	Insufficient Evidence of Monotonic Trend ($p > 0.05$)	Decreasing (> 1 mg/L/yr)	Decreasing (≤ 1 mg/L/yr)	Stable Trend (≤ 0.1 mg/L/yr change)	Slightly Increasing (≤ 1 mg/L/yr)	Increasing (> 1 mg/L/yr)
Upper	Long Term	167	71	0	15	52	26	3
	Recent	294	148	9	30	58	37	12
Lower	Long Term	182	94	0	11	58	18	1
	Recent	300	145	1	32	72	47	3
Below Lower	Long Term	111	43	0	5	49	14	0
	Recent	215	104	0	6	70	34	1
All Wells of Known Depth	Long Term	460	208	0	31	159	58	4
	Recent	809	397	10	68	200	118	16

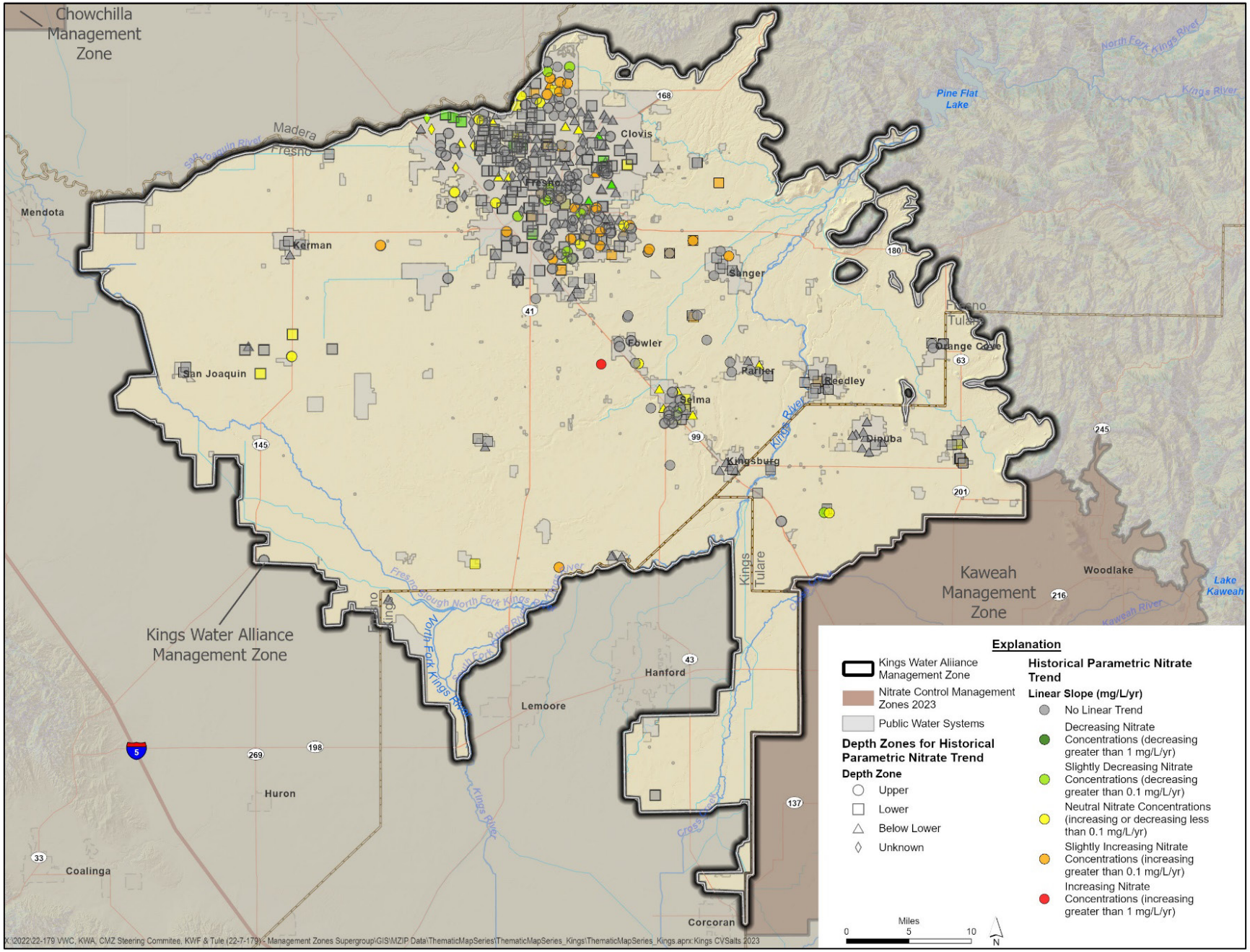


Figure 2-5a. Historical (Long-Term) Parametric Trends in Nitrate

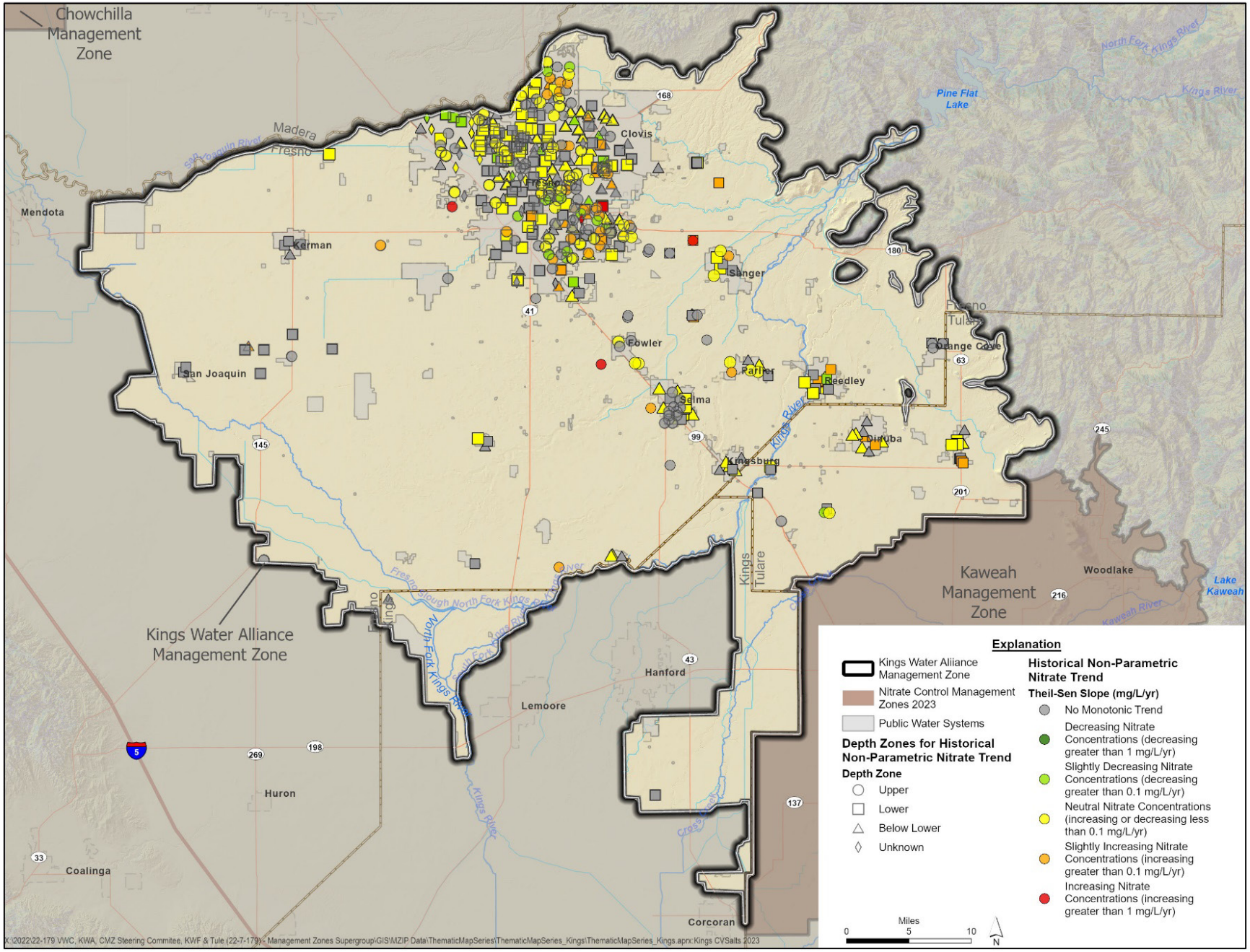


Figure 2-5b. Historical (Long-Term) Non-Parametric Trends in Nitrate

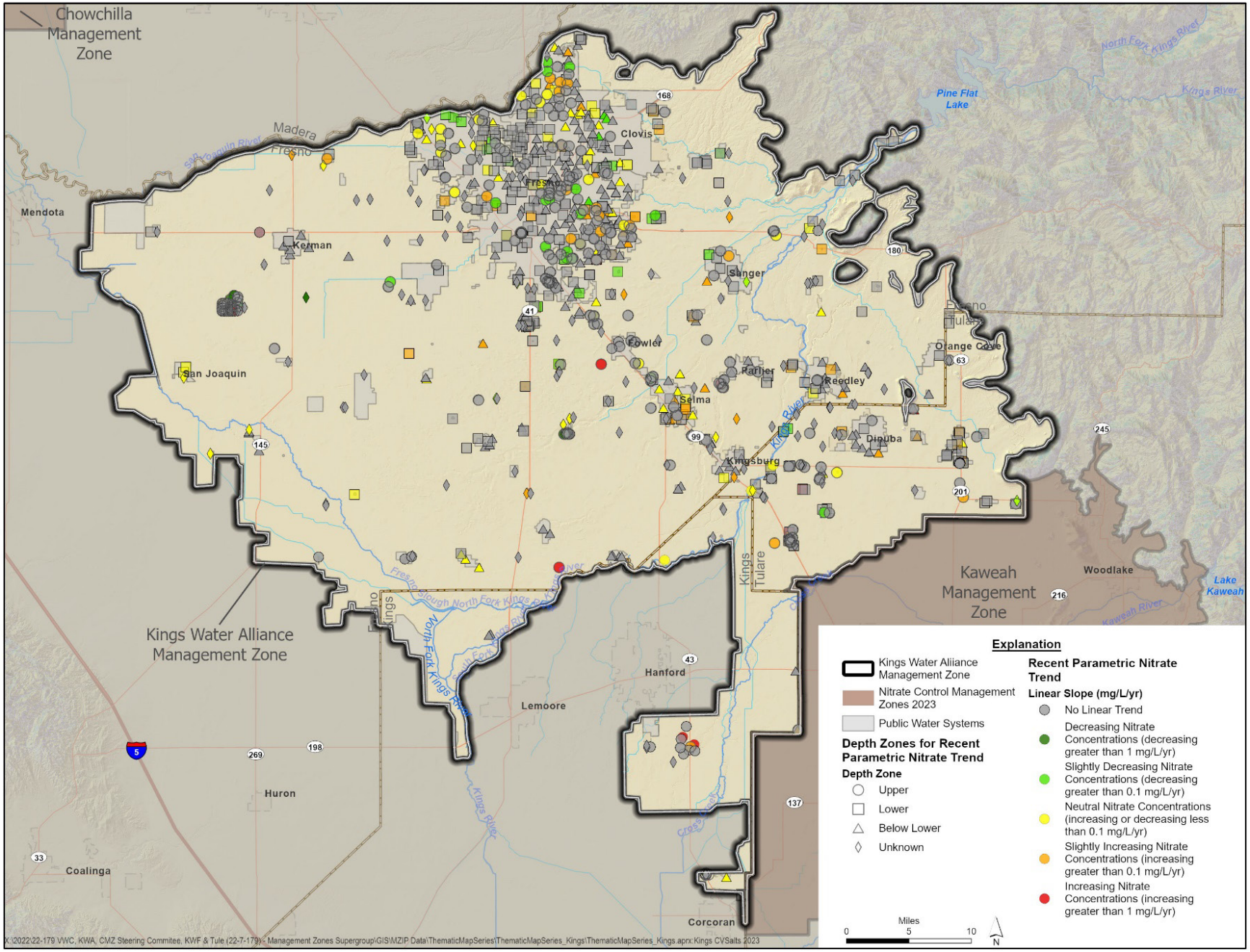


Figure 2-6a. Recent (Post-2000) Parametric Trends in Nitrate

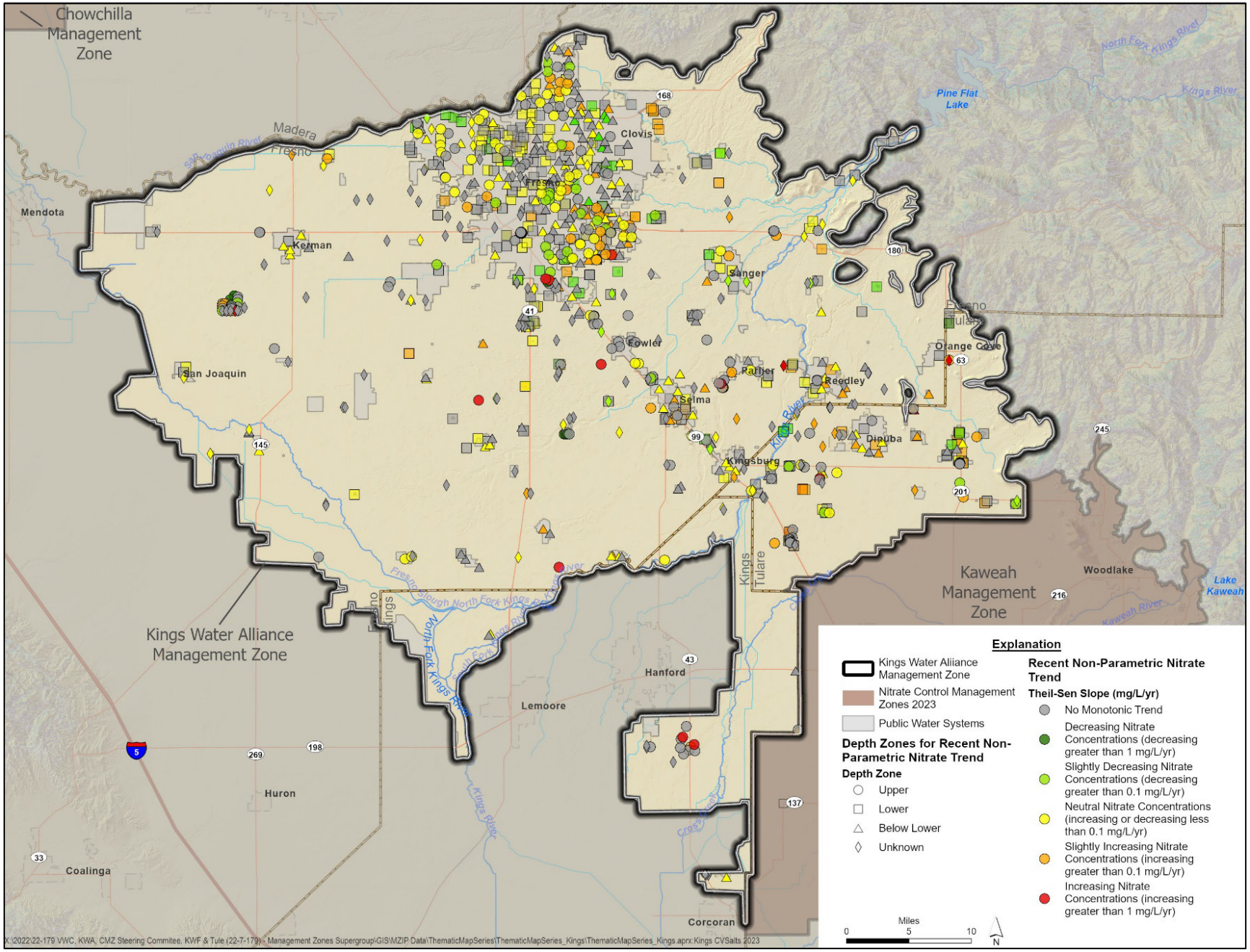


Figure 2-6b. Recent (Post-2000) Non-Parametric Trends in Nitrate

2.1.3.1. Parametric Trends for Upper Zone

167 and 294 wells meet data requirements for the long-term and recent trend analyses, respectively. Linear trends are not detected in 121 of the 167 long-term wells. 11 wells are stable long-term (changing <0.1 mg/L/yr), and 12 are slightly decreasing (<1 mg/L/yr). Stable and slightly decreasing wells are concentrated mostly within Fresno with some on the southeastern edge of the management zone. 22 are slightly increasing, and one is increasing (>1 mg/L/yr) long-term. Slightly increasing trends are mostly within Fresno or east of Fresno, with one on the southern edge. The increasing well is just southwest of Fowler.

Comparatively, more increasing and decreasing (rates >1 mg/L/yr) trends were detected recently. 208 of the 294 wells analyzed for recent trends did not have statistically significant linear trends. 19 wells are slightly decreasing, and ten are decreasing. Slightly decreasing wells are concentrated within Fresno, and decreasing wells are southwest of Kerman. 26 wells are slightly increasing, and ten are increasing. Increasing wells are southwest of Fowler and at the southernmost portions of the Management Zone. The remaining 21 wells are recently neutral with many concentrated in northern Fresno.

2.1.3.2. Parametric Trends for Lower Zone

182 and 300 wells in the Lower Zone meet data requirements for the long-term and recent trend analyses, respectively. Trends in the Lower Zone are distributed similarly to the Upper Zone with fewer identified increasing and decreasing trends. Linear trends are not detected in 148 of the 182 long-term wells. 13 wells are stable long-term, and eight are slightly decreasing. Stable wells are within Fresno, Selma, and on the western and southwestern edges of the Management Zone. Slightly decreasing wells are mostly within Fresno, especially northern Fresno near the San Joaquin River. 13 are slightly increasing and none are increasing long-term. Slightly increasing trends are in Fresno and east of Fresno.

225 of the wells 300 analyzed for recent trends did not have a linear trend. 18 wells have a recent slightly decreasing trend, mostly within Fresno and southeast of Fresno. 30 wells are slightly increasing, and three are increasing. Most slightly increasing wells are in Fresno with some also in Selma, Reedley, and Dinuba. Increasing wells are near the southeastern edge of Fresno and southeastern edge of the Management Zone. The remaining 24 wells are recently neutral, largely within urban areas.

2.1.3.3. Parametric Trends for Below Lower Zone

111 and 215 wells in the Below Lower Zone met data requirements for the long-term and recent trend analyses, respectively. No linear trends were detected in 88 of the 111 long-term wells. 14 wells are stable long-term with three slightly decreasing. Stable wells are within Fresno and Selma, and slightly decreasing wells are in eastern Fresno. Six wells have slightly increasing long-term linear trends, and none are increasing. Slightly increasing wells are in Fresno and Selma.

Comparatively, more increasing linear trends were detected recently. 159 of the 215 wells analyzed for recent trends did not have a linear trend. Four wells are slightly decreasing recently, all within eastern Fresno. 21 wells are slightly increasing, and one is increasing. Slightly increasing wells are mostly in urban areas, and the increasing well is on the eastern edge of the management zone. The remaining 30 wells are recently neutral.

2.1.3.4. Non-Parametric Trends for Upper Zone

Non-parametric trends in the Upper Zone are distributed similarly to linear trends with more identified trends overall. No monotonic trends are detected in 71 of the 167 long-term wells. 52 wells are stable long-term and 15 wells are slightly decreasing. 26 wells are slightly increasing and three are increasing long-term. Slightly increasing wells are generally within urban areas in addition to one in southern KWA. Increasing wells are southeast of Fowler, and east and west of Fresno.

Comparatively, more decreasing trends were detected recently. 148 of the wells 294 analyzed for recent trends did not have a monotonic trend. 30 wells are slightly decreasing, and nine wells are decreasing. Slightly decreasing wells are mostly within Fresno with some clustered southwest of Kerman and in the southeastern portion of the management zone. Many decreasing wells are clustered southwest of Kerman. 37 wells are slightly increasing, and 12 wells are increasing. Most slightly increasing wells are in Fresno with additional scattered throughout including near the northwestern and southeaster portions of the management zone. The remaining 58 wells are recently neutral. Neutral trends are in Fresno and along the southern portion of the Management Zone.

2.1.3.5. Non-Parametric Trends for Lower Zone

182 and 300 wells in the Lower Zone meet data requirements for the long-term and recent trend analyses, respectively. No monotonic trends were detected in 94 of the 182 long-term wells, and 58 wells are stable long-term. 11 wells are slightly decreasing long-term while 18 wells are slightly increasing and one well increasing. Slightly decreasing trends are mostly within Fresno with an additional in Reedley. Slightly increasing wells are in Fresno, Reedley, Dinuba, and east of Fresno.

Recent trends are similarly distributed to long-term trends. 145 of the wells analyzed for recent trends did not have a monotonic trend. 32 wells have a recent slightly decreasing trend, and one well is decreasing. 47 wells are slightly increasing, and three are increasing. The remaining 72 wells are recently neutral. Many wells are clustered in Fresno with more slightly decreasing compared to slightly increasing. Wells are additionally clustered in the southeast with more slightly increasing wells compared to slightly decreasing. Increasing wells are in southeast Fresno and near the southeastern edge of the Management Zone.

2.1.3.6. Non-Parametric Trends for Below Lower Zone

Non-parametric trends in the Below Lower Zone are distributed similarly to linear trends with more identified trends overall. No monotonic trends were detected in 43 of the 111 long-term wells. 49 wells are stable long-term with five slightly decreasing. Stable wells are in urban areas, and slightly decreasing wells are in eastern Fresno. 14 wells have slightly increasing long-term non-parametric trends, and none are increasing. Outside of urban areas a slightly increasing well is observed on the western edge of the Management Zone.

Comparatively, more increasing trends were detected recently. 104 of the 215 wells analyzed for recent trends did not have a linear trend. Six wells have a recent slightly decreasing trend. 34 wells are slightly increasing, and one is increasing. The remaining 70 wells are recently neutral. The distribution of trends recently is similar to the long-term trends with noticeably more slightly increasing concentrations,

especially in the urban areas in the southeast portion of the Management Zone. The increasing trend is east of Dinuba.

2.2. Groundwater Elevation and Regional Flow Directions

2.2.1. Contours of Equal Groundwater Elevation

Groundwater elevation contour data and corresponding groundwater elevation point data were downloaded from the DWR Sustainable Groundwater Management Act (SGMA) Data Viewer (DWR 2023). The data summarized corresponds to groundwater elevation contours and point data from Spring 2022 (**Figure 2-7**).

Groundwater elevations in the Management Zone tend to decrease moving from the northeast towards the southwest region of the Management Zone. There is a small depression of groundwater elevations in the southwest area. Groundwater level elevations peak near the northeastern edge of the Management Zone, creating a mound, and decline eastward. The groundwater elevations seen in the Management Zone vary widely, from a high of 369 feet (ft) in the northeast to a low of -56 ft in the western depression. Groundwater tends to flow into the Management Zone from the west and out of the Management Zone to the south.

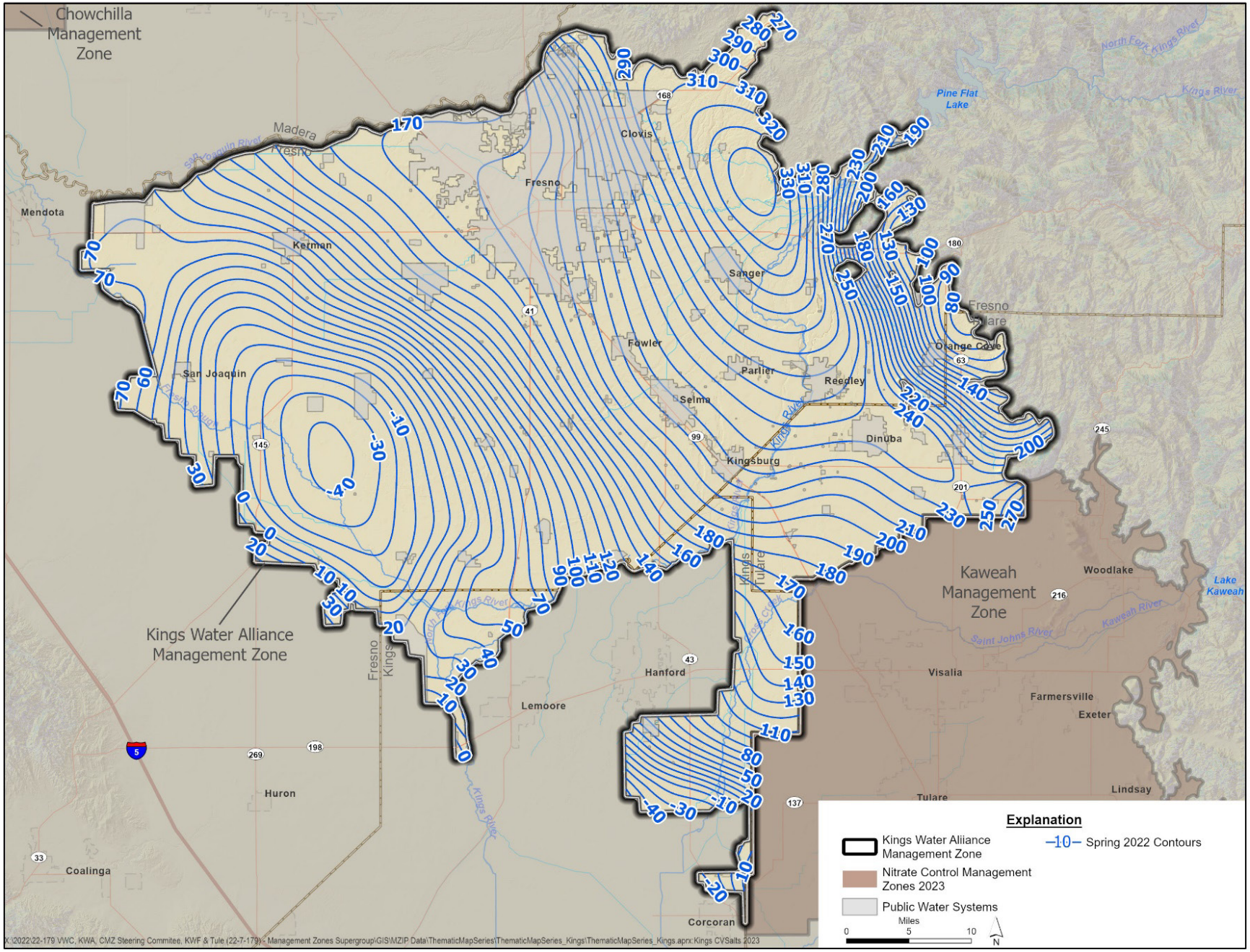


Figure 2-7. Contours of Equal Groundwater Elevation, Spring 2022 (Source: DWR 2023)

2.2.2. Regional Flow Directions

The general flow direction of groundwater is from east to west-southwest. A groundwater level mound and two groundwater level depressions exist within the Management Zone causing local deviations from this general flow pattern. A groundwater elevation mound and a small groundwater level depression both occur along the eastern boundary with the mound in the north and the depression in the south. These features lead to groundwater flowing to the east near the eastern boundary of the Management Zone. Another groundwater level depression occurs near the western boundary of the Management Zone. This depression changes the local flow directions from east to west to the center of the depression. Furthermore, this depression results in groundwater flowing towards the east along the entire western boundary of the Management Zone.

2.2.3. Areas of Potential Contribution

This section evaluates potential impacts to groundwater associated with downgradient migration of nitrate from the Priority 1 area of the Kings Management Zone. Using the Spring 2022 GWE Contours from the DWR, hydraulic gradients and groundwater flow directions are quantified along the boundaries of the Management Zone. The Management Zone boundary is divided into major segments of distinct groundwater flow direction characteristics, based on this Spring 2022 snapshot in time as provided by DWR's spatial coverage of contours of equal groundwater elevation. Hydraulic gradients and groundwater flow directions are provided in **Table 2-2** to quantify potential areas of contribution associated with possible downgradient migration of nitrate from within the Management Zone, based on Spring 2022 groundwater conditions, as reported by DWR. Groundwater can flow into and out of the Management Zone along its border with adjacent subbasins. The adjacent subbasins and their Nitrate Control Program's basin priority are also listed in the table. No gradients were calculated along the eastern boundary, as this represents the edge of alluvial materials and the terminus of the Upper Zone. Gradients are not calculated along the southern border between the KWA Priority 1 and KWA Priority 2 (Tulare Lake Subbasin) areas, as both of these areas are covered by the KWA.

The table lists the direction of groundwater flow and indicates whether the flow is entering (going into) or exiting (going out) of the Management Zone. The area of potential contribution associated with nitrate originating from the Management Zone corresponds with spatial areas along the Management Zone border where groundwater elevation contours (Spring 2022, from DWR) indicate that groundwater flows out of the Management Zone and into the adjacent subbasin. The border of the Management Zone is divided into eight segments based on similar characteristics of the direction and magnitude of the hydraulic gradient. Groundwater flows out of the Management Zone from two of the segments along the northern and southeastern borders of the Management Zone. Northward flow out of the Management Zone is observed along the northern boundary from Hwy 41 to Barstow. Groundwater from this segment flows into the Madera Subbasin (Priority 2), however, ambient nitrate concentrations along this segment are low (<=2.5 mg/L as N). Elevated nitrate concentrations (>7.5 mg/L as N) are seen along the southern-southeastern border of the Kings Management Zone. Groundwater tends to flow in the southwest direction, out of the Management Zone into the Kaweah Management Zone and the Tulare Lake Subbasin. The Kaweah Subbasin to the south is a Priority 1 Subbasin, under the purview of the Kaweah Water Foundation, and so residents within the areas of potential contribution along this boundary are already covered by the Kaweah Management Zone and are not included in this analysis. However, a small area near Remnoy and another area near the intersection of Kent Avenue and 12th Avenue both have elevated

nitrate concentrations and groundwater flowing into the Tulare Lake subbasin. These areas may be appropriate to consider for outreach and well testing.

The Management Zone recognizes that there is uncertainty with the quantification of the areas of potential contribution described above, due to both hydraulic gradients calculated from specific seasons and years, as well as the ambient nitrate map. The Management Zone also recognizes that this analysis represents a snapshot in time, as represented by DWR's Spring 2022 groundwater elevation contour. As additional information is developed, including groundwater flow assessments performed for SGMA and GSP purposes, the areas of potential nitrate contribution will be revisited and future work for the MZIP will rely heavily on results from the GSPs in KWA. Revised GSP documents were submitted at the end of July 2022, and coordination efforts between KWA and the Groundwater Sustainability Agencies (GSAs) in this area are underway. The influence of domestic well pumping is not expected to exceed a capture zone of ¼ mile (based on typical domestic pumping rates and aquifer properties), so the zone of influence outside of the Management Zone may be spatially limited.

Table 2-2. Quantification of Areas of Potential Nitrate Contribution (Kings P1 Management Zone)					
Description of Area Along Management Zone Border	Approximate Hydraulic Gradient (ft/ft)	GWE Contour Data Source	GW Flow Direction (In/Out of Management Zone)	Ambient Post-2000 Nitrate Level	Adjacent Subbasin and Priority
Northern border from the northeastern corner west to Hwy 41	0.0049	Spring 2022 (DWR)	Southwest (in)	<=2.5 to 7.5 mg/L as N	Madera Subbasin (Priority 2)
Northern border from Hwy 41 to the northern border near Barstow	0.0025	Spring 2022 (DWR)	North (Out)	<=2.5 mg/L as N	Madera Subbasin (Priority 2)
Northwestern border near Barstow to northwestern corner of Management Zone	0.0015	Spring 2022 (DWR)	Southwest (In)	<=2.5 to >10.0 mg/L as N	Madera Subbasin (Priority 2)
Northwestern corner of the Management Zone (northern border) to the western border at W Manning Ave	0.00057 to 0.0020	Spring 2022 (DWR)	Southeast (In)	<=2.5 mg/L as N	Madera Subbasin (Priority 2) and Delta-Mendota Subbasin (Priority 2)
Western border from W Manning Ave to near the intersection of Hwy 145 and Colorado Ave (near Helm)	0.0018	Spring 2022 (DWR)	East (In)	<=2.5 mg/L as N	Delta-Mendota Subbasin (Priority 2) and Westside Subbasin (Priority 2)
Western border from Helm to Five Points	0.0030	Spring 2022 (DWR)	Northeast (In)	<=2.5 mg/L as N	Westside Subbasin (Priority 2)
Five Points to the Lemoore Naval Base	0.0029	Spring 2022 (DWR)	Northeast (In)	<=2.5 mg/L as N	Westside Subbasin (Priority 2)
Lemoore Naval Base to Southeastern border of Kings Subbasin (east of Hwy 99)	0.0012 to 0.0018	Spring 2022 (DWR)	Southwest (Out)	<=2.5 to >10.0 mg/L as N	Kaweah Subbasin (Priority 1) and Kings Subbasin (Priority 1) and Tulare Lake Subbasin

2.3. Impacts to Public Water Systems

2.3.1. At-Risk and Failing PWS Due to Nitrate

An assessment of all Public Water Systems (PWSs) within the Management Zone was performed for the MZIP. The matrix in **Appendix PWS-1** provides an assessment of all public water systems (PWSs) and state small water systems (SSWSs) within the Management Zone for nitrate risk using data from the Safe Drinking Water Information System (SDWIS), the Safe and Affordable Funding for Equity and Resilience (SAFER) program, and the analysis of nitrate conditions described earlier in this section. The parameters and the rationale used to assess the water systems are described herein.

The number of systems with current nitrate violations and systems with the likelihood of future nitrate issues based on SAFER data, drinking water compliance violations, nitrogen trending data, and aquifer risk is provided in **Appendix PWS-1**. This analysis allowed populations served by drinking water systems with nitrate or potential for nitrate issues to be identified for prioritization. Other information collected included water system and service area classification, SAFER status, number of service connections, and medium household income status.

Each water system is uniquely identified by their name and public water system identification number (PWSID). GIS analysis was used to ensure the greatest number of water systems was represented in the Management Zone using public sources. Water system shapefile boundaries were acquired from the State Water Board (SWB) ArcGIS REST Services Directory.[3,4] Data gaps identified include incongruent shapefiles and missing water system boundaries. The public data from the State Water Board lacked a single shapefile including all the water system boundaries known to be present in the Management Zone. Information about each PWS in **Appendix PWS-1** is provided to help determine those systems that are at-risk and failing due to nitrate.

Water System Classification

The PWSs are classified based on the regular service population and the typical duration of water service. Water systems are classified in three main categories: PWS, SSWS, or unknown[4]

Public Water System - system that provides water for human consumption to 15 or more connections or regularly serves 25 or more people daily for at least 60 days out of the year. These systems are regulated by the State Water Board Division of Drinking Water (DDW) and the classification is available through SDWIS. PWSs are broken down into the following categories[5]:

- Community Water System (CWS) – Describes water systems in an area where people reside (e.g. residential areas, mobile home parks). Water is typically supplied by a City, County, Utility, Regional Water System, Water Company, Water District, or other similar entity.

[3] Drinking_Water/California_Drinking_Water_System_Area_Boundaries (FeatureServer)
[4] Hosted/California_Public_Water_System_Locations (FeatureServer)
[5] https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/waterpartnerships/what_is_a_public_water_sys.pdf

- Non-Transient Non-Community Water System (NTNC) – Describes places such as schools, businesses, or industrial/agricultural properties that have their own water source that provides water to a population that regularly spends time there but does not reside there.
- Transient Non-Community Water System (TNC) – Describes places that have their own water source that provide water to a population that does not reside or regularly spend time there (e.g. hotels/motels, service stations, restaurants, recreation areas).

State Small Water System (SSWS) – Describes water systems that provide water to at least 5 service connections but no more than 14 service connections and do not regularly serve drinking water to more than an average of 25 individuals daily for more than 60 days out of the year. SSWSs are regulated by counties, Local Primary Agencies (LPAs), or other local entities. SSWSs are not regulated by State Water Board DDW and therefore do not appear in SDWIS. These systems were previously identified by the Steering Committee and information was included from SAFER when available.

Unknown – water systems that were identified by previous Management Zone work but did not appear on SAFER or SDWIS were classified under an "unknown" category, as data were not available to discern a system classification. It is assumed that these systems are likely locally regulated SSWSs or perhaps no longer in operation. Unknown system classifications made up a very small subset of the overall system classifications.

The water system classification gives a general indication of the service population, regulation requirements, and the amount of time the water service is provided. Data gaps for this information include the lack of data available for some of the SSWSs, potential inconsistencies in data sources (SAFER vs SDWIS), and potential lack of updated data on SDWIS. Additionally, some PWSs on SDWIS have mixed service populations that apply to more than one category (CWS, NTNC, TNC). In these cases, the most prevalent service population was selected as the representative classification.

Service Area Classification

Each PWS was assigned a service area classification that describes the service population type and provides an indication of the purpose of the water served. The service area is included in SDWIS for each PWS water system as follows:

- Residential Area (RES)
- Secondary Residences (SRES)
- Mobile Home Park (MHP)
- School (SCHL)
- Medical Facility (MED)
- Institution (INST)
- Hotel/Motel (H/M)
- Camp (CMP)
- Recreation Area (REC)
- Restaurant (REST)
- Service Station (SERV)

- Highway Rest Area (HR)
- Industrial/Agricultural (IND/AG)
- Recycled Water (RW)
- Other (O)

SSWSs that had service area classifications available through SAFER were also categorized as applicable under the PWS service area classifications. Data gaps for this information include the lack of data available for some of the SSWSs and potential lack of updated data on SDWIS.

Median Household Income

The median household income (MHI) status data field in **Appendix PWS-1** identifies water systems serving financially disadvantaged communities based on State Water Board's 2022 Affordability Assessment.[6] The MHI status is determined by the State Water Board using American Census Survey data results and calculating the water system's percent above or below the California statewide MHI as dictated in the table below (**Table 2-3**).[7] The Eligible Non-Disadvantage Community and Unknown MHI status categories were not determined by the State Water Board. The Eligible Non-Disadvantage Community status was calculated from the water system's estimated MHI (including a margin of error) as determined in the 2022 Affordability Assessment. The Unknown status is for water systems that were not included in the 2022 Affordability Assessment, thus no MHI data were available. The purpose of the MHI status data field is to identify which systems may be eligible for project grant funding.

Table 2-3. MHI Status Result Categories

MHI Status	Description
Severely Disadvantaged Community (SDAC)	Water system serves a community with an MHI less than 60% of the California statewide MHI (<$47,203). Typically, eligible for grant funding.
Disadvantaged Community (DAC)	Water system serves a community with an MHI less than 80% of the California statewide MHI (<$62,938). Typically, eligible for grant funding.
Eligible Non-Disadvantage Community (NDAC (150%))	Water system serves a community with an MHI less than 150% of the California statewide MHI (<$118,008). Potentially, eligible for construction grant funding.
Non-Disadvantage Community (NDAC)	Water system serves a community with an MHI greater than 100% and/or 150% of the California statewide MHI ($78,672 and $118,008 respectively). Not typically, eligible for grant funding.
Unknown (UNK)	MHI status was not evaluated under the 2022 Affordability Assessment and is unknown.

Data gaps identified include limited data and updates to the California statewide MHI. The MHI status data field was recorded for water systems evaluated in the 2022 Affordability Assessment. These water

6 https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2022affordabilityassessment.pdf

7 https://www.waterboards.ca.gov/drinking_water/services/funding/documents/srf/mhi.pdf

systems primarily included community water systems and K-12 schools. Consequently, many TNCs, NTNCs, and SSWSs were not evaluated in the 2022 Affordability Assessment. It should be noted that the 2022 Affordability Assessment was conducted using the California statewide MHI of $78,627, but since April 1, 2023, the California statewide MHI has increased to $84,097. Consequently, some water systems' MHI status may have changed making them potentially eligible for more grant funding (e.g., NDAC may now be a DAC, or DAC may now be a SDAC).

SAFER Status

The State Water Board's SAFER program has developed a risk status (SAFER status) based on a water system's ability to meet the goals of the Human Right to Water (HR2W), which include the tenant that "every human being has the right to safe, clean, affordable, and accessible water".[8] In order to ensure this right to every Californian and achieve the HR2W goals an annual Needs Assessment is conducted to determine a water system's SAFER status. The SAFER status helps the State Water Board prioritize water systems to assist in achieving the HR2W goals. The SAFER statuses are described in the table below (**Table 2-4**). The SAFER statuses of the water systems are from the 2022 Needs Assessment.[9] Where a water system's SAFER status was not found in the 2022 Needs Assessment, it was assumed that the water system was not assessed. The purpose of the SAFER status data field provided for each PWS in **Appendix PWS-1** is to identify which water systems are on the State Water Board's priority list to achieving the HR2W goals.

Table 2-4. SAFER Status Result Categories

SAFER Status	Description
Failing/HR2W	Water system is out of compliance or consistently fails to meet primary drinking water quality standards.
At-Risk	Water system is at-risk of being out of compliance or consistently failing to meet primary drinking water quality standards.
Potentially At-Risk	Water system is potentially at-risk of being out of compliance or consistently failing to meet primary drinking water quality standards.
Not At-Risk	Water system is not at-risk of being out of compliance or consistently failing to meet primary drinking water quality standards.
Not Assessed	Water system was not assessed in the 2022 Needs Assessment.

Data gaps identified include limited data and assessment period. The SAFER status data field was recorded for water systems evaluated in the 2022 Needs Assessment. These water systems primarily included community water systems and K-12 schools. Consequently, many TNCs, NTNCs, and SSWSs were not

[8] http://www.leginfo.ca.gov/pub/11-12/bill/asm/ab_0651-0700/ab_685_bill_20120925_chaptered.pdf

[9] https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2022needsassessment.pdf

evaluated in the 2022 Needs Assessment. Since the 2022 Needs Assessment was conducted based on 2021 data, the results may have changed.

Under the HR2W and State Water Board DDW Compliance requirements, PWSs are required to regularly sample their water sources and have their samples analyzed for organic and inorganic substances to determine compliance with drinking water standards. Systems are required to report MCL exceedances to State Water Board DDW, and sampling results are uploaded to SDWIS.

If a system has a compliance violation, the State issues an Enforcement Action to be addressed by the water system. The Enforcement Action remains in effect until the system has returned to compliance or met the obligations of the Enforcement Action. At that time, a State Compliance Achieved (SOX) is issued and the Enforcement Action is no longer in effect. To determine if each PWS within the Management Zones had an open Violation/Enforcement Action, the "Violation/Enforcement Action" tab in SDWIS was reviewed. Starting at the most recent violation, each Violation/Enforcement Action was opened to determine if the action included an SOX. If an SOX for the constituent was present, the system was considered in compliance for the given contaminant or action. If an SOX was not present, the system was considered out of compliance for the given contaminant or action. If a system was out of compliance for a contaminant or action at any point in time and then reaches compliance, the SOX appears for all past violations for the contaminant or action. If an SOX was present for the most recent violation for the given contaminant or action, it was assumed that all other violations of that contaminant or action were also closed/in compliance. Each unique violation type was reviewed for compliance, and open violations were recorded in the data matrix.

Data gaps in the compliance information include potential lack of updated data on SDWIS and user identification error. Additionally, the compliance status of each system is representative of the compliance at the time of review. This compliance is based on the most recent sampling results. For example, systems with a history of a constituent(s) may have been in compliance at the time of review given one recent sampling result that was in compliance due to recently improved water quality. These systems were then categorized as "in compliance" with no additional information on their compliance history or tendency to contain certain contaminants. Similarly, a system may have exhibited no history of a contaminant and has only recently received a violation/enforcement action. Compliance status therefore could vary depending seasonal changes in water quality, water use, treatment techniques, and sampling errors or inconsistency, among other factors. Furthermore, systems such as SSWSs that do not have water quality data publicly available could not be reviewed for compliance and prioritized based on compliance status.

Violation Category

Violations and their associated enforcement actions were determined in SDWIS as described above. SDWIS lists the violation type on the particular violation/enforcement action. These were identified in the data matrix to allow systems with MCL exceedances to be quickly identified and to give indication as to what types of violations are occurring. The categories were included in the data matrix as provided in SDWIS with a "multiple" identifier added following the categories listed in **Table 2-5**:

Table 2-5. Violation Categories	
Violation Category	**Description**
Maximum Contaminant Level (MCL)	Water quality result exceeds the State Water Board DDW maximum level for a given contaminant. This includes Primary and Secondary MCLs. Primary MCLs were set by State Water Board DDW based on health protection, feasibility, and cost. Secondary MCLs were set based on consumer acceptance of taste, odor, and appearance.
Treatment Technique (TT)	The treatment technique is an enforceable procedure or level of technological performance to ensure control of a contaminant. Violations occur when a system does not follow the required treatment techniques. Examples include failure to provide or maintain treatment, failure to address a deficiency or contamination, turbidity exceedances, and lead and copper compliance.
Monitoring (MON)	Violation that occurs when a water system fails to conduct regular monitoring of drinking water quality or to submit monitoring results in a timely manner.
Reporting (RPT)	Violation that occurs when a system fails to provide required reports to State Water Board DDW in a timely manner. These violations include failure to provide a Consumer Confidence Report (CCR) and Lead and Copper Rule Reporting.
Waterworks (Source Capacity) (WW)	Water quantity violation that occurs when a water system fails to meet the source capacity required to provide sufficient water supply to consumers. The required source capacity is determined for each system using a Maximum Day Demand (MDD) for the system that must be met at all times. These violations are often associated with drought conditions.
Permit Provision (PP)	Water systems have a Water Supply Permit issued by State Water Board DDW to operate and serve water to consumers. This violation category describes failure to comply with provisions of the Water Supply Permit and/or other permits required to operate the system.
Multiple (MULT)	Identifier added to the data matrix to categorize water systems with multiple violation types.

The chemical and date related to each violation was included in the data matrix. This was performed to help identify water systems with nitrate MCL exceedances. Other contaminants associated with violations were also identified to determine if there were MCL exceedances for other contaminants in addition to an MCL exceedance for nitrate ("nitrate plus co-contaminant"). This gives an indication of systems that may be out of compliance for nitrate only, nitrate and a co-contaminant, or another contaminant.

Other nitrate risks were included in the PWS matrix provided in **Appendix PWS-1**. Three additional indicators were assessed to further understand a PWS's nitrate MCL exceedance risk: (1) Nitrogen Trending; (2) Nitrate Aquifer Risk Status; and (3) Ambient Nitrate Levels.

Nitrogen Trending

An increasing presence of water quality trends toward the MCL is a risk indicator of a water system becoming out-of-compliance with regulatory standards. Under the State Water Board's 2022 Needs Assessment, water quality trends for regulated contaminants were evaluated to identify water systems

at-risk. Three categories of contaminants were evaluated under the 2022 Needs Assessment: (1) Primary Acute Contaminants; (2) Primary Non-Acute Contaminants; and (3) Secondary Contaminants. Primary Acute Contaminants, such as Nitrate (as N), Nitrate-Nitrite (as N), and others, have an acute health risk effects (i.e., death, damage or illness) "as a result of a single period of exposure of a duration measured in seconds, minutes, hours or days". For primary acute contaminants, the 2022 Needs Assessment considers a water system at-risk if 25% or greater of its water sources have either: (a) 9-year average is equal to or greater than 80% of the MCL (excluding running annual averages); (b) the most recent 24-month average is equal to or greater than 80% of the MCL; or (c) any one water source sample measures over the MCL. If the water systems' well sources meet these criteria the respective well is assigned a score of 1. Unfortunately, the 2022 Needs Assessment does not provide a water system score for nitrate only. Instead, it combines scores for an average maximum well score for the water system, which includes other contaminants like primary non-acute and secondary (scores of 0.5 and 0.25 respectively). The analysis approach taken filters out water systems with an average maximum well score less than 1 and non-nitrate primary acute contaminants from the State Water Board's 2022 risk spreadsheet.

The 2022 Needs Assessment primarily included community water systems and K-12 schools. Consequently, many TNCs, NTNCs, and SSWSs were not evaluated in the 2022 Needs Assessment. Moreover, the approach taken to filter out water systems with an overall well average less than 1 potentially excludes water systems at-risk for nitrate contaminants only. For example, a water system with 3 wells may have one with a nitrate exceedance and another with a primary non-acute contaminant within 80% of the MCL. The well with a nitrate exceedance would receive a score of 1 whereas the other well would receive a score of 0.5. The maximum score well average water system score would be 0.75. Although this water system would be considered at-risk of a nitrate MCL exceedance, the filtering method of selecting water system scores of 1 excludes this water system. Lastly, since the 2022 Needs Assessment was conducted based on 2021 data, the results may have changed.

Nitrate Aquifer Risk Status

The purpose of the nitrate aquifer risk data field is to identify water quality risk for each water system at the maximum domestic well depth. The data for this parameter is sourced from the State Water Board's 2023 Aquifer Risk individual contaminants results for nitrate (NO3N ARM).[10] The aquifer risk ranking was developed by the State Water Board to prioritize areas with domestic wells or state small water systems (less than 15 service connections) that may be utilizing groundwater that does not meet primary drinking water standards.[11] Per the State's methodology, groundwater quality data are collected to produce a 20-year average (or recent sample within 5-years) for domestic wells, state small water systems, and public water systems. Within each groundwater basin unit as identified by DWR's Bulletin 118, the maximum domestic well depth is used to filter out public well data from wells whose bottom depths are not within 10% of the maximum domestic well bottom depth.[12] It is assumed that public wells deeper than 10% of

[10] https://gispublic.waterboards.ca.gov/portalserver/rest/services/Hosted/Individual_Contaminants_2023_ARM/FeatureServer/0

[11] 2023 Aquifer Risk Map Methodology - Overview (ca.gov)

[12] California's Groundwater (Bulletin 118)

the maximum domestic well depth access different groundwater quality, as deeper wells tend to have better water quality.

After public well data are filtered out, square mile sections are assigned an aquifer risk level. The table below (**Table 2-6**) delineates the four aquifer risk levels and the State Water Board's metrics used to determine them.

Table 2-6. 2023 Aquifer Risk Levels & Metrics

Aquifer Risk Level	Metrics
High	20-year average or recent sample (within 5-years) water quality results are above the MCL for one or more contaminants (highest risk contaminant represents section)
Medium	20-year average or recent sample (within 5-years) water quality results are between 80-100% of the MCL for one or more contaminants (highest risk contaminant represents section)
Low	20-year average or recent sample (within 5-years) water quality results are below 80% of the MCL for all sampled contaminants
No Data	No water quality data available that meets depth- or time-filtering criteria

In GIS, the statewide NO3N ARM results were plotted within the Management Zone. The PWS locations and boundaries were intersected with NO3N ARM results to identify which water systems were within a high or medium aquifer risk zone. If greater than 95% of the water systems boundary was within either a high or medium risk zone it was assigned the risk level accordingly. If only 50% or greater of the water system was within a high or medium risk zone the respective risk value was identified with a tag (e.g., "High (>50%)" or "Medium (>50%)"). If the area of risk for high or medium was below 50% individually but combined greater than 50% the water system was identified as "High+Medium (>50%)". If the individual area of risk for high and medium individually and combined was below 50% the water system NO3N ARM risk was identified as "Unknown". If no high or medium risk aquifer zone intersected with the water system boundary, or a water system boundary did not exist, the water system NO3N ARM risk was identified as "Not Assessed".

Data gaps identified pertain to a limited data range (domestic well depth) and analysis approach. The aquifer risk level results were specifically developed for prioritizing state small water systems and domestic wells and thus exclude public well data below the domestic well depth. Furthermore, the aquifer risk level results are not exact representations of the aquifer conditions and should be confirmed with water quality sampling within each groundwater unit's maximum domestic well depth. In addition to the limited data range (domestic well depth), the analysis approach only assesses water systems with a water system boundary and within a high or medium risk aquifer zone. Consequently, no data were collected to determine if a water system was within a low-risk aquifer zone.

Ambient Nitrate Levels

The purpose of the ambient nitrate levels data field is to identify nitrate water quality risk for each water system by using the ambient post-2010 Upper Zone nitrate levels developed for the MZIP. In GIS, the

ambient nitrate levels were plotted with the water system boundaries/locations to identify which water systems were within an area of elevated ambient nitrate (above 7.5 mg/L as N). If greater than 95% of the water systems boundary was within either a nitrate level of >10 mg/L as N or >7.5-10 mg/L as N, it was assigned the risk level accordingly. If only 50% or greater of the water system area was within a nitrate level of >10 mg/L as N or >7.5-10 mg/L as N, the respective risk value was identified with a tag (e.g., ">10mg/L (>50%)" or ">7.5-10mg/L (>50%)"). If the area within nitrate levels of >10 mg/L as N or >7.5-10 mg/L as N was below 50% individually but combined greater than 50%, the water system was identified as ">7.5 & >10mg/L (>50%)". If the individual area of risk for the >10 mg/L as N or >7.5-10 mg/L as N individually and combined was below 50%, the water system ambient nitrate level was identified as "Unknown". If the >10 mg/L as N or >7.5-10 mg/L as N nitrate levels were not intersected with the water system boundary, or a water system boundary did not exist, the water system ambient nitrate level was identified as "Not Assessed".

Data gaps identified pertain to a limited data range (post 2010 and Upper Zone) and analysis approach. The ambient nitrate levels used here were for the Upper Zone using post-2010 data. Furthermore, the ambient nitrate levels from the Upper Zone represent nitrate conditions typically above where many (but not all) public supply wells are completed. These nitrate levels were used because they represent the most complete spatial representation of nitrate conditions in the subsurface compared to the deeper aquifer zones that have much less spatial coverage for recent nitrate conditions.

Population Served by Out of Compliance Systems

For water systems that were determined to be "out of compliance," due to any violation, a nitrate MCL exceedance only, or nitrate plus a co-contaminant MCL exceedance, the population served by system was identified in **Appendix PWS-1**. The total number of water systems in the Management Zone with a nitrate MCL exceedance, both nitrate only and nitrate plus a co-contaminant, and their associated population served are presented in **Table 2-7** below:

Table 2-7. Public Water Systems with Nitrate and Nitrate Plus Co-Contaminant Violations

Management Zone	Water Systems with Nitrate [only] MCL Violation	Population Served by Systems with Nitrate [only] MCL Violation	Water Systems with Nitrate + Co-Contaminant MCL Violation	Population Served by Systems with Nitrate + Co-Contaminant MCL Violation
Kings	4	1,134	4	333

Violations related to other contaminants and/or non-MCL exceedances are not presented here due to the focus on nitrate MCL exceedances. Data gaps include systems with unknown compliance status and systems with nitrate compliance violations that were non-MCL exceedances.

Population Served by System At-Risk of Nitrate MCL Exceedance

Water systems identified as at-risk of a nitrate MCL exceedance were dependent on the Nitrogen Trending, NO3N ARM, and Ambient Nitrate Level results in **Appendix PWS-1**. If a water system was identified as having nitrate levels trending toward the MCL, it was considered at-risk and the population considered to be at-risk was recorded. If a water system was identified as having a "High" or "Medium"

NO3N ARM [risk] greater than 50% (individually or combined) of the water system boundary area, it was considered at-risk and the population was recorded. If a water system was identified as having a ">10mg/L" or ">7.5-10mg/L" (nitrate as N) ambient nitrate level greater than 50% (individually or combined) of the water system boundary area, it was considered at-risk and the population was recorded.

2.3.2. Analytical Capture Zone Estimates for PWS Wells

Understanding the extent of public supply well capture zones is helpful to identify wells that may be impacted by elevated nitrate presently or in the future. The methodology for determining capture zone extents for public supply wells is described in **Appendix PWS-2** (Methodology for Public Water System Supply Well Capture Zone Analysis). Combining information about public supply well capture zone extents with post-2010 ambient nitrate levels involved multiple steps.

1) Compilation of Drinking Water Source Assessment Protection Program (DWSAPP) data from documents requested and provided by local State Water Board DDW District offices into a single spreadsheet (data including PWS ID, PWS name, Well ID, radii of 2-year, 5-year, and 10-year capture zones, the method employed to determine those radii, and any surface activities listed in the DWSAPP as "potential contaminating activities" that could contribute to nitrate loading).

2) Location data for each well (Latitiude/Longitude) was downloaded and cross referenced via the well system name and/or ID/Code from the GAMA Groundwater Information System Map website (https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/) and imported into GIS.

3) Several wells with public supply wells with nitrate data in the GAMA Groundwater Information System did not have a corresponding DWSAPP document provided by the local State Water Board DDW office. In those cases, the default capture zone extent for 2-year (600 ft), 5-year (1,000 ft), and 10-years (1,500 ft), was used to estimate maximum ambient nitrate concentrations for those wells and systems.

4) Post-2010 ambient nitrate levels within each wells' capture zone were spatially joined in GIS to determine the maximum nitrate level within each well's 10-year capture zone for the Upper, Lower, and Below Lower Zones.

Public water supply wells in the Management Zone are mapped with their 10-year capture zone radius (using a default of 1,500 ft if no DWSAPP was provided for that particular public supply well) around each well with recent (post-2010) ambient nitrate levels from the Upper Zone in **Figure 2-8**. The entire dataset of public supply wells' capture zones and maximum nitrate levels in the 10-year capture zone is provided in **Appendix PWS-3**. A summary of the public supply well capture zone analysis with ambient nitrate concentrations is provided in **Table 2-8.** The majority of community public supply wells (category CWS) are located in disadvantaged and severely disadvantaged communities (DAC and SDAC); 175 out of 756 community supply wells are located in elevated nitrate levels (above 7.5 mg/L as N); and 105 of those 756 wells are located in areas with estimated nitrate levels above the MCL of 10 mg/L as N in the Upper Zone.

Table 2-8. Number of Public Supply Wells with Maximum Post-2010 Ambient Upper Zone Nitrate Level in the 10-Year Capture Zone							
PWS Type and MHI Status for Count of PWS Wells	Maximum Post-2010 Ambient Upper Zone Nitrate Level in the 10-Year Capture Zone						Total Number of Public Supply Wells
	<2.5 mg/L as N	>2.5 – 5.0 mg/L as N	>5.0 – 7.5 mg/L as N	>7.5 – 10.0 mg/L as N	>10.0 mg/L as N	Unknown Nitrate Level	
Community Water Systems (CWS)							
DAC	112	165	83	41	37	28	466
SDAC	45	31	26	26	53	13	194
NDAC(150%)	16	29	26	3	11	6	91
NDAC	0	0	0	0	4	0	4
Unknown MHI Status	1	0	0	0	0	0	1
CWS Total	**174**	**225**	**135**	**70**	**105**	**47**	**756**
Non Transient Non Community Systems (NTNC)							
Unknown MHI Status	25	40	25	24	47	16	177
NTNC Total	**25**	**40**	**25**	**24**	**47**	**16**	**177**
State Small Water Systems (SSWS)							
Unknown MHI Status	4	2	2		3	7	18
SWS Total	**4**	**2**	**2**		**3**	**7**	**18**
Transient Non Community Systems (TNC)							
Unknown MHI Status	29	19	17	14	32	12	123
TNC Total	**29**	**19**	**17**	**14**	**32**	**12**	**123**
Grand Total of Public Supply Wells	**232**	**286**	**179**	**108**	**187**	**83**	**1,075**

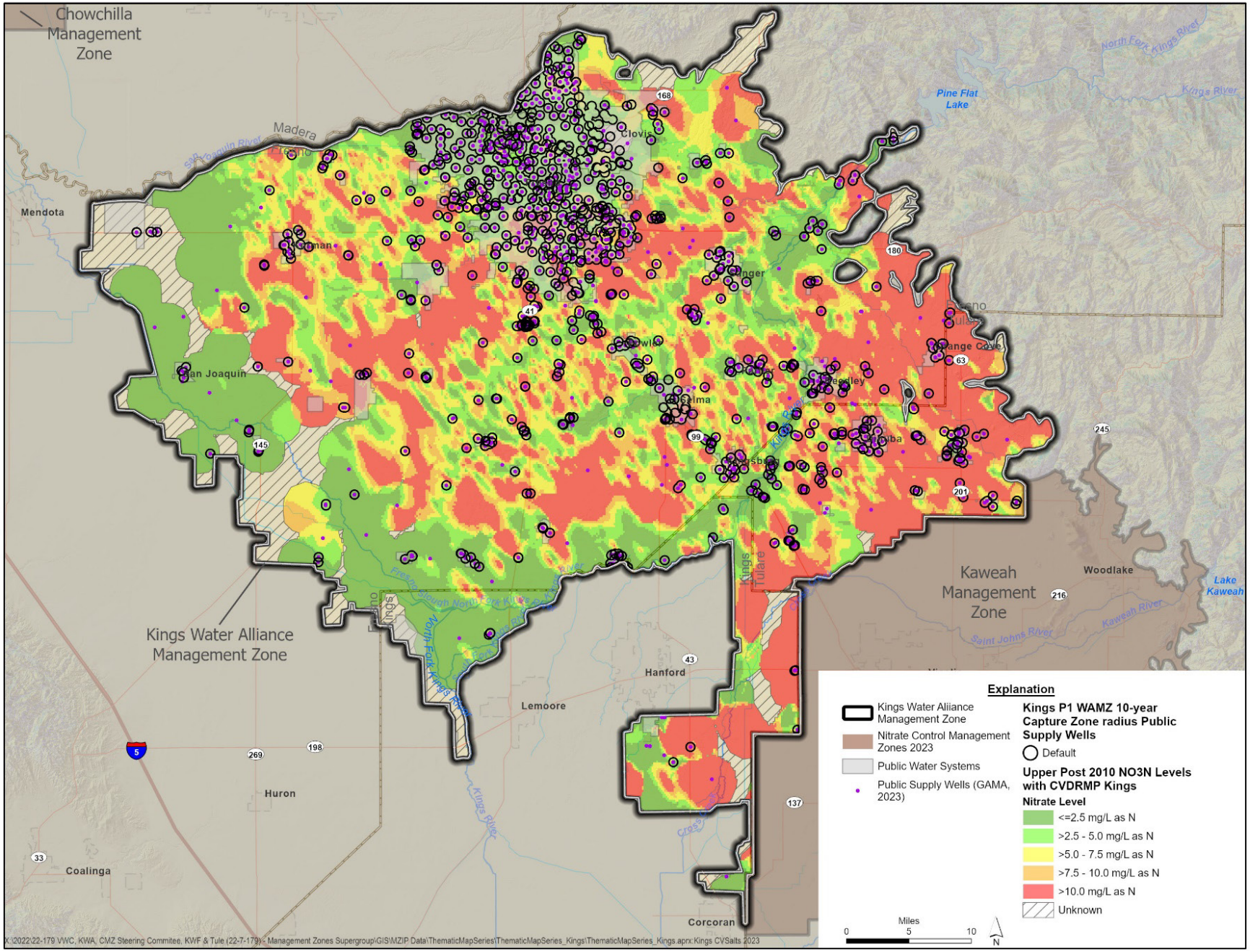


Figure 2-8. Public Supply Well 10-Year Capture Zones with Recent Ambient Nitrate Levels

2.3.3. Disadvantaged Communities and Disadvantaged Unincorporated Communities Drinking Water Needs

The locations of disadvantaged communities, disadvantaged unincorporated communities, and severely disadvantaged communities are available through DWR's DAC Mapping Tool[13] and presented for the MZIP in the series of figures **Figure 2-9a, 2-9b,** and **2-9c**. These figures show the locations of disadvantaged communities based on a) Census Block Groups; b) Census Tracts; and c) Census Places. The locations of DACs and SDACs are used to help identify areas with the most urgent needs of drinking water solutions as described further in **Section 4** Long Term Drinking Water Solutions Program (specifically **Section 4.2.1**).

The information in **Appendix PWS-1** indicates that there are 57 PWSs in DAC and SDAC areas, 15 of which are known to be out of compliance (as of February 2023) due to various violations; one of those failing system is related to a nitrate MCL violation and multiple non-MCL violations (the rest for other non-nitrate MCL or reporting violations). Thirteen out of fifteen of the PWSs in DACs and SDAC areas that are out of compliance are located in areas exhibiting a medium to high level of aquifer risk according to the SAFER Nitrate Aquifer Risk Map (NO3N ARM).

