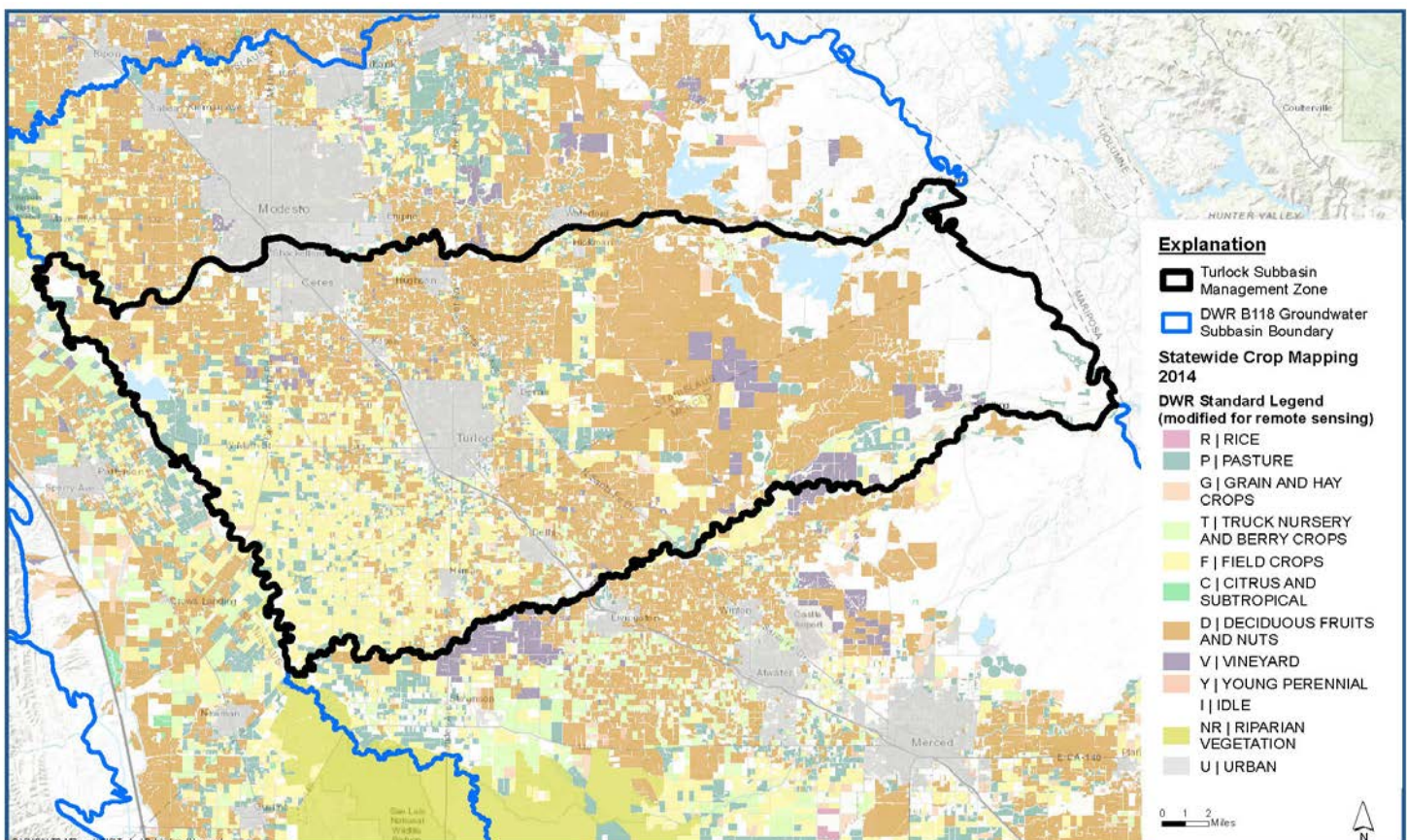


Central Valley-Wide Nitrate Control Program Management Zone Boundary Delineation

There are many factors to consider when delineating a Management Zone area. Hydrogeology should be the primary focus, but there are other considerations as well. The table below provides a list of categories and factors to consider.

