



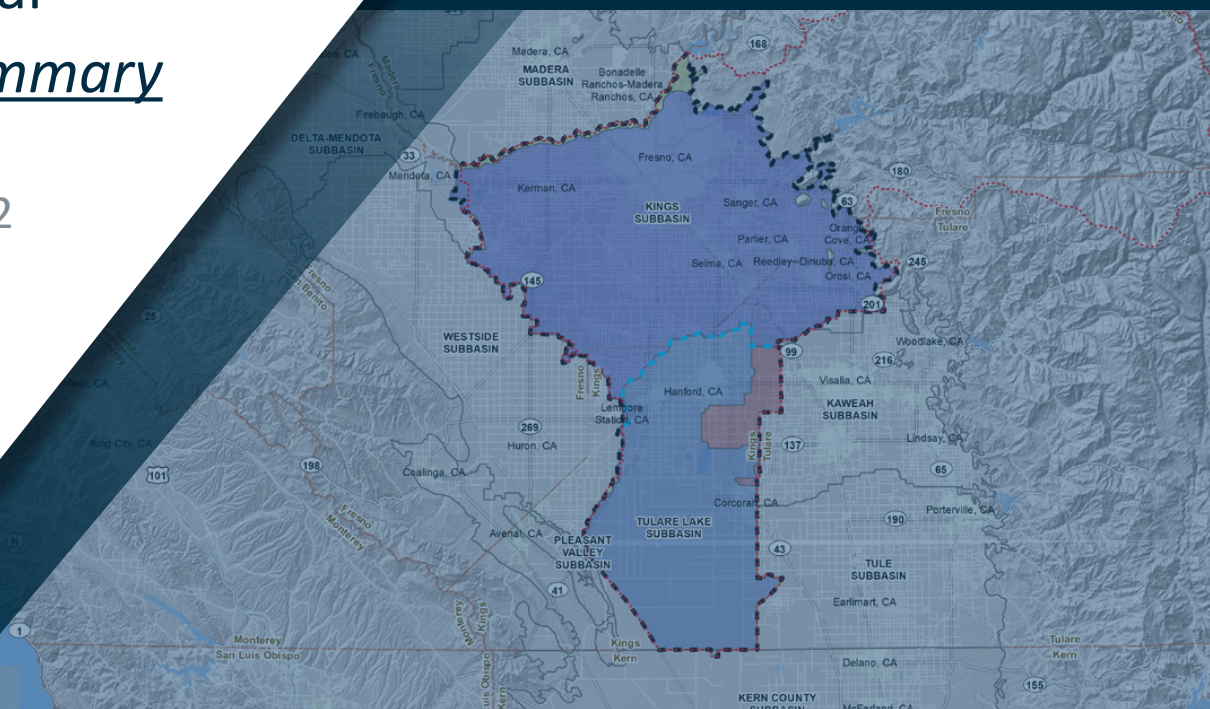
# KINGS WATER ALLIANCE MANAGEMENT ZONE

## Final Management Zone Proposal

### Executive Summary

AUGUST 29, 2022

PREPARED BY:



# Executive Summary

## ES 1. Final Management Zone Overview

The Kings Water Alliance (KWA) initiated the formation of the KWA Management Zone to comply with the Central Valley Regional Water Quality Control Board (Central Valley Water Board or CVWB) Nitrate Control Program requirements. To address the growing needs of this large region of California to solve the nitrate problem in groundwater, representatives from local growers, dairies, and other permitted dischargers in the Kings and Tulare Lake Subbasins formed the KWA. The KWA elected to pursue Path B to comply with the Nitrate Control Program, which meant forming a Management Zone.



The Kings Water Alliance Management Zone was formed to locally solve the nitrate problem in groundwater.

The KWA Management Zone includes the Kings Groundwater Subbasin, the Tulare Lake Groundwater Subbasin, a portion of the Kaweah Groundwater Subbasin, and smaller areas of other neighboring groundwater subbasins (**Figure ES-1**). Due to differences in nitrate groundwater conditions within the subbasins of the Central Valley, the CVWB assigned priorities based on the urgency of addressing nitrate problems in each groundwater subbasin. The Kings and Kaweah Subbasins and four other subbasins were deemed the highest priority, Priority 1, which means that their compliance with the Nitrate Control Program is on a fast-track compared to the Tulare Lake Subbasin (and seven other subbasins), which was deemed a Priority 2 basin.

The overarching management goals of the Nitrate Control Program are (Central Valley Water Board, 2020):

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

The overarching management goals of the Nitrate Control Program are  
(Central Valley Water Board, 2020):

### Goal 1

Ensure a safe drinking water supply.