[13] DWR's Disadvantaged Communities (DAC) Mapping Tool https://gis.water.ca.gov/app/dacs/

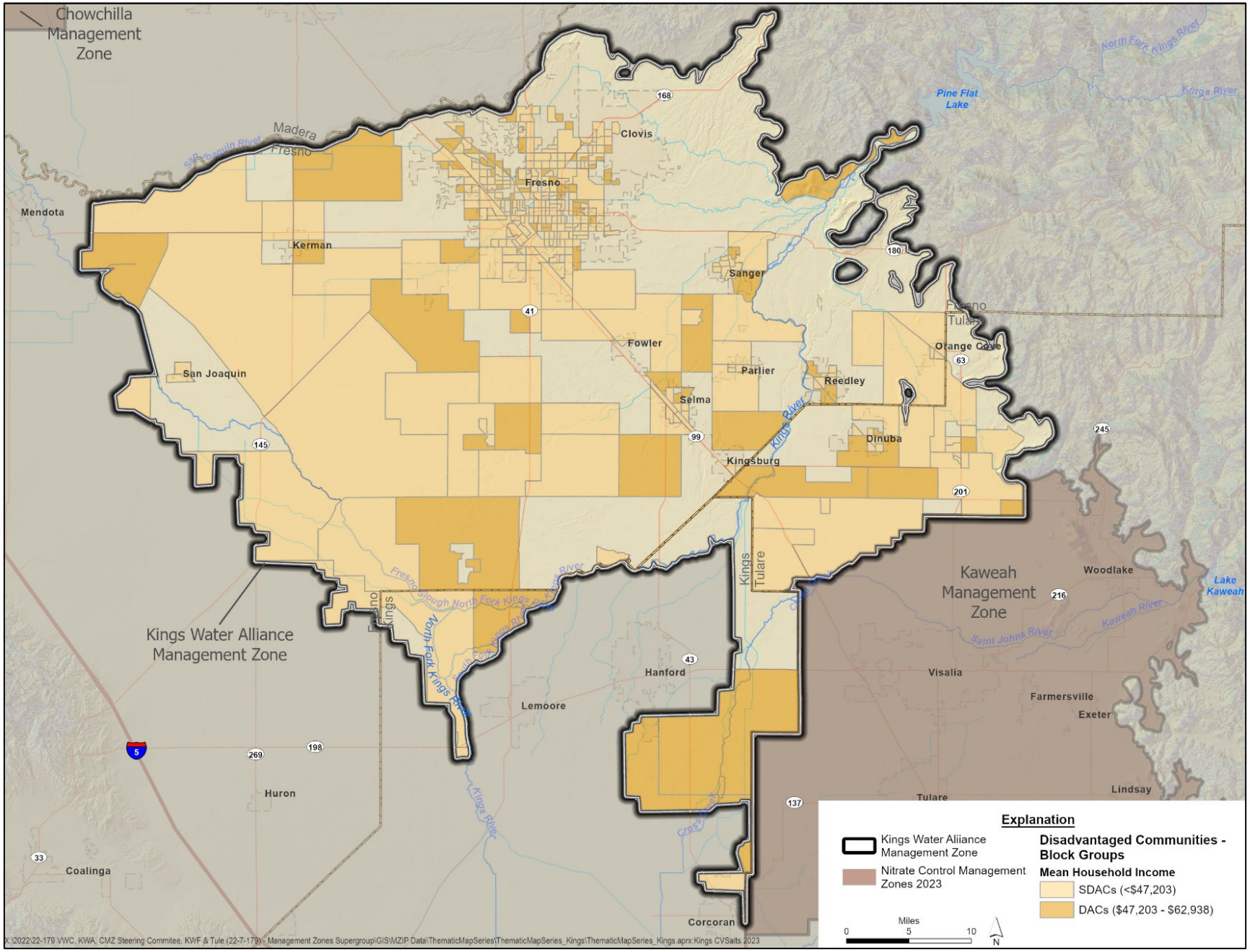


Figure 2-9a. Disadvantaged Communities Census Block Groups (2020)

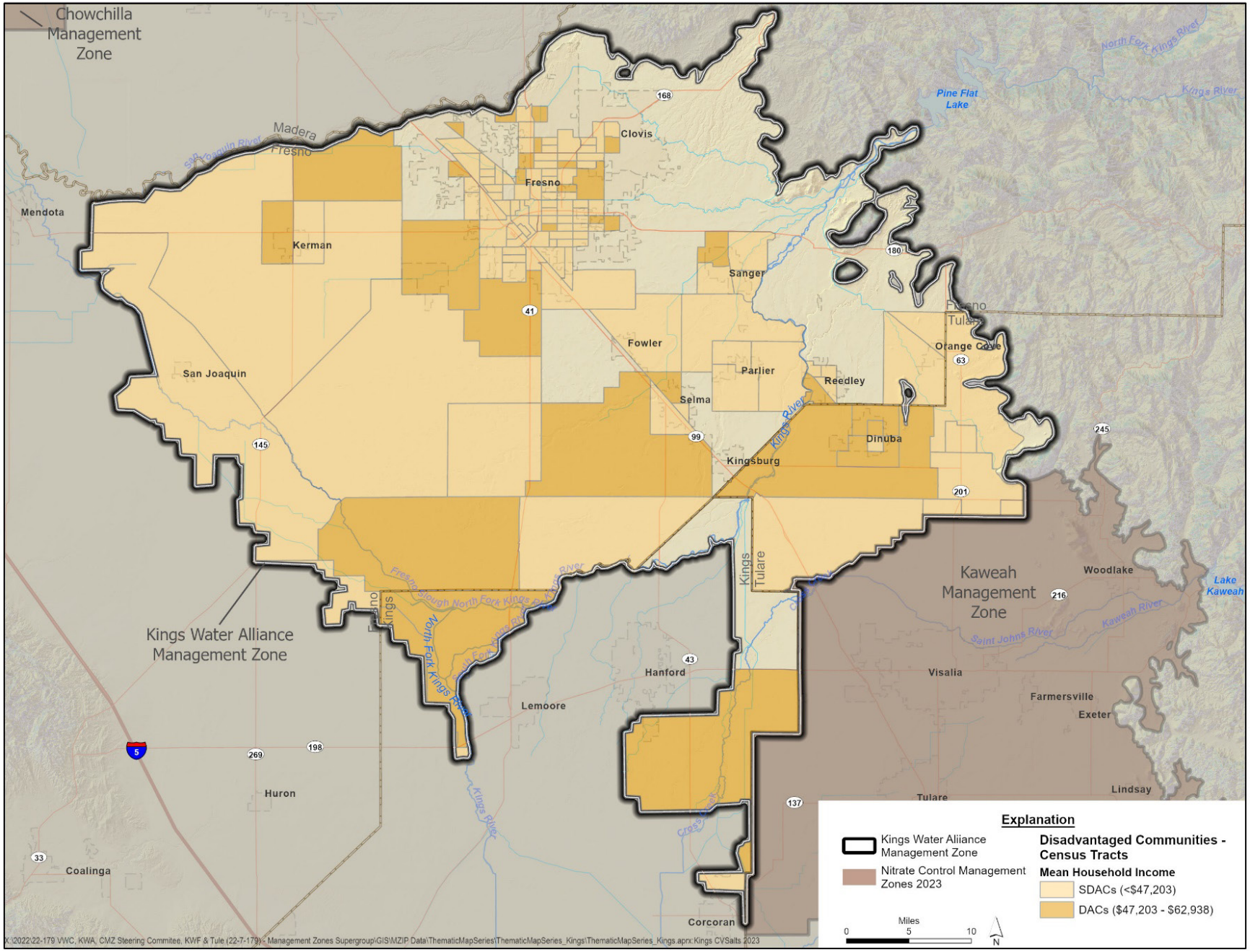


Figure 2-9b. Disadvantaged Communities Census Tracts (2020)

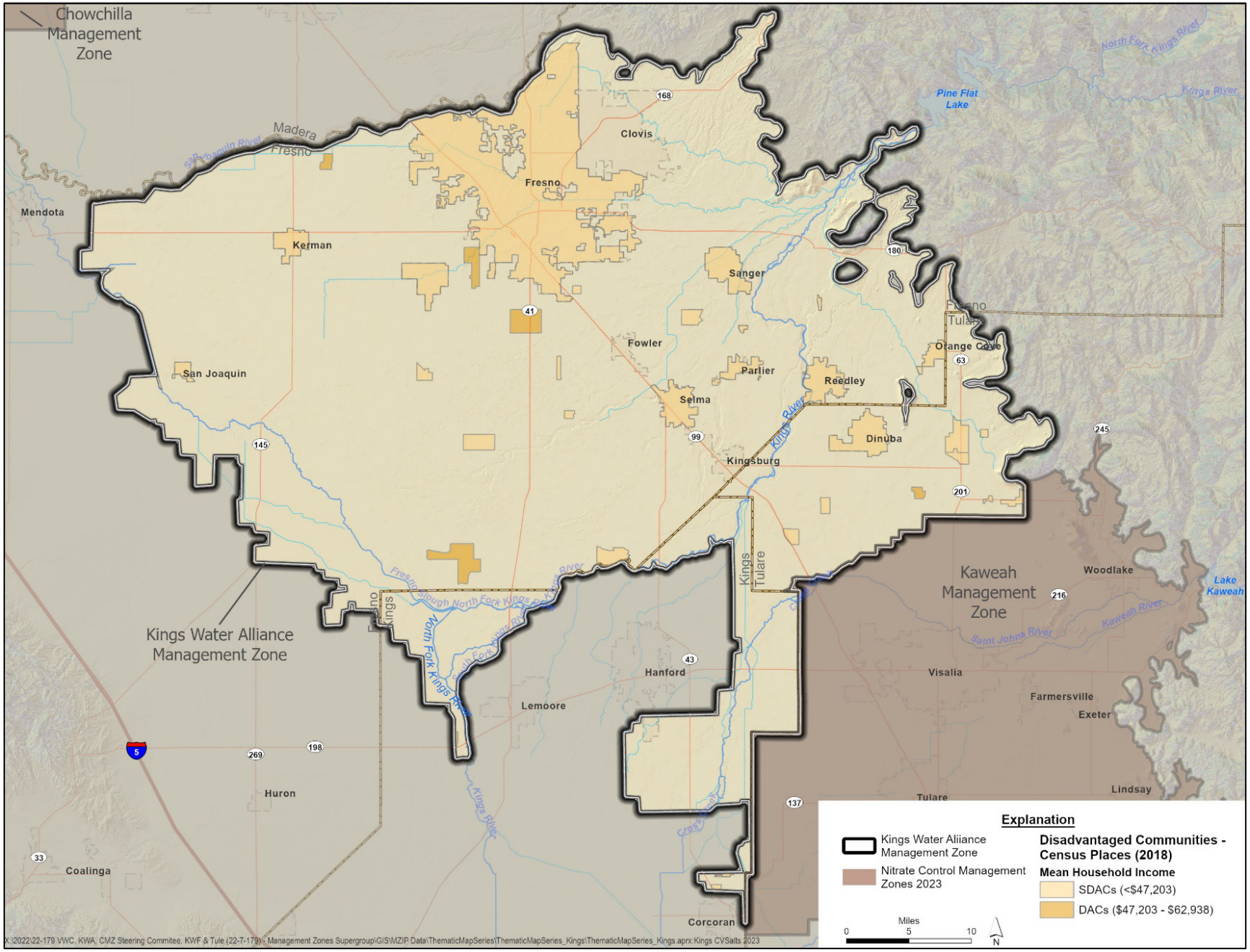


Figure 2-9c. Disadvantaged Communities Census Places (2018)

2.4. Analysis of Impacted Domestic Wells and Populations

Domestic well locations in the Management Zone were publicly available through DWR's GIS spatial coverage of Well Completion Reports[14]. The approach to identify potentially impacted domestic wells and local small water systems utilizes PWS service area GIS map coverages. Domestic wells located within the boundaries of a PWS were identified even though they may not be used for drinking water. The map of recent post-2010 ambient Upper Zone nitrate was used to estimate the number of potentially impacted domestic wells in the Management Zone. To estimate the number of domestic 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;
- Group 2 - Groundwater in the Upper Zone with nitrate as N above 2.5 mg/L and at or below 5.0 mg/L;
- Group 3 - Groundwater in the Upper Zone with nitrate as N above 5.0 mg/L and at or below 7.5 mg/L;
- Group 4 - Groundwater in the Upper Zone with nitrate as N above 7.5 mg/L and at or below the MCL of 10 mg/L;
- Group 5 - Nitrate as N exceeding the MCL of 10 mg/L 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 inside and outside PWS boundaries was compared to the number of wells in each elevated nitrate category to estimate the percent of domestic wells potentially impacted by elevated nitrate in groundwater. **Table 2-9** summarizes the results of this analysis. This analysis has some inherent uncertainty associated with domestic well locations and the ambient nitrate map (which is adaptable and subject to change as additional Upper Zone groundwater nitrate data become available over time).

To estimate the population potentially impacted by residents relying on domestic wells that may have elevated nitrate, 2020 census block data were mapped and joined with the post-2010 ambient Upper Zone nitrate concentrations occurring outside of PWS boundaries. The population was summed for census blocks outside PWS boundaries and within the Management Zone for those areas with nitrate concentrations in the Upper Zone (using the six categories of nitrate concentration described above). **Table 2-9** summarizes the results of this analysis.

[14] Several domestic well locations provided by DWR's Well Completion Report database may not be exact locations, but rather plot in the center of a 1-square mile township/range-section area. Therefore, several domestic wells may plot at the same location, and their locations are accurate up to one mile. The DWR Well Completion Report Map Application can be accessed here: https://gis.water.ca.gov/app/wcr (accessed 8/7/2023).

Table 2-9. Summary of Domestic Wells and Population with Estimated Upper Zone Nitrate Area Categories					
Estimated Upper Zone Ambient Nitrate (2010-2022)**	DWR Domestic Wells Located Outside PWS Boundaries		DWR Dom. Wells Within PWS Boundaries	DWR Total Domestic Wells in MZ	2020 Census Block Analysis (outside PWS service areas)
	Domestic Well Count Outside of PWS Boundaries	% of Total Domestic Wells Outside PWS	Total Domestic Wells in MZ Within PWS	All Domestic Wells in MZ	Population Outside PWS Boundaries
Group 1: <=2.5 mg/L as N	2,005	82.7%	418	2,423	42,617
Group 2: >2.5 – 5.0 mg/L as N	2,144	65.8%	1,113	3,257	65,042
Group 3: >5.0 – 7.5 mg/L as N	2,655	82.5%	565	3,220	43,099
Group 4: >7.5 – 10.0 mg/L as N	2,074	88.7%	264	2,338	27,967
Group 5: >10.0 mg/L as N	3,718	93.9%	241	3,959	54,500
Group 6: Unknown*	139	67.5%	67	206	52,913
Total	**12,735**	**82.7%**	**2,668**	**15,403**	**286,138**

**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.*

***Ambient nitrate levels are based on best available publicly-available groundwater nitrate data*

2.5. Summary of Groundwater Conditions

The groundwater nitrate conditions (ambient and trends) indicate areas within the Management Zone that have elevated nitrate levels. Groundwater elevations and flow directions and nitrate levels along the border of the Management Zone indicate areas of potential contribution to areas outside the Management Zone.

PWSs within the Management Zone and compliance statuses are provided for all PWSs, focusing on those that have nitrate issues. The domestic well and population counts located in areas with elevated nitrate levels help estimate the number of nitrate-impacted domestic wells and residents within the Management Zone.

SECTION 3.
Emergency & Interim Drinking Water Program

The Nitrate Control Program required the establishment of an Early Action Plan (EAP) for proposed Management Zones, defined as a plan that identifies community outreach activities and an implementation schedule that will ensure access to safe drinking water for those dependent on groundwater wells exceeding the nitrate drinking water standard of 10 mg/L as N. Per the regulations, the EAP was required to address the following requirements (Central Valley Water Board 2020):

- 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 impacted communities, domestic well users and their representatives, the State Water Board's DDW, Local Planning Departments, Local County Health Officials, SGMA 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 EAP, which may include seeking funding from Management Zone participants, and/or local, state and federal funds that are available for such purposes.

The KWA submitted its EAP to the Central Valley Water Board on March 8, 2021. The Central Valley Water Board conditionally approved the EAP on May 7, 2021, and the KWA began implementation immediately within the portion of the KWA that is a Priority 1 area under the Nitrate Control Program (EAP implementation will be expanded into Priority 2 areas under the jurisdiction of the KWA at a later date). The EAP established a community outreach program, domestic well testing program and Interim Replacement Water Program to be implemented in the Management Zone to ensure access to safe drinking water for those dependent on groundwater wells where well testing showed that the well water exceeded the nitrate drinking water standard.

The KWA is incorporating its EAP into this MZIP where it will continue to guide efforts to outreach to the community, provide free well testing to residents and, where needed, offer emergency and interim drinking water while the Management Zone implements its long-term drinking water program that will work to assist residents and communities obtain permanent solutions to provide safe drinking water to residents in the Management Zone. There will be no interruption in these early action activities in Priority 1 areas of the KWA as the MZIP undergoes review and is implemented when approved. The sections below, which were part of the original EAP, are now the key elements of the Management Zone's Emergency & Interim Drinking Water Program for the area of the KWA covered by this MZIP.

3.1. Community Outreach

Community outreach activities will continue during MZIP implementation. As community input is received, modifications to outreach activities described here may occur. Where appropriate and to support a cost-effective strategy, these community outreach activities may be coordinated with the adjacent Priority 2 Tulare Lake Subbasin and very small adjacent Priority 2 areas in the Westside, Pleasant Valley and Kern County Subbasins Zone and potentially other neighboring planned Priority 2 Management Zones.

3.1.1. Community Engagement Strategy

Community outreach in the Management Zone was originally guided by KWA's Early Action Plan Communication & Outreach Plan. This was developed in accordance with the *Guidance for Engaging Communities During Development of Early Action Plans* (State Water Board, 2020) and included in the original EAP submitted for the Management Zone. The Community Engagement Communication and Outreach Plan was recently updated and, as amended, includes the following objective for KWA's outreach process:

- To create a level of engagement and awareness with community residents that establishes trust and provides robust participation in the development and implementation of short- and long-term drinking water solutions.

Critical to achieving the objective are a set of goals that employ integrated communications tactics, using various channels and communication mediums to reach impacted residents effectively while giving all an opportunity for engagement. The goals set to achieve the objective are as follows:

1. Identify and cultivate relationships with key influential individuals and organizations in the communities to amplify information from the KWA.
2. Provide channels for input and participation that connect with residents in a way that is effective and accessible.
3. Provide accurate, easy-to-understand, timely information on the development and implementation of short- and long-term drinking water solutions.

As the Community Engagement Communication and Outreach Plan was implemented, it was adapted when needed to optimize engagement. This will continue to be used during MZIP implementation; it is considered a "living" document that will be updated, as needed.

3.1.2. Community Engagement Activities

Community outreach activities are designed to support efforts to provide emergency and interim drinking water until long-term solutions are identified and implemented. These community engagement activities are conducted in a manner to encourage active involvement of diverse social, cultural, and economic elements of the community (see **Appendix O** for KWA's outreach to date).

The following sections summarize key elements of the program to engage the community. To facilitate outreach efforts, the Management Zone partnered with Self-Help Enterprises (SHE) during the EAP development process. SHE provided and will continue supporting the KWA in the following areas:

- Translation of Community Outreach Materials
- Well Assessment Data & Outreach

3.1.2.1. Maintain Management Zone Website

The Management Zone maintains a website: https://kingswateralliance.org/. This website serves two key purposes. It provides a: (a) mechanism for residents to notify the Management Zone that they would like to receive notifications of upcoming outreach events and mailouts of program information; and (b) place to post the following information:

- Schedule for implementation of MZIP's Emergency & Interim Drinking Water Program.
- Planned community outreach-related activities and how to participate.
- Information regarding how to have your well tested for nitrate at no cost to the resident.
- Interim Drinking Water Replacement water program information, including, e.g., (1) how to receive bottled water deliveries at your home; (2) how to have a POU System installed in your home; and (3) locations of and procedures to use the existing operational water fill stations and information on the development status of any new water fill stations in the area.
- Informational materials such as fact sheets, community flyers or other materials that can be used individually or shared with others.
- Frequently Asked Questions (FAQs) regarding relevant Nitrate Control Program activities, e.g., MZIP implementation.

The website also includes a Storymap (https://storymaps.arcgis.com/stories/c59a0d4fb59749cbb180b842b8604f05) that provides an easily understood summary of the nitrate water quality concerns in the Management Zone and ongoing efforts to implement the Emergency & Interim Drinking Water Program. The website includes an interactive map for residents to determine if they are within the Kings Water Alliance Management Zone (https://kingswateralliance.org/map/).

3.1.2.2. Materials Development & Distribution

The Management Zone will prepare informational materials on an as needed basis to support implementation of this Emergency & Interim Drinking Water Program (e.g., FAQs or "how to" instructions for topics such as how to have your well tested, how to request bottled water delivery or installation of a POU System, or how to access and operate a water fill station). These materials will be posted on the website and as needed, provided to stakeholders within the Management Zone to facilitate information sharing. Any posted documents will include both English and Spanish translations when feasible. Other language translations will be developed, if the need is identified.

3.1.3. General Management Zone Outreach

KWA will continue to conduct periodic community outreach meetings to support MZIP implementation. Upcoming meeting schedules will be shared with the community during outreach activities and through postings on KWA's website, Facebook page, and other social media platforms.

3.1.3.1. Community Outreach Meetings

General community outreach meetings will continue to be held during MZIP implementation (information will be provided in both English and Spanish to the maximum extent practicable; other language support will be provided, if determined necessary). Opportunities to participate in these meetings continues during MZIP implementation. Meetings may vary between in-person, virtual (or potentially a hybrid of the two options) depending on the need/purpose of the meeting. **Table 3-1** summarizes the activities that will be implemented by the Management Zone to conduct each meeting. The content of each meeting may vary, but the primary purpose of these meetings is to inform the community of the following:

- Content of the MZIP and phasing of implementation across the Management Zone;
- Overall status of MZIP implementation activities under each phase;
- Opportunity for residents with a well with nitrate at a concentration greater than 10 mg/L-N to participate in or access services from the interim drinking water program;
- Obtain input from the community on how implementation of the MZIP can be improved;
- Have discussions regarding ongoing efforts to identify long-term drinking water solutions in Initial Focus Areas as planning efforts in those areas increase (see Section 4); and
- Schedule for subsequent meetings and upcoming milestones.

Table 3-1. Process to Conduct Community Outreach Meeting	
Task	**Primary Activities**
1. Address meeting logistics (if meeting is virtual, 1a will not be necessary)	a. Secure public venue for in-person meeting. b. Prepare and send out "save the date" meeting notice at least 10 days in advance of the meeting date (English and Spanish); post same information on the website. c. Send out follow-up meeting notice in English and Spanish within 3-4 days of the meeting date. d. Send out meeting notice flyers to other supporting stakeholders to email their internal email list, post on bulletin boards or post on their websites. e. Secure necessary translation services for meeting.
2. Prepare meeting materials	a. Prepare, as needed, meeting agenda, handouts, PowerPoint presentation materials specific to the purpose of the meeting. b. Bring copies of any Management Zone informational materials for distribution at the meeting (if in-person).
3. Post follow-up information as needed after outreach meeting	a. Post meeting presentation materials and handouts to Management Zone website, as appropriate.
4. Follow-up directly with meeting participants after meeting, as needed	a. Follow-up on action items from the meeting b. Respond to post-meeting emails/inquiries

The Management Zone will notify the public of MZIP-related community outreach events (at a minimum in both English and Spanish) through the use of one or more of the following methods:

- Email to residents that have registered with the KWA to receive information.
- Postings on the Management Zone website and the websites of organizations that have partnered with the Management Zone to share information.
- Social media networks, e.g., Facebook, Twitter, or Nextdoor.
- Direct mail to Management Zone residents, using cost effective methods.
- Public announcements, e.g., through newspaper notices in local and regional media or radio advertisements in the local area.
- Requests to other entities to facilitate outreach efforts, e.g., civic organizations, school and community service districts or houses of worship.
- Others, as determined by the Management Zone.

3.1.3.2. Targeted Resident Outreach

Section 4.3 characterizes areas within the Management Zone that have been selected as Initial Focus Areas during MZIP development. Potentially affected residents identified in these Initial Focus Areas will be targeted for direct outreach during the beginning of MZIP implementation. As MZIP implementation progresses, additional focus areas will be identified and targeted community outreach will occur in these future focus areas. Outreach will continue periodically to capture new residents that may have moved into identified focus areas. KWA will develop information to send to each resident targeted for outreach.

The Management Zone will send the following information to each household in these Initial Focus Areas (at a minimum, information will be provided in both English and Spanish):

- Cover letter that explains the MZIP and how its implementation may apply to their residence.
- Educational materials regarding nitrate in drinking water as a potential health concern.
- Provide information about options available to obtain interim drinking water and, if needed, have their domestic well tested for nitrate (these materials will make clear that where well testing is needed it will be done at no cost to the resident).
- Information about opportunities to participate in MZIP implementation and development of long-term drinking water solutions.
- Contact information for a representative of the Management Zone and website where the resident can obtain more information (Management Zone will have Spanish-speaking representative available, as needed). A Management Zone representative will be available to address questions during day and evening hours.

The Management Zone will conduct additional outreach to targeted residents that have not responded in some manner to the initial mailout of information. Additional outreach to non-respondents included a second mailout in the form of a postcard containing information (unless previous mailed information was returned as undeliverable). The Management Zone will also look for additional opportunities to share information at locations where people gather in the local area, e.g., local community centers, schools, houses of worship, or farm labor centers.

3.1.3.3. Coordination with Non-Dischargers

The Management Zone coordinates with entities that are not dischargers subject to the requirements of the Nitrate Control Program but have a potential role in ensuring residents have access to safe drinking water. This collaboration helps the Management Zone:

- Identify potentially affected residents to target for outreach;
- Implement the Interim Drinking Water Program;
- Support outreach activities to all residents within the Management Zone;
- Prepare outreach materials tailored to the constituencies associated with non-dischargers;
- Inform other interested parties of MZIP-related activities ongoing in the area, e.g., Fresno and Tulare County Boards of Supervisors, Fresno and Tulare County Public Health Departments, other appropriate County departments, trade groups, local community organizations, etc.

- Keep the Central Valley Water Board and State Water Board DDW informed (outside of regular MZIP status reports) of any issues or concerns that may be developing through program implementation;
- Apply for grants that support not just implementation of the Nitrate Control Program but other area programs to ensure the community has safe drinking water; and
- Develop long-term solutions for providing safe drinking water to residents in the Management Zone.

3.2. Short-Term Drinking Water Solutions

The Interim Drinking Water Program previously detailed in the EAP as the Interim Replacement Water Program began at the start of EAP implementation in May 2021 for Priority 1 areas within the Management Zone. Priority 2 areas within the Management Zone will be addressed at a later date.[15] This program provides replacement water at no costs to residents and will continue until permanent, long-term solutions are in place. The emergency and interim drinking water program includes two key components that will be implemented in parallel to meet the needs of as many residents as possible and as quickly as possible:

- Drinking water options designed to meet individual household needs including: (a) bottled water delivery; and (b) installation of a POU System in the home (where appropriate).
- Implementation of water fill stations to meet additional community needs.

One of the key goals of the Nitrate Control Program is to ensure residents in a Management Zone have access to water that is not nitrate contaminated. Once a long-term drinking water solution that provides a permanent source of safe drinking water has been implemented in an area where residents are receiving water under this temporary program (e.g., receiving bottled water or providing access to a water fill station), the Management Zone will notify the residents of the availability of the new source of drinking water and how they may obtain water from that source.

3.2.1. Interim Replacement Water Program Options

The sections below describe each of these program components and how they are being implemented through the Emergency & Interim Drinking Water Program.

3.2.1.1. Bottled Water Delivery Program

The Management Zone offers a bottled water delivery program to meet household-specific water needs. Section 3.2.2 below describes how a residence can participate in this program. In general, residents participating in the program will:

[15] The Nitrate Control Program requires the Central Valley Water Board to send Notices to Comply to dischargers and irrigated agricultural lands coalition groups that are within the boundaries of the identified Priority 2 basins within two to four years after the effective date of the Nitrate Control Program. Notices to Comply in Priority 2 areas are currently expected to be sent out in December 2023.

- Receive regular deliveries of bottled water from the Management Zone's bottled water vendor at no cost to the residents.
- Establish any necessary agreements and schedules with the Management Zone's vendor(s) to implement service at their residence. It is anticipated the vendor providing the bottled water service will: (a) provide a hand pump to the resident at no cost during the initial delivery; (b) deliver 5-gallon water bottles on a regular schedule; and (c) pick-up the empty bottles (Note: Smaller sized bottle options, e.g., 3-gallon, may also be available).
- Receive an initial volume of 60 gallons/month of water at their home. Through coordination with the Management Zone, this initial volume may be increased or decreased based on the needs of each household.

As noted above, each resident is responsible for establishing any necessary agreements with the vendor and complying with the terms and conditions of any signed agreements. However, the Management Zone will assist residents as needed with any questions or issues that arise during the establishment of the agreement with the Management Zone's vendor.

3.2.1.2. Point of Use Treatment System Program

The Management Zone may offer a program to install and operate a POU System in a residence at no cost to the resident to meet household-specific water needs. In general, a resident participating in this program would have a POU System installed at an appropriate location in the residence to provide the household with water for drinking and cooking (e.g., under the kitchen sink). Section 3.2.2 below describes how a resident can participate in this program.

Every request for POU System installation requires careful evaluation to be sure the appropriate treatment system can be installed in the household. In addition, a POU System cannot be considered for installation without additional water quality analyses that test for the full range of water quality contaminants known to potentially occur in groundwater in the subbasin. In some cases, for example due to a lack of necessary data or site-specific circumstances a POU System may not be a viable interim drinking water option for the residence. Reasons why installation of a POU System may not be a viable option include, but may not be limited to:

- Inadequate incoming pressure to the treatment system;
- High nitrate levels (typically > 20 mg/L as N) that limit the effectiveness of the POU System to treat the water to a safe level;
- Presence of other contaminants besides nitrate that limit the effectiveness of the POU System and/or are not treatable through a POU System; and
- Inability to ensure that a robust POU System service plan can be implemented at the residence.

To support the POU System Program, the Management Zone will coordinate with State Water Board DDW and the vendor(s) as needed to assist with POU System technical issues. If the technical problems are unresolvable, the residence may alternatively participate in the bottled water delivery program.

Where a POU System is a feasible interim drinking water option, the Management Zone's POU System vendor(s) will work with the resident to install the treatment system. If the resident is not the owner of

the residence, the process to install and maintain the POU System will require written approval of the property owner.

Once approved, the resident will establish any necessary agreements (and schedule) with the Management Zone's vendor(s) to install and maintain a POU System at the residence. It is anticipated that services will include: (a) installation of the treatment device; (b) initial and follow-up water testing to ensure the device is removing nitrate down to safe levels as expected; and (c) periodic maintenance of the POU System (as required by the manufacturer). The cost of these services will be borne by the Management Zone as long as the MZIP is effective or until an alternative option is provided to ensure the residence has drinking water safe from nitrates. As part of its ongoing community outreach efforts under this MZIP, the Chowchilla Management Zone will be obtaining input from residents on possible long-term, permanent solutions for the Management Zone. If a resident chooses to continue the use of the POU treatment system, even where permanent drinking water solutions have been made available, the resident will be responsible for paying maintenance services. If the resident does not allow required maintenance and monitoring of the POU System to take place (as per the vendor agreement), then the Management Zone has the discretion to modify the approved interim drinking water option from a POU System to bottled water delivery.

As noted above, each resident is responsible for establishing any necessary agreements with the vendor and complying with the terms and conditions of any signed agreements. However, the Management Zone will assist residents as needed with any questions or issues that arise during the establishment of an agreement with the Management Zone's vendor.

3.2.1.3. Water Fill Station Program

3.2.1.3.1. Description

A water fill station is an independent water-dispensing facility connected directly to a PWS that meets safe drinking water standards and is constructed and operated consistent with state and federal regulations (i.e., as required to meet implementation of the California Safe Drinking Water Act as defined in the California Health & Safety Code and Titles 17 and 22 of the California Code of Regulations), as applicable. Three water fill stations are currently operational within the Management Zone (https://kingswateralliance.org/safedrinkingwater/fillstations/):

- *Kerman, CA* – This station, is located in the northwest portion of the Priority 1 Kings Subbasin at the Kerman Community Center (15101 W Kearney Blvd, Kerman, CA 93630).
- *Dinuba, CA* – This station is located in the southeast portion of the Priority 1 Kings Subbasin at the Circle K (517 W El Monte Way, Dinuba, CA 93618).
- *Hanford, CA* - This station is located in the northern portion of the Priority 2 Tulare Lake Subbasin at the KART Transit Center (504 W. 7th Street, Hanford, CA 93230).

In addition to the three stations above already located within the proposed Management Zone, two water fill stations are also operating within the boundary of the Kaweah Water Quality Coalition along the east/southeast side of the KWA Management Zone. One of these locations is only a few miles east of the Management Zone boundary, at the southwest corner of Avenue 229 and Road 48 in Okieville. The

Kaweah Management Zone provides additional information about this water fill station at its website: https://kaweahwater.org/.

The fill stations may be used by anyone to fill water bottles up to five gallons in size as often as necessary at no cost to the user. Water stations may not be the preferred solution for some residents to obtain drinking water; however, they do serve as a front-line solution to reach as many residents as possible while other solutions are implemented. Moreover, while fill stations are being developed to address nitrate concerns, their presence in the community can provide other local benefits, including for example:

- Safe drinking water source for the homeless;
- Source of water for farm labor contractors to fill up containers to provide safe water for field workers;
- Alternative water source for residents who are:
    - Reliant on wells that may dry up during significant periods of drought; and
    - Who, because of privacy concerns, do not respond to the Management Zone's offers to provide bottled water delivery or POU System services.

Under the MZIP, the Management Zone may establish additional fill stations that target areas with the following characteristics:

- Results of community outreach activities indicate the need and support for additional fill stations;
- Residents are not served by a nitrate compliant PWS;
- Nitrate concentrations in the underlying groundwater are most likely greater than 10 mg/L-N; and
- Area is not already served by an existing water fill station, including those in an adjacent Management Zone.

If additional fill stations are planned for development, the KWA will work with the community through its outreach process to identify the best areas to target for installation of the stations as needed, where it fits operational standards and requirements.

3.2.1.3.2. Siting and Use Criteria for Identifying a Water Fill Station Location

It is anticipated that any additional fill stations developed by the KWA will be new installations. However, if the opportunity becomes available in the Management Zone, the KWA will consider partnering with entities that already have an operational fill station. Where such a partnership can be established, KWA will work with the entity to make any modifications to the facility necessary to support the fill station requirements under this program and compensate the owner for water used.

When identifying a new location to establish a water fill station, the Management Zone will look for locations that meet as many of the following criteria as possible:

- It is within an area that the community has indicated would benefit from a water fill station.
- Management Zone is able to obtain permission to install and operate a filling station on land or property owned by a third party.
- Fill station receives its water from an existing PWS that (a) complies with all regulatory requirements to provide safe drinking water; and (b) has sufficient capacity to dispense water at

a reasonable rate to fill up multiple containers (up to five gallons) within a short period of time. The minimum targeted rate is 1.5-2 gallons/minute, consistent with California regulations for faucets in new residential construction.

- The location is within an area where the public already goes to meet other family needs, e.g., at a governmental facility, shopping center, school, or house of worship.
- Establishment of the fill station is not expected to create any safety issues for users, e.g., location is in a well-lit and well-trafficked area.
- Vehicle access/parking is available close to the fill station (to minimize distance a water bottle must be carried) and sufficient in area to not cause any unnecessary congestion.
- To the extent practicable, the location meets the goal to have a water fill station open 24 hours/7 days per week.
- Operation of the fill station does not create noise impacts to neighboring properties, especially during nighttime hours.

Through its existing program to establish water fill stations, the Kings River Water Quality Coalition has developed significant experience identifying and developing locations for these stations. This experience has shown there are challenges to finding viable locations that meet all of the above the criteria. Regardless, the KWA will work to identify sites that most closely meet these criteria.

3.2.1.3.3. Implementation Approach

Table 3-2 summarizes the key steps/activities that the Management Zone will implement to install and operate a water fill station. Consistent with the implementation of existing fill stations, residents that use the fill station will need to provide their own bottles to fill at the facility. Information regarding how the user should clean and sanitize water bottles and store them is provided here: https://kingswateralliance.org/safedrinkingwater/fillstations/.

Table 3-2. Process to Develop Water Fill Stations	
Task	**Primary Activities**
1. Establish locations for installation of additional fill stations	a. Complete research to identify viable locations b. Conduct site visits; coordinate with land/property owners c. Make final selection of site location
2. Establish agreements with land/property owner of selected site and water provider for the station	a. Establish any necessary agreements to secure use of the site for installation and operation of a fill station b. Establish water usage agreements with water provider, as needed
3. Complete site design and obtain necessary approvals and funding to install new fill station	a. Prepare the station design (including operational signage) and construction-related documents) b. Obtain any required approvals/permits to implement the project (as required by local or state regulations)
4. Establish operational plans, as needed	a. Prepare sampling analysis plan for testing (or rely on existing plans used for other water fill stations) b. Prepare operation and maintenance (O&M) procedures including cleaning procedures as needed to operate the station
5. Construct the new filling station	a. Complete construction of the facility (including installation of signage) and obtain any necessary approvals to open the facility to the public
6. Conduct outreach to the local community to inform the public of the availability of the fill station	a. Conduct outreach as described in Section 3.1 b. Notify the community when the fill station is open c. Notify the Central Valley Water Board when the fill station is open
7. Manage operating site, conducting necessary maintenance and gathering usage data	a. Gather data on usage b. Respond promptly to repair needs to minimize time when water not available c. Conduct routine maintenance

3.2.2. Participation in Bottled Water or POU System Programs

Table 3-3 summarizes the steps or activities to be carried out by the Management Zone to implement the bottled water and POU System programs. Residents in Priority 1 areas of the Management Zone may request participation immediately for either of these interim drinking water options through various options: (a) contact the KWA directly by phone (559) 549-6747; (b) send an email to info@kingswateralliance.org; or (c) by submitting an eligibility survey available on the Management Zone website: https://kingswateralliance.org/eligibilty/ (survey may be submitted by mail or online). After receiving the survey, KWA staff follows up directly with the resident. A domestic drinking well testing agreement is filled out prior to well testing and implementation of bottled water delivery. Priority 2 areas

within the Management Zone will be able to request participation at a later time[16]. The Management Zone will confirm that the resident submitting the request meets the following three eligibility criteria:

1. Residence requesting services is within the KWA Management Zone and does not receive drinking water from a PWS where state- and/or county-mandated testing indicates the PWS complies with the nitrate water quality objective.

2. If the Management Zone contracts with a vendor(s) to provide the requested bottled water or POU System services and the vendor(s) requires the resident sign an agreement to receive these services, the resident must be willing to sign and meet the terms and conditions of the agreement.

3. Current drinking water source at the residence has a nitrate concentration that is above the safe drinking water level of 10 mg/L-N (see Section 3.3 below for information regarding how to have your well tested).

Residents participating in the bottled water or POU System programs will receive periodic check-ins (e.g., via email or telephone) from the Management Zone after services are initiated. These check-ins are provided to verify the Management Zone's approved vendor(s) are providing services as contracted. In addition, check-ins provide the opportunity for the Management Zone to (a) the answer questions from residents; (b) verify sufficient bottled water is being delivered to the residence; and (c) evaluate if the POU System is receiving proper maintenance.

Table 3-3. Process to Request Participation in Replacement Water Programs

Task	Primary Activities
1. Establish agreements with vendor(s) to provide services to residents	a. Select vendor(s) to provide the following services: (a) bottled-water delivery; (b) POU System installation and maintenance; and (c) well testing. b. Establish procedures to (a) connect vendor(s) with residents (including understanding regarding agreements residents will need to establish with the vendor); and (b) process payments for services rendered.
2. Conduct targeted residential outreach in Management Zone (see Section 3.1.3.2)	a. Send direct mailout to target areas (areas most likely to have nitrate concentrations in groundwater > 10 mg/L-N) informing them of the availability of all drinking water programs active in the Management Zone and how to participate in any program. b. Use other mechanisms described in Section 3.1 to notify the community at large of the availability of drinking water programs and how to participate in any program.

[16] The Nitrate Control Program requires the Central Valley Water Board to send Notices to Comply to dischargers and irrigated agricultural lands coalition groups that are within the boundaries of the identified Priority 2 basins within two to four years after the effective date of the Nitrate Control Program. Notices to Comply in Priority 2 areas are currently expected to be sent out in December 2023.

Table 3-3. Process to Request Participation in Replacement Water Programs	
Task	**Primary Activities**
3. Verify residents requesting bottled-water delivery or POU System installation meet eligibility Criteria 1 and 2 (see Section 3.2.2)	a. Verify the resident is located within the Management Zone. b. Verify the resident is willing to establish any required agreements with the Management Zone's vendor(s) providing the requested services.
4. Unless acceptable nitrate data are already available (see Section 3.3.1), conduct well testing to verify eligibility with Criterion 3	a. Obtain well water sample in coordination with the resident (and property owner, as needed) to test the drinking water source to the residence; notify resident of well test results. b. If well test result indicates the nitrate concentration is > 10 mg/L-N, the Management Zone will discuss options for drinking water with the resident, including the pros and cons of each approach. The Management Zone will connect the resident or property owner with the appropriate vendor (bottled water delivery or POU System) to initiate drinking water services if either of these drinking water options are selected. c. If well test result indicates the nitrate concentration is ≤ 10 mg/L-N the resident and property owner will be notified that (a) the bottled water delivery or POU System options are not available to them through the Management Zone at this time; and (b) a follow-up well test will be offered (i.e., if the test result was ≥ 7.5 and ≤ 10 mg/L-N (see Section 3.3.2)).
5. Conduct follow-up with residents receiving bottled water deliveries	a. Check-in with residents receiving services to verify: (a) monthly delivery volume is sufficient for household; modify as needed; and (b) service is being provided by vendor(s) as contracted. Check-ins will occur as follows: i. Within one month of initiation of service; ii. Approximately six months after initiation of service; and iii. Annually.
6. Conduct follow-up with residents with POU System	a. Check-in with residents receiving services to: (a) verify POU System is operating; (b) answer any questions regarding POU System O&M; and (c) verify resident is having system maintained as required by the agreement established with the vendor(s). Check-ins will occur as follows: i. Within one month of initiation of service; ii. Approximately six months after initiation of service; and iii. Annually.
7. Conduct follow-up outreach to residents or property owners with a nitrate test result that was ≤ 10 mg/L but ≥ 7.5 mg/L	a. Provide opportunity for residents or property owners to have well re-tested per procedures provided in Section 3.3.2.

3.3. Residential Well Testing Program

The KWA established its residential nitrate well testing program during EAP implementation and will continue this program during MZIP implementation. Any resident in the Management Zone may request to have their well sampled for nitrate during the two phases of Emergency & Interim Drinking Water Program implementation. Priority 1 areas within the Management Zone will be addressed first during Phase 1, followed by Priority 2 areas during Phase 2. Well testing will be provided to residents that live within the Management Zone boundary, are not currently receiving drinking water from a nitrate compliant PWS and receive their drinking water from a well. In addition, well testing will be provided to residents that live outside the Management Zone boundary *where* the resident is located immediately downgradient from Management Zone dischargers within their area of contribution. The Management Zone will only test the well that provides water to the residence. If the resident does not know the source of water to the household, e.g., whether the household receives nitrate compliant water from a regulated PWS, Management Zone representatives will work with them to evaluate this question.

A well test is necessary to verify eligibility to receive bottled water delivery or installation of a POU System, as described in the previous section. Section 3.2.2 above describes the various ways a resident can contact the Management Zone regarding getting a well test conducted. The following sections describe the KWA Management Zone well-testing program.

3.3.1. Initial Well Test

If the nitrate concentration of the well water is unknown, the Management Zone will coordinate with the residence to have the water tested as soon as possible at no cost to the resident. If the resident is not the owner of the property, permission from the property owner is necessary to have the well tested (see http://kingswateralliance.org/eligibilty/ for well-testing information). The resident may also provide the results from a previous well test if the water sample was collected within the last five years using standard methods for well sampling, and the nitrate concentration was analyzed using an approved Environmental Protection Agency (EPA) method by a laboratory certified under the California Environmental Laboratory Accreditation Program (ELAP).

It is anticipated that the resident will initiate contact with the landowner to obtain permission to have a well tested. However, if requested by the resident, the KWA Management Zone will follow up and obtain permission from the landowner on behalf of the resident. If the Management Zone learns that the resident is unable to obtain permission from the landowner or the landowner is not responsive to requests to obtain permission, the Management Zone will work with the Central Valley Water Board staff to address the issue.

Well sampling carried out by the Management Zone will be conducted using standard well sampling procedures consistent with sample methods used to implement other well testing programs in the area, e.g., as described in Central Valley Water Board's ILRP Drinking Water Well Program FAQ guidance (Central Valley Water Board 2020). All samples will be analyzed for nitrate using EPA-approved methods at an ELAP certified laboratory.

Residents and property owners will be notified of the results from the well test following receipt of the results from the laboratory:

- If the results indicate nitrate levels exceed 10 mg/L-N, the resident and property owner will be contacted directly via telephone or email within 24 hours of the Management Zone receiving the test result. The Management Zone will discuss options for replacement water with the resident, including the pros and cons of each approach. If bottled water or POU System service is selected, the Management Zone will coordinate with the resident and property owner to initiate bottled-water or POU System service at the residence as quickly as possible. The telephone/email communication will be followed up with a mailed written summary of the well test findings to the resident and the property owner, as applicable, that includes: a copy of the laboratory report; if applicable, documentation that the well water was only tested for nitrate and recommend that the resident consider having the well tested for other potential contaminants if seeking installation of a POU System (also see Section 3.3.3; if known, the Management Zone will provide information regarding other well testing programs that may be available in the area) and any recommended next steps. If any additional water testing is required by the vendor to support installation of a POU System, the Management Zone will coordinate this testing with the vendor providing this service.
- If the results indicate nitrate levels are ≤ 10 mg/L-N, the resident and property owner will receive a written summary of the results, including a copy of the laboratory report. The written summary will indicate, as relevant that: (a) the residence will not be able to participate in the Management Zone's bottled water or POU System drinking water programs; (b) the well water was only tested for a selected set of contaminants and that the resident may want to consider having their well tested for other potential contaminants (also see Section 3.3.3) (if known, the Management Zone will provide information regarding other well testing programs that may be available in the area); and (c) advise the resident of opportunity to have their well tested again, if applicable (see Section 3.3.2).

3.3.2. Follow-up Well Test

For any resident or property owner that has an initial nitrate well test result showing nitrate levels ≤ 10.0 mg/L but ≥ 7.5 mg/L, and the resident is not already having their well tested on a regular basis as required through the Central Valley Water Board's ILRP or the KRWQC groundwater trend monitoring program, the Management Zone will offer follow-up well testing. Within one year of the initial well test the Management Zone will contact the resident or property owner to offer the opportunity to retest the well at no cost. If the resident or property owner does not want their well re-tested, no additional follow-up will occur. If the resident or property owner agrees to have the well re-tested and the result remains between 7.5 and 10 mg/L, then the Management Zone will continue to reach out on an annual basis to provide the opportunity to have the well tested at no cost until the nitrate concentration is < 7.5 mg/L , or exceeds 10 mg/L and the resident is provided the option to receive bottled water or have a POU system installed.

3.3.3. Coordination with Other Related Safe Drinking Water Programs

The purpose of this Emergency & Interim Drinking Water Program is to fulfill the safe drinking water requirements of the Nitrate Control Program as they pertain to nitrate levels in groundwater. It does not address other potential water quality concerns that may impact drinking water within the Management Zone area, e.g., arsenic, uranium or 1,2,3 Trichloropropane (TCP). However, other programs (e.g., Safe

and Affordable Funding for Equity and Resilience [SAFER] under the Safe and Affordable Drinking Water Fund) are anticipated to support efforts to test for these other constituents of concern through the grant funding in the near future (pending KWA Board approval, as early as 2023).

Through its ongoing community outreach program and early coordination with SHE (either directly or through contract mechanisms established by other entities such as the Central Valley Salinity Coalition), the Management Zone will identify opportunities to collaboratively address these other contaminants of concern where appropriate. The intent of this collaboration is to implement as cost effective a program as possible that minimizes the potential for a residence to have its well tested multiple times, each time for different constituents. To this end, the Management Zone will coordinate with the State Water Board, Central Valley Water Board, community-based organizations and other interested entities to identify opportunities to implement a complementary well testing program. KWA is currently applying for a SAFER grant to enhance the well testing program to contain additional water quality concerns. KWA has participated in monthly collaborative efforts with Self Help Enterprises (SHE) in the past to avoid duplicating efforts providing assistance to residents and continue to communicate with SHE as needed when questions about services arise.

3.3.4. Coordination with Irrigated Lands Regulatory Program

Well testing regulatory requirements have been established for the ILRP. Given the overlap between these regulatory programs, the KWA Management Zone recognizes the importance of simplifying efforts by residents with the Management Zone to have their drinking water well tested. Accordingly, the KWA Management Zone will coordinate its Residential Well Testing Program with ILRP's Drinking Water Well Monitoring Program. If a resident applying for a well test under the Emergency & Interim Drinking Water Program well testing program is located on an enrolled parcel under the ILRP, the Management Zone will work with the resident and the associated parcel owner within the ILRP Coalition to determine if the well has already been sampled to satisfy ILRP well testing requirements. If the well has been tested and the test result indicates that nitrate exceeds the 10 mg/L-N threshold, the Management Zone will work with the resident and parcel owner to ensure the resident receives drinking water. Similarly, if the well has not been tested for nitrate, consistent with the Emergency & Interim Drinking Water Program procedures, the Management Zone will work with all parties to get the well sampled and address any needs for drinking water. Regardless of the situation, the Management Zone will coordinate with all parties so that the resident can receive drinking water if warranted. Also, while the Management Zone is ready to assist residents with having their well tested, any action by the Management Zone under the NCP is not a substitute for or satisfies domestic well testing requirements under the ILRP program.

3.3.5. Central Valley Dairy Representative Monitoring Program

The CVDRMP is working closely with selected dairy and confined bovine feeding operations within the Central Valley to implement a monitoring program to evaluate potential impacts of industry practices on first encountered groundwater. Domestic well testing is not part of the CVDRMP. However, the facilities permitted under the dairy/confined bovine feeding operation general orders and participants in the CVDRMP do test domestic wells and submit findings directly to the Central Valley Water Board. As a participant in the proposed Management Zones, the CVDRMP will encourage dairies and confined bovine feeding operations to share domestic well test results with the KWA to facilitate MZIP implementation in a more cost effective and efficient manner.

3.4. Monitoring Activities

The Management Zone is implementing the following record-keeping and data collection efforts activities:

- *Bottled-water Delivery Program* - The Management Zone maintains records that include the following information:
    - Requests for participation in this program;
    - Wells tested as a result of requests for participation and the well test results;
    - Communications with each resident regarding well test results and eligibility to participate in bottled water program; and
    - Communications with residents and status of participation in program (e.g., follow-up check-ins to verify water needs are being met and contracted services are being provided).
- *POU System Program* - The Management Zone maintains records that include the following information:
    - Requests for participation in this program;
    - Wells tested as a result of requests for participation and the well test results (including results for contaminants other than nitrate);
    - Communications with each resident and property owner (as needed) regarding well test results and eligibility to participate in POU System program;
    - Status of participation of residents that had a POU System installed (e.g., verify vendor is able to provide maintenance and conduct monitoring as required for each system); and
    - Communications with residents and status of participation in program (e.g., follow-up check-ins to verify contracted services are being provided).
- *Water Fill Station* – For any operational stations, the Management Zone collects usage data, including volume of water dispensed and days and times fill stations are most often used. These data provide (a) insight on patterns of usage at each facility; and (b) if needed, a basis for compensating the owner of the facility providing water to the fill station. Fill station usage data also may be used to evaluate whether additional fill station capacity is needed in the Management Zone. If periods of high usage are identified at any station, additional site monitoring may be temporarily conducted to determine the degree to which lines may be forming causing significant delays in obtaining water or congestion at the site.

The Management Zone will continue conducting the following additional record-keeping activities to support its effort to evaluate MZIP implementation:

- Residences that have been targeted for outreach to participate in the Emergency & Interim Drinking Water Program but have not responded or have indicated no interest in participating in the program[17].

[17] This tracking is completed using the number of mailers sent using the USPS direct mailing route and the response rate.

- Documentation of any residents that were approved for bottled-water delivery or POU System installation but did not activate the services with the Management Zone's vendor(s).
- Documentation of how situations were resolved where the resident requested a POU System but due to technical issues had to rely on bottled water delivery instead.
- Contacts with residents to provide an opportunity for a re-test of their domestic well and the outcome of those efforts.
- Documentation of how a situation was resolved if the well was tested as part of the ILRP or dairy program, and how the resident's drinking water needs are resolved if the well test indicates that the well exceeds the nitrate standard of 10 mg/L.

3.5. Program Implementation Metrics

At the request of the Central Valley Water Board's Executive Officer and in coordination with other Priority 1 Management Zones, the KWA established the following metrics to track progress in the implementation of the KWA EAP (KWA 2022):

- Location, forum type and general attendance figures for all outreach efforts
- Number of residences tested for nitrates
- Number of residences tested for other contaminants
- Number of households being provided bottled water
- Number of operable fill stations/kiosks and usage information for each.

These metrics will continue to be implemented as part of this MZIP's Emergency & Interim Drinking Water Program. In general, the KWA along with other Management Zones provide the above information generally on a monthly basis to the Central Valley Salinity Coalition (CVSC). The CVSC then compiles the information into a report which is submitted to the CV-SALTS Executive Committee, which includes the Central Valley Water Board. The Central Valley Water Board's Executive Officer shares this information with the Central Valley Water Board in the Executive Officer reports, which are prepared and disseminated approximately six times per year. The information is also publicly available on the CVSC's website at: https://www.cvsalinity.org/nitrate-program/management-zones/.

The Management Zones report this information in numeric and graphic formats. Reported information includes illustration of periodic reporting for the non-outreach metrics (e.g., number of residences wells tested, people being served bottled water, and kiosk usage information). In addition to providing periodic reporting of the metrics described above, the Management Zones also report summary statistics of combined outreach activities. Outreach activities generally fall within the following five categories.

- **Postcards and flyers** – This category includes distribution of flyers and/or postcards through direct mail services and door-to-door canvassing.
- **One-on-One discussions** – This category includes discussions that Management Zone representatives have with residents at community-based events (e.g., County fairs, flea markets, farmers markets, food banks), during door-to-door canvassing events, via phone in response to questions and when Management Zones follow up on pending applications. One to one discussions may include inquiries, but is broader in that one-on-one discussions may not result in

a resident showing an affirmative interest in applying for well testing, which would change the one-on-one discussion to an Inquiry, as reported above.

- **Promotions** – This category captures the estimated number of viewers, readers, or listeners that may be exposed to Management Zone messages through paid and earned media promotions, including radio, television, newspapers, social media, etc.
- **Websites** – Each Management Zone manages a website that provides information regarding the program and allows for well testing applications to be submitted on-line. The Management Zones utilize on-line browser tools to track the number of website visitors, and receive and respond to applications submitted via the website.
- **Meetings and Events** – In addition to providing a presence at community-based events such as County fairs, baseball games, flea markets, food banks, and other similar events, where one-on-one discussions may occur, the Management Zones also hold and sponsor in-person and online community meetings and events where they can describe the program in greater detail and encourage participants to apply for the program. This category is intended to track the number of Management Zone held/sponsored events and the number of participants at these events.

3.6. Path A Coordination

There are a number of permitted facilities within the KWA Management Zone that have submitted a Notice of Intent (NOI) to comply with the Nitrate Control Program under Pathway A. For the most part, clear boundaries between where a Path A facility and Management Zone have responsibility for ensuring residents with nitrate contaminated wells have safe drinking water have not been established. Since submittal of the FMZP, coordination between the KWA Management Zone and these Path A facilities has been initiated to address this potential gap in implementation of the Nitrate Control Program replacement water program. As part of the implementation of this MZIP, the KWA Management will continue its efforts to establish coordination agreements with each of these Path A facilities to ensure there are no gaps in coverage of this Emergency & Interim Drinking Water Program.

3.7. Schedule of Implementation

Implementation of the KWA EAP began on May 8, 2021 and is ongoing today and will continue under this MZIP as the Emergency & Interim Drinking Water Program. No interruption of outreach, residential well testing or provision of temporary drinking water will occur while the MZIP awaits Central Valley Water Board review and approval. Further, the Emergency & Interim Drinking Water Program will remain active until permanent solutions to address nitrate contamination are implemented in the Management Zone under the Long-term Drinking Water Solutions Program (see Section 4). General implementation actions includes:

- Provide generally monthly data to CVSC for their periodic reporting;
- Annually provide summarized program information to support the Annual Progress Report;
- In areas where residents are participants of the Interim Drinking Water Program Options, notify residents as soon as possible but no longer than 30 days of an implemented long-term solution;
- Annually or periodically consider the need for additional fill stations, as requested by the community residents.

SECTION 4.
Long-Term Drinking Water Solutions Program

4.1. Introduction

The Management Zone is comprised of several communities and unincorporated areas with residents that have experienced or may experience elevated nitrate conditions in groundwater. A science-based prioritization criteria approach, that considers disadvantaged (and severely disadvantaged) community status, the density of domestic wells and residents within areas of elevated nitrate concentrations (7.5 mg/L nitrate as N or greater), are used in concert with local Management Zone knowledge to identify the areas in most urgent need of long-term drinking water solutions. The Management Zone is divided spatially to identify these "Initial Focus Areas". These areas aid the Management Zone in the preliminary development of the Kings Management Zone Interim and Long-Term Drinking Water Solutions (DW Solutions) to address the needs of residents experiencing elevated nitrate conditions (now or in the future). The development of the drinking water solutions starts with the Initial Focus Areas and will be expanded to include the remaining areas of the Management Zone with nitrate issues. The DW Solutions for the Kings Management Zone Initial Focus Areas are described below and complement the supplemental document in MZIP **Appendix LT-2**, the Interim and Long-Term Drinking Water Solutions Workplan.

4.2. Summary of Science-Based Approach to Support Initial Focus Area Selection

Numerous criteria were examined to help identify potential areas for preliminary prioritization, as described in the "Approach for Identification of Initial Focus Area(s) for Long-Term Drinking Water Solutions" TM (**Appendix LT-1**). The final criterion weighting process included: disadvantaged/severely disadvantaged community status; density of domestic wells in areas of elevated nitrate (7.5 mg/L as N or greater as estimated in ambient Upper Zone nitrate level mapping); and the density of residents in elevated nitrate areas. The following subsections provide more details regarding the criteria used in the selection of Initial Focus Areas.

4.2.1. Disadvantaged Communities/Severely Disadvantaged Communities

DACs and SDACs in the Management Zone are delineated according to 2020 census income data. These communities include residents that generally represent a more vulnerable population and greater need due to financial hardship. DACs are represented with MHI that fall below 80 percent of the statewide MHI. This translates to between $47,203 and $62,938. SDACs are represented with MHIs that fall below 60 percent of the statewide median, or less than $47,203. Through EAP implementation, the Management Zones are already providing free bottled water and/or fill stations with free safe drinking water to all residents with nitrate issues in their domestic wells, regardless of income. For the selection of Initial Focus Areas, however, the Management Zone is especially concerned with assisting those with the greatest need for drinking water, and these residents can be identified by their status as disadvantaged and severely disadvantaged communities. **Figure 4- 4-1** shows the distribution of DACs and SDACs in the Management Zone.

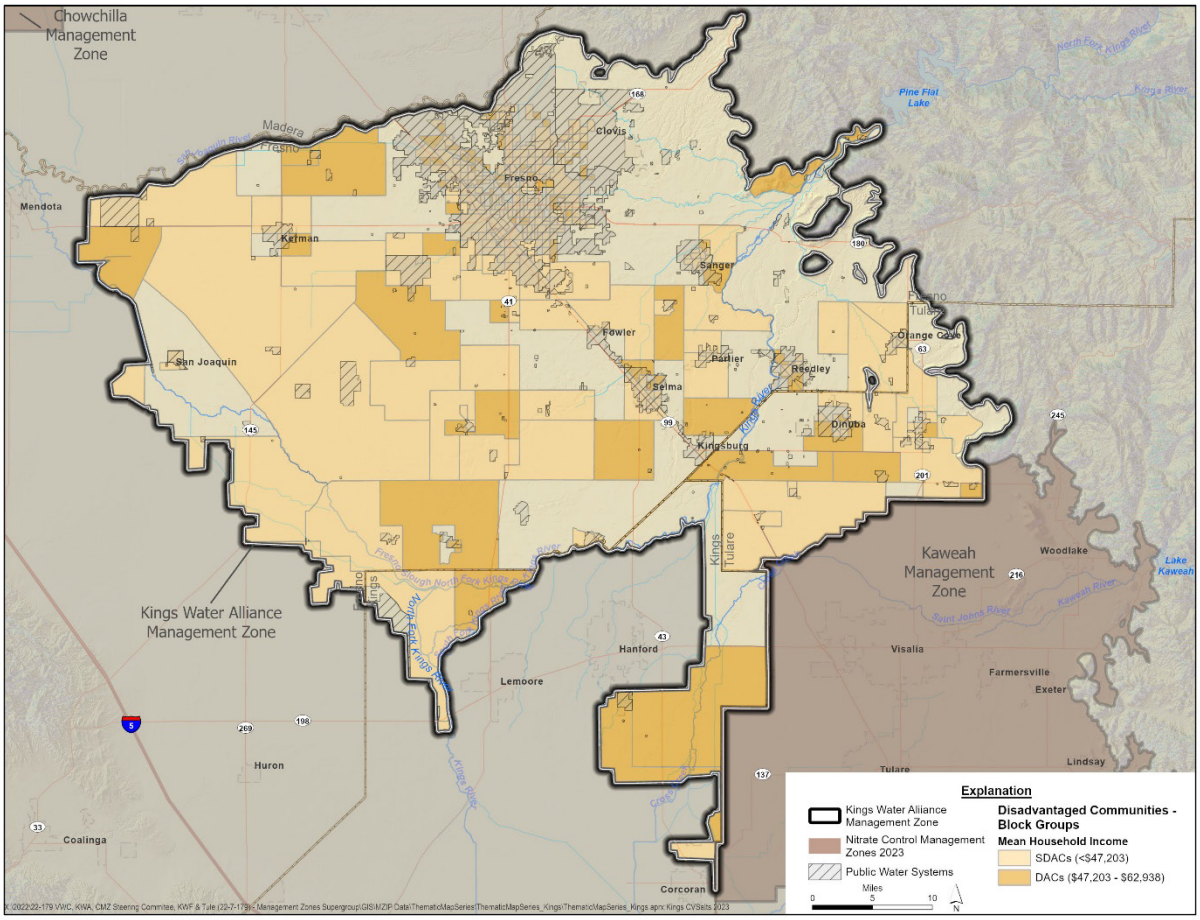


Figure 4-1. Kings Priority 1 Management Zone Disadvantaged and Severely Disadvantaged Communities

4.2.2. Density of Domestic Wells and Population in Elevated Nitrate Areas

Ambient nitrate levels in groundwater are used to characterize the estimated number of domestic wells and residents that are situated in areas of elevated nitrate (above 7.5 mg/L). The distribution of domestic wells and population within areas of elevated nitrate are illustrated with density maps. The most complete spatial GIS coverage of Department of Water Resources (DWR) well completion records[18] was filtered for domestic wells and then intersected with the ambient Upper Zone nitrate level map. The density of domestic wells (with WCRs) in areas with estimated elevated nitrate was computed on a one-mile square section (using the Public Land Survey System (PLSS) section) basis. **Figure 4-2** shows the density of domestic wells in the Management Zone in areas of elevated nitrate.

[18] The Well Completion Report dataset from DWR's Online System for Well Completion Reports (OSWCR): https://gis.data.ca.gov/maps/7194b8f69ddc4c73a04a417905b8c0b1/about, accessed 6/14/2023. The catalog of domestic well completion reports contains wells from as long ago as 1914 and as recently as September 2022. The use of the DWR well completion online database to estimate domestic well counts may result in a conservative approach to quantifying impacts to domestic well users as there may be domestic wells in the database that have since been destroyed or abandoned.

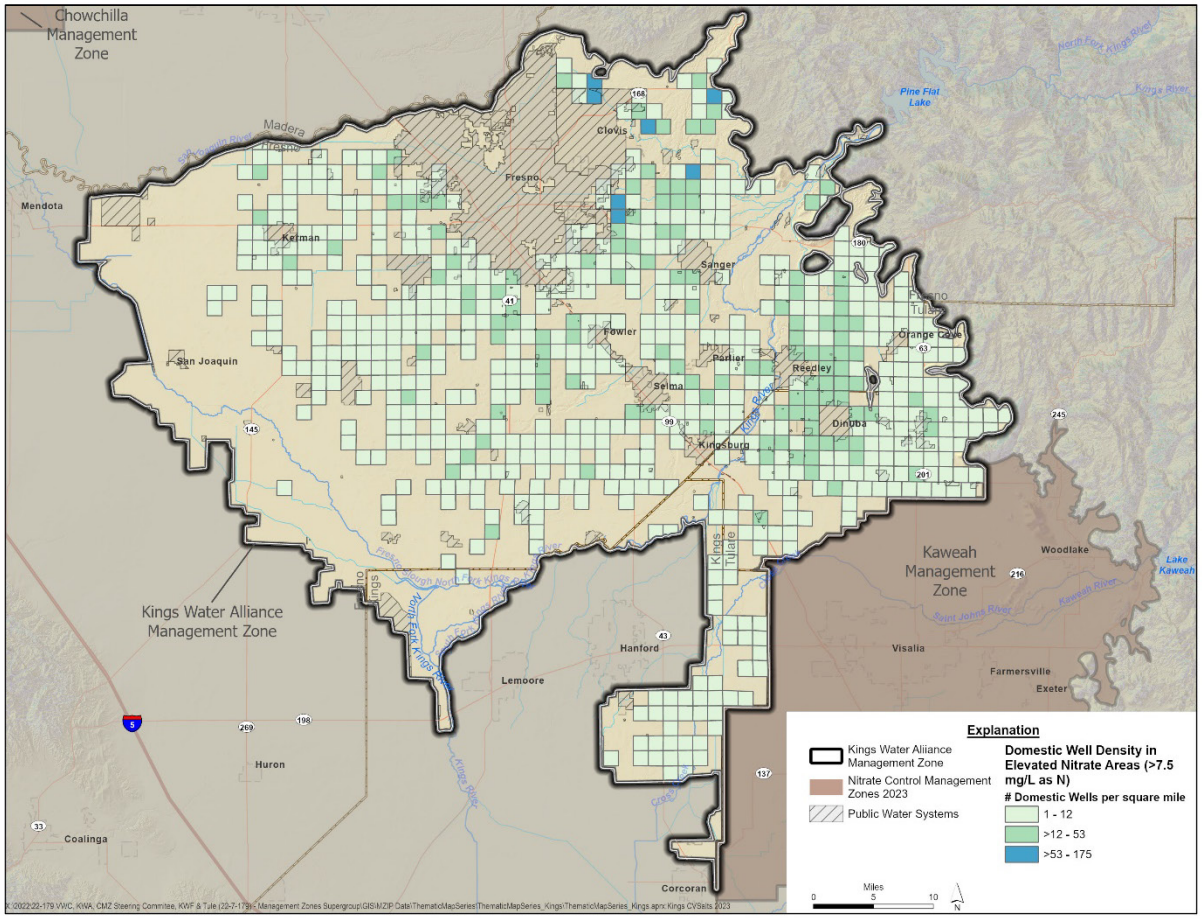


Figure 4-2. Domestic Well Density in Elevated Nitrate Concentration Areas (Above 7.5 mg/L as N)

Similarly, for population, the 2020 census[19] block GIS coverage was intersected with the ambient Upper Zone nitrate level map to estimate the number of residents living in areas with estimated elevated nitrate conditions (above 7.5 mg/L as N). The population density was computed on a one-mile square section basis. **Figure 4-3** shows the population density in the Management Zone.

[19] https://www.census.gov/data.html, accessed 6/14/2023.