Category	Factors for Consideration
Institutional	<p>One entity– boundary aligned with Management Zone objective?</p> <p>More than one entity– boundary aligned with multiple objectives?</p>
Physical Setting	<p>Geologic boundaries and/or features (e.g., faults, confining units, etc.) that need to be factored into the Management Zone delineation?</p> <p>Hydrologic boundaries (e.g., streams, lakes, groundwater divide, ocean, groundwater basins/subbasins, etc.) that need to be factored into the area?</p> <p>Existing hydrogeologic studies/evaluations– physical conceptualization of subsurface system; are potential groundwater quality impacts well understood?</p> <p>Groundwater monitoring network– provide an understanding of groundwater flow directions in the aquifer system? Will this influence the Management Zone area delineation?</p>
Groundwater Quality Characterization	<p>Availability of groundwater quality data and distribution of those data– does this affect the selection of the Management Zone area, or is this something that is not important to the selection of the area and can be addressed as needed?</p> <p>Existing groundwater quality characterization, i.e., do the existing data provide an understanding of the distribution of key constituents of concern (nitrate, salt, other) within various units of the aquifer system– will this influence the Management Zone area delineation?</p> <p>Groundwater quality monitoring network– does the network provide a good understanding of the movement of constituents, including vertical movement from the land surface to groundwater, from the upper part of the aquifer system to the lower part of the aquifer system, and surface water/groundwater interaction as applicable?</p>
Sources of Supply	<p>Location of groundwater use generally known, including completion depths of municipal, irrigation, private and other types of water supply wells?</p> <p>Intensive water resources use (especially groundwater); is the use localized within the management zone area of interest or is it more broadly distributed? Does this affect Management Zone area considerations?</p> <p>Recycled water– what is the source of supply (or supplies) and location(s) of use? Does this affect the Management Zone area delineation?</p> <p>Stormwater– what is the source of supply (or supplies) and location(s) of discharge and recharge? Does this affect the Management Zone area delineation?</p>

Category	Factors for Consideration
Land Cover	Land cover data readily available– does the land cover relate to entity Management Zone area objectives? Variety of land use types– adequately encompassed in the Management Zone area?
Dischargers	What types of dischargers are located within the Management Zone? (see also Discharger Template)
Tools	Existing groundwater flow and/or transport model(s) exist that overlie Management Zone area of interest? Would one or more of such models be useful for accomplishing Management Zone objectives?
Regional Collaboration	Is the Management Zone area within an existing Integrated Regional Water Management (IRWM), Groundwater Management Plan/Groundwater Sustainability Plan, Groundwater Sustainability Agency (GSA), Agriculture Coalition, etc., and are there factors related to other programs that need to be considered when delineating the Management Zone area?
Water Resources Management Strategies	Are there existing or planned management strategies that would affect the selection of the Management Zone area, i.e., conjunctive use program, recharge facilities, etc.

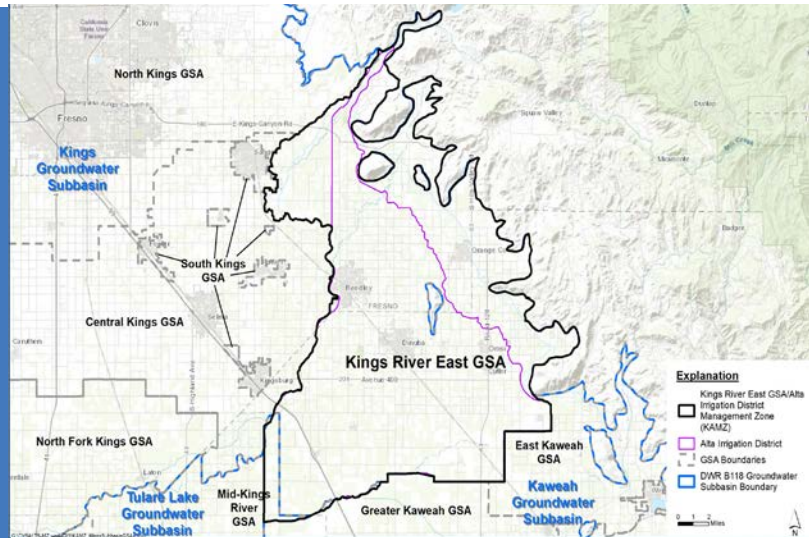


Example: Turlock Subbasin MZ's Land Use

The boundary of the actual Management Zone is determined by the stakeholders and submitted a Preliminary Management Zone Proposal to the Regional Water Board. The following administrative boundaries and other programmatic boundary considerations may be made.