### Goal 2

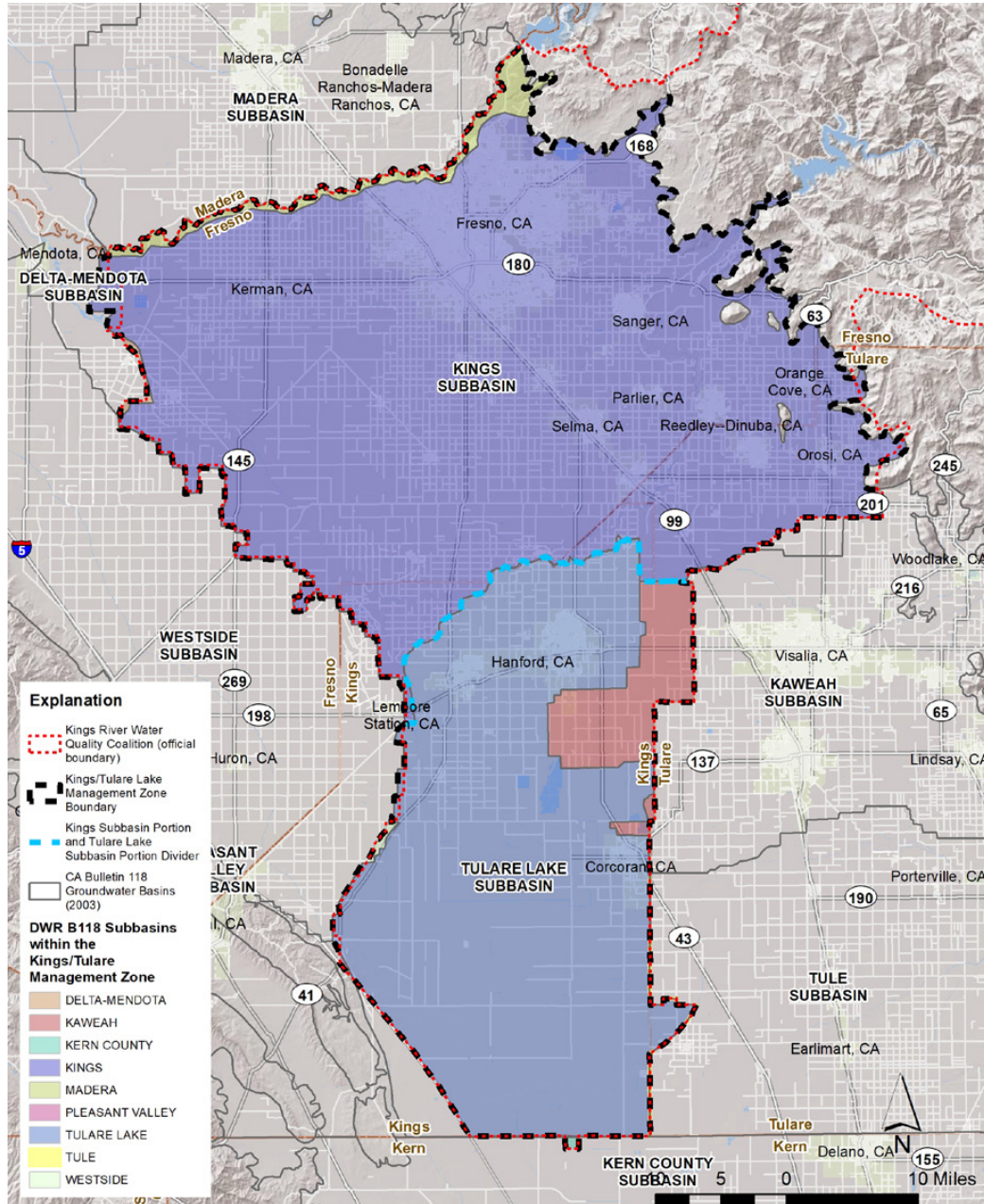
Reduce salt and nitrate loading so that ongoing discharges neither threaten to degrade high-quality waters absent appropriate findings by the CVWB nor cause or contribute to exceedances of water quality objectives.

### Goal 3

Implement long-term, managed restoration of impaired water bodies.



**Figure ES-1. Kings Water Alliance Management Zone**



The Kings Water Alliance worked collaboratively with permittees to form a Management Zone to achieve these goals. The formation of the KWA Management Zone (Path B) to comply with the Nitrate Control Program allows an exception from the nitrate standard compared to Path A. Path A is for Individual Permitting and imposes requirements to the discharger that may be difficult and expensive (potentially including: making significant upgrades to a discharger's facility, conducting extensive monitoring of discharge and local groundwater, providing replacement drinking water to local residents, etc.). The Path B option encourages partnership and teamwork among its discharging members to solve the nitrate problem within their Management Zone boundary.