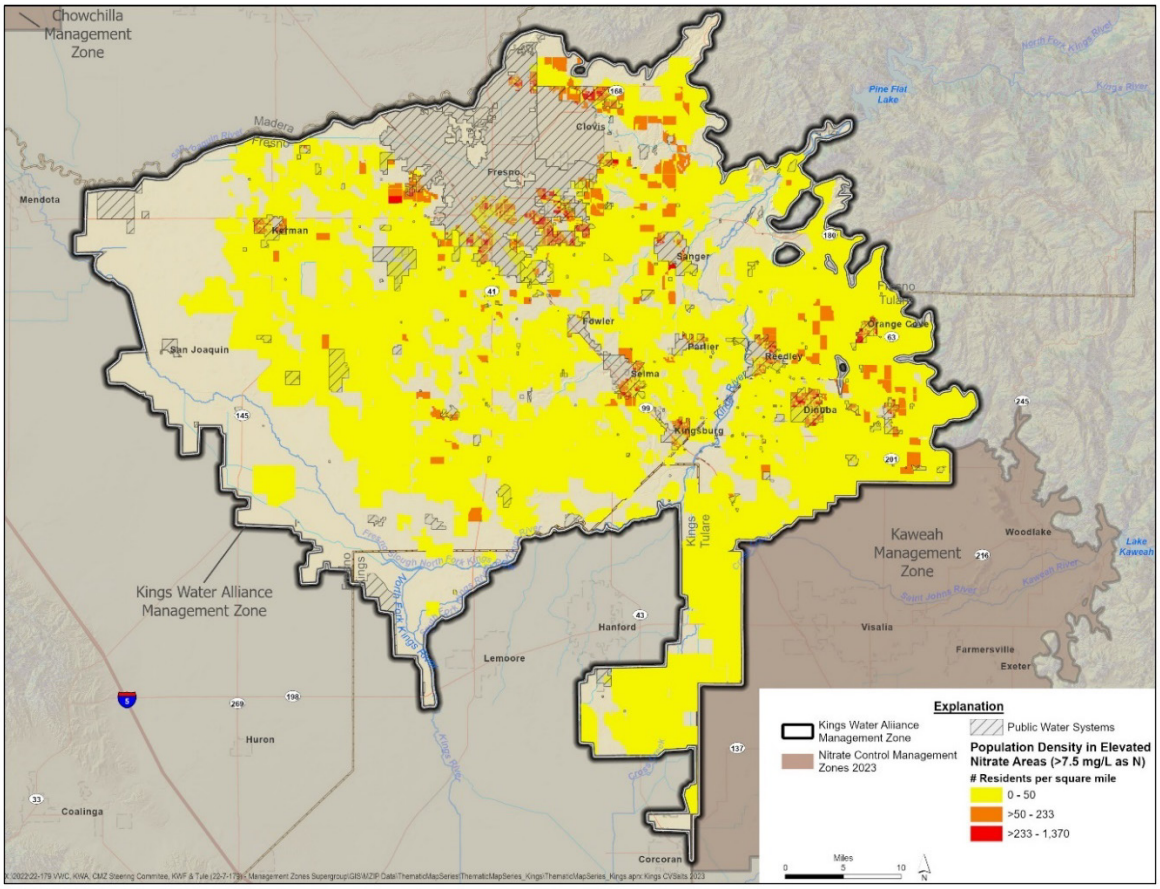


Figure 4-3. Population Density in Elevated Nitrate Concentration Areas (Above 7.5 mg/L as N)

4.2.3. Prioritization Criteria Results

Using the DAC/SDAC spatial distribution along with the densities of domestic wells and residents in areas with elevated nitrate concentrations in groundwater (above 7.5 mg/L as N), a weighting approach has been applied that allows for identification of areas within the Management Zone that have the DAC/SDAC status and the highest domestic well and population density in areas of elevated nitrate. This science-based approach has been used in concert with local Management Zone knowledge to identify the areas selected for Initial Focus Areas. **Figure 4-4** shows the Initial Focus Areas for the Management Zone. Again, the identification of Initial Focus Areas represents a starting point for addressing the long-term drinking water needs of those residents that are in most urgent need, while continuing to serve the entire Management Zone through implementation of the Emergency & Interim Drinking Water Program (see **Section 3**). As solutions are identified in these Initial Focus Areas, the Management Zone will shift its attention to other areas.

For the Kings Management Zone, eight Initial Focus Areas were identified (**Figure 4- 4**):

1) North Dinuba/Between Reedley and Orange Cove
2) South and West Dinuba Area
3) Raisin City Area
4) Easton Area
5) South Selma Area
6) South Sanger Area
7) North Reedley Area
8) Orosi/East Orosi Area

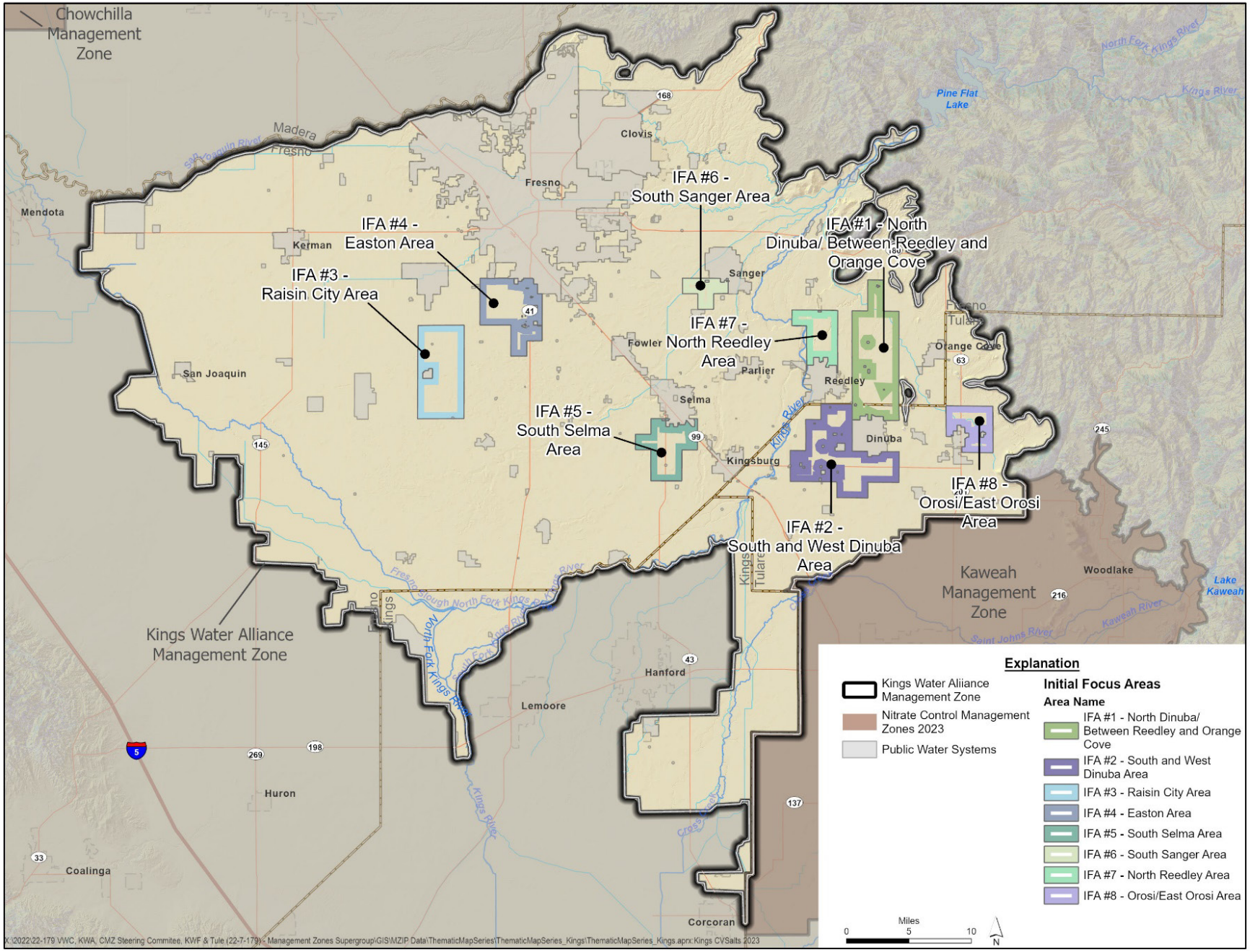


Figure 4-4. Initial Focus Areas

4.3. Characterization of Initial Focus Areas

4.3.1. Initial Focus Area #1 – North Dinuba/Between Reedley and Orange Cove

4.3.1.1. Local Knowledge

The North Dinuba area is located in Tulare and Fresno County adjacent to the north city limit boundary for the City of Dinuba and identified for expansion (partially) as part of the City of Dinuba General Plan Update Sphere of Influence boundary. North Dinuba land use consists of agricultural and commercial designations. Efforts in the North Dinuba area would include rural\agriculture residential not connected to the existing public water system.

4.3.1.2. Density of Domestic Wells and Population

The density of domestic wells is measured on a 100-acres basis across the Initial Focus Area (IFA) for:1) domestic wells that are located in areas of elevated ambient Upper Zone nitrate (above 7.5 mg/L as N) and 2) all domestic wells with known locations. The population density is measured similarly over 100 acres. The 2020 census block data are intersected with the ambient Upper Zone nitrate levels (using a spatial weighting of the population if multiple nitrate levels exist in the same population census block) to identify all residents in the IFA and those residents located in IFA areas with elevated nitrate concentrations (above 7.5 mg/L as N). The table below (**Table 4-1**) provides the total number of domestic wells and population, as well as the number of domestic wells and population within areas of elevated nitrate (above 7.5 mg/L as N), and the density of domestic wells and population in this Initial Focus Area, again in total and for areas of elevated nitrate (above 7.5 mg/L as N).

Table 4-1. Domestic Well and Population Count and Densities for Initial Focus Area #1

Initial Focus Area Number		1			
Initial Focus Area Name		North Dinuba/Between Reedley and Orange Cove			
Area of Initial Focus Area (acres)		14,491			
Total Number of Wells	All Domestic Wells	399	Total Population	All Population	2,465
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	391		Population (Area with NO3N Above 7.5 mg/L)	2,343
Density of Domestic Wells (wells/100 ac)	All Domestic Wells	3	Density (Population/100 ac)	All Population	17
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	3		Population (Area with NO3N Above 7.5 mg/L)	16

4.3.1.3. Household Income (Disadvantaged/Severely Disadvantaged Community Status)

The median household income is used as a measure of the status for disadvantaged and severely disadvantaged communities. **Table 4-2** shows the minimum, maximum, and median values of the MHI for 2020 census blocks in this Initial Focus Area and identifies the DAC/SDAC status of the median MHI.

Table 4-2. Median Household Income and Disadvantaged Community Status for Initial Focus Area #1					
Initial Focus Area Number	Initial Focus Area Name	MHI			DAC/SDAC Status
		Min	Max	Median	
1	North Dinuba/Between Reedley and Orange Cove	$21,300	$84,137	$41,667	SDAC

4.3.1.4. Public Water System Initial Evaluation for Initial Focus Area #1

4.3.1.4.1. Overview of Public Water Systems within 3-miles of Initial Focus Area #1

Public water systems (PWSs) of all types and sizes within three miles of the Initial Focus Area #1 are summarized in **Table 4-3**, including information about the type of water system, the number of connections, the population served, the compliance status, the SAFER status, information about any outstanding violations from the State Water Board's Division of Drinking Water (DDW), as of June 2022.

Table 4-3. Summary of Public Water Systems within 3-miles of the Initial Focus Area #1

PWS Name	PWS ID	PWS Type	PWS Status	Water System Classification	SAFER Status	Number of Connections (source: HR2W or SDWIS DWW)	Population Served (source: HR2W or SDWIS DWW)	Compliance Status [1]	Compliance Status Source	Violation Category (SDWIS DWW)	Violation Chemical(s) (SDWIS DWW)	Date of Violation (SDWIS DWW Determination Date)	MCL Exceedance			Non-MCL Violation
													Nitrate	Nitrate PLUS Co-Contaminant	Other Contaminant	
ALTA ELEMENTARY SCHOOL	CA1000180	NTNC	Out of Compliance	NTNC	Failing	1	380	Out of Compliance	SDWIS DWW (Mar 2023)	MCL	1,2,3-TCP	########	-	-	X	-
GREAT WESTERN ELEMENTARY SCHOOL	CA1000185	NTNC	In Compliance	NTNC	Not At-Risk	1	369	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
NAVELENCIA SCHOOL	CA1000193	NTNC	In Compliance	NTNC	Not At-Risk	1	392	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
KINGS CANYON HIGH SCHOOL	CA1000316	NTNC	Out of Compliance	NTNC	Failing	1	130	Out of Compliance	SDWIS DWW (Mar 2023)	MCL	1,2,3-TCP, Coliform	3/22/18, 4/29/19	-	-	X	-
GEORGE COX WATER SYSTEM[20]	CA1000407	CWS	Unknown	CWS	Not At-Risk	20	40	Unknown	Not in SDWIS	-	-	-	-	-	-	-
FRANZIA WINERY-SANGER	CA1000479	NTNC	In Compliance	NTNC	Not Assessed	4	39	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
GILLETTE CITRUS COMPANY	CA1000507	NTNC	In Compliance	NTNC	Not Assessed	5	74	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
GERAWAN FRUIT PACKING	CA1000608	TNC	In Compliance	TNC	Not Assessed	2	703	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
DINO MART 1	CA1000625	TNC	In Compliance	TNC	Not Assessed	2	104	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
JEHOVAH'S WITNESSES	CA1000637	TNC	In Compliance	TNC	Not Assessed	1	275	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-

[20] This water system may be consolidated with the City of Sanger and no longer a unique PWS. At the time of this report, this PWS was still listed in the SDWIS system.

Table 4-3. Summary of Public Water Systems within 3-miles of the Initial Focus Area #1

PWS Name	PWS ID	PWS Type	PWS Status	Water System Classification	SAFER Status	Number of Connections (source: HR2W or SDWIS DWW)	Population Served (source: HR2W or SDWIS DWW)	Compliance Status [1]	Compliance Status Source	Violation Category (SDWIS DWW)	Violation Chemical(s) (SDWIS DWW)	Date of Violation (SDWIS DWW Determination Date)	MCL Exceedance			Non-MCL Violation
													Nitrate	Nitrate PLUS Co-Contaminant	Other Contaminant	
CHURCH - REEDLEY																
CABOT PACKING, LLC	CA1000665	TNC	In Compliance	TNC	Not At-Risk	1	60	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
COUNTRY CORNER MARKET	CA1000670	TNC	Out of Compliance	TNC	Not At-Risk	1	51	Out of Compliance	SDWIS DWW (Apr 2023)	MON	RTCR	4/4/2022	-	-	-	X
CITY OF ORANGE COVE	CA1010023	CWS	In Compliance	CWS	At-Risk	1705	9780	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
REEDLEY, CITY OF	CA1010027	CWS	In Compliance	CWS	Potentially At-Risk	5880	25917	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
SULTANA CSD	CA5400824	CWS	In Compliance	CWS	At-Risk	249	779	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
GLEANINGS FOR THE HUNGRY	CA5402047	CWS	Out of Compliance	CWS	At-Risk	12	31	Out of Compliance	SDWIS DWW (Apr 2023)	MON	Lead & Copper Rule, TTHM, HAA5	3/2/2023, 12/20/2022, 12/20/2022	-	-	-	X
BRANDT FARMS, INC	CA5403138	NTNC	In Compliance	NTNC	Not Assessed	2	100	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
SUN VALLEY PACKING	CA5403207	TNC	In Compliance	TNC	Not At-Risk	1	350	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
DINUBA, CITY OF	CA5410002	CWS	Out of Compliance	CWS	Not At-Risk	6330	26731	Out of Compliance	SDWIS DWW (Apr 2023)	RPT	Lead Service	7/2/2020	-	-	-	X

4.3.1.4.2. Domestic Wells and Population within 1-mile and 3-mile Buffer of Community Public Water Systems

There are six community PWSs in Initial Focus Area #1. Two of these community PWSs are out of compliance (as of June 2022), but not due to nitrate. The number of domestic wells and the population of residents within 1-mile and 3-miles of these community PWSs in total and in estimated areas of elevated nitrate concentrations (above 7.5 mg/L as N) are summarized in **Table 4-4** below.

Table 4-4. Domestic Well and Population Within 1-mile and 3-mile Buffers of Community Public Water Systems in Initial Focus Area #1

Public Water System Name	Public Water System ID	PWS Status	Number of Domestic Wells Within Buffer Area				Population Within Buffer Area			
			1-mile Buffer		3-mile Buffer		1-mile Buffer		3-mile Buffer	
			# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population
GEORGE COX WATER SYSTEM[21]	CA1000407	Unknown	27	27	2	2	344	344	369	369
CITY OF ORANGE COVE	CA1010023	In Compliance			47	47			525	527
REEDLEY, CITY OF	CA1010027	In Compliance	58	58	2	2	401	405	518	521
SULTANA CSD	CA5400824	In Compliance					0	3	8	10
GLEANINGS FOR THE HUNGRY	CA5402047	Out of Compliance	0	0	16	16	7	11	151	153
DINUBA, CITY OF	CA5410002	Out of Compliance	47	52	2	2	473	589	181	184

[21] This water system may be consolidated with the City of Sanger and no longer a unique PWS. At the time of this report, this PWS was still listed in the SDWIS system.

4.3.2. Initial Focus Area #2 – South and West of Dinuba Area

4.3.2.1. Local Knowledge

The South and West Dinuba area is located in Tulare and Fresno County adjacent to the south and western city limit boundary for the City of Dinuba and identified for expansion (partially) as part of the City of Dinuba General Plan Update Sphere of Influence boundary. The South and West Dinuba land use consists of agricultural and commercial designations. Efforts in the South and West Dinuba area would include rural\agriculture residential not connected to the existing public water system.

4.3.2.2. Density of Domestic Wells and Population

The density of domestic wells is measured on a 100-acres basis across the Initial Focus Area for both domestic wells that are located in areas of elevated ambient Upper Zone nitrate concentrations (above 7.5 mg/L as N) and all domestic wells with known locations. The population density is measured similarly over 100 acres. The 2020 census block data are intersected with the ambient Upper Zone nitrate levels (using a spatial weighting of the population if multiple nitrate levels exist in the same population census block) to identify all residents and those residents located within areas of elevated nitrate concentrations (above 7.5 mg/L as N). **Table 4-5** provides the total number of domestic wells and population, as well as the number of domestic wells and population within areas of elevated nitrate (above 7.5 mg/L as N), and the density of domestic wells and population in this Initial Focus Area, again in total and for areas of elevated nitrate (above 7.5 mg/L as N).

Table 4-5. Domestic Well and Population Count and Densities for Initial Focus Area #2

Initial Focus Area Number		2			
Initial Focus Area Name		South and West Dinuba Area			
Area of Initial Focus Area (acres)		14,859			
Total Number of Wells	All Domestic Wells	434	Total Population	All Population	2,395
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	371		Population (Area with NO3N Above 7.5 mg/L)	2,159
Density of Domestic Wells (well/100 ac)	All Domestic Wells	3	Density (Population/100 ac)	All Population	16
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	2		Population (Area with NO3N Above 7.5 mg/L)	15

4.3.2.3. Household Income (Disadvantaged/Severely Disadvantaged Community Status)

Table 4-6 shows the minimum, maximum, and median values of the MHI for 2020 census blocks in this Initial Focus Area and identifies the DAC/SDAC status of the median MHI.

Table 4-6. Median Household Income and Disadvantaged Community Status for Initial Focus Area #2					
Initial Focus Area Number	Initial Focus Area Name	MHI			DAC/SDAC Status
		Min	Max	Median	
2	South and West Dinuba Area	$27,188	$105,250	$53,591	DAC

4.3.2.4. Public Water System Initial Evaluation for Initial Focus Area #2

4.3.2.4.1. Overview of Public Water Systems within 3-miles of Initial Focus Area

PWSs of all types and sizes within three miles of the Initial Focus Area #2 are summarized in **Table 4-7**, including information about the type of water system, the number of connections, the population served, the compliance status, the SAFER status, information about any outstanding violations from the State Water Board's Division of Drinking Water (DDW).

Table 4-7. Summary of Public Water Systems within 3-miles of the Initial Focus Area #2

PWS Name	PWS ID	PWS Type	PWS Status	Water System Classification	SAFER Status	Number of Connections (source: HR2W or SDWIS DWW)	Population Served (source: HR2W or SDWIS DWW)	Compliance Status [1]	Compliance Status Source	Violation Category (SDWIS DWW)	Violation Chemical(s) (SDWIS DWW)	Date of Violation (SDWIS DWW Determination Date)	MCL Exceedance			Non-MCL Violation
													Nitrate	Nitrate PLUS Co-Contaminant	Other Contaminant	
EL MONTE VILLAGE MHP	CA5400523	CWS	Out of Compliance	CWS	Failing	47	100	Out of Compliance	SDWIS DWW (Mar 2023)	MULT.	1,2-D3CP, CCR Report	1/21/2020, 10/29/2018	-	-	X	X
WESPAK, INC.	CA5400526	NTNC	Out of Compliance	NTNC	Not Assessed	6	53	Out of Compliance	SDWIS DWW (Mar 2023)	MCL	1,2,3-TCP, Nitrate	4/26/2022, 2/8/2022	-	X	-	-
GRAND VIEW SCHOOL	CA5400620	NTNC	In Compliance	NTNC	Not At-Risk	9	400	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
SULTANA CSD	CA5400824	CWS	In Compliance	CWS	At-Risk	249	779	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
PEOPLE'S FOOD AND DELI INC.	CA5402056	TNC	Out of Compliance	TNC	Not At-Risk	1	100	Out of Compliance	SDWIS DWW (Apr 2023)	MCL	Coliform	6/17/2021	-	-	X	-
DELFT COLONY WATER	CA5403023	CWS	Out of Compliance	CWS	Not At-Risk	99	454	Out of Compliance	SDWIS DWW (Apr 2023)	MON	Nitrate	2/16/2023	-	-	-	X
FAMILY TREE FARMS	CA5403041	NTNC	Out of Compliance	NTNC	Not Assessed	3	30	Out of Compliance	SDWIS DWW (Mar 2023)	MCL	1,2,3-TCP, Nitrate, Public Notice	5/21/2018, 4/28/2016, 10/22/2021	-	X	-	X
LEGACY PACKING	CA5403080	NTNC	Out of Compliance	NTNC	Not At-Risk	1	125	Out of Compliance	SDWIS DWW (Apr 2023)	MCL	Nitrate, 1,2,3-TCP	12/2/2022, 3/6/2018	-	X	-	-
PETERS FRUIT FARMS, INC	CA5403081	NTNC	Out of Compliance	NTNC	Not At-Risk	1	125	Out of Compliance	SDWIS DWW (Apr 2023)	MULT.	Nitrate, 1,2,3-TCP, Public Notice	5/7/2019, 3/5/2018, 10/22/2021	-	X	-	X

Table 4-7. Summary of Public Water Systems within 3-miles of the Initial Focus Area #2

PWS Name	PWS ID	PWS Type	PWS Status	Water System Classification	SAFER Status	Number of Connections (source: HR2W or SDWIS DWW)	Population Served (source: HR2W or SDWIS DWW)	Compliance Status [1]	Compliance Status Source	Violation Category (SDWIS DWW)	Violation Chemical(s) (SDWIS DWW)	Date of Violation (SDWIS DWW Determination Date)	MCL Exceedance			Non-MCL Violation
													Nitrate	Nitrate PLUS Co-Contaminant	Other Contaminant	
JODY FRESH COOLING CO - PWS	CA5403083	NTNC	In Compliance	NTNC	Not Assessed	7	66	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-

4.3.2.4.2. Domestic Wells and Population within 1-mile and 3-mile Buffer of Community Public Water Systems

There are eight community PWSs in Initial Focus Area #2. Five of these community PWSs are currently out of compliance (as of June 2022), one of those is out of compliance due to nitrate. The number of domestic wells and the population of residents within 1-mile and 3-miles of this community PWS in total and in estimated areas of elevated nitrate concentrations (above 7.5 mg/L as N) are summarized in **Table 4-8** below.

Table 4-8. Domestic Well and Population Within 1-mile and 3-mile Buffers of Community Public Water Systems in Initial Focus Area #2

Public Water System Name	Public Water System ID	PWS Status	Number of Domestic Wells Within Buffer Area				Population Within Buffer Area			
			1-mile Buffer		3-mile Buffer		1-mile Buffer		3-mile Buffer	
			# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population

EL MONTE VILLAGE MHP	CA5400523	Out of Compliance	69	83	7	7	494	569	83	88
SULTANA CSD	CA5400824	In Compliance	0	0	15	15				
DELFT COLONY WATER	CA5403023	Out of Compliance	46	65	30	36	477	518	163	190
MONSON WATER SYSTEM	CA5403212	Out of Compliance	0	0	18	32	17	17	255	280
CUTLER PUD	CA5410001	Out of Compliance					668	840	129	129
OROSI PUBLIC UTILITY DISTRICT	CA5410008	In Compliance					1,466	1,638	129	129
LONDON COMMUNITY SERV DIST	CA5410017	Out of Compliance	0	2	30	35	8	24	153	175
TEEN CHALLENGE	CA5403213	In Compliance					35	35		

4.3.3. Initial Focus Area #3 – Raisin City Area

4.3.3.1. Local Knowledge

The community of Raisin City is located approximately 8 miles southwest of the City of Fresno in Fresno County. Easton land use consists of rural residential, commercial, and agriculture designations. The County of Fresno operates FSCA #43/Raisin City which includes one active well for 3 commercial and 65 residential connections. Efforts in the Raisin City area would include rural\agriculture residential not connected to the existing public water system.

4.3.3.2. Density of Domestic Wells and Population

The density of domestic wells is measured on a 100-acres basis across the Initial Focus Area for both domestic wells that are located in areas of elevated ambient Upper Zone nitrate (above 7.5 mg/L as N) and all domestic wells with known locations. The population density is measured similarly measured over 100 acres. The 2020 census block data are intersected with the ambient Upper Zone nitrate levels (using a spatial weighting of the population if multiple nitrate levels exist in the same population census block) to identify all residents and those residents located within areas of elevated nitrate concentrations (above 7.5 mg/L as N). **Table 4-9** provides the total number of domestic wells and population, as well as the number of domestic wells and population within areas of elevated nitrate concentrations (above 7.5 mg/L as N), and the density of domestic wells and population in this Initial Focus Area, again in total and for areas of elevated nitrate concentrations (above 7.5 mg/L as N).

Table 4-9. Domestic Well and Population Count and Densities for Initial Focus Area #3					
Initial Focus Area Number		3			
Initial Focus Area Name		Raisin City Area			
Area of Initial Focus Area (acres)		11,221			
Total Number of Wells	All Domestic Wells	190	**Total Population**	All Population	1,524
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	78		Population (Area with NO3N Above 7.5 mg/L)	1,014
Density of Domestic Wells (well/100 ac)	All Domestic Wells	2	**Density (Population/100 ac)**	All Population	14
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	1		Population (Area with NO3N Above 7.5 mg/L)	9

4.3.3.3. Household Income (Disadvantaged/Severely Disadvantaged Community Status)

Table 4-10 shows the minimum, maximum, and median values of the MHI for 2020 census blocks in this Initial Focus Area and identifies the DAC/SDAC status of the median MHI.

Table 4-10. Median Household Income and Disadvantaged Community Status for Initial Focus Area #3					
Initial Focus Area Number	**Initial Focus Area Name**	**MHI**			**DAC/SDAC Status**
		Min	**Max**	**Median**	
3	Raisin City Area	$33,472	$57,452	$43,360	SDAC

4.3.3.4. Public Water System Initial Evaluation for Initial Focus Area #3

4.3.3.4.1. Overview of Public Water Systems within 3-miles of Initial Focus Area

Public water systems (PWSs) of all types and sizes within three miles of the Initial Focus Area #3 are summarized in **Table 4-11**, including information about the type of water system, the number of connections, the population served, the compliance status, the SAFER status, information about any outstanding violations from the State Water Board's Division of Drinking Water (DDW).

Table 4-11. Summary of Public Water Systems within 3-miles of the Initial Focus Area #3

PWS Name	PWS ID	PWS Type	PWS Status	Water System Classification	SAFER Status	Number of Connections (source: HR2W or SDWIS DWW)	Population Served (source: HR2W or SDWIS DWW)	Compliance Status [1]	Compliance Status Source	Violation Category (SDWIS DWW)	Violation Chemical(s) (SDWIS DWW)	Date of Violation (SDWIS DWW Determination Date)	MCL Exceedance			Non-MCL Violation
													Nitrate	Nitrate PLUS Co-Contaminant	Other Contaminant	
AMERICAN UNION SCHOOL	CA1000204	NTNC	Out of Compliance	NTNC	Failing	33	250	Out of Compliance	SDWIS DWW (Mar 2023)	MCL	1,2,3-TCP	3/21/2018	-	-	X	-
GOLDEN STATE VINTNERS - FRESNO	CA1000362	NTNC	In Compliance	NTNC	Not Assessed	1	41	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
FOUR BAR C FARMS	CA1000462	TNC	In Compliance	TNC	Not Assessed	5	40	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
BATTH DEHYDRATOR	CA1000465	NTNC	Unknown	NTNC	Not Assessed	1	200	Unknown	Not in SDWIS	-	-	-	-	-	-	-
FCSA #39 A&B	CA1000471	CWS	In Compliance	CWS	At-Risk	141	395	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
FCSA #43/RAISIN CITY	CA1000551	CWS	In Compliance	CWS	At-Risk	68	182	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
RAU DAIRY	CA1009120	CWS	Out of Compliance	CWS	At-Risk	43	105	Out of Compliance	SDWIS DWW (Apr 2023)	MON	1,2,3-TCP	5/17/2018	-	-	-	X
DE GROOT & SON DAIRY	CA1009210	SSWS	Unknown	SSWS	Not Assessed	6	19	Unknown	Not in SDWIS	-	-	-	-	-	-	-
CITY OF FRESNO	CA1010007	CWS	In Compliance	CWS	Not Assessed	137939	549905	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
CARUTHERS COMM SERV DIST	CA1010039	CWS	Out of Compliance	CWS	Failing	746	2503	Out of Compliance	SDWIS DWW (Mar 2023)	MCL	Arsenic, 1,2,3-TCP	1/15/2009, 1/28/2019	-	-	X	-

Table 4-11. Summary of Public Water Systems within 3-miles of the Initial Focus Area #3

PWS Name	PWS ID	PWS Type	PWS Status	Water System Classification	SAFER Status	Number of Connections (source: HR2W or SDWIS DWW)	Population Served (source: HR2W or SDWIS DWW)	Compliance Status [1]	Compliance Status Source	Violation Category (SDWIS DWW)	Violation Chemical(s) (SDWIS DWW)	Date of Violation (SDWIS DWW Determination Date)	MCL Exceedance			Non-MCL Violation
													Nitrate	Nitrate PLUS Co-Contaminant	Other Contaminant	
FRESNO POLICE TRAINING FACILITY	CA1010060	TNC	In Compliance	TNC	Not Assessed	1	264	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-

4.3.3.4.2. Domestic Wells and Population within 1-mile and 3-mile Buffer of Community Public Water Systems

There are five community PWSs within 3 miles of Initial Focus Area #3. Two of these are out of compliance (as of June 2022) but not due to nitrate issues. The number of domestic wells and the population of residents within 1-mile and 3-miles of the community PWSs in total and in estimated areas of elevated nitrate concentrations (above 7.5 mg/L as N) are summarized in **Table 4-12** below.

Table 4-12. Domestic Well and Population Within 1-mile and 3-mile Buffers of Community Public Water Systems in Initial Focus Area #3

Public Water System Name	Public Water System ID	PWS Status	Number of Domestic Wells Within Buffer Area				Population Within Buffer Area			
			1-mile Buffer		3-mile Buffer		1-mile Buffer		3-mile Buffer	
			# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population
FCSA #39 A&B	CA1000471	In Compliance	2	15	1	1	179	256	68	68
FCSA #43/RAISIN CITY	CA1000551	In Compliance	27	58	33	77	546	618	621	884
RAU DAIRY	CA1009120	Out of Compliance			1	2			47	53
CITY OF FRESNO	CA1010007	In Compliance	68	196	16	38	55	55	493	505
CARUTHERS COMM SERV DIST	CA1010039	Out of Compliance							25	96

4.3.4. Initial Focus Area #4 – Easton Area

4.3.4.1. Local Knowledge

The community of Easton is located approximately 3 miles south of the City of Fresno in Fresno County. Easton land use consists of rural residential, single family residential, and commercial designations and is surrounded by agriculture. The Easton Community Water System Authority (ECWSA) was established in 2015 between the Washington Colony School District and the Washington Unified School District. Currently, there are two water wells serving drinking and irrigation purposes to the Washington Colony School campus, Washington Union High School, and Easton High School. There is no community water system serving the residential needs of the community. The ECWSA was formed to work on behalf of the Easton community to engage with the State of California and other stakeholders to bring a public water system to Easton. The ECWSA has been working with Self-Help Enterprises (SHE) to evaluate the feasibility of connecting up to fifteen customers including single family residences between Washington Union High School and Washington Colony School. The project includes a new municipal well, improvements to an existing well, distribution pipeline, fire hydrants, and appurtenances. SHE is continuing efforts with ECWSA on this project. The KWA is exploring coordination and cooperation efforts with SHE and the ECWSA on this project.

The Easton Community Service District (ECSD) encompasses approximately 700 acres and provides street lighting, storm drainage, recreation and park, and landscape maintenance services to the community. SHE is currently in discussions with ECSD on a community survey to determine the public interest in building a community water system. The KWA is exploring coordination and cooperation efforts with SHE and the ECSD on this survey and other efforts related to long-term drinking water solutions for the Easton community.

4.3.4.2. Density of Domestic Wells and Population

The density of domestic wells is measured on a 100-acres basis across the Initial Focus Area for both domestic wells that are located in areas of elevated ambient Upper Zone nitrate (above 7.5 mg/L as N) and all domestic wells with known locations. The population density is measured similarly measured over 100 acres. The 2020 census block data are intersected with the ambient Upper Zone nitrate levels (using a spatial weighting of the population if multiple nitrate levels exist in the same population census block) to identify all residents and those residents located within areas of elevated nitrate concentrations (above 7.5 mg/L as N). **Table 4-13** provides the total number of domestic wells and population, as well as the number of domestic wells and population within areas of elevated nitrate concentrations (above 7.5 mg/L as N), and the density of domestic wells and population in this Initial Focus Area, again in total and for areas of elevated nitrate concentrations (above 7.5 mg/L as N).

Table 4-13. Domestic Well and Population Count and Densities for Initial Focus Area #4					
Initial Focus Area Number		4			
Initial Focus Area Name		Easton Area			
Area of Initial Focus Area (acres)		9,144			
Total Number of Wells	All Domestic Wells	409	Total Population	All Population	3,561
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	256		Population (Area with NO3N Above 7.5 mg/L)	2,965
Density of Domestic Wells (well/100 ac)	All Domestic Wells	4	Density (Population/100 ac)	All Population	39
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	3		Population (Area with NO3N Above 7.5 mg/L)	32

4.3.4.3. Household Income (Disadvantaged/Severely Disadvantaged Community Status)

Table 4-14 shows the minimum, maximum, and median values of the MHI for 2020 census blocks in this Initial Focus Area and identifies the DAC/SDAC status of the median MHI.

Table 4-14. Median Household Income and Disadvantaged Community Status for Initial Focus Area #4					
Initial Focus Area Number	**Initial Focus Area Name**	**MHI**			**DAC/SDAC Status**
		Min	**Max**	**Median**	
4	Easton Area	$21,492	$59,559	$44,428	SDAC

4.3.4.4. Public Water System Initial Evaluation for Initial Focus Area #4

4.3.4.4.1. Overview of Public Water Systems within 3-miles of Initial Focus Area

PWSs of all types and sizes within three miles of the Initial Focus Area #4 are summarized in **Table 4-15**, including information about the type of water system, the number of connections, the population served, the compliance status, the SAFER status, information about any outstanding violations from the State Water Board's Division of Drinking Water (DDW).

Table 4-15. Summary of Public Water Systems within 3-miles of the Initial Focus Area #4

PWS Name	PWS ID	PWS Type	PWS Status	Water System Classification	SAFER Status	Number of Connections (source: HR2W or SDWIS DWW)	Population Served (source: HR2W or SDWIS DWW)	Compliance Status [1]	Compliance Status Source	Violation Category (SDWIS DWW)	Violation Chemical(s) (SDWIS DWW)	Date of Violation (SDWIS DWW Determination Date)	MCL Exceedance			Non-MCL Violation
													Nitrate	Nitrate PLUS Co-Contaminant	Other Contaminant	
EASTON ESTATES WATER COMPANY	CA1000018	CWS	Out of Compliance	CWS	Potentially At-Risk	108	302	Out of Compliance	SDWIS DWW (Apr 2023)	MON	1,2,3-TCP	8/14/2018	-	-	-	X
PACIFIC UNION ELEMENTARY SCHOOL	CA1000194	NTNC	In Compliance	NTNC	Not At-Risk	1	490	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
RUBYS VALLEY CARE HOME	CA1000200	CWS	In Compliance	CWS	At-Risk	1	75	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
EASTON AUTHORITY JPA	CA1000221	NTNC	Out of Compliance	NTNC	Not At-Risk	23	1000	Out of Compliance	SDWIS DWW (Apr 2023)	MCL	Coliform	5/6/2019	-	-	X	-
ELM COURT	CA1000277	CWS	Out of Compliance	CWS	At-Risk	12	64	Out of Compliance	SDWIS DWW (Apr 2023)	RPT	CCR Report	1/15/2020	-	-	-	X
MANNING GARDENS CARE CENTER INC	CA1000324	CWS	In Compliance	CWS	Potentially At-Risk	1	170	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
SAF-T-CAB	CA1000399	NTNC	In Compliance	NTNC	Not Assessed	3	110	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
EASTON PRESBYTERIAN CHURCH	CA1000416	NTNC	Out of Compliance	NTNC	Failing	6	450	Out of Compliance	SDWIS DWW (Mar 2023)	MCL	1,2,3-TCP	1/24/2020	-	-	X	-
CHERRY AUCTION	CA1000442	TNC	Out of Compliance	TNC	Not Assessed	8	7000	Out of Compliance	SDWIS DWW (Mar 2023)	MON	RTCR	6/14/2021	-	-	-	X
ROAD RUNNER FOOD AND FUEL	CA1000459	TNC	In Compliance	TNC	Not Assessed	1	300	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
CARGILL MEAT SOLUTIONS CORPORATION	CA1000461	NTNC	In Compliance	NTNC	Not Assessed	4	1100	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-

Table 4-15. Summary of Public Water Systems within 3-miles of the Initial Focus Area #4

PWS Name	PWS ID	PWS Type	PWS Status	Water System Classification	SAFER Status	Number of Connections (source: HR2W or SDWIS DWW)	Population Served (source: HR2W or SDWIS DWW)	Compliance Status [1]	Compliance Status Source	Violation Category (SDWIS DWW)	Violation Chemical(s) (SDWIS DWW)	Date of Violation (SDWIS DWW Determination Date)	MCL Exceedance			Non-MCL Violation
													Nitrate	Nitrate PLUS Co-Contaminant	Other Contaminant	
FOWLER PACKING COMPANY	CA1000480	NTNC	In Compliance	NTNC	Not Assessed	5	470	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
ST JUDE CATHOLIC CHURCH	CA1000502	TNC	In Compliance	TNC	Not Assessed	3	100	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
CROSSOVER COMMUNITY CHURCH	CA1000511	TNC	Out of Compliance	TNC	Not Assessed	1	80	Out of Compliance	SDWIS DWW (Mar 2023)	MON	Nitrate	1/1/2021	-	-	-	X
MICHELSEN PACKAGING	CA1000515	TNC	In Compliance	TNC	Not Assessed	1	40	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
USED PALLET COMPANY	CA1000542	NTNC	Unknown	NTNC	Not Assessed	1	60	Unknown	Not in SDWIS	-	-	-	-	-	-	-
SHOP-N-QUICK #2	CA1000544	TNC	In Compliance	TNC	Not At-Risk	1	25	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
FRESNO SOUTH JEHOVAH WITNESSES	CA1000552	TNC	In Compliance	TNC	Not Assessed	2	170	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
DOLLAR GENERAL STORE #15320	CA1000620	TNC	In Compliance	TNC	Not Assessed	1	250	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
EASTON BRANCH LIBRARY	CA1000626	TNC	In Compliance	TNC	Not Assessed	1	25	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
ADAM'S MARKET	CA1000650	TNC	In Compliance	TNC	Not At-Risk	2	1500	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-

Table 4-15. Summary of Public Water Systems within 3-miles of the Initial Focus Area #4

PWS Name	PWS ID	PWS Type	PWS Status	Water System Classification	SAFER Status	Number of Connections (source: HR2W or SDWIS DWW)	Population Served (source: HR2W or SDWIS DWW)	Compliance Status [1]	Compliance Status Source	Violation Category (SDWIS DWW)	Violation Chemical(s) (SDWIS DWW)	Date of Violation (SDWIS DWW Determination Date)	MCL Exceedance			Non-MCL Violation
													Nitrate	Nitrate PLUS Co-Contaminant	Other Contaminant	
MALAGA COUNTY WATER DISTRICT	CA1010042	CWS	In Compliance	CWS	Not At-Risk	462	5979	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-

4.3.4.4.2. Domestic Wells and Population within 1-mile and 3-mile Buffer of Community Public Water Systems

There are five community PWSs within 3 miles of Initial Focus Area #4. Two of these are currently out of compliance (as of June 2022), but not due to nitrate. The number of domestic wells and the population of residents within 1-mile and 3-miles of the community PWS in total and in estimated areas of elevated nitrate concentrations (above 7.5 mg/L as N) are summarized in **Table 4-16**.

Table 4-16. Domestic Well and Population Within 1-mile and 3-mile Buffers of Community Public Water Systems in Initial Focus Area #4

Public Water System Name	Public Water System ID	PWS Status	Number of Domestic Wells Within Buffer Area				Population Within Buffer Area			
			1-mile Buffer		3-mile Buffer		1-mile Buffer		3-mile Buffer	
			# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population
EASTON ESTATES WATER COMPANY	CA1000018	Out of Compliance	114	134	28	42	1,569	1,921	446	465
RUBYS VALLEY CARE HOME	CA1000200	In Compliance			14	16			91	110
ELM COURT	CA1000277	Out of Compliance	40	84	27	39	718	759	372	372
MANNING GARDENS CARE CENTER INC	CA1000324	In Compliance			14	16			80	99
MALAGA COUNTY WATER DISTRICT	CA1010042	In Compliance							36	36

4.3.5. Initial Focus Area #5 – South Selma Area

4.3.5.1. Local Knowledge

The South Selma area is located in Fresno County adjacent to the south city limit boundary for the City of Selma and identified for expansion (partially) as part of the City of Selma General Plan Update 2035 Sphere of Influence boundary. South Selma land use consists of agricultural designations. Efforts in the South Selma area would include rural\agriculture residential not connected to the existing public water system.

4.3.5.2. Density of Domestic Wells and Population

The density of domestic wells is measured on a 100-acres basis across the Initial Focus Area for both domestic wells that are located in areas of elevated ambient Upper Zone nitrate (above 7.5 mg/L as N) and all domestic wells with known locations. The population density is measured similarly measured over 100 acres. The 2020 census block data are intersected with the ambient Upper Zone nitrate levels (using a spatial weighting of the population if multiple nitrate levels exist in the same population census block) to identify all residents and those residents located within areas of elevated nitrate concentrations (above 7.5 mg/L as N). **Table 4-17** provides the total number of domestic wells and population, as well as the number of domestic wells and population within areas of elevated nitrate concentrations (above 7.5 mg/L as N), and the density of domestic wells and population in this Initial Focus Area, again in total and for areas of elevated nitrate concentrations (above 7.5 mg/L as N).

Table 4-17. Domestic Well and Population Count and Densities for Initial Focus Area #5					
Initial Focus Area Number		5			
Initial Focus Area Name		South Selma Area			
Area of Initial Focus Area (acres)		6,582			
Total Number of Wells	All Domestic Wells	92	Total Population	All Population	1,205
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	74		Population (Area with NO3N Above 7.5 mg/L)	1,124
Density of Domestic Wells (well/100 ac)	All Domestic Wells	1	Density (Population/100 ac)	All Population	18
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	1		Population (Area with NO3N Above 7.5 mg/L)	17

4.3.5.3. Household Income (Disadvantaged/Severely Disadvantaged Community Status)

Table 4-18 shows the minimum, maximum, and median values of the MHI for 2020 census blocks in this Initial Focus Area and identifies the DAC/SDAC status of the median MHI.

Table 4-18. Median Household Income and Disadvantaged Community Status for Initial Focus Area #5					
Initial Focus Area Number	**Initial Focus Area Name**	**MHI**			**DAC/SDAC Status**
		Min	**Max**	**Median**	
5	South Selma Area	$18,819	$115,682	$38,519	SDAC

4.3.5.4. Public Water System Initial Evaluation for Initial Focus Area #5

4.3.5.4.1. Overview of Public Water Systems within 3-miles of Initial Focus Area

PWSs of all types and sizes within three miles of the Initial Focus Area #5 are summarized in **Table 4-19**, including information about the type of water system, the number of connections, the population served, the compliance status, the SAFER status, information about any outstanding violations from the State Water Board's Division of Drinking Water (DDW).

Table 4-19. Summary of Public Water Systems within 3-miles of the Initial Focus Area #5

PWS Name	PWS ID	PWS Type	PWS Status	Water System Classification	SAFER Status	Number of Connections (source: HR2W or SDWIS DWW)	Population Served (source: HR2W or SDWIS DWW)	Compliance Status [1]	Compliance Status Source	Violation Category (SDWIS DWW)	Violation Chemical(s) (SDWIS DWW)	Date of Violation (SDWIS DWW Determination Date)	MCL Exceedance			Non-MCL Violation
													Nitrate	Nitrate PLUS Co-Contaminant	Other Contaminant	
TERRY SCHOOL	CA1000198	NTNC	In Compliance	NTNC	Not At-Risk	25	236	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
SELMA HIGH SCHOOL	CA1000367	NTNC	In Compliance	NTNC	Not At-Risk	21	2225	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
SUN MAID GROWERS OF CALIFORNIA	CA1000381	NTNC	Out of Compliance	NTNC	Not Assessed	1	750	Out of Compliance	SDWIS DWW (Mar 2023)	MON	Lead & Copper Rule, 1,2,3-TCP	3/29/22, 12/24/18	-	-	-	X
GUARDIAN INDUSTRIES LLC	CA1000383	NTNC	In Compliance	NTNC	Not Assessed	1	291	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
HMC GROUP COLD STORAGE	CA1000440	NTNC	In Compliance	NTNC	Not Assessed	1	580	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
VIKING RV PARK	CA1000454	TNC	In Compliance	TNC	Not Assessed	50	86	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
JOSAN AND JOSAN, INC.	CA1000520	TNC	In Compliance	TNC	Not Assessed	3	402	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
HARRIS RANCH BEEF CO	CA1000526	NTNC	In Compliance	NTNC	Not Assessed	2	850	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
BHANDAL, INC	CA1000540	TNC	In Compliance	TNC	Not Assessed	2	25	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
SELMA EXXON TIGER MART	CA1000545	TNC	In Compliance	TNC	Not Assessed	8	203	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-

Table 4-19. Summary of Public Water Systems within 3-miles of the Initial Focus Area #5

PWS Name	PWS ID	PWS Type	PWS Status	Water System Classification	SAFER Status	Number of Connections (source: HR2W or SDWIS DWW)	Population Served (source: HR2W or SDWIS DWW)	Compliance Status [1]	Compliance Status Source	Violation Category (SDWIS DWW)	Violation Chemical(s) (SDWIS DWW)	Date of Violation (SDWIS DWW Determination Date)	MCL Exceedance			Non-MCL Violation
													Nitrate	Nitrate PLUS Co-Contaminant	Other Contaminant	
POINDEXTER NUT COMPANY	CA1000575	NTNC	In Compliance	NTNC	Not Assessed	6	50	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
SUPER DRIVE IN	CA1000634	TNC	In Compliance	TNC	Not Assessed	1	50	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
SELMA QUICK STOP	CA1000635	TNC	Out of Compliance	TNC	Not Assessed	1	50	Out of Compliance	SDWIS DWW (Mar 2023)	MON	RTCR, Nitrate	7/2/2022, 3/7/22	-	-	-	X
LEE'S MARKET	CA1000648	TNC	Out of Compliance	TNC	Not At-Risk	1	25	Out of Compliance	SDWIS DWW (Apr 2023)	MON	RTCR	7/20/2022	-	-	-	X
KINGSBURG, CITY OF	CA1010019	CWS	In Compliance	CWS	Not At-Risk	4027	12002	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
CWS - SELMA	CA1010024	CWS	In Compliance	CWS	Not At-Risk	6419	26248	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-

4.3.5.4.2. Domestic Wells and Population within 1-mile and 3-mile Buffer of Community Public Water Systems

There are two community PWSs within 3 miles of Initial Focus Area #5. Both are currently in compliance (as of June 2022). The number of domestic wells and the population of residents within 1-mile and 3-miles of the community PWS in total and in estimated areas of elevated nitrate concentrations (above 7.5 mg/L as N) are summarized in **Table 4-20** below.

Table 4-20. Domestic Well and Population Within 1-mile and 3-mile Buffers of Community Public Water Systems in Initial Focus Area #5

Public Water System Name	Public Water System ID	PWS Status	Number of Domestic Wells Within Buffer Area				Population Within Buffer Area			
			1-mile Buffer		3-mile Buffer		1-mile Buffer		3-mile Buffer	
			# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population
KINGSBURG, CITY OF	CA1010019	In Compliance					90	90	195	232
CWS - SELMA	CA1010024	In Compliance	33	41	19	21	702	750	397	446

4.3.6. Initial Focus Area #6 – South Sanger Area

4.3.6.1. Local Knowledge

South Sanger is located in Fresno County adjacent to the southwest city limit boundary for the City of Sanger and identified for expansion (partially) as part of the 2035 Sanger General Plan Sphere of Influence boundary. South Sanger land use consists of rural residential, commercial/manufacturing, and agricultural designations and also includes the community of Tombstone. Currently, an expansion pipeline from the City of Sanger to the community of Tombstone is at 90% design engineering and right of way acquisition is anticipated to be completed by the end of 2023. Efforts in the South Sanger area would include rural\agriculture residential not connected to the existing public water system.

4.3.6.2. Density of Domestic Wells and Population

The density of domestic wells is measured on a 100-acres basis across the Initial Focus Area for both domestic wells that are located in areas of elevated ambient Upper Zone nitrate (above 7.5 mg/L as N) and all domestic wells with known locations. The population density is measured similarly measured over 100 acres. The 2020 census block data are intersected with the ambient Upper Zone nitrate levels (using a spatial weighting of the population if multiple nitrate levels exist in the same population census block) to identify all residents and those residents located within areas of elevated nitrate concentrations (above 7.5 mg/L as N). **Table 4-21** provides the total number of domestic wells and population, as well as the number of domestic wells and population within areas of elevated nitrate concentrations (above 7.5 mg/L as N), and the density of domestic wells and population in this Initial Focus Area, again in total and for areas of elevated nitrate concentrations (above 7.5 mg/L as N).

Table 4-21. Domestic Well and Population Count and Densities for Initial Focus Area #6

Initial Focus Area Number		6			
Initial Focus Area Name		South Sanger Area			
Area of Initial Focus Area (acres)		2,443			
Total Number of Wells	All Domestic Wells	85	Total Population	All Population	869
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	69		Population (Area with NO3N Above 7.5 mg/L)	752
Density of Domestic Wells (well/100 ac)	All Domestic Wells	3	Density (Population/100 ac)	All Population	36
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	3		Population (Area with NO3N Above 7.5 mg/L)	31

4.3.6.3. Household Income (Disadvantaged/Severely Disadvantaged Community Status)

Table 4-22 shows the minimum, maximum, and median values of the MHI for 2020 census blocks in this Initial Focus Area and identifies the DAC/SDAC status of the median MHI.

Table 4-22. Median Household Income and Disadvantaged Community Status for Initial Focus Area #6

Initial Focus Area Number	Initial Focus Area Name	MHI			DAC/SDAC Status
		Min	Max	Median	
6	South Sanger Area	$19,185	$109,286	$58,346	DAC

4.3.6.4. Public Water System Initial Evaluation for Initial Focus Area #6

4.3.6.4.1. Overview of Public Water Systems within 3-miles of Initial Focus Area

PWSs of all types and sizes within three miles of the Initial Focus Area #6 are summarized in **Table 4-23**, including information about the type of water system, the number of connections, the population served, the compliance status, the SAFER status, information about any outstanding violations from the State Water Board's Division of Drinking Water (DDW).

Table 4-23. Summary of Public Water Systems within 3-miles of the Initial Focus Area #6

PWS Name	PWS ID	PWS Type	PWS Status	Water System Classification	SAFER Status	Number of Connections (source: HR2W or SDWIS DWW)	Population Served (source: HR2W or SDWIS DWW)	Compliance Status [1]	Compliance Status Source	Violation Category (SDWIS DWW)	Violation Chemical(s) (SDWIS DWW)	Date of Violation (SDWIS DWW Determination Date)	MCL Exceedance			Non-MCL Violation
													Nitrate	Nitrate PLUS Co-Contaminant	Other Contaminant	
KINGS PARK APARTMENTS	CA1000295	CWS	Out of Compliance	CWS	Failing	41	160	Out of Compliance	SDWIS DWW (Mar 2023)	MON	RTCR	6/3/2021	-	-	-	X
CHOOLJIAN BROS PACKING CO	CA1000534	NTNC	In Compliance	NTNC	Not Assessed	1	30	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
LONE STAR DEHYDRATOR	CA1000576	NTNC	Out of Compliance	NTNC	Not Assessed	2	175	Out of Compliance	SDWIS DWW (Mar 2023)	MON	Lead & Copper Rule	1/1/2021	-	-	-	X
KINGS RIVER WINERY	CA1000629	TNC	Out of Compliance	TNC	At-Risk	2	50	Out of Compliance	SDWIS DWW (Apr 2023)	MON	Nitrate	3/4/2022	-	-	-	X
CITY OF SANGER	CA1010029	CWS	In Compliance	CWS	At-Risk	6986	25664	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
DEL REY COMMUNITY SERV DIST	CA1010035	CWS	Out of Compliance	CWS	Failing	312	1358	Out of Compliance	SDWIS DWW (Mar 2023)	MCL	1,2,3-TCP	5/18/2018	-	-	X	-

4.3.6.4.2. Domestic Wells and Population within 1-mile and 3-mile Buffer of Community Public Water Systems

There are three community PWS within 3 miles of Initial Focus Area #5. Two of them are currently out of compliance (as of June 2022), but not due to nitrate. The number of domestic wells and the population of residents within 1-mile and 3-miles of the community PWS in total and in estimated areas of elevated nitrate concentrations (above 7.5 mg/L as N) are summarized in **Table 4-24** below.

Table 4-24. Domestic Well and Population Within 1-mile and 3-mile Buffers of Community Public Water Systems in Initial Focus Area #6

Public Water System Name	Public Water System ID	PWS Status	Number of Domestic Wells Within Buffer Area				Population Within Buffer Area			
			1-mile Buffer		3-mile Buffer		1-mile Buffer		3-mile Buffer	
			# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population
KINGS PARK APARTMENTS	CA1000295	Out of Compliance	40	45	7	8	557	632	30	57
CITY OF SANGER	CA1010029	In Compliance	61	67	7	8	720	796	30	57
DEL REY COMMUNITY SERV DIST	CA1010035	Out of Compliance	0	9	7	8	89	103	30	57

4.3.7. Initial Focus Area #7 – North Reedley Area

4.3.7.1. Local Knowledge

North Reedley area is located in Fresno County adjacent to the north city limit boundary for the City of Reedley and identified for expansion (partially) as part of the City of Reedley General Plan 2030 Sphere of

Influence boundary. North Reedley land use consists of agricultural designations. Efforts in the North Reedley area would include rural\agriculture residential not connected to the existing public water system.

4.3.7.2. Density of Domestic Wells and Population

The density of domestic wells is measured on a 100-acres basis across the Initial Focus Area for both domestic wells that are located in areas of elevated ambient Upper Zone nitrate (above 7.5 mg/L as N) and all domestic wells with known locations. The population density is measured similarly measured over 100 acres. The 2020 census block data are intersected with the ambient Upper Zone nitrate levels (using a spatial weighting of the population if multiple nitrate levels exist in the same population census block) to identify all residents and those residents located within areas of elevated nitrate concentrations (above 7.5 mg/L as N). **Table 4-25** provides the total number of domestic wells and population, as well as the number of domestic wells and population within areas of elevated nitrate concentrations (above 7.5 mg/L as N), and the density of domestic wells and population in this Initial Focus Area, again in total and for areas of elevated nitrate concentrations (above 7.5 mg/L as N).

Table 4-25. Domestic Well and Population Count and Densities for Initial Focus Area #7

Initial Focus Area Number		6			
Initial Focus Area Name		North Reedley Area			
Area of Initial Focus Area (acres)		4,902			
Total Number of Wells	All Domestic Wells	157	Total Population	All Population	926
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	100		Population (Area with NO3N Above 7.5 mg/L)	846
Density of Domestic Wells (well/100 ac)	All Domestic Wells	3	Density (Population/100 ac)	All Population	19
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	0		Population (Area with NO3N Above 7.5 mg/L)	17

4.3.7.3. Household Income (Disadvantaged/Severely Disadvantaged Community Status)

Table 4-26 shows the minimum, maximum, and median values of the MHI for 2020 census blocks in this Initial Focus Area and identifies the DAC/SDAC status of the median MHI.

Table 4-26. Median Household Income and Disadvantaged Community Status for Initial Focus Area #7

Initial Focus Area Number	Initial Focus Area Name	MHI			DAC/SDAC Status
		Min	Max	Median	
7	North Reedley Area	$38,478	$93,981	$47,764	DAC

4.3.7.4. Public Water System Initial Evaluation for Initial Focus Area #7

4.3.7.4.1. Overview of Public Water Systems within 3-miles of Initial Focus Area

PWSs of all types and sizes within three miles of the Initial Focus Area #6 are summarized in **Table 4-27**, including information about the type of water system, the number of connections, the population served, the compliance status, the SAFER status, information about any outstanding violations from the State Water Board's Division of Drinking Water (DDW).

Table 4-27. Summary of Public Water Systems within 3-miles of the Initial Focus Area #7

PWS Name	PWS ID	PWS Type	PWS Status	Water System Classification	SAFER Status	Number of Connections (source: HR2W or SDWIS DWW)	Population Served (source: HR2W or SDWIS DWW)	Compliance Status [1]	Compliance Status Source	Violation Category (SDWIS DWW)	Violation Chemical(s) (SDWIS DWW)	Date of Violation (SDWIS DWW Determination Date)	MCL Exceedance			Non-MCL Violation
													Nitrate	Nitrate PLUS Co-Contaminant	Other Contaminant	
RIVERVIEW SCHOOL	CA1000196	NTNC	Out of Compliance	NTNC	Failing	1	458	Out of Compliance	SDWIS DWW (Mar 2023)	MCL	1,2,3-TCP	4/30/2018	-	-	X	-
O'NEILL VINTNERS & DISTILLERS	CA1000411	NTNC	Out of Compliance	NTNC	Not Assessed	2	90	Out of Compliance	SDWIS DWW (Mar 2023)	MCL	1,2,3-TCP	5/18/2018	-	-	X	-
CITY OF PARLIER	CA1010025	CWS	Out of Compliance	CWS	Failing	2688	14494	Out of Compliance	SDWIS DWW (Mar 2023)	MCL	1,2,3-TCP	5/8/2018	-	-	X	-

4.3.7.4.2. Domestic Wells and Population within 1-mile and 3-mile Buffer of Community Public Water Systems

There is one community PWS within 3 miles of Initial Focus Area #7: City of Parlier. This system is currently out of compliance (as of June 2022), but not due to nitrate. The number of domestic wells and the population of residents within 1-mile and 3-miles of the community PWS in total and in estimated areas of elevated nitrate concentrations (above 7.5 mg/L as N) are summarized in **Table 4-28** below.

Table 4-28. Domestic Well and Population Within 1-mile and 3-mile Buffers of Community Public Water Systems in Initial Focus Area #7

Public Water System Name	Public Water System ID	PWS Status	Number of Domestic Wells Within Buffer Area				Population Within Buffer Area			
			1-mile Buffer		3-mile Buffer		1-mile Buffer		3-mile Buffer	
			# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population
CITY OF PARLIER	CA1010025	Out of Compliance							1	1

4.3.8. Initial Focus Area #8 – Orosi/East Orosi Area

4.3.8.1. Local Knowledge

The Orosi/East Orosi area is located in Tulare County adjacent to the community of Orosi. Orosi/East Orosi area land use consists of rural residential, commercial, and agricultural designations. Currently, the Orosi Public Utility District and East Orosi Community Service District are under an order mandating consolidation of the two districts' water systems.

4.3.8.2. Density of Domestic Wells and Population

The density of domestic wells is measured on a 100-acres basis across the Initial Focus Area for both domestic wells that are located in areas of elevated ambient Upper Zone nitrate (above 7.5 mg/L as N) and all domestic wells with known locations. The population density is measured similarly measured over 100 acres. The 2020 census block data are intersected with the ambient Upper Zone nitrate levels (using a spatial weighting of the population if multiple nitrate levels exist in the same population census block)

to identify all residents and those residents located within areas of elevated nitrate concentrations (above 7.5 mg/L as N). **Table 4-29** provides the total number of domestic wells and population, as well as the number of domestic wells and population within areas of elevated nitrate concentrations (above 7.5 mg/L as N), and the density of domestic wells and population in this Initial Focus Area, again in total and for areas of elevated nitrate concentrations (above 7.5 mg/L as N).

Table 4-29. Domestic Well and Population Count and Densities for Initial Focus Area #8

Initial Focus Area Number		6			
Initial Focus Area Name		Orosi/East Orosi Area			
Area of Initial Focus Area (acres)		4,641			
Total Number of Wells	All Domestic Wells	96	Total Population	All Population	2,017
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	93		Population (Area with NO3N Above 7.5 mg/L)	1,825
Density of Domestic Wells (well/100 ac)	All Domestic Wells	2	Density (Population/100 ac)	All Population	43
	Domestic Wells (Area with NO3N Above 7.5 mg/L)	2		Population (Area with NO3N Above 7.5 mg/L)	39

4.3.8.3. Household Income (Disadvantaged/Severely Disadvantaged Community Status)

Table 4-30 shows the minimum, maximum, and median values of the MHI for 2020 census blocks in this Initial Focus Area and identifies the DAC/SDAC status of the median MHI.

Table 4-30. Median Household Income and Disadvantaged Community Status for Initial Focus Area #8					
Initial Focus Area Number	Initial Focus Area Name	MHI			DAC/SDAC Status
		Min	Max	Median	
8	Orosi/East Orosi Area	$25,833	$73,032	$44,941	SDAC

4.3.8.4. Public Water System Initial Evaluation for Initial Focus Area #8

4.3.8.4.1. Overview of Public Water Systems within 3-miles of Initial Focus Area

PWSs of all types and sizes within three miles of the Initial Focus Area #8 are summarized in **Table 4-31**, including information about the type of water system, the number of connections, the population served, the compliance status, the SAFER status, information about any outstanding violations from the State Water Board's Division of Drinking Water (DDW).

Table 4-31. Summary of Public Water Systems within 3-miles of the Initial Focus Area #8

PWS Name	PWS ID	PWS Type	PWS Status	Water System Classification	SAFER Status	Number of Connections (source: HR2W or SDWIS DWW)	Population Served (source: HR2W or SDWIS DWW)	Compliance Status [1]	Compliance Status Source	Violation Category (SDWIS DWW)	Violation Chemical(s) (SDWIS DWW)	Date of Violation (SDWIS DWW Determination Date)	MCL Exceedance			Non-MCL Violation
													Nitrate	Nitrate PLUS Co-Contaminant	Other Contaminant	
OROSI HIGH SCHOOL	CA5400636	NTNC	Unknown	NTNC	At-Risk	14	1200	Unknown	Not in SDWIS	-	-	-	-	-	-	-
EAST OROSI CSD	CA5401003	CWS	Out of Compliance	CWS	Failing	103	932	Out of Compliance	SDWIS DWW (Mar 2023)	MULT.	Nitrate, Public Notice, Lead Service, Lead & Copper Rule, CCR Report	8/22/2012, 10/22/2021, 7/2/2020, 8/5/2019, 10/29/2018	X	-	-	X
CUTLER PUD	CA5410001	CWS	Out of Compliance	CWS	Failing	1217	6200	Out of Compliance	SDWIS DWW (Mar 2023)	MCL	1,2,3-TCP	8/26/2022	-	-	X	-
OROSI PUBLIC UTILITY DISTRICT	CA5410008	CWS	In Compliance	CWS	Not At-Risk	1570	8300	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-
YETTEM WATER SYSTEM	CA5403043	CWS	Out of Compliance	CWS	At-Risk	66	350	Out of Compliance	SDWIS DWW (Apr 2023)	MON	RTCR	1/29/2021	-	-	-	X
VISALIA CITRUS PACKING GROUP-ORANGE COVE	CA5403046	TNC	Out of Compliance	TNC	Not Assessed	7	78	Out of Compliance	SDWIS DWW (Mar 2023)	PP	Public Notice	10/22/2021	-	-	-	X
FAMILY EDUCATION CENTER	CA5403126	NTNC	In Compliance	NTNC	Not Assessed	7	50	In Compliance	SDWIS DWW (Mar 2023)	-	-	-	-	-	-	-
PRIMA WAWONA - CUTLER PLANT	CA5403145	NTNC	In Compliance	NTNC	Not At-Risk	1	770	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-

PENA'S DISPOSAL SERVICES	CA5403205	NTNC	In Compliance	NTNC	Not At-Risk	4	86	In Compliance	SDWIS DWW (Apr 2023)	-	-	-	-	-	-	-

4.3.8.4.2. Domestic Wells and Population within 1-mile and 3-mile Buffer of Community Public Water Systems

There are four community PWS within 3 miles of Initial Focus Area #8. Three of them are currently out of compliance (as of June 2022), one of which with a nitrate issue (among other chemical and non-MCL violations). The number of domestic wells and the population of residents within 1-mile and 3-miles of the community PWS in total and in estimated areas of elevated nitrate concentrations (above 7.5 mg/L as N) are summarized in **Table 4-32** below.