1. IDENTIFY SUSTAINABLE GROUNDWATER MANAGEMENT ACT (SGMA) GROUNDWATER SUSTAINABILITY AGENCIES (GSAS) IN AND AROUND THE AREA OF INTEREST.

- GSAs are comprised of water users in the area and are required to list interested parties, including other irrigation districts, public water supply systems, coalitions, etc. that are involved with groundwater resources in the area.
- DWR provides a Map Viewer of the boundaries of each GSA in the state (<https://sgma.water.ca.gov/webgis/index.jsp?appid=gasmaster&rz=true>), and the boundaries of each GSA can be downloaded as a GIS file from this Map Viewer as well. The lists of interested parties are provided under each GSA's individual link on DWR's SGMA Portal



Example: Kings River East/Alta Irrigation District MZ Boundary and GSA boundaries

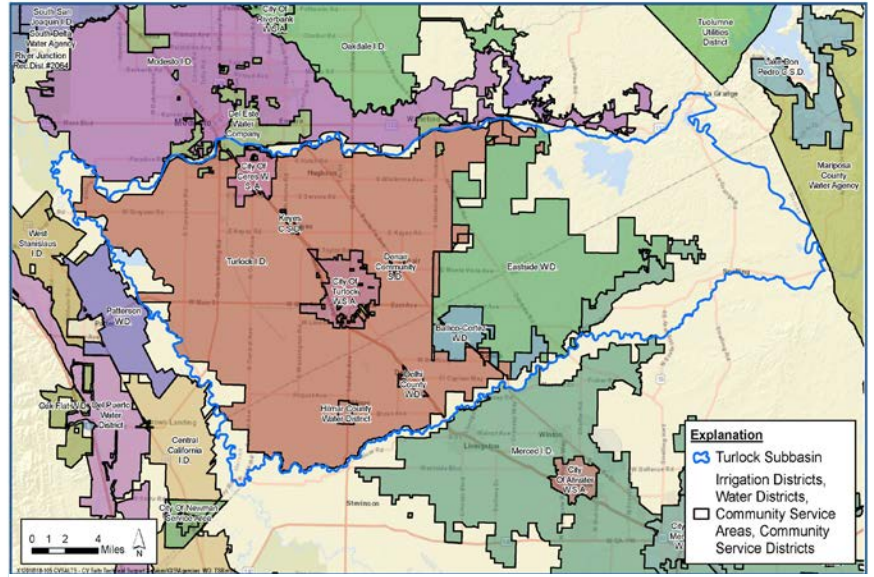
- GSA entities are required to develop their own Hydrogeologic Conceptual Model (HCM), determine groundwater conditions in the area (including water quality), and estimate water budget components, including annual groundwater pumping as part of their Groundwater Sustainability Plan (GSP). These pieces of data are useful for nitrate management considerations. DWR provides a Map Viewer of the boundaries of each GSA in the state and the boundaries of each GSA can be downloaded as a GIS file from this Map Viewer as well. The lists of interested parties are provided under each GSA's individual link on DWR's SGMA Portal

2. IDENTIFY THE GROUNDWATER BASIN(S) OR SUBBASIN(S) DWR'S BULLETIN 118 GROUNDWATER BASIN BOUNDARIES DATASET:

- DWR updated the basin boundaries in 2016 with some basin boundary modifications. A more recent updated basin boundary GIS coverage is now available (as of February 2019) that contains approved basin boundary modifications (<https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118>).
- The actual link to the GIS file download is here: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/Bulletin-118-Groundwater-Basin-Boundary-GIS-Data---v6_1.zip?la=en&hash=D947E7AC9E03D122CC5D707369E581DF41320E50.
- To understand which basin boundaries have been modified or are attempting to be modified, DWR has a Basin Boundary Modification Map Viewer (<https://sgma.water.ca.gov/basinmod/modrequest/map?sessionId=658C11952F60F610812069F4F5860BCD>). For example, the Kings Subbasin proposed a boundary modification for the eastern Subbasin boundary to more closely align with the alluvial/bedrock boundary.