The Kings Water Alliance works collaboratively with the permitted dischargers to achieve the Nitrate Control Program goals.

Several documents are required to comply with Path B of the Nitrate Control Program. The first was the Preliminary Management Zone Proposal, including a key companion document, the Early Action Plan. For Priority 1 subbasins, these must be submitted to the Central Valley Regional Water Board (Central Valley Water Board or CVWB) within 270 days of dischargers receiving a Notice to Comply. These two KWA Management Zone companion documents were submitted to the Regional Board on March 8, 2021. Implementation of the Early Action Plan began within 60 days of submittal, on May 8, 2021. The Final Management Zone Proposal (this document) is due on August 29, 2022, which is 180 days after public comment and the CVWB's review of the Preliminary Management Zone Proposal. The Management Zone Implementation Plan is due 180 days after public comment and the CVWB's review of the Final Management Zone Proposal.

This document, the Final Management Zone Proposal, along with one of its main attachments, the Early Action Plan, is the next step to complying with the Nitrate Control Program and continuing the process of solving the nitrate problems that occur within the Management Zone boundary. One of the most important components of the development of the Preliminary and Final Management Zone Proposals and Early Action Plan is public outreach and community engagement. California State law (AB 685) declares that “every person in the state has a right to clean, safe, and affordable drinking water.” This policy is commonly referred to as the [Human Right to Water](#). To promote this effort, the KWA Management Zone has been engaging the community through various outlets (including but not limited to: mailings, flyers, radio announcements, advertisements, emails, public webinars, public surveys) in order to empower residents within the Management Zone to become engaged and involved in the decision-making process associated with solving their local nitrate problems.



This Final Management Zone Proposal document is purposely designed to address the two main subbasins (Kings and Tulare Lake Subbasins), which are largely an intersection of the Kings River Water Quality Coalition boundary. For purposes of this report, the KWA Management Zone is divided into two main portions: the KWA Northern Portion (Kings Subbasin Priority 1 area); and the KWA Southern Portion (Tulare Lake Subbasin Priority 2 and a small area of the Priority 1 Kaweah Subbasin). Many of the descriptions of basic features and components are similar across the two portions of the Management Zone; therefore, this document contains some repetition between Sections 2 and 3.

## The contents of this Final Management Zone Proposal include:

### Section 1 Final Management Zone Overview

This section provides an introduction and document roadmap, as well as background information about the Nitrate Control Program, more details on the Priority 1 and 2 timelines, the formation of the Kings Water Alliance Management Zone, a table cross referencing where in this document regulatory requirements are addressed, the preliminary governance, and the initial list of participants..

### Section 2 KWA Northern Portion of Management Zone (Kings Subbasin Area)

- This section describes the characterization of the Northern Portion (Kings Subbasin area) of the Kings Water Alliance Management Zone, including: geography, jurisdictions, Groundwater Sustainability Agencies, water management entities, drinking water systems, Disadvantaged Communities and Disadvantaged Unincorporated Communities, and land use.
- This section also includes the Initial Assessment of Groundwater Conditions, which is a crucial component to determining the extent of nitrate issues within the Management Zone. This involves a summary of hydrogeology, groundwater elevations and flow, delineation of the Upper Zone of the groundwater system, and most importantly the nitrate water quality. This section contains several maps illustrating these elements within the Management Zone and describes how the spatial interpretation of ambient nitrate conditions is developed. The ambient nitrate map is used to identify areas within the Management Zone that have elevated nitrate conditions as determined using scientific and analytical techniques with the most recent and complete dataset available at the time.
- This section contains a description and list of Management Zone participants, including both permitted dischargers subject to the requirements of the Nitrate Control Program, as well as non-dischargers that have agreed to work collaboratively with the permitted dischargers to support implementation of the Program.
- This section also contains descriptions of current nitrate treatment and control efforts or management practices that exist within the Management Zone. These descriptions mainly originate from dischargers themselves, whether under a General Order (such as the Irrigated Lands Regulatory Program or Concentrated Animal Feeding Operations) or individual permit.

### Section 3 KWA Southern Portion of the Management Zone (Tulare Lake Subbasin and a small area of the Kaweah Subbasin)

This section contains all of the same information as Section 2, but for the Tulare Lake Subbasin and a small portion of the Kaweah Subbasin

### Section 4 Early Action Plan Development

This section provides an overview of the Early Action Plan (which is an attachment to this Final Management Zone Proposal).

### Section 5 Management Zone Implementation

This section discusses how the Management Zone will next develop a Management Zone Implementation Plan in accordance with the requirements of the Nitrate Control Program.

The following table lists the Nitrate Control Program requirements for the Final Management Zone Proposal and where these requirements are addressed within this document (**Table ES-1**).