Table 4-32. Domestic Well and Population Within 1-mile and 3-mile Buffers of Community Public Water Systems in Initial Focus Area #8

Public Water System Name	Public Water System ID	PWS Status	Number of Domestic Wells Within Buffer Area				Population Within Buffer Area			
			1-mile Buffer		3-mile Buffer		1-mile Buffer		3-mile Buffer	
			# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	# Domestic Wells with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total # Domestic Wells	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population	Population with Estimated Elevated Nitrate (>7.5 mg/L as N)	Total Population
EAST OROSI CSD	CA5401003	Out of Compliance	41	41	14	14	1,056	1,056	600	621
CUTLER PUD	CA5410001	Out of Compliance	12	15	13	13				
OROSI PUBLIC UTILITY DISTRICT	CA5410008	In Compliance	63	66	14	14				
YETTEM WATER SYSTEM	CA5403043	Out of Compliance							19	19

4.4. Initial Focus Area Drinking Water Needs and Solutions

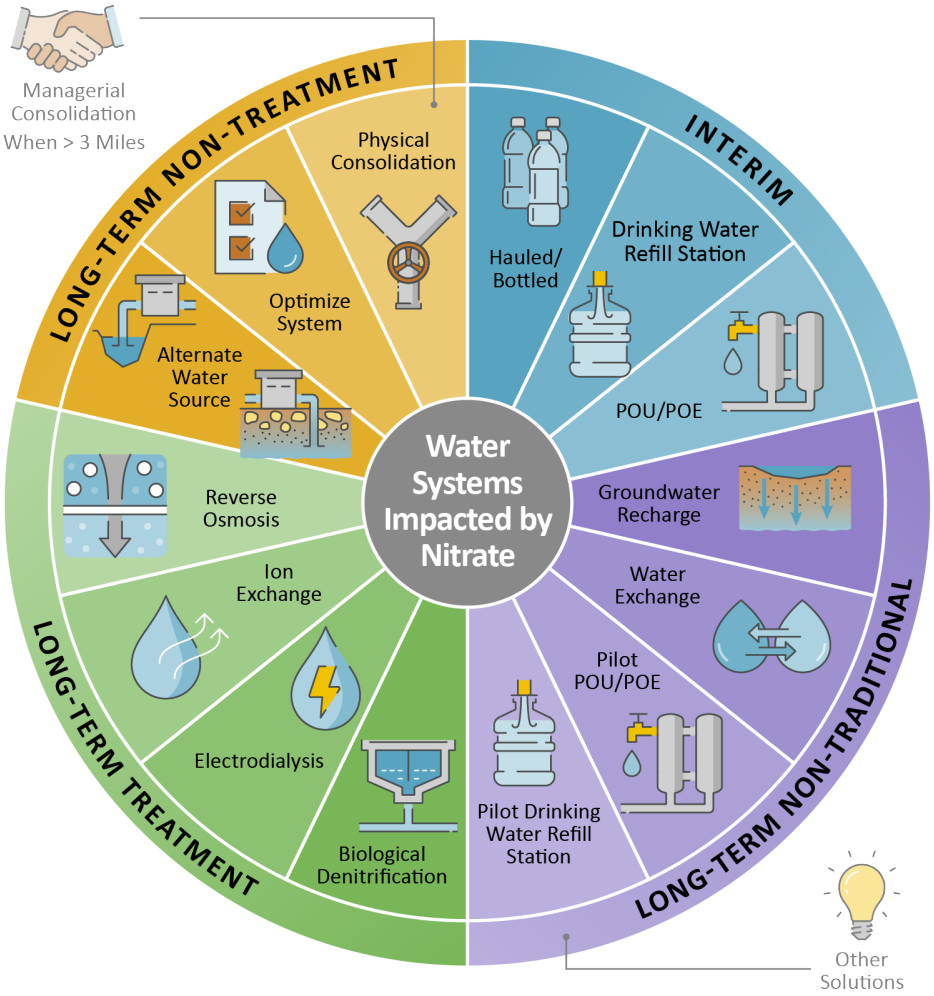
This section provides a workplan for interim and long-term solutions “for any person living in the area adversely affected by the discharge under the requested nitrate exception”.

4.4.1. Public Outreach Activities to Obtain Local Input on Potential Solution Projects

The Management Zone plans on continuing adaptive outreach strategies to better understand which outreach methods are most effective for engaging with the population in various Management Zone regions. Outreach related to Long-Term Drinking Water Solutions will occur before the selection of long-term drinking water projects to receive input from the community and stakeholders on potential approaches and projects. Outreach activities and coordination will also include the counties, the state, local public water systems, other local entities, and Groundwater Sustainability Agencies (GSAs). Ongoing outreach will occur during the process to obtain and secure funding for long-term drinking water solution projects, during feasibility analyses, and during implementation of the selected solutions (see **Figure 4-5a** and **b).** Possible solutions shown in **Figure 4-5a** and **4-5b** are discussed in detail in **Appendix LT-2**. This appendix contains information about traditional solutions, including optimizing water systems, connecting to an existing adjacent water system, alternate water supply source (via surface water or a new groundwater well), and nitrate treatment systems. **Appendix LT-2** also provides information about watershed or indirect solutions (including source control and groundwater recharge), as well as non-traditional long-term solutions (including point-of-use or point-of-entry devices, water fill stations, water exchanges, and designated potable water faucet).

Drinking Water Solutions

Public and State Water Systems



Physical Consolidation
- Consolidate with nearby existing water system and dissolve current water system if within 3 miles of neighboring water system
- Establish an intertie to purchase water from nearby existing water system.

Managerial Consolidation or Regionalization
- Water systems have separate water sources and infrastructure but share staff and other resources required to operate each water system.
- Does not directly resolve nitrate compliance issues but may provide adequate resources necessary to sustainably and effectively operate the subsumed water system.

Optimize System
- Increase pumping from wells with sufficient water quality
- Well rehabilitation and modifications
- Surface water intake and treatment system rehabilitation
- Blend water sources

Alternate Water Source
- Construct a new groundwater well and pump station if water quality and quantity is sufficient
- Construct a new surface water intake, treatment system, and pump station if water quality and quantity is sufficient and surface water rights are available. Surface water sources may include lakes, canals, rivers, streams, or reservoirs.

Reverse Osmosis
- Centralized system utilizes semi-impermeable membrane to filter out nitrates

Ion Exchange
- Centralized system utilizes pressurized treatment vessels and filter media to exchange chloride ions with nitrate ions

Electrodialysis
- Centralized system utilizes electrodes to selectively remove nitrate ions

Biological Denitrification
- Centralized system utilizes bacteria to break down nitrate into nitrogen gas

POU/POE
- Point of Use (POU) typically installed under the sink in a residence to treat water at the faucet
- Point of Entry (POE) installed just upstream of where water enters the residence.
- May be piloted as a long-term treatment solution when other solutions are impractical or economically infeasible. For example, when physical consolidation with an existing water system is infeasible to due to distance, consider POU/POE at residences.

Drinking Water Refill Station
- Centralized station where customers refill jugs with water that meets drinking water standards
- May be piloted as a long-term non-treatment solution when other solutions are impractical or economically infeasible. For example, when physical consolidation with an existing water system is infeasible to due to distance, consider a centralized refill station.

Hauled/Bottled Water
- Bottled water that is purchased and delivered to customers that meets drinking water standards

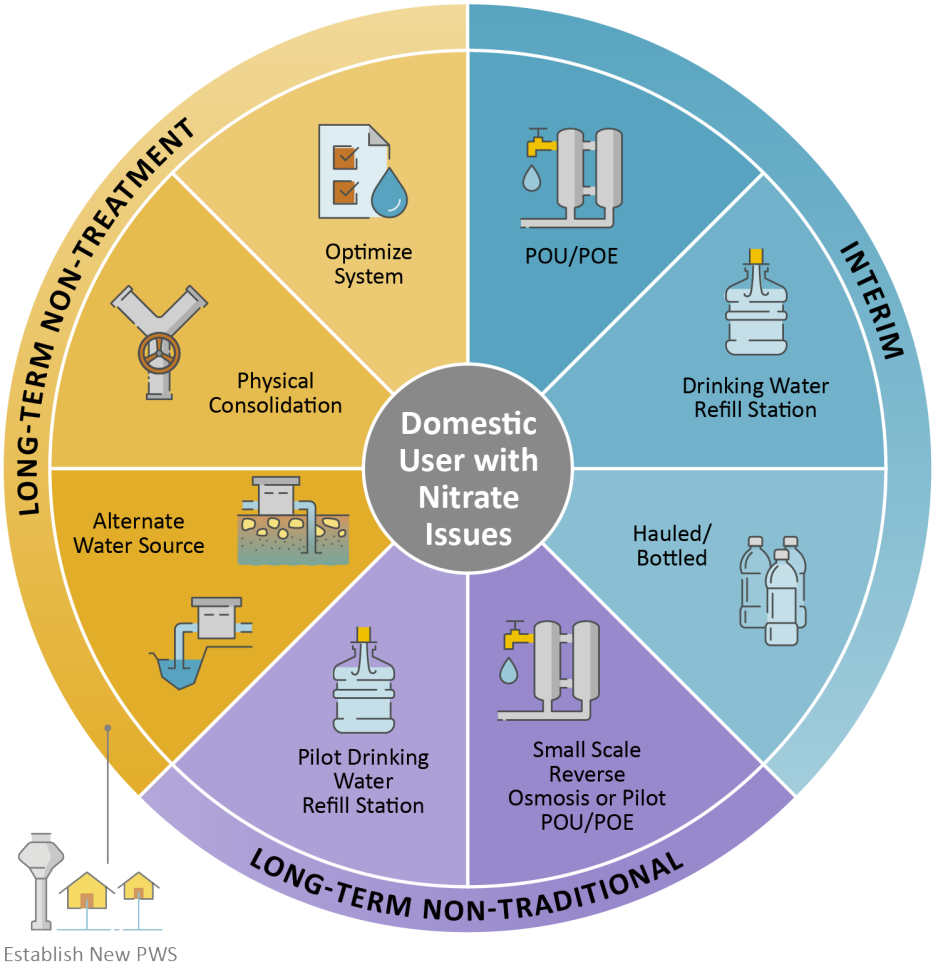
Water Exchanges
- Agreements may be made to exchange water sources amongst water systems or other water purveyors.

Groundwater Recharge
- Surplus water may be percolated or injected into the ground to allow wells the opportunity to pump better quality water

Figure 4-5a. Nitrate Solutions Part 1

Drinking Water Solutions

Domestic Well Users



Optimize System
- Increase pumping from wells with sufficient water quality
- Well rehabilitation and modifications
- Surface water intake and treatment system rehabilitation
- Blend water sources

Physical Consolidation
- Request a service connection be established if a consolidation or regionalization project between water systems is planned in your area. Domestic groundwater wells and surface intakes should be abandoned as a drinking water source
- Request a service mainline be extended to your neighborhood to benefit multiple residences
- Establish an intertie to purchase water from a nearby existing water system

Alternate Water Source
- Construct a new domestic groundwater well and pump station if water quality and quantity is sufficient.
- Construct a new domestic surface water intake, treatment system, and pump station if water quality and quantity is sufficient and surface water rights are available. Surface water sources may include lakes, canals, rivers, or streams.

Establish New Public Water System (PWS)
- Consider establishing a new PWS with a minimum of 15 residences within a 1-mile radius of each other. Residents may operate the water system or managerially consolidate with a larger existing water system within a 5-mile radius. Managerial consolidation allows for shared staff and resources between both water systems.

POU/POE
- Purchase a Point of Use (POU) device typically installed under the sink in a residence to treat water at the faucet.
- Purchase a Point of Entry (POE) device to be installed just upstream of where water enters the residence.
- Participate in a pilot program for POU/POE as a long-term treatment solution when other solutions are infeasible.

Drinking Water Refill Station
- Centralized station where customers refill jugs with water that meets drinking water standards.
- Participate in a pilot program for refill stations as a long-term non-treatment solution when other solutions are infeasible.

Hauled/Bottled Water
- Bottled water that is purchased and delivered to customers that meets drinking water standards

Figure 4-5b. Nitrate Solutions Part 2

4.4.1.1. Early Action Plan Implementation and Outreach Progress

The Management Zone has been performing outreach across the Management Zone, including within the Initial Focus Areas. Outreach activities associated with the EAP have included and will continue to include domestic well testing and bottled water deliveries. Domestic well tests are sometimes also conducted by or for other entities (e.g., Irrigated Lands Regulatory Program, State Water Board/U.S. Geological Survey's Groundwater Ambient Monitoring and Assessment (GAMA) program, and the Central Valley Dairy Representative Monitoring Program). **Figure 4-6** shows the progress of domestic well testing and bottled water deliveries within each Initial Focus Area.

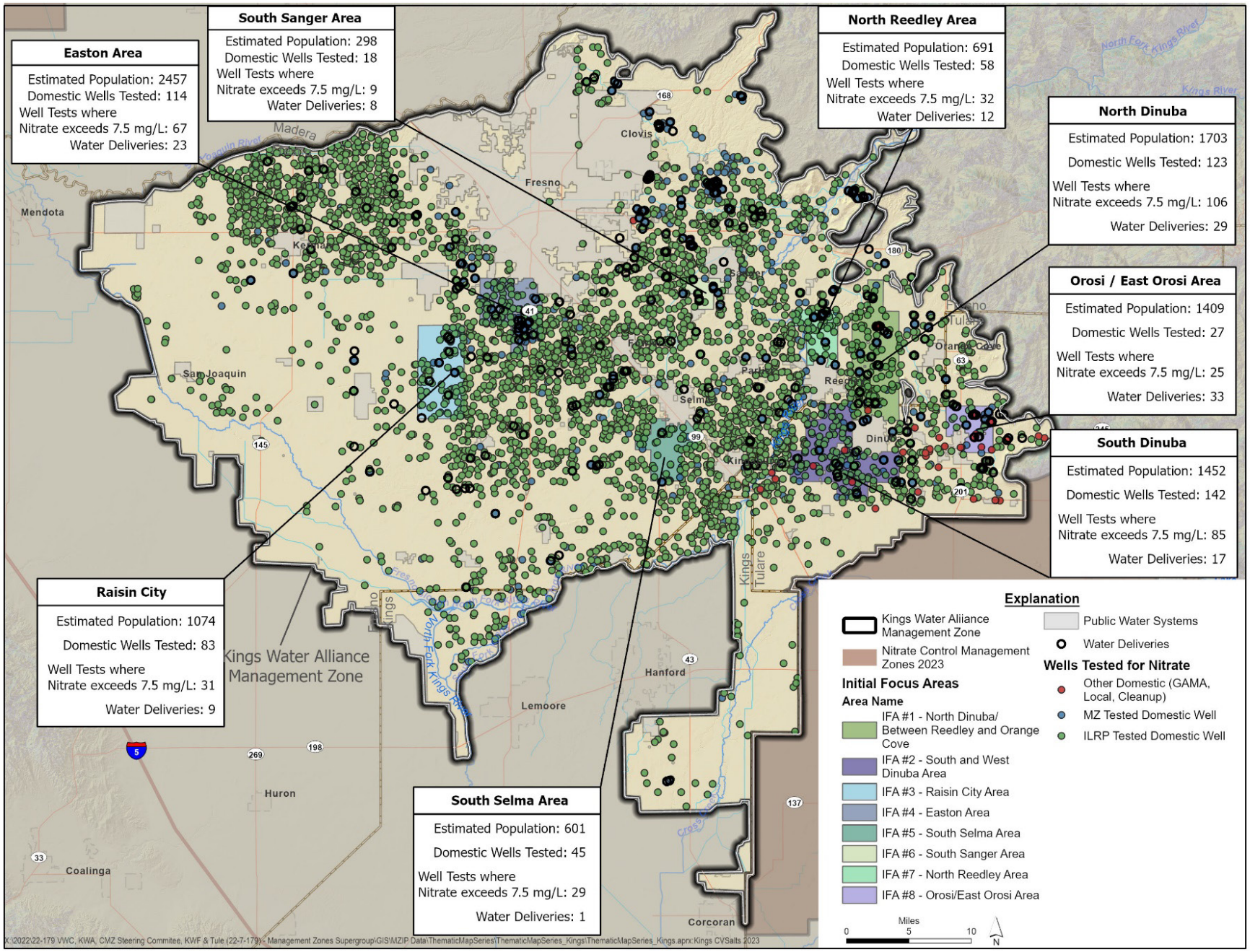


Figure 4-6. Kings Domestic Well Tests and Water Deliveries

4.4.1.2. Planned Public Outreach Activities

At the outset of MZIP efforts, public outreach activities will be expanded to obtain local input on potential drinking water solution approaches and projects. The goal of public outreach activities for the long-term drinking water solutions component of the Nitrate Control Program is to engage with the residents for which these solutions are intended to benefit and solicit their input regarding the best (most reasonable and feasible) solution they support. Targeted outreach will include specific activities focused on the residents within the Initial Focus Areas and include the following[22]:

1) Performing surveys through in-person interviews, over the phone, or over the internet (via the Management Zone website) to solicit engagement and input;
2) Produce and provide educational materials describing the various options for long-term drinking water solutions tailored to the specific needs of residents in each Initial Focus Area, including translations for multiple languages, as appropriate;
3) Hold round table events to provide an open forum opportunity for residents to offer input about the various considerations for long-term drinking water solution options.
4) Other public outreach activities that may include (but are not limited to) other opportunities to engage with the public and solicit input regarding long-term drinking water solutions: attending Back-To-School Nights, attending church functions, attending swap meets/food bank events, hosting brown-bag lunches at places of work, etc.

Public outreach activities will continue following MZIP submittal. The nature of the outreach will evolve from EAP free well testing and free bottled water delivery to information and education about the MZIP and potential long-term drinking water solutions. More comprehensive outreach pertaining to long-term drinking water solutions would occur following MZIP submittal (**Figure 4-7**). It is anticipated that Initial Focus Area-specific outreach may span one to two years for the Management Zone to receive sufficient feedback from community members regarding a path forward for the selection of a long-term drinking water solution (or solutions) most suitable to the area.

[22] Engagement and attendance at public outreach activity events may require some incentivization, which will be explored by the MZ.

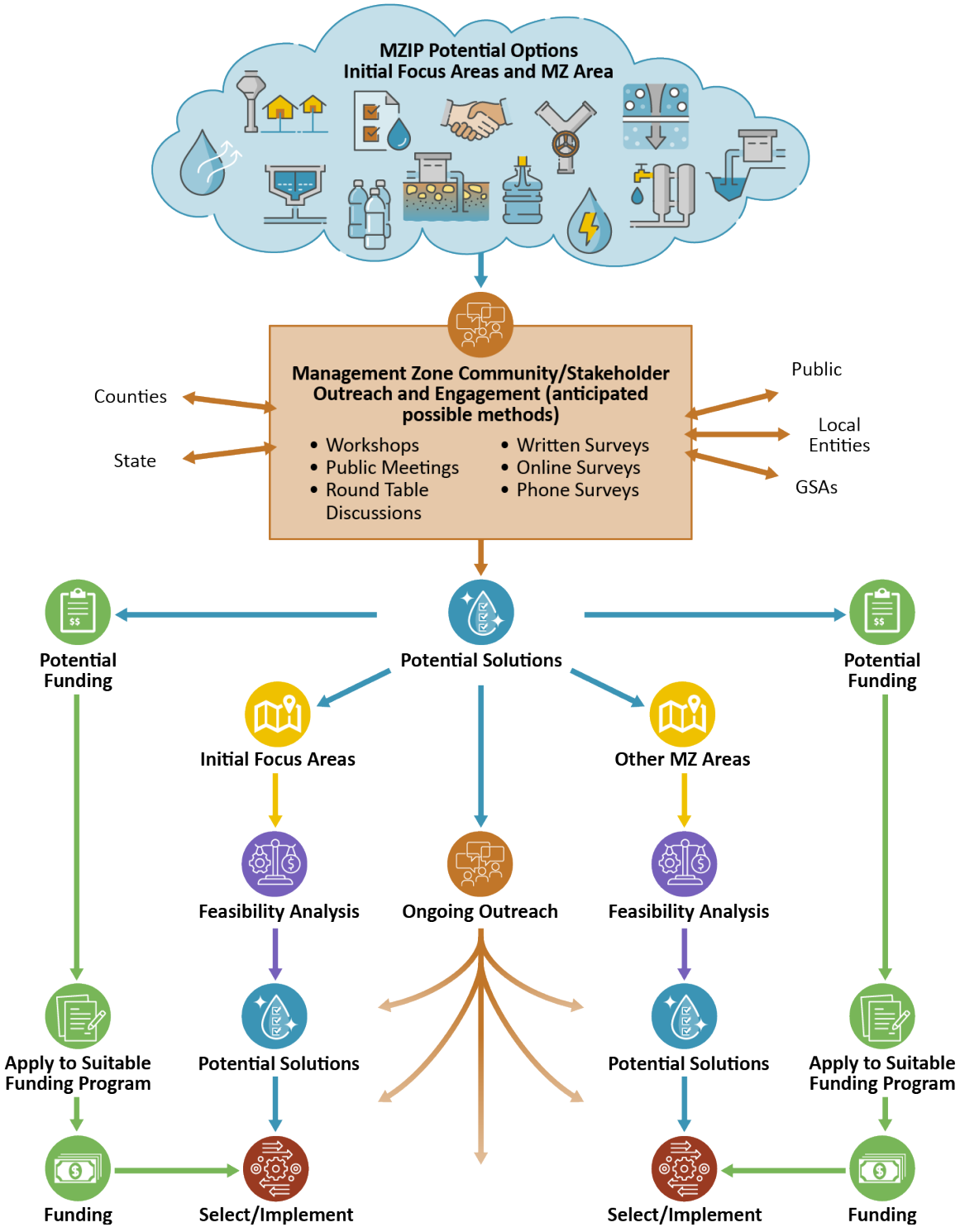


Figure 4-7. Long-Term Drinking Water Solutions Outreach and Engagement

4.4.1.3. Coordination with State Water Board DDW, Counties, GSAs, Local Communities & Others

Management Zone outreach efforts also involve coordination with the State Water Board's State Water Board DDW, the State Water Board's Division of Financial Assistance and technical service providers, the counties (including Departments of Health and Human Services and Local Agency Management Programs (LAMPs)), GSAs, community organizations, local communities, and others. Coordination activities between these entities may include but are not limited to: in-person or hybrid meetings and workshops; attending regularly-scheduled community/agency meetings to present information about the MZIP program and long-term drinking water solutions; phone calls and emails; etc.

KWA staff provides updates regularly at Board Meetings for the KWA (monthly), Kings River Conservation District (KRCD), and Kings River Water Quality Coalition (every other month). Staff and/or representatives for the following GSAs serve on one or more of these Boards: James ID GSA, North Kings GSA, North Fork Kings GSA, South Fork Kings GSA, and El Rico GSA. In October 2021, the KWA presented at the Easton Domestic Well Owner Workshop held in partnership with the Easton Community Services District, North Kings Groundwater Sustainability Agency, Self-Help Enterprises, and County of Fresno Department of Public Health. Attendees received a five-minute flash presentation from each agency that provided attendees with an overview of unique services provided to domestic well owners. The KWA is hoping this workshop partnership model will be replicated in additional KWA communities in cooperation with the GSAs. The KWA will seek to further partner with Groundwater Sustainability Agencies for outreach and engagement opportunities. Additionally, the KWA is exploring coordination opportunities with GSAs related to well permitting and mitigation activities.

4.4.2. Steps Needed to Identify Potential Intermediate and Long-Term Drinking Water Projects

Several steps need to occur to identify suitable Initial Focus Area potential drinking water solutions and include public consideration. The first step includes preliminary planning where conceptual solutions are identified. The needs of the community and residents within the Initial Focus Area would be identified (needs such as consensus/agreement about the most suitable path forward; any land requirements to achieve conceptual solutions; and any construction requirements to achieve conceptual solutions); funding sources must also be identified. There are multiple funding sources that could potentially support long-term drinking water projects. Potential funding sources are described in **Appendix LT-2**; Interim and Long-Term Drinking Water Solutions Workplan. All intermediate and long-term drinking water projects would be discussed on a case-by-case basis, allowing for individual solutions to be explored.

4.4.3. Potential Impacts of Planned Solutions on Disadvantaged Communities

The eight Initial Focus Areas in the Kings P1 Management Zone have MHIs that represent DACs and SDACs. Facilitating long-term drinking water solutions for these communities will have an impact on approximately 14,962 residents (with an assumed population of 13,028 located in areas of elevated nitrate levels above 7.5 mg/L as N) and help address potential nitrate concerns from 1,862 domestic wells (with an estimated 1,432 domestic wells located in areas of elevated nitrate above 7.5 mg/L as N).

4.4.4. Drinking Water Solutions Schedule and Milestones

The conceptual approach for implementing the actual projects identified for the Long-Term Drinking Water Solutions (projects) is illustrated in the graphic below (**Figure 4-8**). Implementation of projects for the Initial Focus Areas involves four main steps that must occur prior to construction: Outreach; Conceptual Planning; Engineering; and Permitting. A description of the outreach is provided in Section 4.1., Community and stakeholder outreach and engagement are necessary prior to and following the Conceptual Planning portion of the project implementation. The timing of the Engineering and Permitting steps will vary depending on the potential project(s) selected. More details about the range of possible solutions, along with the timing, ballpark costs, and other considerations, are provided in the Interim and Long-Term Drinking Water Solutions Workplan (**Appendix LT-2**). A list of milestones and schedule (timeline) are provided below and illustrated in **Figure 4-9** to help facilitate these long-term drinking water solutions.

Milestone 1

Before initiating public and stakeholder outreach pertaining to long-term drinking water solutions, the Management Zone will take steps to first identify if there are projects or technical service providers already engaged within the Initial Focus Area. The Management Zone will also engage with State Water Board DDW to understand if there are compliance order efforts underway that may impact a PWS's compliance with nitrate drinking water standards. Through these early engagement activities, the Management Zone can then determine the role (or roles) that it will undertake to facilitate long-term drinking water solutions in the communities impacted by nitrate.

Timeline: Complete in 1st Year of MZIP implementation and re-visit financial responsibilities annually.

Milestone 2

This milestone involves performing public and stakeholder outreach and meaningful engagement activities to obtain local input on potential solutions. Where efforts are already underway through other efforts, the Management Zone will perform this outreach in coordination and conjunction with existing efforts. This milestone is anticipated to occur throughout the implementation of the MZIP with particular focus on the long-term drinking water solutions. The Management Zone plans to perform a variety of outreach activities to solicit input from local residents on which potential drinking water solutions would be most suitable for them. The Management Zone will hold workshops, public meetings, round table discussions, or surveys to engage with Counties, the State (State Water Board DDW), the residents, other local entities, and GSAs. Targeted outreach will occur within Initial Focus Areas.

Timeline: Continuous starting in 1st Year of MZIP implementation.

Milestone 3

This milestone involves determining which PWSs in and around Initial Focus Areas require further evaluation. PWSs will be identified in the Management Zone, and compliance status and nitrate compliance risk will be assessed. PWSs will be grouped and prioritized for further evaluation. This milestone will also address areas within Initial Focus Areas where domestic well owners exist near Public Water Systems.

Timeline: Complete in 1st Year of MZIP implementation .

Milestone 4

This milestone includes performing PWS evaluations to determine suitability for potential drinking water solutions for PWSs and domestic well owners. This will involve reviewing and evaluating available data for each selected PWS. Potential drinking water solutions available to the PWS will be determined, including any projects already in progress.

Timeline: Begin in Year 2 of MZIP implementation.

Milestone 5

This milestone involves determining the feasibility of various solutions identified in Milestone 4, including reviewing capital costs, funding opportunities, operation and maintenance costs, operational requirements, permitting requirements, stakeholder input, etc. A report will be produced describing the results of the feasibility study. Results from the feasibility study would be shared with the public through outreach and public engagement.

Timeline: Begin in Year 2 of MZIP implementation.

Milestone 6

This milestone includes prioritizing and developing a Management Zone-Specific Workplan for areas outside of the Initial Focus Areas. A second round of priority groups will be established to identify more areas within the Management Zone where the Management Zone can help facilitate long-term drinking water solutions and address communities and residents affected by elevated nitrate conditions.

Timeline: Begin in Year 6 of MZIP implementation.

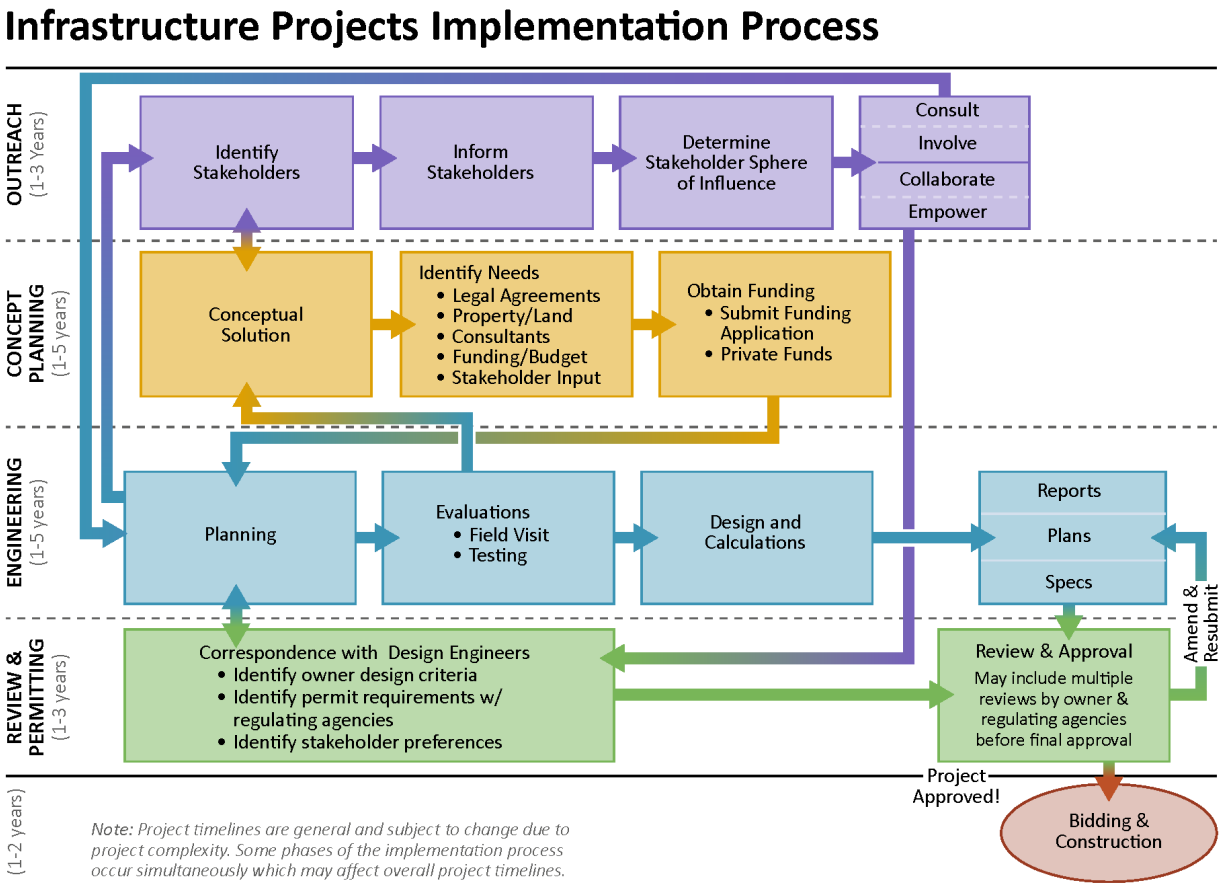


Figure 4-8. Long Term Drinking Water Projects Flow Diagram

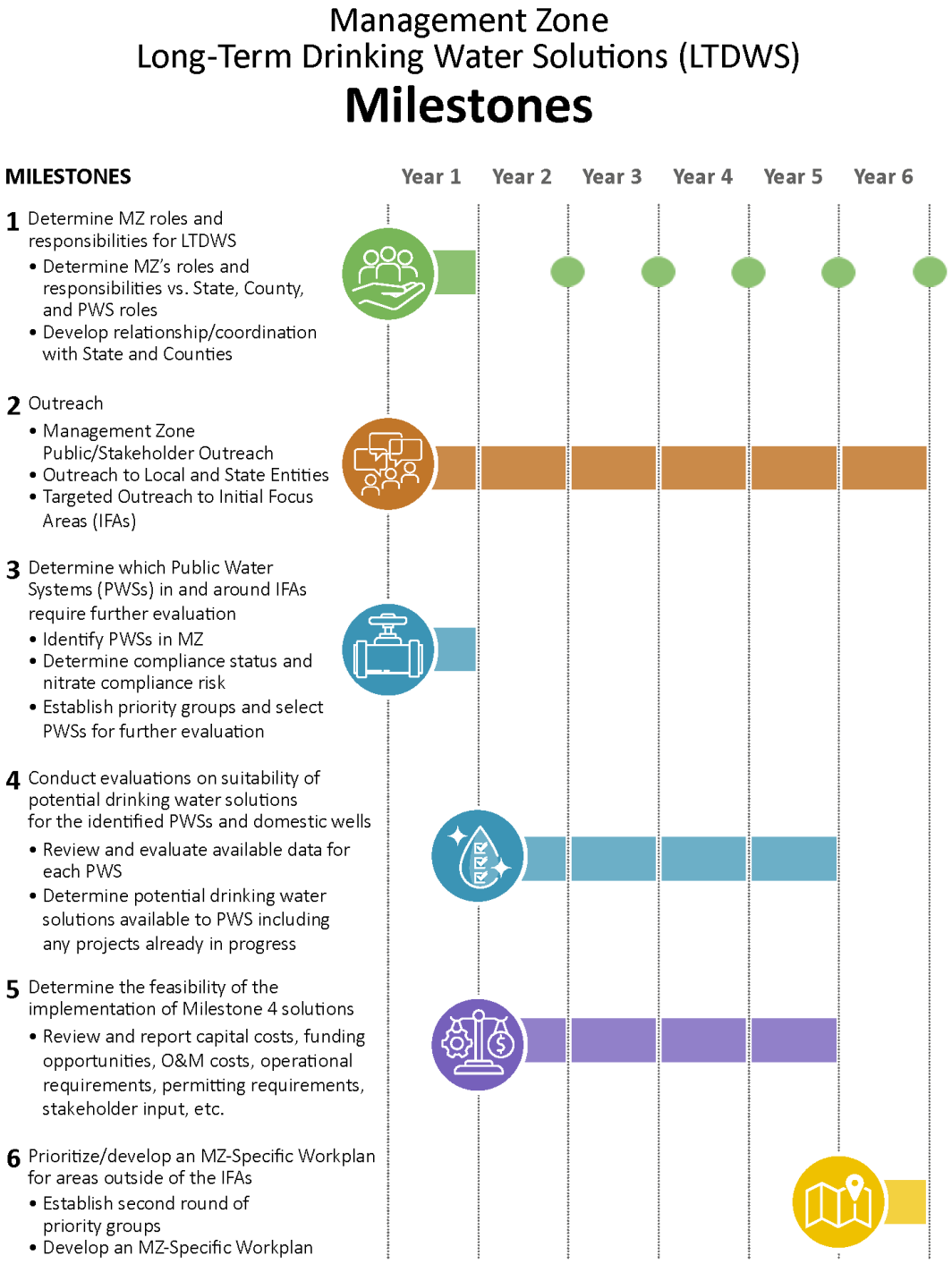


Figure 4-9. Long Term Drinking Water Solutions Milestones

4.5. Adaptive Management

The Management Zone recognizes that circumstances can change over time, and activities outside the Management Zone's jurisdiction may impact the Management Zone's facilitation of long-term drinking water solutions' projects. For example, different funding opportunities may arise that support different solution choices than those selected initially. Changes in local county or state policies may also affect the feasibility of certain solution projects and will need consideration. Changes in groundwater conditions may also affect implementation of solution projects (e.g., extended droughts may exacerbate nitrate issues, while reductions in nitrogen loading and increased groundwater recharge may dilute or ease some nitrate issues) and will need to be evaluated and considered during the long-term drinking water solution process.

In response to changed circumstances, including the examples described above, the Management Zone would follow an adaptive management strategy during the long-term drinking water solutions project development process.

4.6. Long-Term Drinking Water Solutions Workplan for Other Areas

Other areas within the Management Zone that are not part of the Initial Focus Areas will be addressed as part of community outreach and engagement efforts following MZIP submittal to the Central Valley Water Board and in future Management Zone-Specific Long-Term Drinking Water Solutions Workplans. A second round of prioritization will occur to identify the next areas for which the Management Zone can facilitate long-term drinking water solutions. It is currently anticipated that the second round of prioritization and development of an Management Zone-Specific workplan will occur in Year 6 of the MZIP implementation. The second round of prioritization will consider DAC and SDAC (income) status, as well as domestic well and population density in areas with elevated (above 7.5 mg/L as N) ambient nitrate concentrations.

Long-term drinking water solutions for these newly identified areas will be evaluated for feasibility and practicability and follow the same community outreach and engagement approaches described above for the Initial Focus Areas. Outreach to specific residents in these newly identified areas will occur to discuss the potential long-term drinking water solutions to educate and receive input from the residents related to drinking water solutions in their area.

The prioritization of areas outside of the Initial Focus Areas in approximately Year 6 of MZIP implementation will allow a small period (five years) for the Management Zone to collect more data (including data described in the Nitrate Reduction Program) and work on the long-term drinking water solutions for the Initial Focus Areas before further assessment of other Management Zone areas proceeds. The work conducted in the Initial Focus Areas is anticipated to inform the path forward for long-term drinking water solutions needed in other Management Zone areas.

The Management Zone will be conducting community outreach and engagement in the Initial Focus Areas and the overall Management Zone area throughout MZIP implementation. Additional outreach to specific Management Zone areas will be aligned with the prioritization of drinking water needs.

SECTION 5.
Nitrate Reduction Program

5.1. Introduction

The Nitrate Control Program requires MZIPs to include a number of specific elements to address the nitrate reduction goals of the program:

- Plans to reduce nitrate loading so that ongoing discharges do not cause or contribute to exceedances of water quality objectives within the Management Zone;
- Enforceable and quantifiable interim deadlines that focus on reducing nitrate in ongoing discharges and a proposed final compliance date for ongoing discharges of nitrate to cease causing or contributing to exceedances of the applicable water quality objective in the receiving water;
- Identification of nitrate management measures, including short and long-term projects and planning activities, that will be implemented within the Management Zone to make progress towards attaining each of the management goals applicable to the Nitrate Control Program;
- Milestones related to reducing nitrate loading and achieving compliance in ongoing discharges and management basin and sub-basin restoration;
- Short and long-term schedule for implementation of nitrate management activities and interim milestones;
- Identification of triggers for the implementation of alternative procedures or measures to be implemented if the interim milestones are not met; and,
- Identification of responsibilities of each regulated discharger, or groups of regulated dischargers participating in the Management Zone, to manage nitrate within the zone.

This MZIP includes Nitrate Reduction Programs for each of the key sources or sectors of permitted dischargers participating in the Management Zone (irrigated agriculture, dairy and bovine facilities, poultry facilities and Non-15 Program facilities). In addition, the Nitrate Reduction Program also considers other sources of nitrogen loading to groundwater including septic systems, turfgrass and leaky sewer systems in urban areas. The sections below provide the following information to present the Nitrate Reduction Program that will be implemented in the KWA Management Zone:

- Preliminary estimate of nitrogen loading from key sources in the Management Zone (to the extent known during development of this MZIP);
- Nitrate Reduction Programs applicable to each sector that contributes to nitrogen loading;
- Summary of the nitrate reduction goals (milestones) applicable to each sector; and
- Compliance assessment approach to track progress towards compliance with the final Nitrate Control Program goal to no longer cause or contribute to an exceedance of the nitrate water quality objective in Upper Zone groundwater.

5.2. Sources of Nitrogen Loading in the Management Zone

This section documents the findings from analysis of the key sources of nitrogen loading within the Management Zone. Section 5.2.1 provides summaries of the methodologies used to estimate loading from each sector. Section 5.2.2. summarizes the results for the KWA Management Zone based on application of the sector-specific methodologies.

5.2.1. Methodology to Estimate Nitrogen Loading from Key Sectors

Below is a description of the methodologies applied to each-sector to prepare a preliminary estimate of nitrogen loading in the Management Zone. **Appendices NL-1** through **NL-5** provide additional details regarding each of these methodologies.

5.2.1.1. Irrigated Agriculture Nitrogen Loading Methodology

Appendix NL-1 (*Nitrogen Loading Methodology for Irrigated Agriculture*) documents the approach used to estimate nitrogen loading from irrigated agriculture in the Priority 1 Management Zones. This section provides a summary of the methodology which relies on implementation of four key steps (**Figure 5-1**):

- *Use DWR's 2019 Crop Cover Data to Identify Irrigated Acreage* – The 2019 statewide crop cover land use survey data were used to identify irrigated acres within the Priority 1 Management Zone (Note: this dataset was the most recent data available at the time of development of this MZIP). Development of this land use dataset included removing urban and unclassified land use categories from the DWR GIS coverage.
- *Remove Acreage that Represents Dairy and Bovine Facilities* - The DWR crop cover GIS land use survey dataset does not distinguish between acreage where there are crops grown at dairy or bovine facilities and acreage that is represented by irrigated agriculture. Accordingly, to avoid duplication, the CVDRMP provided GIS data to remove dairy and bovine acreage from the irrigated agriculture analysis.
- *Intersect Groundwater Protection Nitrogen Loading Values* - Nitrogen loading data resulting from irrigated acreage together with the ILRP Groundwater Protection Values (GWPV) were used to match irrigated acreage within each township in the Priority 1 Management Zone and estimate loading. The township-scale nitrogen loading value (or GWPV) provides a representative nitrogen loading rate (pounds/acre/year [lbs/ac/yr]) based on climate, soil conditions, nutrient and, surface runoff, the nitrogen cycle, plant growth, and management practices specific to the local township area.
- *Calculate Nitrogen Loading to Groundwater for Township* – The number of acres of irrigated agriculture within each township was totaled and then each township-based total was multiplied by the GWPV specific to that township.[23]

[23] A small number of irrigated acres were found in townships where there was no GWPV developed. In that case, the average GPWV from all township GWPVs within the Management Zone was calculated and assigned to those acres that did not have their own township-prescribed GWPV.

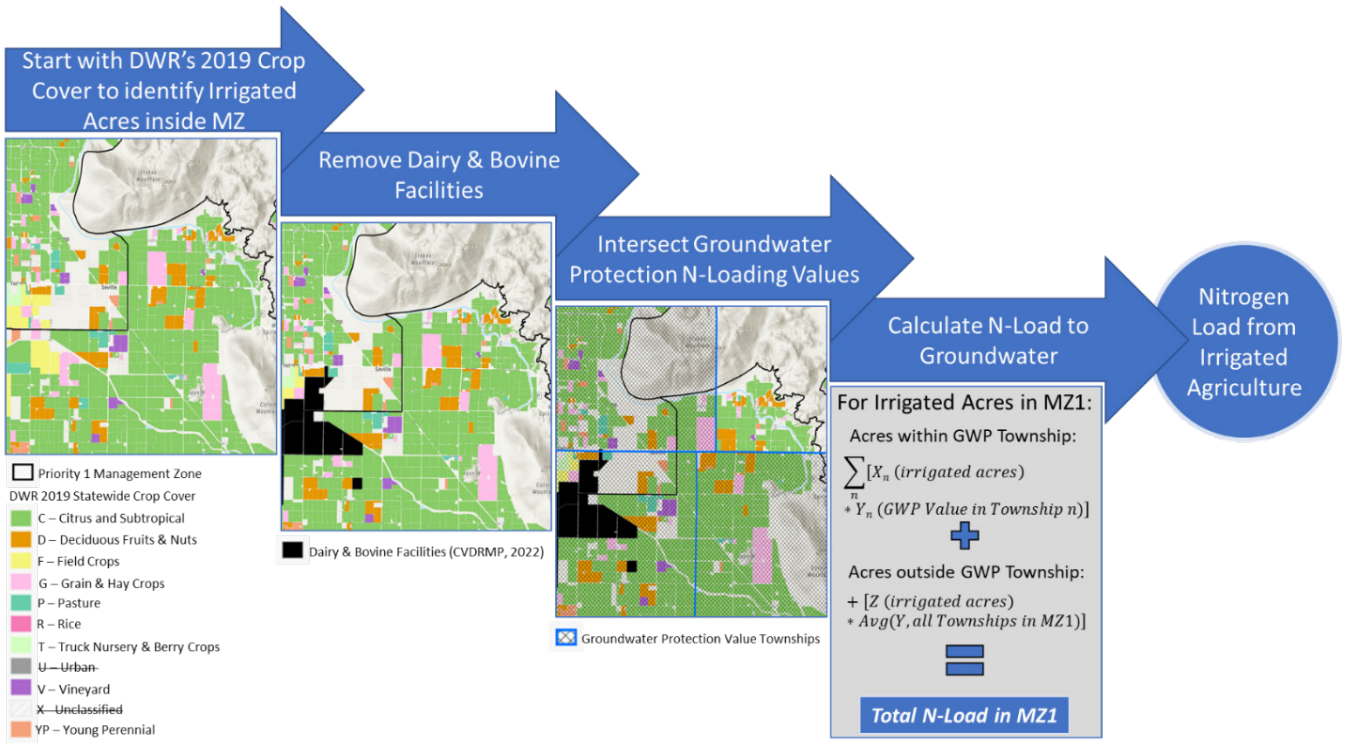


Figure 5-1. Generalized Schematic of the Methodology for Estimating Nitrogen Loads from Irrigated Agriculture in Priority 1 Management Zones

5.2.1.2. Dairy and Bovine Facility Nitrogen Loading Methodologies

Appendix NL-2 (*Nitrogen Loading Methodology for Dairy and Bovine Facilities*) describes the complete methodology used to estimate nitrogen loading from these facilities in the Management Zone. For each facility, CVDRMP provided 2022-based GIS data regarding location, acreage and animal numbers. These datasets were used in combination with the latest research and methodologies specific to dairy and bovine facility nitrogen loads in the Central Valley, as described below.

Dairy Facilities

Milk cow numbers for facilities within the Management Zone were summed and an excretion rate was applied to estimate the total amount of nitrogen excreted (**Figure 5-2**). Some of the nitrogen excreted is lost to volatilization (environmental loss); the remaining manure nitrogen (Manure Nitrogen Available for Application [MNAA]) is considered to be available for application to land. The MNAA value was reduced by 20%, which represents the average Central Valley-wide industry average of MNAA exported from dairy facilities (**Figure 5-2**). The MNAA that remains on the dairy facility was assumed to be applied to cropland. Some of the applied nitrogen is harvested in crops; the remainder is loaded to the subsurface (**Figure 5-2**). The resulting estimated nitrogen loads and nitrogen loading rates are based on the pounds of MNAA applied to dairy cropland and leached to the ground. The resulting values were then divided by the total number of acres of dairy facilities within the Management Zone to compute a nitrogen loading rate (lb/ac/yr).

Bovine Facilities

Nitrogen loading from bovine facilities is mostly associated with earthen corrals rather than manure applied to cropland as was the case for dairy facilities. Using the latest research on nitrogen loads to groundwater from earthen corrals, a range of nitrogen loading rates could be applied to bovine facilities: 2 to 7 lb/ac/yr (see **Appendix NL-2**). Using this approach, the nitrogen load associated with bovine facilities represents a mass flux that enters the groundwater system. In contrast, the cropland approach applied to dairies (similar to the approach for irrigated agriculture) represents a nitrogen flux through the root zone (and does not consider any processes that could alter the nitrogen load amount as it travels through the vadose zone or the unsaturated portion of the subsurface below the root zone and above the groundwater table).

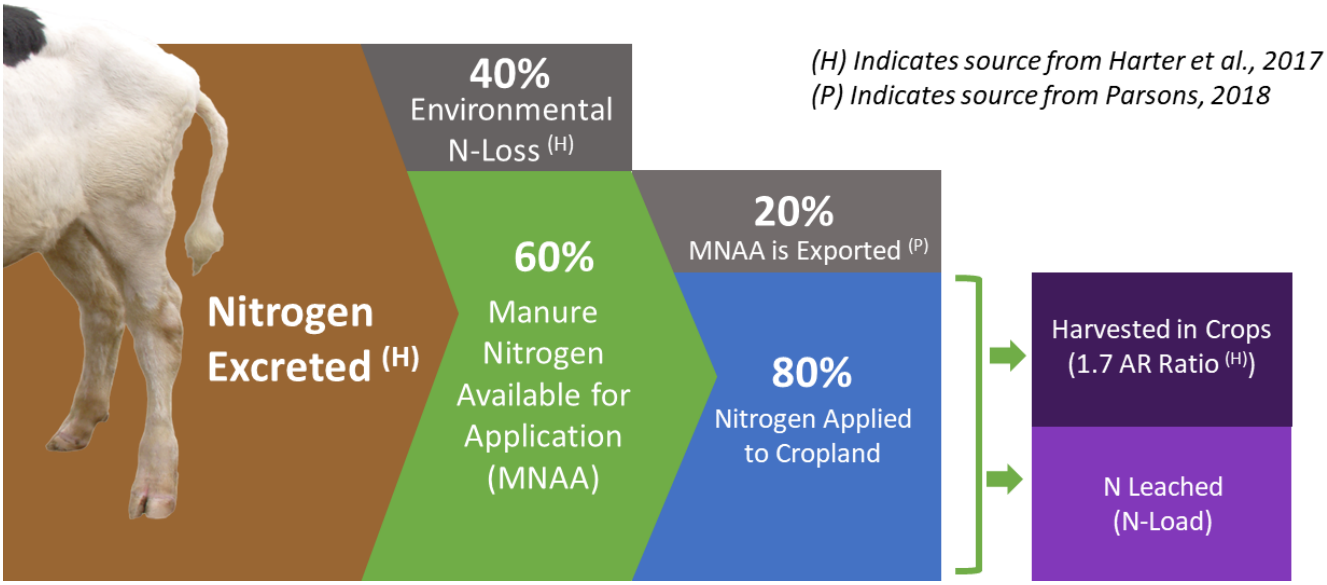


Figure5-5. Overview of the Nitrogen Loading Methodology for Dairy Facilities

5.2.1.3. Poultry Facility Nitrogen Loading Methodology

Appendix NL-3 (*Nitrogen Loading Methodology for Poultry Facilities*) provides the methodology used to develop the preliminary nitrogen loading estimates for various types of poultry operations. As noted in the methodology, if a facility is classified as a Low Threat Operation under the Poultry General Order, then under dry weather conditions waste produced by these poultry facilities should contribute little to no nitrogen load to groundwater if the facility is compliant with all permit requirements. The Poultry General Order does not require Low Threat Operations to conduct water quality monitoring. Accordingly, no nitrogen loading estimate could be estimated for the MZIP; but if there are impacts, they are expected to be de minimis.

Full Coverage Operations (permitted under the Poultry General Order) and poultry facilities permitted under an individual WDR are required to conduct water quality monitoring. Given that the approaches to manage waste discharge at these poultry facilities has similarities to what occurs at Non-15 Program facilities, the methodology to estimate nitrogen loading to groundwater from these poultry facilities was the same methodology used for Non-15 Program facilities. This methodology is summarized in Section 5.2.1.4 below.

5.2.1.4. Non-Chapter 15 Program Facility Nitrogen Loading Methodology

Appendix NL-4 (*Nitrogen Loading Methodology for Non-Chapter 15 Program Dischargers*) provides the methodology used to develop the preliminary nitrogen loading estimates for the various types of Non-15 Program dischargers in the Management Zone. The primary methodology relied on a general and simplified formula commonly used to calculate the nitrogen loading rate from a treated effluent source. The types of data needed to apply the formula included: total nitrogen concentration (milligrams/liter [mg/L]) in treated effluent; effluent flow volume (million gallons/day [mgd]) to a land application area (LAA) or evaporation/percolation (E/P) pond; and area (acres) of the LAA or E/P pond. Alternative methods were applied to develop a preliminary nitrogen loading estimate where a facility only monitored for nitrate-nitrogen and not total nitrogen (see **Appendix NL-4**). In addition, where no nitrogen-related monitoring data were available from a facility, a preliminary estimate was developed using data from a facility with similar type of operation or waste discharge process (e.g., type of domestic wastewater treatment facility or similar type of food processor). Given the wide range of data available from Non-15 Program facilities, it was often necessary to make simplifying assumptions when developing a preliminary loading estimate for the MZIP. **Appendix NL-4** provides more information regarding the use of assumptions to address common data issues.

To develop a preliminary nitrogen loading estimate for Non-15 Program dischargers in the KWA Management Zone, a data request was sent to each permitted discharger to obtain the following information, to the extent such data were available:

- Maximum allowable discharge authorized by the facility's order (e.g., maximum average daily discharge in mgd);
- Location(s) and acres where the facility's effluent is delivered, e.g., LAA, E/P pond(s), or other disposal practice;
- Average monthly (or daily) dry weather effluent volume, e.g., gallons/day (gpd), delivered to each effluent disposal area (LAA, E/P or other);
- Total nitrogen water quality data (mg/L) for effluent delivered to an LAA, E/P ponds or other area (or if no total nitrogen data were available, then provide any other nitrogen-related water quality data);
- Nitrogen loading estimate to LAA (if the facility's order required this type of reporting); and
- Nutrient Management Plan, if the facility's order required preparation of such a plan.

Using the nitrogen loading methodology developed for this MZIP, and data provided by the discharger, a preliminary nitrogen load estimate (annual loading rate in lbs/yr/ac) was prepared for each permitted facility.[24] An opportunity was provided to each permitted discharger to review the preliminary load estimate. Based on comments or additional data received through this review process, a final preliminary nitrogen loading estimate was prepared. It is important to note that this preliminary estimate is based on currently available data and is likely very conservative given that the estimate may not consider nitrogen-related processes that occur when effluent is land applied or when it percolates through the vadose zone.

5.2.1.5. Septic System and Other Nitrogen Loading Methodologies

Septic systems are under the regulatory purview of counties and/or LAMPs and not the Management Zone. However, an estimate of the contribution of nitrogen loading from septic systems has been included in this MZIP to provide an accounting of all major sources of nitrogen to groundwater in the Management Zone. In addition to septic systems, other sources of nitrogen loading include: (1) urban residential landscaping and urban fields (parks, golf courses, athletic sports fields, etc.), herein referred to as "turfgrass"; and (2) leakage from urban sewer collection system infrastructure. **Appendix NL-5** (*Nitrogen Loading Methodology for Septic Systems and Other Sources*) provides details regarding the methodology used to estimate nitrogen loads associated with septic systems and these other sources. Following is a brief summary from this document.

Septic Systems

As part of MZIP development, coordination was initiated between the Management Zone and entities responsible for septic system management. California does not maintain a database of septic system locations or densities. Therefore, nitrogen loading from septic systems had to be estimated indirectly using information about populations and areas serviced by an existing sewer system. In particular, the methodology relied on (a) use of 2020 census data and various jurisdictional datasets to estimate the number of residents living outside of sewered areas; and (b) application of a human excretion rate of 13.3 grams (0.0293 pounds) of nitrogen per day per person (Tchobanoglous et al. 2003) to estimate the annual nitrogen loading in lbs/ac/yr in these unsewered areas. The methodology to identify areas likely serviced by a sewer system is provided in **Appendix NL-5**.

Other Sources of Nitrogen Loading

State Water Board (2012) provides methods for determining nitrogen loading from urban landscape and leaky sewage systems.[25] To account for the potential nitrogen leaching to groundwater for turfgrass and golf course areas in the Management Zone, a nominal 8.9 lb/ac/yr nitrogen loading rate was applied to a small percentage of urban areas. Urban areas were identified using the 2019 DWR Statewide Crop Cover GIS dataset, and the relative percentage assumed to be residential landscaping or urban fields was 15%. Residential landscaping outside of urban areas was not quantified due to a lack of data. For sewer system

[24] Where water quality data were not available or not provided, an estimate was developed based on the information in the permit and use of information from a similar type of facility that was used as a surrogate.
[25] State Water Resources Control Board (2012) also evaluated atmospheric deposition of nitrogen and naturally occurring nitrogen from bedrock materials as potential sources of nitrogen in the Central Valley. Both sources were found to be negligible.

leakage, a uniform assumption of 8.9 lb/ac/yr was applied to areas identified as urban (State Water Board 2012).

5.2.2. Preliminary Nitrogen Loading Analysis Results

Based on methodologies for each potential key source of nitrogen loading to Upper Zone groundwater described in Section 5.2.1, the following sections provide a summary of the findings from application of these methodologies to discharges occurring in the Management Zone. These findings are considered preliminary and will be updated during implementation of the Nitrate Reduction Programs for each sector. Moreover, many of the nitrogen loading estimates do not take into account processes that may affect nitrate water quality in Upper Zone groundwater. That is, some estimates of nitrogen loading are only loading at the ground surface and thus only provide qualitative information on the potential impact of a discharge on the underlying groundwater, i.e., the loading estimates may not consider chemical, biological and hydrological processes that occur in or below the root zone before and after effluent percolates to groundwater.

5.2.2.1. Irrigated Agriculture Nitrogen Loading Results

Growers that are members of the Kings River Water Quality Coalition and that farm within in the KWA Management Zone are authorized to discharge under the ILRP General Order, General Order R5-2013-0120 (as amended, *Waste Discharge Requirements General Order for Growers within the Tulare Lake Basin Area that are Members of the Third-Party Group*). Using DWR 2019 Statewide Crop Cover types, **Table 5-1** summarizes the acreage of each crop type managed by growers in the Management Zone. The irrigated crop acreage within each township (as determined through application of the methodology), coupled with corresponding township-designated GWPVs, was used to estimate the nitrogen load from irrigated agriculture in each township. **Figure 5-3** illustrates the following for each township in the KWA Management Zone: (a) irrigated agricultural acreage; (b) GWPV (lbs/ac/yr). **Table 5-2** summarizes this information by providing the average, median and range of GWPVs for all townships, and **Table 5-3** provides the total acreage associated with irrigated agriculture alone (not including dairy or bovine parcels, and not including urban or “unclassified” acres) and an estimate of the average nitrogen loading rate (lbs/ac/yr) across the Management Zone.

Table 5-1. 2019 Land Use Cover Type (Acres) Within the Kings Priority 1 Management Zone (Source: DWR)	
DWR 2019 Land Use Cover Type	**Land Use Cover (Acres)**
C - Citrus and Subtropical	71,425
D - Deciduous Fruits and Nuts	264,202
F - Field Crops	38,012
G - Grain and Hay Crop	14,713
P - Pasture	27,961
R - Rice	
T - Truck Nursery and Berry Crops	21,141
U - Urban	121,451
V - Vineyard	144,016
X - Unclassified	34,149
YP - Young Perennial	21,048
Total Acres Covered by DWR's 2019 Mapping	**758,117**

Table 5-2. Summary of Groundwater Protection Values (Nitrogen Loading, lb/acre) by Township					
Management Zone (MZ)	**Number of GWP Townships that Intersect MZ**	**Average GWP Township Value (lb/ac)**	**Median GWP Township Value (lb/ac)**	**Minimum GWP Township Value (lb/ac)**	**Maximum GWP Township Value (lb/ac)**
Kings Water Alliance (Priority 1)	67	36.8	35.4	13.6	88.6

Table 5-3. Summary of Irrigated Agricultural Acreage and Resultant Nitrogen Loading		
Management Zone (MZ)	**Irrigated Acreage[26] (acres)**	**Average MZ-scale Nitrogen Loading Rate (lb/acre/year)**
Kings Water Alliance (Priority 1)	602,516	34.6

[26] The total irrigated acres provided here represents DWR-mapped categories indicating agricultural activities, thereby removing urban and unclassified acres. The total here also removes any acreage associated with dairy and bovine parcels, as they are used for estimating nitrogen loads differently in the next section of text.

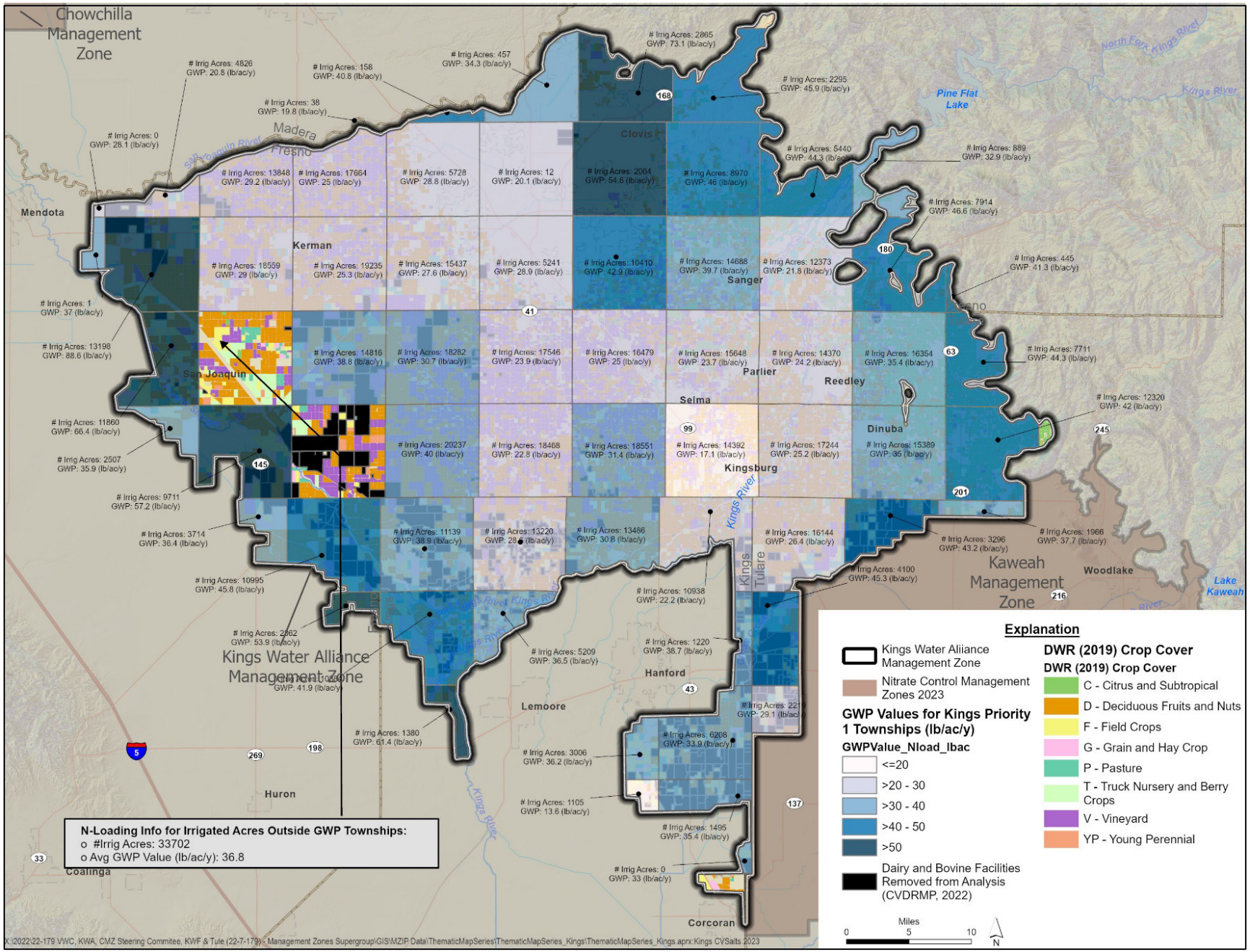


Figure 5-3. Preliminary Nitrogen Loading Estimates for Irrigated Agriculture in KWA Management Zone Townships

5.2.2.2. Dairy and Bovine Nitrogen Loading Results

Dairies and bovine facilities in the KWA Management Zone are generally regulated under General Order R5-2013-0122 (*Reissued Waste Discharge Requirements General Order for Existing Milk Cow Dairies*) or General Order R5-2017-0058 (*Waste Discharge Requirements General Order for Confined Bovine Feeding Operations*), respectively. **Appendix P-1** provides the list of dairies and bovine facilities that are participants in the KWA Management Zone, most of which collectively participate in the Management Zone through their CVDRMP membership.

Figure 5-4 illustrates the locations of dairy and bovine facilities in the KWA Management Zone. **Table 5-4** provides preliminary estimates of nitrogen loads and nitrogen loading for dairy facilities. **Table 5-5** provides the estimate for bovine facilities.

Table 5-4. Preliminary Estimates of Nitrogen Loading Rates for Dairy Facilities

Management Zone	2022 Number of Dairies	2022 Milk Cows (head)	2022 Dairy Land (ac)	Excreted Nitrogen (lbs/y)	MNAA (lbs/y)	Total N Applied to Land (lbs/ac/y)	N Removal (assume AR=1.7) (lbs/ac/y)	N-Loading Rate (lbs/ac/y)
Kings (Priority 1)	142	228,942	92,652	100,047,725	60,028,635	518	305	213

Table 5-5. Nitrogen Loading Rates for Bovine Corrals (based on 2022 CVDRMP data)

Management Zone	2022 Number of Bovine Facilities	2022 Bovine Cattle (head)	2022 Bovine Land (ac)	Lower Bound for Total N-Loading Rate (lbs/acre/yr)	Upper Bound for Total N-Loading Rate (lbs/acre/yr)
Kings (Priority 1)	25	58,109	6,786	2	7

5.2.2.3. Poultry Nitrate Loading Results

There are 72 poultry facilities participating in the KWA Management Zone. All of these poultry facilities are permitted under the Poultry General Order R5-2016-0087, as amended (*Waste Discharge Requirements General Order for Poultry Operations*). **Appendix P-1** provides the list of poultry facilities enrolled under the Poultry General Order. These permitted dischargers collectively participating in the Management Zone are being outreached to and coordinated with by representatives of the poultry industry, including the California Poultry Federation and Foster Poultry Farms.