3. IDENTIFY WATER DISTRICT BOUNDARIES, INCLUDING IRRIGATION DISTRICTS, WATER DISTRICTS, COMMUNITY SERVICE AREAS, AND COMMUNITY SERVICE DISTRICTS

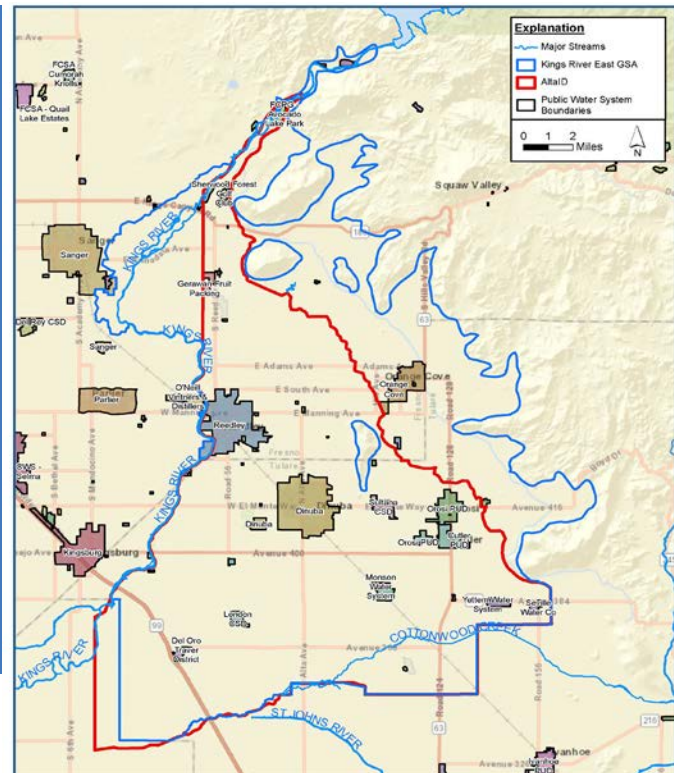
- a. Water district and water system data are available in several different datasets that are all incomplete and overlap each other. Water system boundaries and identifications (names or IDs) are inconsistent in small details between the datasets, so that it can be difficult to determine if two features from different datasets are in fact the same water system, without individual examination of each feature.
- b. Water district boundaries are compiled by the State of California into a feature class hosted by the California Open Data Portal here:
 - These data consist of 3574 polygon features, including public residential water systems, mutual water companies, community services districts, private water systems, schools, and others. The data do not include estimates of the number of people served, indications of who the regulatory authority is, or current status of the systems delineated.