Table ES-1. Final Management Zone Proposal Requirements (Central Valley Water Board 2020)	
FMZP Requirement	Location in FMZP
Proposed preliminary and final boundaries of the Management Zone area	Section 1.3.1
Identification of initial and updated Participants/ Dischargers	Section 1.5
Identification of other dischargers and stakeholders in the Management Zone area that the initiating group is in contact with regarding participation in the Management Zone	Section 4.1
Assessment of groundwater conditions based on readily available existing data and information	Section 2.0 and 3.0
Identification/summary of current treatment and control efforts, or management practices of Management Zone participants	Section 5.0
Initial and updated identification of public water supplies or domestic wells within the Management Zone area with nitrate concentrations exceeding the water quality objective	Early Action Plan, Attachment D
An Early Action Plan to address drinking water needs for those that rely on public water supply or domestic wells with nitrate levels exceeding the water quality objective	Summary in Section 4.0; complete Early Action Plan in Attachment D
Documentation of process utilized to identify affected residents, outreach utilized to ensure that they are given the opportunity to participate in development of the Early Action Plan, and actions taken to implement the Early Action Plan	Early Action Plan, Attachment D
Identification of areas within or adjacent to the Management Zone that overlap with other management areas/activities	Section 2.1 and 3.1
Management Zone Implementation: <ul style="list-style-type: none"> <li>• Timeline for development of the MZIP;</li> <li>• Governance and funding structure for administration of the Management Zone;</li> <li>• Explanation of how the Management Zone intends to interact and/or coordinate with other programs such as Sustainable Groundwater Management Act (SGMA)</li> </ul>	Section 5.0, 4.7, and 4.8



## ES 2. KWA Northern Portion (Kings Subbasin Area) of the Management Zone

This section of the document describes the area encompassed by the Northern Portion (Kings Subbasin area) of the KWA Management Zone, including general geographic and hydrologic characteristics, jurisdictions located within the planning area and key planning agencies and utilities. This section also contains the initial assessment of groundwater conditions, as well as the Management Zone participants to date, and summaries of existing current nitrate treatment, control efforts, and management practices as performed by dischargers within the Management Zone boundary.

### *ES 2.1. KWA Northern Portion (Kings Subbasin Area) Characterization*

The Northern Portion (Kings Subbasin area) of the KWA Management Zone covers an area of approximately 1,547 square miles (990,133 acres), which represents about 64% of the total 2,424 square miles (over 1.55 million acres) of the entire Management Zone. This portion of the Management Zone lies within the Kings, Fresno, and Tulare Counties, and contains major surface water features, including the San Joaquin River, the Kings River, Fresno Slough, and James Bypass. Major communities within the Northern Portion (Kings Subbasin area) of the Management Zone include: Kerman, Fresno, Sanger, Parlier, Selma, Orange Cove, Reedley, Kingsburg, Clovis, Fowler, San Joaquin, Dinuba, and Orosi.

Many Groundwater Sustainability Agencies established under the Sustainable Groundwater Management Act (SGMA) exist within the Northern Portion (Kings Subbasin area) of the Management Zone. General information associated with these Groundwater Sustainability Agencies, including contact information and interested parties, is included in **Attachment A**. Other water management entities, including irrigation districts, water districts, community service areas, community service districts and drinking water systems, are also presented in this section. There are 225 Public Water Systems with known GIS boundary data within the KWA Management Zone; the majority (215) of these systems are located within the Northern Portion (Kings Subbasin area) of the Management Zone.

There are 16 Disadvantaged Communities and 38 Disadvantaged Unincorporated Communities within the Northern Portion (Kings Subbasin area) of the Management Zone, covering approximately 1,258 square miles (804,938 acres) and containing an estimated population of over 638,001. The majority of the Northern Portion (Kings Subbasin area) of the Management Zone is covered by agricultural land use categories, with Deciduous Fruits and Nuts (22%), Vineyards (17%), and Urban (12%) as the predominant mapped land uses according to the California Department of Water Resources land use mapping effort in 2016.