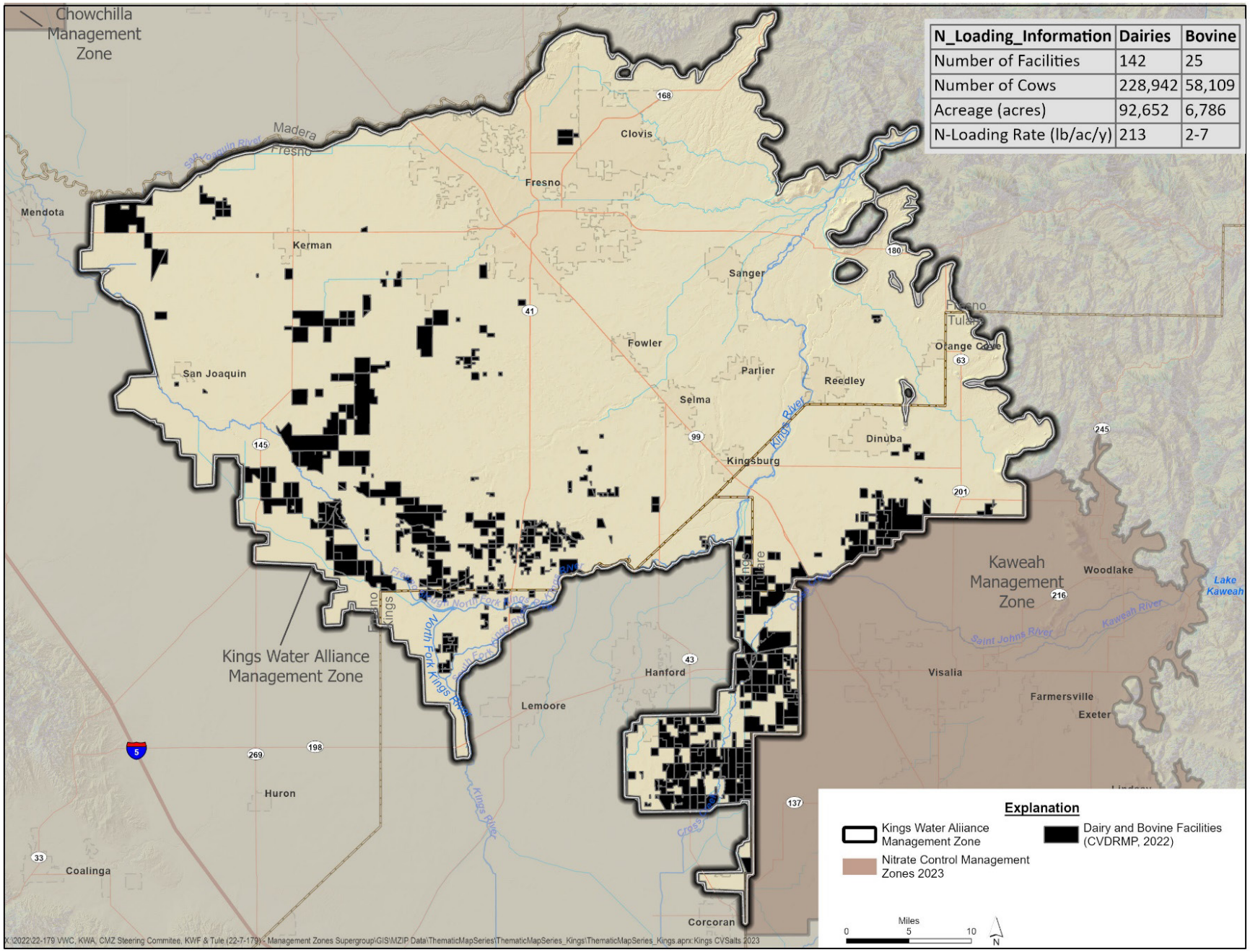


Figure 5-4. Dairy and Bovine Facilities in the KWA Management Zone

All facilities operating under the Poultry General Order in the KWA Management Zone are categorized as Low Threat Operations. Given the lack of monitoring data from these facilities, it is assumed at this time that the nitrogen load to groundwater from these facilities is de minimis. This assumption will be further evaluated during MZIP implementation.

5.2.2.4. Non-Chapter 15 Program Nitrogen Loading Results

The KWA Management Zone includes a number of facilities that are permitted to discharge under the Non-15 Program. **Appendix P-1** provides the following information about these facilities, to the extent available at this time: (a) summary of the existing permit requirements applicable to each facility; (b) data that were reviewed to develop a preliminary nitrogen loading estimate, including any key assumptions that were required to develop the estimate; and (c) the results of the loading analysis. **Table 5-6** summarizes the findings for all Non-15 Program dischargers in the KWA Management Zone. **Figures 5-5a** and **5-5b** show the locations of all facilities in the KWA Management Zone. **Figures 5-6** and **5-7** illustrate where each of the Non-15 Program facilities is permitted to discharge within the Management Zone, e.g., either through land application or discharge to an Evaporation/Percolation(E/P) pond.

Table 5-6. Preliminary Nitrogen Loading Estimate for Non-15 Program Facilities Participating in the KWA Management Zone (LAA = Land Application Area; E/P = Evaporation/Percolation Pond)

Facility Name (CV-SALTS ID)	Order No.	Discharge Characteristics		
		Average Discharge[1]	Applied Acres (Location)	Annual Nitrogen Loading Rate (lb N/acre/yr)
Baker Commodities Kerman Division (2167)	R5-2014-0062	0.137 (monthly, mgd)	606.1 (LAA)	447
Cargill Meat Solution (Beef Packers Fresno Processing Facility) (2040)	5-00-089	Facility effluent currently discharged to City of Fresno POTW (average daily flow is 813, 565 gallons)		
Biola WWTF (2708)	96-288	0.088 (monthly, mgd)	2.28 (E/P)	42.28
Booth Ranches Citrus Packing Facility (1902)	97-006	0.002 (daily, mgd)	0.16 (E/P)	436
Caruthers Raisin Packing Facility (2403)	R5-2012-0001	0.032 (monthly, mgd)	24.4 (LAA)	98.4
Chooljian Bros Raisin Dehydrator & Packing Plant 2402)	98-041	0.01 (monthly, mgd)	9 (LAA)	29.6
Cutler-Orosi WWTF (3310)	R5-2018-0011	1 (monthly, mgd)	105.8 (LAA)	415
Del Monte Foods, Inc., Hanford Plant #24 (1951)[2]	R5-2014-0116	0.68 (daily, mgd)	1,232 (LAA)	-75.6
Del Rey WWTF (2710)	96-284	0.13 (monthly, mgd)	18.6 (E/P)	171
Delft Colony WWTF (1955)	88-097	0.032 (monthly, mgd)	6.1 (E/P)	231
Dinuba Energy Cogeneration (1963)[3]	95-045	N/A	N/A	N/A
Dinuba Packing Plant (1964)	97-129	0.001 (daily, mgd)	0.5 (E/P)	128.8
Dinuba WWTF (2660)	95-200	2.1 (monthly, mgd)	54.9 (E/P)	858

Table 5-6. Preliminary Nitrogen Loading Estimate for Non-15 Program Facilities Participating in the KWA Management Zone (LAA = Land Application Area; E/P = Evaporation/Percolation Pond)

Facility Name (CV-SALTS ID)	Order No.	Discharge Characteristics		
		Average Discharge[1]	Applied Acres (Location)	Annual Nitrogen Loading Rate (lb N/acre/yr)
E & J Gallo Winery Fresno Winery (2042)	R5-2015-0040	40.9 (annual, mg)	434 (LAA)	186
East Orosi Packing House (1987)[4]	85-167	0.002 (daily, mgd)	0.16 (E/P)	436
Elkhorn Correctional Facility WWTF (1995)	97-207	To be decommissioned by December 2023; not in operation for 10 years		
Eriksson, LLC	R5-2022-0013	33.8 (annual, mg)	930	67
Family Tree Reedley Packing House (2426)	96-207	0.015 (daily, mgd)	0.6 (E/P)	246.8
Fig Garden Packing Facility (2018)	94-135	0.0068 (daily, mgd)	15 (LAA)	1.13
Four Bar C Farms Caruthers Dehydrator (1873)	01-155	0.026 (daily, mgd)	220 (LAA)	2.26
Fowler Acetylene Plant (2032)	67-117	0.007 (daily, mgd)	0.13 (E/P)	3.98
Fowler Packing Cedar Avenue Facility (1881)	89-141	0.22 (daily, mgd)	1.5 (E/P)	1,829
Fresno Cnty #44-D Monte Verde Estates WWTF (1751)	92-203	0.31 (daily, mgd)	12.6 (LAA)	82.86
Fresno County #47-Quail Lake WWTF (1753)	96-120	0.16 (monthly, mgd)	38.8 (LAA)	152
Fresno County Juvenile Justice WWTF (2161)	R5-2007-0150	0.038 (daily, mgd)	90 (LAA)	21.3
Gerawan Farms Plant 3 (3035)	R5-2020-0032	0.6 (monthly, mgd)	1.3 (E/P)	479
Gerawan Farms Plant 4 (3039)	R5-2020-0041	1.07 (monthly, mgd)	0.7 (E/P)	427
GSV Cutler Winery (2741)	R5-2015-0013	0.038 (monthly, mgd)	33.1 (LAA)	51.9[a]
GSV Fresno Winery (2043)[2]	R5-2012-0076	0.12 (monthly, mgd)	452 (LAA)	-99.8[a]
H&R Facilities, LLC (3616)	Pending	55.1 (annual, mg)	40 (LAA)	31
Harris Ranch Processing Plant (2114)	R5-2017-0021	0.49 (monthly, mgd)	154.3 (LAA)	106[a]
Helm Fertilizer Plant (2118)[5, 10]	99-083	N/A	8.66 (E/P)	479
HMC Group Cold Storage, Inc. (2124)	90-253	0.0145 (monthly, mgd)	4.76 (E/P)	32.58
Sun Pacific Reedley Packinghouse (2424)	01-157	0.15 (monthly, mgd)	5.3 (LAA)	388
Kerman WWTF (2168)	R5-2007-0115	1.1 (monthly, mgd)	43.1 (E/P)	1,705
Kings River UESD OWTS (2810)[6]	97-010-DWQ	0.0002 (monthly, mgd)	0.4 (E/P)	682

Table 5-6. Preliminary Nitrogen Loading Estimate for Non-15 Program Facilities Participating in the KWA Management Zone (LAA = Land Application Area; E/P = Evaporation/Percolation Pond)

Facility Name (CV-SALTS ID)	Order No.	Discharge Characteristics		
		Average Discharge[1]	Applied Acres (Location)	Annual Nitrogen Loading Rate (lb N/acre/yr)
Lamanuzzi & Pantaleo Plant No 1 (2384)[7]	R5-2020-0002	0.55 (annual, mg)	5.5 (LAA)	2.3
Laton WWTF (2717)	R5-2016-0079	0.1 (monthly, mgd)	3.05 (E/P)	2,497
Lion Raisins Selma Plant (2473)	R5-2018-0064	0.07 (daily, mgd)	26.3 (LAA)	202
London WWTF (2720)	R5-2017-0109	0.126 (monthly, mgd)	10.4 (E/P)	492
Malaga CWD WWTF (3311)	R5-2020-0001	0.56 (daily, mgd)	23.2 (E/P)	1,214
McCall Winery (2309)	93-098	0.008 (daily, mgd)	61.5 (LAA)	5.81
Nichols Pistachio (2321) [10]	R5-2013-0007	0.9 (daily, mgd)	865 (LAA)	65.5[a]
O'Neill Vintners Reedley Winery (2427)	R5-2014-0045	0.196 (monthly, mgd)	178.8 (LAA)	21.35[a]
Orange Cove WWTF (2676) [10]	R5-2004-0008	0.27 (monthly, mgd)	50 (LAA)	162
Parlier WWTF (2677)	95-103	0.92 (monthly, mgd)	67.6 (LAA)	211
Pom Wonderful Fruit Processing Plant (2054)	R5-2012-0090	0.9 (daily, mgd)	275 (LAA)	26.5
Riverbend Mobile Home Park (2516)[8, 10]	90-098	0.0275 (daily, mgd)	0.31 (E/P)	17,739
Riverdale WWTF (2725)	R5-2018-0028	0.188 (monthly, mgd)	21.6 (E/P)	731
Riverland RV Resort (3598) [10]	2014-0153-DWQ	0.015 (monthly, mgd)	0.51 (E/P)	11,481
San Joaquin WWTF (2680)	R5-2007-0100	0.28 (monthly, mgd)	39.3 (E/P)	155
Sanger Industrial WWTF (2147)	98-131	0.86 (monthly, mgd)	112.9 (LAA)	936
Sanger WWTF (2681)	R5-2014-0004	1.46 (monthly, mgd)	27 (E/P)	6,904
Shady Lakes MHP (2482)	75-079	0.018 (monthly, mgd)	0.73 (LAA)	0.63
Six Jewels Dehydrator (2503)	97-244	0.016 (daily, mgd)	13 (LAA)	4.35
Selma-Kingsburg-Fowler County Sanitation District WWTF (2727)	01-255	3.55 (monthly, mgd)	71.8 (E/P)	438
Stone Ranch Evaporation Basin (2004)	R5-2019-0008	4.53 (daily, mgd)	1,901 (LAA)	375
Sun-Maid Kingsburg Plant (2877)[2]	R5-2013-0096	0.117 (daily, mgd)	64.6 (LAA)	-308[a]
Sun-Maid Orange Cove Plant (2340)	88-060	0.029 (monthly, mgd)	36 (E/P)	838

Table 5-6. Preliminary Nitrogen Loading Estimate for Non-15 Program Facilities Participating in the KWA Management Zone (LAA = Land Application Area; E/P = Evaporation/Percolation Pond)

Facility Name (CV-SALTS ID)	Order No.	Discharge Characteristics		
		Average Discharge[1]	Applied Acres (Location)	Annual Nitrogen Loading Rate (lb N/acre/yr)
Sunview Dry Fruit & Nut Company (2856)	R5-2015-0117	0.045 (monthly, mgd)	45.1 (LAA)	27.6
Teen Challenge of Southern California (2966)[6]	97-010-DWQ	0.0002 (monthly, mgd)	0.4 (E/P)	682
The Wine Group Franzia Winery-Sanger (2034)[2]	R5-2014-0094	51.4 (annual, mg)	192.4 (LAA)	-12.0[a]
TKI Fresno Pesticide Manufacturing Plant (2851)	R5-2019-0037	0.026 (monthly, mgd)	1.4 (E/P)	436
Traver WWTF (2574)	88-098	0.033 (monthly, mgd)	10.55 (E/P)	454
Tri-County Citrus Orange Cove Packing House (2353)	94-075	0.26 (annual, mg)	0.85 (E/P)	30
Trinity Packing (2892)	98-130	0.033 (monthly, mgd)	0.84 (E/P)	2,366
Trinity Presbyterian Church OWTS (2351)[4]	97-010-DWQ	0.0002 (monthly, mgd)	0.4 (E/P)	682
Verni Olive Oil Extract Facility (2937)[9]	R5-2020-0002	0.1 (annual mg)	10 (LAA)	8.4
Vie-Del Plant #1, Selma[10]	95-043	Discharger summary under development		
Vie-Del Plant #2, Kingsburg[10]	95-044	Discharger summary under development		
VFG Anaerobic Digester (1777)	Pending Order	0.06 (monthly, mgd)	0.65 (E/P)	317
Vita-Pakt Fruit Processing & Dehydrating Plant (2047)	96-119	0.0008 (daily, mgd)	6.5 (LAA)	101
Wawona Packing Co Facility (2774)[2]	R5-2012-0042	12.4 (annual, mg)	16.1 (LAA)	-30[a]
Wildwood MHP (2633)	R5-2002-0064	0.007 (daily, mgd)	1.4 (LAA)	416

[1] Average discharge generally reported in the same manner as required by the permit
[2] Negative load and loading rate estimated because facility data includes estimated nitrogen reduction from crop removal
[3] Offline since October 2015; may resume operation in 2024
[4] Data unavailable; estimate based on surrogate facility: Booth Ranches Citrus Packing Facility (CV-SALTS ID 1902)
[5] Based on limited data
[6] Data from Chowchilla Certain-Teed (CV-SALTS ID 2017; Chowchilla Management Zone) used as a surrogate for this facility
[7] Based on limited data; facility has not discharged to land since 2014
[8] Data from Riverland RV Resort (CV-SALTS ID 3598; KWA Management Zone) used as a surrogate for this facility
[9] Permitted up to 1 mg/year; expected to increase in future
[10] Continued participation in KWA Management Zone under evaluation (see Appendix P-1).
[a] Annual nitrogen loading rate includes crop removal as indicated by discharger

Map ID	Facility Name	Map ID	Facility Name	Map ID	Facility Name
1	Baker Commodities Kerman Division	26	Gerawan Farms Plant 3	51	Sanger Industrial WWTF
2	Beef Packers Fresno Processing Facility	27	Gerawan Farms Plant 4	52	Sanger WWTF
3	Biola WWTF	28	GSV Cutler Winery	53	Selma-Kingsburg-Fowler County Sanitation District WWTF
4	Booth Ranches Citrus Packing Facility	29	GSV Fresno Winery	54	Shady Lakes MHP
5	Caruthers Raisin Packing Facility	30	H&R Facilities, LLC	55	Six Jewels Dehydrator
6	Chooljian Bros Raisin Dehydrator & Packing Plant	31	Harris Ranch Processing Plant	56	Stone Ranch Evaporation Basin
7	Cutler-Orosi WWTF	32	Helm Fertilizer Plant	57	Sun-Maid Kingsburg Plant
8	Del Monte Foods, Inc., Hanford Plant #24	33	HMC Group Cold Storage, Inc.	58	Sun-Maid Orange Cove Plant
9	Del Rey WWTF	34	Kerman WWTF	59	Sun Pacific Reedley Packinghouse
10	Delft Colony WWTF	35	Kings River UESD OWTS	60	Sunview Dry Fruit & Nut Company
11	Dinuba Energy Cogeneration	36	Lamanuzzi & Pantaleo Plant No 1	61	Teen Challenge of Southern California
12	Dinuba Packing Plant	37	Laton WWTF	62	The Wine Group Franzia Winery-Sanger
13	Dinuba WWTF	38	Lion Raisins Selma Plant	63	TKI Fresno Pesticide Manufacturing Plant
14	E&J Gallo Winery Fresno Winery	39	London WWTF	64	Traver WWTF
15	East Orosi Packing House	40	Malaga CWD WWTF	65	Tri-County Citrus Orange Cove Packing House
16	Elkhorn Correctional Facility WWTF	41	McCall Winery	66	Trinity Packing
17	Eriksson, LLC	42	Nichols Pistachios	67	Trinity Presbyterian Church OWTS
18	Family Tree Farms	43	O'Neill Vintners Reedley Winery	68	Verni Olive Oil Extract Facility
19	Fig Garden Packing Facility	44	Orange Cove WWTF	69	VFG Anaerobic Digester
20	Four Bar C Farms Caruthers Dehydrator	45	Parlier WWTF	70	Vie-Del Plant #1, Selma
21	Fowler Acetylene Plant	46	Pom Wonderful Fruit Processing Plant	71	Vie-Del Plant #2, Kingburg
22	Fowler Packing Cedar Avenue Facility	47	Riverbend MHP	72	Vita-Pakt Fruit Processing & Dehydrating Plant
23	Fresno Cnty #44-D Monte Verdi Estates WWTF and Reclamation Facility	48	Riverdale WWTF	73	Wawona Packing Co Facility
24	Fresno County #47-Quail Lake WWTF	49	Riverland RV Resort	74	Wildwood MHP
25	Fresno County Juvenile Justice WWTF	50	San Joaquin WWTF		

Figure 5-5a. List of Non-15 Program Facilities Participating within the KWA Management Zone (see Figures 5-5b for mapped locations)

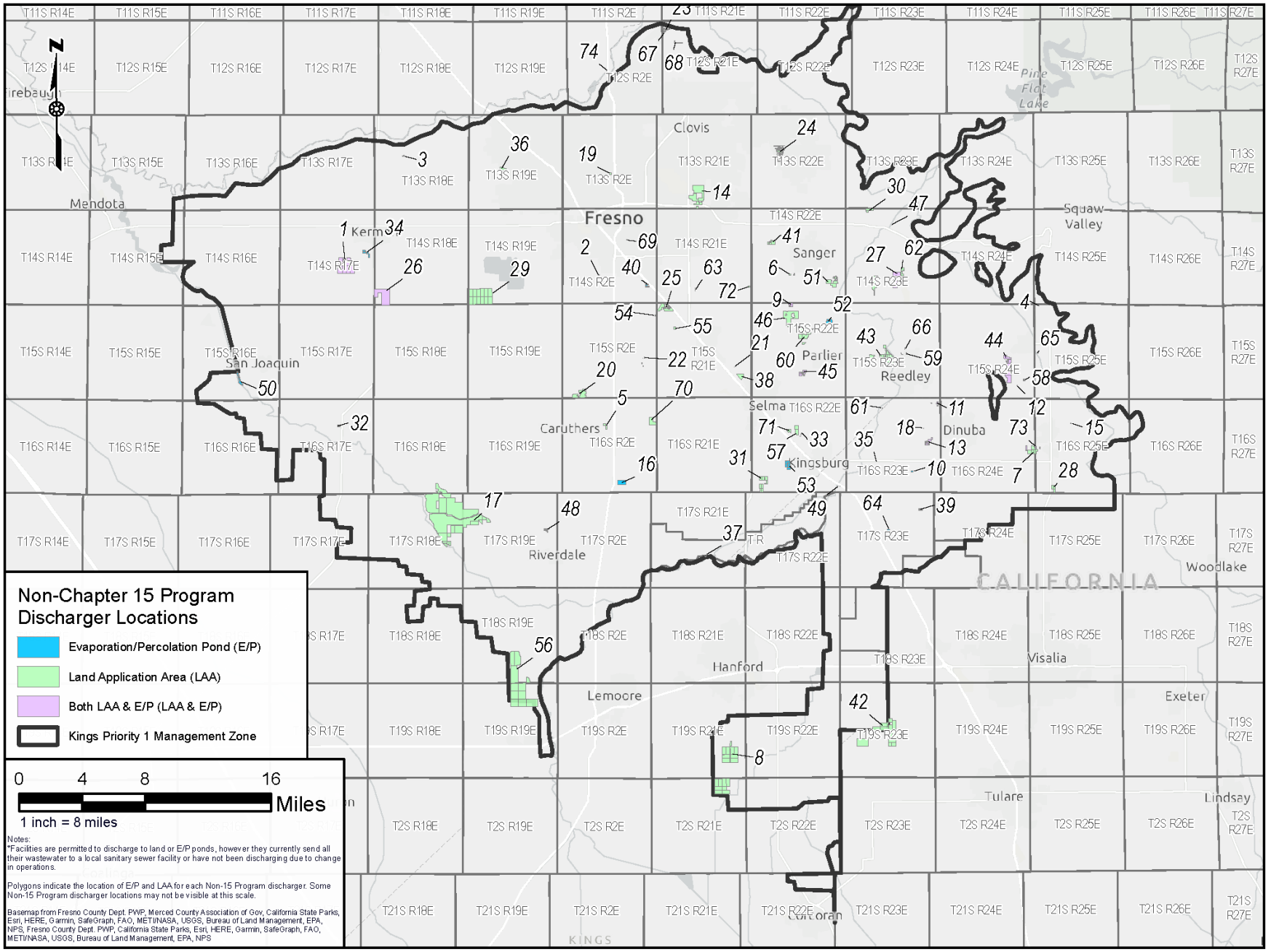


Figure 5-5b. Location of Non-15 Program Facilities Participating in the KWA Management Zone (see Figure 5-5a for facility names)

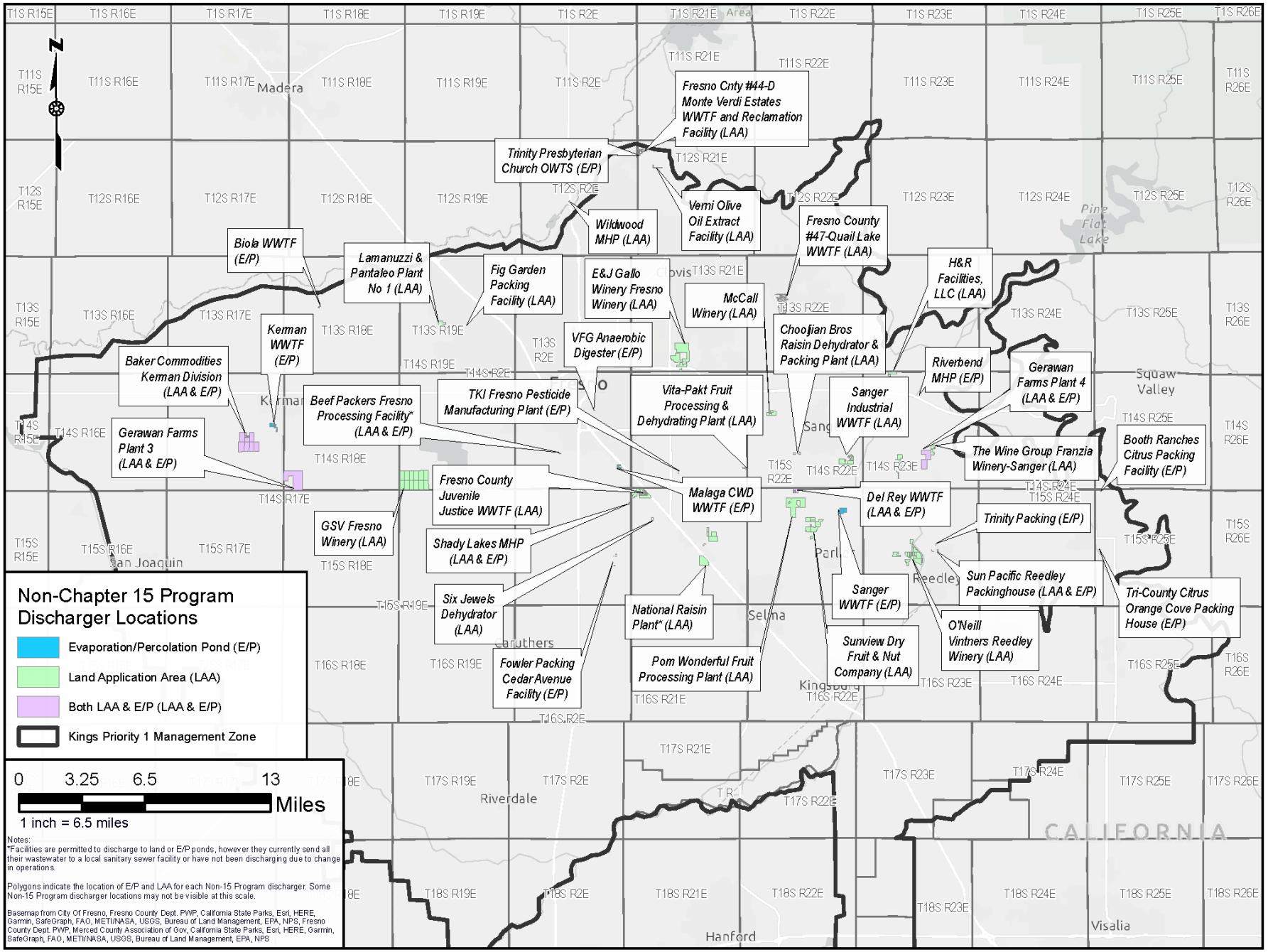


Figure 5-6. Location of Participating Non-15 Program Facilities in the Northern Portion of the KWA Management Zone

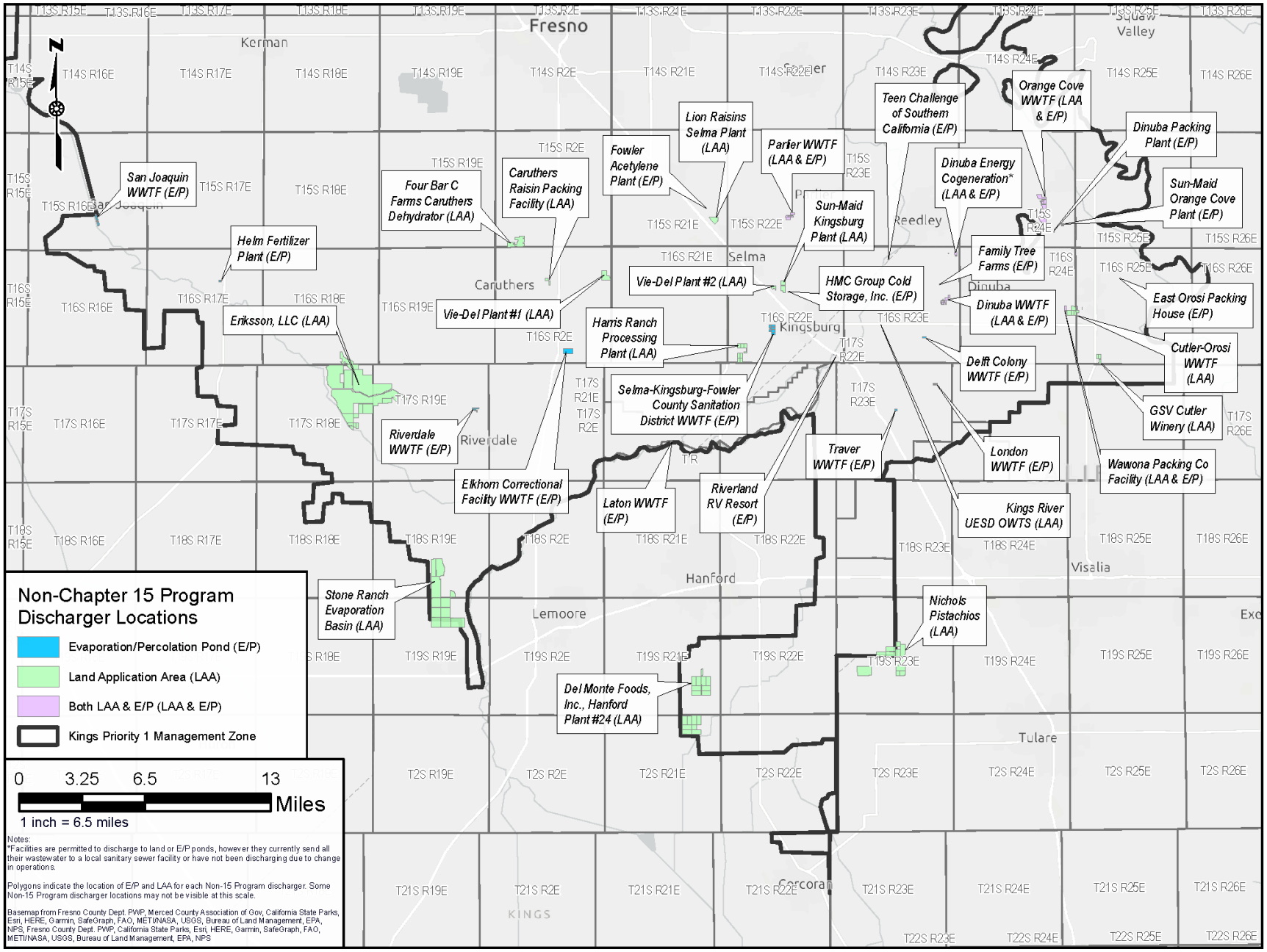


Figure 5-7. Location of Participating Non-15 Program Facilities in the Southern Portion of the KWA Management Zone

5.2.2.5. Septic Nitrate Loading Results

Figure 5-8 illustrates the areas within the KWA Management Zone that are potentially impacted by septic systems. The majority of the acreage where septic systems are present is estimated to receive not more than 0.5 lbs/acre of nitrogen from these systems. **Table 5-7** summarizes preliminary estimates of loads from these systems over all of the Management Zone.

Figure 5-8 also illustrates the location of urbanized areas with sewer service (light gray areas) within the Management Zone where other nitrogen sources (turfgrass or leaky sewer systems) may contribute to the nitrogen load to groundwater. **Table 5-8** summarizes the preliminary estimated load from these sources.

Table 5-7. Estimates of Nitrogen Loading from Septic Systems

Management Zone	Unsewered Area (Acres)	Unsewered Population	Nitrogen Load by Area (lb/ac/yr)		Acres </= 0.5 lb/ac/yr	Acres > 5 lb/ac/yr
			Average N-load	Maximum N-load		
Kings Water Alliance Priority 1	890,717	83,632	1.0	119	483,706	29,359

Table 5-8. Estimates of Other Sources of Nitrogen Loading to Groundwater in the Urban Landscape

Urban Area (acres)[1]	Urban Turfgrass			Leaking Sewer System
	Percent of Urban Land (%)	Area (acres)	Nitrate Leaching Rate (lb/ac/yr)[2]	N-Loading Rate to Groundwater from Urban Areas (lb/ac/yr)[1]
121,451	15	18,218	8.9	8.9

[1] DWR 2019 data; includes all urban areas that may be contained in Pathway A boundaries. Official Pathway A boundaries were not defined at the time of this analysis.
[2] *Viers et al. 2012*

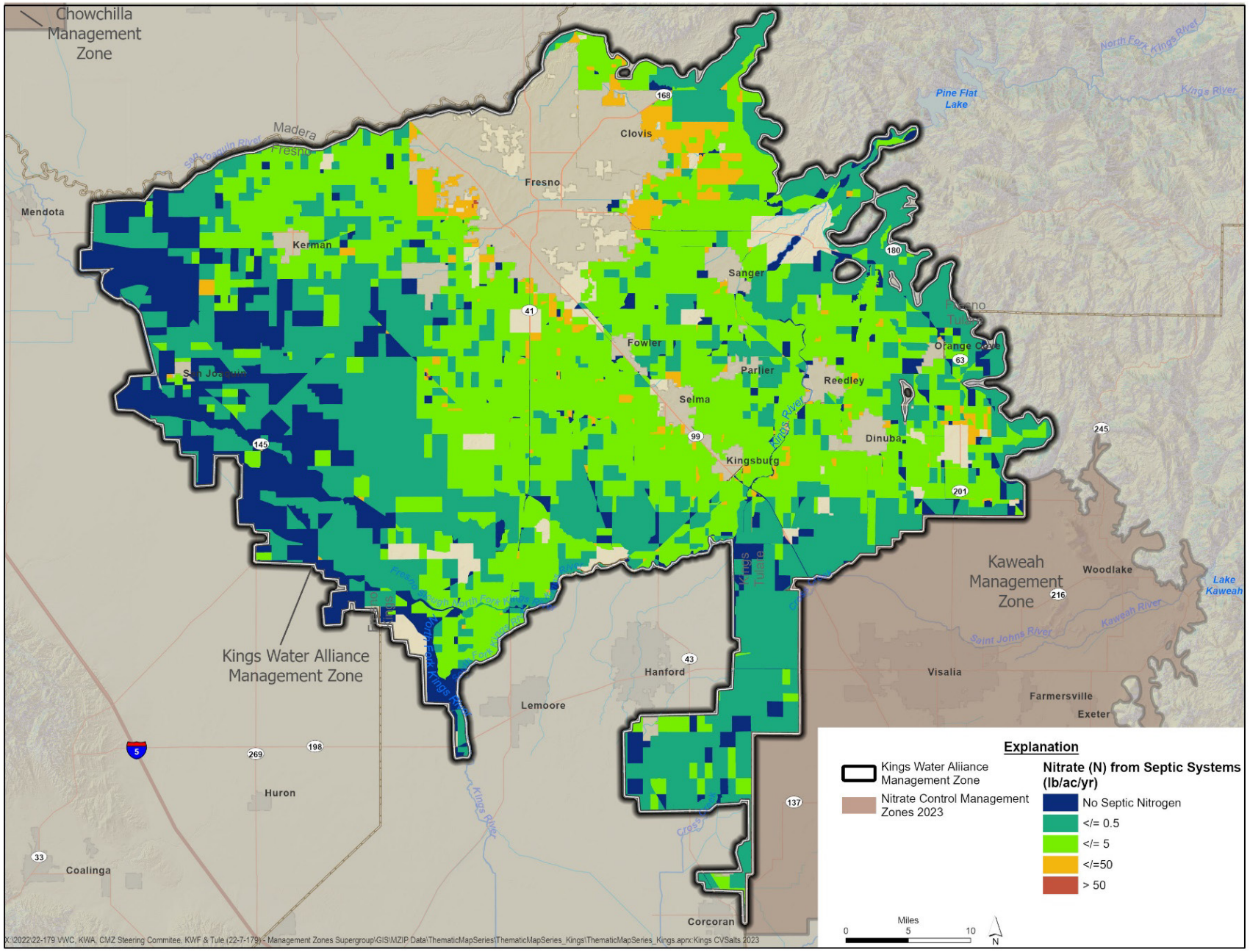


Figure 5-8. Estimated Nitrogen Loading Rates from Septic Systems in the KWA Management Zone (Note: Light gray areas are primarily urban and expected to be sewered)

5.3. Sector-Based Nitrate Reduction Programs

Detailed information on the Nitrate Reduction Programs planned for each of the sectors is provided in the appendices: Irrigated agriculture in Priority 1 Management Zones (**Appendix NRP-1**), dairies (**Appendix NRP-2a**), bovine facilities (**Appendix NRP-2b**), poultry facilities (Appendix NRP-3), Non-15 Program dischargers (**Appendix NRP-4**) and septic systems (**Appendix NRP-5**). The following sections provide a summary of the key elements associated with each of these Nitrate Reduction Programs.

5.3.1. Irrigated Agriculture for Priority 1 Management Zones

Appendix NRP-1 provides a detailed description of the Nitrate Reduction Program for irrigated agriculture in Priority 1 Management Zones, including nitrate reduction goals (milestones), interim milestones to achieve those goals and the basis for the requested Exception. The following sections provide an overview of the program and the requested Exception for irrigated agriculture.

5.3.1.1. Program Summary

Section 5.2.2.1 identifies the irrigated agricultural acres in the KWA Management Zone. Growers that are members of Third-Party Groups (Coalitions) have a series of WDRs (General Orders) that apply to owners and operators of irrigated lands. These growers are required to comply with specified substantive implementation and reporting requirements to protect and maintain water quality. The framework of existing General Orders contains several groundwater-based nitrate-related requirements for individual growers, as well as several groundwater-based nitrate related requirements for Coalitions to comply with on behalf of their grower members. These requirements support the goals of the Nitrate Control Program and are enhanced through implementation of the Priority 1 Management Zone Nitrate Reduction Program for irrigated agriculture. The following key elements summarize the Priority 1 Management Zone Nitrate Reduction Program for irrigated agriculture:

- The Nitrate Reduction Program for irrigated agriculture is designed in ten-year phases so that later phases can be further enhanced as new data and information is developed. Interim milestones are identified in the Nitrate Reduction Program to be completed in the first ten years, with greater detail provided for the first five years.
- Nitrogen Loading Verification Plan: Activities included in the first five years focus on collecting data associated with application and removal of nitrate for high and low vulnerability irrigated acres within the Management Zone in order to calculate more accurate GWPVs (nitrate loading amounts) on a township level. This involves compiling Irrigation and Nutrient Management Plan (INMP) summary reports from high and low vulnerability growers.
- Through implementation of the MZIP, nitrate loading from all Management Zone participants (e.g., dairies, bovine facilities and Non-15 Program dischargers) will be used to develop Groundwater Protection Targets (GWPTs) in order for the Management Zone to work with their participants to develop a methodology that informs dischargers within a given township the estimated load reduction need for dischargers within the township to collectively be in compliance with the Nitrate Control Program goal to no longer cause or contribute to an exceedance of the nitrate water quality objective. The GWPT for irrigated agriculture in Priority 1 Management Zones is expected to be sector-based and will be incorporated into the Coalitions' Groundwater Quality Management Plans (GQMPs).

- Coalitions will be directed to conduct outreach and education activities to growers within the Management Zone to inform them of the need to comply with the Nitrate Reduction Program, including meeting interim milestones and continued implementation of management practices that are designed to minimize nitrate moving below the root zone.
- The Nitrate Reduction Program includes interim and final performance goals related to acceptable, crop-specific ranges of applied and removed nitrogen, and township-based GWPTs. Tasks also include reviewing and updating interim and final performance goals approximately once every five years but no later than once every ten years, depending on the status of additional data and information available at the end of each five-year period.
- Nitrate Reduction Goals (Milestones): The percentage of acreage in the Management Zone within acceptable application/removal (A/R) ratio ranges specific to the crop grown on that irrigated acreage will reach 75% by year 10 of MZIP implementation, and 100% by year 20. The percentage of townships in the Management Zone meeting the Groundwater Protection Targets for irrigated land parcels will reach 50% by year 10, 75% by year 20, 90% by year 30, and 100% by year 35.

5.3.1.2. Requested Exception for Irrigated Agriculture in Priority 1 Management Zones

The Nitrate Reduction Program for irrigated agricultural growers requests authorization of an Exception of 35 years, as this is as short as practicable due to the complex interrelationship between crop production and a crop's basic need for nitrogen in the form of nitrate for plant growth and crop yield. Without nitrate-based fertilizers, agricultural production in the Central Valley cannot be sustained. While technological advancements in fertilization and irrigation practices, crop varieties and best management practices have and will continue to be made, such advancements do not yet allow Central Valley agriculture to maintain economically viable crop production without having some amount of nitrate making its way below the root zone. Further, the Central Valley's economy is highly dependent on agriculture. A significant decrease in crop production as a result of compliance with the Nitrate Control Program would have devasting impacts on Central Valley communities and residents if implementation of the Nitrate Reduction Program is not carefully and thoughtfully laid out over the 35-year period. Accordingly, the Nitrate Reduction Program is designed to reduce the amount of nitrate available below the root zone over time without jeopardizing crop production and the Central Valley's agricultural dependent economy.

5.3.2. Dairy Facilities

Appendix NRP-2a provides a detailed description of the Nitrate Reduction Program for dairy facilities, including nitrate reduction goals (milestones), interim milestones to achieve those goals and the basis for the requested Exceptions. The following sections provide an overview of the program and the requested Exceptions for dairy facilities.

5.3.2.1. Program Summary

The following key elements summarize the dairy Nitrate Reduction Program in the KWA Management Zone:

- To better inform the steps that the dairy industry generally and dairies individually will need to take to meet the requirement of no longer causing or contributing to groundwater nitrate

concentrations exceeding 10 mg/L as N in 35 years, the dairy Nitrate Reduction Program incorporates a phased approach.

- The first industry-wide step is to improve the quantification of nitrate loads that may potentially leach to groundwater. This step is planned to be completed within the first ten years of MZIP implementation, and involves implementation of a better process/methodology for measuring nitrate loads using a combination of tactics including improve farm-level assessments and reporting, better data collection, analysis, and modeling.
- Interim milestones include the implementation of improved technology and practices that safely dispose of surplus manure nitrogen while increasing crop nutrient use efficiency. These advances will be driven by the dairy industry (through funding of improved CVDRMP management capacity, research, outreach, and education) and by the government (through revised regulations, policies, and incentives).
- Infrastructure Projects for Safe Handling of Surplus N: Within five years of the MZIP effective date, CVDRMP will share information regarding successful construction of projects that reduce nitrate loading (while also reducing greenhouse gas emissions). These projects are anticipated to continue over the next five years and involve projects that: (1) convert manure nitrogen into harmless nitrogen gas (denitrification); (2) create value-added products from manure such as compost, fertilizer pellets, or ammoniated liquids; or (3) combine both export of nitrate manure and denitrification of manure.
- Web Portal/Data Management System (DMS): Within the first five years of the MZIP effective date, dairies will submit annual reports using a standardized format. This reporting will involve a web portal/DMS funded, developed, and managed by CVDRMP to reconcile shortcomings in the current dairy annual reporting requirements. The DMS will implement improvements to field-scale nitrogen accounting.
- Track and Inform Dairies Regarding Farm-Scale Manure Management: Starting in year five of the dairy Nitrate Reduction Program, the DMS will be used to track individual dairy performance for Farm-Scale Manure Management to focus education and outreach on dairies that appear to be at risk for not achieving a whole farm balance within the set 10-year period (first key Nitrate Reduction Program milestone).
- Other elements of the dairy Nitrate Reduction Program include the lining of all new and reconstructed dairy lagoons, education and outreach regarding better irrigation and nitrogen management, establishing an INMP to support good farming practices, studying technology advances to reduce nitrogen loading on dairies, and also participating and supporting the California Department of Food and Agriculture's (CDFA) Manure Recycling and Innovative Products (MRIP) Task Force.

5.3.2.2. Requested Exception for Dairy Facilities

In accordance with the Exceptions Policy for Salinity, Nitrate, and/or Boron (Exceptions Policy) contained in the Basin Plans, dairies subject to this Dairy Nitrate Reduction Program seek an exception to the term of 35 years for dairies located in the Priority 1 Management Zones. The 35-year term would start from the date that the MZIP is approved or incorporated into applicable dairy orders, whichever comes first. Under the Exceptions Policy, this means that dairies subject to the MZIP requirements must cease from causing

or contributing to an exceedance of the nitrate water quality objective by the end of the 35-year term. For dairies, 35 years is as short as practicable because dairies are subject to all the challenges and difficulties faced by non-animal farmers, plus the challenge of reconciling the surplus manure-N challenge.

5.3.3. Bovine Facilities

Appendix NRP-2b provides a detailed description of the Nitrate Reduction Program for bovine facilities, including nitrate reduction goals (milestones), interim milestones to achieve those goals and the basis for the requested Exceptions. The following sections provide an overview of the program and the requested Exceptions for bovine facilities.

5.3.3.1. Program Summary

The following key elements summarize the bovine Nitrate Reduction Program in the KWA Management Zone:

- Bovine facilities are separated into two main groups: (1) Limited Population Operations (LPOs) and Limited Time Operations (LTOs); and (2) Full Coverage Operations. LPOs and LTOs are deemed to pose a low threat to water quality if they meet specific criteria (R5-2017-0058, pps. 2-3). Full Coverage Operations are facilities that generate wastewater or have herds large enough to generate significant amounts of manure. Due to differences in these main groups of bovine facilities, their nitrate reduction programs differ.
- LPOs/LTOs are expected to have minimal impact on groundwater quality, so their most important issues of concern under the Nitrate Control Program are to: (a) ensure that facilities enrolled under the General Order as a Low Threat Operation are in full compliance with all permit provisions; and (b) verify that impacts to groundwater are *de minimis* as expected. The Nitrate Reduction Program for these Low Threat Operation facilities focuses on addressing these concerns by establishing a Bovine Quality Assurance Program (BQAP).
- For Full Coverage Bovine Facilities, they must first determine the potential for impacts to groundwater quality in order to determine how it can best comply with the Nitrate Control Program goals. The following implementation activities will support each full coverage facility's understanding of their actual impact to groundwater quality and help identify potential feasible alternatives to comply with the Nitrate Control Program goals within a term that is as short as practicable:
    - Data Collection: where needed, data will be collected to better characterize and quantify the facility's impact on nitrate water quality in the Upper Zone of groundwater underlying the facility's area of contribution.
    - Prepare a Facility-Specific Nitrate Reduction Workplan: The workplan will include: (a) schedule with interim milestones to be implemented during each MZIP phase to meet the internal deadlines to comply with the Nitrate Control Program's final goal; and (b) basis for proposed compliance date that is as short as practicable and no more than 35 years from the date the MZIP requirements are incorporated into the facility's permit.

5.3.3.2. Requested Exceptions for Bovine Facilities

The Bovine Nitrate Reduction Program requests authorization of Exceptions for permitted facilities in the Management Zone as follows:

- *Bovine Facilities Categorized as LPOs or LTOs under the Bovine General Order* – For facilities enrolled under the Bovine General Order as LTOs or LPOs, the Management Zones request Exceptions for a term of 10 years from the date the MZIPs are approved or incorporated into the Bovine General Order, whichever comes first.
- *Full Coverage Bovine Facilities under Bovine General Order* - For these facilities, the Management Zones request Exceptions for a term of 35 years from the date the MZIPs are approved or incorporated into the applicable permits, whichever comes first.

5.3.4. Poultry Facilities

Appendix NRP-3 provides a detailed description of the Nitrate Reduction Program for poultry facilities, including nitrate reduction goals (milestones), interim milestones to achieve those goals and the basis for the requested Exceptions. The following sections provide an overview of the program and the requested Exceptions for poultry facilities.

5.3.4.1. Program Summary

Section 5.2.2.3 summarizes the poultry facilities participating in the KWA Management Zone, including how they are currently permitted to discharge. In particular, poultry facilities (all categorized as Low Threat Operations) are authorized to discharge under the Poultry General Order. The Nitrate Reduction Program requirements vary based on the how the facility is permitted:

- ***Low Threat Operations*** – These facilities that primarily conduct their operations indoors, do not generate process wastewater, and do not store uncovered manure outdoors. To qualify as a Low Threat Operation, poultry facilities must be able to provide documentation that they meet all of applicable criteria in General Order R5-2016-0087 (as summarized in **Appendix NRP-3**). Unless directed by the Executive Officer of the Central Valley Water Board, no surface water or groundwater monitoring is required for these facilities. Given that these facilities are expected to have minimal impact on groundwater quality, the Nitrate Reduction Program focuses on ensuring that all of these facilities are in full compliance with all permit provisions and are causing no more than a de minimis impact on groundwater quality. The primary element of this program is establishment of a Poultry Quality Assurance Program (PQAP) for poultry operators that provides a mechanism for obtaining certification that the facility is in compliance with all requirements of the General Order applicable to Low Threat Operations.
- ***Other Poultry Operations*** – Poultry facilities operating under an individual WDR or as a Full Coverage Operation can potentially impact groundwater quality, thus causing or contributing to an exceedance of the nitrate water quality objective. It is, therefore, necessary to implement actions to determine the potential for impacts to groundwater quality and then address those impacts as needed. However, there are no "Other Poultry Operations" currently in the KWA Management Zone.

5.3.4.2. Requested Exceptions for Poultry Facilities

The Poultry Nitrate Reduction Program requests authorization of Exceptions for permitted poultry operations in the Management Zone as follows:

- *Poultry Facilities Categorized as Low Threat Operations under Poultry General Order* – For facilities enrolled under the Poultry General Order as a Low Threat Operation, the Management Zone requests Exceptions for a term of 15 years from the date the MZIP becomes effective for participating poultry facilities.
- *Other Poultry Facilities* – There are no currently none of these facilities operating in the KWA Management Zone.

5.3.5. Non-15 Program Dischargers

Appendix NRP-4 provides a detailed description of the Nitrate Reduction Program for Non-15 Program permitted dischargers in the Management Zone, including nitrate reduction goals (milestones), interim milestones to achieve those goals and the basis for the requested Exceptions. The following sections provide an overview of the program and the requested Exceptions for Non-15 Program facilities.

5.3.5.1. Program Summary

Section 5.2.4 identifies the Non-15 Program facilities permitted to discharge in the KWA Management Zone (see **Table 5-6** and **Appendix P-1** for additional detail on each facility). Key elements of this program may be summarized as follows:

- Establishes a stepwise approach to be implemented by each facility. While the level of effort to complete each step may vary from one facility to another, the key steps include:
    - Collect data, as needed, to better characterize and quantify the facility's impact on nitrate water quality in the Upper Zone of groundwater underlying the facility's area of contribution. This effort includes refining the preliminary nitrogen loading estimate developed for this MZIP.
    - Prepare facility-specific Nitrate Reduction Workplan for Central Valley Water Board approval that includes: (a) estimated nitrogen load reduction required by the facility to comply with all Nitrate Control Program requirements and support efforts by the Management Zone to meet GWPTs established for each township in the Management Zone (see Section 5.5 below); (b) actions to be completed at the facility to achieve the required load reduction (e.g., public outreach, facility planning and engineering design, permits/approvals and construction); and (c) schedule for implementation of actions in the Workplan. If the proposed schedule affects the currently authorized Exception applicable to the facility, the Workplan will provide a justification for any proposed changes.
    - Implement Central Valley Water Board-approved Workplan per the approved schedule.
- Categorizes and thus prioritizes implementation of the Nitrate Reduction Program at Non-15 Program facilities based on the currently estimated potential impact to groundwater quality and

whether the facility provides wastewater treatment services for a DAC/ SDAC. Specifically, Non-15 Program facilities are categorized into one of three following groups:

- *Group 1* - Facilities within the Management Zone that have the greatest potential to impact water quality in Upper Zone groundwater (based on this MZIP's preliminary nitrogen loading analysis), e.g., average volume of treated effluent, size of area where treated effluent is discharged (i.e., LAA or E/P ponds), and/or estimated annual nitrogen load.
- *Group 2* – Facilities that have a lower potential than Group 1 facilities to impact water quality in Upper Zone groundwater (based on this MZIP's preliminary nitrogen loading analysis).
- *Group 3* – Limited to wastewater treatment facilities that provide services in areas designated as a DAC/SDAC.

5.3.5.2. Requested Exceptions for Non-15 Program Facilities

The Nitrate Reduction Program for Non-15 Program facilities requests authorization of Exceptions of varying length based on the Group (see above):

- *Group 1* – The Management Zone request Exceptions for a term of up to 20 years from the date the MZIP requirements are incorporated into the permits for each facility.
- *Group 2* - The Management Zone request Exceptions for a term of up to 25 years from the date the MZIP requirements are incorporated into the permits for each facility.
- *Group 3* - The Management Zone request Exceptions for a term of up to 35 years from the date the MZIP requirements are incorporated into the permits for each facility.

Per the Nitrate Reduction Program, the Nitrate Reduction Workplan prepared by each facility must include an implementation schedule that is as short as practicable and documents why compliance with the Nitrate Reduction Goals cannot be reasonably achieved sooner than what is allowed under the existing authorized Exception for the facility.

5.3.5.3. Categorization of Non-15 Program Facilities

Table 5-9 identifies the Non-15 Program facilities in the KWA Management Zone that have been placed into Group 1, Group 2 or Group 3, based on the characteristics of each facility (see above). The Non-15 Program Nitrate Reduction Program (**Appendix NRP-4**) provides the nitrate reduction milestones and schedule with interim milestones applicable to each of these groups.

Table 5-9. Group Categorization of Non-15 Program Facilities in the KWA Management Zone		
Facility (CV-SALTS ID)	**Order No.**	**Group**
Baker Commodities Kerman Division (2167)	R5-2014-0062	1
Cargill Meat Solution (Beef Packers Fresno Processing Facility) (2040)	5-00-089	2
Biola WWTF (2708)	96-288	3
Booth Ranches Citrus Packing Facility (1902)	97-006	2
Caruthers Raisin Packing Facility (2403)	R5-2012-0001	1
Chooljian Bros Raisin Dehydrator & Packing Plant 2402)	98-041	2
Cutler-Orosi WWTF (3310)	R5-2018-0011	3
Del Monte Foods, Inc., Hanford Plant #24 (1951)[2]	R5-2014-0116	1
Del Rey WWTF (2710)	96-284	3
Delft Colony WWTF (1955)	88-097	3
Dinuba Energy Cogeneration (1963)[3]	95-045	2
Dinuba Packing Plant (1964)	97-129	2
Dinuba WWTF (2660)	95-200	3
E & J Gallo Winery Fresno Winery (2042)	R5-2015-0040	1
East Orosi Packing House (1987)[4]	85-167	2
Elkhorn Correctional Facility WWTF (1995)	97-207	2
Eriksson, LLC (3576)	R5-2022-0013	1
Family Tree Reedley Packing House (2426)	96-207	2
Fig Garden Packing Facility (2018)	94-135	2
Four Bar C Farms Caruthers Dehydrator (1873)	01-155	1
Fowler Acetylene Plant (2032)	67-117	2
Fowler Packing Cedar Avenue Facility (1881)	89-141	1
Fresno Cnty #44-D Monte Verde Estates WWTF (1751)	92-203	2
Fresno County #47-Quail Lake WWTF (1753)	96-120	2
Fresno County Juvenile Justice WWTF (2161)	R5-2007-0150	3
Gerawan Farms Plant 3 (3035)	R5-2020-0032	2
Gerawan Farms Plant 4 (3039)	R5-2020-0041	2
GSV Cutler Winery (2741)	R5-2015-0013	1
GSV Fresno Winery (2043)	R5-2012-0076	1
H&R Facilities, LLC (3616)	Pending	2
Harris Ranch Processing Plant (2114)	R5-2017-0021	1

Table 5-9. Group Categorization of Non-15 Program Facilities in the KWA Management Zone		
Facility (CV-SALTS ID)	**Order No.**	**Group**
Helm Fertilizer Plant (2118) *	99-083	2
HMC Group Cold Storage, Inc. (2124)	90-253	2
Sun Pacific Reedley Packinghouse (2424)	01-157	2
Kerman WWTF (2168)	R5-2007-0115	3
Kings River UESD OWTS (2810)	97-010-DWQ	3
Lamanuzzi & Pantaleo Plant No 1 (2384)	R5-2020-0002	2
Laton WWTF (2717)	R5-2016-0079	3
Lion Raisins Selma Plant (2473)	R5-2018-0064	1
London WWTF (2720)	R5-2017-0109	3
Malaga CWD WWTF (3311)	R5-2020-0001	3
McCall Winery (2309)	93-098	2
Nichols Pistachio (2321) *	R5-2013-0007	1
O'Neill Vintners Reedley Winery (2427)	R5-2014-0045	1
Orange Cove WWTF (2676) *	R5-2004-0008	3
Parlier WWTF (2677)	95-103	3
Pom Wonderful Fruit Processing Plant (2054)	R5-2012-0090	1
Riverbend Mobile Home Park (2516) *	90-098	3
Riverdale WWTF (2725)	R5-2018-0028	3
Riverland RV Resort (3598) *	2014-0153-DWQ	3
San Joaquin WWTF (2680)	R5-2007-0100	3
Sanger Industrial WWTF (2147)	98-131	3
Sanger WWTF (2681)	R5-2014-0004	3
Shady Lakes MHP (2482)	75-079	3
Six Jewels Dehydrator (2503)	97-244	2
Selma-Kingsburg-Fowler County Sanitation District WWTF (2727)	01-255	3
Stone Ranch Evaporation Basin (2004)	R5-2019-0008	1
Sun-Maid Kingsburg Plant (2877)	R5-2013-0096	2
Sun-Maid Orange Cove Plant (2340)	88-060	1
Sunview Dry Fruit & Nut Company (2856)	R5-2015-0117	1
Teen Challenge of Southern California (2966)	97-010-DWQ	3
The Wine Group Franzia Winery-Sanger (2034)	R5-2014-0094	2

Table 5-9. Group Categorization of Non-15 Program Facilities in the KWA Management Zone		
Facility (CV-SALTS ID)	**Order No.**	**Group**
TKI Fresno Pesticide Manufacturing Plant (2851)	R5-2019-0037	2
Traver WWTF (2574)	88-098	3
Tri-County Citrus Orange Cove Packing House (2353)	94-075	2
Trinity Packing (2892)	98-130	2
Trinity Presbyterian Church OWTS (2351)[4]	97-010-DWQ	2
Verni Olive Oil Extract Facility (2937)[9]	R5-2020-0002	2
Vie-Del Plant #1, Selma*	95-043	2
Vie-Del Plant #2, Kingsburg*	95-044	2
VFG Anaerobic Digester (1777)	Pending Order	2
Vita-Pakt Fruit Processing & Dehydrating Plant (2047)	96-119	2
Wawona Packing Co Facility (2774)	R5-2012-0042	2
Wildwood MHP (2633)	R5-2002-0064	3

*Continued participation in KWA Management Zone under evaluation (see Appendix P-1)

5.3.6. Septic Systems

The Nitrate Reduction Program for Septic Systems is fully described in **Appendix NRP-5**. Counties (local agencies) are responsible for regulating septic systems. These agencies are not formal participants of the Management Zone. While an overarching objective is to reduce nitrate contributions from septic systems, the Management Zone does not have the ability to define enforceable and quantifiable interim deadlines regarding the control of nitrate emissions from septic systems. However, interim milestones associated with county/local agency coordination are included in the Septic System Nitrate Reduction Program. Nitrogen loading sources in the Management Zone are important to track and update periodically to improve the understanding of sources of nitrate contributions to groundwater and water quality conditions. Within the first five years of the MZIP effective date, the Management Zone plans to request and compile counties'/local agencies' Onsite Wastewater Treatment Systems (OWTS) reports containing all permitted septic system locations and request and compile GIS coverages of all sewered infrastructure and extents from sewered communities within the Management Zone. After year five of MZIP implementation, the Management Zone plans to support community outreach by counties/local agencies related to Wastewater Consolidation Projects and evaluate potential funding opportunities pertaining to long-term drinking water solutions coupled with counties/local agencies Wastewater Consolidation Projects.

5.4. Nitrate Reduction Goals (Milestones) Applicable to Management Zone Participants

The Nitrate Reduction Programs provide the overall nitrate reduction goals (milestones) for each of the following sectors: Irrigated agriculture in Priority 1 Management Zones, dairies, bovine facilities, poultry facilities and Non-15 Program permitted dischargers. **Tables 5-10 through 5-14** summarize these Nitrate Reduction Goals for each of these sectors. The details regarding the basis for each of the goals and the justification for the timeline to complete the goals are provided in the Sector-specific Nitrate Reduction Programs (**Appendices NRP-1** through **NRP-4**).

Table 5-10. Nitrate Reduction Goals (Milestones) for Irrigated Agriculture in Priority 1 Management Zones (also see Appendix NRP-1)

Nitrate Reduction Goals	Year 10	Year 20	Year 30	Year 35
Percentage of fields/acreage within Priority 1 Management Zone within acceptable A/R ratio range for that crop	75%	100%	N/A (Milestone Complete)	
Percentage of townships in Priority 1 Management Zone meeting GWPTs established for ILRP parcels	50%	75%	90%	100%

Table 5-11. Nitrate Reduction Goals (Milestones) for Dairies (also see Appendix NRP-2a)

Year 10	Year 20	Year 35
100% of dairies achieve zero whole-farm manure-Nitrogen balance by Year 10	20-Year goals with interim milestones to achieve those goals to be identified in an updated Dairy Nitrate Reduction Plan submitted by Year 10	100% of dairies meet final Nitrate Control Program goal

Table 5-12. Nitrate Reduction Goals (Milestones) for Bovine Facilities in Priority 1 Management Zones (also see Appendix NRP-2b)

Nitrate Reduction Goals	Year 10	Year 15	Year 20	Year 25	Year 30	Year 35
Percentage of bovine facilities categorized as LPOs or LTOs in Priority 1 Management Zone in compliance with the Nitrate Reduction Program	100%	N/A (Milestone Complete)				
Percentage of full coverage bovine facilities in Priority 1 Management Zone in compliance with the Nitrate Reduction Program	--	--	--	--	--	100%

Table 5-13. Milestones (Nitrate Reduction Goals) Applicable to Poultry Facilities in Priority 1 Management Zones (also see Appendix NRP-3)					
Type of Permitted Facility	**Nitrate Reduction Goal**	**Year 10**	**Year 15**	**Year 20**	**Year 25**
General Order - Low Threat Operations	Percentage of poultry facilities certified under PQAP	50%	100%	N/A - Complete	
General Order – Full Coverage Operations (No full coverage facilities in KWA Management Zone)	Percentage of facilities with an approved Nitrate Reduction Workplan	100%	N/A - Complete		
	Percentage of poultry facilities in Management Zone meeting applicable Groundwater Protection Targets (GWPTs)[1]	--	> 25%	> 50%	100%
Individual WDRs (None in KWA Management Zone)	Percentage of facilities with an approved Nitrate Reduction Workplan	100%	N/A - Complete		
	Percentage of poultry facilities in Management Zone meeting applicable GWPTs[1]	--	--	--	100%
[1] Applicable GWPT is based on the collective sources of loading within the area where the facility is located and established by the Management Zone in coordination with dischargers responsible for compliance with the target (see Section 5.5 of the MZIP)					

Table 5-14. Nitrate Reduction Goals (Milestones) for Non-15 Program Facilities (also see Appendix NRP-4)							
Facility Group	**Nitrate Reduction Goals**	**Year from MZIP Effective Date**					
		10	**15**	**20**	**25**	**30**	**35**
Group 1	Percentage of facilities with an approved Nitrate Reduction Workplan	100%	N/A (Milestone Complete)				
	Percentage of facilities meeting applicable target to comply with Nitrate Control Program requirements in the Management Zone	--	--	100%	N/A (Milestone Complete)		
Group 2	Percentage of facilities with an approved Nitrate Reduction Workplan	--	100%	N/A (Milestone Complete)			
	Percentage of facilities meeting applicable target to comply with Nitrate Control Program requirements in the Management Zone	--	--	--	100%	N/A (Milestone Complete)	
Group 3	Percentage of facilities with an approved Nitrate Reduction Workplan	--	--	100%	N/A (Milestone Complete)		
	Percentage of facilities meeting applicable target to comply with Nitrate Control Program requirements in the Management Zone	--	--	--	--	--	100%

5.5. Compliance with Nitrate Control Program

5.5.1. Introduction

Section 5.3 above provides an overview of the Nitrate Reduction Programs to be implemented by each of following sectors: Irrigated agriculture; dairy and bovine facilities, poultry facilities, and Non-15 Program facilities. The complete Nitrate Reduction Programs for these sectors are provided in **Appendices NRP-1** through **NRP-5**. These programs are designed to demonstrate how the Management Zone plans to reduce nitrate loading to groundwater so that ongoing discharges from permitted discharges do not cause or contribute to exceedances of the nitrate water quality objective within the Management Zone.

The Nitrate Control Program regulations require that the Management Zone establish, "*milestones related to reducing nitrate loading and achieving compliance in ongoing discharges and managed basin and sub-basin restoration.*" Further, the Nitrate Control Program requires implementation of a "*water quality surveillance and monitoring program that is adequate to ensure that the plan when implemented is achieving the expected progress towards attainment of management goals.*" This Section describes the approach that will be implemented by the Management Zone to assess compliance with the final goal of the Nitrate Control Program to no longer cause or contribute to an exceedance of the nitrate water quality objective in the underlying groundwater. The Management Zone's surveillance and monitoring program, which will provide data to assess overall progress by the Management Zone to comply with the Nitrate Control Program, is provided in Section 7.