Example: Turlock Subbasin MZ Boundary and Water Districts

4. IDENTITY PUBLIC WATER SYSTEM BOUNDARIES

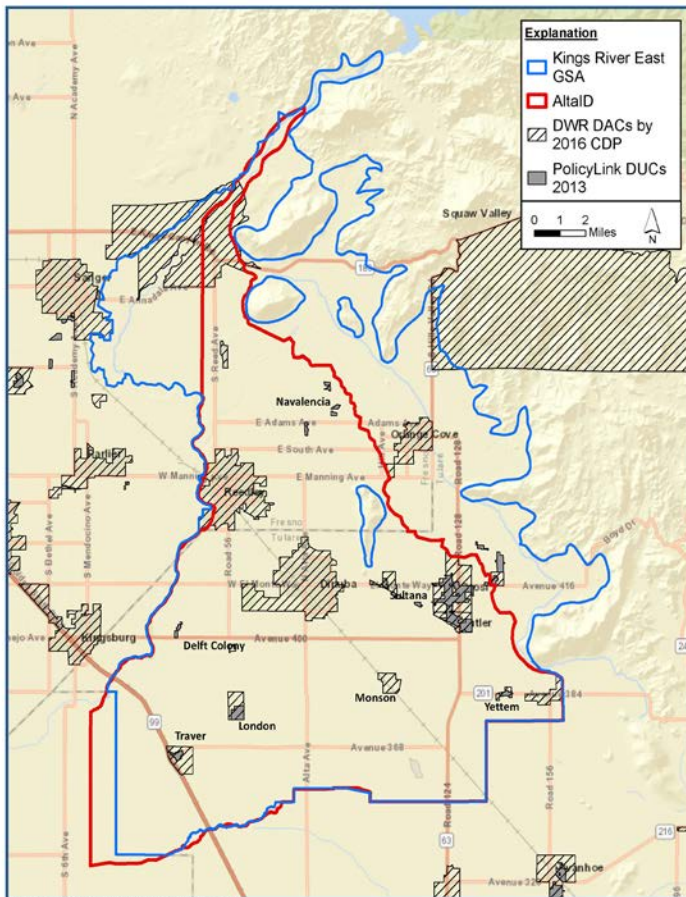
- a. Public Water System boundaries are hosted by California Environmental Health Tracking Program (CEHTP) at <http://www.cehtp.org/water/download>
 - These are identified by their Public Water System Identification Number and include counts of households and populations served, as well as water system type (community, non-transient non-community, transient non-community). All of these are regulated by the state Division of Drinking Water (DDW) at SWRCB.
- b. State Small Water Systems, those serving between 5 and 14 households, are typically regulated at the county level. For these, information must be requested from each county Environmental Health Department individually. Each county has a different system for tracking those water systems.



Example: Kings River East/Alta Irrigation District MZ Boundary and Public Water Systems

5. IDENTIFY AND CONSIDER THE BOUNDARIES OF DISADVANTAGED COMMUNITIES (DACs) AND DISADVANTAGED UNINCORPORATED COMMUNITIES (DUCS)

- a. DWR hosts (<https://data.cnra.ca.gov/organization/dwr>) 3 versions of the Disadvantaged Communities (DAC) data based on different census analysis levels:
 - Census Designated Places are not congruent with blocks or tracts are based on historically residential areas. These include incorporated and unincorporated areas.
 - Tract is the largest census survey areal designation below County. Tracts are subsets of counties and tract boundaries are congruent with county boundaries.
 - Blockgroup (BG) is the next smaller census survey areal designation below tract. BGs are subsets of and congruent with boundaries of tracts. Blocks are subsets of BGs.
- b. Each level of analysis is based on the same criteria, but they are assessed at different spatial resolutions. The criteria are based on Proposition 1 IRWM Guidelines (2016).
 - A Place, Tract, or Blockgroup that has Median Household Income (MHI) of less than 80% of statewide MHI is defined as a DAC.
- c. Policy Link, a non-profit advocacy and research organization in San Francisco (policylink.org) developed a set of Disadvantaged Unincorporated Community Polygons for the San Joaquin Valley in 2013. This dataset has a higher resolution targeting residential neighborhoods that are not recognized as separate places, tracts, or BGs, but that are isolated from surrounding communities, either by geography, language, or other considerations, and that meet the 80% of MHI criteria from IRWM.



Example: Kings River East/Alta Irrigation District MZ Boundary and Public Water Systems

For the Successful Delineation of a Management Zone-

- Based on the boundaries of the Management Zone primarily on hydrogeology.
- Assess and document the potential impacts from downgradient nitrate migration.
- Document agreements with neighboring Management Zones with regards to providing drinking water and aquifer restoration.
- Show technical justification for the area of contribution, or zone of influence, associated with dischargers inside and outside the Management Zone.
- Thorough justification must be provided for exclusion of any impacted areas where groundwater is used for domestic or municipal supply.

Provided by the Central Valley Salinity Coalition, October 17th, 2019. For more information, visit www.cvsalinity.org