### *ES 2.2. KWA Northern Portion (Kings Subbasin Area) Initial Assessment of Groundwater Conditions*

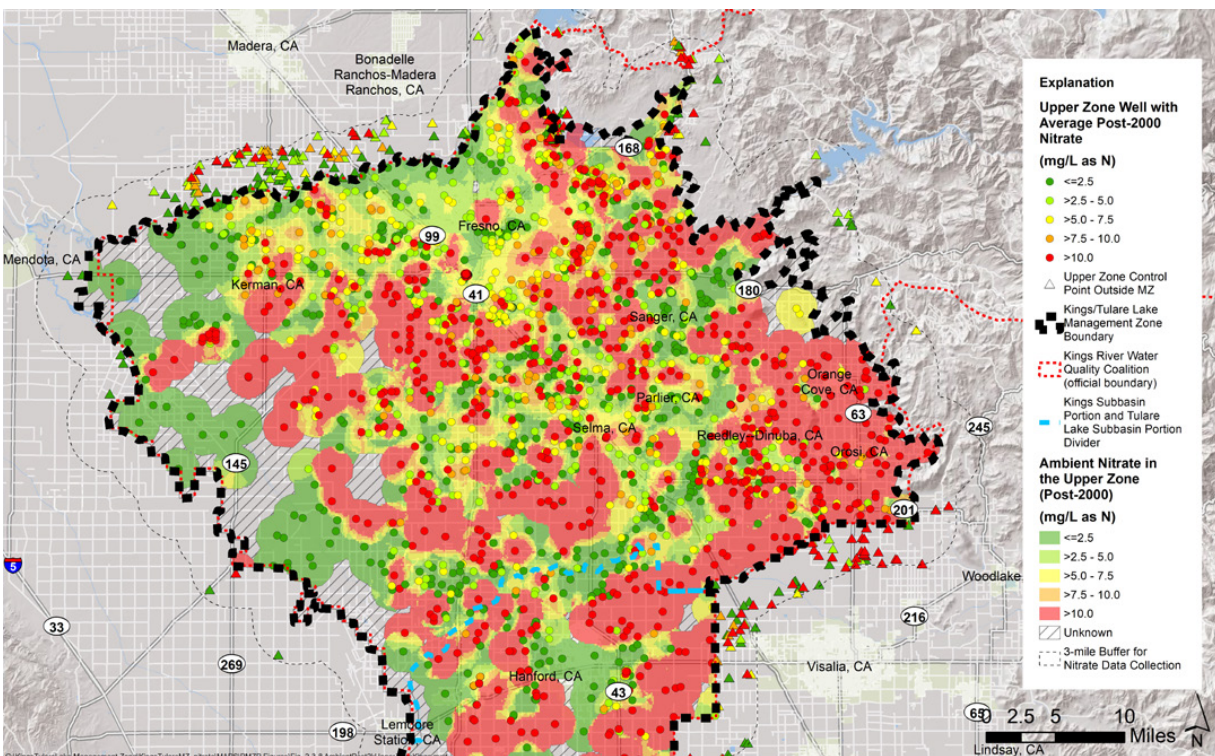
The initial assessment of groundwater conditions is based on readily available existing data and information. The hydrogeology of the Kings Subbasin is summarized within this section, including the predominant physical features underlying the area. Groundwater elevation mapping indicates that groundwater flows regionally from the Sierra Nevada foothills in the east to the southwest, and towards a groundwater depression located in the western-central area of the Subbasin.



**The Nitrate Control Program focuses on the Upper Zone of groundwater, from which most domestic wells draw their water.**

As mentioned above, the Nitrate Control Program focuses on the Upper Zone of the groundwater system. This zonation of the subsurface is a result of previous studies from the Central Valley Salinity Coalition that defined the depth from which groundwater is produced from most domestic wells across the Central Valley. In the Northern Portion (Kings Subbasin area) of the Management Zone, the depth to the bottom of the Upper Zone ranges from 85 feet (at its shallowest in the northeast) to 500 feet (at its deepest in the southwest) below ground surface.

Nitrate groundwater quality data were collected from readily available public databases, an existing Central Valley Salinity Alternatives for Long-term Sustainability (CV-SALTS) database, as well as requested data from local entities including irrigation districts and County Departments of Environmental or Public Health. Groundwater nitrate data from wells were meticulously vetted and categorized based on well depth and/or well type to determine whether the data represent nitrate conditions in the Upper Zone of the Management Zone. The best readily available groundwater nitrate dataset compiled and analyzed included sample results for Upper Zone wells from January 2000 to August 2020. These nitrate data were temporally and spatially declustered for use in determining ambient nitrate conditions in the Upper Zone for the Management Zone. Ambient nitrate conditions were developed using spatial interpolation (kriging) on average post-2000 nitrate sample data for wells categorized into the Upper Zone, using a search radius of 1.5 miles. The resultant map (**Figure ES-2**) illustrates relative concentration areas across the subbasin, identifying areas (in red) that have elevated nitrate conditions that potentially exceed the drinking water standard (maximum contaminant level) of 10 milligrams per liter nitrate as nitrogen (mg/L as N). The Management Zone recognizes that the



**Figure ES-2. Ambient Post-2000 Nitrate Concentrations in the Upper Zone of Groundwater Underlying the KWA Northern Portion (Kings Subbasin Area) of the Proposed Kings Water Alliance Management Zone**



map of ambient nitrate in the Upper Zone has inherent uncertainty and is adaptive in nature. As more Upper Zone nitrate data become available (through implementation of the Early Action Plan's well testing program, as well as other monitoring programs such as the Irrigated Lands Regulatory Program or Groundwater Sustainability Plans), this process and analysis will be repeated. The ambient map will be updated as part of the Management Zone Implementation Plan.