5.5.2. Use of Townships to Assess Compliance

The Management Zone will evaluate compliance with the final goal of the Nitrate Control Program at a township-level scale (36 square miles). Use of a township scale for evaluating compliance is consistent with the existing approach for the ILRP, which relies on the use of Groundwater Protection Targets at a township scale. The ILRP has previously made findings that spatial resolution by township provides a common unit that facilitates analysis of data and provides a basis for comparisons between different areas. Continued use of townships to aggregate nitrogen loading data and evaluate compliance with the goal of no longer causing or contributing to exceedances of the nitrate objective allows the Management Zone to build on the extensive work already completed by ILRP Coalitions to comply with ILRP requirements. In addition, use of townships as the scale to evaluate compliance with the Nitrate Control Program is consistent with the purpose and intent of a Management Zone to provide a means for dischargers to work collectively to manage nitrate. In particular, per the Nitrate Control Program regulations, Management Zones:

- Are to be a defined area that serves as a discrete regulatory compliance unit for complying with the Nitrate Control Program for multiple permittees;
- Provide the basis for the establishment of local management plans to manage nitrate within the Management Zone's boundary;
- Are an area where participants work collectively to reduce nitrate loading so that ongoing discharges do not cause or contribute to exceedances of water quality objectives; and
- Allow permittees to work towards better resource management through appropriate allocation of resources.

Use of a township-scale resolution for evaluating compliance with the final goal of the Nitrate Control Program is also technically justified. The majority of permitted discharges within a Management Zone that have the potential to impact the underlying groundwater occur over large areas either through use of fertilizer by irrigated agriculture, dairy-related discharges, or land application of treated effluent. Given the diffuse nature of land applied nitrogen, directly linking a specific discharge activity at the surface to an impact in the underlying groundwater can be very challenging. Therefore, aggregation of data to a larger scale to assess compliance with regulatory requirements has been found to be appropriate, as long as the approach has an appropriate feedback mechanism to assess progress towards achieving compliance with applicable requirements.[27] The sections below describe how the Management Zone will build on the existing irrigated lands township-scale groundwater protection framework to incorporate other types of permitted dischargers.

5.5.3. Compliance Assessment Approach

The Management Zone compliance assessment approach builds on the existing approach being implemented by the ILRP. Key to this approach is the use of a Groundwater Protection Formula to establish GWPVs, which are then used to support the development of GWPTs for each township. For the purposes of this MZIP, these key elements are defined as follows:

- *Groundwater Protection Formula* – Used to generate a GWPV, expressed as either a nitrogen loading number or a concentration of nitrate in water (e.g., mg/L), as appropriate, 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 in a given township over a given time period.
- *Groundwater Protection Value (GWPV)* – For a given period of time, the current estimated nitrogen load from a sector or individual discharger from the bottom of the root-zone that does not take into consideration post-root-zone processes (e.g., groundwater recharge or vadose zone attenuation) that may affect the concentration of the percolate that reaches groundwater in the Upper Zone. In the ILRP, the Groundwater Protection Formula has been used to calculate a GWPV that is reflective of the acre weighted average amount of nitrogen attributable to all growers within a given township. For the Management Zone, GWPVs will be established to evaluate compliance, as described further below.
- *Groundwater Protection Target (GWPT)* - Nitrate (as N) load (lb/ac) that all dischargers in a township must collectively achieve at the bottom of the root zone to no longer cause or contribute to an exceedance of the nitrate water quality objective in the groundwater in the Upper Zone underlying the township. Development of this collective target takes into consideration post-root zone processes (e.g., effect of groundwater recharge or vadose zone attenuation) that may affect the nitrate concentration of the percolate that reaches groundwater in the Upper Zone.

[27] The California Third District Court of Appeals in *Environmental Law Foundation v. State Water Resources Control Bd.* recently agreed with this assessment in its review of questions pertaining to the aggregation of data: "The best that current science can do, so far as the administrative record reveals, is to connect nitrate discharges to groundwater at the township-level. The Order does this and more. The Order's feedback mechanisms are thus sufficient for determining whether the program is achieving this purpose." (*Environmental Law Foundation v. State Water Resources Control Bd.* (2023) 89 Cal.App.5th 451, 484.)

Within any township, the nitrogen loading and the potential effect of the discharge from each sector or an individual discharger may change as the nature of the discharge from each sector changes over time, e.g., due to factors such as changes in area or types of crops grown, industry nutrient management practices, quality of treated effluent, or nature of permitted dischargers in the township. These anticipated changes over time require implementation of a feedback mechanism in the development GWPVs and use of these values to establish GWPTs. Accordingly, once the Management Zone establishes initial GWPVs and GWPTs for each township, these values and targets will be periodically reviewed and, as needed, updated.

5.5.4. Process to Establish Management Zone GWPVs and GWPTs

As required by their respective General Orders, the ILRP Coalitions have worked collaboratively to establish a Groundwater Protection Formula for use in establishing GWPVs and subsequently GWPTs for townships in areas designated as high vulnerability areas (HVAs) within their respective Coalitions. HVAs are either areas that meet the requirements for preparing a Groundwater Quality Management Plan under the ILRP, or where available information indicates the irrigated lands could cause or contribute to an exceedance of water quality objectives or degradation of groundwater quality that may threaten applicable beneficial uses. The Central Valley Water Board conditionally approved the Groundwater Protection Formula on January 19, 2021 (requesting additional information be submitted along with submittal of the GWPVs). Subsequently, the Coalitions submitted to the Central Valley Water Board their respective GWPVs and GWPTs for townships on July 19, 2021, and July 19, 2022, respectively. Updated GWPTs were subsequently submitted in December of 2022. The Central Valley Water Board conditionally approved the GWPVs on October 27, 2021, and the GWPTs on June 30, 2023.

The work completed by the Coalitions provides a firm base upon which to build the Management Zone compliance assessment program. Under the MZIP, the development and use of GWPVs and GWPTs will be expanded to include not only non-irrigated agriculture dischargers (e.g., dairies, bovine or poultry facilities) but also irrigated lands not designated as HVAs under the ILRP. **Figure 5-9** illustrates the overall stepwise approach to apply the existing GWPV and GWPT framework to the Management Zone. Steps include:

- *Step 1 – Sector-Specific Data Development* – In the initial step, work will be conducted by all sectors to gather the data necessary to support establishment of GWPVs for the Management Zone. As noted above, this effort will include incorporation of non-HVAs into the GWPVs for irrigated lands. For other sectors, such as the dairies, bovine and Non-15 Program facilities, this effort will result in the development of updated nitrogen loading estimates to replace the preliminary estimates developed for this MZIP (which for some facilities are based on very limited data). **Table 5-15** summarizes general data needs by sector. As part of the implementation of this step, sector-specific data needs will be identified and provided to dischargers to implement and facilitate consistent data collection.
- *Step 2 – Develop Initial GWPVs for Management Zone Townships* – The Management Zone will develop Initial GWPVs to be used to support establishment of initial GWPTs. As part of this step the Management Zone will work collaboratively with other Management Zones on any necessary methodology development. The methodology to develop the Management Zone GWPVs for the townships will be based primarily on the methodology being used by the ILRP; however, this methodology will be modified or updated where needed to accommodate considerations for

other sectors (e.g., dairy, bovine and poultry facilities) or individual dischargers. The Management Zone GWPV methodology will be submitted to the Central Valley Water Board Executive Officer for approval before it is used to develop GWPTs. The initial GWPVs developed under Step 2 will be periodically reviewed and updated, as needed (see Step 6).

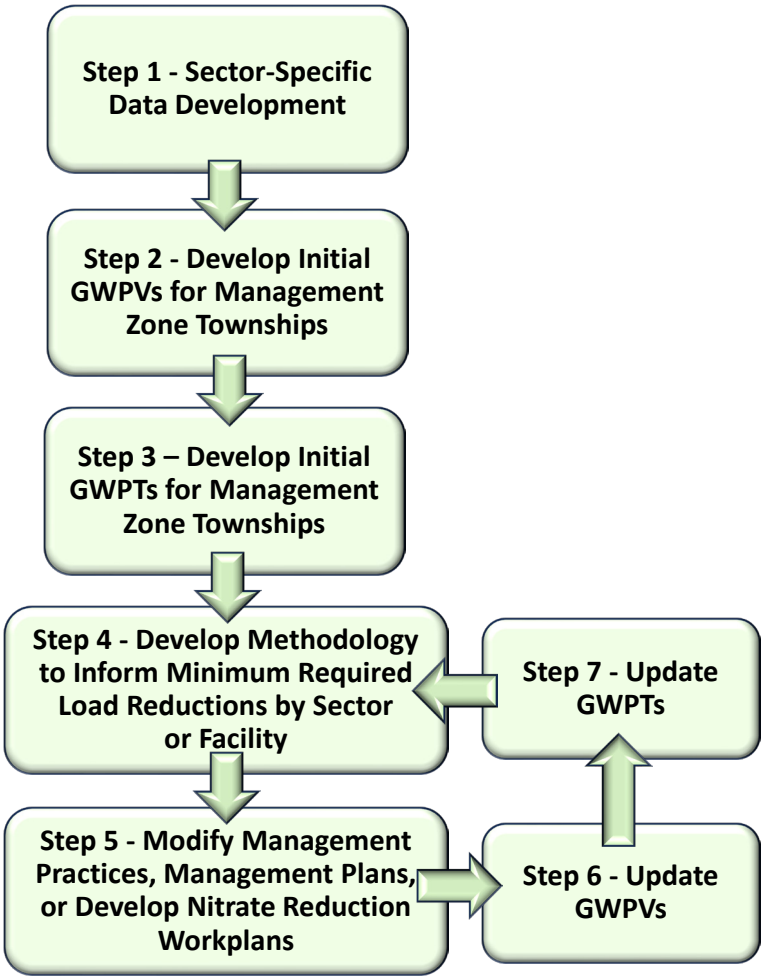


Figure 5-9. Stepwise Process to Develop and Implement GWPVs and GWPTs in a Management Zone

Table 5-15. Preliminary Evaluation of Data Needs by Sector to Support Development of Initial GWPVs in Management Zones			
Sector		**Data Currently Available to Develop GWPVs**	**Key Data Need(s) to Develop Initial GWPVs**
Irrigated Agriculture (Priority 1 Management Zones)		2019 INMP report data for HVAs (see Section 5.2.2.1/Appendix NL-1)	• Incorporate parcel data from non-HVAs; • Update database using more recent INMP reports
Dairy Facilities		Preliminary load estimate in MZIP based on general industry assumptions (see Section 5.2.2.2/ Appendix NL-2)	Implement data collection program to refine preliminary load estimate for MZIP
Bovine Facilities		Preliminary load estimate in MZIP based on general industry assumptions (see Section 5.2.2.2/ Appendix NL-2)	Implement data collection program to refine preliminary load estimate for MZIP
Poultry Facilities	**Low Threat (General Order)**	Discharge currently assumed to be de minimis, but lack of data to confirm (see Section 5.2.2.3/ Appendix NL-3)	Verify de minimis or no discharge at facilities
	• **Full Coverage (General Order)** • **Individually permitted facilities**	Preliminary load estimate in MZIP based on limited data (see Section 5.2.2.3/ Appendix NL-3)	Implement data collection program to refine preliminary load estimate for MZIP
Non-15 Program	**Effluent Land Applied to Agricultural Crops**	MZIP includes preliminary nitrogen load estimates for each facility; however, nature of facility-specific data varies widely (see Section 5.2.2.4/ Appendix NL-4)	• Additional targeted data collection needed to verify or refine loads estimated for MZIP • Specific data collection needs vary by Non-15 Program facility type
	Land Disposal of Waste		
	Effluent Disposed in Percolation/Evaporation Ponds		
Septic Systems		Estimated load based on GIS data analysis and published data sources (see Section 5.2.2.5/ Appendix NL-5)	Refine load estimate, where possible

- *Step 3 – Develop Initial GWPTs for Management Zone Townships* - The Management Zone will develop Initial GWPTs to be used to support implementation of nitrate reduction activities by various sectors or individual dischargers. As part of this step, the Management Zone will work collaboratively with other Management Zones to address any methodology development needs. The methodology ultimately used to develop the Management Zone GWPTs for each township will be based primarily on the methodology already in use by the ILRP. This methodology will be modified or updated where needed to accommodate consideration of the diversity of types of dischargers that may be present in a given Management Zone township as well as other factors such as presence of Path A permitted facilities in the township. For the Management Zone, the development of the GWPTs will also need to consider discharges that have a very small or localized area of contribution, e.g., as is the case with many Non-15 Program dischargers and some poultry facilities. In addition, the Management Zone will develop a compliance assessment

methodology that will be used periodically to evaluate progress towards achieving GWPTs for townships within each Management Zone. The Management Zone GWPT calculation and assessment methodologies will be submitted to the Central Valley Water Board Executive Officer for approval. The initial GWPTs developed under this step will be periodically reviewed and updated, as needed (see Step 7).

- Step 4 – Develop Methodology to Inform Minimum Required Load Reductions by sector or Individual-permitted Facility to meet Management Zone GWPTs – The purpose of this step is to use the township-based GWPTs developed within each Management Zone to inform the dischargers within a given township (by sector or individually) the estimated load reduction needed for dischargers within the township to collectively be in compliance with the Nitrate Control Program goal to no longer cause or contribute to an exceedance of the nitrate water quality objective. All of the Management Zones will work collaboratively to develop a methodology to: (a) determine how to estimate the necessary nitrogen load reduction required collectively by a sector or an individual facility to be in compliance with the Nitrate Control Program; and (b) monitor and report progress in meeting the required load reduction. Once a methodology has been established for a Management Zone, the methodology will be used to develop the load reductions applicable to dischargers in each township. The load reductions will be provided in a Management Zone Nitrogen Reduction Report that summarizes the load reductions for each sector or individual facility to meet the applicable Management Zone GWPTs.
- *Step 5 – Modify Management Practices, Management Plans, or Develop Nitrate Reduction Workplans* – Sectors or individual dischargers will be responsible for determining next steps to achieve their assigned load reductions, including but not limited to, preparation of Nitrate Reduction Workplans (e.g., Non-15 Program facilities) or modification of existing management practices or management plans (e.g., irrigated agriculture, dairy/bovine facilities or poultry low threat operation facilities).
- *Step 6 Update GWPVs* – Management Zone GWPVs will be updated, as needed, every five years to coincide with existing ILRP GWPV review/update requirements. Periodic updates provide the opportunity to consider changes in available data or factors that affect the nitrogen load from a given sector (e.g., due to changes in management practices) or individual discharger (changes in treatment process). Prior to each GWPV update cycle, the GWPV methodology will be reviewed and updated, as needed. Any changes to the methodology will be submitted to the Central Valley Water Board Executive Officer for approval before they are used to develop GWPTs.
- *Step 7 – Update GWPTs* – Following each update of the GWPVs, the Management Zone GWPTs will be updated as needed. Similar to GWPVs, prior to updating targets, the GWPT methodology will be reviewed and updated, as needed. Any changes to the methodology will be submitted to the Central Valley Water Board Executive Officer for approval.

The GWPV/GWPT review/update cycle continues throughout the duration of the Management Zone implementation process. The existing five-year cycle for GWPV/GWPT updates coincides with existing ILRP requirements; however, at the discretion of the Central Valley Water Board, the ILRP five-year cycle could be modified. If the ILRP schedule were modified, then the Management Zone schedule would be modified as well to keep Management Zone compliance assessment activities aligned with the ILRP program.

5.5.5. Interim Deadlines and Interim Milestones

Table 5-16 provides the interim deadlines and interim milestones to be implemented by the Management Zone to develop and implement GWPVs and GWPTs in the Management Zone according to the stepwise process described above.

Table 5-16. Interim Deadlines and Interim Milestones to Implement Management Zone Nitrate Reduction Compliance Assessment Program

Interim Deadline	Interim Milestones	Schedule (from MZIP effective date)	Responsibility
Step 1 – Complete Sector-specific Data Development	In coordination with other Management Zones, develop minimum data collection needs, where needed (by sector or facility), to ensure appropriate and consistent data are obtained to support Management Zone GWPV calculations	Within 6 months	Coordination by all Management Zones
	Verify all sectors or facilities are collecting the necessary data needed to support Management Zone GWPV calculations	Within 1 year	Management Zone Lead
	Complete initial data collection by all sectors/dischargers and submit data to the Management Zone to support Management Zone GWPV development	Within 5 years	Sectors/Dischargers
Step 2 - Develop Initial GWPVs for Management Zone Townships	In coordination with other Management Zones, update existing ILRP GWPV methodology, as needed, to support Management Zone GWPV determinations	Within 3 years	Coordination by all Management Zones
	Obtain Central Valley Water Board approval of Management Zone GWPV methodology	Within 4 years	Coordination by all Management Zones
	Update existing modeling tools, as needed, to support implementation of approved GWPV methodology in the Management Zone	Within 5 years	Coordination by all Management Zones
	Establish GWPVs for Management Zone townships, including updated nitrogen loading data for each sector or individual facility	Within 6 years	Management Zone Lead
Step 3 - Develop Initial GWPTs for Management Zone Townships	In coordination with other Management Zones: • Update existing ILRP GWPT methodology, as needed, to support establishment of a GWPT for each Management Zone township; and • Develop GWPT Compliance Assessment Methodology to evaluate progress towards achieving GWPTs in each Management Zone	Within 4 years	Coordination by all Management Zones

Table 5-16. Interim Deadlines and Interim Milestones to Implement Management Zone Nitrate Reduction Compliance Assessment Program			
Interim Deadline	**Interim Milestones**	**Schedule (from MZIP effective date)**	**Responsibility**
	Obtain Central Valley Water Board approval of Management Zone GWPT calculation and compliance assessment methodologies	Within 5 years	Coordination by all Management Zones
	In coordination with other Management Zones, update existing modeling tools, as needed, to support development of GWPTs for Management Zone townships	Within 6 years	Coordination by all Management Zones
	Establish GWPTs for each Management Zone township	Within 7 years	Management Zone Lead
Step 4 – Develop Methodology to Inform Minimum Required Load Reduction by Sector or Individual Facility to Meet Management Zone GWPTs	Develop methodologies to: • Determine how to estimate the necessary nitrogen load reduction required collectively by a sector or an individual facility • Monitor and report progress in meeting the required load reduction	Within 6 years	Management Zone Lead
	Determine load reductions for dischargers within each Management Zone township	Within 8 years	Management Zone Lead with Sectors/ Dischargers
	Prepare Management Zone Nitrogen Load Reduction Report that summarizes the nitrogen load reduction for each sector or individual facility, including to meet the GWPTs assigned to the Management Zone townships	Within 8 years	Management Zone Lead; with Sectors/ Dischargers
Step 5 – Modify Management Practices, Management Plans, or Develop Nitrate Reduction Workplans	Sectors or individual dischargers will develop an approach to reduce their respective nitrogen loads based on the methodologies and findings from Step 4	As required by sector-specific Nitrate Reduction Program and Individual Dischargers' Nitrate Reduction Workplans	Sectors/Dischargers
	• As appropriate, the irrigated agriculture and dairy/bovine sectors and poultry facilities will modify management practices and/or management plans as needed to reduce nitrogen loading • Individual dischargers (Non-15 Program and relevant poultry facilities) will prepare Nitrate Reduction Workplans that establish their respective approaches to reduce nitrogen loads		Sectors/Dischargers
Step 6 – Update Groundwater Protection Values	Update dataset used to determine GWPVs and, as needed, update GWPV methodology; obtain Central Valley Water Board approval of methodology updates	Within 1 year of next GWPV update	Coordination by all Management Zones

Table 5-16. Interim Deadlines and Interim Milestones to Implement Management Zone Nitrate Reduction Compliance Assessment Program			
Interim Deadline	**Interim Milestones**	**Schedule (from MZIP effective date)**	**Responsibility**
	Develop updated GWPVs	Within 5 years of previous GWPV calculation[1]	Management Zone Lead
Step 7 – Update Groundwater Protection Targets	Update GWPT development methodology, as needed; obtain Central Valley Water Board approval of methodology updates	Within 1 year of next GWPT update	Coordination by all Management Zones
	Establish updated GWPTs	Within 5 years of previous GWPT calculation[1]	Management Zone Lead
[1] The five year schedule for updating GWPVs and GWPTs is based on the existing ILRP requirement to review/revise GWPV/GWPTs every five years. If the time between review and update of GWPV/GWPTs was modified in the ILRP, this schedule would be modified as well to keep the Management Zone and ILRP schedules in alignment.			

SECTION 6.
Long-Term Aquifer Restoration (Restoration) Program

6.1. Overview of Restoration Management Goal

As noted in Section 1, the Nitrate Control Program is designed to achieve three management goals in the Central Valley Region. Goal 3 is to: "implement long-term, managed restoration of impaired water bodies." Per the Nitrate Control Program:

> *"Further, the SNMP [Salt and Nitrate Management Plan] recognized that it may not be reasonable, feasible or practicable[7] to fully restore groundwater in some basins/sub-basins. For other basins, it may take multiple decades to achieve restoration. In some limited cases, where restoration of the groundwater basin for MUN uses may not be reasonable, feasible or practicable,[7] it may be necessary for the Central Valley Water Board to consider de-designating the MUN beneficial use designations from that groundwater basin."*[28]

The Nitrate Control Program requires the MZIP to, "include a plan for establishing a managed aquifer restoration program to restore nitrate levels to concentrations at or below the water quality objectives to the extent it is reasonable, feasible and practicable to do so." In addition, as part of the development of the FMZP, the Management Zone was required to provide an, "[e]xplanation of how the Management Zone intends to interact and/or coordinate with other similar efforts such as those underway pursuant to the SGMA." Given the Management Zone's interest in maintaining or improving groundwater quality through various restoration approaches and the interest of GSAs to address similar objectives through GSP implementation, the opportunity exists to coordinate activities that may support efforts to meet the restoration goal of the Nitrate Control Program. For example, projects or management actions that maintain or improve groundwater quality include (but are not limited to):

1) Controlling nitrogen sources to reduce the amount of nitrogen discharged to the land surface that may potentially affect groundwater quality;
2) Augmenting sources of water distributed across or injected into the groundwater system to recharge the system with high quality (low nitrate) source water, and
3) Extracting existing groundwater (including nitrate-impaired groundwater) for beneficial uses thereby reducing the nitrate mass in the groundwater system and ultimately improving groundwater quality.

[28] Footnote 7 in Resolution R5-2020-0057 states: "The managed restoration limitation (only to the extent "where reasonable, feasible, and practicable") is derived from existing provisions in the Porter-Cologne Water Quality Control Act and other applicable laws, and does not create a new standard for de-designating beneficial uses of groundwater or adopting less stringent site-specific water quality objectives. Any determination by the Central Valley Water Board that managed restoration activities need not commence or continue shall be made in the context of a future proposed amendment to the Basin Plans to either de-designate beneficial uses or adopt a site-specific water quality objective, and the Central Valley Water Board will apply the law in effect at the time of the future proposed amendment to the Basin Plans."

To design a restoration plan that maintains or achieves improved groundwater quality, it will be necessary to understand many factors that affect the movement of nitrate into and out of the groundwater system. Collaboration between the Management Zones, GSAs, and other local entities will facilitate strategies to accomplish maintaining or achieving improved groundwater quality. As noted in the Nitrate Control Program, not all portions of the nitrate-impaired groundwater system within the Management Zone will necessarily be restored reasonably and feasibly, or at least not all areas would be restored on the same time scale. Accordingly, it is worthwhile for the Management Zone, together with GSAs and other entities, along with outreach to stakeholders, to optimize strategies that result in the highest benefit to the public by prioritizing Management Zone (and subbasin) restoration efforts.

6.2. Potential Restoration Approaches

GSP regulations require GSAs to include a description of projects and management actions (PMAs) in GSPs that are necessary to achieve the basin sustainability goal. PMAs in the GSPs have considered the many different approaches that can be implemented to address sustainability goals and avoid causing undesirable results during GSP implementation. PMAs largely focus on demand management (managing groundwater use) or replenishing the supply to replace at least a portion of the groundwater pumped to meet local demands that are not otherwise replenished by natural sources. Projects generally refer to structural programs that supplement and expand available water supplies, including, for example, direct and in-lieu recharge utilization of surplus stormwater and other capital improvement projects. In contrast, management actions are typically non-structural programs or policies that do not require a substantial capital outlay and are intended to incentivize reductions in groundwater pumping when needed.

GSAs have identified recharge opportunities as highly desirable projects to address local groundwater level declines in response to increasing demands and/or in response to climate factors and hotter and drier conditions. Hydrologic extremes during water years 2020 through 2022 and a part of 2023 have demonstrated a need for preparedness to better utilize surplus stormwater for recharge when available, which can also help mitigate drought effects during drought periods. As described above, recharge opportunities are of strong interest to Management Zones not only for improved water supply reliability but also to maintain or achieve improved water quality and, ultimately, restoration, where reasonable and feasible. For the Management Zones and GSAs, recharge opportunities can provide co-benefits.

Management Zone restoration will likely involve multiple approaches, with some being implemented sooner than others, including:

Source Control: Ceasing to cause or contribute to nitrate exceedances once all the sector-specific Nitrate Reduction Programs are implemented, which will assist in managed restoration.

Intentional Recharge: Facilitating coordination between the Management Zones and GSAs to provide opportunities for identifying where intentional recharge can serve multiple benefits by (a) increasing the volume of lower-nitrate concentration source water infiltrated (or injected) into and replenishing the groundwater system; and (b) reducing nitrate concentrations in groundwater.

Non-Potable Beneficial Uses: Identifying strategies to support the use of shallow nitrate-affected groundwater for non-potable beneficial uses (e.g., pump and fertilize).

Other Potential Approaches: Identifying other strategies to address restoration through new technologies that may become available in the future where reasonable, feasible, and practicable.

6.2.1. Groundwater Recharge Approaches

Various methods are available to recharge groundwater, including:

Flood-Managed Aquifer Recharge (MAR) – This is a recharge strategy that diverts seasonal floodwater to available farmlands and other designated landscapes. Flood-MAR commonly occurs in the late fall to winter months and takes advantage of existing irrigation infrastructure to convey and distribute water to agricultural fields. The term "Ag-MAR" is sometimes used to describe this practice (DWR 2022; University of California 2022). In limited circumstances (such as described below), this strategy does not require a water right for the recharge water, but most often, a surface water right is needed.

Rain-MAR – The strategic capture and recharge of rainfall that is accomplished by retaining runoff on agricultural fields or other designated landscapes. This approach uses existing field perimeter berms or other constructed features on the field perimeter to retain rainfall. Rain-MAR commonly does not require a water right as long as the rainfall does not reach an offsite drain or channel (The Freshwater Trust 2021).

Recharge Basins – This approach uses surface water storage facilities (e.g., percolation ponds or infiltration basins) that are intentionally sited, designed, and constructed for receiving and infiltrating water into the subsurface. This approach can use many sources of water for recharge (e.g., rainfall-runoff, surplus stormwater flows, etc.) and can operate nearly year-round, unlike other MAR approaches that are largely seasonal.

Aquifer Storage and Recovery (ASR) Wells – This approach accomplishes groundwater recharge using well structures, which are most commonly designed to purposely inject water into the aquifer at one or more specified depth intervals. ASR involves planning, engineering design, and infrastructure construction for the well structure and associated facilities.

6.2.1.1. GSP Implementation and Groundwater Recharge Projects

As part of SGMA, several GSAs have identified groundwater recharge projects that can help restore aquifers within the Management Zone. **Table 6-1** describes the projects associated with Kings GSP implementation (P&P 2022; 4Creeks 2022; Ruddell, Stanton, Bixler, Mauritson & Evans, LLP) that involve aquifer recharge and the location of these recharge projects relative to estimated ambient nitrate concentrations in the Management Zone.

GSP-related recharge project locations and project descriptions are publicly available through DWR's California Groundwater Projects Tool,[29] designed to provide information to support DWR's Financial Assistance Branch on SGMA-related projects. To evaluate the potential to link these GSP projects to Management Zone water quality, the GIS coverage and locations of these SGMA-related projects were first intersected with the Management Zone boundary and then overlain on the Upper Zone post-2010 ambient nitrate concentration map for Upper Zone groundwater (**Figure 6-1**). **Table 6-2** includes SGMA-related recharge projects that are not already included in **Table 6-1**. **Figure 6-1** includes all the GSP referenced recharge projects and the additional SGMA-related projects.

[29] The California Groundwater Projects Tool can be found online at: https://experience.arcgis.com/experience/00197adac22f4b06a3f410068d43a641/ accessed 8/16/2023.

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
80-acre Recharge Project	This project envisions an 80-acre site off the existing surface water supply system being developed for intentional groundwater recharge purposes. During wet and typical years, when excess water is available, flow rates would be expected to vary from 40 to 120-cfs depending upon the canal system. The maximum flow rate would occur on the Fowler Switch Canal. The average infiltration rate across all the Consolidated Irrigation District (CID) ponds is about 1 foot per day. A minimum flow of 20-cfs would be needed at each site in the District.
CID Adams & Academy Basin	This project will reduce groundwater overdraft within CID by constructing a groundwater banking project located near the intersection of Adams and Academy Ave between Sanger and Parlier. Construction of this project would allow CID to take this otherwise unused water as well as other available surface waters and divert them into the new basin and recharge the groundwater aquifer.
CID Wristen Ditch Intertie	Divert water from the Wristen Ditch for recharge.
Melruna & Carmel Avenues Basin	The Melruna & Carmel Avenues Basin Project would involve constructing a recharge basin on the CSD-owned parcel of land at the southwest corner of Melruna and Carmel Avenues. The parcel is partially developed as a park; however, it is underutilized due to other facilities in the community. The project will consist of the construction of a new basin and required piping to connect to CID facilities.
Rechange Pond off Kingsburg Branch Canal	The project consists of constructing a new groundwater recharge pond along the Kingsburg Branch Canal. There are few existing ponds along this canal system, so a new recharge facility will increase the District's ability to recharge groundwater in this region. The District's soils have the ability to percolate very large volumes of water and can take advantage of the additional flood water recharge.
Recharge Pond Near Kingsburg/Selma Branch Canal Divide	The project consists of constructing a new groundwater recharge pond near the Kingsburg/Selma Branch Canal divide. The project would also reduce flood flows in the Kings River by allowing the District to capture additional flood water from the river into its recharge ponds. The District's soils have the ability to percolate very large volumes of water and can take advantage of the additional flood water recharge.
Recharge Pond off Cole Slough Canal	The project consists of constructing a new groundwater recharge pond along the Cole Slough Canal. There is only one existing pond along this canal system (near the head), so a new recharge facility will significantly increase groundwater recharge in this region. In addition, there are several other nearby canals that could contribute recharge water to this basin. The project would also reduce flood flows in the Kings River by allowing the District to capture additional flood water from the river in its recharge ponds. The District's soils have the ability to percolate very large volumes of water and can take advantage of the additional flood water recharge.

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
Recharge Pond off Ward Drainage Canal	The project consists of constructing a new groundwater recharge pond along the Ward Drainage Canal. There are few existing ponds along this canal system, so a new recharge facility will increase the District's ability to recharge groundwater in this region. There are several other nearby canals that could contribute recharge water to this basin. In addition, the project would also reduce flood flows in the Kings River by allowing the District to capture more flood water from the river in its recharge ponds. The District's soils have the ability to percolate very large volumes of water and can take advantage of the additional flood water recharge.
Rockwell Pond Groundwater Recharge Project	The proposed project is intended to create a fulltime multipurpose pond at the existing Rockwell Pond facility in Selma. The existing pond is an approximately 47-acre facility that is dry much of the year. The two sources of water are City storm water and water supplied by CID for recharge. This project proposes to dedicate an approximate 11-acre portion of the pond as a full-time water feature providing constant and consistent recharge as well as recreational facility for a planned community park at Rockwell Road.
Santa Fe Pond Enlargement	The project consists of expanding an existing groundwater recharge pond along the Cole Slough Canal. There are no other existing ponds along this canal system, so an expanded recharge facility will significantly increase the District's ability to recharge groundwater in this region. There are several other nearby canals that could contribute recharge water to this basin. In addition, the project would also reduce flood flows in the Kings River by allowing the District to capture additional flood water from the river into its recharge ponds. The District's soils have the ability to percolate very large volumes of water and can take advantage of the additional flood water recharge.
South and Highland Basin	Construct a new groundwater banking facility for recharge and recovery. The facility will include the construction of two recharge ponds on a 75-acre site, along with two recovery wells, two monitoring wells, and two diversion structures. CID will deliver excess and available surface water to the basin for recharge during winter and spring months when water is available. Then during summer months, CID will pump the banked water using recovery wells into existing CID canals for delivery to meet downstream irrigation demands. It is anticipated that this project will provide as much as 7,000 acre-feet of additional recharge capacity during a wet year.
Ward Drainage Canal Capacity Enlargement and Recharge Project	The project consists of enlarging the District's existing Ward Drainage Canal and constructing new canal check structures. Enlarging the canal will increase flow capacity and the new check structures will allow the District to create "pools" along the canal that can be used for groundwater recharge. This project is effectively an on-stream groundwater recharge facility. The increased canal capacity will allow the District to convey water to growers and existing recharge ponds at the same time as utilizing the new canal pools as recharge "basins". In addition, the project would also reduce flood flows in the Kings River by allowing the District to capture more flood water from the river in its recharge ponds. The District's soils have the ability to percolate very large volumes of water and can take advantage of the additional flood water recharge.

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
Westside Banking Facility	The project consists of constructing approximately 500 acres of recharge ponds and recovery wells to develop a large banking facility in the western region of the District. The project may be located in a single large location or have recharge ponds and wells distributed throughout this region of the District. This project will greatly expand the District's conjunctive use capability to protect the region's groundwater resources. In addition, the project would also reduce flood flows in the Kings River by allowing the District to capture more flood water from the river into its recharge ponds. In general, the District's soils have the ability to percolate very large volumes of water and can take advantage of the additional flood water recharge.
Laton North Recharge Project	A gross 150-acre parcel will be excavated for groundwater recharge in conjunction with the California High Speed Rail (HSR) Project. The net ponded area is approximately 109 acres. A conveyance system will be constructed to deliver water to the project site from Cole Slough on the Kings River. The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. Indirectly there could be secondary benefits of some groundwater quality improvement and reduction in land subsidence.
LID Laton North Recharge Project	The project will expand existing conveyance infrastructure to an existing recharge basin. The turnout will primarily provide and utilize Kings River floodwater to help address sustainability issues within the North Fork Kings GSA.
North Fork Regional Recharge Project (NFRRP)	The NFRRP would involve construction of the conveyance modifications for enlargement of the Liberty Canal to support the Elkhorn Property Recharge Project and Beeler Recharge Project along with other existing and potential recharge basins served by the Liberty Canal, including another future project Mussel Slough Ranch Recharge (NFK11). The Liberty Canal improvements would improve the headworks and approximately 6.5 miles of the canal, increasing the capacity from 150-cfs to 430-cfs for the first 2.9 miles of the canal, then increasing to 320-cfs from 150-cfs for the next 2.2 miles, and from 60 to 210-cfs to Highway 41 (next 1.4 miles).
On-Farm Recharge Project*	The project entails spreading water on suitable fields by landowners when excess high flow Kings River water or CVP water is available to achieve groundwater recharge. The field soil type and crop type must be considered, along with the timing when the high flow water is available. It is anticipated that the program that is developed by the GSA may involve incentives and a groundwater credit system to encourage landowners to participate.
Cerini Recharge Project*	The property is undeveloped, uncropped, and has not been farmed for over 20 years. Ephemeral swales and drainages naturally occur on the property and can be used to deliver and spread water on most of the property when excess high flow Kings River water or Central Valley Project water is available to achieve groundwater recharge.
Kamm Recharge Project*	The property is undeveloped, uncropped, and has not been farmed for over 20 years. Multiple ephemeral swales and drainages naturally occur on the property and can be used to deliver and spread water on portions of the property when

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
	excess high flow Kings River water or Central Valley Project water is available to achieve groundwater recharge or for surface storage for later use. The property is known to have surficial clay lenses which inhibit expedient infiltration seen in other portions of the North Fork Kings GSA.
Terra Linda Farms Recharge Project	The project entails constructing an approximately 72-acre recharge basin with levees less than 6 feet tall to balance the site earthwork and limit excavation. The project will store water approximately 5 feet deep and provide recharge when excess high flow Kings River water or Central Valley Project water is available. The project site is adjacent to the Liberty Millrace Canal which would be the main conveyance system to deliver water to the project site.
Miscellaneous Landowner Recharge Basins*	The project entails spreading water in recharge basins by private landowners when excess high flow Kings River water or Central Valley Project water is available to achieve groundwater recharge. The basin depth and soil type must be considered, along with the timing when the high flow water is available. It is anticipated that the program that is developed by the GSA may involve a groundwater credit system to encourage landowners to participate. A groundwater banking program along the lines of the existing LID banking policy will be taken into consideration when developing this project/program.
Upgradient Recharge Outside the NFKGSA*	The project entails several potential options to recharge water upgradient of North Fork Kings GSA when excess high flow Kings River water or CVP water is available. The project would be structured to be of mutual benefit to both the North Fork Kings GSA and the upgradient partner. Project details need to be finalized and an agreement developed with the upgradient partner, but recharge opportunities could entail a combination of any of the following projects and associated canal capacity improvements that might be required: ➢ Recharge in existing basins upgradient and outside the North Fork Kings GSA, ➢ Recharge in new basins constructed upgradient and outside the North Fork Kings GSA, ➢ On-farm recharge by landowners upgradient and outside the North Fork Kings GSA through incentives to encourage landowner participation. Dedicated recharge basins would be prioritized over cropland if storage capacity was available to avoid potential crop damage and water consumption. A program must be developed with the upgradient partner to locate suitable recharge areas, identify any necessary conveyance system improvements, and develop an equitable groundwater credit system with a fair leave behind percentage that also benefits the upslope area.
Mussel Slough Recharge Project	The project entails construction of a groundwater recharge basin to capture excess high flow Kings River water or Central Valley Project water is available to achieve groundwater recharge. The total area of the proposed project site is 288.67

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
	acres, with an anticipated net recharge area of approximately 220 acres. The main conveyance system to deliver water to the property would be the Liberty Canal.
Dry Well Recharge Systems*	The project is still largely conceptual in nature and entails individual landowners constructing a series of interconnected dry wells that could be used to achieve groundwater recharge when excess high flow Kings River water or Central Valley Project water is available. The dry well would be a standpipe filled with gravel that would allow water to infiltrate below the soil surface. The size and depth of the dry wells would be site dependent. The dry well recharge system would likely only be constructed in areas where surface soils are not conducive to recharge and it is necessary to deliver water for recharge below shallow clay layers in the soil, or if recharge in an existing basin would be enhanced by delivering water deeper into the soil profile. It is anticipated that the program that is developed by the GSA may involve incentives and a groundwater credit system to encourage landowners to participate, especially in those areas where surface recharge is not highly effective.
Laton North Phase 2 Recharge Project*	A gross 150-acre parcel will be excavated for groundwater recharge in conjunction with the California High Speed Rail (HSR) Project. The project site will be acquired from the State of California after HSR construction is completed. The net ponded area is approximately 109 acres. The conveyance system used to deliver recharged water to the Laton North project site from Cole Slough on the Kings River will be used to deliver water to this site.
Pires Recharge Project	The existing property has approximately 27 acres of partially excavated land capable of capturing some surface water flows from the LID Island Canal. The project would develop the property into a recharge basin by deepening the existing site and constructing perimeter basin levees for increased storage capacity when excess high flow Kings River water or Central Valley Project water is available to achieve groundwater recharge.
Basin 11 Expansion Project	The property is proposed for a groundwater recharge basin as an expansion of the existing Basin 11 and would primarily utilize Kings River flood water to help address sustainability issues within the North Fork Kings GSA. The delivery and/or purchase of other Kings River water supplies could also be possible when available from Laguna Irrigation District or other Kings River Water Association member units. Total acreage of the proposed project site is 38.43 acres, with an anticipated net recharge acreage of approximately 35 acres that would be in addition to the existing Basin 11 site. The main conveyance system to deliver water to the property would be Liberty Canal. The recharge rate of the proposed project will be influenced by the on-site solids and the depth excavation in the basin, but the recharge rate is expected to be approximately 0.75 ft/day and the site would be able to recharge approximately 26 acre-feet per day in addition to the recharge that would occur at the existing Basin 11 site.

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
Beeler Recharge Project	The property is proposed for a groundwater recharge basin, primarily utilizing Kings River floodwater to help address sustainability issues within the North Fork Kings GSA. The delivery and/or purchase of other Kings River water supplies could also be possible when available from Laguna Irrigation District or other Kings River Water Association member units. Total acreage of the proposed project site is 109.64 acres, with an anticipated net recharge acreage of approximately 100 acres. The main conveyance system to deliver water to the property would be the Liberty Canal. The recharge rate of the proposed project will be influenced by the on-site soils and the depth of exaction in the basin, but the recharge rate is expected to be approximately 0.5 ft/day and the site would be able to recharge approximately 50 acre-feet per day.
Mud Dam Spreading and Recharge	The project will utilize the small reservoir created by Mud Dam to pool and store water and allow it to spread over time across conservation easement lands. An estimated 360 acres will be inundated by the project. A portion of the water applied to the conservation easement lands will recharge the aquifer. Minor improvements to existing facilities may be required to facilitate effective long-term use.
Fresno County Elkhorn Property Recharge Project	A portion of the property is proposed for a groundwater recharge basin, primarily utilizing Kings River floodwater to help address sustainability issues within the North Fork Kings GSA. The purchase of other Kings River water supplies could also be possible that was available from Kings River Water Association member units. Total acreage of the parcel is 317.12 acres, although the expected size of recharge area is approximately 80 acres, likely located in the western portion of the property. The main conveyance system to deliver water to the property would be the Liberty Canal. The property is adjacent to an existing small recharge basin owned by Liberty Water District at the northeast corner of Elkhorn and Highway 41, which was excavated during expansion of Highway 41 and has a percolation rate of over 1 ft/day. The recharge rate of the proposed project will be influenced by the depth of excavation in the basin but is expected to be approximately 0.75 ft/day and the site would be able to recharge 60-acre-feet per day.
Upper Kings: Laguna Irrigation District Recharge Basin 11	Develop a groundwater recharge basin on a 52-acre site using Kings River floodwater as the primary water source. Improve conveyance capacity of Liberty Canal by constructing a turnout and check structure, flow meters, basin with exterior levees, settling pond, outlet to Murphy Slough, and monitoring wells.
North Fork Group Site 16 Recharge Project/North Fork Group Site 3 Recharge Project/North Fork Group Site 6 Recharge Project	The existing property, approximately six acres, is a privately owned abandoned vineyard. The project would construct a recharge basin capable of storing surface water flows from the Liberty Millrace Canal when excess high flow Kings River water or CVP water is available to achieve groundwater recharge. The project will construct a recharge basin with levees less than 6 feet tall to balance the site earthwork and limit excavation. It may be possible to expand the project onto adjacent property to increase the recharge potential.

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
American & Del Ray Avenues Basin	The project will consist of converting an existing storm drain retention basin into a recharge basin with a pipeline connected to the basin. The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence.
Industrial Drive Basin	The project will include modifying the existing basin, providing any infrastructure needed to convey surface water from CID facilities to the basin for recharge. The basin will not increase from its current size of 3.1 acres. The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence.
Milton Avenue Basin	The project entails the conversion of the existing stormwater retention basin at this location into a recharge basin. Modifications and additions to the existing basin and its related infrastructure will allow for conveyance of surface water from CID facilities for recharge. The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence.
Tuolumne Street Basin	The project will consist of any needed modifications or additions to the existing basin, its piping, and connection to CID facilities to allow water to be delivered for recharge. The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence.
Manning Avenue Basin	The project will involve the conversion of the existing stormwater basin to a recharge basin, which will likely include additions and modifications to the basin's existing piping in order to deliver water from CID facilities to the basin. The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence.
Avila Street Basin	The efforts to convert the basin into a recharge basin may include modifying or adding to the existing storm drainage system connected to the basin to allow water to flow from CID facilities to the basin. The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence.
Mendocino Avenue Basin	The project will convert an existing stormwater basin into a recharge basin. In order to deliver water from CID facilities to the basin, additions and modifications to the existing structures and piping at the basin and CID lateral may be included in the project. The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence.

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
Academy Avenue Basin	This project will involve converting the existing stormwater basin into a recharge basin by making additions and modifications to the basin's piping and allowing the flow of water from the Kingsburg Branch canal to the basin. The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence.
Kelly Basin	The existing basin will be converted to a recharge basin and will be connected to CID facilities through existing storm drain mains, which can be dual purposed for conveyance of surface water to the basin. The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence.
Medrano Basin	The Medrano Basin Project will convert an existing stormwater basin into a recharge basin. Additions and modifications to the existing nearby storm drain system will be needed to allow conveyance of water from the Lonetree Channel to the basin for recharge. The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence.
Southwest Groundwater Banking	The project will recharge an estimated average of 2,625 AF/year. Recharged water can be recovered using nearby existing wells. This project will provide a reliable water source during dry years while minimizing overdraft near the project area. The locally available surface water that will be diverted into the basin will be of better quality than that of the groundwater and is expected to improve groundwater quality in the project area. Present canal capacities are limited to 150-cfs upstream of the project site, however, the basin and planned increased capacity of Lower Dry Creek Canal will ultimately allow for up to 200-cfs of water to be diverted.
Lassen Avenue Reverse Flow and Recharge	This project would improve groundwater levels and mitigate critical over drafting by redirecting flood flows or other flows that could be wheeled through James Irrigation District (JID) off the Mendota Pool for on-farm or in-lieu groundwater recharge. JID shares the southwestern border with MAGSA and owns a siphon which crosses the James Bypass as well as the two groundwater-fed canals connected to it located within the boundaries of MAGSA. One of the canals, the JID Kerman Line, follows the Lassen Avenue alignment due north for about 3.9 miles to collect water from their well fields; however, the canal does not run during the non-irrigation season. The non-irrigation season often aligns with the time of year flood flows occur or when there is lower irrigation demand, therefore there is potential to use the canal to bring surface water into MAGSA by reverse flows from within JID for groundwater recharge or direct use.
MAGSA Groundwater Banking Program*	Conceptually, water from an interested party would be delivered from the O'Neil Forebay through the Delta Mendota Canal and to the Mendota Pool. Once in the Fresno Slough arm of the Mendota Pool, water would then be diverted to MAGSA and conveyed to a dedicated groundwater banking facility, delivered to growers for them to utilize "in-lieu" of

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
	pumped groundwater, delivered to growers for them to recharge through an on-farm recharge program, or through a combination of these approaches. Water recovered in dry years would be collected in MAGSA and returned to the Mendota Pool, where it would be exchanged through the Delta Mendota Canal for a water supply in the San Luis Reservoir on the California Aqueduct.
Grantland Area Recharge	Due to the proximity of the Liberty Millrace Canal (LMC) to RCWD, a connection with the LMC was investigated to divert Kings River floodwater when available. The LMC is operated by Laguna Irrigation District on behalf of the Liberty Millrace Canal Co. The connection would be accomplished through the development of a new conveyance canal from the LMC into the RCWD area of MAGSA at the Grantland Avenue alignment. This will allow MAGSA to develop a groundwater recharge project, or projects, to capture excess surface water during wet years and replenish the aquifer through either direct recharge, on-farm recharge, or an in-lieu recharge method.
Distributed Recharge Basins	The project will construct a number of small recharge basins either adjacent to or near existing district-owned conveyances located outside of the James GSA for the purpose of groundwater recharge. The basins could either be constructed on lands purchased or leased by the JID or constructed by others and served by the JID. The basins would either be used for groundwater recharge and, if appropriate, regulation of flood and excess water delivered to areas that normally do not receive surface water. At this time, it is estimated that up to 60-acres of recharge basins can be constructed by this project.
James Ranch Recharge Basin	The project will construct recharge basins on a large contiguous parcel of land outside of the James GSA. The project is analyzed assuming four 640-acre recharge basins would be constructed in the area east of the James Bypass within the former landholding of the James Ranch. Adjacent or nearby lands may also be used for the project. The basins would be used to capture flood flows for groundwater recharge on a large scale.
McMullin On-Farm Flood Capture and Recharge Project	Located north of Helm, CA, Terranova Ranch serves as the project site for the McMullin On-Farm Flood Capture and Recharge Project, a multi-phase project that aims to capture Kings River flood flows and utilize flows for on-farm conjunctive use activities (i.e., direct recharge, in-lieu recharge, irrigation). The 6,000-acre Terranova Ranch sits adjacent to the Kings River and has an executed Memorandum of Understanding with the Kings River Water Association for access to flood flows (when available). Phase I of the Project is the diversion of flood flows, when available, through a 500-cfs capacity turnout onto farm fields for conjunctive use activities. Construction work for the Project includes an upgrade to the turnout from Kings River and James Bypass in the Terranova Canal, installation of 400 cfs crossing under McMullin Grade, and extension of Terranova Canal two (2) miles to Manning Avenue and one (1) mile east pass Highway 145 (McMullin Grade).

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
McMullin Recharge Project - Site #1	The proposed project includes three (3) 80-acre sites for the development of a groundwater recharge basin project. The site is currently underdeveloped farmland. Kings River Floodwater would be the primary water source recharged in the basin. The conveyance could be provided by means through the proposed McMullin On-Farm Recharge Project facilities.
Raisin City Water District Stinson North Canal Water Supply and Recharge Project	The project consists of a new 500-cfs canal about 9 miles in length from above the Stinson Weir on the North Fork of the Kings River into Raisin City Water District, with a 320-acre dedicated recharge area at the terminus of the canal in favorable areas of said Section 33, and a connection to the Phase 2 improvements of the McMullin On-Farm Recharge Project. Turnouts would be included off the canal for landowners to also take water when it is available.
Upgradient Recharge Programs*	MAGSA and RCWD are interested in working with neighboring districts to recharge surface water upgradient from MAGSA in a nearby district for the mutual benefit of all participating entities. The project yield will likely be split in some manner between the parties that develop the project. Both CID and Fresno Irrigation District are upgradient and groundwater flow comes from these areas toward MAGSA due to the pumping cone of depression within MAGSA. This type of program would help to mitigate those circumstances in the affected districts. For the purpose of providing an estimate of potential yield and costs, the water source is presumed to be Kings River high flow supplies and the site to be 480-acres (gross area) that would be located adjacent to existing distribution facilities. Since no specific location within a district has been identified, the project discussion and costs are more general in nature compared to the other projects identified.
North Dinuba Water Supply Augmentation Area	North Dinuba Water Supply Augmentation Area may include up to 60 acres of basins to capture high flows from the Kings River. This project is anticipated to capture about 5,200 acre-feet of water, which will help offset local groundwater extractions. Other features associated with this project include construction of levees, new turnout equipped with flow measurement, fencing, and other miscellaneous site improvements.
Clovis North Recharge Facility	Develop a new water recharge facility of 20-acres with a potential to recharge 1,000 to 1,400 acre-feet per year.
Reedley Retention Basin Project	This storm water basin on the corner of Reed and Floral will allow the City to collect storm water that would otherwise go into the Kings River. This basin will retain stormwater runoff from Drainage Basin N, as defined in the City's Integrated Master Plan, for the primary intent of increasing groundwater recharge to the underlying aquifer.
Marion Recharge Basin Improvements	Improve recharge at the Marion Recharge Basins through a variety of measures to increase percolation including routine maintenance and capital projects. Quantity is estimated. The City is entertaining the use of a proprietary product and/or installing dry wells to increase groundwater percolation.
Lions Park Groundwater Recharge Project	The proposed project would install the valving, piping, and metering equipment necessary to allow for regular distribution of FID surface water into the City's stormwater collection system, to be conveyed to the Lion's Park Stormwater Basin for

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
	groundwater recharge purposes. The estimated recharge volume was calculated based on the basin size, percolation/recharge rate, and number of days water would be available for recharge.
County of Fresno NKGSA Recharge Program	This project will implement priority projects identified in the Northeast Fresno-Clovis Area Potential and Groundwater Investigation (April 2015), to provide groundwater recharge in the County of Fresno area east of FID within the North Kings GSA. The report identified 19 potential recharges within Big Dry Creek, Dog Creek, as well as dedicated recharge basin sites. The expected annual project benefits have not been identified in detail as the County still needs to evaluate the priority projects in detail. The estimated project benefit is subject to a negotiated water supply. Recharge within Big Dry Creek and Dog Creek will likely provide significant volume of recharge if water supply allows.
Central Basin Recharge Project	The Fresno Irrigation District's Central Basin Project is approximately 90-acres of groundwater banking and recharge facilities at three locations. The recharge potential of the project was calculated based on the available surface supply, basin volume (360 AF, 90 wetted acres at 4 feet deep), diversion capacity (100-cfs) and assumed infiltration rate of 0.25 ft/day.
Wagner Recharge Basin	The project is a 60-acre groundwater recharge basin, including earthwork and structures. The project will provide approximately 200 AF of flood water surface storage and recharge approximately 2,300 AF/year annual average. The recharge potential was calculated based on approximately 50 acres of wetted area having an infiltration rate of 0.4 ft per day, assuming water is available for approximately 120 days per year.
On-Farm Recharge Program*	FID will establish a program to offer and encourage growers to perform on-farm recharge during wet years when would otherwise be lost to the region. The program is in the conceptual phase and will be dependent on grower's willingness to take surface water during wet periods. Floodwater is typically available every 3-4 years. A conservative estimate of 8,000AF of supply could be available for this program, with 4,000-8,000acres participating, netting an average annual benefit of 2,000af/yr.
Ricchiuti Recharge Basin Project	The District proposes to annex into the District the remaining portion of APN 580-040-01, an existing five (5) acre basin, then construct a delivery connection from its distribution system to the existing basin to allow for the delivery of surface water for recharge. The five (5) acre site is anticipated to have an infiltration/percolation rate of 0.625 feet per day with water being available an average of 240 days per year.
Heritage Grove Recharge Basin*	Construct a 40-acre recharge basin in future northwest Clovis development area - Heritage Grove. Basin RC-2 per Clovis Water Master Plan.
Basin 'C' Groundwater Recharge Project*	The project will construct a turnout structure on the Houghton West No. 94 Canal and a pipeline along Madera Avenue from the Canal to the City Storm Drainage System north of Whites bridge Road. The Project will allow for surface water

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
	from the Canal to be conveyed via the proposed pipeline to the City's Storm Drainage System, which will convey the surface water to City Basin 'C' for recharge purposes. The benefit was quantified based on the proposed size of City Basin 'C' (1.89 acres), estimated percolation rate (12 in/day based on visual observations), and estimated number of days of surface water availability (4.5 months/135days). Based on these parameters, Basin 'C' could recharge approximately 255 AF/yr.
Basin 'M' Groundwater Recharge Project*	The project will construct an approximately 12-acre recharge basin, including basin excavation, structures, and a pipeline to convey surface water to the basin. The basin is shown on the City's General Plan to be located in the southwest quadrant of Nielsen and Siskiyou Avenues. The benefit was quantified based on the proposed size of City Basin 'C' (12-acres), estimated percolation rate (6 in/day), and estimated number of days of surface water availability (4.5 months/135days). Based on these parameters, Basin 'M' could recharge approximately 776 AF/yr.
Basin 'D' Recharge Project*	The project will construct an approximately 11-acre recharge basin, including basin excavation, structures, and a pipeline to convey surface water to the basin. The basin is shown on the City's General Plan to be located in the southwest quadrant of Nielsen and Vineland Avenues. The benefit was quantified based on the proposed size of City Basin 'D' (11 acres), estimated percolation rate (6 in/day), and estimated number of days of surface water availability (4.5 months/135days). Based on these parameters, Basin 'M' could recharge approximately 667 AF/yr.
Basin 'P' Groundwater Recharge Project*	The project will construct an approximately 7-acre recharge basin, including basin excavation, structures, and a pipeline to convey surface water to the basin. The basin is shown on the City's General Plan to be in the northeast quadrant of Goldenrod and Whitesbridge. The benefit was quantified based on the proposed size of City Basin 'P' (7 acres), estimated percolation rate (6 in/day), and estimated number of days of surface water availability (4.5 months/135days). Based on these parameters, Basin 'P' could recharge approximately 447 AF/yr.
American Fowler Recharge Project*	This project is an approximately 15-acre recharge basin, including earthwork and structures. The project will provide approximately 60 AF of flood water surface storage and recharge approximately 360 AF/year annual average. The estimated recharge benefit is based on an assumed infiltration rate of 0.5 feet per day for 120 days during wet years which occurs 4 out of every 10 years. (15 acres x 0.5ft/day x 120 days x 4/10).
Barstow Chateau Fresno Recharge Project*	This project is an approximately 40-acre recharge basin, including earthwork and structures. The project will provide approximately 160 AF of flood water surface storage and recharge approximately 960 AF/year annual average. The estimated recharge benefit is based on an assumed infiltration rate of 0.5 feet per day for 120 days during wet years which occurs 4 out of every 10 years. (40 acres x 0.5ft/day x 120 days x 4/10).

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
Wagner Basin Expansion Project*	This project is an approximately 50-acre recharge basin, including earthwork and structures. The project will provide approximately 200 AF of flood water surface storage and recharge approximately 1200 AF/year annual average. The assumed infiltration rate of 0.5 feet per day for 120 days during wet years which occurs 4 out of every 10 years. (50 acres x 0.5ft/day x 120 days x 4/10).
Barstow Jameson Recharge Basin*	This project is an approximately 35-acre recharge basin, including earthwork and structures. The project will provide approximately 140 AF of flood water surface storage and recharge approximately 840 AF/year annual average. The estimated recharge benefit is based on an assumed infiltration rate of 0.5 feet per day for 120 days during wet years which occurs 4 out of every 10 years. (35 acres x 0.5ft/day x 120 days x 4/10).
Central Hughes Basin Expansion Project*	This project is an approximately 40-acre recharge basin, including earthwork and structures. The project will provide approximately 160 AF of flood water surface storage and recharge approximately 960 AF/year annual average. The estimated recharge benefit is based on an assumed infiltration rate of 0.5 feet per day for 120 days during wet years which occurs 4 out of every 10 years. (40 acres x 0.5ft/day x 120 days x 4/10).
Barstow Westlawn Recharge Basin*	This project is an approximately 25-acre recharge basin, including earthwork and structures. The project will provide approximately 100 AF of flood water surface storage and recharge approximately 600 AF/year annual average. The estimated recharge benefit is based on an assumed infiltration rate of 0.5 feet per day for 120 days during wet years which occurs 4 out of every 10 years. (25 acres x 0.5ft/day x 120 days x 4/10).
Whitesbridge Nielsen Recharge Basin*	This project is an approximately 70-acre recharge basin, including earthwork and structures. The project will provide approximately 280 AF of flood water surface storage and recharge approximately 1680 AF/year annual average. The estimated recharge benefit is based on an assumed infiltration rate of 0.5 feet per day for 120 days during wet years which occurs 4 out of every 10 years. (70 acres x 0.5ft/day x 120 days x 4/10).
Tulare Avenue Recharge Basin Project*	Construction of a 4.3-acre recharge basin. Assuming a percolation rate of 0.42 feet per day, a wetted perimeter of 3.7 acres, and an average of 120 days per year; the estimated yield is 185AF/yr.
Fowler Spillway Recharge Basin Project*	Construction of an approximately 11-acre recharge basin. Assuming a percolation rate of 0.42 feet per day, a wetted perimeter of 10.3 acres, and an average of 120 days per year; the estimated yield is 519AF/yr.
Basin CF - Stormwater Recharge and Flood Protection Project	This project will construct an intertie (connection) between FMFCD's existing Basin "CF" with FID's Washington Colony Canal No. 15 to allow for the delivery of surface water for recharge into the basin. Basin improvements include a basin pump station, telemetry system, internal basin pipeline, basin relief pipeline, canal intertie structure and appurtenant facilities. An exhibit depicting the basin location and proposed improvements is attached. The basin is used for local urban

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
	stormwater capture to prevent localized flooding. Currently, there is no pipeline to convey water from the nearby canal to the basin. The project will construct the intertie and is estimated to provide approximately 1,000 acre-feet per year.
Basin "CE" Pump Station – Regional Groundwater Recharge Project	The project consists of the construction of a groundwater recharge intertie between a Fresno Irrigation District canal and Fresno Metropolitan Flood Control District Drainage Basin "CE", to facilitate the diversion of City of Fresno surface water entitlements into the basin under current agreements. This project also includes the construction of the basin pump station. It is expected that this project will recharge approximately 1,800 acre-feet annually. Project benefits include enhancing groundwater recharge, increasing localized flood protection capabilities, enhancing wildlife habitat, reducing energy use, improving groundwater quality, increasing water supply, and maximizing beneficial uses of public property.
Basin "CF" Pump Station – Regional Groundwater Recharge Project	The project consists of the construction of a groundwater recharge intertie between a Fresno Irrigation District canal and Fresno Metropolitan Flood Control District Drainage Basin "CF", to facilitate the diversion of City of Fresno surface water entitlements into the basin under current agreements. This project also includes the construction of the basin pump station. It is expected that this project will recharge approximately 1,400 acre-feet annually. Project benefits include enhancing groundwater recharge, increasing localized flood protection capabilities, enhancing wildlife habitat, reducing energy use, improving groundwater quality, increasing water supply, and maximizing beneficial uses of public property.
Basin "SS" Pump Station - Regional Groundwater Recharge Project	The project consists of the construction of a groundwater recharge intertie between a Fresno Irrigation District canal and Fresno Metropolitan Flood Control District Drainage Basin "SS", to facilitate the diversion of City of Fresno surface water entitlements into the basin under current agreements. This project also includes the construction of the basin pump station. It is expected that this project will recharge approximately 1,800 acre-feet annually. Project benefits include enhancing groundwater recharge, increasing localized flood protection capabilities, enhancing wildlife habitat, reducing energy use, improving groundwater quality, increasing water supply, and maximizing beneficial uses of public property.
Big Dry Creek Recharge Project	The project being considered is the use of the existing Big Dry Creek reach from the Friant Kern Canal to the Enterprise Canal as a linear recharge facility. This reach of the creek is utilized for flood routing purposes but is not currently used as a recharge facility. The project being considered would divert water from the Friant Kern Canal to be recharged along the existing few miles of creek channel upstream of the Enterprise Canal.
Coehlo and Gragnani Wetlands Recharge Project	The project will reconfigure the Coehlo and Gragnani Wetlands sites to facilitate additional recharge. The reconfiguration will consist of increasing variations in habitat topography to access soils with higher permeability and increasing differing types of wetlands habitat. The goal of the project is to create an additional 1,200 AF/day of groundwater recharge.
FID Wagner Recharge Basin	This project consists of the construction of a 60-acre groundwater recharge basin, including earthwork to construct levees, and the construction of a concrete turnout structure and pipeline to divert water from the Fresno Irrigation District's

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
	Kennedy Owens No. 51 canal. The project will capture, store, and recharge surface water normally lost from the Kings River, allowing for sustained management
Nielsen Recharge Facility	This project is to expand the City's groundwater recharge program and includes land acquisition, development of new recharge basins, structures and conveyance systems such as pipelines, canal turn-outs, metering systems, and interties. The project goal is to optimize groundwater recharge efforts so as to balance groundwater extractions as laid out in the City's 2014 Metropolitan Water Resources Plan.
Torrey Ridge Recharge Basin Project*	Expand an existing pond to 7-acres and convert it to a recharge basin. Assuming a percolation rate of 0.42 feet per day, a wetted perimeter of 6.2 acres, and an average of 120 days per year; the estimated yield is 313AF/yr.
K-Basin Groundwater Recharge	The Lateral K Recharge Basin is a 226-acre basin in the JID used for groundwater recharge and banking. This project will substantially benefit measurable objectives related to reduction in groundwater storage and chronic lowering of groundwater levels. This project will also be expected to benefit measurable objectives related to degraded water quality and depletions of interconnected surface water. The project may incidentally benefit measurable objectives related to subsidence.
Basins 1 and 2 Storage and Recharge	The project seeks to utilize two existing basins used by James ID for the dual purpose of capturing flood and excess water for later use and to recharge water into the aquifer. Basin 1 is 6.0 acres and holds approximately 100 AF. Basin 2 is 40 acres and holds approximately 900 AF. At currently configured, only 600 AF may be removed from the basins by pumping using permanently installed facilities. The completed project seeks to build out Basin 2 to allow for 300 AF of additional storage and permanent facilities that will allow for the removal of an additional 600 AF from Basin 2. The project will also include modifications to increase the flow rate conveyed into the basins to allow for the capture of short duration flows in the Kings River. This project will substantially benefit measurable objectives related to reduction in groundwater storage and chronic lowering of groundwater levels. This project will also be expected to benefit measurable objectives related to degraded water quality and depletions of interconnected surface water. The project may incidentally benefit measurable objectives related to subsidence.
Basin 3 Floodwater Capture and Recharge	The project seeks to utilize an existing basin currently used by James ID for the dual purpose of capturing flood and excess water for later use and to recharge water into the aquifer. Basin 3 is 16.0 acres and holds approximately 240 AF. As currently constructed, water can only be removed from basin 3 and utilized by the district if temporary facilities (pumps) are used. The project seeks to build out Basin 3 to allow for 400 AF of storage and permanent facilities that will allow for the removal of 320 AF from the basin. This project will substantially benefit measurable objectives related to reduction in groundwater storage and chronic lowering of groundwater levels. This project will also be expected to benefit measurable

Table 6-1. Summary of GSP Listed Groundwater Recharge Projects in the Kings Management Zone	
Project Type	**Description**
	objectives related to degraded water quality and depletions of interconnected surface water. The project may incidentally benefit measurable objectives related to subsidence.
Carmichael Slough Recharge	The project site is the Carmichael Slough and is located between James ID Laterals E and F. The project will introduce flood and excess water into the slough and will utilize the slough for groundwater recharge. The facilities for the project may include structures to introduce water into the slough from Lateral E and allow water to exit the slough into Lateral F. The slough is approximately 2,800 feet long and 40 feet wide. This project will substantially benefit measurable objectives related to reduction in groundwater storage and chronic lowering of groundwater levels. This project will also be expected to benefit measurable objectives related to degraded water quality and depletions of interconnected surface water. The project may incidentally benefit measurable objectives related to subsidence.
City of San Joaquin Storm Water Pond Recharge	The project site consists of utilizing two existing storm water basins in the City of San Joaquin for groundwater recharge. The basins would be used primarily for storm water capture and disposal through percolation. When basin capacity is not needed for storm water storage, a portion of the basin's capacity would be used for groundwater recharge. The Colorado Avenue basin percolates water well; however, the California Avenue basin does not percolate water well. The cause of the poor percolation is purportedly clay materials that are present at the bottom of the basin. The project, if fully implemented, will remove the clay material exposing native materials and improving percolation.
Distribution System Recharge	The project consists of the utilization of the JID water distribution system to recharge additional water into the aquifer by operating laterals and ditches at times when those facilities would not normally be operated.
Fallow Land Recharge*	The program provides incentives to landowners and growers to apply flood and excess water to fallow lands within the James ID. The program was implemented by JID in 2017 and 2019.
Fresno Slough Recharge Project	The project will utilize the Fresno Slough to recharge water into the aquifer. A portion of the water delivered into the slough will recharge the aquifer. Water will also be stored and circulated within the slough for later use. The project is expected to inundate an area 10,000 feet by 40 feet (9.18 acres).