### *ES 2.3. KWA Northern Portion (Kings Subbasin Area) Management Zone Participants*

Dischargers that received a **Notice to Comply** with the Nitrate Control Program include: (a) Kings River Water Quality Coalition that represents growers subject to the Irrigated Lands Regulatory Program; (b) permittees subject to various General Orders applicable to concentrated animal feeding operations including milk cow dairies, confined bovine feeding operations and poultry operations; and (c) permittees that discharge under individual waste discharge requirements. The Management Zone conducted outreach to the representatives of permittees under General Orders and individual dischargers. The FMZP identifies the **permitted dischargers** that have elected to participate in the Management Zone.



**Permitted dischargers are participating in the Management Zone and represent growers, dairies, feeding operations, and others.**

### *ES 2.4. KWA Northern Portion (Kings Subbasin Area) Current Nitrate Treatment and Control Efforts or Management Practices*

This FMZP summarizes the current nitrate treatment and control efforts or management practices required by the discharge permit held by each of the participating permittees located in the Northern Portion (Kings Subbasin area) of the Management Zone. The FMZP provides a general summary of the permit requirements applicable to permittees that are members of the Kings River Water Quality Coalition or subject to a General Order for a concentrated animal feeding operation. For permittees with an individual WDR that are participating in the Management Zone, the FMZP provides a brief summary of nature of the permitted facility and their existing permit requirements as they relate to nitrate management.

## **ES 3. KWA Southern Portion (Tulare Lake Subbasin Area) of the Management Zone**

This section of the document describes the area encompassed by the Southern Portion of the Management Zone (Tulare Lake Subbasin and a small portion of the Kaweah Subbasin). Similar to Section 2 (Northern Portion/Kings Subbasin area), this section includes general geographic and hydrologic characteristics, jurisdictions located within the planning area, and key planning agencies and utilities. This section also contains the initial assessment of groundwater conditions, as well as the Management Zone participants to date, and summaries of existing current nitrate treatment, control efforts and management practices as performed by dischargers within the Management Zone boundary.

### *ES 3.1. KWA Southern Portion (Tulare Lake Subbasin Area) Characterization*

The KWA Southern Portion of the Management Zone (Tulare Lake Subbasin and a small portion of the Kaweah Subbasin) covers an area of approximately 877 square miles (561,353 acres), which represents about 36% of the total area of the entire Management Zone. This part of the Management Zone lies

mostly within Kings County, with a small portion of Tulare County in the east, and shares part of its northern boundary with Fresno County. Surface water features include the Kings River and several canals. Major communities within the Southern Portion of the Management Zone include Lemoore, Hanford, and Corcoran.

Many Groundwater Sustainability Agencies established under the Sustainable Groundwater Management Act exist within the Southern Portion of the Management Zone. General information associated with these Groundwater Sustainability Agencies, including contact information and interested parties, is included in **Attachment A**. Other water management entities, including irrigation districts, water districts, community service areas, community service districts and drinking water systems, are also presented in this section. Of the 225 Public Water Systems with known GIS boundary data within the KWA Management Zone, ten (10) of them are located within the Southern Portion of the Management Zone.

There are eight (8) Disadvantaged Communities and eleven (11) Disadvantaged Unincorporated Communities within the Southern Portion of the Management Zone, covering approximately 833 square miles (532,882 acres) and containing an estimated population of 53,170. The 2016 Department of Water Resources land use within the Southern Portion of the Management Zone indicates that Field Crops make up the most common mapped land use type (27% of the total Southern Portion area).