*Asterisk indicates that the project is not represented in **Figure 6-1**.

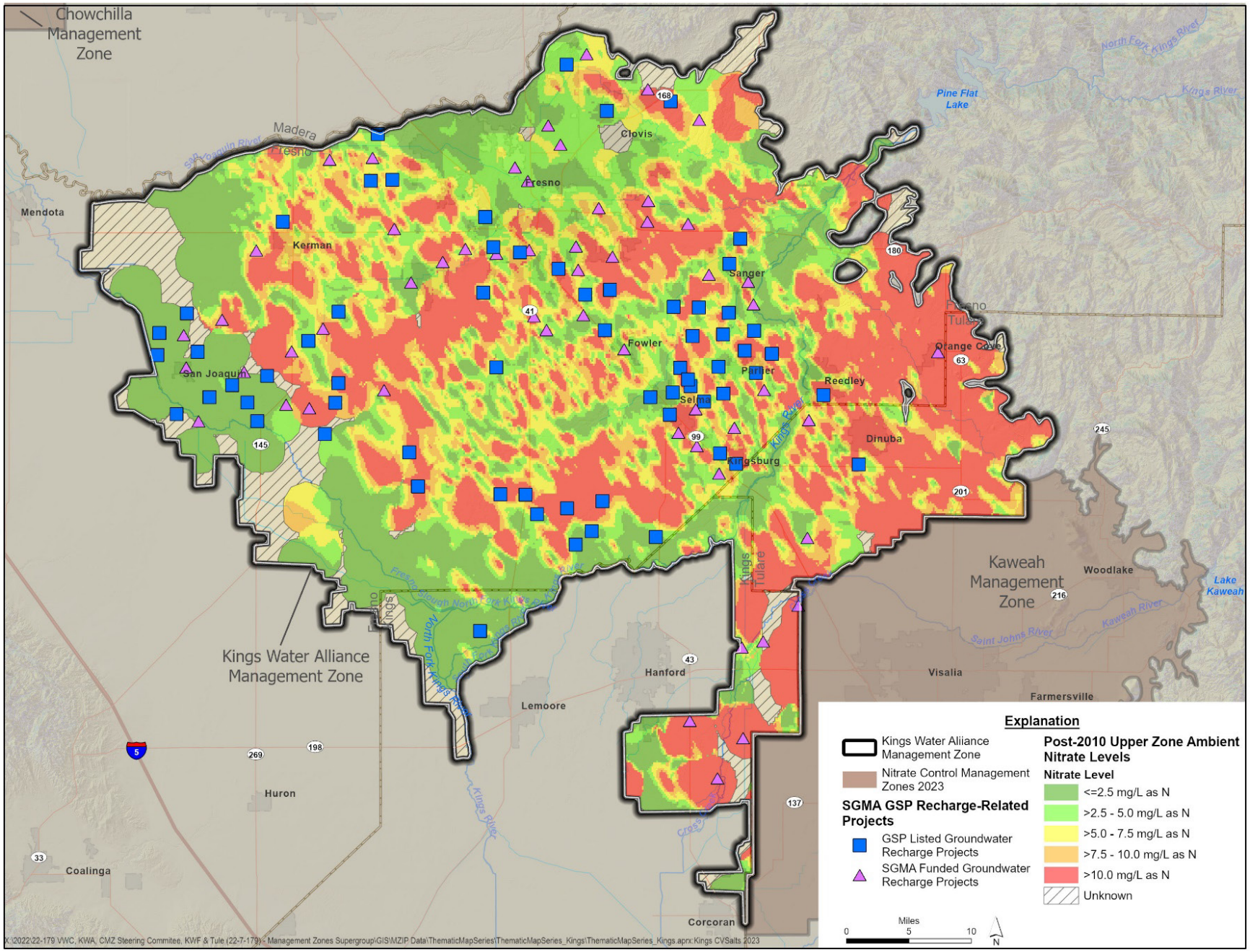


Figure 6-1. SGMA Groundwater Recharge-Related GSP Projects in the Kings Management Zone

6.2.1.2. Diverting Surface Water for Recharge (Governor's Executive Orders)

In response to unanticipated significant precipitation events and accumulated snowpack in water year 2023 and to facilitate opportunities for groundwater recharge, Governor Newsom put forth two Governor's Executive Orders (N-4-23 and N-7-23) for Flood Diversion. On March 10, 2023, the Governor issued Executive Order N-4-23 to address evolving drought conditions due to the winter storms and to mitigate flooding by facilitating groundwater recharge. Executive Order N-7-23 extended the allowable time frame for the operation to August 31 for projects operational as of June 1, 2023, and requires (among other things) the submittal of a final report with the State Water Board and any applicable GSA or GSAs for the basin no later than September 15, 2023. These Orders "created streamlined permitting pathways to enable groundwater recharge that augments natural aquifer recharge while protecting the environment and other water users." To help maximize the extent to which winter precipitation recharges underground aquifers, the Department of Water Resources, Water Board, and the Department of Fish and Wildlife were directed to collaborate on expediting permitting of recharge projects and to work with local water districts to facilitate recharge projects (N-4-23).

All authorized flood flow diverters were required to file an initial and final report with the State Water Board detailing their groundwater recharge operations. The reports were made publicly available at: (https://www.waterboards.ca.gov/waterrights/water_issues/programs/groundwater-recharge/)

The reports were compiled, and the recharge operations were located. The reports identified the latitude and longitude of flood diversion points as well as Accessor Parcel Numbers (APNs) where flood water was available for recharge. The APNs provided in the reports were matched to publicly available County APN shapefiles to determine if the operations occurred inside the Management Zone boundary. The reports identified how much water was diverted and recharged to each APN. For the Kings Priority 1 Management Zone area, 82,140 AF of surface water were diverted and recharged (**Table 6-2**). **Figure 6-2** shows the locations of the recharge along with the Upper Zone post-2010 ambient nitrate levels. Most recharge locations fall within areas where post-2010 ambient nitrate levels are <=2.5 mg/L. In the western portion of the Kings Priority 1 Management Zone area (west of Lemoore), the recharge locations are where the post-2010 ambient nitrate levels are presently unknown. Southeast of Hanford, one recharge location is in an area where post-2010 ambient nitrate levels range from 5.0 to >10 mg/L.

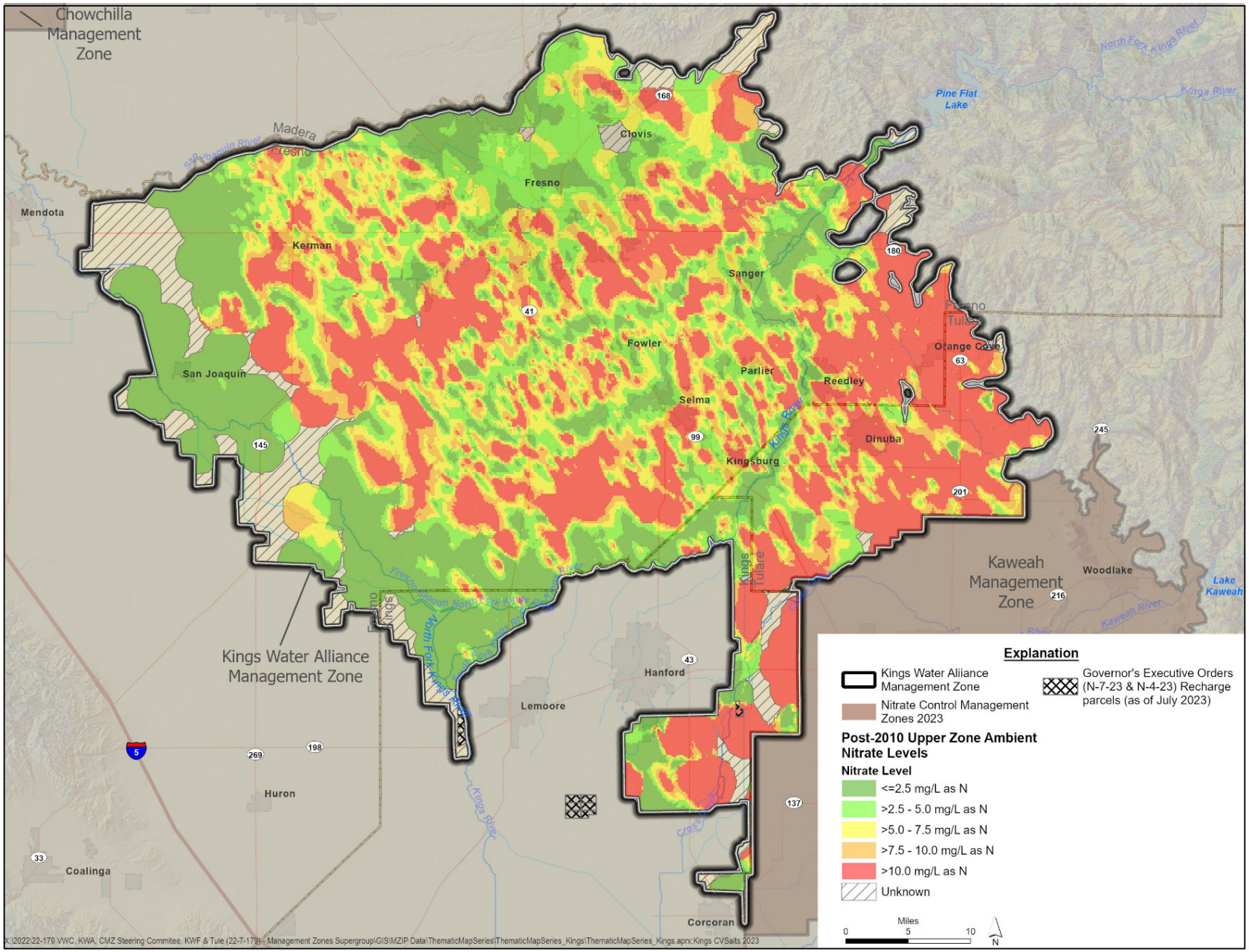


Figure 6-2. Locations of Surface Water Diversion Intentional Recharge from the Governor's Orders (2023) in the Kings Management Zone

Table 6-2. Summary of Surplus Flood Flow Diversions and Recharge Operations in Kings Priority 1 Management Zone			
Report Date	Diverter Name	Acre Feet	Acres
3/23/2023	AST Farms LLC	720	239
3/29/2023	Stone Land Co	5400	620
3/23/2023	Terranova Ranch Inc.	75150	1015
3/23/2023	Toor Farming Laton	870	96

6.2.1.3. Groundwater Quality Considerations in the Vicinity of Recharge Sites

Restoration efforts have the long-term objective of improving groundwater quality conditions. Short-term responses to intentional MAR projects can also have the effect of mobilizing legacy nitrogen in the unsaturated zone and/or causing nitrate in shallower groundwater near, for example, a Flood-MAR location to migrate downgradient at an increased rate compared to non-project recharge conditions. While groundwater replenishment and restoration are long-term benefits, it is prudent during pre-project planning to evaluate and characterize potential receptors in the recharge area to avoid or mitigate unplanned short-term impacts.

The following checklist is for consideration prior to the implementation of PMAs and particularly long-term groundwater recharge operations. This checklist does not replace California Environmental Quality Act or other local/state/federal permitting and reporting requirements and is not meant to be all-inclusive of the parties or beneficial users or uses of groundwater that may be impacted by the implementation of PMAs.

General Information

1. Location of activities (latitude/longitude)
    a. Address (street number, city, county, zip code)
2. Land Use Authority
3. General Plan land use designation
    a. Description of land use
    b. Zoning

Are these within 1 mile of the proposed activities?

1) City(ies)/community(ies)
2) Disadvantaged Community(ies) per SB535 (https://oehha.ca.gov/calenviroscreen/sb535)
3) California Native American tribal affiliation(s):
4) Community group(s):
5) Water provider(s)/utility(ies)
6) Public space(s) (e.g., parks, trails, greenbelts, etc.)

7) Private well(s):
    a. Depth of well(s)
    b. Other construction information (age, screen depths, presence/absence of sanitary seals, etc.)
8) Public water system(s)
    a. Surface water intake(s)
    b. Depths of well(s)
    c. Other construction information (age, screen depths, etc.)
9) Surface water supply(ies)
10) Known historical, archaeological, paleontological, or unique geological resource(s)
11) Habitat(s), including protected wetlands or migration corridors
12) Candidate, sensitive, or special status species
13) Other parties that may be impacted by activities
14) Regulated facility sites/operations (historical or current)
15) Contamination associated with regulated facility sites

Distance to Existing Monitoring Wells?

16) Locations of nearest existing monitoring wells to the proposed project site
17) Available groundwater quality information in the vicinity of the project site
18) Available groundwater level information in the vicinity of the project site

6.2.2. Strategies for Pumping and Using Shallow Nitrate-Effected Groundwater for Non-Potable Beneficial Uses

Restoration activities can also include strategies to pump and use shallow nitrate-affected groundwater for non-potable beneficial uses. In areas where shallow groundwater is available but has been impaired by nitrate, this groundwater may still be beneficial for other uses, particularly to meet agricultural water demands, as long as other constituents, such as salinity, do not preclude its potential use for this purpose. Even if shallow groundwater has elevated salts, a shallower water source could potentially be blended to achieve the desired quality for non-potable uses. By strategizing ways to use nitrate-impaired groundwater, the nitrate removed from the groundwater system facilitates other efforts to achieve restoration by recharging surplus low-nitrate stormwater or flood flows to the groundwater system.

6.2.3. Other Potential Approaches

The restoration approaches described in this section are only some of the possible strategies that may be available to achieve the Nitrate Control Program management goal. It is anticipated that in the future innovative strategies and new technologies may be identified to address restoration where reasonable, feasible, and practicable.

6.3. Evaluation of Restoration

The progress and effects of restoration activities on improving groundwater quality will be measured through the implementation of the Management Zone Surveillance and Monitoring Program (see Section 7). The changes in nitrate concentration over time in areas where restoration activities occur will be identified in the five- and ten-year MZIP reports.

To achieve compliance with Nitrate Control Program's Goal 3 to: "implement long-term, managed restoration of impaired water bodies", it is anticipated that several interim milestones will need to be conducted throughout implementation of the Program to ultimately achieve Goal 3, as reasonable, feasible or practicable. These interim milestones are described below.

6.3.1. Interim Milestone 1: Management Zone and GSA Collaboration and Coordination

As discussed above, there are many synergies between the Management Zone's interest in restoration approaches that maintain or improve groundwater quality and the GSAs' interests in replenishing groundwater supplies and/or maintaining or improving groundwater quality. Collaboration between the entities has been initiated already (see **MZIP Section 8**), and future collaboration will facilitate mutually beneficial outcomes. With the updated ambient nitrate groundwater conditions, it will be beneficial to both groups to meet, discuss GSP recharge-related project priorities, and determine how GSP project priorities and the timing of such projects also address overall Management Zone interests for achieving Goal 3. Management Zone and GSA collaborative interests could also explore other restoration efforts that may also be mutually beneficial to both groups. This could include recharge projects involving streamlined permitting facilitated through such actions as occurred in 2023 with the Governor's Executive Order, or comparable future directives.

6.3.2. Interim Milestone 2: Management Zone Tracking of Planned and Implemented Recharge Projects

As GSP implementation continues and planned recharge projects transition to implemented projects, it will be beneficial for the Management Zone to be apprised by the GSA of recharge project progress, i.e., project site pre-characterization especially baseline groundwater quality conditions, recharge source water quality and volumes recharged, and monitoring conducted during recharge project implementation. Both groups will benefit from ongoing tracking and measurement of the benefits occurring in response to recharge project implementation.

6.3.3. Interim Milestone 3: Reporting Actions and Progress Related to Restoration

The Basin Plan's Exceptions Policy requires the preparation of a status report every five years summarizing compliance with the terms and conditions of the exception. As explained in MZIP **Section 9**, each Five-Year Exceptions Status Report will address this requirement, including information that would normally be included in the Management Zone's regular Annual Progress Report. Each Five-year Exceptions Status Report will also include updates on findings from Surveillance and Monitoring Program-related analyses

(see **MZIP Section 7**). Since the Management Zone Surveillance and Monitoring Program's purpose focuses on assessing whether the MZIP, "when implemented is achieving the expected progress towards attainment of management goals," the Five-Year Exceptions Status Report cycle provides a reasonable interval for assessing changes in groundwater quality conditions in response to implementation of restoration projects. As described above, many GSP-related recharge projects are planned or are already being implemented. Benefits to both groundwater replenishment and groundwater quality improvements are anticipated to occur through these local efforts. It will be useful to the Management Zone to receive the information described in Interim Milestone 2 from GSAs and for the Management Zone to then provide an update in the Five-Year Exception Status Report on the co-benefits achieved by both groups through local recharge or other restoration projects. The Five-Year reporting cycle would provide an ongoing means for the Management Zone to report on progress towards achieving Nitrate Control Program Goal 3.

SECTION 7.
Surveillance and Monitoring Program (SAMP)

7.1. General SAMP Approach

There are many different monitoring programs already being conducted within the Management Zone (and throughout the Central Valley). The Surveillance and Monitoring Program approach for the Management Zone aims to utilize existing long-term programs that may be tailored specifically to meet the needs of the MZIP. In particular, the Management Zone plans to largely rely on the Central Valley Region SAMP approved in 2023. The Central Valley Salinity Coalition, the lead entity responsible for implementing the Central Valley Region SAMP, submitted the Central Valley Region Salt and Nitrate Control Program, Surveillance and Monitoring Program Workplan, and Quality Assurance Project Plan (QAPP) (CVSC 2023) to the Central Valley Water Board. On March 23, 2023, the Central Valley Water Board approved the SAMP Workplan, indicating it "adequately addresses the Salt and Nitrate Control Program requirements in both of the Central Valley Water Board Basin Plans."

The Central Valley Region SAMP addresses both legacy and ongoing salt and nitrate accumulation issues in groundwater and salinity concerns in surface waters. The primary focus of early actions being implemented under the Nitrate Control Program (i.e., the first ten years) is on groundwater quality and, in particular, nitrate impacts to drinking water supplies. Background information on the Central Valley Region SAMP and the proposed Management Zone SAMP approach for the Priority 1 Management Zones is described in **Appendix SAMP** and includes the full Central Valley Region SAMP Workplan. The Central Valley Region SAMP Workplan contains a thorough explanation of the planned groundwater monitoring network and technical analyses planned to implement the SAMP at the regional scale. This Section summarizes the Management Zone-specific SAMP components applicable to the Kings Management Zone.

7.1.1. Management Zone Implementation Plan SAMP Requirements

The Nitrate Control Program requires that the MZIP include a SAMP. Specifically, the MZIP must include:

> *"A water quality surveillance and monitoring program that is adequate to ensure that the plan when implemented is achieving the expected progress towards attainment of management goals. All or parts of the surveillance and monitoring program may be coordinated or be part of a valley-wide and/or regional groundwater monitoring, if appropriate."*

The approved Central Valley Region SAMP provides many components that achieve the required objectives for the MZIP SAMP. Accordingly, the MZIP presents a two-pronged approach to meeting the MZIP SAMP objectives.

1. **Central Valley Region SAMP (Appendix - SAMP)**: The Management Zone will utilize subbasin scale information already being addressed by the Central Valley Region SAMP to track and report on groundwater quality trends and conditions at the regional scale.

2. **Management Zone Implementation SAMP**: The Management Zone will use a subset of the monitoring well network included in the Central Valley Region SAMP to further track and assess expected progress towards the attainment of management goals, including nitrate reduction and long-term managed aquifer restoration to maintain or improve groundwater quality conditions specifically at the Management Zone scale. The Management Zone monitoring network would focus on wells that have been vetted for use in robust monitoring programs administered by the USGS/State Water Board GAMA and the agricultural coalitions as part of the ILRP GQTM Program (i.e., wells with known well construction information) and also have some prior monitoring history, which will facilitate assessment of local groundwater quality trends. The Management Zone will also include domestic wells that must be resampled on an annual basis as part of the Management Zone domestic well testing program (see Section 3) to supplement these other program datasets as needed.

7.1.2. Central Valley Region and Management Zone SAMP Coordination

The Central Valley Region SAMP requires that the CVSC periodically submit a SAMP Assessment Report The groundwater portion of this Assessment Report, in particular the objectives and planned content, align directly with the reporting already being implemented for the ILRP Coalitions. Specifically, ILRP Coalition reports already encompass: (1) ILRP GQTM Networks; (2) GAMA well network proposed for inclusion in the Central Valley Region SAMP; and (3) the significant numbers of other wells with publicly available data that may provide supplemental nitrate and salinity data.

As described in the MZIP SAMP requirements, the Central Valley Region SAMP has related objectives to the Management Zone SAMP. The Central Valley Region SAMP covers assessment of the Kings Management Zone in the context of regional conditions, including surrounding subbasins. The Management Zone SAMP will be able to use similar existing monitoring networks and methods to track nitrate trends and groundwater conditions at the local scale and assess progress in achieving overall Nitrate Control Program goals in the Management Zone.

7.2. Management Zone SAMP Monitoring Network

7.2.1. Overview of Available Monitoring Network

The Central Valley Region SAMP includes three categories of wells for tracking ambient conditions and trends. Of particular interest for the Kings Management Zone SAMP is the category called “Formal SAMP Representative Trends Network of Wells.” The wells in this category are derived from the vetted subset of monitoring wells that are in the USGS/State Water Board and ILRP GQTM Networks. The Kings Management Zone includes many wells that are monitored already as part of these two networks, including 155 GAMA wells and 86 GQTM wells (at the time of the development of this MZIP). Nitrate data from existing monitoring wells would be used to assess ambient conditions and trends in the Upper Zone, while giving some consideration to Lower Zone groundwater quality to help inform the big picture.

As required by the State Water Board DDW, community water supply wells are required to periodically test groundwater to ensure it meets water quality objectives. The Kings Management Zone includes

approximately 613 community water system wells with nitrate results (at the time of the development of this MZIP). While these wells typically have a historical monitoring record, their status and sampling schedule may change due to water quality conditions, including impairment. As described below, a subset of these wells is proposed for tracking nitrate trends in the Kings Management Zone.

Additionally, the Kings Management Zone includes many additional wells monitored as part of the ILRP Drinking Water Well Testing Program (3973 wells) and Management Zone well testing (437 wells) conducted as part of EAP implementation efforts (at the time of the development of this MZIP). ILRP landowners are required to conduct (or arrange for others to conduct) private drinking water well testing annually for three years. If sample results are lower than 8 mg/L nitrate as N, sampling may be conducted every five years. If nitrate test results exceed 8 mg/L, annual testing is required unless the well is taken out of service or no longer used for drinking water. The Management Zone is required to perform repeat testing of drinking water wells when well tests conducted by the Management Zone have nitrate concentrations exceeding 7.5 mg/L nitrate as N. Although nitrate results from wells in the ILRP Drinking Water Well and Management Zone Well Testing Programs provide valuable information on groundwater quality produced at specific locations, the monitoring record is typically very short due to the newness of these programs, and there is no corresponding well construction information. While these wells are not the focus of the Management Zone SAMP, to the extent data gaps are identified during MZIP implementation, these programs may provide suitable monitoring well candidates for incorporation in the ongoing MZIP SAMP program.

Figures 7.1, 7.2, and **7.3** show the distribution of the GAMA and GQTM wells, State Water Board DDW wells, and ILRP Drinking Water Well Testing Program and Management Zone Well Testing Program in the Kings Management Zone.

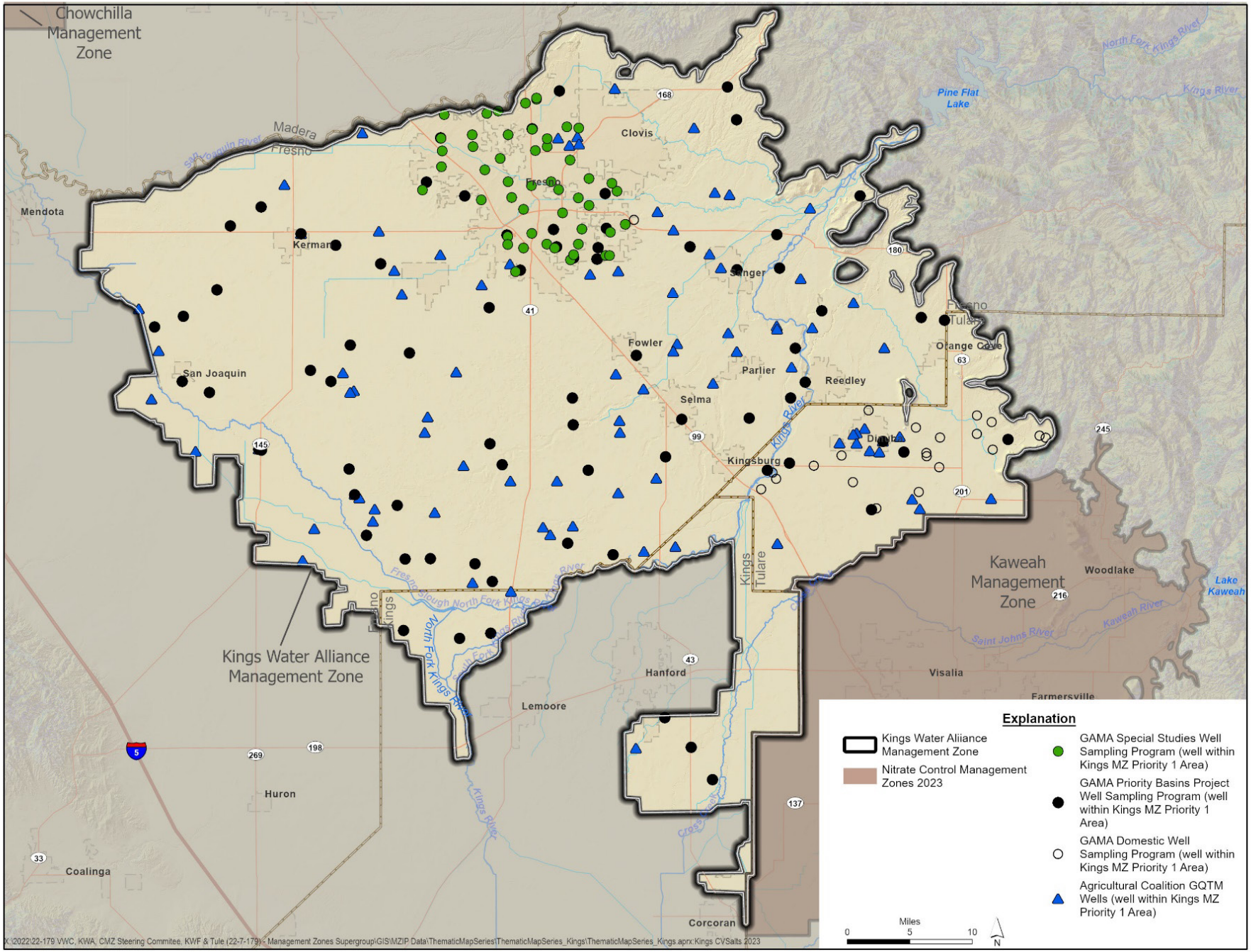


Figure 7-1. Kings Management Zone: GAMA and GQTM Wells

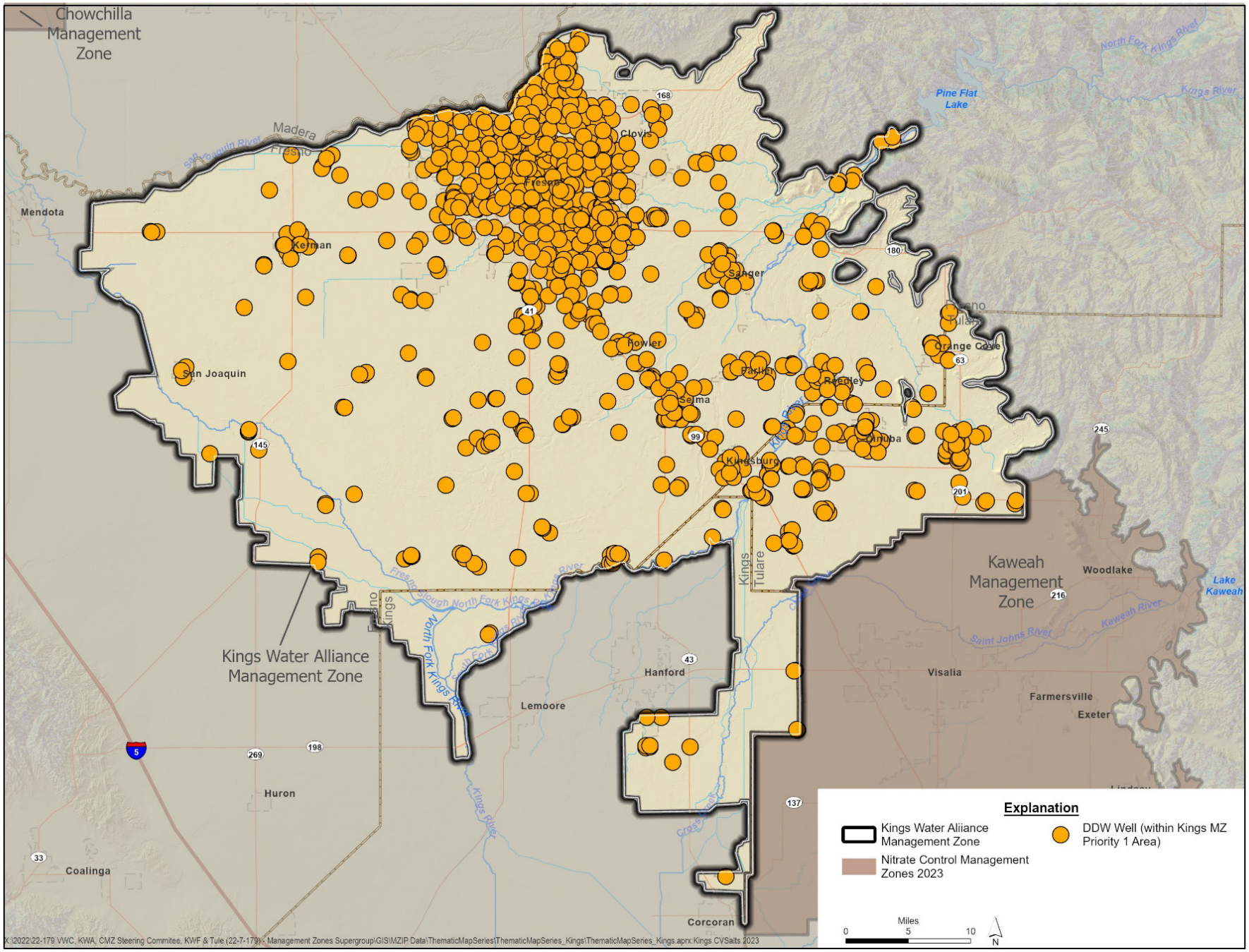


Figure 7-2. Kings Management Zone: State Water Board DDW Wells

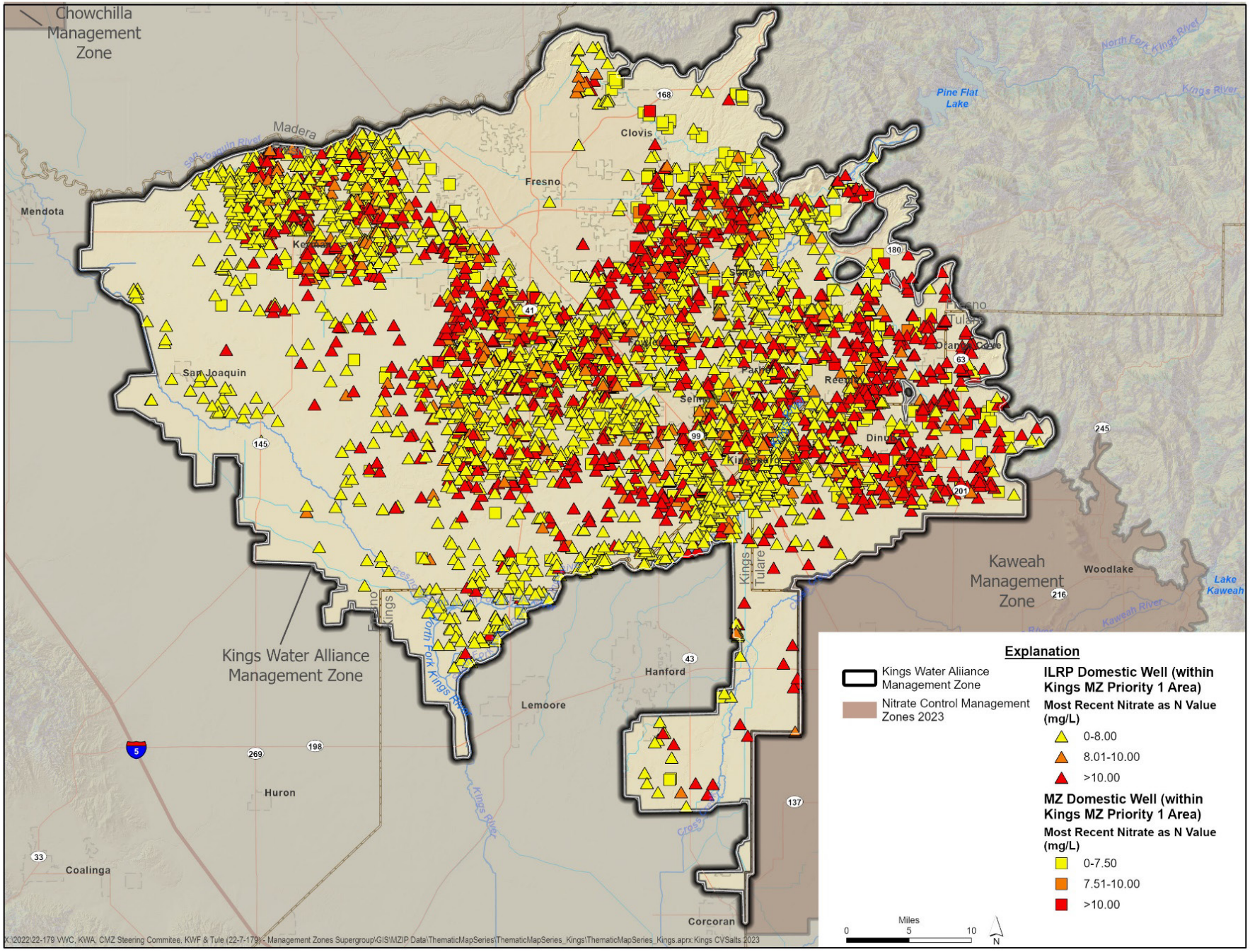


Figure 7-3. Kings Management Zone: ILRP Drinking Water Well Testing Program and Management Zone Domestic Well Testing

7.2.2. Management Zone SAMP: First Five Years

For purposes of achieving the Management Zone SAMP objectives, the Kings Management Zone SAMP monitoring network will focus on the use of data from the USGS/State Water Board GAMA and the ILRP GQTM monitoring programs. The GAMA wells include: Special Studies Well Sampling Program, Priority Basins Project Well Sampling Program, and Domestic Well Sampling Program (see **Appendix - SAMP**). The Kings Management Zone monitoring network will emphasize monitoring wells where sufficient historical data have been collected to perform trend analyses. The analyses will focus on nitrate groundwater conditions in the Upper Zone. However, based on the proposed networks and the objectives of the Central Valley Region SAMP, some consideration will be given to changes in nitrate trends in the Lower Zone of the groundwater system.

Since the GAMA and GQTM monitoring programs are still quite young and may not immediately provide sufficient time-series records to be used alone during the first five years of Management Zone implementation. For this reason, during the first five years of Management Zone implementation, in addition to the GAMA and GQTM wells, the Management Zone SAMP would review and track nitrate trends in State Water Board DDW wells that have a historical monitoring record and have exhibited increasing trends in nitrate concentrations. As additional data become available for the GAMA and GQTM wells, these wells would be the focus for reviewing and tracking trends in the Kings Management Zone and assessing progress in achieving overall Nitrate Control Program goals.

The Kings Management Zone has 77 State Water Board DDW wells where increasing nitrate trends have been observed and would be used in conjunction with the GAMA and GQTM wells to assess local nitrate groundwater conditions for the first five years (**Figure 7.4**). **Figure 7.5** shows the GAMA, GQTM, and State Water Board DDW wells with increasing nitrate trends in the Kings Management Zone that are currently monitored and provide coverage for local evaluation of progress towards attainment of Nitrate Control Program goals.

7.2.3. Existing Monitoring Wells and Quality Assurance Project (QAPP) Provisions

The Kings Management Zone SAMP will rely on existing monitoring programs as the basis for the local SAMP trend monitoring network. Therefore, new monitoring wells are not envisioned as part of the Management Zone SAMP.

Quality Assurance Project Plan provisions are accounted for through the existing monitoring programs that are the basis of the Central Valley Region Management Zone Trend Well Network (**Appendix – SAMP**). No additional QAPP is proposed for the Management Zone SAMP.

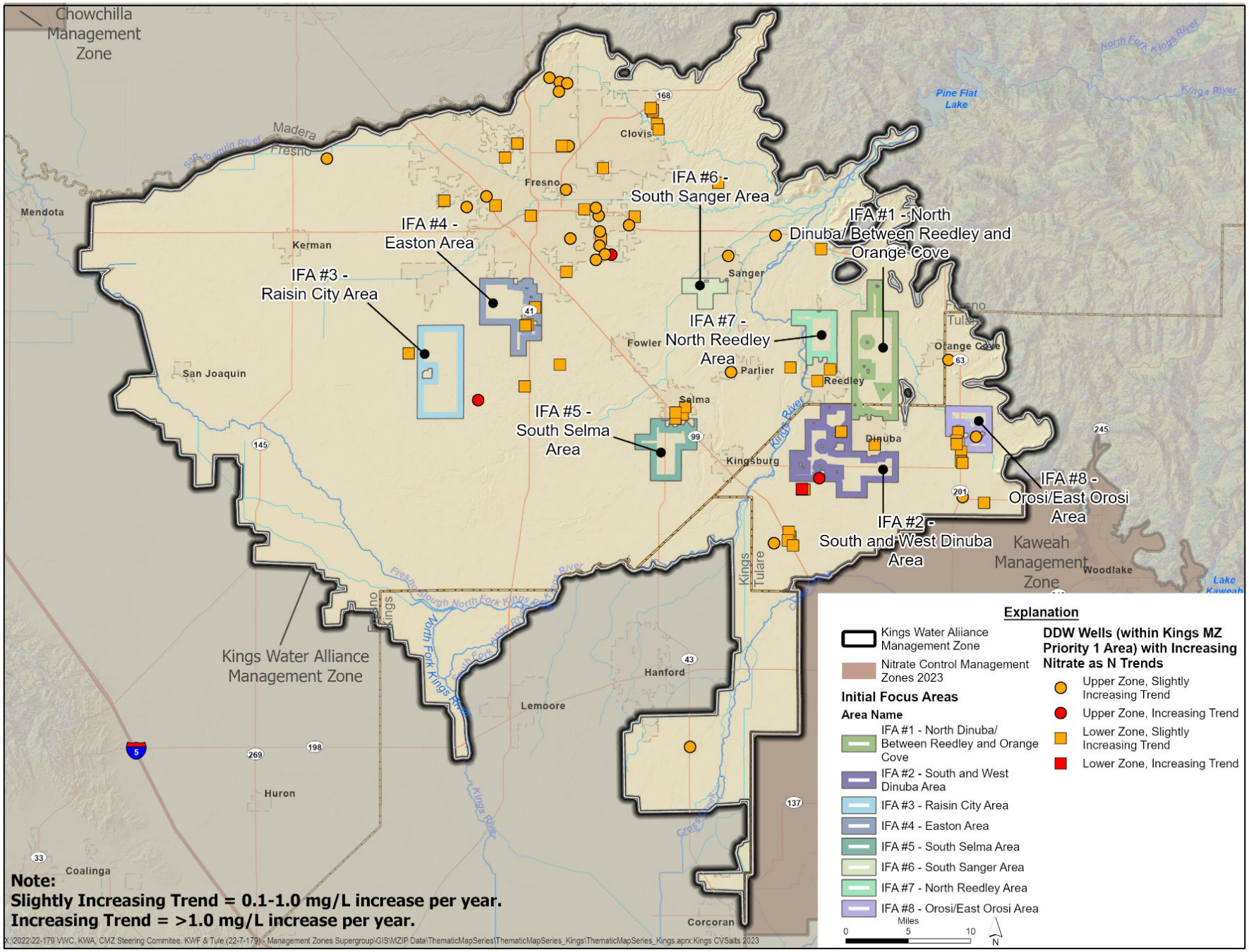


Figure 7-4. Kings Management Zone: State Water Board DDW Wells with Increasing Nitrate (as N) Trends and Initial Focus Areas

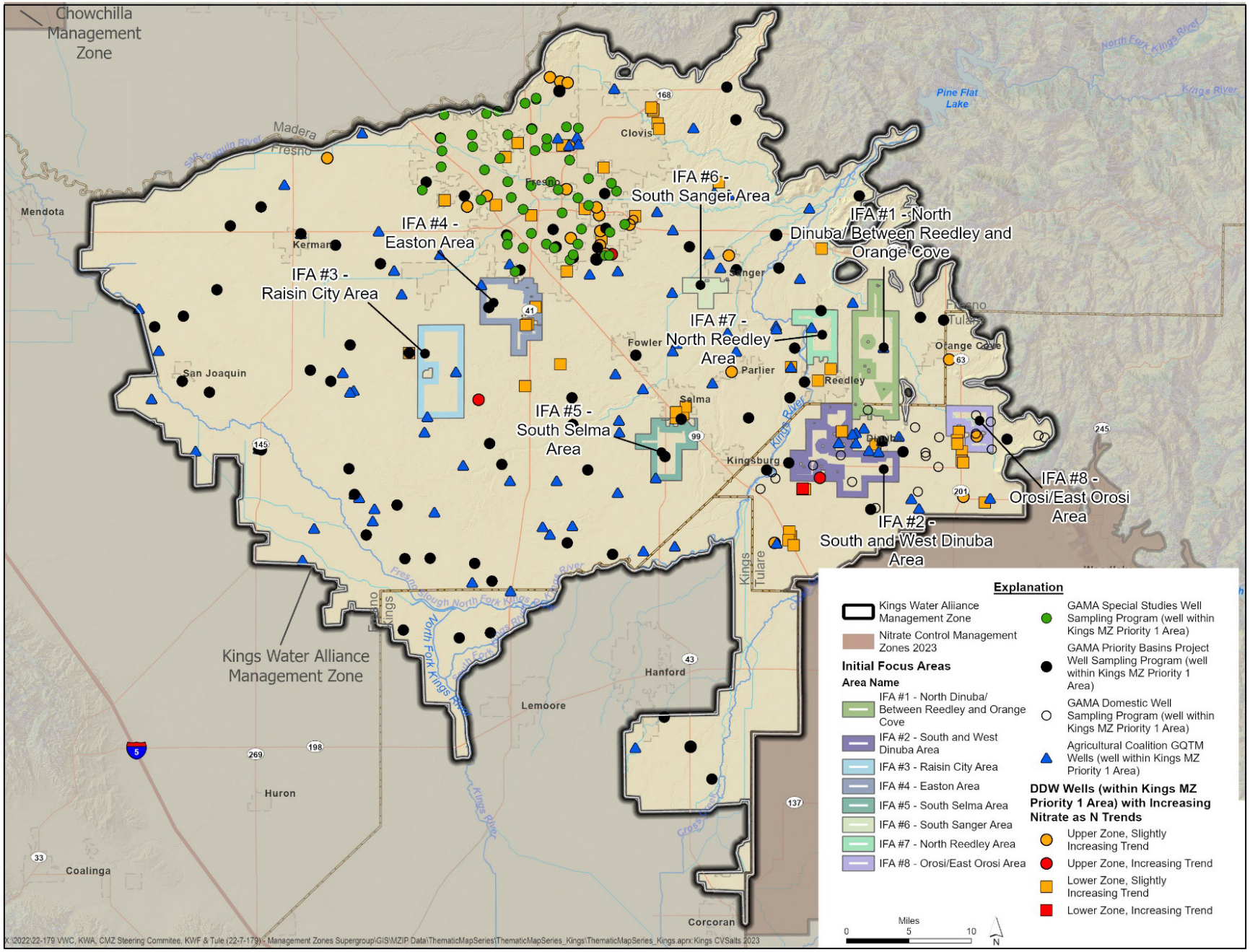


Figure 7-5. Kings Management Zone: GAMA, GQTM and State Water Board DDW Wells with Increasing Nitrate (as N) Trends

7.3. Management Zone Coordination

7.3.1. Central Valley Region SAMP

The Central Valley Region Formal SAMP Representative Trends Network is dynamic since the dataset and corresponding trend monitoring well network are anticipated to grow over time. Future nitrate trend analyses will also incorporate and utilize data and analyses resulting from monitoring conducted for other programs, including Sustainable Groundwater Management Act (SGMA) compliance (i.e., Groundwater Sustainability Plan (GSP) monitoring networks) and Nitrate Control Program Management Zone implementation. The monitoring networks designated for Management Zone SAMP purposes provide multiple benefits by supporting groundwater quality assessments at both the regional (Central Valley) and local (Management Zone) scales.

7.3.2. Coordination with GSAs and Other Local Entities

To comply with SGMA, GSAs located in the Kings Subbasin have developed GSPs that include groundwater quality monitoring networks and track sustainable management criteria. GSAs must ensure that groundwater is managed to avoid significant and unreasonable effects that degrade groundwater quality or exacerbate existing groundwater quality conditions, including the migration of contaminant plumes that impair water supplies. The Kings Management Zone has developed a refined understanding of the occurrence and distribution of elevated nitrate conditions in groundwater for the Upper Lower and Below Lower Zones. Coordination among the Kings Management Zone, GSAs, and other local entities will facilitate groundwater management strategies to maintain or improve groundwater quality conditions.

7.3.3. Coordination with ILRP

As described above, ILRP member landowners are required to conduct private drinking water well testing in accordance with ILRP Waste Discharge Requirements applicable to irrigated lands within the Management Zone. The Kings Management Zone will continue to coordinate with the ILRP program constituents regarding the well testing conducted by or on behalf of individual landowners. Coordinated efforts between the Management Zone and the required ILRP testing will seek to ensure that eligible residents affected by nitrate levels in groundwater that exceed 10 mg/L nitrate as N have access to safe drinking water.

7.4. SAMP Reporting and Schedule

The Basin Plan's Exceptions Policy requires the preparation of a status report every five years summarizing compliance with the terms and conditions of the exception. As explained in MZIP Section 9, each Five-Year Exceptions Status Report will address this requirement, including information that would normally be included in the Management Zone's regular Annual Progress Report. Each Five-year Exceptions Status Report will also include updates on findings from SAMP-related analyses.

Since the Management Zone SAMP's purpose focuses on assessing whether the MZIP, *"when implemented is achieving the expected progress towards attainment of management goals*," the Five-Year Exceptions Status Report cycle provides a reasonable interval for assessing changes in groundwater

quality conditions in response to implementation of sector-based Nitrate Reduction Programs. Because the first 10 years of MZIP implementation involves improved data collection and sector-specific efforts to initiate activities to achieve reductions in nitrate loading, and since changes in groundwater quality are anticipated to occur slowly, the following is proposed for SAMP reporting in Management Zone Status Reports at five-year intervals. Nitrate data from the Management Zone SAMP network would be used to assess ambient conditions and trends in the Upper Zone, while giving some consideration to Lower Zone groundwater quality to help inform the big picture.

First Management Zone Five-Year Exceptions Status Report:

- Table of findings for Trends Well Network (GAMA, GQTM, and State Water Board DDW well network, for wells with statistically increasing nitrate concentrations). Table to include (but is not limited to) for each well: a period of record; number of sampling events; most recent nitrate result; minimum/maximum/and average nitrate concentration; and statistical result for most recent Mann-Kendall nonparametric trend analysis.
- Management Zone map shown and the Trends Well Network symbolized to show nitrate concentrations and statistical results for nonparametric trend analysis.
- Summary of results, including key findings and identification of data gaps (if applicable relative to SAMP objectives). If data gaps are identified, steps and a timeline to address data gaps will be included.

Subsequent Management Zone Five-Year/Ten-Year Exception Status & Assessment Report:

- Same content as above for Five-Year (but with a focus on GAMA and GQTM well network, as appropriate and supplemented by other well networks possibly including State Water Board DDW and/or GSP monitoring wells); and
- Following the first Central Valley Region SAMP Groundwater Assessment Report submittal and approval (submittal due date November 30, 2031), the Management Zone Five Year/Ten-Year Exceptions Status Reports would include a summary of any additional nitrate groundwater quality findings relevant to the Management Zone area and attaining Nitrate Control Program goals.

SECTION 8.
Outreach and Engagement

8.1. Outreach During PMZP and FMZP Developments

The Kings Water Alliance (KWA) PMZP and FMZP discussed community outreach activities completed since the development of the EAP, with much more detail on outreach provided in the EAP. Activities completed during the development of the PZMP and the FZMP included several community outreach meetings to encourage public participation. These meetings addressed questions about the Nitrate Control Program and EAP and why impacted residents should get involved. Other efforts included email updates, direct mailers, in-person canvassing, social media developments, and radio outreach.

The Early Action Plan (EAP) detailed the activities designed to encourage community outreach. Those activities included outreach meetings; public meetings notices for each meeting; community surveys aimed at impacted residents soliciting feedback on preferred immediate drinking water solutions; the development of a KWA Management Zone website; and EAP public review opportunities.

The FMZP document describes in detail the completed outreach activities during EAP implementation occurring during FMZP development. These included six public meetings, outreach at multiple food banks and World Water Day at Fresno State University; 25 email campaigns to interested parties; logging of website activity; five direct mailing events; flyer distribution events; six in-person canvassing events; social media presence on Facebook and Instagram; online videos, radio outreach, and news media releases on two occasions.

As a result of outreach activities during PMZP and FMZP development, 366 domestic wells were tested for nitrate, 235 households received replacement bottled water deliveries, and 340 gallons per day of safe drinking water via fill stations were made available (as of August 1, 2022). Targeted outreach continued for those residents in portions of the Management Zone identified as affected by greater than 7.5 mg/L ambient nitrate in the Upper Zone of the aquifer system. Outreach activities included direct mailers to notify residents of community events, free well testing and bottled water, and fill station availability.

Outreach activities completed to date, including those activities performed during PMZP and FMZP development are included in **Appendix O**. **Appendix O** also contains the KWA Community Engagement Communication & Outreach Plan (Updated August 2023) which details the strategies for engaging with the public through outreach activities.

8.2. Outreach During MZIP Development

On February 28, 2023, the Priority 1 Management Zones were notified by the Central Valley Water Board to submit their respective MZIPs no later than September 5, 2023, or within about six months. Given the limited time to prepare all required program elements, especially the Long-term Drinking Water Solutions and Nitrate Reduction Programs, the opportunity for community outreach was limited during preparation of the MZIP. However, during preparation of the MZIP the Management Zone coordinated with key Management Zone stakeholders and conducted outreach with its participants to receive early input on proposed approaches to develop long-term drinking water solutions and reduce nitrogen loading to

achieve Nitrate Control Program goals in the Management Zone. **Appendix O** contains other information about outreach activities performed during MZIP development. Following is a summary of key coordination and outreach activities that occurred during MZIP development:

Briefings to Central Valley Water Board Staff

The Priority 1 MZIPs are the first of these types of plans prepared under the Central Valley Region's Nitrate Control Program. Accordingly, no existing MZIPs exist that may be used as examples of appropriate content to comply with all Nitrate Control Program requirements. During MZIP development, the Management Zones briefed the Central Valley Water Board staff on three occasions to present concepts for establishment of the Long-term Drinking Water Solutions and Nitrate Reduction Programs. These briefings provided opportunities for the Management Zones to resolve questions regarding interpretation of Nitrate Control Program regulations and work towards ensuring that the MZIPs, when submitted, were consistent with the regulations.

Briefings to Representatives of the Environmental Justice Community

The Management Zones held two meetings with representatives of the Environmental Justice Community (Community Water Center, Clean Water Action, Environmental Law Foundation, Leadership Counsel for Justice and Accountability, and California Rural Legal Assistance) to present the approaches planned for development of the Long-term Drinking Water Solutions and Nitrate Reduction Programs. The meetings provided opportunities to receive preliminary comments on the proposed programs and answer questions from meeting participants.

Coordination among Priority 1 Management Zones

Throughout MZIP development, the Priority 1 Management Zones worked collaboratively on a number of programmatic issues to encourage consistency in how key components of the MZIP would be implemented in each Management Zone. For example, the effort was made to ensure that growers or dairies in one Priority 1 Management Zone would be implementing the same Nitrate Reduction Program applicable to growers or dairies in another Priority 1 Management Zone (which may be geographically adjacent). The value in this approach is that permitted dischargers regardless of the Management Zone will be able to work collaboratively to achieve the same interim milestones at the same time. This approach will increase the overall effectiveness and efficiency of efforts to reduce nitrogen loading in all Priority 1 Management Zones.

Coordination and Outreach with Management Zone Participants During development of this MZIP, the Management Zones worked collectively to outreach to representatives of ILRP Coalitions and dairy, bovine and poultry participants to advise them of Nitrate Control Program requirements for development of a Nitrate Reduction Program designed to meet the Program's nitrate management goals. Outreach included discussions regarding Basin Plan requirements to obtain an Exception from the nitrate water quality objective. Through these outreach activities, the Managements Zones crafted Nitrate Reduction Programs (see Appendices NRP-1 through NRP-4) that are designed to meet Nitrate Control Program goals. In addition, the Management Zones also coordinated with representatives of Non-15 Program permitted facilities to further characterize the diversity of types of permitted facilities (e.g., wastewater treatment facilities vs. various types of food processors) within the Management Zones and variability of existing effluent quality. Findings from these coordination activities and other outreach activities were

used to develop preliminary nitrogen loading estimates and develop a Nitrate Reduction Program that considers the diversity of permitted dischargers in Priority 1 Management Zones.

Outreach to Groundwater Sustainability Agencies (GSAs)

KWA staff provides updates regularly at Board Meetings for the KWA (monthly), Kings River Conservation District (KRCD), and Kings River Water Quality Coalition (every other month). Staff and/or representatives for the following GSAs serve on one or more of these Boards: James ID GSA, North Kings GSA, North Fork Kings GSA, South Fork Kings GSA, and El Rico GSA. In October 2021, the KWA presented at the Easton Domestic Well Owner Workshop held in partnership with the Easton Community Services District, North Kings Groundwater Sustainability Agency, Self-Help Enterprises, and County of Fresno Department of Public Health. Attendees received a five-minute flash presentation from each agency that provided attendees with an overview of unique services provided to domestic well owners. The KWA is hoping this workshop partnership model will be replicated in additional KWA communities in cooperation with the GSAs. The KWA will seek to further partner with Groundwater Sustainability Agencies for outreach and engagement opportunities. Additionally, the KWA is exploring coordination opportunities with GSAs related to well permitting and mitigation activities.

Outreach to Other Governmental Entities Responsible for PWS

The Management Zone conducted preliminary outreach activities where possible with some of the entities within the Management Zone boundaries that are responsible for regulating PWS. Consequently, where such outreach has already begun, these entities have already been advised the Nitrate Control Program's goals and the plan that has been incorporated into this MZIP to work collaboratively on the identification and implementation of long-term drinking water solutions.

8.3. Planned Outreach During MZIP Implementation

Outreach associated with the Emergency & Interim Drinking Water Program (formerly the EAP) is ongoing now and will continue with no interruption with submittal of this MZIP. During MZIP implementation, outreach will also occur to support implementation of the Long-term Drinking Water Solutions and sector-based Nitrate Reduction Programs. Outreach associated with each of these programs will begin as soon as possible following MZIP submittal (September 5, 2023), as described below.

8.3.1. Outreach Associated with the Long-Term Drinking Water Solutions Program

Outreach associated with facilitating Long-Term Drinking Water Solutions is described in detail in **Appendix LT-2**, as well as in Section 4 of the MZIP document, and summarized here. Outreach and coordination are planned to occur between the Management Zone and community leaders, GSAs, Counties/Local Agency Management Programs (LAMPs), State Water Board DDW, Environmental Justice Community, community organizations, technical service providers, and the public residents within the Initial Focus Area9s) and overall Management Zone area). The anticipated outreach and engagement pathway is shown in **Figure 8-1**. Outreach associated with development of long-term drinking water solutions will consider all of the possible drinking water solutions while conducting meaningful engagement with the community and stakeholders. Workshops, public meetings, round table discussions, and surveys (written, online, or phone surveys) will be conducted by the Management Zone to solicit input

regarding potential drinking water solutions. Starting with the Initial Focus Areas, outreach will be conducted the entire time that solutions are being explored, discussed, considered, and analyzed for feasibility prior to selection and implementation.

The following activities are examples of anticipated outreach efforts associated with long-term drinking water solutions:

- Management Zone website updates regarding drinking water solutions and outreach activities;
- Development of printed information;
- Distribution of mailers and postings (to inform residents within Initial Focus Areas of the planned outreach activities; sending mailers to be distributed containing surveys to identify interest in participating in the Nitrate Control Program for safe drinking water solutions; and other public education programs focusing on investigating consolidation/intertie to existing water systems, establishing new water systems, pilot programs for POU/POE and potable water fill stations, etc.)
- Hosting a series of public meetings to inform the public on the program and engage in a robust dialogue with members of the public directly affected by the long-term drinking water solutions, where the Management Zone will solicit feedback and input from the public to better understand the preferred drinking water solutions. Open houses, fact sheets, presentations, and websites may be utilized to hold these public meetings.

The following steps will be taken to have meaningful engagement with the community and residents in the Initial Focus Areas and the Management Zone:

- Identify Stakeholders: The stakeholders have already been identified through the development of the Preliminary and Final Management Zone Proposals, and the Management Zone will continue to identify additional stakeholders through the MZIP outreach process.
- Inform Stakeholders: The purpose of informing stakeholders is to provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities, and/or solutions. The Management Zones can inform the public about nitrate health risks, the Management Zone program, possible projects for interim and long-term drinking water solutions, and sign ups to participate in the program.
- Determine Stakeholders' Sphere of Influence: Stakeholders may be consulted, involved, collaborated with, or empowered to make decisions during the long-term drinking water solutions project selection process.
- Management Zone Advocacy: Even though the Management Zone is not a regulatory entity and thus does not have enforcement authority over the public and businesses within the Management Zone, the Management Zones do have useful information that can serve the public, businesses, and governing bodies. As such, the Management Zone plans to be actively engaged in stakeholder meetings for potential solutions-oriented projects, including public workshops.

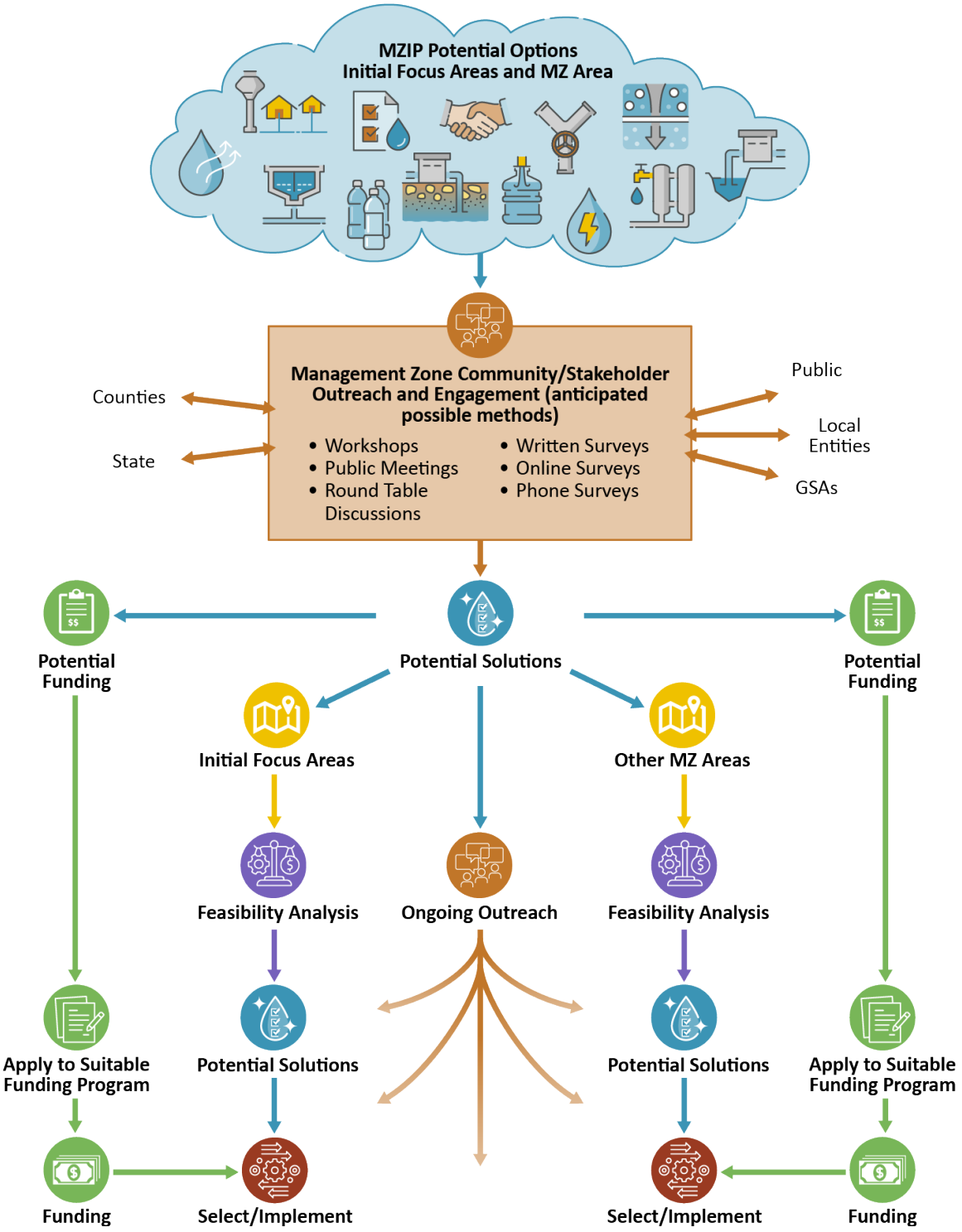


Figure 8-1. Management Zone Long-Term Drinking Water Solutions Outreach and Engagement

8.3.2. Outreach Associated with the Nitrate Reduction Programs

Outreach will occur to Management Zone Participants during implementation of the Nitrate Reduction Program, primarily by each sector. Outreach activities will include (see also Section 9):

Irrigated Agriculture

The Nitrate Reduction Program (**Appendix NRP-1**) includes an outreach and education program for growers, most of which will occur through the direction of ILRP Coalitions. Key elements for implementation during the first five- and ten-year period under MZIP Phase 1 for the Priority 1 Management Zones include:

- Focused outreach and education to Coalition growers to inform them of the Nitrate Reduction Program requirements.
- Coordination with University of California Agricultural and Natural Resources (UCANR) to provide growers in Priority 1 Management Zones with targeted assistance under the UCANR's Nitrogen and Irrigation Initiative.
- Coordination with Commodity organizations and other grower groups to inform them of the Nitrate Reduction Program requirements
- Focused outreach to Coalition growers with parcels that have three-year running totals that are not within the Applied/Removed acceptable range for that crop, based on the most recent three years of INMP summary report data.
- Focused outreach to Coalition growers in townships where the township exceeds the ILRP GWPT.

Dairies

The Dairy Nitrate Reduction Program (**Appendix NRP-2a**) includes a range of education and outreach activities using various approaches that will assist dairy producers in gaining a more detailed understanding of options and strategies for reducing nitrogen loading, including for example:

- "How-to" courses for proper use of flowmeters, sample collection methods, using new reporting forms and the web portal;
- Training in irrigation efficiency; and
- Updates on various dairy management topics including, but not limited to: new incentive programs, funding opportunities, new technology, case studies and demonstration projects.

Specific Nitrate Reduction Program outreach and education interim milestones to be achieved in the Priority 1 Management Zones during the Phase 1 MZIP implementation include:

- Within two years, dairies will need to attend an education event hosted by California Dairy Quality Assurance Program (CDQAP), or other appropriate entity, to receive information regarding the dairy Nitrate Reduction Program and the need to work towards meeting the whole-farm N balance.
- Within three years, CVDRMP, in coordination and cooperation with CDQAP, will prepare and submit an education and outreach workplan to the Management Zones for dairies located in Priority 1 Management Zones.

- Within five years, CVDRMP, in coordination and cooperation with CDQAP, will focus education and outreach efforts on dairies that are at risk of not achieving a whole-farm N balance by year ten or the end of Phase 1 of MZIP implementation.
- Within five years, and every five years thereafter, CVDRMP will document the implementation of education and outreach efforts directed toward dairies in Priority 1 Management Zones.

The CVDRMP, in cooperation and coordination with CDQAP, will help lead the education and outreach activities described above with support from other cooperating entities, including non-governmental organizational partners, government agencies such as the CDFA and the USDA Natural Resources Conservation Service, trade organizations, and others. CVDRMP will be an active partner in developing and advising content for such programs and will report on activity in this area in its future annual reports to the Central Valley Water Board and Management Zones, as applicable.