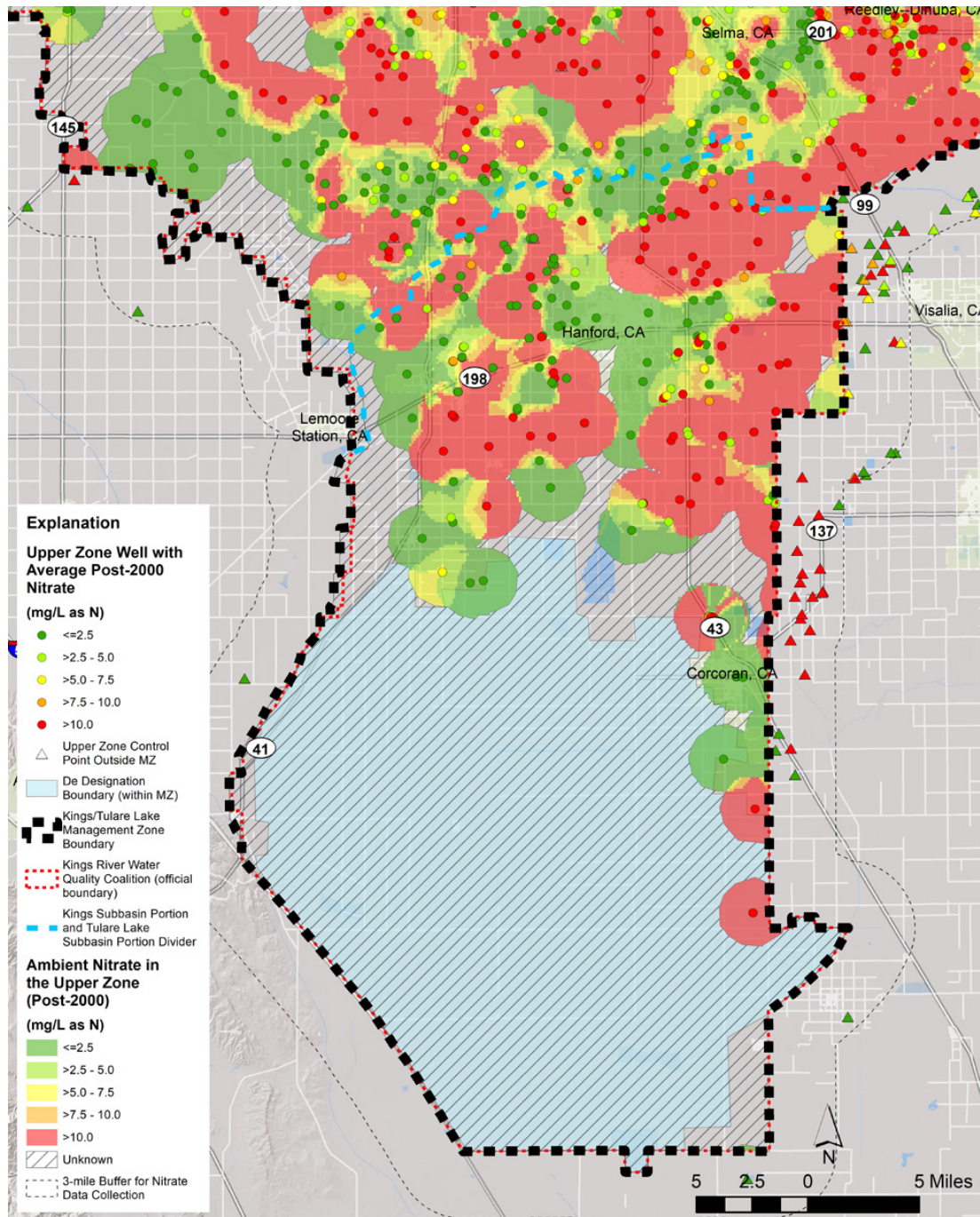
### *ES 3.2. KWA Southern Portion (Tulare Lake Subbasin and Small Part of Kaweah Subbasin) Initial Assessment of Groundwater Conditions*

As mentioned above, the initial assessment of groundwater conditions is based on readily available existing data and information. The hydrogeology of the Tulare Lake Subbasin is summarized within this section, that provides insight to the physical features that dominate the subsurface of the area, including the ancestral and former Tulare Lake Bed deposit of fine-grained lacustrine sediments in the central and southern parts of this area. Groundwater elevation mapping indicates that local flow directions are variable in the northern portion of the Tulare Lake Subbasin. There are very few wells located within the former Tulare Lake Bed, forming a large data gap area in the majority of the Tulare Lake Subbasin. This area of the former Tulare Lake Bed has received regulatory scrutiny in the past due to exceptionally high salinity making the water in parts of the subsurface unsuitable for domestic, municipal, and agricultural beneficial uses. As a result, groundwater in this area has been “de-designated” from beneficial uses within specified horizontal and vertical portions of the Tulare Lake Bed.

In the KWA Southern Portion of the Management Zone, the depth to the bottom of the Upper Zone ranges from about 200 feet (at its shallowest in the northeast) to about 600 feet (at its deepest in the central northwest) below ground surface.

Similar to the northern area of the Management Zone, nitrate groundwater quality data were collected from readily available databases and categorized based on well depth and/or well type to determine nitrate conditions in the Upper Zone of the Management Zone. Ambient nitrate conditions were developed using spatial interpolation on average post-2000 nitrate sample data for wells meticulously vetted and categorized into the Upper Zone (actual data utilized in the ambient nitrate conditions spatial interpolation kriging were from January 2000 to August 2020 and used a search radius of 1.5 miles). The resultant map (**Figure ES-3**) illustrates relative concentration areas across the Tulare Lake Subbasin, identifying areas (in red) that have elevated nitrate conditions that potentially exceed the drinking

water standard (maximum contaminant level) of 10 milligrams per liter nitrate as nitrogen (mg/L as N). The Management Zone recognizes that the map of ambient nitrate in the Upper Zone has inherent uncertainty and is adaptive in nature. As more Upper Zone nitrate data become available (through implementation of the Early Action Plan's well testing program, as well as other monitoring programs such as the Irrigated Lands Regulatory Program or Groundwater Sustainability Plans), this process and analysis will be repeated. The ambient map will be updated during the development of the Management Zone Implementation Plan.



**Figure ES-3. Ambient Post-2000 Nitrate Concentrations in the Upper Zone of Groundwater Underlying the KWA Southern Portion (Tulare Lake Subbasin and Small Part of Kaweah Subbasin) of the Proposed Kings Water Alliance Management Zone**



### *ES 3.3. KWA Southern Portion (Tulare Lake Subbasin and Small Part of Kaweah Subbasin) Management Zone Participants*

Dischargers that received a Notice to Comply with the Nitrate Control Program include: (a) Kings River Water Quality Coalition that represents growers subject to the Irrigated Lands Regulatory Program; (b) permittees subject to various General Orders applicable to concentrated animal feeding operations including milk cow dairies, confined bovine feeding operations and poultry operations; and (c) permittees that discharge under individual waste discharge requirements. The Management Zone conducted outreach to the representatives of permittees under General Orders and individual dischargers. The FMZP identifies the permitted dischargers that have elected to participate in the Management Zone.

### *ES 3.4. KWA Southern Portion (Tulare Lake Subbasin and Small Part of Kaweah Subbasin) Current Nitrate Treatment and Control Efforts or Management Practices*

This FMZP summarizes the current nitrate treatment and control efforts or management practices required by the discharge permit held by each of the participating permittees located in the Tulare Lake/Kaweah Subbasin portions of the Management Zone. The FMZP provides a general summary of the permit requirements applicable to permittees that are members of the Kings River Water Quality Coalition or subject to a General Order for a concentrated animal feeding operation. For permittees with an individual WDR that are participating in the Management Zone, the FMZP provides a brief summary of nature of the permitted facility and their existing permit requirements as they relate to nitrate management.



This document provides overviews of all of the current nitrate treatment, control, or management practices by permitted dischargers in the Management Zone.

## **ES 4. Early Action Plan Development**

Establishment of a Management Zone requires the preparation of an **Early Action Plan (EAP)** that identifies actions the KWA has initiated to address sources of drinking water with unsafe nitrate levels. The key element of the EAP, which was developed in collaboration with the community, is the **Interim Replacement Water Program**. This Program provides immediate alternative sources of drinking water for those that depend on groundwater with unsafe levels of nitrate for their drinking and cooking needs, that is water with more than 10 mg/L as N.

The FMZP includes a summary of the key elements of the EAP including a summary of the wells potentially impacted by high nitrate levels, identification of areas within the Management Zone where the groundwater quality most likely exceeds 10 mg/L-N, a brief overview of key EAP elements such as community outreach, the interim replacement water options (e.g., bottled water delivery, point-of-use treatment systems and water fill stations), a well-testing program to support EAP implementation and a general schedule for implementation.



**Bottled Water Delivery**



**Point-of-Use Treatment Systems**



**Water Fill Stations**

The FMZP includes a summary of the key elements of the EAP including a summary of the wells potentially impacted by high nitrate levels, identification of areas within the Management Zone where the groundwater quality most likely exceeds 10 mg/L-N, a brief overview of key EAP elements such as community outreach, the interim replacement water options (e.g., bottled water delivery, point-of-use treatment systems and water fill stations), a well-testing program to support EAP implementation, and a general schedule for implementation. The actual EAP, which includes more comprehensive information is attached to this FMZP as **Attachment D**.

## ES 5. Management Zone Implementation

This section discusses how the KWA Management Zone will work with the Central Valley Water Board during the review and acceptance of this FMZP. While that process is ongoing, the KWA Board will begin development of the Management Zone Implementation Plan (MZIP) for the Management Zone. The content of the MZIP will be consistent with the Nitrate Control Program regulations and outcome of ongoing discussions with Central Valley Water Board staff regarding interpretation of these regulations. The KWA Management Zone is committed to submitting its MZIP for its Priority 1 areas to the Central Valley Water Board within six months after this FMZP is accepted by the Executive Officer, as required by the Nitrate Control Program.

### Key Milestones