Bovine Facilities

There is a component of outreach associated with the implementation of the bovine Nitrate Reduction Program (**Appendix NRP-2b**) in which CVDRMP plans to educate and engage with bovine facilities to implement the BQAP to certify for each facility that (a) no discharge occurs from the facility during dry weather; and (b) stormwater is captured at each facility as required by the permit. The BQAP will include an environmental stewardship education program and a certification process to verify completion of education requirements.

Poultry Facilities

As noted in Section 5 and in the poultry Nitrate Reduction Program (**Appendix NRP-3**), most poultry facilities located in the Priority 1 Management Zones are permitted to operate under the Poultry General Order as Low Threat Operations. Accordingly, potential impacts to groundwater are likely to be de minimis if poultry operators are compliant with all of the permit terms and conditions applicable to these types of operations. To facilitate compliance with these permits, the poultry Nitrate Reduction Program focuses on the establishment of a Poultry Quality Assurance Program (PQAP) that is similar to the CDQAP already established for the dairy program. The PQAP would include a significant outreach and education program for poultry operators so that their facilities can be certified as compliant with the Poultry General Order.

Under the Poultry Nitrate Reduction Program, the PQAP is to be established and ready for implementation by the end of the first five years of MZIP implementation. Development of this program will include preparation of the necessary outreach and education materials to support the program. Once the PQAP is approved for implementation, all poultry operators in the Poultry 1 Management Zones will be required to be certified under the program (at least 50% by the end of MZIP Year 10 and 100% by end of MZIP Year 15). To achieve these milestones, significant outreach and education with poultry operators will be regularly ongoing.

Non-15 Program Facilities

Implementation of the Nitrate Reduction Program at Non-15 Program facilities (see **Appendix NRP-4**) is largely the responsibility of the individual facilities. During preparation of a facility-specific Nitrate Reduction Workplan (see Section 5.3.5.1), where it is necessary to conduct outreach with local communities to facilitate the development of alternatives and selection of a preferred alternative to reduce nitrogen loading, e.g., for a local wastewater facility, the permitted discharger will be responsible

for implementing the local outreach. In addition, to this local outreach, the Management Zone will conduct periodic outreach with Non-15 Program facilities to keep them informed on the activities of the Management Zone and to provide timely reminders of the schedule for implementation of interim milestones (see Section 9).

Septic Systems

For the septic system Nitrate Reduction Program (see **Appendix NRP-5**), most of the outreach activities will involve the Management Zone coordinating and requesting data from counties and local agencies to improve the understanding of the locations and amounts of septic system nitrogen loading in the Management Zone.

SECTION 9.
Implementation of the Management Zone Implementation Plan

This section summarizes the program to implement the MZIP and defines roles and responsibilities of the Management Zone and its participants to implement the program. In addition, this section describes how the Management Zone will regularly report progress implementing this MZIP.

9.1. Summary of Key MZIP Implementation Activities

The MZIP will be implemented in ten-year phases with each ten-year phase including two five-year parts. This overall ten-year phased framework was chosen purposefully to align implementation of the Nitrate Reduction Program with the five and ten-year reporting requirements associated with the authorization and reauthorization of Exceptions from the nitrate water quality objective. Some implementation activities begin immediately upon submittal of the MZIP (e.g., Emergency & Interim Drinking Water Program); others will begin by the beginning of 2024 (e.g., initial activities to begin work in the Initial Focus Areas and outreach to Management Zone participants regarding MZIP content). Other activities may not begin until the MZIP becomes effective through action by the Central Valley Water Board (e.g., incorporation of the Nitrate Reduction Program into WDRs or General Orders). The sections below provide general summaries of the phased schedule for implementation of the MZIP and the primary responsibilities for implementation. As appropriate, the reader is directed to where additional information may be found in this MZIP.

9.1.1. Emergency & Interim Drinking Water Program

As noted in Section 3, this MZIP's Emergency & Interim Drinking Water Program is a continuation of the implementation of the Management Zone's EAP. The EAP has been providing free well tests for nitrate to residents and, where needed, replacement safe drinking water to households since May 2021. **Table 9-1** summarizes interim milestones applicable to the Emergency & Interim Drinking Water Program that will be implemented under the MZIP.

9.1.2. Long-term Drinking Water Solutions Program

MZIP Section 4 describes the Long-term Drinking Water Solutions Program that will be implemented in the Management Zone. Program activity will occur in parallel in all eight of the Initial Focus Areas identified in this MZIP: (a) Initial Focus Area #1 North Dinuba/Between Reedley and Orange Cove; (b) Initial Focus Area #2 – South and West Dinuba Area; (c) Initial Focus Area #3 – Raisin City Area; (d) Initial Focus Area #4 – Easton Area; (e) Initial Focus Area #5 – South Selma Area; (f) Initial Focus Area #6 – South Sanger Area; (g) Initial Focus Area #7 – North Reedley Area; and (h) Initial Focus Area #8 - Orosi/East Orosi Area. **Table 9-1** summarizes the schedule for completion of the interim milestones to be implemented within each of these Initial Focus Areas and schedule for extension of the Program into other areas of the Management Zone.

9.1.3. Nitrate Reduction Program

Section 5 provides an overview of the Nitrate Reduction Program to be implemented by the permittees within each of the following sectors: Irrigated agriculture (Priority 1 Subbasins), dairies, bovine facilities, poultry facilities and Non-15 Program facilities. Section 5 is supported by appendices that provide additional information regarding each of the sector-based Nitrate Reduction Programs, including detailed schedules for implementation of interim milestones (see **Appendices NRP-1** through **NRP-5**).

Table 9-2 below provides a summary of the interim milestones to be implemented by the permitted dischargers[30] within each sector. In addition to these sector-specific interim milestones, all permitted dischargers participating in the Management Zone, individually or through a recognized third-party, are required to support MZIP activities directed by the Management Zone, e.g., collection of water quality data, periodic Management Zone compliance assessments, providing information to support periodic reporting efforts.

9.1.4. Other MZIP Programmatic Elements

In addition to the specific MZIP program elements summarized above, the MZIP includes additional interim milestones to be directed by the Management Zone to address other Nitrate Control Program requirements applicable to the Management Zone, including:

- Facilitating implementation of septic system Nitrate Reduction Program interim milestones through coordination with counties/entities responsible for implementation of the State's OWTS program (see **Appendix NRP-5**);
- Completing the steps required to develop and implement the Management Zone's compliance assessment program, as described in MZIP Section 5.5;
- Conducting the Management Zone's surveillance and monitoring program, as described in MZIP Section 7;
- Submitting timely progress and status reports to the Central Valley Water Board, as described in MZIP Section 9.3; and
- Administering the Management Zone, including:
    - Establishing and maintaining coordination agreements with Path A Facilities;
    - Collaborating with other Management Zones, as needed, to coordinate work on common interim milestones (e.g., compliance assessment program methodology development);
    - Regularly verifying Management Zone participant status and addressing any discrepancies with the appropriate entity, e.g., Coalition, CVDRMP, Third Party Group representative or Central Valley Water Board;
    - Communicating periodically with Management Zone participants to provide timely reminders of applicable MZIP interim milestones and notifying participants that are not

[30] The term "permitted dischargers" is intended to mean dischargers subject to individual WDRs as well as those subject to General Orders, including irrigated agricultural operations that are members in good standing of a recognized Coalition.

fulfilling the requirements of their Management Zone Participant Agreement in a timely manner to initiate efforts to resolve the issue; and

- Notifying the Central Valley Water Board in a timely manner of non-responsive Management Zone participants that are violating the terms and conditions of their Management Zone Participation Agreement.

Table 9-3 provides a summary of the schedule of implementation for each of the above MZIP programmatic elements.

9.2. Roles and Responsibilities

The KWA was established to govern the KWA Management Zone. In this role, the KWA ensures that the Management Zone has the necessary resources to oversee implementation of this MZIP. Successful implementation of the activities summarized in Section 9.1 above requires the combined efforts of both Management Zone leadership and Management Zone participants. For some activities, the Management Zone will be directly responsible for implementation of the work and meeting the MZIP schedule. In contrast, the MZIP includes many activities where the Management Zone acts in an oversight role, i.e., while the Management Zone can coordinate MZIP activities and communicate information to its participants, the Management Zone participants are directly responsible for compliance with some of the MZIP's interim milestones. Further, successful implementation of some elements of this MZIP requires collaboration with entities that are neither subject to the Nitrate Control Program nor are they formal Management Zone participants (i.e., they have not signed a Participation Agreement). While the Management Zone will do its best to facilitate collaboration with these entities, it may not have the necessary authority in some areas to make the progress needed to implement necessary solutions to implement drinking water solutions and reduce impacts to drinking water. Given this background, the following sections define roles and responsibilities of the Management Zone in its efforts to lead implementation of this MZIP in the KWA Management Zone.

9.2.1. Emergency & Interim Drinking Water Program

The KWA will continue to be responsible for implementation of the Emergency & Interim Drinking Water Program (as described in MZIP Section 3) to address wells contaminated by elevated nitrate levels within areas that are the responsibility of the Management Zone. This responsibility includes conducting outreach to the community, implementing the well testing program and providing replacement water where required. Limitations to the implementation of this program by the Management Zone include:

- *Refusal to Accept Local Long-term Drinking Water Solution* – A key goal of the Nitrate Control Program is to provide a long-term or permanent drinking water solution in areas where it is currently necessary to provide emergency or interim drinking water because of nitrate contamination in the groundwater. Once an area, residence or facility receiving replacement water has access to a permanent source of safe drinking water, then the Management Zone's Emergency & Interim Drinking Water Program will no longer provide replacement water. If the area, residence or facility refuses to accept the permanent source of safe drinking water, the Management Zone is not obligated to continue to provide replacement water through the Emergency & Interim Drinking Water Program.

- *Coordination with a Facility Complying with the Nitrate Control Program Under Path A* – The Management Zone will work to establish coordination agreements with facilities that have submitted a Notice of Intent (NOI) to comply with the Nitrate Control Program via Pathway A ("Path A Facility") and have had the NOI approved by the Central Valley Water Board. It is anticipated that the coordination agreement will define the roles and responsibilities of the Path A Facility and Management Zone with regards to providing (a) opportunity for a well test for nitrate; and (b) replacement water if the test results show that the well is contaminated for nitrate. However, since Path A Facilities are not under the Management Zone's purview, the Management Zone is only responsible for making good faith efforts towards reaching a coordination agreement with any Path A Facilities located within the Management Zone's boundary area.

9.2.2. Long-term Drinking Water Solutions Program

The KWA is responsible for the implementation of the Long-term Drinking Water Solutions Program and its interim milestones established for the Initial Focus Areas (see MZIP Section 4). In particular, this program identifies how long-term or permanent drinking water needs for those affected by nitrates in the Management Zone will be addressed. However, while responsible for the overall implementation of this program, there may be limitations to the KWA's responsibilities or abilities to provide permanent safe drinking water, including:

- *PWS Requirement to Comply with State Drinking Water Regulations* – A PWS is subject to regulation by the State Water Board DDW or other local entities. The Management Zone is not responsible for ensuring that a PWS within the Management Zone is in compliance with drinking water regulations applicable to the facility. A Management Zone is only responsible for working with the PWS to reach a solution that addresses nitrate levels.
- *Resolution of Compliance and Enforcement Actions at a PWS* – The Management Zone is not responsible for resolving any regulatory compliance and enforcement activities applicable to a PWS. However, if necessary to help implement a long-term drinking water solution in an Initial Focus Area where the non-compliant PWS is located, the Management Zone may consider helping facilitate efforts by the PWS to come into compliance.
- *Testing for Constituents Other than Nitrate* – It is recognized that to support the development of a long-term drinking water solution in an Initial Focus Area, it may be necessary to conduct testing of water for constituents other than nitrate. However, under this MZIP, the Management Zone is only responsible for testing well samples for nitrate.
- *Identification and Implementation of a Feasible Alternative of a Long-term Drinking Water Solution* – The Management Zone will work with communities and local entities to identify and evaluate feasible alternatives to provide permanent drinking water solutions within an Initial Focus Area and then work with stakeholders to select an alternative for implementation. While the Management Zone is only responsible for addressing nitrate contamination, it is recognized that selection of a feasible alternative to implement a permanent drinking water solution may need to consider other contaminants or issues unrelated to water quality. Accordingly, the Management Zone will work with project proponents and communities to identify implementable

alternatives to provide safe drinking water and work with communities to identify local, state or federal funding that is available to fund the selected alternative.

- *Lack of Timely Participation by Other Entities* – In many cases, successful implementation of the Long-term Drinking Water Solutions Program in Initial Focus Areas depends on participation by other responsible entities, e.g., City or County agencies, existing PWSs, State Water Board DDW, etc. Moreover, the Management Zone has no regulatory authority with regards to compliance with state or local drinking water regulations and thus may be limited in its ability to facilitate development and implementation of a feasible solution to provide a permanent safe drinking water source within a given area. When these challenges affect efforts to meet interim milestones in this MZIP, the Management Zone will notify the Central Valley Water Board. At a minimum, notification will be provided in Annual Progress Reports, but sooner where necessary to facilitate progress.

9.2.3. Nitrate Reduction Program

Management Zone participants have voluntarily elected to work collectively to achieve compliance with the Nitrate Control Program within the KWA Management Zone. With the exception of the MZIP compliance assessment program to track compliance with targeted reductions in nitrogen loads to groundwater (see Section 5.5), implementation of many of the interim milestones within the Nitrate Reduction Program is the responsibility of sector representatives (e.g., through Third Party Group representation) or individual permitted dischargers. The KWA will track overall implementation of the Nitrate Reduction Program, coordinating with Management Zone participants as needed, but there are limitations to the KWA's responsibilities for implementation of sector-specific interim milestones in this Program, including:

- *Completion of Permittee-specific Nitrate Reduction Program Interim Milestones* - Permitted dischargers participating in the Management Zone (as a member of a Third Party group or as an individual permitted discharger) are responsible for the implementation of their respective Nitrate Reduction Programs and completing interim milestones according to the schedule established by this MZIP. If an individual permittee or Third Party Group is not implementing the Nitrate Reduction Program as prescribed by this MZIP, the Management Zone will implement the procedures described in each sector's Nitrate Reduction Program (see "Alternative Procedures to Address Deficiencies" in Appendices NRP-1 through NRP-5).
- *Compliance with Permittee-specific Requirements* - Permitted dischargers participating in the Management Zone (as a member of a Third Party group or as an individual permitted discharger) are responsible for complying with requirements in their General Order or individual permit. If the Central Valley Water Board modifies a WDR or General Order to incorporate the requirements of the MZIP, or issues an Order to a permittee or group of permittees to implement elements of this MZIP (e.g., through a California Water Code §13267 Order), each permittee is responsible for compliance with revised permit requirements or any issued water quality orders related to implementation of this MZIP.
- *Data Collection to Support Management Zone Compliance Assessments* – Where data collection is a required component of a sector-specific Nitrate Reduction Program, it is the permittee or Third Party Group's responsibility to collect the required data and provide it to the Management

Zone as directed to support Management Zone compliance assessments. If data are not made available, the Management Zone will consider implementing the procedures described in each sector's Nitrate Reduction Program (see "Alternative Procedures to Address Deficiencies" in Appendices NRP-1 through NRP-5).

- *Nitrate Reduction in Groundwater Underlying a Path A Facility's Area of Contribution* – The Management Zone is not responsible for nitrate reduction in groundwater associated with the discharge of effluent from a Path A Facility. The Management Zone is also not responsible for the long-term restoration of the aquifer underlying a Path A Facility's area of contribution, as defined by the Nitrate Control Program.
- Compliance with State OWTS Regulatory Program – The existing State OWTS program states: "Implementation of [the OWTS] Policy involves individual OWTS owners; local agencies, be they counties, cities, or any other subdivision of state government with permitting powers over OWTS; Regional Water Quality Control Boards; and the State Water Resources Control Board" (State Water Board 2018). The OWTS Policy assigns no responsibility or authority for the approval, installation and management of septic systems to a Management Zone. Accordingly, under the MZIP the Management Zone accepts no responsibility for the implementation of the OWTS Policy. However, the Management Zone will make every effort to work with the appropriate entities within the Management Zone that have been delegated authority to implement the OWTS Policy to implement the MZIP's septic system Nitrate Reduction Program to reduce potential impacts from septic systems to groundwater quality in the Management Zone.
- Funding of Projects to Reduce Impact of Septic Systems – As appropriate, the Management Zone will work with the entities responsible for the implementation of the OWTS Policy and those that manage sewer systems within the Management Zone to support efforts to reduce impacts from septic systems on groundwater quality. However, the Management Zone is not responsible for funding any projects related to reducing reliance on septic systems (e.g., through expansion of the area serviced by a wastewater treatment facility) or implement programs to replace existing septic systems to reduce impacts to groundwater. While not responsible for funding a project, the Management Zone will work with the project proponents and community to identify local, state or federal funding options and assist with efforts to obtain the funding necessary to implement projects. Further, a wastewater facility that is a Management Zone participant may decide that water quality is better served by expanding wastewater treatment services to currently un-served areas before seeking funding to upgrade a wastewater treatment facility.
- *Lack of Timely Participation by Other Entities Responsible for Septic Systems* – Successful implementation of the septic system Nitrate Reduction Program in the Management Zone will largely depend on participation by other entities, including, but not limited to, County or LAMP agencies responsible for implementation of the OWTS in the local area, cities or community representatives, community service districts, etc. Moreover, the Management Zone has no regulatory authority with regards to compliance with the State OWTS policy or its implementation within the Management Zone. Accordingly, while the Management Zone will facilitate implementation of this MZIP's septic system Nitrate Reduction Program, its ability to mitigate nitrate sources from septic systems is limited. Where such challenges may affect efforts to meet interim milestones applicable to this Nitrate Reduction Program, Management Zone will notify the Central Valley Water Board, e.g., through Annual Progress Reports.

9.2.4. Reporting

The KWA is responsible for overseeing implementation of the MZIP Reporting Program (see Section 9.3). However, preparation of all elements of the Annual Progress and the Five-year and Ten-year Reports requires input from Management Zone participants. The Management Zone will notify Management Zone participants in a timely manner of the need for information to support preparation of an MZIP report. If a participant is not responsive, then the Management Zone will consider implementing the procedures described in each sector's Nitrate Reduction Program (see "Alternative Procedures to Address Deficiencies" in Appendices NRP-1 through NRP-5).

9.3. Management Zone Reporting Program

The Management Zone will submit reports to the Central Valley Water Board to fulfill Nitrate Control Program reporting requirements, apprise Central Valley Water Board staff on the status of MZIP implementation activities, and document progress in meeting Nitrate Control Program goals. Four types of reports will be prepared during MZIP implementation (**Figure 9-1**):

- Periodic Emergency & Interim Drinking Water Reports;
- Annual Progress Reports;
- Five-year Exceptions Status Reports; and
- Ten-year Exceptions Status & Technology Assessment Report that reassesses available BMPs and treatment technologies to manage nitrate.

The following sections provide a summary of the content planned for each report, roles and responsibilities for development of report elements and the schedule for submittal.

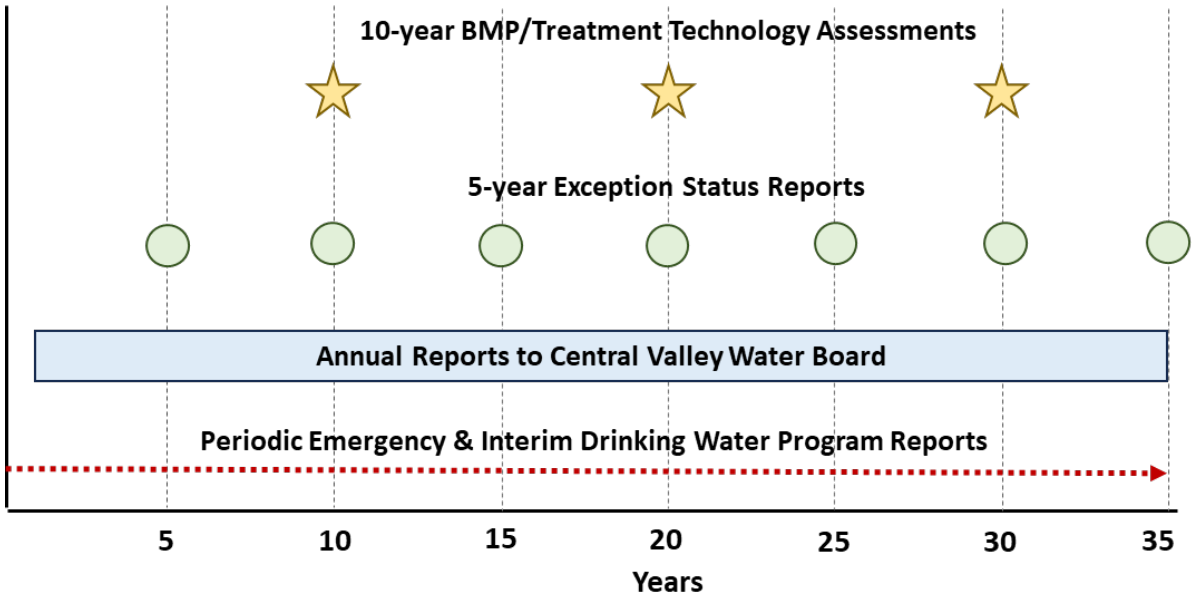


Figure 9-1. General Schedule for Submittal of MZIP Reports to the Central Valley Water Board

9.3.1. Emergency & Interim Drinking Water Program Reports

As part of the submittal of the FMZP, the KWA Management Zone EAP established a routine reporting approach to provide periodic updates to the CV-SALTS Executive Committee on activities occurring through implementation of the EAP (see Attachment G: EAP Reporting Metrics, in the KWA Management Zone FMZP). Reporting of these metrics, which has been incorporated into the Emergency & Interim Drinking Water Program (see MZIP Section 3), will continue as part of MZIP implementation. These periodic reports included the following implementation metrics:

- Location, forum type and general attendance figures for outreach efforts;
- Number of wells tested for nitrate;
- Number of wells tested for other contaminants;
- Number of households provided bottled water; and
- Number of operable fill stations/kiosks and usage information for each (if the Management Zone has any operating water fill stations/kiosks).

As part of the implementation of the Emergency & Interim Drinking Water Program under this MZIP (see Section 3), the KWA Management Zone in coordination with other Management Zones will continue to report these metrics. Specifically, the Management Zone will provide information on the above metrics to the CVSC. The CVSC will compile information from all Management Zones into a report that is submitted to CV-SALTS Executive Committee, which includes the Central Valley Water Board. The Central Valley Water Board's Executive Officer shares this information with the Central Valley Water Board in the Executive Officer reports, which are prepared and disseminated approximately six times per year. The information will also continue to be publicly available on the CVSC's website at: https://www.cvsalinity.org/nitrate-program/management-zones/. The KWA Management Zone will continue to submit these periodic reports to the CVSC as long as the Emergency & Interim Drinking Water Program continues to provide drinking water to residents in the Management Zone.

9.3.2. Annual Progress Reports

The Nitrate Control Program requires that the Central Valley Water Board review MZIPs, "*every two years to confirm whether the plans are achieving quantifiable milestones and time schedules, as well as achieving progress towards the goals of the Salt and Nitrate Control Program.*" To support this required biennial MZIP review and keep the Central Valley Water Board regularly informed of the status of MZIP implementation, the Management Zone will submit an Annual Progress Report that provides a brief summary of the following key program elements:

- Emergency & Interim Drinking Water Program
    - Summary of outreach and collaboration activities conducted with communities to provide drinking water to affected residents.
    - Summary of the program reporting metrics submitted to the CVSC during the previous year (see Section 9.3.1).
- Long-term Drinking Water Solutions Program

  - Outreach and collaboration activities conducted with communities throughout the Management Zone regarding the status of the Long-term Drinking Water Solutions Program.
  - Status of implementation of Long-term Drinking Water Solutions Program interim milestones in MZIP-specified Initial Focus Areas (see MZIP Section 4), including status of targeted outreach activities, potential funding opportunities and challenges that have arisen that are impacting efforts to make progress on the implementation of long-term drinking water solutions.
  - Activities planned for implementation in the Initial Focus Areas in the next year.
  - If relevant, identification of additional Focus Areas for long-term drinking water solutions milestones for implementation (as needed).
- Nitrate Reduction Program
  - Summary of status of MZIP implementation by each sector based on information provided by Management Zone participants or their representatives.
  - Summary of status of implementation of Management Zone interim milestones that are applicable to all sectors, e.g., as related to data collection or development of GWPVs/GWPTs.
  - Summary of key activities planned for implementation in the next year.
  - Identification of any ongoing challenges that may result in implementation of alternative procedures to address deficiencies within a particular sector.

Table 9-4 identifies the interim milestones associated with the preparation of Annual Progress Reports and the roles and responsibilities of Management Zone participants. Annual Progress Reports summarizing the status of MZIP implementation for the previous calendar year will be submitted to the Central Valley Water Board Executive Officer by March 31 of each year, except during years when submittal of an MZIP Five-year Exceptions Status Report or Ten-year Exceptions Status & Technology Assessment Report is required (see below). In those years, the information that would normally have been included in the Annual Progress Report will be included in the Five-year or Ten-year Report. Unless the Central Valley Water Board Executive Officer requests a different submittal date, the Management Zone will submit its first Annual Progress Report by March 31, 2025.

9.3.3. MZIP Five-Year Exceptions Status Report

The Basin Plan's Exceptions Policy requires "*discharger(s) with authorized exceptions to prepare a status report every five years summarizing compliance with the terms and conditions of the exception. The status reports may be presented individually for individual exceptions or collectively for exceptions granted to multiple dischargers*." Each Five-year Exceptions Status Report will address this requirement and provide information that would normally be included in the regular Annual Progress Report. In addition, Five-year Reports will include any proposed modifications to elements of the MZIP (e.g., milestones, interim milestones or the schedule to meet an interim milestone). Each Five-year Exceptions Status Report will include the following information:

- Emergency & Interim Drinking Water Program

  - Summary of outreach and collaboration activities conducted with communities to provide drinking water to affected residents.
  - Summary of the program reporting metrics submitted to the CVSC during the previous year (see Section 9.3.1).
  - Proposed modifications to the Emergency & Interim Drinking Water Program, as needed.
- Long-term Drinking Water Solutions Program
  - Outreach and collaboration activities conducted with communities throughout the Management Zone regarding the status of the Long-term Drinking Water Solutions Program.
  - Status of implementation of Long-term Drinking Water Solutions Program interim milestones in MZIP-specified Initial Focus Areas (see MZIP Section 4), including status of targeted outreach activities, potential funding opportunities and challenges that have arisen that are impacting efforts to make progress on the implementation of long-term drinking water solutions.
  - Activities planned for implementation in the Initial Focus Areas in the next year.
  - If relevant, identification of additional Focus Areas for long-term drinking water solutions milestones for implementation (as needed).
  - Proposed modifications to the Long-term Drinking Water Solutions Program, as needed.
- Nitrate Reduction Program
  - Sector-based Compliance Assessment:
    - Evaluation of the status of compliance with the terms and conditions of the Exceptions applicable to a specific sector or a facility.
    - Documentation of changes to nitrogen loading (as applicable) and compliance pertaining to specific sector Nitrate Reduction Program overall milestones and supporting interim deadlines or interim milestones.
    - Proposed modifications to the Nitrate Reduction Program applicable to a specific sector, e.g., modifications to overall milestones and supporting interim deadlines or interim milestones.
  - Status of implementation of Management Zone interim milestones applicable to all sectors (including individual facilities), e.g., data collection efforts, providing data to Management Zone to support compliance assessment-related activities (e.g., see Section 5.5) etc.
  - Summary of key activities planned for implementation in the next year by the Management Zone collectively or by each sector (including individual facilities).
  - Proposed modifications to the Nitrate Reduction Program, where applicable to all sectors
- Other MZIP Program Elements
  - Findings from water quality-related analyses, as required to support preparation of the Management Zone SAMP Report (see Section 7).

- Ensure that updated groundwater quality data and analyses are made available at a publicly accessible website when the Five-year Exceptions Status Report is submitted to the Central Valley Water Board.
- Status of GSP implementation activities within the Management Zone that could benefit the Management Zone's long-term aquifer restoration program (see MZIP Section 6.
- Other as needed MZIP implementation-related information, including any other proposed modifications to a program element.

As noted above the MZIP Five-year Exceptions Status Report may include proposed modifications to the MZIP. Any such proposals will include a description of the proposed modification and the reason(s) for the requested change. If a proposed modification impacts a schedule (e.g., sector-based interim milestones), the proposed modification will include an evaluation of any potential impacts of the proposal on other elements of the MZIP. Proposed modifications to the MZIP may not be implemented without written approval from the Central Valley Water Board.

Table 9-4 identifies the interim milestones associated with the preparation of the Five-year Exceptions Status Report and the roles and responsibilities of Management Zone participants. Unless directed otherwise by the Central Valley Water Board Executive Officer, the first Five-year Exceptions Status Report will be submitted to the Central Valley Water Board Executive Officer by March 31, four years after submittal of the first Annual Progress Report in 2025 (see above), and then every five years thereafter.

9.3.4. MZIP Ten-Year Exceptions Status & Technology Assessment Report

In addition to the five-year reporting requirement addressed above, the Basin Plan's Exceptions Policy requires submittal of the findings from a ten-year assessment of compliance options: "*As a condition for reauthorizing/renewing an exception, the Central Valley Water Board will require those discharger(s) with authorized exceptions terms greater than ten years to prepare and submit a report every ten years that reassesses Best Management Practices (BMPs) and surveys available treatment technologies to determine if feasible, practicable and reasonable compliance options have become available* ["BMP/Treatment Technology Assessment"]." The MZIP Ten-year Exceptions Status & Technology Assessment Report will address this BMP/Treatment Technology Assessment requirement ***and*** provide the information that would normally be included in the regular Five-year Exceptions Status and Annual Progress Reports. Accordingly, this Ten-year Report will include the content described above for the Five-year Exceptions Status Report. In addition, for sectors that have dischargers operating under Exceptions that have been authorized for at least 10 years (per MZIP Section 5.3 and supporting appendices, this would include all sectors/dischargers when the first Ten-year report is required for submittal), the Ten-year Report will include sector-specific BMP/Technology Assessment Reports as follows:

- Irrigated Agriculture (Coalition(s) within Priority 1 subbasins) will prepare this report on behalf of growers participating in the Priority 1 Management Zones through the ILRP;
- Representative(s) of dairy and bovine facilities will prepare this report on behalf of facilities participating in the Management Zone through the CVDRMP;
- Representative(s) of the poultry industry will prepare this report on behalf of all poultry dischargers participating in the Management Zone; and

- For Non-15 Program dischargers, each Management Zone participant may submit a BMP/Technology Assessment Report that is specific to their facility or prepare such an assessment collaboratively with other similar type Non-15 Program dischargers in the same Management Zone or other Management Zones. For example, a single BMP/Technology Assessment Report may be prepared collectively by all domestic wastewater facilities that are participants in Central Valley Region Management Zones.

As with the MZIP Five-year Exceptions Status Report, the Ten-year Exceptions Status & Technology Assessment Report may include proposed modifications to the MZIP. Any such proposals will include a description of the proposed modification and the reason(s) for the requested change. If the proposed modification impacts a schedule (e.g., sector-based interim milestones), the proposed change will include an evaluation of any potential impacts of the proposal on other elements of the MZIP. Proposed modification to the MZIP may not be implemented without written approval from the Central Valley Water Board.

Table 9-4 identifies the interim milestones associated with the preparation of the Ten-year Exceptions Status & Technology Assessment Report and the roles and responsibilities of Management Zone participants. Unless directed otherwise by the Central Valley Water Board Executive Officer, the first Ten-year Report will be submitted to the Central Valley Water Board Executive Officer by March 31, no later than five years after submittal of the first Five-year Exceptions Status Report, and then every ten years thereafter.

9.3.5. Adaptive Management

As noted above, with the submittal of the Five-year Exceptions Status Report and Ten-year Exceptions Status & Technology Assessment Report, the Management Zone may propose modifications to the Long-term Drinking Water Solutions Program, Nitrate Reduction Program or other MZIP program element. These periodic formal reports will serve as the primary opportunities to adaptively manage implementation of the Nitrate Control Program in the Management Zone. However, if the Management Zone becomes aware of a critical need to recommend modifications to the MZIP prior to submittal of a regularly scheduled report, the Management Zone will submit such recommendations to the Central Valley Water Board in writing via a letter. However, no changes to implementation of the MZIP will be made without written approval of the Central Valley Water Board.

9.4. MZIP Funding Mechanisms

Funding to implement the MZIP is currently provided by the participating dischargers. As part of its annual budgeting process, the Board evaluates cost allocations among its participating dischargers. Each Management Zone participant voluntarily participates in the Management Zone, and as part of their volunteer participation signs a Participation Agreement with the Management Zone whereby the participant commits to providing their share of costs for implementation of the Nitrate Control Program in the Management Zone.

In addition to financial contributions provided by Management Zone participants, the KWA will also pursue (or support efforts of other entities) local, state, and federal funds that are available to support management zone activities including require deliverables, implementation of short- and long-term

drinking water solutions, or nitrate management projects or activities. For example, the KWA received a California Department of Conservation grant through the 2020 Sustainable Groundwater Management Water Coordinator Program. The purpose of the $300,000 grant is to address the SGMA sustainability indicator of "significant and unreasonable degraded water quality" by preparing and implementing an Early Action Plan (EAP) to provide an immediate safe drinking water supply to residents with nitrate exceedance and to develop and implement a Final Management Zone Proposal and Management Zone Implementation Plan that outlines milestones for dischargers to ultimately reduce or cease nitrate contamination into the groundwater and identify projects and strategies that will be implemented to retore groundwater quality where reasonable and feasible. Additionally, the KWA has applied for a SAFER Grant through a co-funding agreement with the State Water Board. The purpose of the co-funding agreement is to establish and implement an expanded well sampling constituent and replacement drinking water program in conjunction and coordination with Management Zone implementation activities. The application was submitted in 2023 and the KWA anticipates funding in 2023 or 2024.

In addition to SAFER, the KWA will continue to explore potential supplemental funding sources (e.g., see MZIP Section 4 and **Appendix LT-2** for discussion of potential funding sources), including but not limited to, grant programs administered by the State Water Board and DWR, which are intended for drinking water and agricultural water quality improvement. In particular, as part of the implementation of the Long-term Drinking Water Solutions program in the Initial Focus Areas, the KWA will also work collaboratively with local entities and project proponents to identify funding sources for proposed drinking water projects. Where appropriate, the KWA will support efforts to obtain funding to implement these projects. The KWA will regularly provide updates on status of funding for these projects as part of its Annual Progress Report submittals to the Central Valley Water Board.

Table 9-1. Summary of Milestones/Interim Milestones for Emergency & Interim and Long-Term Drinking Water Programs		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
Emergency & Interim Drinking Water Program (See Section 3)		
• Management Zone will notify the Central Valley Water Board (as required by the Program) if a request to have a residential well tested is being held up by an inability to obtain property owner permission • Management Zone will continue to implement its outreach, well testing, and replacement water programs as described in Section 3. • Management Zone will submit its reporting metric data to the CVSC on a generally monthly basis • Annually the Management Zone will summarize its metrics on wells tested (nitrate or other contaminants), households receiving replacement water and outreach activities as part of the information it includes in Annual Progress Reports	• Management Zone will notify the Central Valley Water Board (as required by the Program) if a request to have a residential well tested is being held up by an inability to obtain property owner permission • Management Zone will continue to implement its outreach, well testing, and replacement water programs as described in Section 3. • Management Zone will submit its reporting metric data to the CVSC on a generally monthly basis • Annually the Management Zone will summarize its metrics on wells tested (nitrate or other contaminants), households receiving replacement water and outreach activities as part of the information it includes in Annual Progress Reports	• Management Zone will notify the Central Valley Water Board (as required by the Program) if a request to have a residential well tested is being held up by an inability to obtain property owner permission • Management Zone will continue to implement its outreach, well testing, and replacement water programs as described in Section 3. • Management Zone will submit its reporting metric data to the CVSC on a generally monthly basis • Annually the Management Zone will summarize its metrics on wells tested (nitrate or other contaminants), households receiving replacement water and outreach activities as part of the information it includes in Annual Progress Reports

Table 9-1. Summary of Milestones/Interim Milestones for Emergency & Interim and Long-Term Drinking Water Programs		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
Long-term Drinking Water Solutions Program (see Section 4 and Appendix LT-2)		
Milestones for implementation in each of the Initial Focus Areas (activities to occur in parallel in each area with goal of completing within first five years in each area): Milestone 1 – During the first year of MZIP implementation (and re-visited annually, as needed), the Management Zone will: (a) ~~,~~ take steps (before starting public and stakeholder outreach) to first identify if there are projects or technical service providers already engaged within the Initial Focus Area; and (b) engage with State Water Board DDW to understand if there are compliance order efforts underway that may impact a PWS's compliance with nitrate drinking water standards. Through these early engagement activities, the Management Zone can then determine the role (or roles) that it will undertake to facilitate long-term drinking water solutions in the communities impacted by nitrate. Milestone 2 – On a regular basis, (a) perform public and stakeholder outreach and meaningful engagement activities to obtain local input on potential solutions (e.g., through workshops, public meetings, round table discussions, or surveys to engage with Counties, State Water Board DDW, residents, other local entities, and GSAs) (where efforts are already underway	• By the beginning of Year 6 of MZIP implementation, implement prioritization process to identify next round of focus areas within the Management Zone for implementation of the Long-term Drinking Water Solutions Program. • Once next areas for program focus are identified, develop a Workplan to guide implementation of this Program within these new areas; Workplan will include the types of milestones that have were implemented in Years 1-5	• By the beginning of Year 11 and every 5 years after, continue the process (where still needed in the Management Zone) to identify new areas to focus program efforts to develop long-term drinking water solutions. Once identified, Workplans will be developed with milestones to complete program activities in the identified priority areas.

Table 9-1. Summary of Milestones/Interim Milestones for Emergency & Interim and Long-Term Drinking Water Programs		
Phase 1		Phase 2 & Later
Years 1 -5	Years 6-10	
through other efforts, the Management Zone will perform this outreach in coordination and conjunction with existing efforts); and (b) conduct targeted outreach within Initial Focus Areas. Milestone 3 – By the end of the first year of MZIP implementation, determine which PWSs in and around Initial Focus Areas require further evaluation (e.g., compliance status and nitrate compliance risk). Milestone 4 – Beginning in Year 2 of MZIP implementation, perform PWS evaluations to determine suitability for supporting potential drinking water solutions. Milestone 5 – Beginning in Year 2 of MZIP implementation, (a) determine feasibility of various solutions identified in Milestone 4 (e.g., capital costs, funding opportunities, operation and maintenance costs, operational requirements, permitting requirements, stakeholder input, etc.); and (b) prepare report with results of the feasibility study that would be used to support outreach and public engagement activities.		

Table 9-2. Summary of Sector-specific Nitrate Reduction Program Interim Milestones (see Appendices NRP-1 to NRP-5 for more information)		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
Irrigated Agriculture (See Appendix NRP-1)		
• Conduct focused outreach & education to growers regarding Priority 1 Nitrate Reduction Program • Outreach to growers in Priority 1 Management Zones regarding University of California Agricultural and Natural Resources (UCANR) Nitrogen and Irrigation Initiative (NII) program • Coordinate with commodity organizations and other grower groups to inform them of the Priority 1 Nitrate Reduction Program • Support Management Zone efforts applicable to all Management Zone sectors throughout duration of Phase 1 • Within 2 years, update Groundwater Quality Management Plans (GQMPs) to incorporate Priority 1 Management Zone specific requirements, including interim milestones, milestones, triggers, interim and final deadlines and final compliance date • Within 5 years, complete collating recently available Irrigation and Nitrogen Management Plan (INMP) Summary Report data for all enrolled acreage	• Conduct annual focused outreach to growers that have parcels outside of the acceptable A/R ratio range – per crop type • Conduct annual focused outreach to growers that have parcels in townships where the township exceeds the ILRP GWPTs • Within 6 years, require low vulnerability growers in Priority 1 Management Zones to have a certified INMP • Within 6 years, require high vulnerability growers in Priority 1 Management Zones to have an updated certified INMP • Within 9 years, submit updates to Priority 1 Nitrate Reduction Program to reduce loads from irrigated agricultural parcels in Priority 1 Management Zones to meet Management Zone township GWPTs; submit updates to Priority 1 Nitrate Reduction Program to	Phase 2 • Years 11-15 - Implement updated interim milestones identified in Year 10 • Years 16-20 – (a) Implement updated interim milestones identified in Year 10; and (b) within 20 years, and using all data and information obtained between years 11 through 20, prepare comprehensive update to GQMP to identify strategies, performance goals, management practices, updated interim milestones, etc. to meet Phase 3 milestones Phase 3 • Years 21-25 - Implement updated interim milestones identified in Year 20 • Years 26-30 – (a) Implement updated interim milestones identified in Year 20; and (b) within 30 years, and using all data and information obtained between years 21 through 30,

Table 9-2. Summary of Sector-specific Nitrate Reduction Program Interim Milestones (see Appendices NRP-1 to NRP-5 for more information)		
Phase 1		Phase 2 & Later
Years 1 -5	Years 6-10	
within Priority 1 Management Zones, calculate ILRP GWPVs for enrolled irrigated acreage in Priority 1 Management Zones, and submit data to Priority 1 Management Zones • Starting within 3 years, and annually thereafter, organize annual management practice and INMP summary report data for enrolled parcels in Priority 1 Management Zones -maintaining anonymous member IDs • Within 4 years, identify enrolled growers with parcels in Priority 1 Management Zones that have 3-year running totals, based on the most recent three-years of INMP summary report data, that are outside Applied/Removed (A/R) ratio acceptable ranges • Starting at the end of year 3, and annually thereafter, prepare a Management Plan Progress Report for submittal to the Management Zone; progress report shall identify actions and progress made towards implementing the Priority 1 Nitrate Reduction Program • Starting within 3 years, and annually thereafter, conduct focused outreach to	Management Zone and Central Valley Water Board • Within 9 years, identify new technologies and management practices designed to reduce the amount of nitrate available to leach below the rootzone; submit report to Management Zone documenting findings regarding new technologies and management practices • Within 10 years, and using all data and information obtained between years 1 through 10, prepare comprehensive update to GQMP to identify strategies, performance goals, management practices, updated interim milestones, etc. to meet Phase 2 milestones	prepare comprehensive update to GQMP to identify strategies, performance goals, management practices, updated interim milestones, etc. to meet Phase 4 milestones Phase 4 • Years 31-35 - Implement updated interim milestones identified in Year 30

Table 9-2. Summary of Sector-specific Nitrate Reduction Program Interim Milestones (see Appendices NRP-1 to NRP-5 for more information)		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
growers that have enrolled parcels that are not within the acceptable A/R ratio range – per crop type • Starting within 5 years, and annually thereafter, conduct focused outreach to growers that have enrolled parcels in townships where the township exceeds ILRP GWPTs		
Dairies (See Appendix NRP-2a)		
• Interim Milestone 1 – Infrastructure Grants ○ CVDRMP, in partnership with other organizations, to notify dairies in Priority 1 Management Zones of available funding and eligibility requirements – when grant applications are being accepted ○ Annually, CVDRMP to track information on a Management Zone basis re: dollars spent, number and type of projects completed, and other information ○ Within 5 years, CVDRMP to share successful project information with other dairies in Priority 1 Management Zone	• Interim Milestone 2 – Web Portal/DMS ○ Within 6 years, CVDRMP to work with Management Zones to update existing modeling tools, as needed, to support implementation of approved GWPV methodology ○ Within 7 years, in coordination with the Management Zones, establish GWPVs for Management Zone townships, including updated nitrogen loading data for dairies in Priority 1 Management Zones	• Implement interim milestones in the updated Dairy Nitrate Reduction Program prepared under Interim Milestone 9 in Phase 1, Years 6-10

Table 9-2. Summary of Sector-specific Nitrate Reduction Program Interim Milestones (see Appendices NRP-1 to NRP-5 for more information)		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	

• Interim Milestone 2 – Web portal/Data Management System (DMS)
  ○ Within 2 years, CVDRMP to develop DMS and have it available for dairy reporting
  ○ Within 3 years, dairies start using DMS to report data
  ○ Within 4 years, CVDRMP to use data from DMS to update Central Valley Soil & Water Assessment Tool (CV-SWAT) to revise previous estimates of subsurface N loading to establish baseline conditions for dairies in Management Zones
  ○ Within 5 years, submit updated estimates of subsurface N loading to Management Zones
• Interim Milestone 3 – Track and Inform Dairies Regarding Farm-Scale Manure Management
  ○ Within 4 years, CVDRMP to convey annually to dairies (using data from the DMS) their maximum average farm-scale manure-N land application rates; maximum average farm-scale manure-N A/R ratios and
	• Interim Milestone 3 – Track and Inform Dairies Regarding Farm-Scale Manure Management
	  ○ CVDRMP to convey annually to dairies (using data from the DMS) their maximum average farm-scale manure-N land application rates; maximum average farm-scale manure-N A/R ratios and differences; and whole-farm manure-N balance
	  ○ CVDRMP to annually identify dairies in Priority 1 Management Zones that are not meeting whole-farm manure-N balance and focus education and outreach on those dairies
	• Interim Milestone 5 – Education and Outreach
	  ○ Within 6 years, CVDRMP to update and submit an education and outreach workplan to the Management Zones for working with dairies in Priority 1 Management Zones	

Table 9-2. Summary of Sector-specific Nitrate Reduction Program Interim Milestones (see Appendices NRP-1 to NRP-5 for more information)		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
differences; and whole-farm manure-N balance ○ Within 5 years, CVDRMP to identify dairies in Priority 1 Management Zones that are not meeting whole-farm manure-N balance and focus education and outreach on those dairies • Interim Milestone 4 – Reduction of N-Leaching from Earthen Lagoons ○ Per revised Dairy Order, require (a) lining for all new and reconstructed dairy lagoons; (b) reconstruction of lagoons that intersect groundwater; (c) periodic evaluation of unlined lagoons; and (d) reconstruction of existing earthen lagoons that do not meet the required standards set forth in the revised Dairy Order ○ Within 3 years, dairies report through DMS on progress toward construction and reconstruction of lagoons in Priority 1 Management Zones, where applicable ○ Within 5 years, and every 5 years thereafter, CVDRMP to calculate seepage reduction estimates and	○ Annually, CVDRMP to focus education and outreach efforts on dairies identified as not making sufficient progress towards meeting whole-farm N balance ○ Within 10 years, and every 5 years thereafter, document implementation of education and outreach efforts to dairies in Priority 1 Management Zones • Interim Milestone 7 – Study Technology Advances ○ Within 10 years, CVDRMP will submit to the Management Zones a report that assesses the state of technology available to dairies to reduce nitrogen loading and to determine if feasible, practicable, and reasonable compliance options have become available • Interim Milestone 8 – MRIP ○ Within 10 years, CVDRMP will submit to the Management Zones a report that summarizes findings made by the MRIP to	

Table 9-2. Summary of Sector-specific Nitrate Reduction Program Interim Milestones (see Appendices NRP-1 to NRP-5 for more information)		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
gross nitrate loading avoided due to the construction and reconstruction of lagoons in Priority 1 Management Zones and provide resulting information to Management Zones • Interim Milestone 5 – Education and Outreach ○ Within 2 years, dairies in Priority 1 Management Zones attend education event hosted by California Dairy Quality Assurance Program (CDQAP), or other appropriate entity, to receive information re: Nitrate Reduction Program and whole-farm nitrogen balance ○ Within 3 years, CVDRMP, in coordination and cooperation with CDQAP, to prepare and submit an education and outreach workplan to the Management Zones for working with dairies in Priority 1 Management Zones ○ Within 5 years, CVDRMP to focus education and outreach efforts on dairies identified as not making sufficient progress towards meeting whole-farm N balance	determine if feasible, practicable, and reasonable compliance options have become available • Interim Milestone 9 – Update Dairy Nitrate Reduction Program ○ Within 10 years, using all of the data and information obtained through the implementation of the Interim Milestones 1 through 8, CVDRMP will update the Dairy Nitrate Reduction Program ○ The updated Dairy Nitrate Reduction Program will include updated interim milestones and milestones	

Table 9-2. Summary of Sector-specific Nitrate Reduction Program Interim Milestones (see Appendices NRP-1 to NRP-5 for more information)		
Phase 1		Phase 2 & Later
Years 1 -5	Years 6-10	
○ Within 5 years, and every 5 years thereafter, document implementation of education and outreach efforts to dairies in Priority 1 Management Zones • Interim Milestone 6 – Irrigation and Nitrogen Management Plan (INMP) ○ Within 3 years, dairies in Priority 1 Management Zones s are required to have prepared an INMP by an individual that meets the professional qualifications set forth by the Central Valley Water Board ○ Within 4 years, and annually thereafter, dairies in Priority 1 Management Zones are required to evaluate compliance with INMP and revise INMP as necessary • Interim Milestone 7 – Study Technology Advances ○ CVDRMP, in collaboration and conjunction with the California Dairy Research Foundation, Dairy Cares, California Department of Food and Agriculture (CDFA), Sustainable Conservation, and others, will continually look to advance the state		

Table 9-2. Summary of Sector-specific Nitrate Reduction Program Interim Milestones (see Appendices NRP-1 to NRP-5 for more information)		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
of technology to reduce nitrogen loading on dairies • Interim Milestone 8 – Manure Recycling and Innovative Products (MRIP) ○ CVDRMP will continue to participate in and support CDFA's MRIP		
Bovine Facilities – Limited Population Operation (LPO) and Limited Time Operation (LTO) (See Appendix NRP-2b)		

• Establish Bovine Quality Assurance Program (BQAP)
  ○ Within 4 years, complete development of all elements of the BQAP
• Implement special studies for Bovine Operations via CVDRMP:
  ○ Within 1 year, report on results of special studies
  ○ Within 5 years, complete study data collection and submit Summary Representative Monitoring Report (SRMR) to Central Valley Water Board with findings and, if needed, recommendations for additional controls
	• Meet Interim Deadline No. 2 with the goal of certifying 100% of LPOs and LTOs within the Management Zone	Phases 2, 3, and 4
		• Maintain compliance with Nitrate Reduction Program for these facilities

Table 9-2. Summary of Sector-specific Nitrate Reduction Program Interim Milestones (see Appendices NRP-1 to NRP-5 for more information)		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
Bovine Facilities – Full Coverage Bovine Facilities (See Appendix NRP-2b)		

• Within 4 years, complete data collection and analyses required to:
  ○ Delineate animal confinement area and manure storage areas
  ○ Verify/update MZIP preliminary nitrate load estimate
• Within 4 years, prepare compliance analysis to estimate nitrate reduction required to comply with Nitrate Control Program
• Within 5 years, prepare facility-specific Nitrate Reduction Workplan
	• Meet facility-specific interim deadlines through implementation of interim milestones in approved Nitrate Reduction Workplan	• Meet facility-specific interim deadlines through implementation of interim milestones in approved Nitrate Reduction Workplan (all facilities to meet Nitrate Reduction Program Milestones applicable to this group of facilities by Year 35)

Poultry – Low Threat Operations (See Appendix NRP-3)		

• Establish PQAP
  ○ Within 4 years, complete development of all elements of the PQAP and submit for regulatory approval
  ○ Within 5 years, obtain regulatory approval of PQAP
	• Meet Interim Deadline No. 2 to have at least 50% of Low Threat Operation facilities certified under PQAP	Phase 2
		• Years 11-15 – Meet Interim Deadline No. 3 to have 100% of facilities certified and all Nitrate Reduction Milestones met
		• Years 16-20 - Maintain compliance with Nitrate Reduction Program for these facilities
		Phase 3 & 4

Table 9-2. Summary of Sector-specific Nitrate Reduction Program Interim Milestones (see Appendices NRP-1 to NRP-5 for more information)		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
		• Maintain compliance with Nitrate Reduction Program for these facilities
Poultry – Full Coverage Operations and Individually Permitted Facilities (See Appendix NRP-3)		
• Within 5 years, complete data collection and analyses required to: (a) delineate facility's area of contribution; and (b) verify/update MZIP preliminary nitrate load estimate	• Continue data collection, reporting support as required by the Management Zone • Within 8 years, prepare facility-specific Nitrate Reduction Workplan and submit to Central Valley Water Board for approval • Implement Central Valley Water Board-approved facility Nitrate Reduction Workplan	• Continue to implement approved facility Nitrate Reduction Workplan
Non-15 Program – Group 1 (See Appendix NRP-4)		
• Within 5 years, complete data collection and analyses required to: (a) delineate facility's area of contribution; and (b) verify/update MZIP preliminary nitrate load estimate	• Continue data collection, reporting support as required by the Management Zone • Within 8 years, prepare facility-specific Nitrate Reduction Workplan and submit to Central Valley Water Board for approval • Implement Central Valley Water Board-approved facility Nitrate Reduction Workplan	• Continue to implement approved facility Nitrate Reduction Workplan

Table 9-2. Summary of Sector-specific Nitrate Reduction Program Interim Milestones (see Appendices NRP-1 to NRP-5 for more information)		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
Non-15 Program – Group 2 (See Appendix NRP-4)		
• Within 1 year, implement monitoring program to generate data needed to support required Management Zone data collection activities • Within 5 years, provide data required to verify/update preliminary MZIP load estimate	• Continue data collection, reporting support as required by the Management Zone • Within 10 years, complete data collection/ analyses required to delineate facility's area of contribution	• Within 3 years from the beginning of Phase 2, prepare facility-specific Nitrate Reduction Workplan and submit to Central Valley Water Board for approval • Implement Central Valley Water Board-approved facility Nitrate Reduction Workplans
Non-15 Program – Group 3 (See Appendix NRP-4)		
• Within 1 year, or as soon as practicable, implement monitoring program to generate data needed to support required Management Zone data collection activities • Within 5 years, provide data required to verify/update preliminary MZIP load estimate	• Continue data collection activities • Initiate preliminary community outreach and planning activities	• Continue preliminary community outreach and planning activities • Continue data collection and preliminary planning and outreach activities • Within 7 years from the beginning of Phase 2, prepare facility-specific Nitrate Reduction Workplan and submit to Central Valley Water Board for approval • Implement Central Valley Water Board-approved facility Nitrate Reduction Workplans

Table 9-3. Summary of Other MZIP Programmatic Interim Milestones		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
Septic System Nitrate Reduction Program (See Appendix NRP-5; Section 5.3.5)		
• Periodically - Coordinate with counties/local agencies (data requests; annual OWTS Policy reports; LAMP Water Quality Assessment (WQA) Reports) • Within 3 years, request/compile GIS coverage of sewer system infrastructure/extent • Within 5 years, complete data collection and analyses required to (a) improve spatial understanding of septic systems; and (b) update preliminary MZIP's septic system nitrogen load estimate	• Periodically - Coordinate with counties/local agencies (data requests; annual OWTS Policy reports; LAMP WQA Reports)	• Support counties/local agencies community outreach and related to Wastewater Consolidation Programs • Evaluate potential funding opportunities pertaining to long-term drinking water solutions coupled with counties/local agencies Wastewater Consolidation Projects
Compliance Assessment Program (See Section 5.5)		

Table 9-3. Summary of Other MZIP Programmatic Interim Milestones		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
• Within 6 months, establish minimum data collection needs for each permittee/sector • Within 1 year verify permittees are collecting required data (to the extent practicable) • Within 5 years complete initial data collection to support GWPV development • Within 4 years, update existing ILRP GWPV methodology for use by Priority 1 Management Zones and obtain Central Valley Water Board approval • Within 4 years, (a) update existing ILRP GWPT methodology and develop compliance assessment methodology for use by Priority 1 Management Zones • Within 5 years, update existing modeling tools to support use of updated GWPV methodology • Within 5 years, obtain Central Valley Water Board approval of updated GWPT calculation methodology and use for compliance assessment	• Within 6 years, establish GWPVs for Priority 1 Management Zone townships • Within 6 years, develop methodologies to (a) estimate necessary load reduction needed collectively by sector or individual facility to meet township-based GWPTs; and (b) monitor/report progress towards meeting required load reductions • Within 7 years, establish GWPTs for each Priority 1 Management Zone township • Within 8 years, determine load reductions required for dischargers within each township • Within 8 years, prepare Priority 1 Management Zone Nitrogen Load Reduction Report	• Review and revise, as needed GWPVs and GWPTs at least once every five years (unless alternative frequency established)
Long-term Restoration Program (see Section 6)		

Table 9-3. Summary of Other MZIP Programmatic Interim Milestones		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
• At least annually, but more frequently where needed, the Management Zone will coordinate with local GSAs on the status of GSP implementation in the Management Zone and discuss GSP recharge-related project status/priorities and determine how GSP project priorities and the timing of such projects also address overall Management Zone restoration interests • At least annually, the Management Zone will track the status of planned and implemented recharge projects and to the extent possible estimate existing or future benefits. • In a timely manner before preparation of the five-year Exceptions Status Report, obtain updated information on the status of groundwater recharge projects in the Management Zone evaluate progress made towards achieving the Nitrate Control Program restoration goal	• At least annually, but more frequently where needed, the Management Zone will coordinate with local GSAs on the status of GSP implementation in the Management Zone and discuss GSP recharge-related project status/priorities and determine how GSP project priorities and the timing of such projects also address overall Management Zone restoration interests • At least annually, the Management Zone will track the status of planned and implemented recharge projects and to the extent possible estimate existing or future benefits • In a timely manner before preparation of the ten-year Exceptions Status Report, obtain updated information on the status of groundwater recharge projects in the Management Zone evaluate progress made towards achieving the Nitrate Control Program restoration goal	• Continue annual coordination activities with GSAs and obtain data needed to support preparation of Management Zone reports every five years
Surveillance and Monitoring Program (See Section 7)		

Table 9-3. Summary of Other MZIP Programmatic Interim Milestones		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
• As needed, coordinate Management Zone SAMP development with activities associated with the implementation of the Central Valley Region SAMP • Within 1 year of the submittal date of the first Five-year Management Zone SAMP Report, identify and address (to the extent possible) data gaps and areas for improvement in the Management Zone's SAMP network to support upcoming assessment • In coordination with submittal of the Five-year Exceptions Status Report, submit the first Five-year Management Zone SAMP Report	• As needed, coordinate Management Zone SAMP development with activities associated with the implementation of the Central Valley Region SAMP • Within 1 year of the submittal date of the second Five-year Management Zone SAMP Report, identify and address (to the extent possible) data gaps and areas for improvement in the Management Zone's SAMP network to support upcoming assessment • In coordination with submittal of the Ten-year Exceptions Status & Technology Assessment Report, submit the second Five-year Management Zone SAMP Report	• As needed, coordinate Management Zone SAMP development with activities associated with the implementation of the Central Valley Region SAMP • Within 1 year of the submittal date of each Five-year Management Zone SAMP Report, identify and address (to the extent possible) data gaps and areas for improvement in the Management Zone's SAMP network to support upcoming assessment • In coordination with submittal of the Five-year Exceptions Status and Ten-year Exceptions Status & Technology Assessment Report, submit a Five-year Management Zone SAMP Report
MZIP Reporting (See Section 9.3)		
• Monthly: Submit generally monthly metrics for implementation of the Emergency & Interim Drinking Water Program • Years 1-4: By March 31 of each year, submit Annual Progress Reports for previous year	• Monthly: Submit generally monthly metrics for implementation of the Emergency & Interim Drinking Water Program • Years 6-9: By March 31 of each year, submit Annual Progress Reports for previous year	• Continue Year 5 and Year 10 reporting cycles as shown for Phase 1, including updating groundwater data and analyses

Table 9-3. Summary of Other MZIP Programmatic Interim Milestones		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
• Year 5: By March 31, submit Five-year Exceptions Status Report • By Year 5: Update groundwater data and analyses; as appropriate make updated data available at a publicly accessible website	• Year 10: By March 31, submit Ten-year Exceptions Status & Technology Assessment Report • By Year 10: Update groundwater data and analyses; as appropriate make updated data available at a publicly accessible website	
MZIP Administration		
• Within 1 year, establish coordination agreements with any Path A Facilities located within the Management Zone • As needed, collaborate with other Management Zones, to coordinate work on common interim milestones • At least annually, verify Management Zone Participants and address any discrepancies with the appropriate entity, e.g., directly with permittee, Third Party Group representative or Central Valley Water Board • At least once every six months, communicate with Management Zone participants to provide timely reminders of applicable MZIP interim milestones	• As needed, collaborate with other Management Zones, to coordinate work on common interim milestones • At least annually, verify Management Zone participants and address any discrepancies with the appropriate entity, e.g., directly with permittee, Third Party Group representative or Central Valley Water Board • At least once every six months, communicate with Management Zone participants to provide timely reminders of applicable MZIP interim milestones • As needed, notify Management Zone participants that are not fulfilling the requirements of their	• As needed, collaborate with other Management Zones, to coordinate work on common interim milestones • At least annually, verify Management Zone participants and address any discrepancies with the appropriate entity, e.g., directly with permittee, Third Party Group representative or Central Valley Water Board • At least once every six months, communicate with Management Zone participants to provide timely reminders of applicable MZIP interim milestones • As needed, notify Management Zone participants that are not fulfilling the requirements of their

Table 9-3. Summary of Other MZIP Programmatic Interim Milestones		
Phase 1		**Phase 2 & Later**
Years 1 -5	**Years 6-10**	
• As needed, notify Management Zone participants that are not fulfilling the requirements of their Management Zone Participant Agreements in a timely manner and establish a plan to resolve issues (see applicable procedures established in Nitrate Reduction Programs, Appendices NRP1 through NRP-5) • As needed, notify Central Valley Water Board in a timely manner of non-responsive Management Zone participants that are violating the terms and conditions of their Management Zone Participation Agreement (see applicable procedures established in Nitrate Reduction Programs, Appendices NRP1 through NRP-5)	Management Zone Participant Agreements in a timely manner and establish a plan to resolve issues (see applicable procedures established in Nitrate Reduction Programs, Appendices NRP1 through NRP-5) • As needed, notify Central Valley Water Board in a timely manner of non-responsive Management Zone participants that are violating the terms and conditions of their Management Zone Participation Agreement (see applicable procedures established in Nitrate Reduction Programs, Appendices NRP1 through NRP-5)	Management Zone Participant Agreements in a timely manner and establish a plan to resolve issues (see applicable procedures established in Nitrate Reduction Programs, Appendices NRP1 through NRP-5) • As needed, notify Central Valley Water Board in a timely manner of non-responsive Management Zone participants that are violating the terms and conditions of their Management Zone Participation Agreement (see applicable procedures established in Nitrate Reduction Programs, Appendices NRP1 through NRP-5)

Table 9-4. Management Zone Implementation Plan Reports with Interim Milestones, Schedule of Implementation and Identification of Roles and Responsibliities[1]

Report	Interim Milestones	Schedule[1]	Roles & Responsibilities
Emergency & Interim Drinking Water Program Reports	Submit metrics for following elements to CVSC: • Location, forum type and general attendance figures for all outreach efforts; • No. of residences tested for nitrates; • No. of residences tested for other contaminants; • No. of households being provided bottled water; and • Number of operable fill stations/kiosks and usage information for each.	Generally monthly reports to CVSC to compile for all Management Zones	Management Zone Lead
Annual Progress Report	Request data and information for annual report from Management Zone participants	Notify Management Zone participants or their representatives by December 1 of year prior to submittal of next Annual Progress Report	Management Zone Lead
	Management Zone participants provide summary of status of implementation of applicable interim milestones for their respective sector	Submit to Management Zone Lead by January 31	Management Zone participants or their representatives
	Submit Annual Progress Report to the Central Valley Water Board	Annually by March 31 (first report planned for 2025)	Management Zone Lead
Five-year Exception Status Report	Request data and information for Five-year Report from Management Zone participants	Notify Management Zone participants or their representatives no later than 6 months before Report's due date	Management Zone Lead
	Irrigated Agriculture Coalition(s) and representatives for the Dairy/Bovine and Poultry Management Zone participants submit a report on the status of sector compliance with the terms and conditions of the applicable Exceptions	Submit to Management Zone Lead by December 1 of year prior to submittal of 5-Year Report	Management Zone participants or their representatives
	Each Non-15 Program Management Zone participant submits a report on their facility's status of compliance with the terms and conditions of the Exceptions	Submit to Management Zone Lead by December 1 of year prior to submittal of 5-Year Report	Management Zone participants or

Table 9-4. Management Zone Implementation Plan Reports with Interim Milestones, Schedule of Implementation and Identification of Roles and Responsibliities[1]

Report	Interim Milestones	Schedule[1]	Roles & Responsibilities
			their representatives
	Update groundwater data and analyses as needed and ensure updated data are posted on a publicly accessible website	Implement in coordination with submittal of the Five-year Report	Management Zone Lead
	Submit Five-year Exceptions Status Report to Central Valley Water Board	Submit by March 31 four years after submittal of first Annual Progress Report and every five years thereafter	Management Zone Lead
Ten-year Exception Status & Assessment Report	Irrigated Agriculture Coalition(s) and representatives for the Dairy/Bovine and Poultry Management Zone participants each submit a report on the status of sector compliance with the terms and conditions of the applicable Exceptions	Submit to Management Zone Lead by December 1 year prior to submittal of 10-year Report	Management Zone participants or their representatives
	Each Non-15 Program Management Zone participant submits reports that: (a) evaluate their facility's status of compliance with the terms and conditions of the Exceptions; and (b) provide a BMP/treatment technology assessment[2]	Submit to Management Zone Lead by December 1 year prior to submittal of 10-year Report	Management Zone participants or their representatives
	Update groundwater data and analyses as needed and ensure updated data are posted on a publicly accessible website	Implement in coordination with submittal of the Ten-year Report	Management Zone Lead
	Submit Ten-year Management Zone Report that includes Exceptions Compliance Status Reports and BMP/Treatment Technology Assessments	Submit by March 31, five years after submittal of first Exceptions Status Report and every ten years thereafter	Management Zone Lead

[1] Year of submittal based on when first Annual Progress Report is due (see text)

[2] Similar Non-15 Program facilities with similar treatment processes, e.g., domestic wastewater treatment facilities, may prepare a joint BMP/Treatment Technology assessment

SECTION 10.
References

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